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德锐电气公司旗下品牌 Brands under DERUI ELECTRIC CO., LTD:



D E R U I E L E C T R I C

专业成套输配电设备供应商
 Professional supplier of complete sets of transmission and distribution equipment



德锐电气有限公司
 DERUI ELECTRIC CO., LTD.

公司地址 Company address::

浙江省乐清市经济开发区浦南六路 66 号 No. 66, Punan 6th Road, Economic Development Zone, Yueqing City, Zhejiang Province

手机 Mobile:

13353373078

传真 Fax:

0577-62858837

网址 Website:

<https://www.chderui.com>

邮箱 E-mail:

312837981@qq.com



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德锐电气有限公司

产品选型手册

德正业兴 锐意进取
 CHINA ELECTRIC DERUI



**一二次融合环网箱 (标准化)
 紧凑型环保柜
 C-GIS 40.5kV SF6 充气柜
 高压低压开关柜、箱式变电站**

Primary and secondary fusion ring main unit (standardized)
 Compact environmental cabinet
 C-GIS 40.5kV SF6 Gas-filled cabinet
 High and low voltage switchgear assembly
 Box-type substation



**产品选型手册
 PRODUCT SELECTION GUIDE**

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科技总是在
巨大的时代变革中
提升着社会的文明，更是在极致的细微处
改变着我们的生活
德锐电气提出坚持创新、智能转型、强化基础、绿色发展新
理念，强力展现中国制造的新名片
Technology always elevates the
civilization of society in the great changes of the times,
and even changes our lives
in the most subtle ways
Derui Electric proposes to adhere to the new concept
of ceaseless innovation, intelligent transformation,
strengthening foundation and green development,
strongly showcasing the new business card of Chinese
manufacturing

国家电网中标企业
国家高新技术企业
State Grid winning bidder
National high-tech enterprise



专业成套输配电设备供应商

Professional supplier of complete sets of power transmission and distribution equipment



ABOUT DERUI

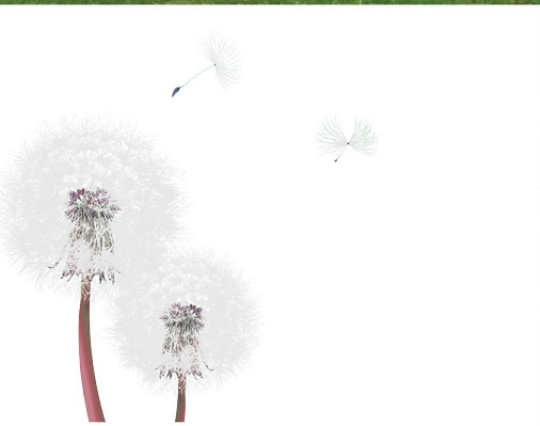
关于德锐

德锐电气有限公司是一家专业生产高、低压成套输配电设备的企业，主要从事 12-40.5kV 中压领域设备—二次融合环网箱、标准化环网柜、充气柜、环保柜、固体绝缘环网柜、环网开关设备、户外开闭所、电缆分支箱、预装箱式变电站、高压成套开关柜、低压成套开关柜、配电箱、光伏风力新能源、预制舱、储能系统、智能充电设备等系列产品的研发，制造与销售。公司连续多年被金融系统评为“AAA”资信企业，明星企业，成长型中小企业，浙江省工商企业信用“A”级“守合同、重信用”单位。公司位于乐清市经济开发区，紧邻 104 国道、G15 高速和温州机场，交通便利。公司采用了现代化经营管理模式，拥有一批电气成套设备机柜专业高级技术管理人才，技术力量雄厚。

公司拥有德国原装进口激光切割机、国产数控冲床、数控折弯、剪板设备等国内电气行业领先的设备。同时，公司建立了质量管理与质量保证体系，通过了 ISO9001:2016 质量管理体系认证，全员着力 6S 素养，重点推行 SFC-MES 精益集成制造执行系统的实施技术，追求“零缺陷，稳定精益品质”。面临激烈的市场竞争，作为电气成套的专业生产厂家，德锐人秉承“创新无止境，服务不停息”的经营理念。倡导以绩效为导向的“务实、创新、知耻、敏行”的企业精神，奉行“诚信为本，共建共享”的价值观。我们将继续不懈努力地探索在电气结构技术与电气成套设备需求之间，找到完美的结合点。我们以优良的品质，良好的售后服务，合理的价格定位，不断赢得市场份额，我们以精益求精来塑造企业形象。竭诚欢迎全国各地电力部门，客商来人来函洽谈合作。

DERUI ELECTRIC CO., LTD is a professional enterprise specializing in the production of high and low voltage complete sets of transmission and distribution equipment. It mainly engages in the research and development, manufacturing and sales of products in the 12-40.5kV medium voltage field, including primary and secondary fusion ring main unit, standardized ring main unit, gas-filled cabinet, environment-friendly cabinet, solid insulation ring main unit, ring main unit, outdoor switching station, cable branch box, prefabricated box-type substation, high voltage switchgear assembly, low voltage switchgear assembly, distribution box, photovoltaic and wind new energy, prefabricated cabin, energy storage system, intelligent charging equipment, etc. Our company has been rated as an "AAA" credit enterprise by the financial system, star enterprise, growth-oriented small and medium-sized enterprise and "A" level "contract abiding and credit worthy" company in Zhejiang Province's industrial and commercial enterprise credit for many consecutive years. Our company is located in the Economic Development Zone of Yueqing City, adjacent to National Highway 104, G15 Expressway and Wenzhou Airport, with convenient transportation. Our company has adopted a modern management mode and has a group of senior technical management talents specializing in switchgear assembly, with strong technical strength.

Our company has leading equipment in the domestic electrical industry, including imported laser cutting machines from Germany, domestically produced CNC punching machines, CNC bending and shearing equipment. Meanwhile, our company has established quality management and quality assurance system, and passed the ISO9001:2016 quality management system certification, and all employees focus on 6S literacy, with focus on promoting the implementation technology of SFC-MES manufacturing execution system, pursuing "zero defect, stable lean quality". Faced with fierce market competition, as a professional manufacturer of switchgear assembly, Derui people adhere to the business philosophy of "innovation knows no bounds, service never stops". We advocate a performance-oriented corporate spirit of "pragmatism, innovation, shame awareness and sensitivity", and adhere to the values of "integrity-based and sharing". We will continue to make unremitting efforts to explore the perfect combination between electrical structure technology and switchgear assembly. We will continuously win market share with excellent quality, good after-sales service, reasonable price positioning, and strive for excellence to shape our corporate image. We sincerely welcome power departments and merchants from all over the world to come and write to us to discuss cooperation.





ABOUT DERUI

关于德锐



德锐电气有限公司合影留念

2022年12月31日



德锐电气有限公司2019年全体员工合影留念

2019.12.31



中国·德锐电气有限公司

COMPANY CULTURE

企业文化

企业愿景：

德锐电气的口号是科技创新，驰骋世界，这也是我们存在的意义。

企业理念：

作为企业，必须聆听及了解客户的需要，然后满足这些需要，继而超越客户的期望。

企业使命：

成为具有创新的企业，并在所服务的市场中成为倍受推崇的企业。在这其中，企业一定要保持产品的高品质，并且不断的推陈出新，为客户创造更高的价值。

企业价值观：

一个企业，不管是属于哪个国家的，最终都是需要人来实现其价值，没有员工就没有企业。很多时候，企业把客户当作上帝。但在德锐电气，员工和客户对于公司是同等的重要。

Corporate vision:

The slogan of Derui Electric is technological innovation, galloping in the world, which is also the meaning of our existence.

Corporate idea:

As an enterprise, it is necessary to listen to and understand and meet the needs of customers, and even exceed their expectations.

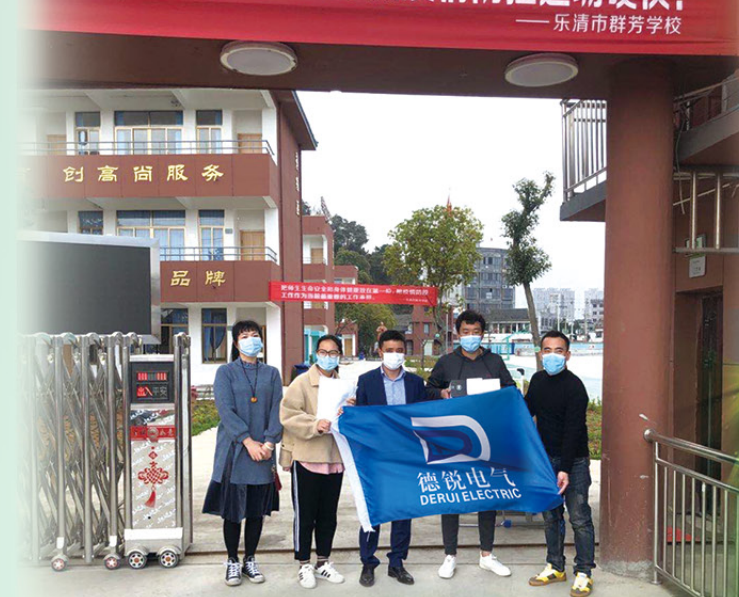
Corporate mission:

To become an innovative enterprise and a highly respected enterprise in the market it serves. Among them, enterprises must maintain the high quality of their products and constantly innovate to create higher value for customers.

Corporate values:

An enterprise, regardless of which country it belongs to, ultimately needs people to realize its value. Without employees, there is no enterprise. Many times, businesses treat customers as gods. But at Derui Electric, employees and customers are equally important to the company.

行动，集中力量坚决打赢疫情防控这场硬仗！
——乐清市群芳学校





| 激光设备 Laser equipment



| 机器人焊接 Robot welding



生产车间设备
Production workshop
EQUIPMENT

D E R U I E L E C T R I C

严把制造工艺，出高品质产品
Strictly control the manufacturing process and
produce high-quality products



| 数控冲床 CNC punching machine



| 折弯机 Bending machine



| 自动化成形铜排机 Automated copper bar forming machine



| 全自动排线机 Fully automatic cable laying machine



| 真空箱氦检漏系统 Vacuum box helium leak detection system

生产车间设备

Production workshop

EQUIPMENT

D E R U I E L E C T R I C



| 雷电冲击 Lightning impulse



| 温升试验装置 Temperature rise test device

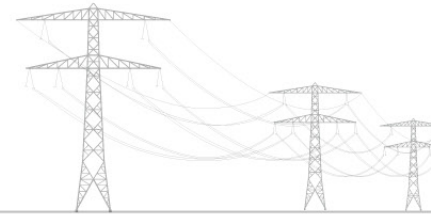
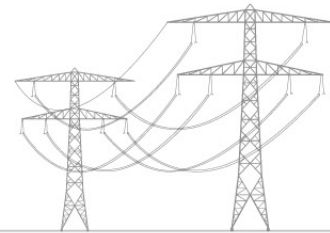
| 屏蔽局放室 Shielded partial discharge room

公司不断引进现代一流的生产装备和制造工艺，并注重对产品研发的投入和科技人才的培养，现已拥有了一整套完善的产品研发和制造的核心技术。在高品质、高精度目标的坚持下，结合德锐人的智慧与勤劳，不断为全球客户提供高质量、高性能的产品，在强手如林的输配电制造领域里，闯出一片更为广阔的天地！

The company continuously introduces modern first-class production equipment and manufacturing processes, and pays attention to investment in product research and development and the cultivation of scientific and technological talents. It now has a complete set of core technologies for product research and development and manufacturing. With the persistence of high-quality and high-precision goals, combined with the wisdom and diligence of Derui people, we continuously provide global customers with high-quality and high-performance products, and break into a broader world in the field of strong power transmission and distribution manufacturing!

PRODUCT CONTENTS

产品目录



环保柜

Environmental Protection

HBG-12 环保气体封闭环网开关设备 001
HBG-12 Environmental Protection Gas Closed Loop Network Switchgear



充气柜系列

Inflatable Series

DSR6-12/24/40.5 (1250~3150) SF6 气体绝缘金属封闭开关设备 (C-GIS) 009
DSR6-12/24/40.5 (1250~3150) SF6 Gas Insulated Metal Enclosed Switchgear (C-GIS)

DRM-12 全绝缘全封闭环网开关设备 (标准化环网柜) 023
DRM-12 Fully insulated and fully enclosed ring network switchgear (standardized ring network cabinet)

DRM-24 全绝缘全密封金属环网开关设备 049
DRM-24 Fully insulated and fully sealed metal ring network switchgear



固体柜

Solid cabinet

DR-GTXGN-12 固体绝缘环网开关设备 057
DR-GTXGN-12 Solid Insulation Ring Network Switchgear



低压成套开关柜系列

Low Voltage Switchgear Series

GCS 低压抽出式成套开关设备 122
GCS Low voltage withdrawable complete switchgear

GCK 低压抽出式成套开关设备 128
GCK Low voltage withdrawable complete switchgear

MNS 低压抽出式开关柜 133
MNS Low voltage withdrawable switchgear

GGD 交流低压配电柜 138
GGD Ac low-voltage power distribution cabinet



高压成套开关柜系列

High Voltage Switchgear Series

XGN □ -12(40.5) 高压交流金属固定式开关设备 143
XGN □ -12(40.5) high-voltage AC metal fixed switchgear

KYN28A-12 铠装移开式交流金属封闭开关柜 147
KYN28A-12 Armored movable AC metal enclosed switchgear

KYN28-24 户内交流金属铠装移开式开关设备 151
KYN28-24 Indoor AC Metal Armored Removable Switchgear

KYN61-40.5 铠装移开式交流金属封闭开关设备 155
KYN61-40.5 Armored Removable AC Metal Enclosed Switchgear



箱式变电站系列

Box-Type Substation Series

YB □ -12 高压 / 低压预装式变电站 159
YB □ -12 High voltage / low voltage prefabricated substation

ZGS □ 美式箱变 165
ZGS □ American style box transformers



一二次融合环网箱、电缆分支箱系列

Primary And Secondary Fusion Ring Net Box, Cable Branch Box Series

DFW10-12 户外高压环网箱 (一二次融合标准化环网箱) 076
DFW10-12 Outdoor high-voltage ring cage (standardized ring cage for primary and secondary integration)

DFW-12(35kV) 高压电缆分支箱 (欧式) 086
DFW-12(35kV) High Voltage Cable Branch Box (European Style)



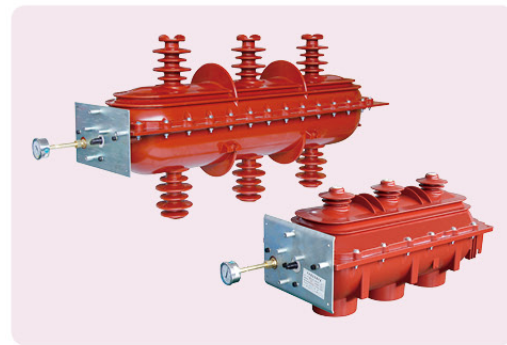
环网开关设备系列

Ring Network Switch Equipment Series

XGN □ -12 金属封闭环网开关设备 092
XGN □ -12 Metal Enclosed Ring Network Switchgear

DR-XGN □ -24 箱型交流金属封闭环网开关设备 102
DR-XGN □ -24 Box-Type Ac Metal-Enclosed Ring Network Switchgear

HXGN □ -12 箱型固定式交流金属封闭环网开关设备 108
HXGN □ -12 Box-Type Fixed Ac Metal-Enclosed Ring Network Switchgear



高压负荷开关系列

High Voltage Load Switch Series

FL(R)N36(12-40.5kV) 负荷开关 114
FL(R)N36(12-40.5kV) load break switch

HBG-12

环保气体封闭环网开关设备

HBG-12 Environmental Protection Gas Closed Loop Network Switchgear



产品简介 Product description

HBG-12 环保气体封闭环网开关设备是一种新型绿色环保的金属封闭开关设备，它采用干燥空气或氮气等环保气体绝缘，无/少温室气体排放，产品生命周期后材料可回收率达90%以上，除套管外其他绝缘部件基本不用难降解的环氧树脂材料，真正达到绿色环保的目的。断路器与负荷开关均采用真空灭弧，具有环境适应性强，体积小，节约占地，无需 SF₆ 气体检测与防护，运行安全可靠，免维护，智能化等特点，是环网柜今后发展的方向。

HBG-12 环保气体封闭环网开关设备用于电压 12kV，三相交流 50Hz，单母线及单母线分段系统的成套配电装置，工业及民用电缆环网及配网终端工程。作为电能的接受和分配之用，在城市居民区配电、小型二次变电所、开闭所、电缆分支箱、箱式变电站、工矿企业、商场、机场、地铁、风力发电、医院、体育场、铁路、隧道等场所使用。

HBG-12 Environmental Protection Gas Closed Ring Main Unit Switchgear is a new type of green and environmental protection metal-enclosed switchgear, which is insulated by environmental protection gases such as dry air or nitrogen, with no/little greenhouse gas emission, and the material recycling rate after its life cycle is over 90%; it is made of degradable materials without epoxy resin, including almost all insulated parts except bushing to be green and environment-friendly. The circuit breakers and load switches based on vacuum arc-extinguishing are highly adaptable to environments, compact with little space occupied, without SF₆ gas detection and protection, with safe and reliable operation, are free from maintenance and intelligent, as the trend of ring main units to develop in future.

HBG-12 Environmental Protection Gas Closed Ring Main Unit Switchgear is applied in 12kV, three-phase AC 50Hz, single-bus and single-bus sectionalized system whole-set power distributors, industrial and civil cable ring main unit and distribution network terminals. To accept and distribute electric energy, it is used in power distribution in urban residential areas, small secondary substations, switchgear houses, cable distribution boxes, box-type substations, industrial and mining enterprises, shopping malls, airports, subways, wind power generation, hospitals, stadiums, railways, tunnels and so on.

型号及含义 Model and meaning



产品特点 Product features

◆ 功能复合、一体化产品

开关设备的充气壳体采用高品质的厚 2.5mm 不锈钢板通过激光焊接而成，保证气箱密闭可靠性，机械强度高，耐腐蚀性好，充气壳体的防护等级达到 IP67：气箱装有防爆膜片，能有效防止气压过高时对人及设备造成的损害；将全部导电部件封闭在气箱当中，既能避免外界环境因素的影响，又能提高运行可靠性，使其具备免维护（或少维护）的功能，同时还能符合体积小化要求。

主回路采用三工位开关（接通 + 隔离 + 接地）和真空灭弧室组合，该结构是目前技术成熟的配置方式，适合目前电网运行维护需求。

◆ Comprehensive functions, combined product

The inflatable shell of the switchgear is made of high-quality 2.5mm-thick stainless steel plate by laser welding to make the gas tank sealed reliably with high mechanical strength, highly resistant to corrosion, and the protection grade of the inflatable shell is IP67: the gas tank is equipped with explosion-proof diaphragm to effectively prevent any damage to people and equipment due to high gas pressure; all conductive parts are enclosed in the gas tank to prevent influence of external environments and make it run reliably, free from maintenance (or with little maintenance), at the same time, it is compact as required.

The main circuit is equipped with three-position switch (closing + breaking + grounding) and vacuum arc-extinguishing chamber, is a mature configuration and ideal for current power grid operation and maintenance.

◆ 环保、无污染

HBG-12 环保气体封闭环网开关设备的绝缘介质是零级干燥空气（外购）或符合 GB/T 8979-2008 的 99.99% 纯 N₂，气体的泄露对外界环境不会造成任何影响，无需进行任何回收处理。

◆ Environment-friendly without pollution

HBG-12 Environmental Protection Gas Closed Ring Main Unit Switchgear adopts level-zero dry air (purchased) or 99.99% pure N₂ in accordance with GB/T 8979-2008, any gas leaked will not impact external environments, no need to recycle.

◆ 灵活的拓展化设计

HBG-12 环保气体封闭环网开关设备为模块化设计，可以将各种模块通过专用的母线连接件，实现多样化的单元组合，较大限度的满足中国各个地方复杂多样的配电设计方案。

◆ Flexible expansion design

HBG-12 Environmental Protection Gas Closed Ring Main Unit Switchgear has a modular design, and various modules are connected by special bus connectors for diverse combinations to meet the demands for these complicate and diverse power distribution design schemes in various areas of China as much as possible.

◆ 完善的机械连锁

HBG-12 环保气体封闭环网开关设备的操作面板具有完善的五防机械连锁功能，所有的连锁功能都在内部已配置好，操作时请按操作说明顺序操作，使用非常方便。

◆ Complete mechanical interlocking

The operation panel of HBG-12 Environmental Protection Gas Closed Ring Main Unit Switchgear has complete five mechanical interlocks, all interlocks are configured inside; it is convenient to operate according to the operation manual.



主要技术参数 (断路器柜) Main technical parameters (circuit breaker cabinet)

项目 Item	单位 Unit	参数 Parameter		
额定电压 Rated voltage	kV	12		
额定频率 Rated frequency	Hz	50		
额定绝缘水平 Rated insulation level	1min 工频耐受电压 1min power frequency withstand voltage	对地、相间 Phase-to-ground, phase-to-phase	kV	42
		隔离断口 Insulation breaking		48
	雷电冲击耐受电压 (峰值) Lightning impulse withstand voltage (peak)	对地、相间 Phase-to-ground, phase-to-phase	kV	75
		隔离断口 Insulation breaking		85
	辅助 / 控制回路的 1min 工频耐受电压 (对地) 1min power frequency withstand voltage (phase-to-ground) of auxiliary/control circuit	kV	2	
额定电流 Rated current	A	630		
额定短时耐受电流 (有效值) Rated instantaneous withstand current (RMS)	主回路 / 接地开关 Main circuit/grounding switch	kA	25/4s	
	接地连接回路 Grounding circuit	kA	21.7/4s	
额定峰值耐受电流 Rated peak withstand current	主回路 / 接地开关 Main circuit/grounding switch	kA	63	
	接地连接回路 Grounding circuit	kA	54.5	

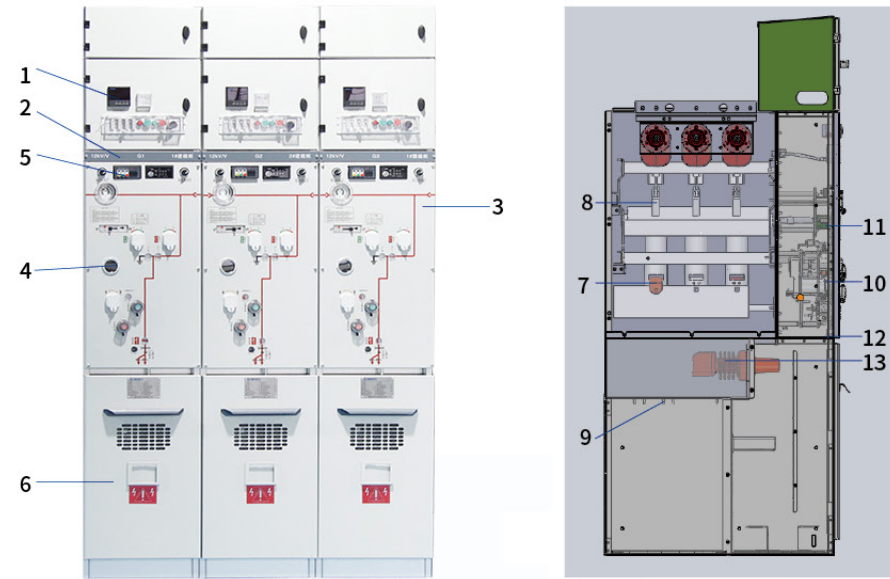
主要技术参数 (断路器柜) Main technical parameters (circuit breaker cabinet)

项目 Item	单位 Unit	参数 Parameter	
额定短路开断电流及次数 Rated short-circuit breaking current and times	kA/ 次 Time	25/30	
额定短路关合电流 (峰值) Rated short-circuit closing current (peak)	kA	63	
额定电缆充电开断电流 Rated cable charge breaking current	A	25	
断路器的额定操作顺序 Rated operating sequence of circuit breaker		O-0.3s-C0.180s-CO	
机械寿命 Mechanical life	断路器 / 隔离开关 Circuit breaker/insulation switch	次 Time	10000/3000
防护等级 Protection grade	密封箱体 Sealed enclosure		IP67
	开关设备外壳 Switchgear shell		IP4X
气体压力 Gas pressure	气体额定充入水平 (20°C、表压) Rated gas charge level (20° C, gauge pressure)	Mpa	0.02
	气体最低功能水平 (20°C、表压) Minimum gas function level (20°C, gauge pressure)	Mpa	0
密封性能 Seal performance	年泄漏率 Annual leak rate	%/ 年 year	≤ 0.05

主要技术参数 (负荷开关柜) Main technical parameters (Load switchgear)

项目 Item	单位 Unit	参数 Parameter		
额定电压 Rated voltage	kV	12		
额定频率 Rated frequency	Hz	50		
额定绝缘水平 Rated insulation level	1min 工频耐受电压 1min power frequency withstand voltage	对地、相间 Phase-to-ground, phase-to-phase	kV	42
		隔离断口 Insulation breaking		48
	雷电冲击耐受电压 (峰值) Lightning impulse withstand voltage (peak)	对地、相间 Phase-to-ground, phase-to-phase	kV	75
		隔离断口 Insulation breaking		85
	辅助 / 控制回路的 1min 工频耐受电压 (对地) 1min power frequency withstand voltage (phase-to-ground) of auxiliary/control circuit	kV	2	
额定电流 Rated current	A	630		
额定短时耐受电流 (有效值) Rated instantaneous withstand current (RMS)	主回路 / 接地开关 Main circuit/grounding switch	kA	25/4s	
	接地连接回路 Grounding circuit	kA	21.7/4s	
额定峰值耐受电流 Rated peak withstand current	主回路 / 接地开关 Main circuit/grounding switch	kA	63	
	接地连接回路 Grounding circuit	kA	54.5	
额定短路关合电流 (峰值) Rated short-circuit closing current (peak)	负荷开关 / 接地开关 Load switch/grounding switch	kA	63	
额定有功负载开断电流 Rated active load breaking current		A	630	
额定闭环开断电流 Rated closed-loop breaking current		A	630	
5% 额定有功负载开断电流 5% Rated active load breaking current		A	31.5	
额定电缆充电开断电流 Rated cable charge breaking current		A	10	
额定有功负载开断次数 Rated active load breaking times		次	100	
接地故障电流开断 Grounding fault current breaking		A/ 次 Time	31.5/10	
接地故障条件下的线路和电缆充电电流开断 Circuit and cable charge current breaking with grounding fault		A/ 次 Time	17.4/10	
机械寿命 Mechanical life	断路器 / 隔离开关 Circuit breaker/insulation switch	次 Time	10000/3000	
防护等级 Protection grade	密封箱体 Sealed enclosure		IP67	
	开关设备外壳 Switchgear shell		IP4X	
气体压力 Gas pressure	气体额定充入水平 (20°C、表压) Rated gas charge level (20° C, gauge pressure)	Mpa	0.02	
	气体最低功能水平 (20°C、表压) Minimum gas function level (20°C, gauge pressure)	Mpa	0	
密封性能 Seal performance	年泄漏率 Annual leak rate	%/ 年 year	≤ 0.05	

产品结构图 Product structure diagram



- | | |
|----------------|--|
| 1、低压仪表室 | 1. Low-voltage instrumentation room |
| 2、眉头 | 2. Marking |
| 3、操作室 | 3. Operation chamber |
| 4、观察筒 | 4. Observation tube |
| 5、带电显示器 | 5. Electric display |
| 6、电缆室 | 6. Cable chamber |
| 7、真空断路器 / 负荷开关 | 7. Vacuum circuit breaker/load switch |
| 8、三工位隔离 / 接地开关 | 8. Three position insulation/grounding switch |
| 9、泄压装置 | 9. Pressure relief device |
| 10、开关机构 | 10. Switching mechanism |
| 11、三工位机构 | 11. Three-position mechanism |
| 12、五防联锁机构 | 12. Five-protection interlocking mechanism |
| 13、进出线穿墙套管 | 13. Incoming/outgoing cable through-wall bushing |

标准模块 - 真空断路器单元 V Standard module - vacuum circuit breaker V

标准配置与特性

- ◆ 630A 母线
- ◆ 真空断路器
- ◆ 真空开关电动操作机构
- ◆ 三工位隔离开关
- ◆ 三工位隔离开关手动操作机构
- ◆ 真空开关和三工位隔离开关位置指示牌
- ◆ 电缆连接套管
- ◆ 显示套管带电的容性电压指示器
- ◆ 气压表
- ◆ 挂锁装置
- ◆ 柜体
- ◆ 接地母排
- ◆ 操作手柄
- ◆ 电流互感器 (保护专用)
- ◆ 数字式继电保护装置

Standard Configuration and Features

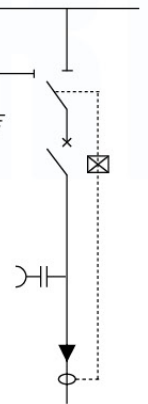
- ◆ 630A bus
- ◆ Vacuum circuit breaker
- ◆ Vacuum switch electric actuator
- ◆ Three-position insulation switch
- ◆ Three-position insulation switch manual actuator
- ◆ Vacuum switch and three-position insulation switch position panel
- ◆ Cable bushing
- ◆ Capacitive voltage indicator for live bushing
- ◆ Gas pressure gauge
- ◆ Padlock
- ◆ Cabinet
- ◆ Grounding bus
- ◆ Handle
- ◆ Current transformer (for protection)
- ◆ Digital relay protector

可选配置与特性

- ◆ 短路及接地故障指示器
- ◆ 可分离连接器 (电缆接头)
- ◆ 避雷器
- ◆ 进线带电 / 接地闭锁装置
- ◆ 钥匙机械互锁装置
- ◆ 环形电流互感器及表计

Optional configuration and features

- ◆ Short-circuit and grounding fault indicator
- ◆ Separable connector (cable gland)
- ◆ Arrester
- ◆ Incoming line live/grounding block
- ◆ Keyed mechanical interlock
- ◆ Loop current transformer and meter



标准模块 - 负荷开关单元 C Standard module - load switch C

标准配置与特性

- ◆ 标准配置与特性:
- ◆ 630A 母线
- ◆ 真空负荷开关
- ◆ 真空负荷开关手动操作机构
- ◆ 三工位隔离开关
- ◆ 三工位隔离开关手动操作机构
- ◆ 负荷开关和三工位隔离开关位置指示牌
- ◆ 电缆连接套管
- ◆ 显示套管带电的容性电压指示器
- ◆ 气压表
- ◆ 挂锁装置
- ◆ 柜体
- ◆ 接地母排
- ◆ 操作手柄

Standard configuration and features

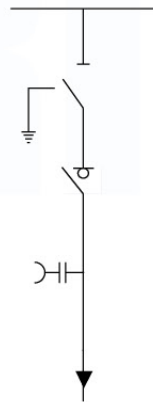
- ◆ Standard configuration and features
- ◆ 630A bus
- ◆ Vacuum load switch
- ◆ Vacuum load switch manual actuator
- ◆ Three-position insulation switch
- ◆ Three-position insulation switch manual actuator
- ◆ Load switch and three-position insulation switch position panel
- ◆ Cable bushing
- ◆ Capacitive voltage indicator for live bushing
- ◆ Gas pressure gauge
- ◆ Padlock
- ◆ Cabinet
- ◆ Grounding bus
- ◆ Handle

可选配置与特性

- ◆ 真空负荷开关电动操作机构
- ◆ 短路及接地故障指示器
- ◆ 可分离连接器 (电缆接头)
- ◆ 避雷器
- ◆ 进线带电 / 接地闭锁装置
- ◆ 钥匙机械互锁装置
- ◆ 环形电流互感器

Optional configuration and features

- ◆ Vacuum load switch electric actuator
- ◆ Short-circuit and grounding fault indicator
- ◆ Separable connector (cable gland)
- ◆ Arrester
- ◆ Incoming line live/grounding block
- ◆ Keyed mechanical interlock
- ◆ Loop current transformer and meter



标准模块 - 电压互感器单元 PT Standard module - potential transformer PT

标准配置与特性

- ◆ 2 只电流互感器
- ◆ 保护 PT 的熔断器
- ◆ 1 只带转换开关的电压表
- ◆ 显示套管带电的容性电压指示器
- ◆ 柜体
- ◆ 气压表

Standard configuration and features

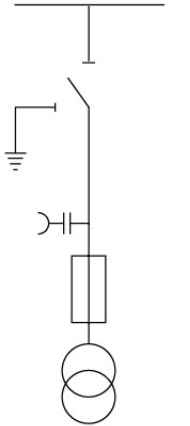
- ◆ 2 current transformers
- ◆ PT protection fuse
- ◆ 1 voltmeter with conversion switch
- ◆ Capacitive voltage indicator for live bushing
- ◆ Cabinet
- ◆ Gas pressure gauge

可选配置与特性

- ◆ 3 只电压互感器
- ◆ 避雷器
- ◆ 三工位隔离开关
- ◆ 三工位隔离开关手动操作机构

Optional configuration and features

- ◆ 3 potential transformers
- ◆ Arrester
- ◆ Three-position insulation switch
- ◆ Three-position insulation switch manual actuator



标准模块 - 计量模块 M Standard module - metering module M

标准配置与特性

- ◆ 630A 母线
- ◆ 电压互感器 (两台)
- ◆ 电流互感器 (两台)
- ◆ 保护 PT 的熔断器
- ◆ 显示套管带电的容性电压指示器
- ◆ 柜体

Standard configuration and features

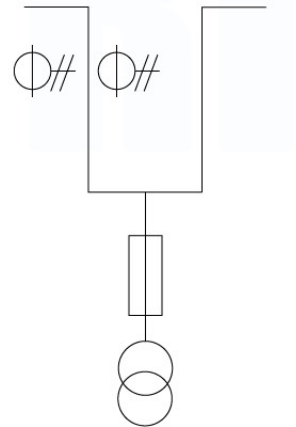
- ◆ 630A bus
- ◆ Potential transformer(two)
- ◆ Current transformer (two)
- ◆ PT protection fuse
- ◆ Capacitive voltage indicator for live bushing
- ◆ Cabinet

可选配置与特性

- ◆ 1 只转换开关
- ◆ 1 只电压表
- ◆ 1 只 / 2 只 / 3 只电流表
- ◆ 1 只有功电表
- ◆ 1 只无功电表

Optional configuration and features

- ◆ 1 conversion switch
- ◆ 1 voltmeter
- ◆ 1/2/3 ammeters
- ◆ 1 active kilo-watt hour meter
- ◆ 1 reactive kilo-watt hour meter



DSR6-12/24/40.5 (1250~3150) SF6 气体绝缘金属封闭开关设备 (C-GIS)

DSR6-12/24/40.5 (1250~3150) SF6 Gas Insulated Metal Enclosed Switchgear (C-GIS)



产品简介 Product description

DSR6-12/24/40.5 系列的 SF6 气体绝缘金属封闭开关设备 (C-GIS) 为我公司自主研发, 采用六氟化硫气体作为绝缘介质, 可同时应用在一次配电或二次配电领域。集真空灭弧技术、APG 密封技术、气体绝缘技术和界面绝缘技术于一体的新一代中压成套开关设备。产品通过了国家权威检测机构的型式试验验证及新产品技术鉴定。产品可广泛应用于国民经济的各个重要配变系统, 如输变电站网络、城市供电网、大型工矿企业、石油化工、冶金、城市轨道交通等领域。

产品采用模块化设计, 可根据不同设计方案进行组合。产品采用密封压力系统, 主回路所有高压带电部件密封在不锈钢气箱内, 不受环境影响。具有运行可靠、占用空间小、免维护等特点。

DSR6-12/24/40.5 series of SF6 Gas Insulated Metal Enclosed Switchgear (C-GIS) is independently developed by our company with sulphur hexafluoride gas as the insulating medium and can be applied in primary or secondary power distribution at a same time. It is a new-generation medium-voltage whole-set switchgear with vacuum arc extinguishing technology, APG solid sealed technology, gas insulation technology and interface insulation technology. The product has passed the type test verification and new product technology appraisal by China's national authoritative testing institution. The product can be widely used in various important power distribution and substation systems of China's national economy, such as power distribution and substation network, urban power supply network, large industrial and mining enterprises, petrochemical, metallurgy, urban rail transit and so on.

The product has a modular design and can be combined according to various design schemes. The product has a sealed pressure system and all high-voltage live parts of its main circuit are sealed in the stainless steel gas tank without influence from environments. It runs reliably, is compact with little space occupied and free from maintenance.

型号及含义 Model and meaning



使用环境 Work environment

- ◆ 海拔高度 ≤ 5000m (当设备运行海拔高度超出 1000m 时, 需要特别注明)。
 - ◆ 环境温度最高气温 +50°C, 最低气温 -25°C, 24h 平均值 ≤ 35°C。
 - ◆ 环境湿度: 24h 相对湿度平均值 ≤ 95%; 月相对湿度平均值 ≤ 90%。
 - ◆ 电磁干扰: 在二次系统中感应出的电磁干扰幅值 ≤ 1.6kV。
 - ◆ 安装环境: 周围空气中没有爆炸性和腐蚀性气体, 安装场所无经常性剧烈震动或冲击。
- 注: 超出上述使用环境条件时, 请与公司协商定制。

- ◆ Altitude ≤ 5000m (when it runs at an altitude over 1000m, pay special attention).
 - ◆ Ambient temperature: highest +50°C, lowest -25°C, 24h average ≤ 35°C.
 - ◆ Ambient humidity: 24h relative humidity average ≤ 95%; monthly relative humidity average ≤ 90%.
 - ◆ Electromagnetic interference: the amplitude of electromagnetic interference induced in the secondary system ≤ 1.6kV.
 - ◆ Installation environment: no explosive or corrosive gas in ambient environments, no frequent violent vibration or shock in the area to install.
- Note: for any deviation from these ambient environment conditions above, consult with the company to customize.

执行标准 Execution standards

GB/T 3804-2017	3.6kV~40.5 kV 高压交流负荷开关
GB/T 1984-2014	高压交流断路器
GB/T 16926-2009	高压交流负荷开关 - 熔断器组合电器
GB/T 1985-2014	高压交流隔离开关和接地开关
GB/T 3906-2020	3.6kV~40.5 kV 交流金属封闭开关设备和控制设备
GB/T 11022-2020	高压交流开关设备和控制设备标准的共用技术要求
GB/T 4208-2017	外壳防护等级 (IP 代码)
GB/T 26218-2010	污秽条件下使用的高压绝缘子的选择和尺寸确定
GB/T 9969-2008	工业产品使用说明书总则
GB/T 13384-2008	机电产品包装通用技术条件
GB/T 191-2008	包装储运图示标志
GB/T 311.1-2012	高压输配电设备的绝缘配合
DL/T 404-2018	3.6kV~40.5kV 交流金属封闭开关设备和控制设备

国家电网公司运维检修部 12kV 环网标准化设计定制方案



GB/T 3804-2017 High-voltage alternating current switches for rated voltage above 3.6 kV and less than 40.5 kV
 GB/T 1984-2014 High-voltage alternating-current circuit-breakers
 GB/T 16926- 2009 High-voltage alternating current switch-fuse combinations
 GB/T 1985-2014 High-voltage alternating-current disconnectors and earthing switches
 GB/T 3906-2020 Alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6 kV and up to and including 40.5 kV
 GB/T 11022-2020 Common specifications for high-voltage alternating-current switchgear and controlgear standards
 GB/T 4208-2017 Degrees of protection provide by enclosure (IP code)
 GB/T 26218-2010 Selection and dimensioning of high-voltage insulators intended for use in polluted conditions
 GB/T 9969-2008 General principles for preparation of instructions for use of industrial products
 GB/T 13384-2008 General specifications for packing of mechanical and electrical product
 GB/T 191-2008 Packaging-Pictorial Marking for Handling of Goods
 GB/T 311.1-2012 Insulation co-ordination-Part 1: Definitions, principles and rules
 DL/T 404-2018 Alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6kV and up to and including 40.5kV
 Operation and maintenance department of state grid corporation 12kV ring main unit standard design customized scheme

产品特点 Product features

- ◆ 采用国际先进的理念，世界一流的生产、检测手段、激光焊接、激光切割、氦检漏等设备；
- ◆ 产品一次元件采用全密封设计，完全密封于不锈钢板焊接的密封气箱内，充入一定压力的 SF6 气体作为绝缘介质，防护等级达 IP67，完全避免外界环境气候对开关柜的影响，能可靠运行于地下室、高原、冻土、沿海、潮湿等恶劣环境中，实现免维护。
- ◆ 产品可实现手动、电动操作，操作机构成熟可靠，并具备完善的机械和电气联锁，能够有效防止因误操作而可能导致的人身伤害和设备损坏。
- ◆ 产品设计结构紧凑，相比传统的空气绝缘开关柜体积显著减少，占地面积减少 30%-70%，提高空间利用率，有效降低工程综合成本。
- ◆ 基于微处理器的保护及系统技术，集保护、控制、计量、检测、通讯功能于一体，实现配网自动化和数字化要求，可以完全实现无人值守。

- ◆ Based on international advanced concepts, with world-class production, testing methods, laser welding, laser cutting and helium leak detection equipment;
- ◆ The primary components of the product are fully sealed in stainless-steel-plate-welded sealed gas tank, filled with SF6 gas at a certain pressure as the insulating medium, and its protection grade is IP67 to prevent any influence from external environments and climate to the switchgear cabinet; it can run reliably in basement, plateau, tundra, coastal, humid and other harsh environments without maintenance.
- ◆ The product can be actuated manually or electrically, and the actuator is mature and reliable with complete mechanical and electrical interlocks to effectively prevent personal injury and equipment damage due to any error in operation.
- ◆ The product is compact, compared with traditional air-insulated switchgear, it is significantly smaller and the floor area occupied is less by 30%-70% to improve space utilization efficiency and effectively reduce comprehensive engineering cost.
- ◆ The protection and system technology based on microprocessor combines protection, control, metering, detection and communication functions to make the power distribution network automatic and digital without personnel on duty.

主要技术参数 Main technical parameters

项目 Item	单位 Unit	参数 Parameter			
额定电压 Rated voltage	kV	12	24	40.5	
额定频率 Rated frequency	Hz	50			
额定电流 Rated current	A	630/1250/2500/3150/4000		630/1250/2500	
额定绝缘水平 Rated insulation level	工频耐压 (相间及对地) Power frequency withstand voltage (phase-to-phase and phase-to-ground)	kV	42	65	95
	工频耐压 (隔离断口) Power frequency withstand voltage (insulation breaking)		48	79	118
	雷电冲击耐压 (相间及对地) Lightning impulse withstand voltage (phase-to-phase and phase-to-ground)	kV	75	125	185
	雷电冲击耐压 (隔离断口) Lightning impulse withstand voltage (insulation breaking)	kV	85	145	215
	辅助回路额定工频耐压 Rated power frequency withstand voltage of auxiliary circuit	kV	2		
额定短时耐受电流 Rated instantaneous withstand current	kA	25/31.5/40			
额定短路持续时间 Rated short-circuit period	s	3			
额定峰值耐受电流 Rated peak withstand current	kA	63/80/100	63/80/100	50/63/80	
断路器额定短路开断电流 Rated short-circuit breaking current of circuit breaker	kA	25/31.5/40	25/31.5/40	25/31.5	
断路器额定短路关合电流 (峰值) Rated short-circuit closing current of circuit breaker (peak)	kA	63/80/100	63/80/100	50/63/80	
额定电缆充电开断电流 Rated cable charge breaking current	A	25			
额定操作顺序 Rated operating sequence		O-0.3s-CO-3min-CO			
绝缘气体 Insulation gas		SF6			
机械寿命 Mechanical life	断路器 Circuit breaker	次 Time	10000		
	三工位开关 Three-position switch	次 Time	5000		
SF6 气体额定压力 (abs.20°C) SF6 gas rated pressure (abs. 20°C)	额定充气压力 (abs.20°C) Rated charge pressure (abs. 20°C)	Mpa	0.14		
	最低充气压力 (abs.20°C) Minimum charge pressure (abs. 20°C)	Mpa	0.12		
防护等级 Protection grade	密封箱体 Sealed enclosure	等级 Grade	IP67		
	开关设备外壳 Switchgear shell	等级 Grade	UP4X		
干燥空气年相对漏气率 Annual relative leak rate of dry air	%/年 year	≤ 0.1			
辅助回路的额定电源电压 Rated power voltage of auxiliary circuit	V	DC48/110/220 AC220			

开关柜常规外尺寸见下表 The general external dimensions of switchgears

额定电压 (kV) Rated voltage (kV)	主母线额定电流 (A) Main bus rated current (A)	柜型 Type of cabinet	宽 a (mm) Width	深 b (mm) Depth	高 d (mm) Height	备注 Remark
12/24/40.5	630/1250	进线、分段、隔离、出线 Incoming, sectional, insulated, outgoing	600	1600	2400	*PT 三次级 *PT tertiary
		母设 (PT) Bus (PT)	1000			
		计量柜 Metering cabinet	气箱 Gas tank	600/1000	1800	2400
	空气 Air					
2500/3150/4000	进线、分段、隔离、出线、母线 (PT) Incoming, sectional, insulated, outgoing Bus (PT)	800/1000	1800	2400	*PT 三次级 *PT tertiary	

主要技术参数 Main technical parameters

序号 NO.	方案 Scheme	型号说明 Description	功能 Function
1		电缆进线柜 1 下进线 1 上进线 Cable feeder cabinet 1 lower incoming 1 upper incoming	配三工位开关、断路器、接通及断开电缆和母线，可关合和开断至额定值的电流，两侧母线可扩展。断路器气室预留 3 组内锥插座，可插接插拔式电缆、避雷器及电压互感器，可双电缆进线不使用的插座用堵头封堵。电缆可上进线或下进线。接地开关可取消或闭锁。 With three-position switch, circuit breaker, closing and breaking cable and bus, can close and break the rated current; the bus on both sides can expand. In the circuit breaker gas chamber, 3 female sockets are reserved to plug in/out the plug-in cable; the arrester, potential transformer and the unused sockets can be blocked. The cable has upper incoming or lower incoming. Can cancel or block the grounding switch.
2		分段断路器柜 1 左联络 1 右联络 Sectional circuit breaker cabinet 1 left link 1 right link	配合三工位开关、断路器，与分段隔离柜配合实现母线分段和联络，可关合和开断至额定值的电流；一侧母线可扩展，另一侧与分段隔离柜相连。接地开关可取消或闭锁。 With three-position switch, combined the sectional circuit breaker cabinet, to sectionalize and link the bus; can cancel or block the grounding switch.
3		分段隔离柜 1 左联络 1 右联络 Sectional insulation cabinet 1 left link 1 right link	配三工位开关，与分段断路器柜配合实现母线分段和联络，接地开关可取消或闭锁。 With three-position switch, combined with sectional circuit breaker cabinet, to sectionalize and link the bus; can cancel or block the grounding switch.

主要技术参数 Main technical parameters

序号 NO.	方案 Scheme	型号说明 Description	功能 Function
4		隔离提升柜 1 下进线 1 上进线 Insulation upgraded cabinet 1 lower incoming 1 upper incoming	配三工位开关，接通及隔离电缆和母线；两侧母线可扩展。如无需接地操作，可取消或闭锁接地开关。 With three-position switch, connect or insulate cable and bus; the bus on both sides can expand. Can cancel or block the grounding switch if grounding isn't required.
5		隔离柜 Insulation cabinet	配三工位开关，且气箱可预留内锥插座，可插接插接式避雷器以及电压互感器。 With three-position switch, female socket is reserved in the gas tank to plug in the plug-in arrester and potential transformer.
6		计量柜 Metering cabinet	配内置电流互感器和插拔式电压互感器，可与其他功能单元组合。 With built-in current transformer and plug-in potential transformer, it can be combined with other functional units.
7		主母线接地柜 1 左联络 1 右联络 Main bus grounding cabinet 1 left link 1 right link	配接地开关，可将主母线接地；通常一侧母线可扩展，与其他功能单元的主母线相连。 With grounding switch, ground the main bus; usually the bus on one side can expand to connect with the main buses of other functional units.

主要技术参数 Main technical parameters

序号 NO.	方案 Scheme	型号说明 Description	功能 Function
8		<p>电缆进出线柜 (用于气箱不可分离结构) Cable incoming/outgoing cabinet (for non-separable structure of gas tank)</p>	<p>配三工位开关、断路器，接地及断开电缆和母线，可关合和开断至额定值的电流，两侧母线可扩展。母线侧可插接插拔式避雷器或电压互感器，不使用的插座用堵头封堵。如无需接地操作，可取消或闭锁接地开关。 With three-position switch, circuit breaker, grounding and breaking cable and bus, can close or break the rated current, the bus on both sides can expand. On the bus side, can plug in/out the plug-in arrester or potential transformer and the unused sockets can be blocked. Can cancel or block the grounding switch if grounding isn't required.</p>
9		<p>分段 + 隔离柜 - 分段断路器柜与分段隔离柜一体化 Sectional + insulation cabinet - sectional circuit breaker cabinet and sectional insulation cabinet combined</p>	<p>配三工位开关、断路器、内置电流互感器，实现母线分段和联络。如无需接地操作，可取消或闭锁接地开关。 With three-position switch, circuit breaker and built-in current transformer, to sectionalize and link the bus. Can cancel or block the grounding switch if grounding isn't required.</p>

备注：以上功能模块化单元均可作为 OEM 合作伙伴提供。

型号规格：气箱型号后面加上额定电压值，支母线额定电流，如主母线额定电流与支母线额定电流不一致，则需在括号内注明。

例如：XGN □ (DSR6) -12/1250: 12kV 开关柜，支母线、主母线额定电流为 1250A；

XGN □ (DSR6) -12/1250 (2500) : 12kV 开关柜，支母线额定电流 1250A、主母线额定电流为 2500A；

Note: These functional modular units above are available for OEM partners.

Model number: add rated voltage and branch bus rated current into the model number of the gas tank; if the main bus rated current and the branch bus rated current are different, indicate in the brackets.

For example:

XGN □ (DSR6) -12/1250: 12kV switchgear, branch bus, main bus rated current is 1250A;

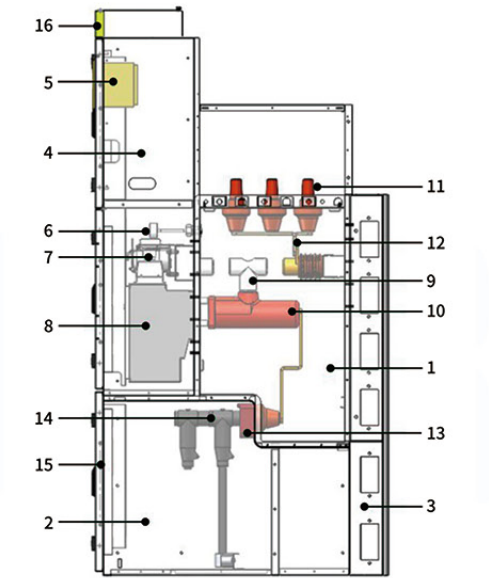
XGN □ (DSR6) -12/1250 (2500): 12kV switchgear, branch bus rated current is 1250A, main bus rated current is 2500A;

产品结构 Product structure

产品设计为模块化组装式结构，由具有独立功能模块（隔室）构成，即柜体底部单元、一体化充气单元、综合保护控制单元、操动机构室、压力泄压通道等部分，整体组装维护灵活高效。

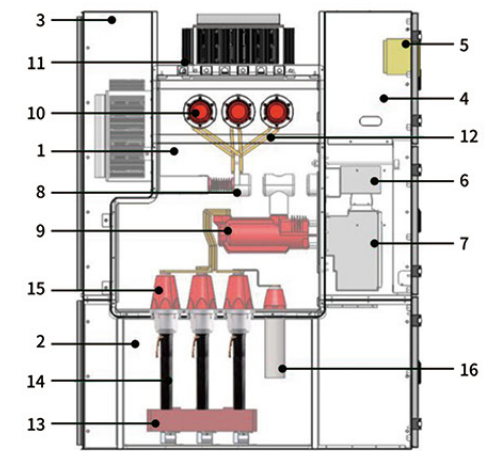
The product has a modular assembly structure and is composed of independent functional modules (compartments), i.e., the cabinet bottom unit, combined chargeable unit, comprehensive protection and control unit, actuator room and pressure relief channel, etc.; it's flexible and efficient to assemble and maintain the whole product.

- | | |
|----------------|---|
| ◆ 气箱 | ◆ Gas tank |
| ◆ 电缆室 | ◆ Cable chamber |
| ◆ 泄压通道 | ◆ Pressure relief channel |
| ◆ 控制室 | ◆ Control room |
| ◆ 保护控制单元 | ◆ Protection and control unit |
| ◆ 气箱压力密度表 | ◆ Gas tank pressure and density gauge |
| ◆ 隔离开关操作机构 | ◆ Insulation switch actuator |
| ◆ 断路器操作机构 | ◆ Circuit breaker actuator |
| ◆ 三工位隔离开关（直动式） | ◆ Three-position insulation switch (directly-actuated type) |
| ◆ 真空断路器 | ◆ Vacuum circuit breaker |
| ◆ 顶并母线套管 | ◆ Top bus bushing |
| ◆ 母线 | ◆ Bus |
| ◆ 环形电流互感器 | ◆ Ring current transformer |
| ◆ 外锥式电缆终端头 | ◆ Male cable terminal |
| ◆ 门板 | ◆ Door panel |
| ◆ 眉头 | ◆ Marking |



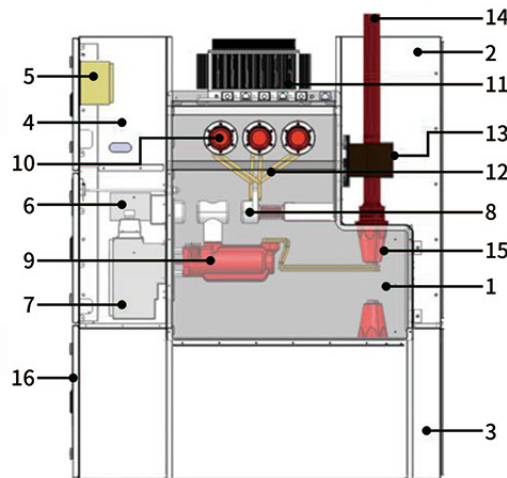
进出线柜 (630~1250A)
Cable incoming/outgoing cabinet (630~1250A)

- ◆ 气箱 ◆ Gas tank
- ◆ 电缆室 ◆ Cable chamber
- ◆ 泄压通道 ◆ Pressure relief channel
- ◆ 控制室 ◆ Control room
- ◆ 保护控制单元 ◆ Protection and control unit
- ◆ 隔离开关操作机构 ◆ Insulation switch actuator
- ◆ 断路器操作机构 ◆ Circuit breaker actuator
- ◆ 三工位隔离开关 (直动式) ◆ Three-position insulation switch (directly-actuated type)
- ◆ 真空断路器 ◆ Vacuum circuit breaker
- ◆ 侧扩母线套管 ◆ Side-expansion bus bushing
- ◆ 散热器 ◆ Heat sink
- ◆ 母线 ◆ Bus
- ◆ 环形电流互感器 ◆ Ring current transformer
- ◆ 内锥式电缆终端头 ◆ Female cable terminal
- ◆ 内锥插座 ◆ Female socket
- ◆ 插拔式避雷器 ◆ Plug-in arrester

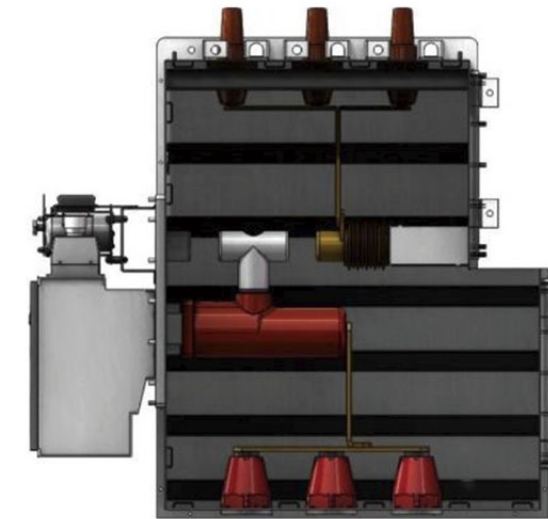


进出线柜 (2500~3150A)
Cable incoming/outgoing cabinet (2500~3150A)

- ◆ 气箱 ◆ Gas tank
- ◆ 母线进线室 ◆ Bus incoming chamber
- ◆ 泄压通道 ◆ Pressure relief channel
- ◆ 控制室 ◆ Control room
- ◆ 保护控制单元 ◆ Protection and control unit
- ◆ 隔离开关操作机构 ◆ Insulation switch actuator
- ◆ 断路器操作机构 ◆ Circuit breaker actuator
- ◆ 三工位隔离开关 (直动式) ◆ Three-position insulation switch (directly-actuated type)
- ◆ 真空断路器 ◆ Vacuum circuit breaker
- ◆ 侧扩母线套管 ◆ Side-expansion bus bushing
- ◆ 散热器 ◆ Heat sink
- ◆ 母排 ◆ Bus
- ◆ 电流互感器 ◆ Current transformer
- ◆ 固体绝缘母线 ◆ Solid insulation bus
- ◆ 内锥插座 ◆ Female socket
- ◆ 门板 ◆ Door panel



管母进线 (2500~3150A) Feeder (2500~3150A)



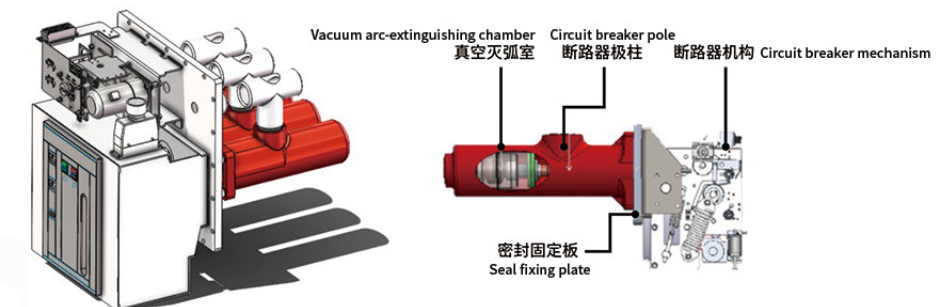
真空断路器特点 Features of vacuum circuit breaker

- ◆ 断路器固封极柱横向布置，固定安装于密封气箱内，无需保养。
- ◆ 采用真空灭弧技术，开断不影响气箱内气体的绝缘强度。
- ◆ 极柱与机构间通过金属波纹管实现气箱内外连接与传动，漏气率极低，可靠性高。
- ◆ 具有更可靠的额定电流关合与开断性能。
- ◆ 可频繁操作，故障率低。
- ◆ Circuit breaker solid-sealing pole is horizontal, fixed in the sealed gas tank and free from maintenance.
- ◆ With vacuum arc extinguishing technology, breaking doesn't influence insulation strength of the gas in gas tank.
- ◆ The pole and mechanism are connected and driven inside and outside of the gas tank by the metal bellows, with little leak and high reliability.
- ◆ More reliable rated current closing and breaking performance.
- ◆ Can be actuated frequently with few fault.

气箱结构特点 Structural features of gas tank

气箱内安装真空断路器，三工位开关、侧并（顶并）母线绝缘套管和内锥（外锥）式电缆插座，整个气箱部分采用 304 不锈钢板及加强筋加固焊接而成，高压带电部分完全密封于不锈钢金属气箱内，气箱内部采用抽真空检测，确保无漏点，通过内部抽真空将气室内水分潮气抽出，并充有压力为 0.04Mpa 的 SF6 气体，防护等级达到 IP67。气室设置了防爆装置和压力释放通道，内部燃弧故障可最大限度地保障人身安全和设备运行。

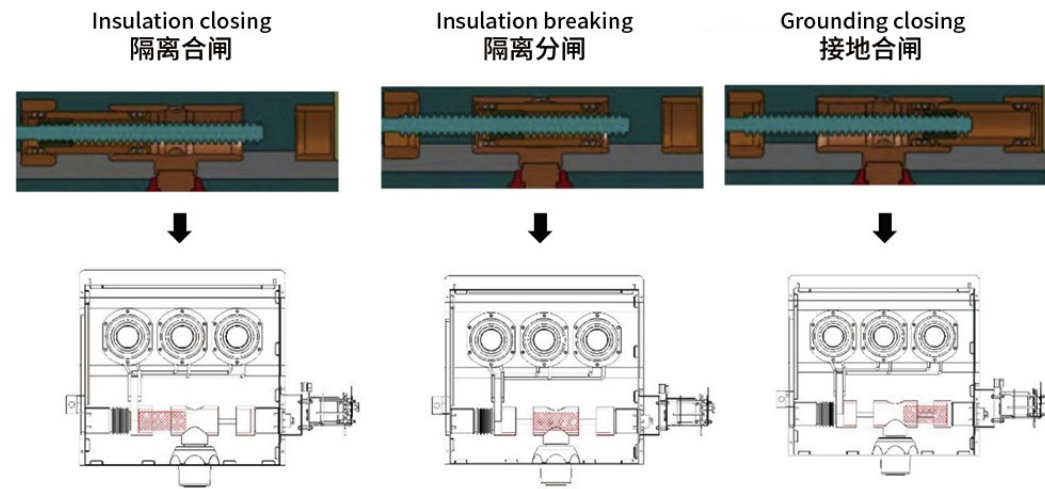
The vacuum circuit breaker, three-position switch, side (top) bus insulation bushing and female (male) cable socket are installed in the gas tank, and the whole gas tank box is made of 304 stainless steel plate and welded by reinforcement ribs; the high-voltage live part is completely sealed in the stainless steel metal gas tank; after vacuum testing, the gas tank shall be sealed without leak; by internal vacuum, the internal moisture is drawn out and charged with SF6 gas at 0.04Mpa; the protection grade is IP67. The gas chamber is equipped with explosion-proof device and pressure relief channel to guarantee personnel safety and equipment operation as much as possible when any internal arc fault happens.



直动式三工位开关 Directly-actuated three-position switch

- ◆ 三工位开关可作为母线隔离开关和馈线接地开关，实现合闸、隔离和接地的功能且互锁。
- ◆ 当三工位开关用作线路侧接地开关时，通过断路器实现快速接地功能。
- ◆ 圆柱形电极，电场均匀，绝缘性能更优越。
- ◆ 操动机构通过磁流体动态密封技术进行传动，通过转动绝缘丝杆，驱动导电杆，实现三工位联动，且联锁可靠，无误操作可能。
- ◆ 可由传感器或辅助开关检测开关位置，具有机械的位置指示。
- ◆ The three-position switch can be used as a bus insulation switch and feeder grounding switch to close, insulate and ground the bus with interlocking.
- ◆ When the three-position switch is used as a side grounding switch, it can ground quickly by circuit breaker.
- ◆ With cylindrical electrode, uniform electric field and superior insulation.
- ◆ The actuator is driven by magnetic fluid dynamic sealing technology. Rotate the insulated lead screw to drive the conductive rod for three-position linked transmission and the interlocking is reliable without any error in operation.
- ◆ Switch position can be detected by sensor or auxiliary switch, with mechanical position indication.

三工位开关特点 Features of three-position switch



开关机构特点 Switching mechanism features

- ◆ 弹簧操作机构设计合理，机械零部件更少，能量输出均衡，动作可靠。
- ◆ 可靠的机械连锁和电气连锁双重连锁装置，可防止误操作。
- ◆ 具有自动重合闸功能，通过密封固定板安装于气箱外侧，方便拆卸与维护，不影响气箱密封性。
- ◆ 与断路器联锁，保证只有三工位开关处于正确位置时才能合闸，性能可靠。
- ◆ 可由传感器或辅助开关检测开关位置，具有机械位置指示。

- ◆ 采用手动双孔操作，隔离操作孔与接地操作孔实现互锁，可预制闭锁电磁铁或机械锁孔。
- ◆ 机构驱动控制器内置整流器，可选用相应的交流电源或直流电源。
- ◆ 手动操作带限位装置，只有操作到位才能取出摇柄。
- ◆ Reasonable design of spring-actuated mechanism, fewer mechanical parts, balanced energy output and reliable operation.
- ◆ With reliable mechanical and electrical interlocking devices, can prevent any error in operation.
- ◆ Automatic reclosing, the seal fixed plate is installed outside of the gas tank, it's easy to disassemble and maintain, without reliable seal of the gas tank.
- ◆ Interlocked with the circuit breaker to ensure that it can only close when the three-position switch is in the correct position, with reliable performance.
- ◆ The switch position is detected by sensor or auxiliary switch, with mechanical position indication.
- ◆ By manual double-hole operation, insulation hole and grounding hole are interlocked and the interlock solenoid or mechanical interlock hole can be prefabricated.
- ◆ The built-in rectifier of mechanism actuator can be equipped with corresponding AC power supply or DC power supply.
- ◆ The manual operation with limit device, only can remove handle when it arrives.



XGND(DSR6) 典型一次方案图 XGND(DSR6) Typical primary scheme diagram

方案编号 NO.	01	02	03	04	05	06	07	08	
柜型 Type of cabinet	电缆进出线柜 Cable incoming/outgoing cabinet				隔离提升柜 Insulation upgraded cabinet				
一次接线方案 Primary wiring scheme									
真空断路器 Vacuum circuit breaker	1	1	1	1					
三工位开关 Three-position switch	1	1	1	1	1	1	1	1	
电流互感器 (CT) Current transformer(CT)	支柱式 (a) Column	可选 Optional	3	可选 Optional	3	可选 Optional	3	可选 Optional	3
	穿心式 (b) Go-through	可选 Optional	3	可选 Optional	3	可选 Optional	3	可选 Optional	3
插拔式电压互感器 (PT) Plug-in potential transformer (PT)			3	3			3	3	
高压熔断器 (PT 内置) High-voltage fuse (PT built-in)			3	3			3	3	
带电显示器 Live monitor	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available	
插拔式避雷器 Plug-in arrester		3		3		3		3	

XGND(DSR6) 典型一次方案图 XGND(DSR6) Typical primary scheme diagram

方案编号 NO.	09	10	11	12	13	14	15	16
柜型 Type of cabinet	母线提升柜 Bus upgraded cabinet				管线进出线柜 Pipeline incoming/outgoing cabinet			分段断路器柜 Sectional circuit breaker cabinet
一次接线方案 Primary wiring scheme								
真空断路器 Vacuum circuit breaker					1	1	1	1
三工位开关 Three-position switch					1	1	1	1
电流互感器 (CT) Current transformer(CT)	支柱式 (a) Column	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3	3	3	3
	穿心式 (b) Go-through	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3			
插拔式电压互感器 (PT) Plug-in potential transformer (PT)			3	3			3	
高压熔断器 (PT 内置) High-voltage fuse (PT built-in)			3	3			3	
带电显示器 Live monitor	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available
插拔式避雷器 Plug-in arrester		3		3		3		

方案编号 NO.	17	18	19	20	21	22	23	24
柜型 Type of cabinet	管母进出提升柜 Pipeline incoming/outgoing cabinet				管母隔离提升柜 Tubular bus insulation upgraded cabinet			
一次接线方案 Primary wiring scheme								
真空断路器 Vacuum circuit breaker								
三工位开关 Three-position switch	1	1	1	1	1	1	1	1
电流互感器 (CT) Current transformer(CT)	支柱式 (a) Column	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3
	穿心式 (b) Go-through	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3	可选 Optional 3
插拔式电压互感器 (PT) Plug-in potential transformer (PT)			3	3			3	3
高压熔断器 (PT 内置) High-voltage fuse (PT built-in)			3	3			3	3
带电显示器 Live monitor	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available
插拔式避雷器 Plug-in arrester		3		3		3		3

XGND(DSR6) 典型一次方案图 XGND(DSR6) Typical primary scheme diagram

方案编号 NO.	25	26	27	28	29	30	31	32
柜型 Type of cabinet	分段隔离柜 Sectional isolation cabinet			母联提升柜 Bus upgraded cabinet		PT 柜 PT cabinet		充气计量 Inflatable metering cabinet
一次接线方案 Primary wiring scheme								
真空断路器 Vacuum circuit breaker								
三工位开关 Three-position switch	1	1	1			1	1	1
电流互感器 (CT) Current transformer(CT)	支柱式 (a) Column							
	穿心式 (b) Go-through	3	3	3	3	3		3
插拔式电压互感器 (PT) Plug-in potential transformer (PT)		3		3		3	3	3
高压熔断器 (PT 内置) High-voltage fuse (PT built-in)								
带电显示器 Live monitor	有 Available	有 Available	有 Available					
插拔式避雷器 Plug-in arrester			3		3		3	

方案编号 NO.	33	34	35	36	37	38	39	40
柜型 Type of cabinet	充气计量柜 Inflatable metering cabinet	空气计量柜 Air metering cabinet				进出线带母线避雷器 Incoming/outgoing & bus arrester	进出线带母线 PT Incoming/outgoing & bus PT	分段 + 隔离柜 Sectional + insulation cabinet
一次接线方案 Primary wiring scheme								
真空断路器 Vacuum circuit breaker						1	1	1
三工位开关 Three-position switch	1					1	1	2
电流互感器 (CT) Current transformer(CT)	支柱式 (a) Column					3	3	3
	穿心式 (b) Go-through	3	用户要求 Required by customer	用户要求 Required by customer	用户要求 Required by customer	用户要求 Required by customer	3	3
插拔式电压互感器 (PT) Plug-in potential transformer (PT)	3	用户要求 Required by customer	用户要求 Required by customer	用户要求 Required by customer	用户要求 Required by customer			
高压熔断器 (PT 内置) High-voltage fuse (PT built-in)	3	3	3	3	3			
带电显示器 Live monitor	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available	有 Available
插拔式避雷器 Plug-in arrester	内锥式 Female	3				3	3	3
	外锥式 Male			3				

DRM-12

全绝缘全封闭环网开关设备 (标准化环网柜)

DRM-12 Fully insulated and fully enclosed ring network switchgear (standardized ring network cabinet)



630A

1250A

标准化环网柜产品简介 Standardized ring cabinet product introduction

标准化环网柜技术参数应符合 DL/T 728、DL/T791 的规定。SF₆ 气体符合 GB/T 12022 的规定。

明确了 SF₆ 气体绝缘环网柜的额定充气水平 (充气压力) 和允许泄漏率。设置用来连接气体处理装置和其他设备的合适连接点 (阀门) ，气体绝缘环网柜装有设气体监测设备，气箱防护等级应达到 IP67。额定充气压力下非灭弧隔室测得水分含量 (20°C 时) 不得大于 1000μL/L；灭弧隔室测得水分含量 (20°C 时) 不得大于 150μL/L。结构设计预留配电自动化终端及终端电源安装位置，类型、额定值和结构相同的所有可移开部件和元件在机械和电气上应有互换性。

标准化环网柜负荷开关单元、电缆连接单元柜宽为 375mm。

断路器、组合电器单元柜宽为 420mm。带隔离开关 PT 单元柜宽 (底框架) 为 600mm。

柜深为 750mm。最大外形 (投影距离) ≤ 850mm。

柜体高度 (含仪表箱、含顶扩母线) 为 1950mm。柜前看，柜体高度 (不含仪表箱) 为 1600mm，仪表箱高为 350mm。

壳体 (气箱) 材质的耐腐蚀性能不应低于 304 不锈钢，标称厚度 ≥ 2mm。柜体框架材质采用敷铝锌板 (镀锌层厚度达到 AZ150 及以上，可按照《GB/T 14978 连续热镀锌锌合金镀层钢板及钢带》) 或镀锌钢板。

The technical parameters of the standardized ring cabinet shall comply with the provisions of DL/T 728 and DL/T791. SF₆ gas complies with GB/T 12022.

The rated filling level (charging pressure) and allowable leakage rate of SF₆ gas insulated ring cabinet are determined. Suitable connection points (valves) shall be provided for connecting the gas handling unit to other equipment. The gas insulated ring cabinet shall be equipped with gas monitoring equipment and the protection level of the gas tank shall reach IP67. The measured moisture content of the non-arc extinguishing chamber under the rated inflation pressure (20°C) shall not be greater than 1000μL/L; The measured moisture content in the arc extinguishing chamber (at 20°C) shall not be greater than 150μL/L. Structure design reserve distribution automation terminal and terminal power installation location, all removable parts and components of the same type, rating and structure should be mechanically and electrically interchangeable.

The width of the load switch unit and cable connection unit of the standardized ring network cabinet is 375mm.

The width of the circuit breaker and combined electrical unit cabinet is 420mm. The cabinet width (bottom frame) of the PT unit with isolation switch is 600mm.

Cabinet depth is 750mm. Maximum shape (projection distance) ≤ 850mm.

The height of the cabinet (including the instrument box and the top expanded bus) is 1950mm. In front of the cabinet, the height of the cabinet (excluding the instrument box) is 1600mm, and the height of the instrument box is 350mm.

The corrosion resistance of the shell (gas box) material should not be lower than 304 stainless steel, and the nominal thickness is ≥ 2mm. The frame material of the cabinet shall be aluminum-zinc plate (the thickness of the galvanized layer shall reach AZ150 or above, according to GB/T 14978 Continuous hot plated aluminum-zinc alloy plated steel plate and steel strip) or galvanized steel plate.

产品简介 Product description

本公司自主研发生产的 DRM-12 全绝缘全封闭环网开关设备 (标准化) ，已经国家高压电器试验中心型式试验和浙江省高新技术项目被列为浙江省高新技术产品。广泛用于 10kV/6kV 配电系统，是城乡各类用户变配电系统的首选开关产品。

开关柜为模块化单元模式，可根据不同用途进行组合；由固定式单元组合与可扩展单元两大类，满足各种变电站对紧凑型开关柜灵活使用的需要。

DRM-12 全绝缘全封闭环网开关设备 (标准化) 是一个完全密封的系统，其所有带电部件以及开关封闭在不锈钢的壳体内。整个开关装置不受外部环境条件的影响，从而可以确保运行可靠性及人身安全，并且实现了免维护。通过选择可扩展母线，可以实现任何组合，达到全模块化。扩展母线安全绝缘和屏蔽，确保了高可靠性和安全性。DRM-12 型充气式开关柜同时可以提供 TV 化的自动化解决方案，形成了智能化开关的概念，并将现场安装及调试工作量降到最低。

DRM-12 全绝缘全封闭环网开关设备 (标准化) 分为非扩展标准配置和可扩展标准配置。由于具有全模块和半模块的组合性以及自身的可扩展性，因而具有极其特殊的灵活性。

DRM-12 全绝缘全封闭环网开关设备 (标准化) 执行 GB 标准。在室内条件下 (20°C) 运行的设计寿命超过 30 年。

DRM-12 Fully insulated and fully enclosed main ring unit switchgear (standardized) independently developed by our company has been listed as a high-tech product of Zhejiang Province by China's National High-Voltage Electrical Apparatus Testing Center in type test and Zhejiang Province High-Tech Technology Project. It is widely used in 10kV/6kV power distribution systems and is preferred by various urban and rural users of power distribution systems.

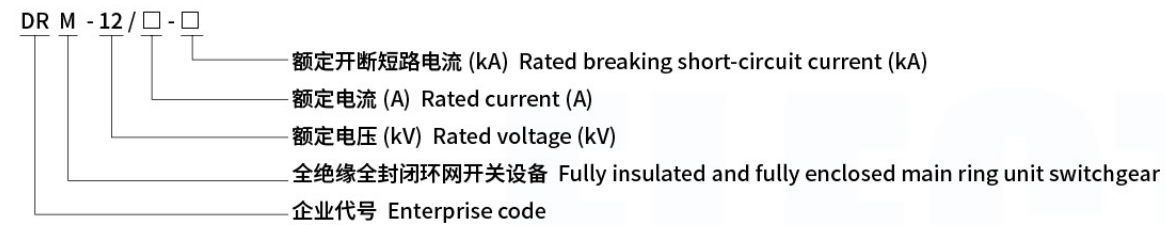
The switchgear is modular and can be combined for various purposes; it consists of two categories: non-expandable unit combination and expandable unit combination, to meet the needs of various power substations in flexible applications of compact switchgears.

DRM-12 Fully insulated and fully enclosed main ring unit switchgear (standardized) is a completely sealed system, with all live parts and switches enclosed in a stainless steel shell. The whole switchgear isn't influenced by external environmental conditions to guarantee reliable operation and personal safety and is free from maintenance. By an expandable bus, any combination is available and fully modular. The expandable bus is insulated and shielded safely to guarantee high reliability and safety. DRM-12 inflatable switchgear can also provide TV-based automation solutions with a concept of intelligent switchgear and minimize the work of on-site installation and commissioning.

DRM-12 Fully insulated and fully enclosed main ring unit switchgear (standardized) has non-expandable standard configuration and expandable standard configuration. Owing to its fully-modular and half-modular combination and expandability, it is especially flexible.

DRM-12 Fully insulated and fully enclosed main ring unit switchgear (standardized) conforms to GB standards. Its design life is over 30 years in indoor conditions (20°C).

型号及含义 Model and meaning



性能指标 Performance index

◆ SF ₆ 气体压力 SF ₆ gas pressure	20°C下绝对压力 0.04Mpa Absolute pressure 0.04Mpa at 20° C
气体年泄漏率 Annual gas leak rate	0.05%
防护等级 Ingress protection	IP67
气室不锈钢厚度 Stainless steel thickness of gas chamber	3.0mm
◆ 母线 Bus	
开关柜内母线 Bus in switchgear	400mm ² Cu
开关柜接地母线 Switchgear grounding bus	150mm ² Cu
◆ 颜色 Color	
开关柜前面板 Switchgear front panel	RAL7012
侧板和电缆室前盖板 Side panel and cable chamber front cover	RAL7035
◆ 正常运行环境条件 Normal work conditions	
最高温度 Maximum temperature	
最低温度 Minimum temperature	
最大平均相对湿度 Maximum average relative humidity	
海拔高度 Altitude	

◆ 满足标准 Compliant with standard

GB/T11022	GB3906	GB1985	+40°C
GB16926	GB38041	GB1984	-40°C
GB3309			≤ 95%
IEC60056	IEC60129	IEC60265	≤ 2000 米
IEC60298	IEC60420	IEC60694	

产品主要特点 Main Features

全绝缘全密封 (标准化) 环网金属开关设备以 SF₆ 气体作为灭弧及绝缘介质。

◆ 运行可靠

开关柜为全密封, 全绝缘结构; 母线、开关及带电部件完全封闭在不锈钢壳体中。腔体充以 0.04Mpa 的 SF₆ 的气体, 防护等级达到 IP67; 整个开关装置完全不受外部环境条件的影响, 即使在短时水浸泡等特别情况下也能保证开关正常运行, 产品终身免维修。

◆ 操作安全

开关柜具有完善的五防联锁装置, 彻底杜绝人为误操作可能引起的人员伤害及运行故障。所有开关柜具有可靠的安全泄压通道, 即使在特别情况下也能保障操作人员的人身安全。

◆ 方案灵活

开关柜分为固定单元组合和可扩展单元组合两类开关柜, 通常由正面进出线, 也可按不同的安装位置实现侧出线或侧扩展。柜体尺寸安装方便, 并能够适合空间狭小及环境条件不良的地方。开关柜可根据用户的不同需求配置电动机构操作, 远程及监测装置。

◆ 应用广泛

馈出线容量大、占地小, 适合多种应用需求。



The fully insulated and fully enclosed (standardized) main ring unit metal switchgear adopts SF₆ gas as arc extinguishing and insulating medium.

◆ Reliable operation

The switchgear is fully enclosed and fully insulated; the bus, switches and live parts are completely enclosed in its stainless steel shell. The cavity is filled with SF₆ gas at 0.04Mpa, and its ingress protection is IP67. The whole switchgear is not influenced by external environmental conditions, even in special conditions such as short-time water immersion, its normal operation is guaranteed and it is free from maintenance for its whole life.

◆ Operation safety

The switchgear is equipped with a perfect five-protection interlocking to prevent any personnel injury or fault due to any error in operation. All switchgears are equipped with reliable pressure relief channels to guarantee operators' personal safety in special conditions.

◆ Flexible configuration

The switchgears are divided into two types: non-expandable combination and expandable combination, with cabling from the front or cabling from the side or expanded from the side according to various installation positions. The cabinet is easy to install, is ideal for a small space or an area with unfavorable environmental conditions. The switchgear can be equipped with electric actuator, remote control and monitoring device according to various users' needs.

◆ Widely applicable

With great feeder capacity and a small area occupied for various applications.

设计说明 Design description
◆ 技术说明

DRM-12 全绝缘全封闭环网开关设备 (标准化) 安装在一个镀锌板框架上, 开关单元在 SF₆ 气箱内, 气箱由抗腐蚀和无磁性 3mm 厚不锈钢板制成。

SF₆ 气箱是一个“密封压力系统”在正常工作环境下可运行 20 年。SF₆ 气体正常工作时压力为 0.03~0.25Mpa。

气箱装有压力释放装置, 当压力过高时, 保证气体能从底部或后部释放。

◆ 开关单元

负荷开关采用同轴旋转双断点方式, 通过同一操作孔与滑板配合进行动能操作, 因此开关在任一时刻只能处于“合闸、分闸、接地”三种状态的其中之一, 彻底避免误操作。

◆ 操作机构

开关的操作机构安装在气箱外的前部, 经特殊工艺处理, 防锈蚀, 方便手动操作及维护, 并很容易实现电动操作。

◆ Technical description

DRM-12 fully insulated and fully enclosed main ring unit switchgear (standardized) is installed on a galvanized sheet frame with switchgear inside an SF₆ gas tank made of corrosion-proof and non-magnetic 3mm-thick stainless steel sheet.

The SF₆ gas tank is a “sealed pressure system” that can run for 20 years in normal work conditions. The SF₆ gas normal operation pressure is 0.03~0.25Mpa. The gas tank is equipped with a pressure relief device to guarantee that the gas can be relieved from the bottom or the back when the pressure is too high.

◆ Switchgear

The load switch with coaxial rotating double-breakpoint method is operated in a same operation hole and a same slide plate to carry out kinetic operation, so it can only be in one of the three states of “closing, breaking, grounding” at any time to prevent any error in operation.

◆ Actuator

The switch actuator is installed in the front of the gas tank and is treated by special technique to be corrosion-proof, easy to operate and maintain manually or actuate electrically.

单元定义 Unit definition

单元代号 Unit code	意义 Meaning
C	标准单套管负荷开关单元 Standard single-bushing load switch unit
F	负荷开关-熔断器组合电器单元 Load switch-fuse appliance combination unit
V	断路器单元 Circuit breaker unit
D	电缆进线单元 (不带开关) Cable feeder unit (without switch)
+	母线侧套管 Bus side bushing
-	母线顶套管 Bus top bushing
SL	母联单元 Bus coupler unit
M	计量单元 Metering unit
PT	PT 单元 PT unit
1K2(4)	双套管出线额负荷开关单元 Load switch unit with double-bushing outlets

主要技术参数 Main technical parameters

名称 Name		C 模块 Module C	F 模块 Module F	V 模块 Module V		CB 模块 Module CB	
		复合开关 Compound switch	组合电器 Appliance combination	真空开关 Vacuum switch	隔离 / 接地开关 Insulation/ grounding switch	真空断路器 Vacuum switch	隔离 / 接地开关 Insulation/ grounding switch
额定电压 Rated voltage	kV	12	12	12	12	12	12
额定频率 Rated frequency	Hz	50/60	50/60	50/60	50/60	50/60	50/60

主要技术参数 Main technical parameters

名称 Name		C 模块 Module C	F 模块 Module F	V 模块 Module V		CB 模块 Module CB	
		复合开关 Compound switch	组合电器 Appliance combination	真空开关 Vacuum switch	隔离 / 接地开关 Insulation/ grounding switch	真空断路器 Vacuum switch	隔离 / 接地开关 Insulation/ grounding switch
工频耐受电压 (相间 / 断口) Power frequency withstand voltage (phase-to-phase/disconnection)	kV	42/48	42/48	42/48	42/48	42/48	42/48
雷电冲击耐受电压 Lightning impulse withstand voltage	kV	75/85	75/85	75/85	75/85	75/85	75/85
额定电流 Rated current	A	630	注 ¹⁾ Note	630/1250	630/1250	630/1250	630/1250
额定闭环开断电流 Rated closed-loop breaking current	A	630					
额定电缆充电开断电流 Rated cable charging breaking current	A	10					
额定短路关合电流 (峰值) Rated short-circuit closing current (peak)	A	50					
额定峰值耐受电流 Rated peak withstand current	kA	50	80				
额定短时耐受电流 Rated instantaneous withstand current	kA/3s	20					
额定短路开断电流 Rated short-circuit breaking current	kA		31.5	20/25		20/25	
额定转移电流 Rated transfer current	A		1750				
配用熔断器最大电流 Maximum fuse current	A	-	125				
回路电阻 Circuit resistance	-n	≤ 200	≤ 400				
机械寿命 Mechanical life	次 Time	5000	3000	5000	5000	5000	5000

注: 1) 取决于熔断器的电流额定值。Note: 1) subject to rated current of fuse.

各类非扩展标准组合单元柜 Various non-expansion standard combination unit cabinets
非扩展标准模块

共提供以下十五种标装组合

DRM-12 型开关柜的每个模块具有下列配置

D 柜 - 提升模块

见 第 035 页 “不带接地刀的电缆连接模块” 中标准配置与特性

C 柜 - 负荷开关模块

见 第 032 页 “负荷开关模块” 中标准配置与特性

F 柜 - 负荷开关熔断器组合电器模块

见 第 036 页 “负荷开关熔断器组合电器模块” 中标准配置与特性

V 柜 - 真空开关模块

见 第 037 页 “真空开关模块” 中标准配置与特性

Non-expansion standard module

The following fifteen standard combinations are available
Each module of DRM-12 switchgear has following configurations

Cabinet D - Lifting module

See standard configuration and features in “Cable connecting module without grounding knife” in page 011.

Cabinet C - Load switch module

See standard configuration and features in “Load switch module” in page 009.

Cabinet F - Load switch fuse appliance combination module

See standard configuration and features in “Load switch fuse appliance combination module” in page 012.

Cabinet V - Vacuum switch module

See standard configuration and features in “Vacuum switch module” in page 013.

DRM-12 型开关柜的每个模块具有下列配置

- ◆ 进线套管的电容性电压指示器
- ◆ 每个气室安装一个监测 SF6 密度的压力计
- ◆ 吊装用的吊耳
- ◆ 操作手柄

Each module of DRM-12 switchgear has following configuration

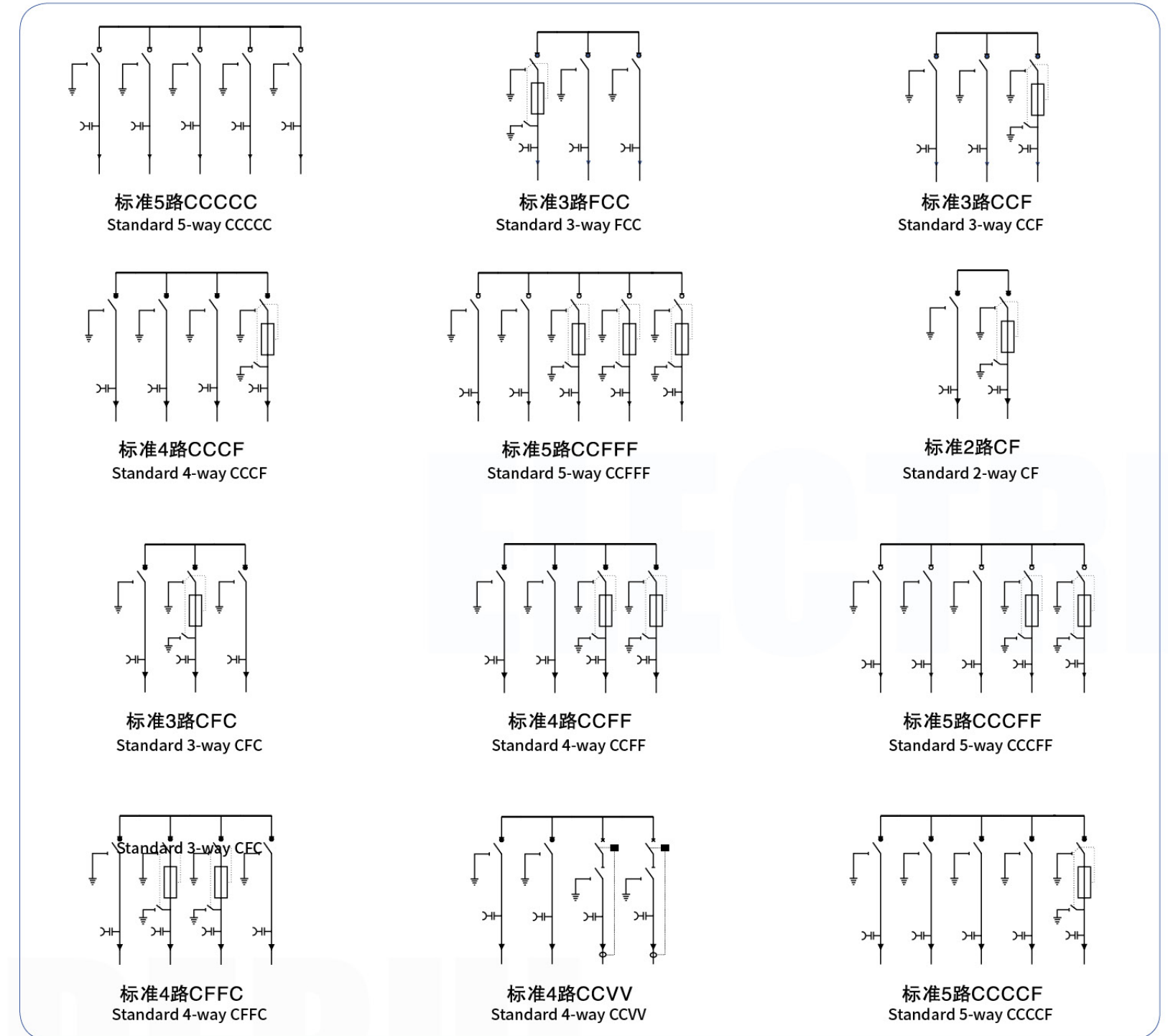
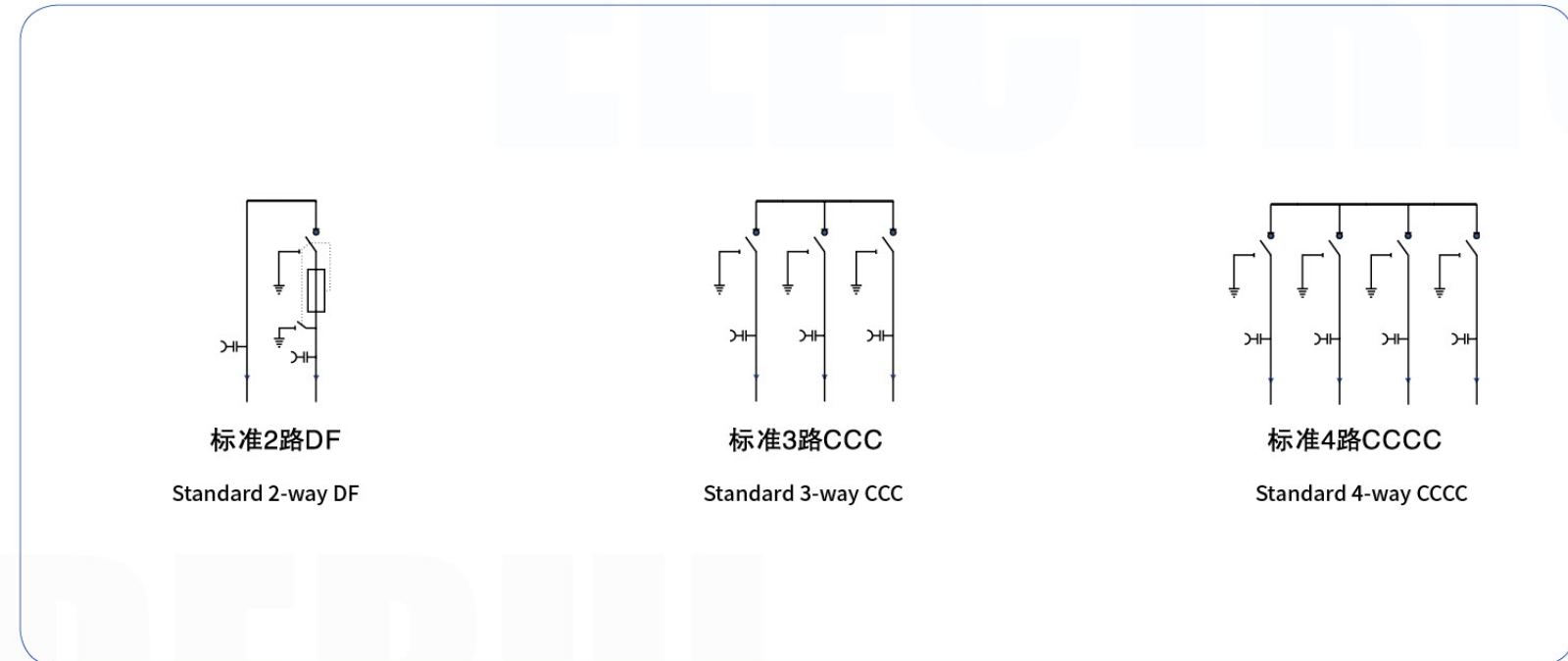
- ◆ Capacitive voltage indicator of inlet bushing
- ◆ Pressure gauge for monitoring SF6 density in each gas chamber
- ◆ Lifting lugs
- ◆ Handle

选配

- ◆ 电动操作机构
- ◆ 电缆短路及接地故障指示器
- ◆ 电流互感器及表计
- ◆ 远程监控及接口

Optional

- ◆ Electric actuator
- ◆ Cable short-circuit and ground-fault indicator
- ◆ Current transformer and meter
- ◆ Remote monitoring and interface



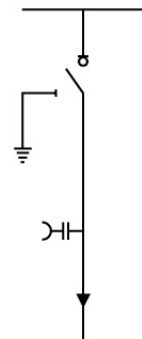
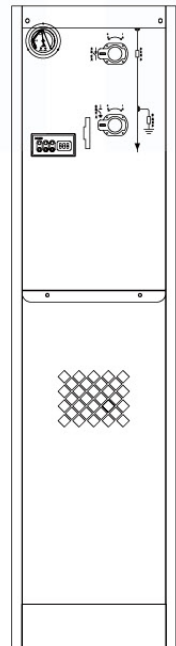
扩展模块 - 负荷开关模块 C Expansion module - Cable connecting module with grounding knife De

标准配置与特性 Standard configuration and features

- ◆ 630A 母线
- ◆ 三工位负荷 / 接地开关
- ◆ 三工位单弹簧操作机构, 有两个独立的负荷开关和接地开关操作轴
- ◆ 负荷开关和接地开关位置指示
- ◆ 位于前部水平布置的出线套管 630A 的 400 系列螺栓式套管
- ◆ 指示套管带电的容性电压指示器
- ◆ 对于所有的开关功能都在面板上有方便的加装挂锁装置
- ◆ SF₆ 气体压力表 (每个 SF₆ 气箱中仅有一处)
- ◆ 接地母排
- ◆ 接地开关与电缆室前面板的联锁
- ◆ 630A bus
- ◆ Three-position load/grounding switch
- ◆ Three-position single-spring actuator with two independent load switches and grounding switch shaft
- ◆ Load switch and grounding switch position indication
- ◆ Horizontal 400 series of bolted bushing of outlet bushing 630A in front
- ◆ Capacitive voltage indicator for live bushing
- ◆ Padlock for all switch functions on panel
- ◆ SF₆ gas pressure gauge (only one per SF₆ gas tank)
- ◆ Grounding bus
- ◆ Interlocking of grounding switch and cable room front panel

可选配置与特性 Optional configuration and features

- ◆ 预留母线扩展
- ◆ 外部母线
- ◆ 负荷开关操作电动机动 24V/48V DC, 110V/220V DC/AC
- ◆ 短路及接地故障指示器
- ◆ 测量环形电流互感器及电流表
- ◆ 计量环形电流互感器及电度表
- ◆ 在电缆进线套管处可加装氧化锌避雷器或双电缆头
- ◆ 钥匙互锁
- ◆ 进线带电接地闭锁 (当套管带电时闭锁接地开关) 110V/220V AC/DC
- ◆ 辅助触点
 - ◇ 负荷开关位置 2NO+2NC
 - ◇ 接地开关位置 2NO+2NC
 - ◇ 带信号的压力表 1NO
 - ◇ 带信号触点的灭弧器 1NO



- ◆ 二次装置可装设于
 - ◇ 开关柜顶部的二次线小室
 - ◇ 开关柜顶部的低压箱
- ◆ Reserved bus extension
- ◆ External bus
- ◆ Electric actuator of load switch 24V/48V DC, 110V/220V DC/AC
- ◆ Short-circuit and ground-fault indicator
- ◆ Measuring loop current transformer and ammeter
- ◆ Metering loop current transformer and kilowatt-hour meter
- ◆ Zinc oxide lightning arrester or double-cable junction are available at cable inlet bushing
- ◆ Key interlocking
- ◆ Inlet live grounding block (block grounding switch when bushing is live) 110V/220V AC/DC
- ◆ Auxiliary contact
 - ◇ Load switch position 2NO+ 2NC
 - ◇ Grounding switch position 2NO+2NC
 - ◇ Pressure gauge with signal 1NO
 - ◇ Arc extinguisher with signal contact 1NO
- ◆ Secondary device can be installed in
 - ◇ Secondary line chamber on top of switchgear
 - ◇ Low-voltage box on top of switchgear

扩展模块 - 带地刀电缆连接模块 De Expansion module - Cable connecting module with grounding knife De

标准配置与特性 Standard configuration and features

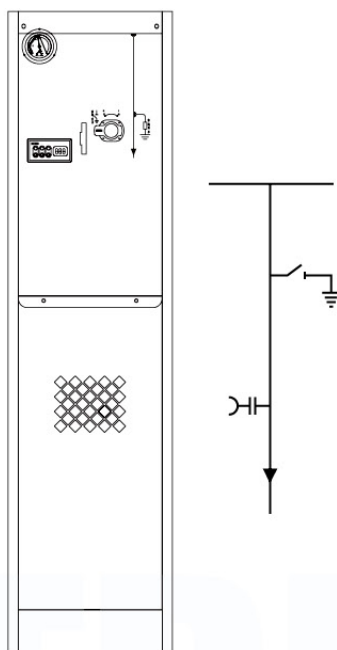
- ◆ 630A 母线
- ◆ 接地开关
- ◆ 两工位单弹簧操作机构
- ◆ 接地开关位置指示
- ◆ 位于前部水平布置的出线套管
- ◇ 630A 的 400 系列螺栓式套管
- ◆ 指示套管带电的容性电压指示器
- ◆ 对于所有的开关功能都在面板上有方便的加装挂锁装置
- ◆ SF₆ 气体压力表 (每个 SF₆ 气箱中仅有一处)
- ◆ 接地母排
- ◆ 接地开关与电缆室前面板的联锁
- ◆ 630A bus
- ◆ Grounding switch
- ◆ Two-position single-spring actuator
- ◆ Grounding switch position indication
- ◆ Horizontal outlet bushing in front
- ◆ 400 series of bolted bushing of 630A



- ◆ Capacitive voltage indicator of live bushing
- ◆ Padlock for all switch functions on panel
- ◆ SF6 gas pressure gauge (only one per SF6 gas tank)
- ◆ Grounding bus
- ◆ Interlocking of grounding switch and cable room front panel

可选配置与特性 Optional configuration and features

- ◆ 预留母线扩展
- ◆ 外部母线
- ◆ 短路及接地故障指示器
- ◆ 测量环形电流互感器及电流表
- ◆ 计量环形电流互感器及电度表
- ◆ 在电缆进线套管处可加装氧化锌避雷器或双电缆头钥匙互锁
- ◆ 进线带电接地闭锁 (当套管带电时闭锁接地开关) 110V/220V AC/DC
- ◆ 辅助触点
 - ◇ 接地开关位置 2NO+2NC
 - ◇ 带信号的压力表 1NO
 - ◇ 带信号触点的灭弧器 1NO
- ◆ 二次装置可装设于
 - ◇ 开关柜顶部的二次线小室
 - ◇ 开关柜顶部的低压箱
- ◆ Reserved bus extension
- ◆ External bus
- ◆ Short-circuit and ground-fault indicator
- ◆ Measuring loop current transformer and ammeter
- ◆ Metering loop current transformer and kilowatt-hour meter
- ◆ Zinc oxide lightning arrester or double-cable junction key interlock is available at cable inlet bushing
- ◆ Inlet live grounding block (block grounding switch when bushing is live) 110V/220V AC/DC
- ◆ Auxiliary contact
 - ◇ Grounding switch position 2NO+2NC
 - ◇ Pressure gauge with signal 1NO
 - ◇ Arc extinguisher with signal contact 1NO
- ◆ Secondary device can be installed in
 - ◇ Secondary line chamber on top of switchgear
 - ◇ Low-voltage box on top of switchgear



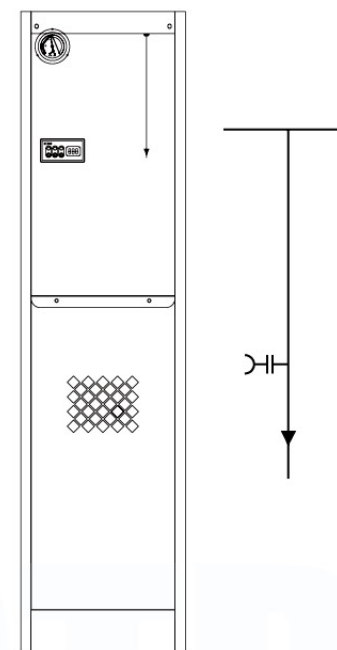
扩展模块 - 不带地刀电缆连接模块 D Expansion module - Cable connecting module without grounding knife D

标准配置与特性 Standard configuration and features

- ◆ 630A 母线
- ◆ 位于前部水平布置的出线套管, 630A 的 400 系列螺栓式套管
- ◆ 指示套管带电的容性电压指示器
- ◆ SF₆ 气体压力表 (每个 SF₆ 气箱中仅有一只)
- ◆ 接地母排
- ◆ 630A bus
- ◆ Horizontal outlet bushing in front 400 series of bolted bushing of 630A
- ◆ Capacitive voltage indicator of live bushing
- ◆ SF₆ gas pressure gauge (only one per SF₆ gas tank)
- ◆ Grounding bus

可选配置与特性 Optional configuration and features

- ◆ 预留母线扩展
- ◆ 外部母线
- ◆ 短路及接地故障指示器
- ◆ 测量环形电流互感器及电流表
- ◆ 计量环形电流互感器及电度表
- ◆ 在电缆进线套管处可加装氧化锌避雷器或双电缆头
- ◆ 二次装置可装设于
 - ◇ 开关柜顶部的二次线小室
 - ◇ 开关柜顶部的低压箱
- ◆ Reserved bus extension
- ◆ External bus
- ◆ Short-circuit and ground-fault indicator
- ◆ Measuring loop current transformer and ammeter
- ◆ Metering loop current transformer and kilowatt-hour meter
- ◆ Zinc oxide lightning arrester or double-cable junction are available at cable inlet bushing
- ◆ Secondary device can be installed in
 - ◇ Secondary line chamber on top of switchgear
 - ◇ Low-voltage box on top of switchgear



扩展模块 - 负荷开关熔断器组合电器模块 F Expandable module - Load switch fuse appliance combination module F

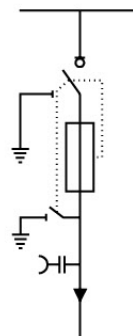
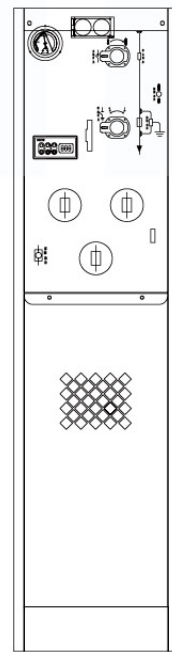
标准配置与特性 Standard configuration and features

- ◆ 630A 母线
- ◆ 三工位的负荷开关，熔断器首端与熔断器末端接地开关为机械联动
- ◆ 三工位双弹簧操作机构，有两个独立的负荷开关和接地开关操作轴
- ◆ 负荷开关和接地开关位置指示
- ◆ 熔断器筒
- ◆ 熔断器水平放置
- ◆ 熔断器跳闸指示
- ◆ 位于前部水平布置的出线套管，200A 的 200 系列插入式套管
- ◆ 指示套管带电的容性电压指示器
- ◆ 对于所有的开关功能都在面板上有方便的加装挂锁装置
- ◆ SF₆ 气体压力表（每个 SF₆ 气箱中仅有一只）
- ◆ 接地母排
- ◆ 用于变压器保护的熔断器参数
- ◇ 12kV, max 125A 熔断器
- ◆ 接地开关与电缆室前面板的联锁

- ◆ 630A bus
- ◆ Three-position load switch with mechanical link between fuse head and fuse end grounding switch
- ◆ Three-position double-spring actuator with two independent load switch and grounding switch shafts
- ◆ Load switch and grounding switch position indication
- ◆ Fuse cartridge
- ◆ Horizontal fuse
- ◆ Fuse trip indication
- ◆ Horizontal outlet bushing in front, 200 series of plug-in bushing of 200A
- ◆ Capacitive voltage indicator of live bushing
- ◆ Padlock for all switch functions on panel
- ◆ SF₆ gas pressure gauge (only one per SF₆ gas tank)
- ◆ Grounding bus
- ◆ Fuse parameters for transformer protection
- ◇ 12kV, max 125A fuse
- ◆ Interlocking of grounding switch and cable chamber front panel

可选配置与特性 Optional configuration and features

- ◆ 预留母线扩展
- ◆ 外部母线
- ◆ 负荷开关操作电动机 24V/48V DC, 110V/220V DC/AC
- ◆ 并联跳闸线圈 24V/48V DC, 110V/220V DC/AC
- ◆ 并联合闸线圈 24V/48V DC, 110V/220V DC/AC



- ◆ 测量环形电流互感器及电流表
- ◆ 计量环形电流互感器及电度表
- ◆ 进线带电接地闭锁（当套管带电时闭锁接地开关）110V/220V AC/DC
- ◆ 辅助触点
- ◇ 负荷开关位置 2NO+2NC
- ◇ 接地开关位置 2NO+2NC
- ◇ 熔断器熔断 1NO
- ◇ 带信号的压力表 1NO
- ◇ 带信号触点的灭弧器 1NO
- ◆ 二次装置可装设于
- ◇ 开关柜顶部的二次线小室
- ◇ 开关柜顶部的低压箱

- ◆ Reserved bus extension
- ◆ External bus
- ◆ Load switch actuating motor 24V/48V DC, 110V/220V DC/AC
- ◆ Parallel tripping coil 24V/48V DC, 110V/220V DC/AC
- ◆ Parallel closing coil 24V/48V DC, 110V/220V DC/AC
- ◆ Measuring loop current transformer and ammeter
- ◆ Metering loop current transformer and kilowatt-hour meter
- ◆ Inlet live grounding block (block grounding switch when bushing is live) 110V/220V AC/DC
- ◆ Auxiliary contact
- ◇ Load switch position 2NO+ 2NC
- ◇ Grounding switch position 2NO+ 2NC
- ◇ Fuse breaking 1NO
- ◇ Pressure gauge with signal 1NO
- ◇ Arc extinguisher with signal contact 1NO
- ◆ Secondary device can be installed in
- ◇ Secondary line chamber on top of switchgear
- ◇ Low-voltage box on top of switchgear

扩展模块 - 真空开关模块 V Expandable module - Vacuum switch module V

标准配置与特性 Standard configuration and features

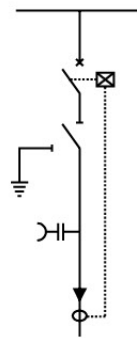
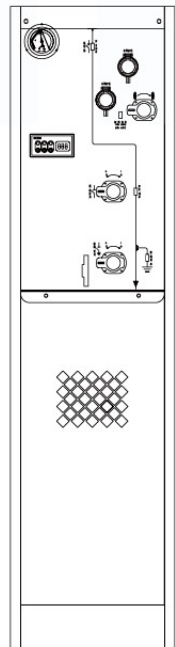
- ◆ 630A 母线
- ◆ 630A 的变压器 / 线路保护用真空开关
- ◆ 真空开关用两工位弹簧操作机构
- ◆ 真空开关下部三工位隔离 / 接地开关
- ◆ 三工位隔离 / 接地开关单弹簧操作机构
- ◆ 真空开关和三工位开关机械联锁
- ◆ 真空开关和三工位开关位置指示
- ◆ 电子式保护继电器

- ◆ 跳闸线圈 (用于继电器动作)
- ◆ 位于前部水平布置的出线套管, 630A 的 400 系列螺栓式套管
- ◆ 指示套管带电的容性电压指示器
- ◆ 对于所有的开关功能, 都在面板上有方便的加装挂锁装置
- ◆ SF₆ 气体压力表 (每个 SF₆ 气箱中仅有一处)
- ◆ 接地母排
- ◆ 接地开关与电缆室前面板的联锁

- ◆ 630A bus
- ◆ Vacuum switch for 630A transformer/line protection
- ◆ Two-position spring actuator of vacuum switch
- ◆ Three-position insulation/grounding switch below vacuum switch
- ◆ Three-position insulation/grounding switch single-spring actuator
- ◆ Mechanical interlocking of vacuum switch and three-position switch
- ◆ Vacuum switch and three-position switch position indication
- ◆ Electronic protection relay
- ◆ Tripping coil (for relay action)
- ◆ Horizontal outlet bushing in front, 400 series of bolted bushing of 630A
- ◆ Capacitive voltage indicator of live bushing
- ◆ Padlock for all switch functions on panel
- ◆ SF₆ gas pressure gauge (only one per SF₆ gas tank)
- ◆ Grounding bus
- ◆ Interlocking of grounding switch and cable chamber front panel

可选配置与特性 Optional configuration and features

- ◆ 预留母线扩展
- ◆ 外部母线
- ◆ 真空开关操作电动机 24V/48V DC, 110V/220V DC/AC
- ◆ 并联跳闸线圈 24V/48V DC, 110V/220V DC/AC
- ◆ 并联合闸线圈 24V/48V DC, 110V/220V DC/AC
- ◆ 测量环形电流互感器及电流表
- ◆ 计量环形电流互感器及电度表
- ◆ 钥匙互锁
- ◆ 进线带电接地闭锁 (当套管带电时闭锁接地开关) 110V/220V AC/DC
- ◆ 辅助接点
 - ◇ 真空开关位置 2NO+2NC
 - ◇ 隔离开关位置 2NO+2NC
 - ◇ 接地开关位置 2NO+2NC
 - ◇ 真空开关跳闸信号 1NO
 - ◇ 带信号的压力表 1NO
 - ◇ 带信号触点的灭弧器 1NO



- ◆ 二次装置可装设于
 - ◇ 开关柜顶部的二次线小室
 - ◇ 开关柜顶部的低压箱
- ◆ 其它继电器
 - ◆ Reserved bus extension
 - ◆ External bus
 - ◆ Vacuum switch actuating motor 24V/48V DC, 110V/220V DC/AC
 - ◆ Parallel tripping coil 24V/48V DC, 110V/220V DC/AC
 - ◆ Parallel closing coil 24V/48V DC, 110V/220V DC/AC
 - ◆ Measuring loop current transformer and ammeter
 - ◆ Metering loop current transformer and kilowatt-hour meter
 - ◆ Key interlocking
 - ◆ Inlet live grounding block (block grounding switch when bushing is live) 110V/220V AC/DC
 - ◆ Auxiliary contact
 - ◇ Vacuum switch position 2NO+2NC
 - ◇ Insulation switch position 2NO+ 2NC
 - ◇ Ground switch position 2NO+2NC
 - ◇ Vacuum switch trip signal 1NO
 - ◇ Pressure gauge with signal 1NO
 - ◇ Arc extinguisher with signal contact 1NO
 - ◆ Secondary device can be installed in
 - ◇ Secondary line chamber on top of switchgear
 - ◇ Low-voltage box on top of switchgear
 - ◆ Other relays

扩展模块 - 母线接地模块 Be Expandable module - Bus grounding module Be

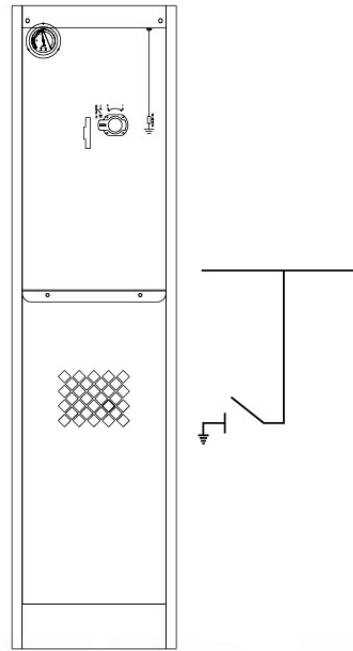
标准配置与特性 Standard configuration and features

- ◆ 630A 母线
- ◆ 接地开关
- ◆ 两工位单弹簧操作机构
- ◆ 接地开关位置指示
- ◆ 对于所有的开关功能都在面板上有方便的加装挂锁装置
- ◆ SF₆ 气体压力表 (每个 SF₆ 气箱中仅有一处)
- ◆ 接地母排

- ◆ 630A bus
- ◆ Grounding switch
- ◆ Two-position single-spring actuator
- ◆ Grounding switch position indication
- ◆ Padlock for all switch functions on panel
- ◆ SF₆ gas pressure gauge (only one per SF₆ gas tank)
- ◆ Grounding bus

可选配置与特性 Optional configuration and features

- ◆ 预留母线扩展
- ◆ 外部母线
- ◆ 钥匙互锁
- ◆ 辅助触点
- ◇ 接地开关位置 2NO+2NC
- ◇ 带信号的压力表 1NO
- ◆ 二次装置可装设于
- ◇ 开关柜顶部的二次线小室
- ◇ 开关柜顶部的低压箱
- ◆ Reserved bus extension
- ◆ External bus
- ◆ Key interlocking
- ◆ Auxiliary contact
- ◇ Grounding switch position 2NO+2NC
- ◇ Pressure gauge with signal 1NO
- ◆ Secondary device can be installed in
- ◇ Secondary line chamber on top of switchgear
- ◇ Low-voltage box on top of switchgear



扩展模块 - 计量模块 M Expandable module - Metering module M

标准配置与特性 Standard configuration and features

- ◆ 2 只电流互感器
- ◆ 2 只电压互感器
- ◆ 6 只 400 系列套管, 用于 DRM-12 型充气式的外母线连接, 上进上出
- ◆ 保护 PT 的熔断器
- ◆ 低压组成部分
- ◇ 1 只带转换开关的电压表
- ◇ 1 只带转换开关的电流表
- ◇ 宽 × 高 × 深 =696X1806X820mm
- ◆ 2 current transformers
- ◆ 2 voltage transformers
- ◆ 6 x 400 series of bushings for DRM-12 inflatable external bus connection, top inlet and top outlet
- ◆ Fuse for PT protection
- ◆ Low-voltage part
- ◇ 1 voltmeter with transfer switch
- ◇ 1 ammeter with transfer switch
- ◇ W*H*D=696*1806*820mm

可选配置与特性 Optional configuration and features

- ◆ 3 只电流互感器
- ◆ 3 只电压互感器
- ◆ 氧化锌避雷器
- ◆ 指示开关柜带电的容性电压指示器
- ◆ 低压组成部分
- ◇ 1 只有功电度表
- ◇ 1 只无功电度表
- ◆ 3 current transformers
- ◆ 3 voltage transformers
- ◆ Zinc oxide arrester
- ◆ Capacitive voltage indicator of live switchgear
- ◆ Low-voltage part
- ◇ 1 active kilowatt-hour meter
- ◇ 1 reactive kilowatt-hour meter

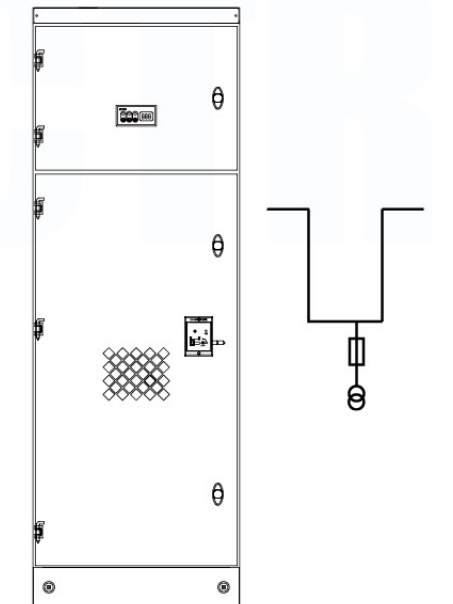
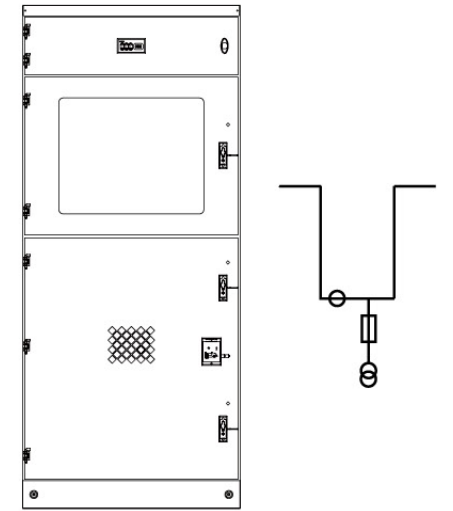
扩展模块 - PT 模块 P Expandable module - PT module P

标准配置与特性 Standard configuration and features

- ◆ 2 只电压互感器
- ◆ 保护 PT 的熔断器
- ◆ 1 只带转换开关的电压表
- ◆ 上进, 出, 3 只 (6 只) 400 系列套管用于开关柜的外置母线连接
宽 × 高 × 深 =696×1806×820mm
- ◆ 下部电缆进, 出线
宽 × 高 × 深 =696×1460×820mm
- ◆ 2 voltage transformers
- ◆ Fuse for PT protection
- ◆ 1 voltmeter with transfer switch
- ◆ Top inlet and top outlet 3 x (6 x) 400 series of bushing for external bus connection of switchgear.
W*H*D=696*1806*820mm
- ◆ Bottom cable inlet and bottom cable outlet
W*H*D=696*1460*820mm

可选配置与特性 Optional configuration and features

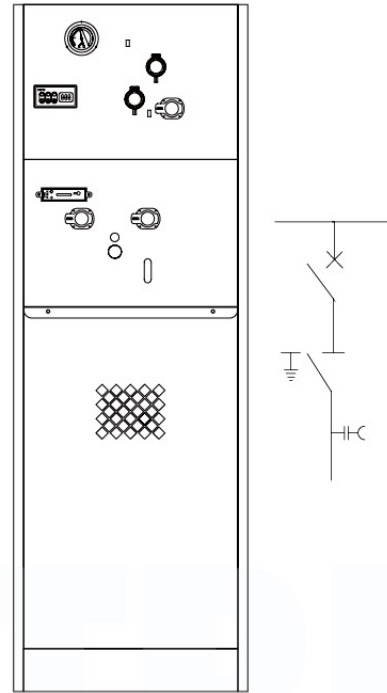
- ◆ 氧化锌避雷器
- ◆ 指示开关柜带电的容性电压指示器
- ◆ 24VDC 充电器及蓄电池
- ◆ 隔离开关
- ◆ Zinc oxide arrester
- ◆ Capacitive voltage indicator of live switchgear
- ◆ 24VDC charger and storage battery
- ◆ Insulation switch



扩展模块 - 真空管断路器模块 CB Expandable module - Vacuum tube circuit breaker module CB

标准配置与特性 Standard configuration and features

- ◆ 1250A/630A 的母线
- ◆ 1250A/630A 的线路保护用真空断路器
- ◆ 真空断路器 VD4(VS1) 电动操作 110/220V DC/AC
- ◆ 真空断路器上部三工位隔离 / 接地开关电动操作
- ◆ 保护与控制单元 (带保护 CT)
- ◆ 分励脱扣线圈 110V/220V DC/AC
- ◆ 合闸线圈 110V/220V DC/AC
- ◆ 位于前部水平布置的出线套管
- ◆ 1250A/630A 系列螺栓式套管
- ◆ 指示套管带电的电容性电压指示器
- ◆ 1250A/630A 的预留母线扩展
- ◆ SF₆ 气体压力表 (每个 SF₆ 气箱中仅有一处)
- ◆ 宽 × 高 × 深 = 690 × 1806 × 781mm
- ◆ 合分顺序: 0-0.3s-CO-180s-CO
- ◆ 气体压力传感器
- ◆ 1250A/630A bus
- ◆ Vacuum circuit breaker for 1250A/630A line protection
- ◆ Vacuum circuit breaker VD4(VS1) electric actuation 110/220V DC/AC
- ◆ Electric actuation of three-position insulation/grounding switch above vacuum circuit breaker
- ◆ Protection and control unit (with CT protection)
- ◆ Shunt trip coil 110V/220V DC/AC
- ◆ Closing coil 110V/220V DC/AC
- ◆ Horizontal outlet bushing in front
- ◆ 1250A/630A series of bolted bushing
- ◆ Capacitive voltage indicator of live bushing
- ◆ 1250A/630A reserved bus extension
- ◆ SF₆ gas pressure gauge (only one per SF₆ gas tank)
- ◆ W*H*D=690*1806*781mm
- ◆ Closing/tripping sequence: 0-0.3S-CO-180s-CO
- ◆ Gas pressure sensor



可选配置与特性 Optional configuration and features

- ◆ 进线电缆处加装氧化锌避雷器
- ◆ 电流传感器
- ◆ 电压传感器
- ◆ Zinc oxide arrester at inlet cable
- ◆ Current sensor
- ◆ Voltage sensor

遥控及监控单元 Remote control and monitoring unit

配置了一体化的遥控、遥测、通信自动化模块的 DRM-12 全绝缘全密封 (标准化) 环网金属开关设备实现了环网开关设备智能化应用。利用通讯将各单元与上级调度中心连接, 可实现配电系统综合自动化。配网自动化使调度运行人员可以足不出户地了解整个配网的运行情况, 迅速实现故障定位, 自动或人为地实现故障的隔离和网络的重构, 从而大大缩短停电面积和时间, 减少故障造成的损失。此外, 还可以方便地进行负荷监控与调配, 有利于网络的合理利用。与开关柜相配的是配网自动化系统。该系统为开放式设计, 包括了子站和自动化终端模块两部分。自动化终端为分布式模块化设计, 具有很高的可靠性。同时, 其紧凑的外形便于安装于紧凑开关设备中。

Equipped with integrated remote control, telemetry and telecommunication automation modules, DRM-12 fully insulated and fully enclosed (standardized) main ring unit switchgear realizes intelligent application of main ring unit switchgear. By telecommunication, it connects each unit with a deployment center at a higher level to realize comprehensive automation of a power distribution system. The automatic power distribution system network enables a deployment operator to understand the whole power distribution system network status in office, locate any fault quickly, automatically or manually realize fault insulation and network reconstruction, to control power failure within a smaller area and a shorter period with less loss. In addition, it's convenient to monitor or deploy any load, which is beneficial to rational utilization of this network.

The switchgear is equipped with a network distribution automation system. This system has an open design and includes two parts: substation and automation terminal module. The automation terminal has a distribution modular design with high reliability. Meanwhile, it is compact and can be installed in any compact switchgear.

标准配置与特性 Standard configuration and features

- ◆ 16 个开关量输入 (单遥信), 隔离电压 1500VDC
- ◆ 8 个模拟量输入 (遥测), 包括 4 个电流 (AC5A)
- ◆ 4 个电压 (1*24VDC, 3*100VDC/220VAC)
- ◆ 6 个开关量输出 (遥控, 可用于多至 3 个开关合分)
- ◆ C 型干触点, 250V AC8A/30V DC8A
- ◆ 1 个 RS485 通讯口用于远方通讯, 最远可达 1200m
- ◆ 16 switch inputs (single telemetry), insulation voltage 1500VDC
- ◆ 8 analogy inputs (telemetry), including 4 current (AC5A)
- ◆ 4 voltage (1*24VDC, 3*100VDC/220VAC)
- ◆ 6 switch outputs (remote control, available for up to 3 switches)
- ◆ C-type dry contact, 250V AC8A/30V DC8A
- ◆ 1 RS485 communication port for remote communication up to 1200m

选择功能 Function to choose

馈线 P、Q、kwh、F 等的计算功能
电流保护功能, 可作用于开关量输出或通讯输出。

Calculation function of feeder P, Q, kwh, F, etc.
Current protection function applicable to switch output or communication output.

变压器 / 线路保护 Transformer, line protection

DRM-12 全绝缘全封闭环网开关设备 (标准化) 提供了两种变压器保护方式: 负荷开关熔断器组合电器和具有继电器保护的断路器。

DRM-12 fully insulated and fully enclosed main ring unit switchgear (standardized) provides two types of transformer protection: load switch fuse appliance combination and circuit breaker with relay protection.

◆ 使用负荷开关熔断器组合电器模块

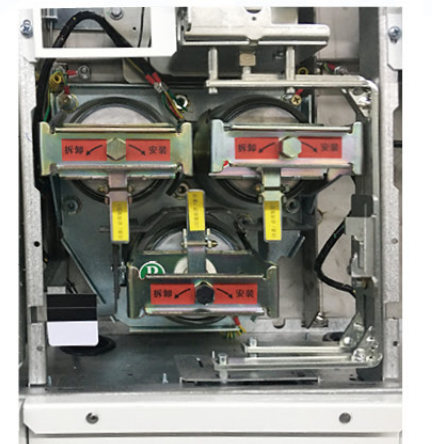
变压器保护为限流高压熔断器与负荷开关的组合。熔断器室将安装在一个位于单元前部独立的有闭锁的外壳后面。负荷开关使用弹簧储能机构, 该机构可由熔断器撞针所触发。

为了便于熔断器的更换, 可以使用操作手柄来拆卸熔断器室的端盖。熔断器的跳闸机构前置, 保证了整个系统的防水性能。

◆ Use of load switch fuse appliance combination module

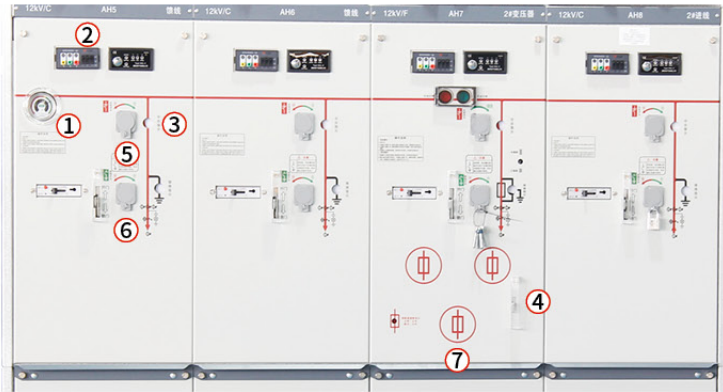
The transformer protection is a combination of current-limiting high-voltage fuse and load switch. The fuse chamber will be installed on the back of an independent latching enclosure shell in the front of the unit. The load switch has a spring-loaded energy storage mechanism to be triggered by fuse firing pin.

To make it easy to replace a fuse, can remove fuse chamber cover by handle. The fuse trip mechanism is in front to keep the whole system water-proof.



DRM-12 产品指示图 DRM-12 Product diagram

- | | | | |
|-----------------------|--------------|--|---|
| ① SF ₆ 气压表 | ④ 接地位置指示 | ① SF ₆ gas pressure gauge | ④ Grounding position indication |
| ② 带电显示器 | ⑤ 负荷开关操作孔 | ② Live indicator | ⑤ Load switch operation hole |
| ③ 合闸、分闸位置指示 | ⑥ 接地开关操作孔 | ③ Closing/breaking position indication | ⑥ Grounding switch operation hole |
| | ⑦ 开关操作位置选择滑板 | | ⑦ Switch position selection sliding plate |



熔断器 - 变压器对照表 Fuse-transformer comparison table

100%	变压器额定容量 (kVA) Rated capacity of transformer (kVA)															
UN(kV)	25	50	75	100	125	160	200	250	315	400	500	630	800	1000	1250	1600
3	16	25	25	40	40	50	50	80	100	125	160					
33	16	25	25	40	40	50	50	63	80	100	125	160				
4.15	10	16	25	25	40	40	50	50	63	80	100	125	160			
5	10	16	25	25	25	40	40	50	50	63	80	100	125	160		
55	6	16	16	25	25	25	40	50	50	63	80	100	125	160		
6	6	16	16	25	25	25	40	40	50	50	80	100	125	160	160	
6.6	6	16	16	25	25	25	40	40	50	50	63	80	100	125	160	
10	6	6	10	16	16	25	25	25	40	40	50	50	80	80	125	125
11	6	6	10	16	16	25	25	25	25	40	50	50	63	80	100	125
12	6	6	10	16	16	16	25	25	25	40	40	50	63	80	100	125
13.8	6	6	10	10	16	16	25	25	25	25	40	50	50	63	80	100
15	6	6	10	10	16	16	16	25	25	25	40	40	50	63	80	100
17.5	6	6	6	10	10	16	16	16	25	25	25	40	50	50	63	80
20	6	6	6	10	10	16	16	16	25	25	25	40	40	50	63	63
22	6	6	6	6	10	10	16	16	16	25	25	25	40	50	50	63
24	6	6	6	6	10	10	16	16	16	25	25	25	40	40	50	63

附件 Accessories

◆ 真正满足需求的电缆室 A cable chamber as required

电缆连接室空间大，套管为标准式设计，实现与所有欧式标准电缆插头的配合。正常情况下每个负荷开关单元可接 1~3 回出线，特殊设计型可接 4~6 回出线。真空断路器单元可接 1~2 回出线。

The cable connection room is large, and the sleeve is standard design to achieve coordination with all European standard cable plugs. Under normal circumstances, each load switch unit can be connected to 1~3 return lines, and the special design type can be connected to 4~6 return lines. The vacuum circuit breaker unit can be connected with 1 or 2 return cables.

◆ 压力释放装置 Pressure relief device

压力释放装置与电缆室之间用金属板隔开，如气箱内压力过高时，装置内防爆膜片破裂，以释放压力。

The pressure relief device is separated from cable chamber by a metal plate. If the pressure in the gas tank is too high, the explosion-proof diaphragm in the device breaks to relieve the pressure.

◆ 电动操作 Electric actuation

对电缆开关单元与变压器单元手动操作机构是标准的方案。也可以选择安装电动操作机构。

电缆开关，真空断路器和接地开关都是通过位于前面板后面的机构进行操作的。对于所有开关和断路器，都可以通过操作手柄操作（标准配置），或者可以配备马达操作机构（附件）。但是，接地开关只能手动操作，并且配置了具有关合故障电流能力的机构。电动操作机构很容易分期实现。

The manual actuator for cable switch unit and transformer unit is standard. An electric actuator is also available. The cable switch, vacuum circuit breaker and grounding switch are operated by a mechanism behind front panel. All switches and circuit breakers can be operated by handle (standard configuration) or can be equipped with a motorized actuator (accessory). However, a grounding switch can only be operated manually and is equipped with a mechanism capable of breaking due to faulty current. It is easy for an electric actuator to realize.

◆ 电缆连接 Cable connection

选用国际标准通用规格套管符合 DIN47636 标准，便于用户选择相应的电缆附件。采用 T 形前、后电缆插头连接，欧式螺栓逐级紧固式结构。前插头与套管的连接采用 M16 螺栓。

The international standard universal specification bushing conforms to DIN47636 standard, so it is convenient for users to choose corresponding cable accessories. The T-shaped front or rear cable plug and European-style bolt step structure are adopted to connect and tighten. M16 bolt is used to connect a front plug with a bushing.

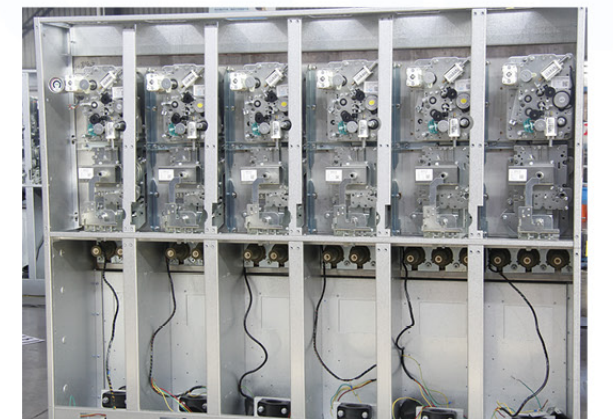
◆ 联锁机构 Interlocking mechanism

开关内部的联锁机构能有效防止误操作。并确保电缆室只有在开关处于“接地”状态，才能进入，并可加明锁，锁定在不同状态。

The interlocking mechanism inside a switch can effectively prevent any error in operation, and guarantee that a person only can enter the cable chamber when the switch is “grounded”, with a lock to lock it in any state.

◆ 避雷器连接 Arrester connection

负荷开关单元可加装 T 形后插式硅橡胶全密封金属氧化锌避雷器。当电缆回路数较多，空间不够时可采用 π 形后插式避雷器。



The load switch unit can be equipped with T-shaped rear-plug silicone rubber fully-sealed metal zinc oxide arrester. When there are many cable circuits without sufficient space, π -shaped rear-plug arrester is available.

◆ 辅助开关 Auxiliary switch

负荷开关、接地开关可根据需要配置能同步反映开关位置状态的辅助开关。

The load switch and grounding switch can be equipped with an auxiliary switch to show the switch position synchronously as required.

◆ 熔断器 Fuse

DRM-12 系列开关熔断器更换直接、简便。使断路器置于绝缘管内。绝缘管位于 SF₆ 的金属气箱内，这种设计有如下优点：

- ◆ 熔断器盖及密封装置在电场最弱部分
- ◆ 无导电物质能附在熔断器组件上
- ◆ 在 SF₆ 气体中的部分完全受保护
- ◆ 熔断器盖无需额外的绝缘

弹簧储能操作机构和联动跳闸装置保证负荷开关三相在任一相熔断器熔断时同时自动断开。

It's easy to replace DRM-12 series of switch fuse. The fuse is in an insulation cartridge, which is in SF₆ metal gas tank. This design has following advantages:

- ◆ Fuse cover and sealing device are at the weakest part of the electric field
- ◆ No conductive substance can attach to the fuse assembly
- ◆ The part within SF₆ gas is completely protected
- ◆ Fuse cover does not require additional insulation

The spring energy storage actuator and linked tripping device guarantee that the 3-phase load switch trips automatically when the fuse of any phase breaks.

◆ 开关测试 Switch test

DRM-12 全绝缘全封闭环网开关设备 (标准化) 通过国家电力工业部电气设备质量检验测试中心检测，产品符合以下主要标准：GB/T11022、IEC 60694、IEC 60265、IEC 60420、IEC 60056、IEC60298、IEC 60129。

DRM-12 fully insulated and fully enclosed main ring unit switchgear (standardized) has been tested by Electrical Equipment Quality Inspection and Test Center of China's Ministry of Electric Power Industry, and the products conform to following main standards: GB/T11022, IEC 60694, IEC 60265, IEC 60420, IEC 60056, IEC60298, IEC 60129.

◆ 使用条件 Use conditions

DRM-12 全绝缘全封闭环网开关设备 (标准化) 适合在 -40°C ~+50°C 的温度范围内使用。12kV 带电体位于 SF₆ 密闭气箱内，硅橡胶手插头实现电缆与开关的连接，形成全绝缘，全密封结构，整个系统不受环境因素的影响，如潮气、灰尘、腐蚀性气体等，SF₆ 气箱由不锈钢材料制成，保证开关免维护，使用寿命长。

DRM-12 fully insulated and fully enclosed main ring unit switchgear (standardized) is ideal to use at -40 ° C ~+50 ° C. The 12kV live part is located in the SF₆ sealed gas tank and the silicone rubber plug makes the cable connected with the switch to form a fully insulated and fully sealed structure; the whole system is not influenced by environmental factors, such as moisture, dust, corrosive gas, etc., the SF₆ gas tank is made of stainless steel to make the switchgear free from maintenance with a long service life.

◆ 表面保护 Surface protection

环网柜框架采用镀锌板，表面静电喷涂，以防腐蚀。柜体正面操作面板有静电喷涂层。

标准涂层：

- ◆ 操作屏 RAL1003 (信号黄)
- ◆ 电统室门 RAL7035 (白色)
- ◆ 开关侧板 RAL7035 (白色)

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

Standard coating:

- ◆ Screen RAL1003 (signal yellow) ◆ Cable chamber door RAL7035 (white) ◆ Switch side plate RAL7035 (white)

真空断路器单元 Vacuum circuit breaker unit

◆ 专用并柜母线 Special parallel cabinet bus

DRM-12 全绝缘全封闭环网开关设备 (标准化) 可以配备外部母线。

DRM-12 fully insulated and fully enclosed main ring unit switchgear (standardized) can be equipped with an external bus.

◆ 电压互感器 Voltage transformer

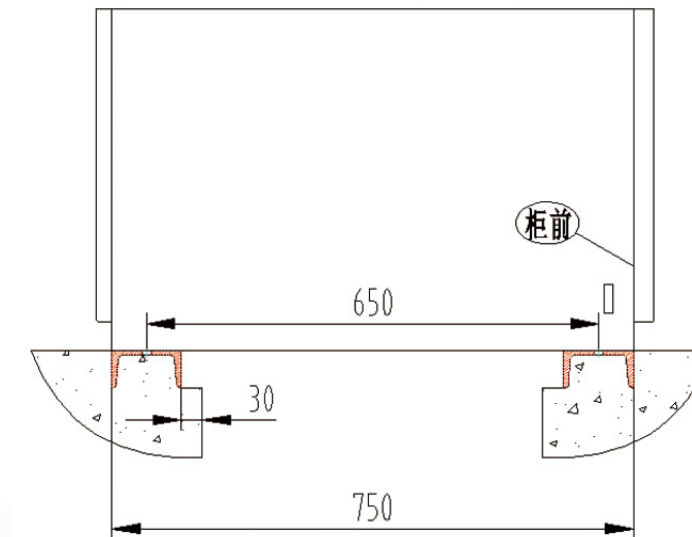
DRM-12 全绝缘全封闭环网开关设备 (标准化) 可根据需要配置 12kV 全密闭电压互感器，以满足配网自动化的要求。可用于提供计量 / 测量用电压信号，开关电动操作机构电源。

- ◆ 可根据需要选择单 / 三相 ◆ 变比：10/0.1/0.22kV ◆ 精度 (AC100V)：0.2 级或 0.5 级

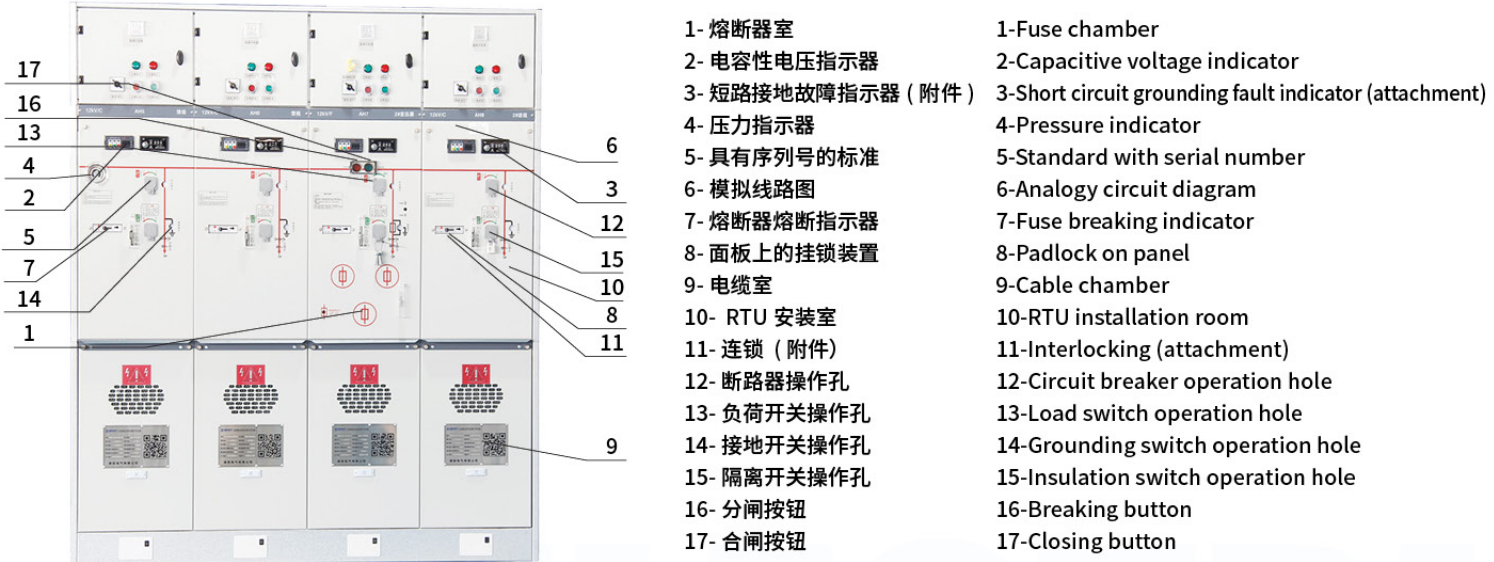
DRM-12 fully insulated and fully enclosed main ring unit switchgear (standardized) can be equipped with a 12kV fully enclosed voltage transformer as required to meet the needs of power distribution network automation. It can be used to provide for measuring/metering voltage signal, switch electric actuator power supply.

- ◆ Can choose single/three-phase as required ◆ Variable ratio: 10/0.1/0.22kV ◆ Precision (AC100V): 0.2 or 0.5

DRM-12 基础槽钢示意图 DRM-12 Foundation channel steel schematic

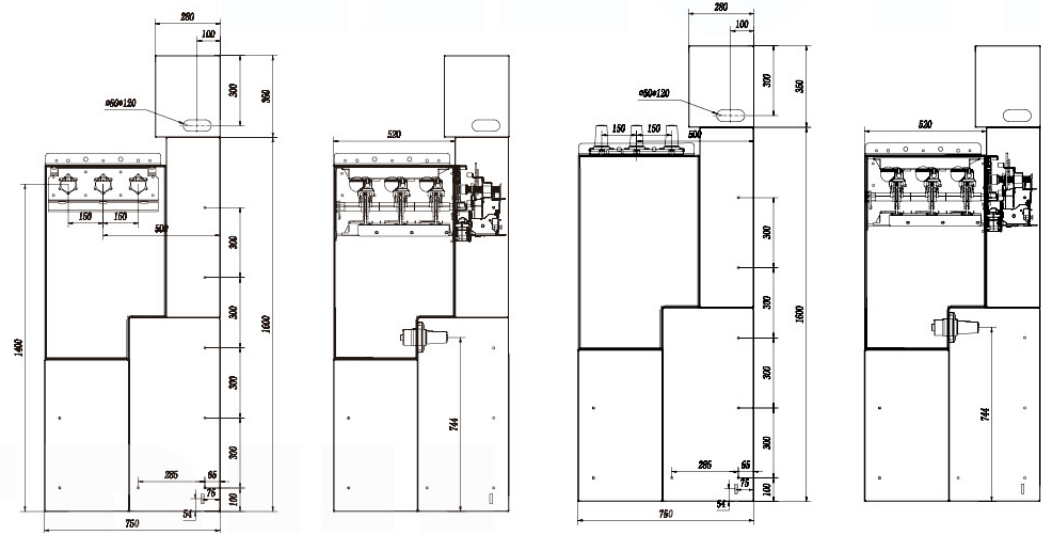


DRM-12 结构示意图 DRM-12 Structure Schematic



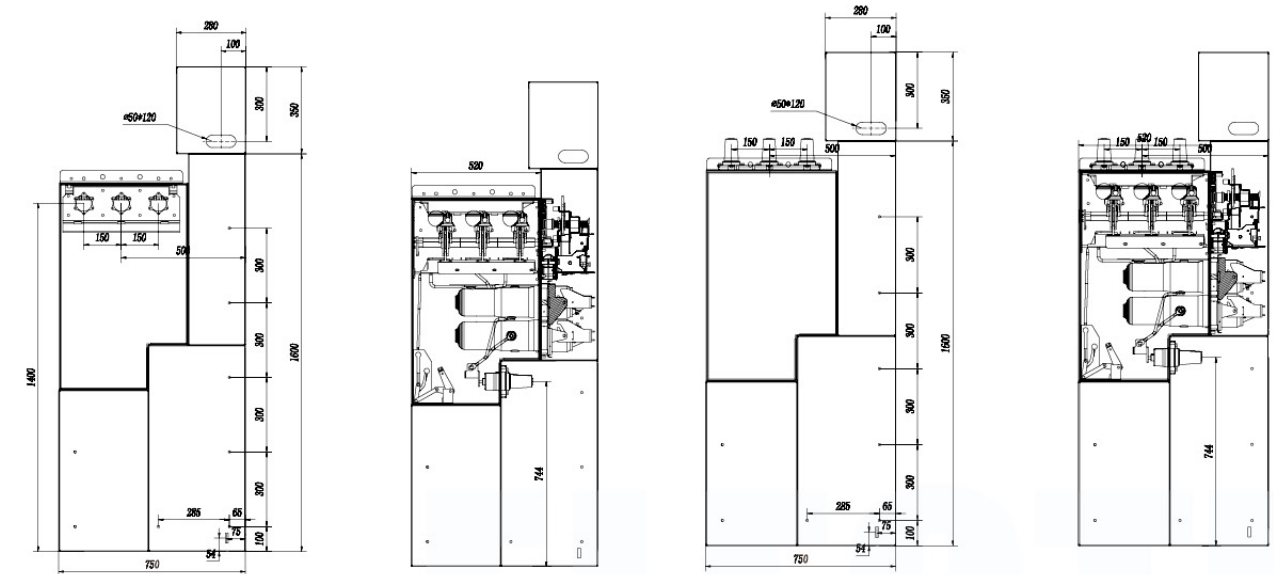
DRM-12 全绝缘全密封 (标准化) 环网金属开关设备尺寸图
DRM-12 fully insulated and fully enclosed (standardized) main ring unit metal switchgear dimensions

◆ 标准化环网金属开关设备尺寸图 -C Standardized main ring unit metal switchgear dimensions-C

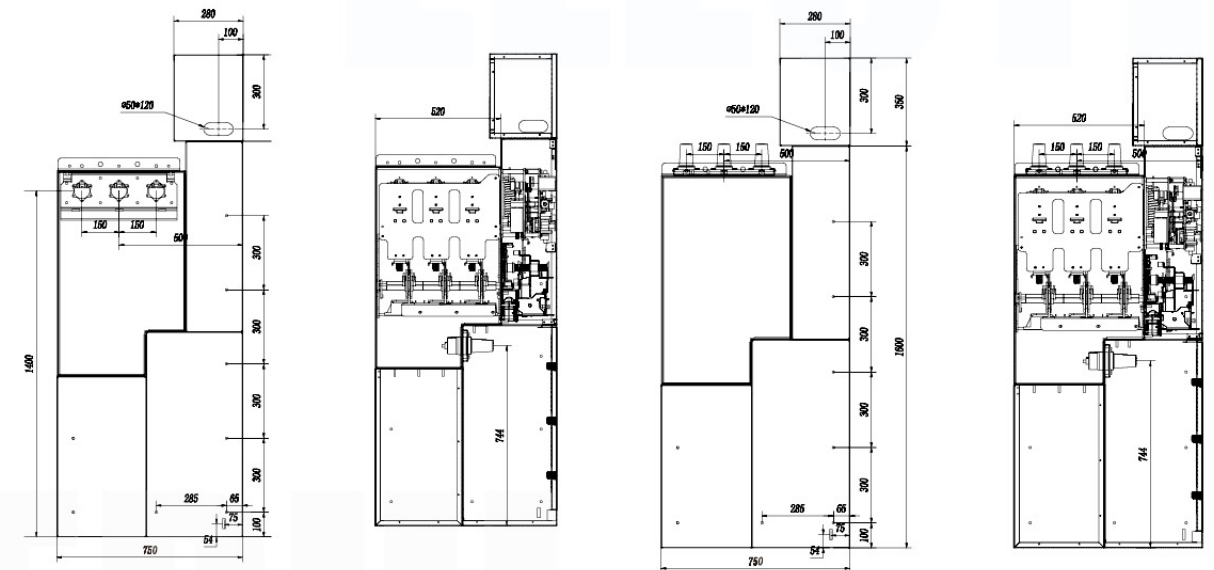


DRM-12 全绝缘全密封 (标准化) 环网金属开关设备尺寸图
DRM-12 fully insulated and fully enclosed (standardized) main ring unit metal switchgear dimensions

◆ 标准化环网金属开关设备尺寸图 -F Standardized main ring unit metal switchgear dimensions-F



◆ 标准化环网金属开关设备尺寸图 -V Standardized main ring unit metal switchgear dimensions-V



DRM-24

全绝缘全密封金属环网开关设备

DRM-24 Fully insulated and fully sealed metal ring network switchgear



产品简介 Product description

公司自主研发生产的 DRM-24 型充气式 SF₆ 金属封闭全绝缘系列环网开关柜，已经过国家高压电器试验中心型式试验。广泛用于 24kV 配电系统，是城乡各类用户变配电系统的首选开关产品。

开关柜为模块化单元模式，可根据不同用途进行组合；由固定式单元组合与可扩展型单元两大类，满足各种变电站对紧凑型开关柜灵活使用的需要。

DRM-24 型充气式开关柜是一个完全密封的系统，其所有带电部件以及开关封闭在不锈钢的壳体内。整个开关装置不受外部环境条件的影响，从而可以确保运行可靠性及人身安全，并且实现了免维护。通过选择可扩展母线，可以实现任何组合，达到全模块化。扩展母线安全绝缘和屏蔽，确保了高可靠性和安全性。DRM-24 型充气式开关柜同时可以提供 TV 化的自动化解决方案，形成了智能化开关的概念，并将现场安装及调试工作量降到最低。

DRM-24 型充气式开关柜分为非扩展标准配置和可扩展标准配置。由于具有全模块和半模块的组合性以及自身的可扩展性，因而具有极其特殊的灵活性。

DRM-24 型充气式开关执行 GB 标准。在室内条件下 (20°C) 运行的设计寿命超过 30 年。

The DRM-24 inflatable SF₆ metal enclosed fully insulated series ring network switchgear independently developed and produced by the company has passed the type test of the national high voltage electrical test center. Widely used in 24kV power distribution system, it is the preferred switch product for all kinds of users in urban and rural areas.

The switchgear is modular unit mode, which can be combined according to different uses; It consists of fixed unit combination and expandable unit to meet the needs of flexible use of compact switchgear in various substations.

The DRM-24 inflatable switchgear is a completely sealed system with all live parts and switches enclosed in a stainless steel housing. The entire switching device is not affected by external environmental conditions, thus ensuring operational reliability and personal safety, and achieving maintenance-free. By selecting an expandable bus, any combination can be achieved to achieve full modularity. Extended bus safety insulation and shielding ensure high reliability and safety. DRM-24 inflatable switchgear can also provide TV-oriented automation solutions, forming the concept of intelligent switches, and minimize the workload of on-site installation and commissioning.

DRM-24 inflatable switchgear is divided into non-expandable standard configuration and expandable standard configuration. Due to the combination of full module and half module and its own scalability, it has extremely special flexibility.

DRM-24 inflatable switch implements GB standard. The design life of operation under indoor conditions (20 ° C) is more than 30 years.

型号及含义 Model and meaning

DR M - 24 / □ - □

- 额定开断短路电流 (kA) Rated breaking short circuit current (kA)
- 额定电流 (A) Rated current (A)
- 额定电压 (kV) Rated voltage (kV)
- 全绝缘全密封金属环网开关设备 Fully insulated and fully sealed metal ring switchgear
- 企业代号 Corporate code

产品符合标准 Product conformity

- ◆ 国际标准
IEC60056、IEC60298、IEC60129、IEC60420、IEC60265、IEC60694 等。
- ◆ 中国标准
GB3804、GB3906、GB11022 等。
- ◆ International standard
IEC60056, IEC60298, IEC60129, IEC60420, IEC60265, IEC60694, etc.
- ◆ Chinese standard
GB3804, GB3906, GB11022, etc.

正常使用条件 Normal service condition

适用于高低温 (+40°C ~ -40°C)、潮湿、多尘、盐污、矿山、高海拔 (小于 4000 米) 等各种环境, 24 小时内的短时浸水不影响使用。

注: 如果更高海拔地区, 请注明具体海拔高度。

Suitable for high and low temperature (+40°C ~ -40°C), wet, dusty, salt pollution, mine, high altitude (less than 4000 meters) and other environments, short-term immersion within 24 hours does not affect the use.

Note: If the altitude is higher, please indicate the specific altitude.

产品主要特点 Main features of product

- ◆ DRM-24 系列充气柜 SF₆ 气体作为灭弧及绝缘介质。
- ◆ 开关柜为全密封、全绝缘结构; 母线、开关及带电部件完全封闭在不锈钢壳体中。
- ◆ 腔体充以 0.04Mpa 的 SF₆ 气体, 防护等级达到, IP67: 整个开关装置完全不受外部环境条件的影响, 即使在短时水浸等极端情况下也能保证开关正常运行, 产品终身免维护。
- ◆ 开关柜具有完善的“五防”联锁装置, 彻底杜绝人为误操作可能引起的人员及设备运行故障。
- ◆ 所有开关柜具有可靠的安全泄压通道, 即使在极端情况下也能保障操作人员人身安全。
- ◆ 开关柜分为固定单元组合和可扩展单元组合两类。
- ◆ 开关柜通常由正面进出线, 也可按不同的安装位置实现侧出线或侧扩展。
- ◆ 柜体尺寸安装方便, 并能够适合空间狭小及环境条件不良的地方。
- ◆ 开关柜可根据用户的不同需求配置电动、远控及监测装置。
- ◆ DRM-24 series gas cabinet SF₆ gas as arc extinguishing and insulation medium.
- ◆ Switch cabinet is fully sealed, fully insulated structure; Bus bars, switches and live parts are completely enclosed in stainless steel housing.
- ◆ The chamber is filled with 0.04Mpa SF₆ gas, the protection level is up to IP67: The whole switch device is completely unaffected by the external environment, even in extreme cases such as short-term flooding can ensure the normal operation of the switch, and the product is maintenance-free for life.
- ◆ The switchgear has a perfect "five prevention" interlock device, which completely prevents personnel and equipment operation failures caused by human error.

- ◆ All switchgear has a reliable safe pressure relief channel, which can guarantee the personal safety of the operator even in extreme circumstances.
- ◆ Switchgear is divided into two categories: fixed unit combination and expandable unit combination.
- ◆ The switch cabinet usually enters and exits from the front, and can also realize side exit or side expansion according to different installation positions.
- ◆ The size of the cabinet is easy to install, and can be suitable for small space and poor environmental conditions.
- ◆ The switch cabinet can be configured with electric, remote control and monitoring devices according to different needs of users.

灵活的出线和扩展方式 Flexible outlet and expansion methods

DRM-24 所有模块都可根据用户要求, 实现侧出线及侧扩展或者出线及顶扩展的连接方式, 最大限度的满足了供电方案的需要。

All DRM-24 modules can be connected by side outlet and side expansion or side outlet and top expansion according to user requirements, which meets the needs of power supply schemes to the maximum extent.

性能指标 Performance index

Sf ₆ 气体压力	20°C下绝对压力为 0.04Mpa	Sf ₆ gas pressure	The absolute pressure at 20°C is 0.04Mpa
气体年泄漏率	0.05%	Annual gas leakage rate	0.05%
防护等级	IP67	Class of protection	IP67
气室不锈钢厚度	3.0mm	Air chamber stainless steel thickness	The 3.0 mm
母线		Bus bar	
开关柜内母线	400mm ² Cu	Switchgear inside the bus	400mm ² Cu
开关柜接地母线	150mm ² Cu	Switchgear ground bus	150mm ² Cu
颜色		colour	
开关柜前面板	RAL 7012	Switch cabinet front panel	RAL 7012
侧板和电缆室前盖板	RAL 7035	Side panel and cable room front cover plate	RAL 7035
满足标准		Meet the criteria	
GB/T11022 GB3906 GB1985 GB3309		GB/T11022 GB3906 GB1985 GB3309	
GB16926 GB38041 GB1984		GB16926 GB38041 GB1984	
IEC60056 IEC60129 IEC60256		IEC60056 IEC60129 IEC60256	
IEC60298 IEC60420 IEC60694		IEC60298 IEC60420 IEC60694	
正常运行环境条件		Normal operating environment conditions	
最高温度	40°C	Maximum temperature	40 °C
最低温度	-40°C	Minimum temperature	To 40 °C
最大平均相对湿度	≤ 95%	Maximum mean relative humidity	≤ 95%
海拔高度	≤ 2000 米	Sea level	≤ 2000 m

主要技术参数 Main technical parameters

名称 Name	C 模块 C module	F 模块 F module	V 模块 V module		CB 模块 CB module	
	负荷开关 Load switch	组合电器 Combination apparatus	真空开关 Vacuum switch	隔离 / 接地开关 Isolation/ground switch	真空断路器 Vacuum circuit breaker	隔离 / 接地开关 Isolation/ground switch
额定电压 kV Rated voltage kV	24	24	24	24	24	24
额定频率 Hz Rated frequency Hz	50/60	50/60	50/60	50/60	50/60	50/60
工频耐受电压 (相间/断口) kV Power frequency withstand voltage (phase/ fracture) kV	65/79	65/79	65/79	65/79	65/79	65/79
雷电冲击耐受电压 kV Lightning impulse withstand voltage kV	125/145	125/145	125/145	125/145	125/145	125/145
额定电流 A Rated current A	630	注 ¹⁾ note	630	630	630	630
分断能力: Breaking capacity:						
额定闭环开断电流 A Rated closed-loop breaking current A	630					
额定电缆充电开断电流 A Rated cable charging breaking current A	10					
额定短路关合电流 (峰值) A Rated short circuit closing current (peak) A	50					
额定峰值耐受电流 kA Rated peak withstand current kA	50	80				
额定短时耐受电流 kA/3s Rated short-time withstand current kA/3s	20					
额定短路开断电流 kA Rated short circuit breaking current kA		31.5	20		20	
额定转移电流 A Rated transfer current A		1400				
配用熔断器最大电流 A Fuse maximum current A	-	63				
回路电阻 -n Loop resistance -n	≤ 200	≤ 400				
机械寿命 (次) Mechanical life (second)	5000	3000	5000	5000	5000	5000

注: 1) 取决于熔断器的电流额定值。
Note: 1) depends on the current rating of the fuse.

DRM-24 型开关柜结构 DRM-24 type switch cabinet structure



- | | |
|-------------------|---|
| 1- 熔断器室 | 1- Fuse room |
| 2- 电容性电压指示器 | 2- Capacitive voltage indicator |
| 3- 短路接地故障指示器 (附件) | 3- Short circuit ground fault indicator (accessories) |
| 4- 压力指示器 | 4- Pressure indicator |
| 5- 具有序列号的标准 | 5- Standard with serial number |
| 6- 模拟线路图 | 6- Analog circuit diagram |
| 7- 熔断器熔断指示器 | 7- Fuse fuse indicator |
| 8- 面板上的挂锁装置 | 8- Padlock device on the panel |
| 9- 电缆室 | 9- Cable room |
| 10- RTU 安装室 | 10- RTU installation room |
| 11- 连锁 (附件) | 11- Interlocking (Accessories) |
| 12- 断路器操作孔 | 12- Circuit breaker operating hole |
| 13- 负荷开关操作孔 | 13- Load switch operating hole |
| 14- 接地开关操作孔 | 14- Ground switch operation hole |
| 15- 隔离开关操作孔 | 15- Isolation switch operating hole |
| 16- 分闸按钮 | 16- Switch button |
| 17- 合闸按钮 | 17- Closing button |

各类非扩展标准组合单元柜 All kinds of non-extended standard combination unit cabinets

非扩展标准模块

共提供以下十五种标装组合

DRM-24 型开关柜的每个模块具有下列配置

D 柜 - 提升模块

“不带接地刀的电缆连接模块”中标准配置与特性

C 柜 - 负荷开关模块

“负荷开关模块”中标准配置与特性

F 柜 - 负荷开关熔断器组合电器模块

“负荷开关熔断器组合电器模块”中标准配置与特性

V 柜 - 真空开关模块

“真空开关模块”中标准配置与特性

DRM-24 型开关柜的每个模块具有下列配置

- ◆ 进线套管的电容性电压指示器
- ◆ 每个气室安装一个监测 Sf_6 密度的压力计
- ◆ 吊装用的吊耳
- ◆ 操作手柄

选配

- ◆ 电动操作机构
- ◆ 电缆短路及接地故障指示器
- ◆ 电流互感器及表计
- ◆ 远程监控及接

Non-extended standard module

The following 15 standard package combinations are available

Each module of the DRM-24 switchgear has the following configurations

D Cabinet - Lifting module

Standard configuration and features in "Cable Connection Module without ground Knife"

Cabinet C - Load switch module

Standard configuration and features in "Load Switch Module"

Cabinet F - load switch fuse combination electrical module

Standard configuration and features in "Load Switch Fuse Combination Electrical Module"

V Cabinet - Vacuum switch module

Standard configuration and features in Vacuum Switch Module

Each module of the DRM-24 switchgear has the following configurations

- ◆ Capacitive voltage indicator for inlet bushing
- ◆ Install a pressure gauge for monitoring Sf_6 density in each air chamber
- ◆ Lifting lug for lifting
- ◆ Operating handle

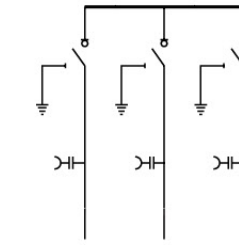
assorting

- ◆ Electric operating mechanism
- ◆ Cable short circuit and ground fault indicator
- ◆ Current transformer and meter
- ◆ Remote monitoring and connection

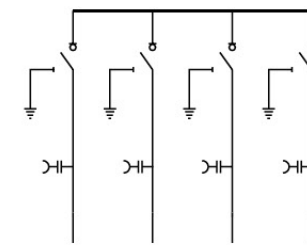
各类非扩展标准组合单元柜 All kinds of non-extended standard combination unit cabinets



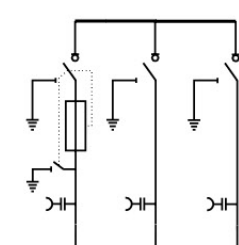
标准2路DF
Standard 2-way DF



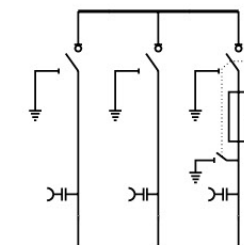
标准3路CCC
Standard 3-way CCC



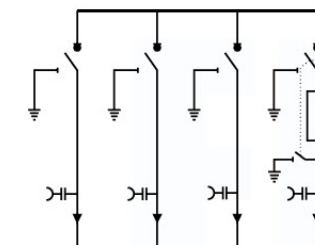
标准4路CCCC
Standard 4-way CCCC



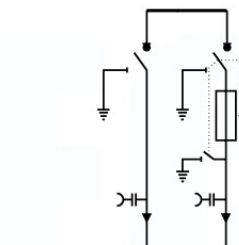
标准3路FCC
Standard 3-way FCC



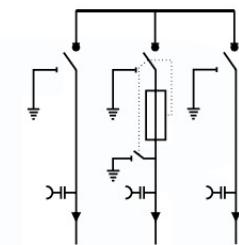
标准3路CCF
Standard 3-way CCF



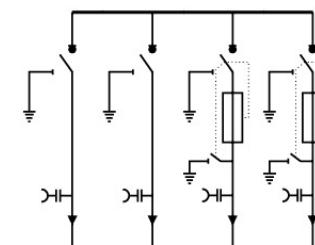
标准4路CCCF
Standard 4-way CCCF



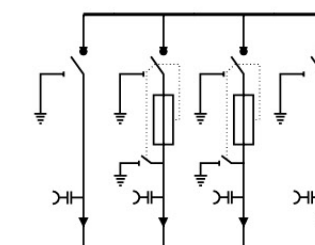
标准2路CF
Standard 2-way CF



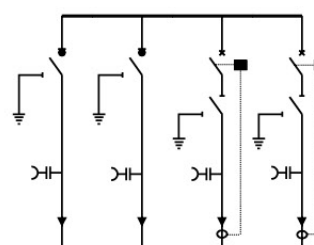
标准3路CFC
Standard 3-way CFC



标准4路CCFF
Standard 4-way CCFF



标准4路CFFC
Standard 4-way CFFC



标准4路CCVV
Standard 4-way CCV

DR-GTXGN-12 固体绝缘环网开关设备

DR-GTXGN-12 Solid Insulation Ring Network Switchgear



产品简介 Product description

DR-GTXGN-12 固体绝缘环网开关设备是本公司自行研发的新一代环保型复合绝缘环网柜。是一种全密封的供电单元，所有带电部件及开关全密封在一个环氧树脂壳体内，壳体内无 SF₆ 气体。整个开关装置不受外部环境影响，确保运行可靠性和人身安全性，并且实现了免维护。

固体绝缘环网柜有三种开关组成，即 V 单元（断路器单元），C 单元（负荷开关单元），F 单元（组合电器单元），每个单元可以单独使用也可以自由扩展，其结构分为智能控制仪表室、操作机构和一次部分，仪表室可配微机保护（控制器），一次部分采用 APG 自动凝胶工艺，将隔离开关和灭弧室完全密封在环氧树脂中，并有专用接头和母线相连。灭弧室采用专用的铜铬触头材料，R 型纵磁场触头，以及完全一次封排工艺，该灭弧室开断短路电流能力及稳定性，电寿命，温升以及绝缘水平都较之前的灭弧室（铜铝触头材料，杯状纵磁场触头结构，以及不完全一次封排工艺）有了明显提高。操动机构采用与开关配合一体的弹操机构，即隔离开关和主开关弹操机构为一整体，可方便实现互锁，而且机构零件少，减少了不必要的传动环节，可靠性高，并可根据用户需要实现电动操作。

固体绝缘全封闭开关设备：是采用固体绝缘材料为主绝缘介质及导电连接、隔离开关、接地开关、主母线、分支母线等主回路单一或组合后用固体绝缘介质包裹封装为一个或几个具有一定功能、可再次组合或扩展的具备全绝缘、全密封性能模块。

环网单元适用于 12kV、50Hz 的三相交流配电系统，用于环网供电或终端供电。环网单元可安装在工矿企业、住宅小区、学校、公园等的配电系统，也可装入紧凑型变电站中，用于配电变压器的控制和保护。所以户内、户外型环网单元均可实现配电自动化。

DR-GTXGN-12 solid-insulated ring main unit switchgear is a new generation of environment-friendly combined insulated ring main unit developed by our company. It is a fully sealed power supply unit and each live part or switch is sealed in an epoxy plastic shell without SF₆ gas in the shell. The whole switchgear is not influenced by external environments to ensure operation reliability and personnel safety without maintenance.

The solid insulated ring main unit has three types of switches, such as V unit (circuit breaker unit), C unit (load switch unit), F unit (combined appliance unit), each unit can be used individually or expanded freely, its structure is divided into intelligent control instrumentation room, actuator and primary part, the instrumentation room can be equipped with microcomputer protection (controller), the primary part is made by APG automatic gel process to solid seal the insulation switch and arc-extinguishing chamber into the epoxy resin completely, with a special terminal to connect with the bus. The arc-extinguishing chamber is made of special copper-chromium contact material, R type longitudinal magnetic field contact and a complete primary sealing process. The arc-extinguishing chamber short-circuit current breaking capacity, stability, electric life, temperature rise and insulation level are significantly improved compared with previous arc-extinguishing chambers (copper-aluminum contact material, cup-shaped longitudinal magnetic field contact structure and an incomplete primary sealing process). The actuator has a spring actuator combined with the switch, i.e. the insulation switch and the main switch spring actuator are combined for interlocking, with fewer components and higher reliability and without unnecessary transmissions, and electric actuation is available when required by a user.

The solid insulated enclosed switchgear: solid insulation material is used as the main insulation medium and these components of the main electric circuit such as conductive connector, isolation switch, grounding switch, main bus, branch bus and so on, solely or combined, encapsulated into a completely insulated and sealed module with one or more functions by solid insulation medium, and it may be combined or expanded further.

The ring main unit is ideal for 12kV, 50Hz three-phase AC power distribution systems for ring main unit or terminal power distribution. The ring main unit can be installed in the distribution systems for industrial and mining enterprises, residential buildings, schools and parks, as well as in compact substations, for the control and protection of power distribution transformers. Therefore, both indoor and outdoor ring main units can be used for power distribution automation.

型号及含义 Model and meaning

DR - GTXGN □ - 12 / □ - □

- 额定开断短路电流 (kA) Rated breaking short-circuit current (kA)
- 额定电流 (A) Rated current (A)
- 额定电压 (kV) Rated voltage (kV)
- 设计序号 Design number
- 固体绝缘环网开关设备 Solid insulated ring main unit switchgear
- 企业代号 Enterprise code

使用环境条件 Work environmental conditions

- ◆ 适用于户内或户外。
 - ◆ 周围空气温度：户内 -10°C ~+25°C，户外 -60°C ~+60°C。
 - ◆ 空气相对湿度：日平均值不大于 95%，月平均值不大于 90%。
 - ◆ 海拔高度不大于 3000m。
 - ◆ 周围空气应没有受到尘埃、水蒸气、盐雾、腐蚀性气体或可燃性气体的明显污染；户外型可以用于较恶劣的环境条件下。
 - ◆ 安装地点无剧烈震动，地震度不超过 8 度。
当上述使用环境条件不能满足使用要求时，由用户与制造厂协商。
 - ◆ It is ideal for indoor or outdoor use.
 - ◆ Ambient air temperature: Indoor -10° C~+25° C, outdoor -60° C~+60° C.
 - ◆ Relative air humidity: Daily average is no more than 95%, monthly average is no more than 90%.
 - ◆ Altitude is no more than 3000m.
 - ◆ Ambient air is free from any pollution of dust, water vapor, salt fog, corrosive gases or flammable gases; the outdoor type can be used in severe environmental conditions.
 - ◆ No severe vibration in the area to install, and the earthquake intensity is no more than 8 ML.
- When the work environmental conditions can not meet the requirements above, the user shall consult with the manufacturer.

安全与保护 Safety and protection

- ◆ 隔离刀可视断口
柜前有明显的隔离断口可视窗口，可查看隔离合位、隔离分位、接地合位，三个工作位置，方便现场工作人员检修确定隔离刀位置，非常安全。
- ◆ 泄压设计
内部燃弧压力阀：当产品内部出现燃弧时，会从该压力释放阀释放压力，燃弧排至电缆沟，以免误伤操作人员。
- ◆ 绿色环保
采用环保性材料设计，不使用 SF₆ 气体作为灭弧介质及绝缘，对环境没有污染，一次回路采用最少的接点设计，确保运行期间低能耗。
- ◆ Insulation knife visual cutout
With an obvious visible cutout window in front of the cabinet, it is convenient and safe for the personnel on site to check the three positions such as the insulation closing position, insulation breaking position and grounding closing position and confirm the insulation knife position.
- ◆ Pressure relief design
Internal arcing pressure valve: when any arcing occurs in the product, the pressure will be relieved from the pressure relief valve and the arcing will be discharged to the cable trench to prevent any injury to the operator.
- ◆ Environment-friendly and green
With environment-friendly materials in design, SF₆ gas isn't used as the arc extinguishing medium and insulation, without pollution to the environment, the primary circuit has minimum-contact design to ensure low energy consumption in operation.

符合标准 Execution standards

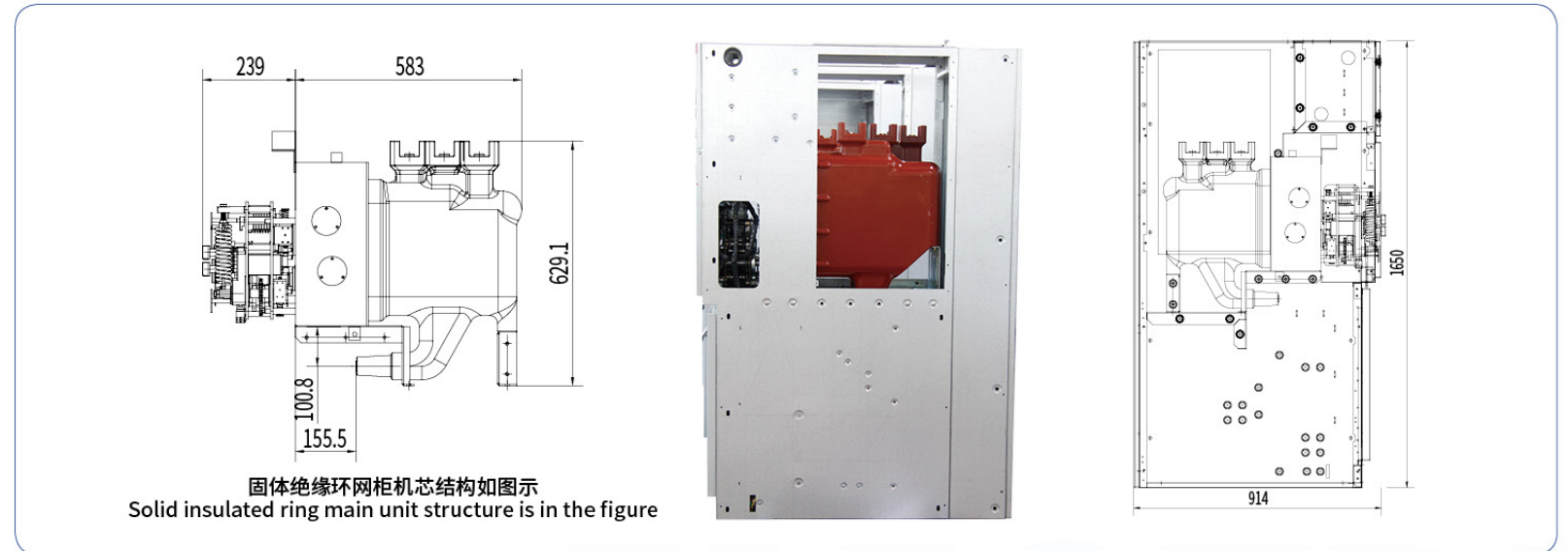
- ◆ IEC62271-1-2007 《高压开关设备和控制设备. 第一部分: 通用规范》
- ◆ IEC620071-200-2003 《1~52kV 交流金属封闭开关设备和控制设备》
- ◆ GB3906-2006 《3.6~40.5kV 交流金属封闭开关设备和控制设备》
- ◆ GB/T11022-2011 《高压开关设备和控制设备标准的共用技术条件》
- ◆ GB1984-2014 《高压交流断路器》
- ◆ GB1985-2014 《高压交流隔离开关和接地开关》
- ◆ GB3804-2004 《3.6kV~40.5kV 高压交流负荷开关》
- ◆ DL/T404-2007 《3.6kV~40.5kV 交流金属封闭开关设备和控制设备》
- ◆ DL/T593-2016 《高压开关设备和控制设备标准的共用技术条件》
- ◆ Q/GDW730-2012 《12kV 固体绝缘环网柜技术条件》
- ◆ DL/T402-2016 《高压交流断路器》
- ◆ IEC62271-1-2007 “High-voltage switchgear and controlgear Part-1 Common specifications”
- ◆ IEC620071-200-2003 “AC metal-enclosed switchgear and controlgear for rated voltages above 1kV and up to and including 52 kV”
- ◆ GB3906- 2006 “Alternating-current metal-enclosed switchgear and controlgear for rated voltage above 3.6kV and up to and including 40.5kV”
- ◆ GB/T11022-2011 “Common specification for high-voltage switchgear and controlgear standards”
- ◆ GB1984-2014 “High-voltage alternating-current circuit-breakers”
- ◆ GB1985-2014 “High-voltage alternating-current disconnectors and earthing switches”
- ◆ GB3804- 2004 “High-voltage alternating-current switches for rated voltage above 3.6kV and less than 40.5kV”
- ◆ DL/T404-2007 “Alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6kV and up to and including 40.5kV”
- ◆ DL/T593-2016 “Common specification for high-voltage switchgear and controlgear standards”
- ◆ Q/GDW730-2012 “Specifications for 12kV solid-insulated ring main units”
- ◆ DL/T402-2016 “High-voltage alternating-current circuit-breakers”



主要技术参数 (开关柜总体) Main technical parameters (whole switchgear)

名称 Name	单位 Unit	参数 Parameter	
额定电压 Rated voltage	kV	12	
额定电流 Rated current	A	630	
额定短时耐受电流 (4s) Rated short-time withstand current (4s)	kA	25	
额定峰值耐受电流 Rated peak withstand current	kA	50	
额定短路关合电流 (峰值) Rated short-circuit closing current (peak)	kA	50	
额定有功负载开断电流 Rated active load breaking current	A	630	
额定闭环开断电流 Rated closed loop breaking current	A	630	
额定电缆充电开断电流 Rated cable charge breaking current	A	10	
组合电器额定开断转移电流 Rated breaking transfer current of combined appliances	A	3700	
1min 工频耐受电压 1min power frequency withstand voltage	相间 相对地 真空断口 Phase-to-phase, phase-to-ground, vacuum breaking	kV	42
	隔离断口 Insulation breaking	kV	48
雷电冲击耐受电压 Lightning impact withstand voltage	相间 相对地 真空断口 Phase-to-phase, phase-to-ground, vacuum breaking	kV	75
	隔离断口 Insulation breaking	kV	85
机械寿命 Mechanical life	断路器 Circuit breaker	次 Time	10000
	隔离刀、接地刀 Insulation knife, grounding knife	次 Time	3000
防护等级 Protection grade			IP4X
外壳防护等级 Shell protection grade			IP4X
局部放电 Partial discharge	pC	$\leq 20(1.2U_r \text{ 下测量})$ $\leq 20(\text{Measured at } 1.2U_r)$	

产品构造 Product structure



工作原理 Working principle

固体绝缘环网柜机芯结构特点 Solid insulated ring main unit structure features

真空灭弧室

真空断路器具有开断短路电流能力，用于电路和电气设备的过载和短路保护。因其触头开距小，燃弧时间短，触头一开断故障电流时烧伤轻微，所需的操作能量小，动作快等特点，它同时还具有体积小，重量轻，维护工作量小，能防火、防爆，操作噪声小的优点，是替代油断路器和 SF₆ 断路器的理想断路器，广泛用于电力、冶金、通讯等行业的高频加热等配电系统。断路器用真空灭弧室是真空断路器的关键部件，是真空断路器的心脏，它基本上决定了断路器的主要性能。

固体绝缘系统

采用 APG 工艺成型的固封极柱将真空灭弧室和上下出线座等载流导体封装成一个整体。隔离开关安装在固封极柱的腔体内，使得相间绝缘以固体绝缘方式为主绝缘方式。单相绝缘母线设计，避免相间及对地等严重故障的发生。母线可扩展设计，实现功能单元无限扩展。

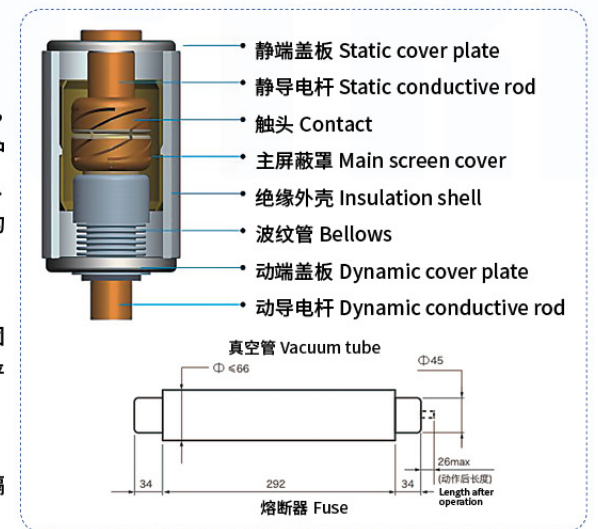
三工位刀闸

所有开关柜配有三工位刀闸。三工位刀闸与主开关一同内置于固封极柱内。三相联动，可操作实现工作/隔离/接地三个位置。与主开关采用了机械联锁，只有在主开关处于分闸位置时，三工位刀闸才能动作。

操作机构

断路器操作机构为弹簧操作机构，有着结构简单、动作可靠、体积小、免维护等特点，合闸功大小可根据用户要求上下调整，机构可以手动储能、手动合闸、手动分闸，也可以电动储能、电动分合闸，方便用户操作。

三工位刀闸操作机构采用过中弹簧设计，能快分快合，具有开断和关合一定负荷电流的功能，三工位机构除了能手动操作外，还能进行电动操作，可实现智能远程控制隔离与接地，大大方便了用户的使用。



◆ 固体绝缘环网柜结构特点

- ◇ 高压负荷开关和高压带电部件密封任无任何气体的环氧树脂绝缘套筒壳内，真空灭弧室灭弧，体积小灭弧可靠。负荷开关带接地开关，有合、分闸和接地三个工位，接地刀并且有隔离刀的功能。
- ◇ 可随意组合，每路单元均通过三个高压套管出线，电缆连接方便。
- ◇ 采用进口制威的密封箱体，操作机构连接处和高压套管处采取了严格的密封措施性能良好。
- ◇ 采用 APG 工艺由进口环氧树脂制成的高压套管及高压绝缘筒，绝缘筒和高压套管之间通过硅橡胶套紧配套装配而成，有较好的密封作用。
- ◇ 各路装有相互独立的操作机构，机构安装在柜体的前面上，具有多种机械联锁功能。
- ◇ 负荷开关和接地开关装有弹簧操动机构，负荷开关可以手动或电动操作，接地开关不但有接地作用而且也有隔离作用，只能手动操作。
- ◇ 断路器可以配置永磁操动机构，可以电动合分闸，可以手动分闸，但不能手动合闸。断路器也可以装弹簧机构，即可手动也可电动，预留配电自动化接口。

◆ Vacuum arc-extinguishing chamber

The vacuum circuit breaker has the capability to break short-circuit current, is used for circuit and electrical equipment overload and short-circuit protection. Owing to its little contact breaking distance, short arc-burning time, slight burn of contact breaking fault current, little actuation energy required, fast reaction and so on, as well as the advantages such as being compact, light, little maintenance, fireproof, explosion-proof and little operation noise, it is ideal to replace the oil circuit breaker and the SF6 circuit breaker, and is widely used in the high-frequency heating and other power distribution systems of electric power, metallurgy, communication and so on. The vacuum arc-extinguishing chamber of the circuit breaker is a key component of vacuum circuit breaker, is the heart of the vacuum circuit breaker, and it basically determines the main performance of circuit breaker.

◆ Solid insulated system

The solid sealed pole molded by APG process encapsulates the current-carrying conductors of the vacuum arc-extinguishing chamber, upper and lower outgoing seats into a whole unit. The insulation switch is installed in the cavity of the sealed pole to make the solid insulation the main insulation method for phase-to-phase insulation. The single-phase insulation bus design prevents any serious phase-to-phase or phase-to-ground fault. The bus is expandable for unlimited expansion of functional units.

◆ Three-position knife gate

All switchgears are equipped with three-position knife gates. The three-position knife gate and the main switch are built in the solid sealed pole. Operate the three-phase into three positions such as closing/insulation/grounding. The main switch adopts mechanical interlocking and the three-position knife gate only can act when the main switch breaks.

◆ Actuator

The actuator of the circuit breaker is a spring actuator with a simple structure and reliable action, is compact and free from maintenance, etc.; the closing power is adjustable as required by the user and it can store energy manually, close manually, break manually, or store energy electrically, break or close electrically, to make it convenient for a user to operate.

The three-position knife gate actuator has a spring in design, can break or close quickly, with the function to break and close a certain load current, the three-position actuator can be actuated manually or electrically for intelligent remote control of insulation and grounding to make it easy to use.

◆ Structural characteristics of solid insulated ring main unit

- ◇ The high-voltage load switch and high-voltage live part are sealed in the epoxy plastic insulation bushing shell without any gas, and the vacuum arc-extinguishing chamber is small and reliable in extinguishing arc. The load switch has a grounding switch with three positions such as closing, breaking and grounding, and the grounding knife has the function of an isolation knife.
- ◇ Can combine randomly, each circuit unit outgoes through three high-voltage bushings and it's convenient to connect a cable.
- ◇ With an imported sealed enclosure, the actuator's terminals and high-voltage bushings are strictly sealed with good performance.
- ◇ The high-voltage bushing and high-voltage insulation cylinder are made of imported epoxy resin by APG process, and the insulation cylinder and high-voltage bushing are assembled tightly by silicon rubber sleeve, with good seal performance.
- ◇ Each circuit is equipped with an independent actuator that is installed in the front of the cabinet with several mechanical interlocking functions.
- ◇ The load switch and grounding switch are equipped with spring actuators, and the load switch can be actuated manually or electrically; The grounding switch can ground or insulate, only can be actuated manually.
- ◇ The circuit breaker can be equipped with a permanent-magnetic actuator, can close or break electrically, can break manually, can't close manually. The circuit breaker can also be equipped with a spring actuator; can be actuated manually or electrically, with power distribution automation interface reserved.

工作原理 Working principle

- ◇ 环网柜面板上有可视窗，能够直接观察到隔离刀断口的分合状态，有明显断开点。
- ◇ 每个环网柜单元都有三个单独的绝缘筒并列而成，安装方便。容易更换最大的优点是避免了相间放电。
- ◇ 固体绝缘全封闭环网柜主要部件是由绝缘筒和真空灭弧室组成。
- ◇ 固体绝缘材料采用进口环氧树脂，厚度不小于 10mm，具有较强的抗腐蚀能力，较高的绝缘能力，内部空间大于 150mm，相与相之间单独分开并通过底板安装架连接在一起，组合灵活结构简单合理，美观。
- ◇ 箱体有电缆进线口的密封式地板，防止电缆沟内的潮气进入箱体。
- ◇ 门以密封条密封，门锁为防雨式结构，门打开时有限位拉杆使门便于固定。
- ◇ 箱体内开关为固体绝缘全密封结构，不需要加热器，电缆头根据用户要求可分可触摸和不可触摸型，不怕浸水。

◆ 操动机构与操作

- ◇ 环网单元中的各路负荷开关和接地开关装有相互独立的弹簧操动机构，装在柜前面板上，可以手动或电动操作。面板上每路有两个操作孔，分别操作负荷开关和接地开关。真空断路器配有一体式的永磁操作机构或弹簧操作机构。

◇ 负荷开关操作说明

送电操作

- 先合隔离接地开关：将操作手柄插入接地操作孔（在隔离刀处于接地合闸状态时），逆时针旋转，接地分闸，再将操作手柄插入隔离操作孔内，逆时针旋转，合上隔离刀。
- 再合负荷开关：将操作手柄插入主开关操作孔内，逆时针转动 2 圈左右，主开关合闸。

停电操作

- 先分负荷开关：逆时针转动分闸旋钮，开关分闸。
- 再分离接地开关：将操作手柄插入隔离机构操作孔，顺时针旋转，分开隔离刀，再将操作手柄插入接地操作孔内，顺时针旋转，合上接地。

◇ 断路器操作说明

- ◇ 机械联锁：负荷开关、断路器和接地开关间有机械联锁。当负荷开关、断路器在合闸状态，接地开关不能分、合闸；接地开关在合闸状态，负荷开关、断路器不能分、合闸。

◆ 熔断器的安装和更换

- ◇ 先闭合接地开关。
- ◇ 把操作把手用力提起逆时针旋转，使销子出槽。
- ◇ 把撞针机构装入熔丝槽，使销子处于槽内，顺时针旋转，使操作把手平行于面板，然后用力压下把手即可。
- ◇ 当负荷开关接地时才能打开。

- ◇ The ring main unit panel has a view window, can directly observe the insulation knife's breaking or closing with an obvious breaking.
- ◇ Each ring main unit has three independent insulation cylinders in parallel, it's easy to install, with the biggest advantage to prevent the phase-to-phase electrical discharge.
- ◇ The main parts of the solid insulated enclosed ring main unit are composed of the insulation cylinder and vacuum arc-extinguishing chamber.
- ◇ The solid insulation material is imported epoxy plastic resin with a thickness no less than 10mm and a strong insulation capacity, is highly resistant to corrosion, the internal space is more than 150mm, two phases are separated and combined by base plate bracket, it's flexible, easy and reasonable to combine a structure with a good look.
- ◇ The enclosure has a sealed floor for cable incoming to prevent the moisture in the cable trench from entering the enclosure.
- ◇ The door is sealed with seal strips, the door lock is in a rainproof structure, it's easy to fix the door when open with limit lever.
- ◇ The switches in the enclosure are solid insulated and sealed and a heater isn't required, and the cable gland can be touchable and non-touchable as required by the user, without worry for water immersion.

◆ Actuator and operation

◇ The load switches and grounding switches in the ring main unit are equipped with independent spring actuators, which are installed in the front of the panel, can be actuated manually or electrically. With two operation holes for each circuit of the panel, to actuate the load switch and grounding switch. The vacuum circuit breaker is equipped with a combined permanent-magnetic actuator or a spring actuator.

◇ Load switch operation

Feed power

First close the grounding switch: insert handle into the grounding hole (when the insulation knife is in grounding), rotate counterclockwise to break, and insert the handle into the insulation hole, rotate counterclockwise to close the insulation knife.

Reclose load switch: insert the handle into the main switch hole, rotate 2 circles counterclockwise to close the main switch.

Cut power

First break the load switch: rotate the breaking knob counterclockwise to break the switch.

Then break the insulation grounding switch: insert the handle into the insulator hole, rotate clockwise to break the insulation knife, then insert the handle into the grounding hole and rotate clockwise to close grounding.

◇ Circuit breaker operation

◇ Mechanical interlocking: With mechanical interlocking between load switch, circuit breaker and grounding switch. When the load switch and circuit breaker are closed, the grounding switch can't break or close: when the grounding switch is closed, the load switch and circuit breaker can't break or close.

◆ Installation and replacement of fuse

◇ First close the grounding switch.

◇ Lift the handle and rotate counterclockwise to make the pin protrude from the slot.

◇ Install the pin mechanism into the fuse drum to make the pin in the slot, rotate clockwise to make the handle parallel to the panel, and then push down the handle with force.

◇ Open only when the load switch is grounded.

负荷开关 - 熔断器组合电器柜配熔断器选配表 Load switch - fuse combination electrical cabinet selection table with fuse

电压器容量 kVA Potential transformer capacity kVA	熔断器型号 Fuse model	熔断器额定电流 (A) Fuse rated current(A)	
		电压等级 12kV Voltage class 12kV	电压等级 6.3kV Voltage class 6.3kV
100	XRNT-12kV	10	16
125	XRNT-12kV	10	20
160	XRNT-12kV	16	20
200	XRNT-12kV	20	25
250	XRNT-12kV	25	31.5
315	XRNT-12kV	31.5	40
400	XRNT-12kV	40	50
500	XRNT-12kV	50	63
630	XRNT-12kV	63	80
800	XRNT-12kV	80	100
1000	XRNT-12kV	100	125
1250	XRNT-12kV	125	-

标准模块 - 断路器柜 Standard module-circuit breaker cabinet

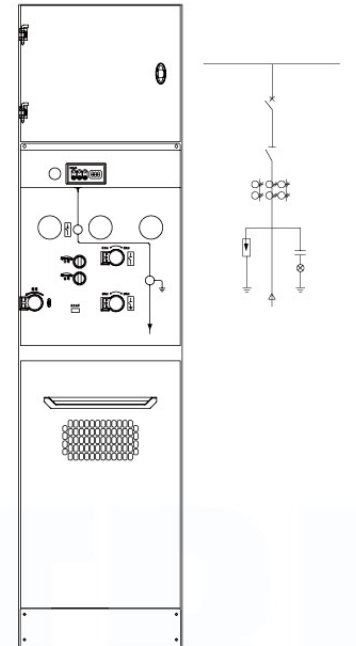
标准配置 Standard configuration

- ◆ 630、1250A 绝缘母线
- ◆ 真空断路器
- ◆ 真空断路器操作机构
- ◆ 隔离 / 接地开关
- ◆ 隔离 / 接地开关操作机构
- ◆ 断路器和接地开关机械联锁
- ◆ 断路器和接地开关具有独立位置显示
- ◆ 出线套管位于前部前部水平位置，前接电缆头
- ◆ 带电指示器与核相孔一体化，符合 ISO61958 标准
- ◆ 接地母排
- ◆ 微机保护装置
- ◆ 满足五防联锁

- ◆ 630, 1250A insulation bus
- ◆ Vacuum circuit breaker
- ◆ Vacuum circuit breaker actuator
- ◆ Insulation/grounding switch
- ◆ Insulation/grounding switch actuator
- ◆ Mechanical interlocking of circuit breaker and grounding switch
- ◆ Circuit breaker and grounding switch have independent position indication
- ◆ Outgoing bushing is horizontal and in the front with a cable gland
- ◆ The live indicator is combined with the phase check hole according to ISO61958 standard
- ◆ Grounding bus
- ◆ Microcomputer protector
- ◆ With five-protection interlocking

可选配置 Optional configuration

- ◆ 辅助触点
- ◆ 程序锁
- ◆ 加热器
- ◆ 后接避雷器
- ◆ 后接电缆头
- ◆ 进线带电接地闭锁
- ◆ 接地故障指示器
- ◆ 套管式电流互感器及电流表、有功功率表、无功功率表
- ◆ Auxiliary contact.
- ◆ Program lock
- ◆ Heater



- ◆ Back arrester
- ◆ Back cable gland
- ◆ Incoming line live grounding block
- ◆ Grounding fault indicator
- ◆ Bushing current transformer and ammeter, active power meter, reactive power meter

标准模块 - 负荷开关柜 Standard module-load switchgear

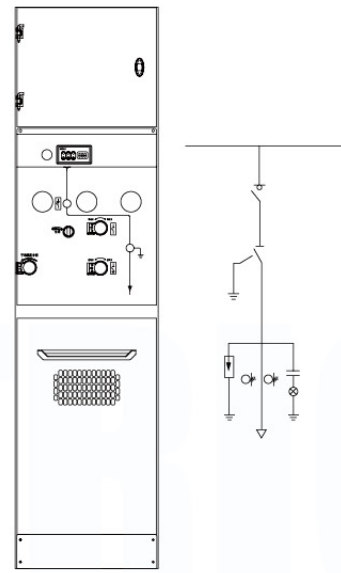
标准配置 Standard configuration

- ◆ 630A 绝缘母线
- ◆ 真空负荷开关
- ◆ 真空负荷开关操作机构
- ◆ 隔离 / 接地开关
- ◆ 隔离 / 接地开关操作机构
- ◆ 负荷开关和接地开关机械联锁
- ◆ 负荷开关和接地开关具有独立位置显示
- ◆ 出线套管位于前部前部水平位置, 前接电缆头
- ◆ 带电指示器与核相孔一体化, 符合 ISO61958 标准
- ◆ 接地母排
- ◆ 满足五防联锁

- ◆ 630A insulation bus
- ◆ Vacuum load switch
- ◆ Vacuum load switch actuator
- ◆ Insulation/grounding switch
- ◆ Insulation/grounding switch actuator
- ◆ Mechanical interlocking of load switch and grounding switch
- ◆ Load switch and grounding switch have independent position indication
- ◆ Outgoing bushing is horizontal and in the front with a cable gland
- ◆ The live indicator is combined with the phase check hole according to ISO61958 standard
- ◆ Grounding bus
- ◆ With five-protection interlocking

可选配置 Optional configuration

- ◆ 负荷开关操作机构储能电动机
- ◆ 分闸线圈
- ◆ 合闸线圈
- ◆ 辅助触点
- ◆ 程序锁
- ◆ 加热器
- ◆ 后接避雷器



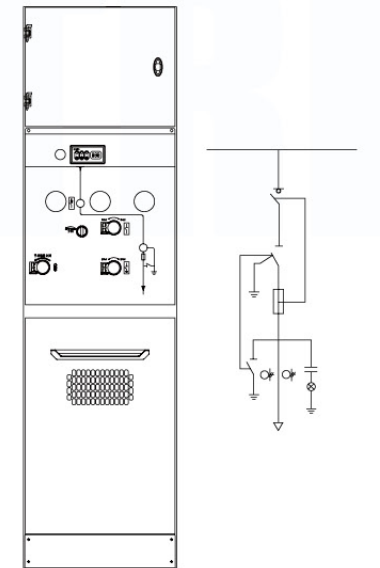
- ◆ 后接电缆头
- ◆ 进线带电接地闭锁
- ◆ 接地故障指示器
- ◆ 套管式电流互感器及电流表、有功功率表、无功功率表
- ◆ Energy storage motor of load switch actuator
- ◆ Breaking coil
- ◆ Closing coil
- ◆ Auxiliary contact
- ◆ Program lock
- ◆ Heater
- ◆ Back arrester
- ◆ Back cable gland
- ◆ Incoming line live grounding block
- ◆ Grounding fault indicator
- ◆ Bushing current transformer and ammeter, active power meter, reactive power meter

标准模块 - 负荷开关熔断器组合电器柜 Standard module-load switch fuse combined appliance cabinet

标准配置 Standard configuration

- ◆ 630A 母线
- ◆ 真空负荷开关
- ◆ 真空负荷开关操作机构
- ◆ 隔离 / 接地开关
- ◆ 隔离 / 接地开关操作机构
- ◆ 负荷开关和接地开关机械联锁
- ◆ 负荷开关和接地开关具有独立位置显示
- ◆ 出线套管位于前部, 前接电缆头
- ◆ 带电指示器与核相孔一体化, 符合 ISO61958 标准
- ◆ 水平放置的熔断器筒
- ◆ 熔断器
- ◆ 接地母排
- ◆ 满足五防联锁
- ◆ 辅助接地装置

- ◆ 630A bus
- ◆ Vacuum load switch
- ◆ Vacuum load switch actuator
- ◆ Insulation/grounding switch
- ◆ Insulation/grounding switch actuator
- ◆ Mechanical interlocking of load switch and grounding switch
- ◆ Load switch and grounding switch have independent position indication



- ◆ Outgoing bushing is in the front with cable gland
- ◆ The live indicator is combined with the phase check hole according to ISO61958 standard
- ◆ Horizontal fuse cartridge
- ◆ Fuse
- ◆ Grounding bus
- ◆ With five-protection interlocking
- ◆ Auxiliary grounding device

可选配置 Optional configuration

- ◆ 负荷开关操作机构储能电动机
- ◆ 分闸线圈
- ◆ 合闸线圈
- ◆ 辅助触点
- ◆ 程序锁
- ◆ 加热器
- ◆ 后接避雷器
- ◆ 后接电缆头
- ◆ 进线带电接地闭锁
- ◆ 接地故障指示器
- ◆ 套管式电流互感器及电流表、有功功率表、无功功率表
- ◆ Energy storage motor of load switch actuator
- ◆ Breaking coil
- ◆ Closing coil
- ◆ Auxiliary contact
- ◆ Program lock
- ◆ Heater
- ◆ Back arrester
- ◆ Back cable gland
- ◆ Incoming line live grounding block
- ◆ Grounding fault indicator
- ◆ Bushing current transformer and ammeter, active power meter, reactive power meter

标准模块 - 带隔离开关的 PT 柜 (全绝缘型) Standard module - PT cabinet with insulation switch (Full insulation)

标准配置 Standard configuration

- ◆ 630A 绝缘型母线
- ◆ 隔离接地开关
- ◆ 隔离接地开关操作机构
- ◆ 隔离 / 接地开关
- ◆ 出线套管位于前部水平位置, 630A 前接电缆头
- ◆ 带电指示器与核相孔一体化, 符合 ISO61958 标准

069/070

- ◆ 固体绝缘型电压互感器
- ◆ 肘型接头 (带电缆)
- ◆ 电压互感器保护熔断器
- ◆ 接地母排
- ◆ 满足五防联锁
- ◆ 630A insulation bus
- ◆ Insulation grounding switch
- ◆ Insulation grounding switch actuator
- ◆ Insulation/grounding switch
- ◆ Outgoing bushing is horizontal and in the front, 630A is connected with cable gland
- ◆ The live indicator is combined with the phase check hole according to ISO61958 standard
- ◆ Solid insulated potential transformer
- ◆ Elbow connector (with cable)
- ◆ Potential transformer protection fuse
- ◆ Grounding bus
- ◆ With five-protection interlocking

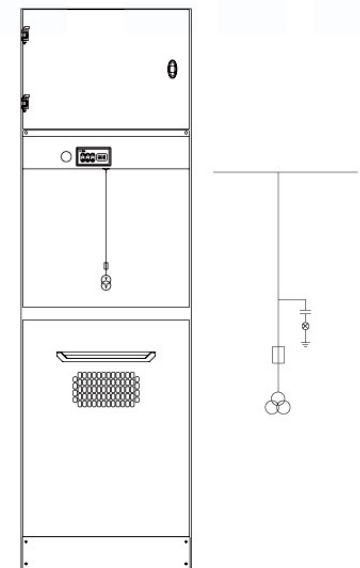
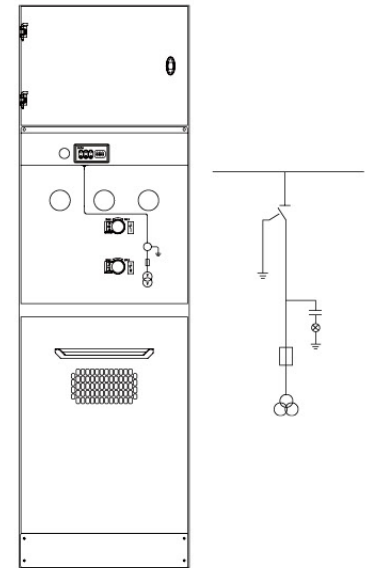
可选配置 Optional configuration

- ◆ 加热器
- ◆ 电压表
- ◆ Heater
- ◆ Voltmeter

标准模块 - 不带隔离开关的 PT 柜 (普通型) Standard module - PT cabinet without insulation switch (common)

标准配置 Standard configuration

- ◆ 630A 绝缘型母线
- ◆ 带电指示器与核相孔一体化, 符合 ISO61958 标准
- ◆ 固体绝缘型电压互感器
- ◆ 肘型接头 (带电缆)
- ◆ 电压互感器保护熔断器
- ◆ 接地母排
- ◆ 满足五防联锁
- ◆ 630A insulation bus
- ◆ The live indicator is combined with the phase check hole according to ISO61958 standard
- ◆ Solid insulated potential transformer
- ◆ Elbow connector (with cable)
- ◆ Potential transformer protection fuse
- ◆ Grounding bus
- ◆ With five-protection interlocking



可选配置 Optional configuration

- ◆ 加热器
- ◆ 电压表
- ◆ Heater
- ◆ Voltmeter

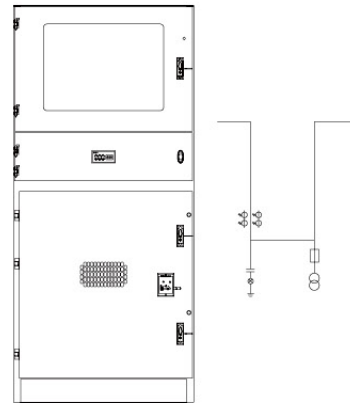
标准模块 - 计量柜 (普通型) Standard module - metering cabinet (common)

标准配置 Standard configuration

- ◆ 630A、1250A 绝缘母线
- ◆ 普通型 PT、CT 电压互感器，电流互感器
- ◆ 电压互感器保护熔断器
- ◆ 电度表
- ◆ 带电指示器与核相孔一体化
- ◆ 630A, 1250A insulation bus
- ◆ Common PT, CT potential transformer, current transformer
- ◆ Potential transformer protection fuse
- ◆ Kilo-watt hour meter
- ◆ The live indicator is combined with the phase check hole

可选配置 Optional configuration

- ◆ 计量联锁装置
- ◆ 加热器
- ◆ 电压表
- ◆ 有功功率表
- ◆ 无功功率表
- ◆ 电压转换开关
- ◆ Metering interlocking device
- ◆ Heater
- ◆ Voltmeter
- ◆ Active power meter
- ◆ Reactive power meter
- ◆ Voltage conversion switch



欧式电缆前接头
Europe-style cable front gland

欧式电缆后接头
Europe-style cable back gland

欧式后接避雷器
Europe-style back arrester

电缆型故障指示器
Cable fault indicator

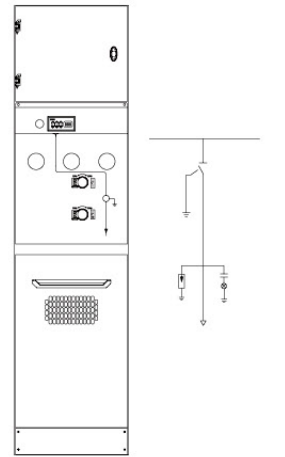
标准模块 - 隔离开关柜 Standard module - insulation switchgear

标准配置 Standard configuration

- ◆ 630A、1250A 母线
- ◆ 隔离 / 接地开关
- ◆ 隔离 / 接地开关操作机构
- ◆ 接地开关具有位置指示
- ◆ 出线套管位于前部前部水平位置，前接电缆头
- ◆ 带电指示器与核相孔一体化，符合 ISO61958 标准
- ◆ 接地母排
- ◆ 满足五防联锁
- ◆ 630A, 1250A bus
- ◆ Insulation/grounding switch
- ◆ Insulation/grounding switch actuator
- ◆ Grounding switch has position indication
- ◆ Outgoing bushing is horizontal and in the front, with cable gland
- ◆ The live indicator is combined with the phase check hole according to ISO61958 standard
- ◆ Grounding bus
- ◆ With five-protection interlocking

可选配置 Optional configuration

- ◆ 辅助触点
- ◆ 加热器
- ◆ 后接避雷器
- ◆ 后接电缆头
- ◆ 进线带电接地闭锁
- ◆ 接地故障指示器
- ◆ 套管式电流互感器及电流表、有功功率表、无功功率表
- ◆ Auxiliary contact
- ◆ Heater
- ◆ Back arrester
- ◆ Back cable gland
- ◆ Incoming line live grounding block
- ◆ Grounding fault indicator
- ◆ Bushing current transformer and ammeter, active power meter, reactive power meter



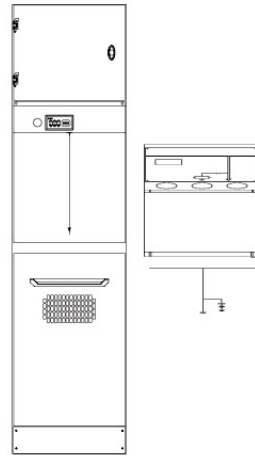
标准模块 - 提升柜 Standard module - upgraded cabinet

标准配置 Standard configuration

- ◆ 630A、1250A 绝缘母线
- ◆ 出线套管位于前部水平位置，前接电缆头（带电缆）
- ◆ 带电指示器与核相孔一体化，符合 ISO61958 标准
- ◆ 接地母排
- ◆ 630A, 1250A insulation bus
- ◆ Outgoing bushing is horizontal and in the front, with cable gland (with cable)
- ◆ The live indicator is combined with the phase check hole according to ISO61958 standard
- ◆ Grounding bus

可选配置 Optional configuration

- ◆ 加热器
- ◆ 后接避雷器
- ◆ 后接电缆头
- ◆ 接地故障指示器
- ◆ 套管式电流互感器及电流表、有功功率表、无功功率表
- ◆ Heater
- ◆ Back arrester
- ◆ Back cable gland
- ◆ Grounding fault indicator
- ◆ Bushing current transformer and ammeter, active power meter, reactive power meter



地基图 Foundation plan

◆ 安装

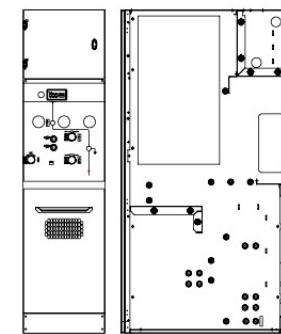
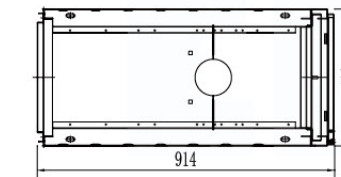
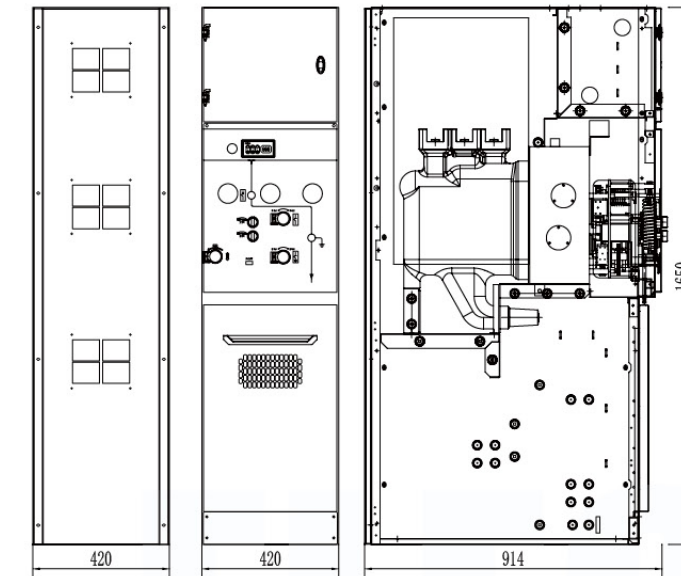
环网单元应安装在通风良好的地方，在正面操作和维护，环网单元的底座有地脚安装孔，在室内柜体可以离墙或靠墙安装，安装位置如图示。安装地基上所铺设轨道的平面度，每平方米范围不得超过 2mm。环网单元的底座必须固定在地基上。户外安装时地基要求建在较高地势处，四周高墙或遮挡物的距离不得小于 1 米，以免妨碍开门。坑壁用水泥和实心砖砌制，表面作防渗水处理。坑壁及基础平台用 1: 2.5 水泥砂浆面厚度为 20mm，表面须平整。混凝土制做按 GB232-82《电气装置安装工程施工及验收规范》。电缆安装完成后，电缆室底板应进行密封处理，防止地沟潮气进入。环网单元的连接必须与现场的接地网相连。环网单元的接地处有接地标志。

◆ Installation

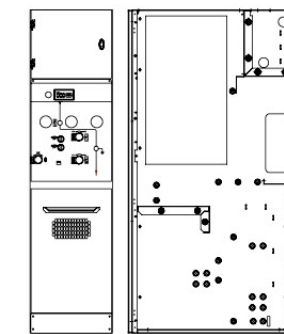
The ring main unit shall be installed in a well-ventilated area, to operate and maintain in front, the base of the ring main unit has foot mounting holes; the indoor cabinet can be installed away from the wall or against the wall, and installation position is in the figure. The flatness of the track laid on the foundation shall not exceed 2mm per square meter. The base of the ring main unit must be fixed onto the foundation. To install outdoor, the foundation must be built on a high ground, and the distance from the wall or shelter around it must not be less than 1 meter to open the door easily.

The walls of the pit are made of cement and solid bricks and the surface is treated to prevent water seepage. The walls of the pit and the foundation are made of 1:2.5 cement mortar with a thickness of 20mm, and the surface must be smooth. The soil mix is made according to GB232-82 "Electrical Installation Engineering Construction and Acceptance Specification". When cables are installed, the cable room bottom plate shall be sealed to prevent moisture from entering the trench. The ring main unit must be connected with the grounding network on site. The grounding of the ring main unit is marked.

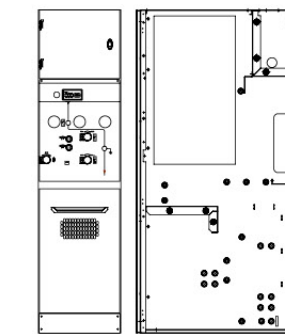
外形尺寸 Dimensions



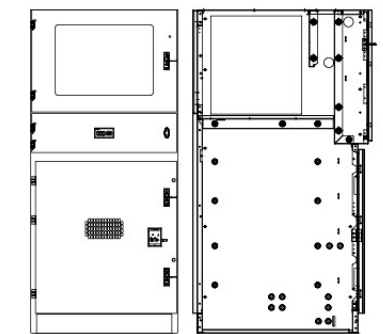
420*914*1650
断路器柜
Circuit breaker cabinet



420*914*1650
负荷开关柜
Load switch cabinet

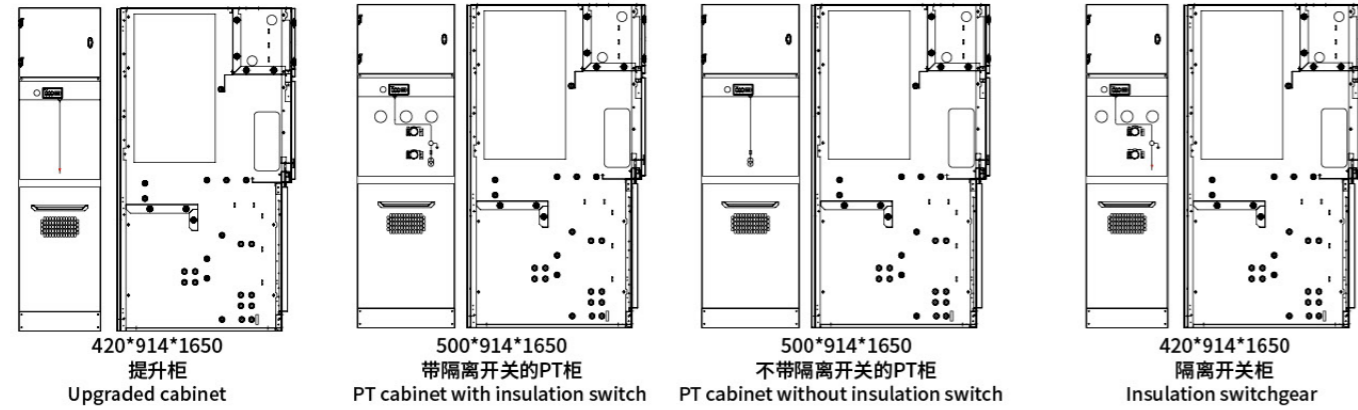


450*914*1650
负荷开关熔断器组合电器柜
Load switch fuse combined appliance cabinet



750*914*1650
计量柜
Metering cabinet

外形尺寸 Dimensions



应用领域 Applications

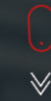
- ◆ 低温寒冷地区：无 SF₆ 气体应用，无需考虑 SF₆ 气体低温运行问题，在 -45°C 下也能正常运行。
- ◆ 高原地区：无需考虑高原大气压对绝缘性能的影响。
- ◆ 强风沙地区：固体绝缘环网柜本体安全防护等级 IP67，控制回路室采用特殊处理确保强风沙地区长期运行。
- ◆ 沿海潮湿地区：环氧树脂密封，抗潮湿，抗盐雾腐蚀，确保在沿海地区能长期使用。
- ◆ 高环保要求地区：SF₆ 气体对大气温室化影响已经高度引起重视，固体环网柜取消了 SF₆ 气体，对环境 and 人身无任何污染和伤害。
- ◆ 智能电网中：由于主开关都能实现电动，选配本公司研发的智能控制器，可对开关设备和变电站现场进行遥控、遥测、通讯，既能进行分散控制，又能方便集中控制。
- ◆ Low-temperature cold area: When SF₆ gas isn't used, no need to consider the low temperature operation of SF₆ gas, it can operate normally at -45° C.
- ◆ Plateau area: No need to consider the effect of plateau atmospheric pressure on insulation performance.
- ◆ Strong-wind and sandy area: Solid-insulated ring main unit safety protection grade is IP67, control circuit room has special treatment to ensure long-term operation in a strong-wind and sandy area.
- ◆ Coastal humid area: Epoxy resin seal is anti-humidity, anti-salt-fog-corrosion to ensure long-term use in a coastal area.
- ◆ An area with high requirements on environmental protection: People have paid great attention to the SF₆ gas warming effect on the atmosphere; SF₆ gas is cancelled in a solid ring main unit, without pollution and harm to environments and people.
- ◆ In smart power grid: The main switch is electrically actuated; the intelligent controller developed by our company is optional, and it can be used for the remote control, telemetry, telecommunication, decentralized or centralized control of the switchgears and substations on site.



DFW10-12

户外高压环网箱 (一二次融合标准化环网箱)

DFW10-12 Outdoor high-voltage ring cage (standardized ring cage for primary and secondary integration)



一二次融合标准化环网箱产品简介 First and second fusion standardized ring cage product introduction

一二次融合标准化环网箱箱体材质性能不低于 S304 不锈钢或 GRC 材料 (玻璃纤维增强水泥) 等材料。外壳应有足够的机械强度, 在起吊、运输和安装时不应变形或损伤。外箱体防护等级应不低于 IP43。环网箱材质如为金属, 则标称厚度 $\geq 2\text{mm}$, 尺寸允许偏差满足《GB/T 708 冷轧钢板和钢带的尺寸、外形、重量及允许偏差》的 B 级精度要求。金属材料外箱体应采取防腐涂层工艺处理, 涂层均匀、厚度一致, 涂层应有牢固的附着力, 保证 20 年不可出现明显可见锈斑, 箱体外壳具有防贴小广告功能。环网箱颜色为国网绿, CMYK 值为 C100M5Y50K40, PANTONG 3292C。如有特殊要求, 应保持与周围人文、地理环境相协调。箱壳表面应有明显的反光警示标志, 保证 15 年不褪色。

外箱体应设置明显的标志, 如设备名称、有电危险等。标志和标识的制作应符合 GDW 742 的规定。

环网箱内的配电自动化终端包括集中式 DTU 和分散式 DTU 两种。集中式 DTU 和分散式 DTU 应分别满足各自技术要求。预留自动化接口的户外环网箱应同时预留独立的配电自动化单元安装空间, 一般按 DTU 遮蔽立式放置, 预留宽度空间不低于 600mm。直流电源系统组合安装于箱内, 并完成二次接线。

一二次融合标准化环网箱金属材质的外形尺寸: 4 路: 箱宽为 3200mm。6 路: 箱宽为 4000mm。环网箱深度为 1150mm。高度 $\leq 2300\text{mm}$, 非金属材质环网箱高度 $\leq 2500\text{mm}$ 。开门角度不小于 90° 。

The material performance of the first and second fusion standardized ring cage box is not lower than S304 stainless steel or GRC material (glass fiber reinforced cement) and other materials. The shell should have sufficient mechanical strength and should not be deformed or damaged during lifting, transportation and installation. The protection level of the outer box shall not be less than IP43. If the material of the ring cage is metal, the nominal thickness is $\geq 2\text{mm}$, and the allowable size deviation meets the B-class accuracy requirements of "GB/T 708 cold-rolled steel plate and steel strip size, shape, weight and Allowable deviation".

The outer box of the metal material should be treated with anti-corrosion coating process, the coating is uniform and the thickness is consistent, the coating should have a firm adhesion to ensure that there can be no obvious rust spots in 20 years, and the box shell has an anti-sticker function.

The color of the ring cage is National network green, the CMYK value is C100M5Y50K40, and the PANTONG 3292C. If there are special requirements, it should be kept in harmony with the surrounding cultural and geographical environment. The surface of the case should have obvious reflective warning signs to ensure that the color will not fade for 15 years.

The outer box should be set up with obvious signs, such as the name of the equipment, electrical hazards, etc. Signs and signs shall be made in accordance with the provisions of GDW 742.

The distribution automation terminal in the ring cage includes centralized DTU and distributed DTU. Centralized DTU and distributed DTU shall meet their respective technical requirements. The outdoor ring cage reserved for the automation interface should also reserve an independent distribution automation unit installation space, which is generally placed according to the DTU shielded vertical, and the reserved width space is not less than 600mm. The DC power supply system is installed in the box, and secondary wiring is completed.

Primary and secondary fusion standardized ring cage metal material dimensions: 4 way: box width of 3200mm. 6 channels: The box width is 4000mm. The ring cage depth is 1150mm. Height $\leq 2300\text{mm}$, non-metallic ring cage height $\leq 2500\text{mm}$. The door opening Angle is not less than 90° .

概述 Overview

随着社会的不断发展进步, 我国城市电网发生了巨大变化, 大多数城市已经形成或正在形成众多的用电负荷密集区。过去那种从变电站 12kV 线路 (或分支线路) 到直接用户的供电已经难以满足城市发展的要求。因而产生了一种新的供电方式通过开闭所向用户供电。但是随着城市密集化的加剧, 原有的一些土建型开闭所已受到土地和城市规划的限制, 因此出现了一种更加先进、实用的户外高压环网箱 (标准化)。该产品无需土建而且占地面积少, 配置非常灵活供电方式更加可靠, 建设安装, 调试时间大为缩短, 总体造价降低。

随着现代工业的发展, 对电气控制设备自动化和智能化程度越来越高, 利用现代电子技术、传感器技术、通信技术、计算机网络技术, 将电力设备在正常及事故状况下的监测、保护、控制、计量等集成化, 达到良好的管理, 已成为一种必然趋势和发展方向。

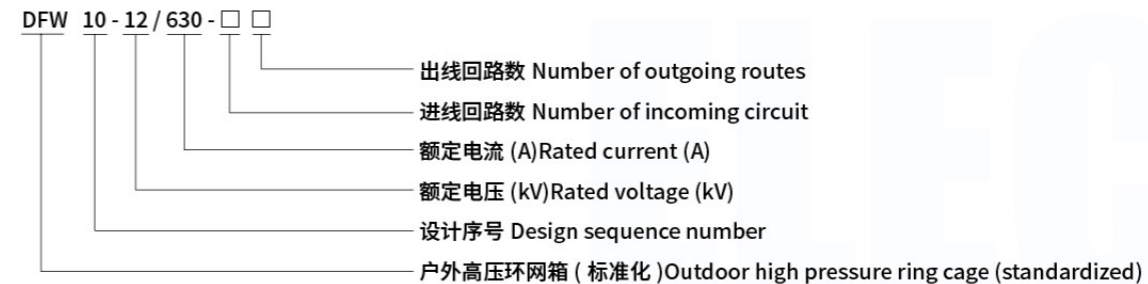
户外高压环网箱 (标准化) 是采用和借鉴国外的先进技术, 将 12kV 开关柜、断路器、负荷开关、电流电压互感器、12kV 电源 PT、开闭所 FTU, RTU、通信控制终端 (CCU)、12kV 计量及自动抄表、USP 电源及指示仪表等安装调试好装入一个可移动、密封防潮的不锈钢箱体内, 从而实现了城市配电网中一、二次系统的集成化、装配的模块化, 缩短了建设周期, 大大地提高了城市电网运行的可靠性。

With the continuous development and progress of society, great changes have taken place in China's urban power grid, and most cities have formed or are forming a large number of load-intensive areas. In the past, the power supply from the substation 12kV line (or branch line) to the direct user has been difficult to meet the requirements of urban development. Therefore, a new power supply method is produced by opening and closing the power supply to the user. However, with the intensification of urban densification, some of the original civil openings have been restricted by land and urban planning, so a more advanced and practical outdoor high-pressure ring cage (standardized) has emerged. The product does not need civil construction and occupies a small area, the configuration is very flexible, the power supply is more reliable, the construction and installation, debugging time is greatly shortened, and the overall cost is reduced.

With the development of modern industry, the degree of automation and intelligence of electrical control equipment is getting higher and higher, the use of modern electronic technology, sensor technology, communication technology, computer network technology, the power equipment in the normal and accident conditions of monitoring, protection, control, measurement and other integration, to achieve good management, has become an inevitable trend and development direction.

Outdoor high pressure ring cage (standardized) is the use of foreign advanced technology, Install and adjust 12kV switchgear, circuit breaker, load switch, current and voltage transformer, 12kV power supply PT, switching station FTU, RTU, communication control terminal (CCU), 12kV metering and automatic meter reading, USP power supply and indicating instrument into a movable, sealed and moisture-proof stainless steel box. Thus, the integration and modular assembly of the primary and secondary systems of the urban distribution network are realized, the construction period is shortened, and the reliability of the urban power network operation is greatly improved.

型号含义 Model meaning



使用环境条件 Environmental conditions of use

- ◆ 海拔高度: $< 1000\text{m}$;
- ◆ 最高环境温度: $+40^\circ\text{C}$;
- ◆ 最低环境温度: -25°C ;
- ◆ 最大日温差: 25K ;
- ◆ 户内相对湿度: 日平均值 $\leq 95\%$ 月平均值 $\leq 90\%$;
- ◆ 耐地震能力: 地面水平加速度 0.2g ; 垂直加速度 0.1g 同时作用。采用共振、正弦、拍波试验方法; 激振 5 次, 每次 5 波, 每次间隔 2s, 安全系数不小于 1.67;
- ◆ 安装场所应无严重影响负荷开关绝缘的气体蒸汽、化学性沉积、灰尘、污秽及其它爆炸和腐蚀介质;
- ◆ 用于不接地系统和通过小电阻接地或经消弧线圈接地的 12kV 系统中。

- ◆ Altitude: $< 1000\text{m}$;
- ◆ Maximum ambient temperature: $+40^\circ\text{C}$;
- ◆ Minimum ambient temperature: -25°C ;
- ◆ Maximum daily temperature difference: 25K ;

- ◆ Indoor relative humidity: daily average $\leq 95\%$ monthly average $\leq 90\%$;
- ◆ Earthquake resistance: ground horizontal acceleration 0.2g; Vertical acceleration 0.1g simultaneously. Resonance, sinusoidal and beat wave test methods were adopted. Exciting 5 times, 5 waves each time, each interval 2s, safety factor is not less than 1.67;
- ◆ The installation site should be free of gas vapor, chemical deposition, dust, pollution and other explosive and corrosive media that seriously affect the insulation of the load switch;
- ◆ Used in ungrounded systems and 12kV systems grounded by small resistance or arc suppression coil.

符合标准 Meet the standard

本产品满足最新颁布执行的国家标准、行业标准和 IEC 标准，在与用户协商达成一致后，可以使用其他性能更高的标准。下列标准所包含的有关条文，通过引用而构成本技术条件的条文。所有标准都会被修订，本技术条件应符合下列标准最新版本的要求。

- ◆ GB 16926-1997 交流高压负荷开关—熔断器组合电器
- ◆ GB 3804-2004 3.6kV~40.5kV 高压交流负荷开关
- ◆ GB 3906-2006 3.6kV~40.5kV 交流金属封闭开关设备和控制设备
- ◆ GB/T 11022-1999 高压开关设备和控制设备标准的共用技术要求
- ◆ GB 4208-2008 外壳防护等级 (IP 代码)
- ◆ IEC420 高压交流负荷开关—熔断器的组合电器
- ◆ IEC 298 1 kV 以上 52kV 及以下交流金属封闭开关设备和控制设备
- ◆ GB 1984-2003 高压交流断路器

This product meets the latest issued and implemented national standards, industry standards and IEC standards, and other standards with higher performance can be used after consultation with the user. The relevant provisions contained in the following standards constitute, by reference, the provisions of these technical conditions. All standards are subject to revision, and this technical condition shall comply with the requirements of the latest version of the following standards.

- ◆ GB 16926-1997 AC high voltage load switch and fuse combination appliance
- ◆ GB 3804-2004 3.6kV~40.5kV high voltage AC load switch
- ◆ GB 3906-2006 3.6kV~40.5kV AC metal enclosed switchgear and control equipment
- ◆ GB/T 11022-1999 High voltage switchgear and control equipment standard common technical requirements
- ◆ GB 4208-2008 Shell protection grade (IP code)
- ◆ IEC420 high voltage AC load switch and fuse combination appliance
- ◆ IEC 298 AC metal enclosed switchgear and control equipment above 1 kV and below 52kV
- ◆ GB 1984-2003 High voltage AC circuit breaker

产品特点 Product characteristics

产品采用气体绝缘，可配断路器、负荷开关、组合电器等一次方案。该产品是根据最新配网自动化标准进行一二次融合设计，集成 DTU 和智能传感、在线检测等智能组件，适合各种配网自动化系统应用。

- ◆ 环境适应能力强
- ◇ 全工业级设计，严酷等级达到户外 IV 级
- ◇ 良好的电磁兼容设计，内部测试满足 IV 级要求；
- ◇ 现场安装、调试方便；
- ◇ 后期维护方便、费用少，提供远程维护。

- ◆ 功能丰富、性能卓越
- ◇ 多种通讯口，双以太网、4 串口、支持光纤、无线路由通信；
- ◇ 支持目前流行规约，GB101、GB104、CDT、MODBUS 等；
- ◇ 支持通信定时， $\leq 5S$ ，守时精度 $\leq 2S/天$ ；
- ◇ 支持国网通信数据加密 (168 号文)；
- ◇ 控制 4 路、6 路、8 路开关设备，及隔离开关和接地刀闸；
- ◇ 支持环境温度湿度监控；
- ◇ 具备谐波分析功能；支持“三遥”功能、模拟量精度达到 0.2/0.5 级；
- ◇ 具备多种保护功能，短路过流、单相接地；
- ◇ 80 点故障录波和故障报文上传；
- ◇ 支持多种电压 / 功率操作电源，电池活化；
- ◇ 支持电磁互感器或电子式互感器接入；
- ◆ 智能化：集成配网自动化智能终端，能实现配网自动化、馈线自动化等智能配网功能。
- ◆ 集成化：一二次融合设计，一次开关设备融合了二次智能组件，一体化设计，方便集成与运维。
- ◆ 小型化：结构紧凑，操作简便，主配我公司生产的气体绝缘开关柜、固体绝缘开关柜设备。
- ◆ 多样化：断路器、负荷开关、组合电器等多种方案自由组合，满足不同需求。

The product adopts gas insulation, and can be equipped with circuit breakers, load switches, combined electrical appliances and other primary programs. The product is based on the latest distribution automation standards for the first and second fusion design, integration of DTU and intelligent sensing, online detection and other intelligent components, suitable for a variety of distribution automation system applications.

- ◆ Strong adaptability to the environment
- ◇ Industrial grade design, the severity level reaches outdoor level IV
- ◇ Good electromagnetic compatibility design, internal test to meet IV requirements;
- ◇ Convenient on-site installation and debugging;
- ◇ Convenient maintenance, low cost, provide remote maintenance.
- ◆ Rich function, excellent performance
- ◇ A variety of communication ports, double Ethernet, 4 serial ports, support optical fiber, wireless routing communication;
- ◇ Support the current popular protocols, GB101, GB104, CDT, MODBUS, etc.
- ◇ Support communication timing, $\leq 5S$, punctuality accuracy $\leq 2S/day$;
- ◇ Support national network communication data encryption (168);
- ◇ Control 4 way, 6 way, 8 way switchgear, isolation switch and grounding brake;
- ◇ Support environmental temperature and humidity monitoring;
- ◇ With harmonic analysis function; Support "three remote" function, analog accuracy reaches 0.2/0.5 level;
- ◇ With a variety of protection functions, short circuit overcurrent, single-phase grounding;
- ◇ 80-point fault recording and fault message upload;
- ◇ Support a variety of voltage/power operation power supply, battery activation;
- ◇ Support electromagnetic transformer or electronic transformer access;
- ◆ Intelligent: integrated distribution network automation intelligent terminal, can achieve distribution network automation, feeder automation and other intelligent distribution network functions.
- ◆ Integration: a two-time integration design, a switch equipment integration of two intelligent components, integrated design, easy integration and operation and maintenance.
- ◆ Miniaturization: compact structure, easy operation, mainly equipped with gas insulated switchgear and solid insulated switchgear equipment produced by our company.
- ◆ Diversification: Circuit breakers, load switches, combined electrical appliances and other schemes can be freely combined to meet different needs.

技术参数 Technical parameter

名称 Name	单位 Unit	负荷开关柜 Load switch cabinet	组合电器柜 Modular electrical cabinet	
额定峰值耐受电流 Rated peak withstand current	kA		50/63	
闭环开断电流 Closed-loop breaking current	A		630	
额定电缆充电开断电流 Rated cable charging breaking current	A		10	
额定空载变压器开断电流 Rated no-load transformer breaking current	A		16	
额定开断转移电流 Rated breaking transfer current	A		1750	
熔断器预期短路开断电流 (有效值) Expected short-circuit breaking current of fuse	kA		63	
接地开关短时耐受电流 / 持续时间 Ground switch short-time withstand current/duration	kA		25kA/1s	
额定电流开断次数 Number of times the rated current is broken	次 Time		≥ 200	
机械寿命 Mechanical life	次 Time		≥ 2000	
SF6 气体年泄漏率 Annual leakage rate of SF6 gas		不大于 1% Not more than 1%		
额定开断转移电流 Rated breaking transfer current	A		1750	
熔断器预期短路开断电流 (有效值) Expected short-circuit breaking current of fuse	kA		63	
接地开关短时耐受电流 / 持续时间 Ground switch short-time withstand current/duration	kA		25kA/1s	
额定电流开断次数 Number of times the rated current is broken	次 Time		≥ 200	
机械寿命 Mechanical life	次 Time		≥ 2000	
SF6 气体年泄漏率 Annual leakage rate of SF6 gas		≤ 0.05%		
额定绝缘水平 Rated insulation level	1min 工频耐受电压 (有效值) 1min power frequency withstand voltage (valid value)	断口 Fracture	kV	48
		相间 Interphase	kV	42
	雷电冲击耐受电压 (峰值) Lightning impulse withstand voltage(peak value)	断口 Fracture	kV	85
		相间 Interphase	kV	75
	相对地 Oppositely	kV	75	
弹簧操作机构 Spring operating mechanism		手动, 可升级为电动 Not more than 1%		
操作电压 Operating voltage	V	DC 48V/ AC 220V		
外绝缘爬电比距 Outer insulation creepage ratio	mm/kV	≥ 20		
分闸不同期性 Switching is not the same	ms	小于 5 Smaller than 5		
合闸不同期性 Different closing times	ms	小于 5 Smaller than 5		
主回路电阻 Main loop resistance	uΩ	小于 140 Smaller than 140		
柜壳防护等级 Shell protection level		IP4X		

结构和技术要求 Structural and technical requirements

一二次融合环网箱中负荷开关采用三工位 SF₆ 负荷开关, SF₆ 负荷开关的电气寿命应达到 E3 级要求; 断路器的电气寿命应达到 E2 级要求。

◆ 在 PT 柜, 计量柜等采用空气绝缘的开关柜内采取防凝露措施 (柜内装凝露控制器), 如加装电阻加热器 (带控制开关)。

◆ 单元式 SF₆ 环网柜气包内 SF₆ 的相对压力不应超过 0.04Mpa。整个充气壳体应当满足 IEC60298 中规定的“密闭压力系统”的要求, 年漏气不大于 0.05%, 30 年免维护, 且不需要重新充气。通过 SF₆ 压力表可以监视 SF₆ 气室内气体的压力。

◆ 熔断器熔丝额定电流应与负荷进行匹配, 熔断器参数为: 额定电压 12kV, 额定开断电流 (有效值) 63kA。用于配变保护用一二次融合环网箱应既能熔断脱扣, 也容易实现电动脱扣。

◆ 一二次融合环网箱应具备完善的五防联锁功能。

◆ 通过机构联锁装置的控制, 操作完全达到以下五防联锁功能:

◇ 防止误分误合断路器 (负荷开关);

◇ 防止带负荷分合隔离开关;

◇ 防止带电挂 (合) 接地线 (接地开关);

◇ 防止带接地线 (接地开关) 合断路器 (负荷开关, 隔离开关);

◇ 防止误入带电间隔;

◇ 采用全封闭式结构, 开关柜主要由气室, 电缆室, 机构室 (二次室) 等隔室构成。电缆接头至电缆引入处 (孔或固定箍) 距离 650mm, 内套管、支持绝缘件采用环氧树脂材料, 其爬电比距 20mm/kV。间接接采用铜母线, 接地汇流母线采用铜母线, 截面的选择应满足 GB3906 的要求。

◇ 机构箱面板安装具有验电功能的带电指示器, 方便更换, 并可以外接二次核相仪。

◇ 一二次融合环网箱一次线路模拟牌标识清晰。

◇ 内部安装的高压电器组件, 如: SF₆ 负荷开关、断路器、互感器、避雷器等, 均应具有耐久而清晰的铭牌, 铭牌应安装在运行或检修时易于观察的位置。

◇ 一二次融合环网箱配置二次室或控制箱, 具有与操作机构配套的二次回路。可配置手动 / 电动操作机构, 并预留电动操作功能, 预留遥控、通信接口, 以适应远方监控需要, 还应具有短路故障指示器, 满足相间短路、单相故障接地指示要求, 并具有开关量输出功能。环网柜内端子要求使用防尘阻燃型产品。CT 的二次电线截面为铜芯 2.5 平方毫米, 回路中安装电流测试盒。电压、控制电线截面为铜芯 1.5 平方毫米。

◇ 下柜门带观察窗, 采用阻燃透明材料制成。

◇ 一二次融合环网箱在柜前完成电缆的安装和维护, 可以靠墙安装。

◇ 负荷开关采用三工位结构, 前面板上具有直观的位置指示。三工位开关的接地开关和负荷开关 / 隔离开关具有分别的操作手柄插孔。

◇ 一二次融合环网箱结构具有防止内部故障燃弧时发生伤害操作人员人身功能: 隔室有金属隔板, 防止事故扩展; 气室有压力释放区; 柜体后部有压力释放板。

◇ 负荷开关及操作机构的安装尺寸统一, 相同部件、易损件和备品、备件具有互换性。

◇ 一二次融合环网箱气室采用 3mm 优质 304 不锈钢板焊接成型, 柜体采用覆铝锌钢板 (除通风、排气口、观察窗外) 制作, 钢板厚度不小于 2mm, 有足够的机械和耐火强度。

◇ 带电主回路的一切组件均安装在气室内, 气室的防护等级应满足 IP67 的要求; 柜体满足 IP4X 的要求。

◇ 供起吊用的吊环 (左右各一只) 位置设置合理, 应使悬吊中的开关设备保持水平, 吊链与任何部件之间不得有摩擦接触, 避免在吊装过程中划伤箱体表面涂层。

◇ 沿所有一二次融合环网箱的整个长度延伸方向, 应设有专用的接地汇流母线, 如果是铜质的, 其电流密度在规定的接地故障时, 不应超过 200A/mm², 但最小截面不得小于 110mm², 该接地导体应设有与接地网相连的固定连接端子, 并且有明显的接地标志。如果接地导体不是铜质的, 也应满足铭牌规定的峰值耐受电和短时耐受电流的要求。壳体接地点的接触面积应满足要求, 接地螺钉的直径不得小于 12mm, 接地点应标有“接地”字样或其他接地符号。

◇ 气室中主母线选用铜质材料, 母线分段柜内分支引线截面与主母线相同; 主母线及分支母线 (含连接部分) 外表面宜采用有机绝缘, 即母线小室及电缆小室内母线不得有裸露部分 (电缆接线端子除外)。

◇ SF₆ 负荷开关的其它要求用有机绝缘, 即母线小室及电缆小室内母线不得有裸露部分 (电缆接线端子除外)。

◇ SF₆ 负荷开关的其它要求:

负荷开关灭弧介质和绝缘介质为 SF₆ 气体;

每个独立的 SF₆ 气室一般应装设能显示内部气压的装置, 该装置应能够明确显示设备安全运行的气压范围。

The load switch in the primary and secondary fusion ring cage adopts the three-station SF₆ load switch, and the electrical life of SF₆ load switch should meet the requirements of E3 level; The electrical life of the circuit breaker should meet the requirements of class E2.

◆ Anti-condensation measures should be taken in the air insulated switch cabinets such as PT cabinets and metering cabinets (condensation controller installed in the cabinet), such as resistance heaters (with control switches).



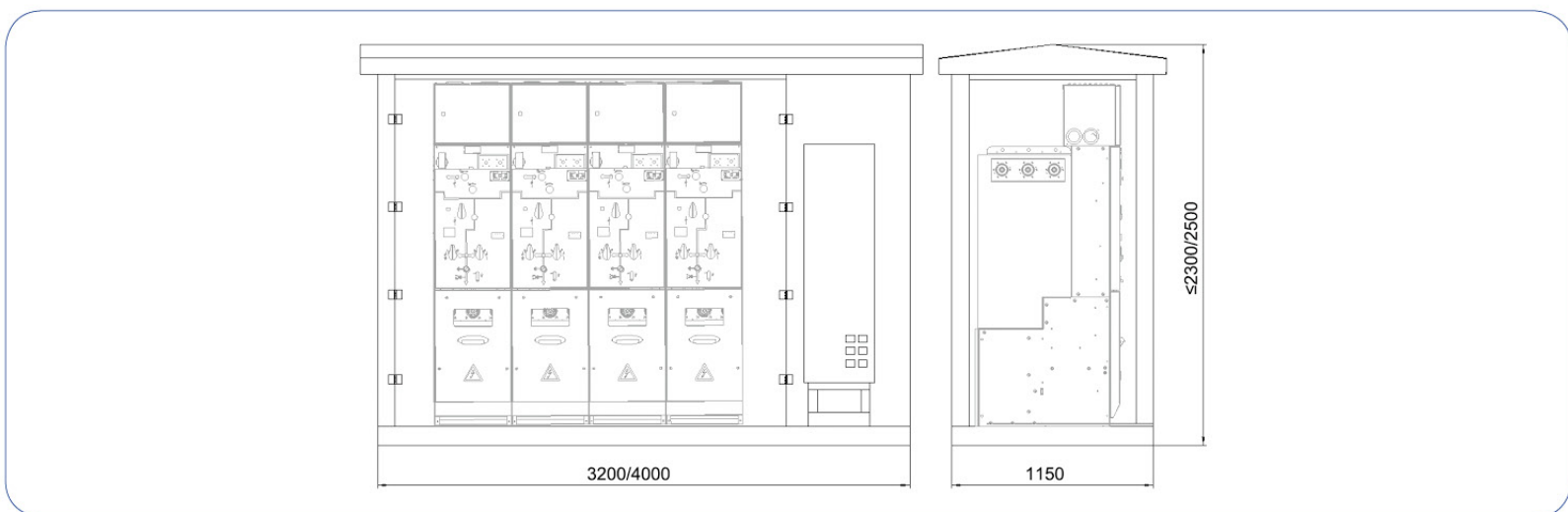
- ◆ The relative pressure of SF6 in the air bag of the unit SF6 ring cabinet should not exceed 0.04Mpa. The entire inflatable housing should meet the requirements of the "closed pressure system" stipulated in IEC60298, the annual air leakage is not more than 0.05%, 30 years maintenance-free, and does not need to be re-inflated. The SF6 pressure gauge monitors the gas pressure in the SF6 gas chamber.
- ◆ The rated current of the fuse should be matched with the load. The parameters of the fuse are: rated voltage 12kV, rated breaking current (RMS) 63kA. The primary and secondary fusion ring cage used for transformer protection should not only fuse the trip, but also easily realize the electric trip.
- ◆ The first and second fusion ring cage should have a perfect five-guard interlock function.
- ◆ Through the control of the mechanism interlock device, the operation fully achieves the following five anti-interlock functions:
 - ◇ Prevent mis-switch circuit breaker (load switch);
 - ◇ Prevent with load switching isolation switch;
 - ◇ Prevent live hanging (close) grounding wire (grounding switch);
 - ◇ Prevent with grounding wire (grounding switch) off circuit breaker (load switch, isolation switch);
 - ◇ Prevent stray live interval;
- ◇ Fully enclosed structure, the switch cabinet is mainly composed of gas chamber, cable room, mechanism room (secondary room) and other compartments. The distance between the cable connector and the cable lead-in (hole or fixed hoop) is 650mm. The inner sleeve and supporting insulation are made of epoxy resin, and the creepage specific distance is 20mm/kV. Copper busbar is used for inter-connection and copper busbar is used for grounding busbar. The selection of cross section should meet the requirements of GB3906.
- ◇ The panel of the mechanism box is equipped with a live indicator with electrical testing function, which is easy to replace and can be connected with a secondary nuclear phase meter.
- ◇ The first and second fusion ring cage a line analog plate identification is clear.
- ◇ Internal installation of high-voltage electrical components, such as: SF6 load switches, circuit breakers, transformers, arresters, etc., should have durable and clear nameplates, nameplates should be installed in the operation or maintenance of easy to observe the position.
- ◇ The primary and secondary fusion ring cage is configured with a secondary chamber or control box, which has a secondary circuit matching with the operating mechanism. Manual/electric operation mechanism can be configured, and electric operation function is reserved, remote control and remote communication interface are reserved to meet the needs of remote monitoring, short-circuit fault indicator should also be provided to meet the requirements of inter-phase short-circuit and single-phase fault grounding indication, and switching output function. The inner terminal of the ring cabinet must be dustproof and flame retardant. CT's secondary wire section is 2.5 mm square of copper core, and a current test box is installed in the loop. The cross section of voltage and control wire is 1.5 square mm copper core.
- ◇ Lower cabinet door with observation window, made of flame-retardant transparent material.
- ◇ The primary and secondary fusion ring cage completes the cable installation and maintenance in front of the cabinet, and can be installed against the wall.
- ◇ The load switch adopts the three-station structure, and the front panel has an intuitive position indication. The ground switch and the load switch/isolation switch of the three-station switch have separate operating handle jacks.
- ◇ The primary and secondary fusion ring cage structure has the function of preventing injury to the operator when the internal fault arcs: the compartment has a metal partition to prevent the expansion of accidents; The gas chamber has a pressure release area; There is a pressure release plate at the rear of the cabinet.
- ◇ The installation size of load switch and operating mechanism is unified, and the same parts, wearing parts and spare parts are interchangeable.
- ◇ The air chamber of the primary and secondary fusion ring cage is welded with 3mm high-quality 304 stainless steel plate, and the cabinet is made of aluminum-zinc clad steel plate (except for ventilation, exhaust port and observation window). The thickness of the steel plate is not less than 2mm, which has sufficient mechanical and fire resistance.
- ◇ All components of the live main circuit are installed in the gas room, and the protection level of the gas room should meet the requirements of IP67; Cabinet meets IP4X requirements.
- ◇ The position of the lifting ring (one on each side) for lifting should be set reasonably, so that the switching device in suspension should be kept level, and there should be no friction contact between the chain and any part, so as to avoid scratching the spray layer on the surface of the box during the lifting process.

- ◇ Along the entire length of all the primary and secondary fusion ring cage extension direction, should be provided with a dedicated ground bus, if it is copper, its current density in the specified ground fault, should not exceed 200A/mm², but the minimum cross section shall not be less than 110mm², the ground conductor should be equipped with a fixed connection terminal connected to the ground network, and there is an obvious grounding mark. If the grounding conductor is not copper, it should also meet the requirements of peak and short-term withstand current specified on the nameplate. The contact area of the ground point of the shell should meet the requirements. The diameter of the ground screw should not be less than 12mm. The ground point should be marked with the word "grounding" or other grounding symbols.
- ◇ The main busbar in the air chamber is made of copper material, and the branch lead section in the busbar section cabinet is the same as the main busbar; The outer surface of the main busbar and the branch busbar (including the connecting part) should be insulated organically, that is, the busbar compartment and the cable compartment should not have exposed parts (except the cable terminal).
- ◇ Other requirements of SF6 load switches should be insulated with organic insulation, that is, the bus bar room and the cable bar room should not have exposed parts (except cable terminal).
- ◇ Other requirements of SF6 load switch:
 - The arc extinguishing medium and insulating medium of the load switch are SF6 gas;
 - Each independent SF6 gas chamber should generally be equipped with a device that can display the internal pressure, and the device should be able to clearly display the pressure range of the safe operation of the equipment.

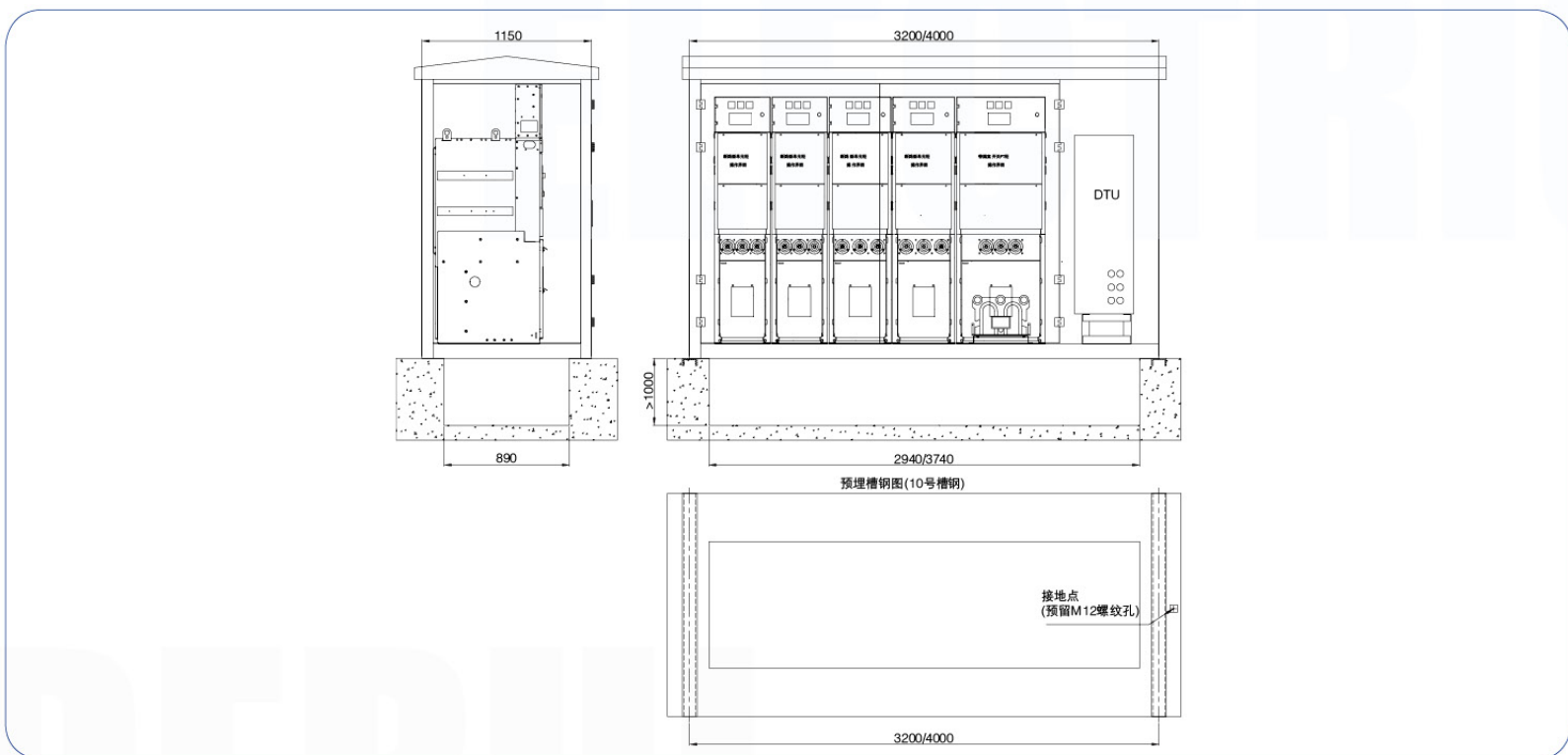
典型设计 Typical design

- ◆ 一二次融合成套环网箱由环进环出单元、馈线单元、母线设备 (TV) 单元、集中式 DTU 单元、外箱体、连接电缆等构成。
 - ◆ 所有环进环出单元、馈线单元的电源、电流、遥信、遥控等回路采用标准化接口设计, 通过二次航空插头汇总于 DTU 单元的航插室; 母线设备单元的电源、电压等回路通过二次航空插头汇总于 DTU 单元的航插室。
 - ◆ DTU 单元柜与开关柜的连接采用电缆双端预制, 设备支持热插拔, 不同厂家航空插头可互换, 可实现 DTU 单元柜、一次开关本体的整体可更换。
 - ◆ DTU 实现三遥、计量、相间及接地故障处理、通信、二次供电等功能; 计量采用独立模块, DTU 核心单元与其通信采集计量数据。
- 配电自动化终端: 由通信单元、核心单元、一二次接口单元组成。
- ◆ 通信单元: 由 101/104 通讯模块 (有 / 无线)
 - ◆ 核心单元: 由核心单元、加密芯片、线损采集模块组成。
 - ◆ 一二次接口单元: 连接电缆、航空插头 (国网圆形航插: 4 芯、10 芯、26 芯; 网矩形航插: 10 芯、26 芯) 组成。
- ◆ The complete set of primary and secondary fusion ring cage is composed of ring in ring out unit, feeder unit, bus equipment (TV) unit, centralized DTU unit, outer box, connecting cable, etc.
 - ◆ All loop in loop out unit, feeder unit power supply, current, remote communication, remote control and other circuits adopt standardized interface design, through the secondary aviation plug summarized in the DTU unit's navigation room; The power supply, voltage and other circuits of the bus equipment unit are summarized in the navigation compartment of the DTU unit through the secondary aviation plug.
 - ◆ DTU unit cabinet and switch cabinet are connected by double-end cable prefabrication, the equipment supports hot swap, and the aviation plugs of different manufacturers are interchangeable, which can realize the overall replacement of DTU unit cabinet and primary switch body.
 - ◆ DTU to achieve three remote, metering, phase and ground fault handling, communication, secondary power supply and other functions; An independent module is used for measurement, and the DTU core unit communicates with it to collect measurement data.
- Distribution automation terminal: composed of communication unit, core unit, primary and secondary interface unit.
- ◆ Communication unit: 101/104 communication module (with/wireless)
 - ◆ Core unit: composed of core unit, encryption chip, line loss acquisition module.
 - ◆ Primary and secondary interface unit: connecting cable, aviation plug (State Grid circular navigation plug: 4 core, 10 core, 26 core; Net rectangular navigation: 10 core, 26 core) composition.

户外高压环网箱 (标准化) 外形尺寸图 Outdoor high pressure ring cage (standardized) dimensions



户外高压环网箱 (标准化) 地基接口尺寸图 Outdoor high pressure ring cage (standardized) ground interface dimensions



DFW-12(35kV) 高压电缆分支箱 (欧式)

DFW-12(35kV) High Voltage Cable Branch Box
(European Style)

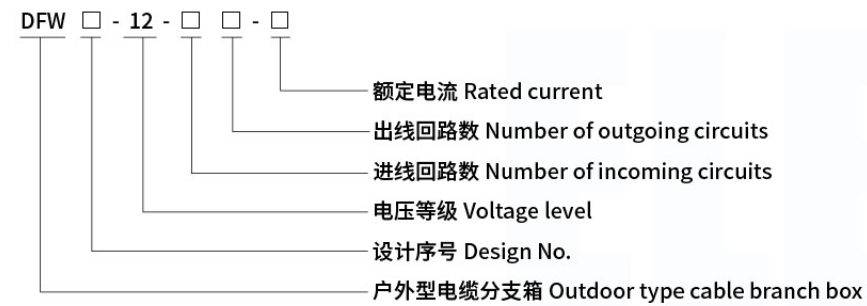


概述 Overview

预制式硅橡胶密闭接插结构，全绝缘、全密封；
带电可触摸型可分离式电缆终端和带电不可触摸型可分离电缆终端可供选择；
防尘、防潮、抗洪水、耐腐蚀、适应户内外各种运行环境；
扩展性强，灵活组合，满足多种接经要求；
免维护、体积小、结构紧凑、安装维护方便、造型美观；
可配带电显示器，可带短路故障指示器，可带避雷器。

Prefabricated silicone rubber enclosed plug-in structure, fully insulated and fully sealed;
Live touchable detachable cable terminal and live non-touchable detachable cable terminal are optional;
Dustproof, moisture-proof, flood resistant, corrosion-resistant, and adaptable to various operating environments inside and outside the house;
Strong scalability, flexible combination, meeting various connection requirements;
Maintenance-free, small in size, compact in structure, easy to install and maintain, and aesthetically pleasing in appearance;
It can be equipped with voltage indicator, short-circuit fault indicator and lightning arrester.

型号含义 Model meaning



使用环境条件 Environmental conditions of use

- ◆ 海拔高度不超过 1000 米。
- ◆ 运行环境温度：-30°C ~40°C。
- ◆ 相对湿度 ≤ 95%。
- ◆ 周围空气应无明显地受可燃性气体污染，但可以受到烟、尘、腐蚀性气体的污染，污秽等级不得超过 GB/T5582 中的 III 级。
- ◆ 无经常性的剧烈振动。
- ◆ The altitude shall not exceed 1000 meters.
- ◆ Operating ambient temperature: -30°C ~40°C .
- ◆ Relative humidity ≤ 95%.
- ◆ The ambient air should not be significantly polluted by flammable gas, but can be polluted by smoke dust and corrosive gas, and the pollution level should not exceed class III in GB/T5582.
- ◆ No frequent severe vibration.

主要技术参数 Main technical parameter

名称 Item name	单位 Unit	参数 Argument	备注 Remark
额定电压 Rated voltage	kV	12	可配置负荷开关、断路器、熔断器等设备，其技术参数另见配件之说明 It can be equipped with load switch, circuit breaker, fuse, etc., and the technical parameters are shown in the instructions of the accessory
额定频率 Rated frequency	Hz	50	
额定电流 Rated current	A	630	
1min 工频耐受电压 1min power frequency withstand voltage	kV	42	
雷电冲击耐受电压 Lightning impulse withstand voltage	kV	75	
防护等级 Protection level		IP54	
外形尺寸 (长宽高) Outline dimension (L×W×H)	mm	650×1150×880~1300×1500×1200	

欧式电缆分支箱结构示例图 European type cable branch box structure diagram

如果因场地所限，不能放置电缆分接箱，则可由电缆接头直接组合，构成多路电缆分支（不需要母排，连接方法见下例）放置在电缆沟内或其地点。

实例一 四路进出线

每相由两只欧式前接头和两只欧式后接头组成，中间一只欧式对接套管连接。欧式后接头末端用绝缘子和半导电端盖封堵。实例见下图：

If the cable branch box cannot be placed due to site limitation, it can be directly combined with cable joint to form multiple cable branches (without the need for busbar, the connection method is shown in the following example) and placed in the cable trench or its location.

Example 1: Four-way incoming and outgoing lines

Each phase consists of two European type front joints and two European type rear joints, with one European type connected to butt sleeve in the middle. The end of the European type rear joint is sealed with insulator and semiconductive end cap. The example is shown in the following figure:



实例二 两进三出

每相由三只欧式前接头和两只欧式后接头组成，中间用欧式对接套管连接。欧式后接头末端用绝缘子和半导电端盖封堵。实例见下图：

Example 2: 2 incoming 3 outgoing

Each phase consists of three European type front joints and two European type rear joints, connected by European type butt sleeve in the middle. The end of the European type rear joint is sealed with insulator and semiconductive end cap. The example is shown in the following figure:



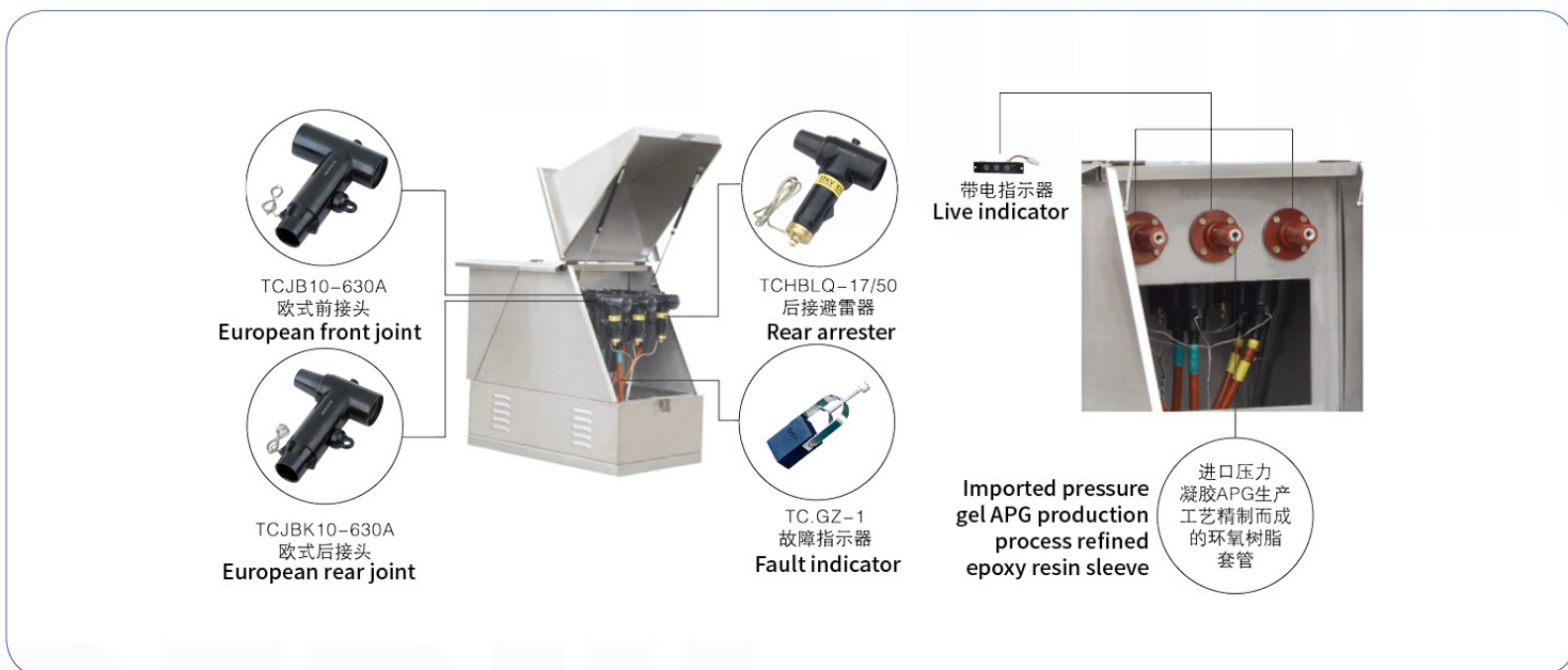
注：电缆分支可根据需要任意扩展或减少，可外罩箱体或直埋于电缆沟。

Note: Cable branches can be expanded or reduced as needed, and can be enclosed in a box or buried directly in cable trench.

欧式电缆分支箱结构示意图 European type cable branch box structure diagram



欧式电缆分支 (接) 箱结构示意图 European type cable branch (connection) box structure diagram

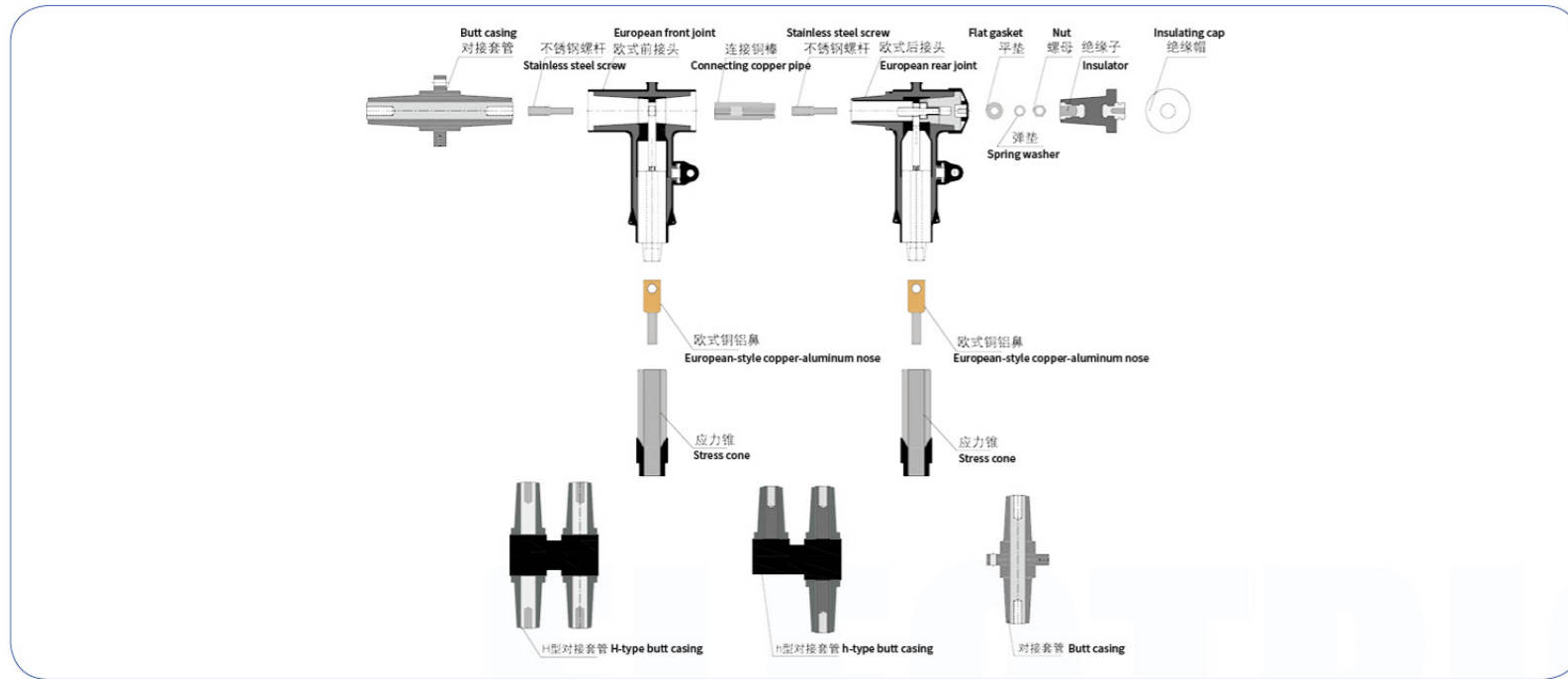


注：电缆分支可根据需要任意扩展或减少，可外罩箱体或直埋于电缆沟。
Note: Cable branches can be expanded or reduced as needed, and can be enclosed in a box or buried directly in cable trench.

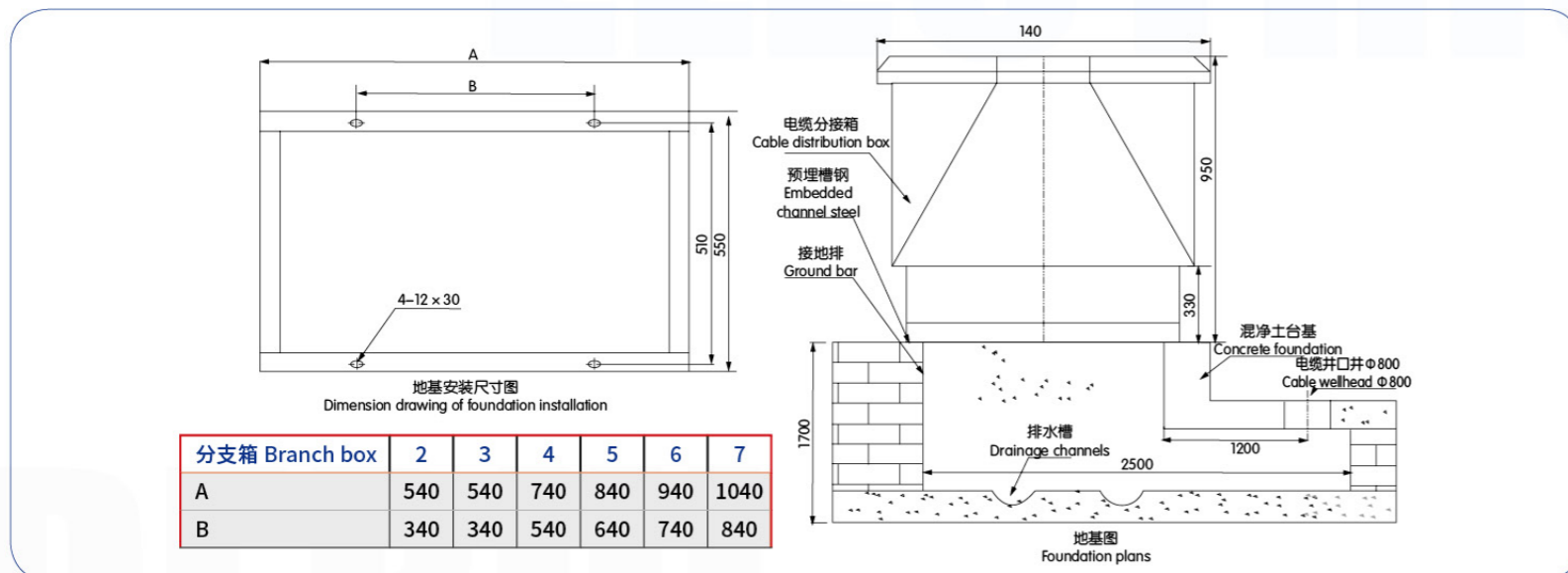
订货信息 (箱体配置方案) Ordering information (box configuration solution)

规格型号 Specification and model	接线方案 Wiring solution	内部排列 Internal arrangement	外型尺寸 Outline dimension
DFW10-2			580×550×950
DFW10-3			700×550×950
DFW10-4			820×550×950
DFW10-5			940×550×950
DFW10-6			1060×550×950
DFW10-7			1180×550×950
DFW10-8			820×650×1000
DFW10-9			940×650×1000

电缆插头安装示意图 Cable plug installation diagram



欧式电缆分支箱地基图 European type cable branch box foundation diagram



XGN □ -12
金属封闭环网开关设备

XGN □ -12 Metal Enclosed Ring Network Switchgear



产品简介 Product introduction

XGN □ -12 单元式金属封闭环网开关设备是以 FLN □ -12 型 SF₆ 负荷开关作为主开关而整柜采用空气绝缘的、适用于配电自动化的、紧凑型可扩展的金属封闭环网开关设备。具有结构简单、操作灵活、连锁可靠、安装方便等特点。对各种不同的应用场合、不同的用户要求均能提供令人满意的技术方案。

XGN □ -12 单元式金属封闭环网开关设备的主开关选用本公司生产的 FLN36-12 型、FLN48-12 型 SF₆ 负荷开关，或 ABB 公司生产的 SFG 型 SF₆ 负荷开关，也可根据用户的需要配装 VS1 型、VD4/S 型、ISM 型真空断路器或 HD4/55 型 SF₆ 断路器。负荷开关和断路器可手动或电动操作，选配电动操作机构、PT、CT、FTU 和通信装置后可实现配电自动化功能。

The XGN □ -12 modular metal enclosed ring main unit is a compact and expandable metal enclosed ring main unit suitable for distribution automation, which uses FLN □ -12 SF₆ load switch as the main switch and adopts air insulation throughout the cabinet. It has the characteristics of simple structure, flexible operation, reliable interlocking and easy installation. We can provide satisfactory technical solutions for various application sites and user requirements.

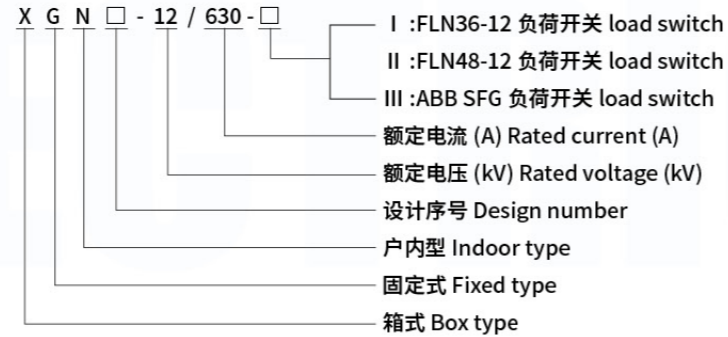
The main switch of XGN □ -12 unit metal enclosed ring main unit is selected from FLN36-12 and FLN48-12 SF₆ load switches produced by our company, or SFG SF₆ load switch produced by ABB. VS1, VD4/S, ISM vacuum circuit breakers or HD4/55 SF₆ circuit breaker can also be installed according to user needs. Load switch and circuit breaker can be operated manually or electrically, with the option of electric operating mechanism, PT, CT, FTU and communication device, distribution automation functions can be achieved.

型号含义 Model meaning

◆ SF₆ 负荷开关 SF6 Load switch



◆ 单元式开关柜 Modular switch cabine



正常使用条件 Normal service condition

- ◆ 海拔高度：不超过 2000m；
 - ◆ 环境温度：最低气温 -25°C 最高气温 +40°C；
 - ◆ 环境湿度：日平均值不超过 95%；月平均值不超过 90%；
 - ◆ 抗震能力：8；
 - ◆ 周围空气没有爆炸性和腐蚀性气体，安装场所无剧烈振动冲击。
 - ◆ Altitude: not exceeding 2000m;
 - ◆ Ambient temperature: minimum temperature -25°C, maximum temperature +40°C ;
 - ◆ Ambient humidity: daily average not exceeding 95%; monthly average not exceeding 90%;
 - ◆ Seismic resistance: 8;
- There should be no explosive or corrosive gas in the ambient air, and no severe vibration or impact in the installation site.

主要用途 Main purpose

- ◆ XGN □ -12 单元式金属封闭环网开关设备适用于额定电压 12kV，额定频率 50Hz 的电力系统，广泛应用于工业及民用电缆环网及供电末端。
- ◆ XGN □ -12 单元式金属封闭环网开关设备特别适用于以下场所：城市居民区及工矿企业配电、小型二次变电站、开闭所、箱式变电站、商场、机场、地铁、风力发电、医院、体育场馆、铁路、桥梁、隧道等。
- ◆ The XGN □ -12 modular metal enclosed ring main unit is suitable for power system with rated voltage of 12kV and rated frequency of 50Hz, and is widely used in industrial and civilian cable ring network and power supply terminal.
- ◆ The XGN □ -12 modular metal enclosed ring main unit is particularly suitable for the following places: urban residential area and industrial and mining enterprise power distribution, small secondary substation, switching station, box-type substation, shopping mall, airport, subway, wind power generation, hospital, sports venue, railway, bridge, tunnel, etc.

参考标准 Reference standard

GB/T191	包装储运图示标志 (ISO 780-11997, MOD)
GB 1985-2004	高压交流隔离开关 (IEC 62271-102:2002, MOD)
GB 3804-2004	3.6kV-40.5kV 高压交流负荷开关 (IE060265-1:1998, MOD)
GB 3906-1991	3-35kV 交流金属封闭开关设备 (neq IEC 60298:1990)
GB 4208-1993	外壳防护等级 (IP 代码) legv IEC 60529:1989)
GB/T 5582-1993	高压电力设备外绝缘污秽等级 (eqv IEC 507:1991)
GB/T 6388	运输包装收发货标志
GB 9969.1	工业产品使用说明书总则
GB/T11022-1999	高压开关设备和控制设备标准的共用技术要求 (aqv IEC 60694:1996)
GB/T 11023-1989	高压开关设备六氟化硫气体密封试验方法
GB/T13384	机电产品包装通用技术条件
GB/T14436	工业产品保证文件总则
GB 16926-1997	交流高压负荷开关熔断器组合电器 (eqv IEC 60420:1990)
JB/T 8754-1998	高压开关设备型号编制办法
DL/T 404-1997	户内交流高压开关柜订货技术条件 (neq IEC 60298:1981)
GB/T191	Packaging-Pictorial Marking for Handling of Goods (ISO 780-111997, MOD)
GB 1985-2004	High-voltage alternating-current disconnectors and earthing switches (IEC 62271-102:2002, MOD)
GB 3804-2004	High-voltage alternating current switches for rated voltage above 3.6 kV and less than 40.5 kV (IE060265-1:1998, MOD)
GB 3906-1991	A.C. metal-enclosed switchgear for rated voltages of 3~35kV (neq IEC 60298:1990)
GB 4208-1993	Degrees of protection provided by enclosure (IP code) legv IEC 60529:1989
GB/T 5582-1993	External insulation pollution classes of high-voltage electric power equipments (eqv IEC 507:1991)
GB/T 6388	Transport package shipping mark
GB 9969.1	General principles for preparation of instructions for use of industrial products
GB/T11022-1999	Common specifications for high-voltageswitchgear and controlgear standards (aqv IEC 60694:1996)
GB/T 11023-1989	Test method of SF6 gas tightness for high—voltage switchgear
GB/T13384	General specifications for packagings of mechanical and electrical products
GB/T14436	General principles of industrial product guarantee documents
GB 16926-1997	High-voltage Alternating Current Switch-fuse Combinations (eqv IEC 60420:1990)
JB/T 8754-1998	Method for Model Compilation of High Voltage Switchgear
DL/T 404-1997	Technical Conditions for Ordering Indoor AC High Voltage Switchgear (neq IEC 60298:1981)

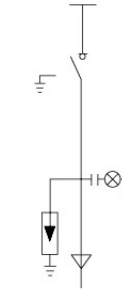
主要技术参数 Main technical parameters

项目 Item name	单位 Unit	负荷开关柜 Load switch cabinet	组合电器柜 Combination electrical cabinet	断路器柜 Circuit breaker cabinet
额定电压 Rated voltage	kV	12		
额定频率 Rated frequency	Hz	50/60		
额定电流 Rated current	A			
主母线 Main busbar	A	630		
分支母线 Branch busbar	A	630	125 (视熔断器额定电流而定) 125 (depending on the rated current of the fuse)	630
额定绝缘水平 Rated insulation level	kV			
工频耐压 (相间及相对地) Power frequency withstand voltage (phase-phase and phase-ground)	kV	42		
工频耐压 (断口间) Power frequency withstand voltage (across isolating distance)	kV	48		
工频耐压 (控制和辅助回路) Power frequency withstand voltage (control and auxiliary circuit)	kV	2		
雷电冲击耐压 (相间及相对地) Lightning impulse withstand voltage (phase-phase and phase-ground)	kV	75		
雷电冲击耐压 (断口间) Lightning impulse withstand voltage (across isolating distance)	kV	85		
额定短时耐受电流 (r.m.s) Rated short-time withstand current (r.m.s)	kA	20	-	25
主回路 Main circuit	kA	50	-	63
接地回路 Ground circuit	kA	50	80	63
额定峰值耐受电流 (peak) Rated peak withstand current (peak)	kA	-	31.5	25
额定短路关合电流 (peak) Rated short-circuit making current (peak)	A	-	1750	-
额定短路开断电流 Rated short-circuit breaking current	A	630	-	-
额定转移电流 Rated transfer current	A	630	-	630
额定有功负载开断电流 Rated active load breaking current	A	10	-	15
额定闭环开断电流 Rated closed-loop breaking current		IP3X		
额定电缆充电开断电流 Rated cable charging breaking current	次 Time			
防护等级 Protection level		5000	5000	10000
机械寿命 Mechanical life		2000	2000	2000
负荷开关 Load switch				
接地开关 Ground switch				

方案示例 Scheme example
一次方案 Primary scheme

 主母线 TMY-3(40×8)
 Main busbar TMY-3 (40×8)

D01

 XGN □ -12 一次系统图
 XGN □ -12 Primary system diagram


配置 Configuration	进线柜 Incoming cabinet
负荷开关 FLN36-12 Load switch FLN36-12	1
负荷开关 FLRN36-12D Load switch FLRN36-12D	
带电显示器 DXN-T Voltage indicator DXN-T	1
电流互感器 LZZBJ9-10 Current Transformer LZZBJ9-10	
熔断器 XRNT □ A Fuse XRNT □ A	
电压互感器 JDZ-10/0.1kV Voltage transformer JDZ-10/0.1kV	
避雷器 HY5WS-17/50 Lightning arrester HY5WS-17/50	3
熔断器 XRNP-10/ □ A Fuse XRNP-10/ □ A	
计量仪表 Metering instrument	
保护方式 Protection method	
辅助功能 Auxiliary function	
操作方式 Operation method	手动操作 Manual operation
柜体宽×深×高 (mm) Cabinet W×D×H (mm)	375×1000×1635

标准配置与特性 Standard configuration and features

- ◆ 630A 主母线
- ◆ 负荷开关: FLN36-12D/T630-20
- ◆ 三工位负荷开关 (合闸、隔离、接地) 或二工位 (合闸、隔离)
- ◆ 开关操作端装有可视窗口
- ◆ 主开关与接地开关操作分设二个操作孔且相互自行闭锁
- ◆ 负荷开关和接地开关位置指示
- ◆ 开关本体带有容性电压指示器
- ◆ SF₆ 气体压力表, 并可装设密度继电器
- ◆ 接地开关与电缆室前面板联锁
- ◆ 630A main busbar
- ◆ Load switch: FLN36-12D/T630-20
- ◆ Three-station load switch (closing, isolation, grounding) or two-station (closing, isolation)
- ◆ The switch operation end is equipped with visual window
- ◆ The main switch and ground switch are equipped with two separate operation holes, which are mutually locked
- ◆ Load switch and ground switch position indication
- ◆ The switch body is equipped with capacitive voltage indicator
- ◆ SF₆ gas pressure gauge, and density relay can be equipped with
- ◆ The ground switch is interlocked with the front panel of the cable room

可选配置与特性 Optional configuration and features

- ◆ 预留母线扩展
- ◆ 负荷开关操作电动机: AC220V/110V DC220V/110V/48V
- ◆ 短路及接地故障指示器
- ◆ 防雷装置 (配电型、电站型、脱扣型)
- ◆ 测量 CT 及表计
- ◆ 压变 PT, 供操作电源
- ◆ 进线带电接地闭锁 (下端电缆带电时闭锁所接地开关及下门) AC110V/220V
- ◆ 辅助接点: 主开关 4NO+4NC 接地开关 2NO+2NC
- ◆ Reserved busbar expansion
- ◆ Load switch operation motor: AC220V/110V DC220V/110V/48V
- ◆ Short circuit and ground fault indicator
- ◆ Lightning protection device (distribution type, power station type, trip type)
- ◆ Measuring CT and meter
- ◆ PT, providing operating power supply
- ◆ Grounding locking for live incoming line (when the lower cable is live, the ground switch and lower door should be locked) AC110V/220V
- ◆ Auxiliary contact: main switch 4NO+4NC ground switch 2NO+2NC



XGN □ -12(C)-II

方案示例 Scheme example

一次方案 Primary scheme

主母线 TMY-3(40×8) Main busbar TMY-3 (40×8)	D02
XGN □ -12 一次系统图 XGN □ -12 Primary system diagram	
配置 Configuration	出线柜 Outgoing cabinet
负荷开关 FLN36-12 Load switch FLN36-12	
负荷开关 FLRN36-12D Load switch FLRN36-12D	1
带电显示器 DXN-T Voltage indicator DXN-T	1
电流互感器 LZZBJ9-10 Current transformer LZZBJ9-10	
熔断器 XRNT □ A Fuse XRNT □ A	3
电压互感器 JDZ-10/0.1kV Voltage transformer JDZ-10/0.1kV	
避雷器 HY5WS-17/50 Lightning arrester HY5WS-17/50	
熔断器 XRNP-10/ □ A Fuse XRNP-10/ □ A	
计量仪表 Metering instrument	
保护方式 Protection method	
辅助功能 Auxiliary function	
操作方式 Operation method	手动操作 Manual operation
柜体 宽×深×高(mm) Cabinet W×D×H (mm)	375×1000×1635

标准配置与特性 Standard configuration and features

- ◆ 630A 主母线
- ◆ 负荷开关: FLN36-12D/T100-50
- ◆ 三工位负荷开关 (合闸、隔离、接地)
- ◆ 熔断器首端与熔断器末端接地开关为机械联动
- ◆ 熔断器跳闸指示并可信号远传
- ◆ 开关操作端装有可视窗口
- ◆ 主开关与接地开关操作分设二个操作孔, 且相互自行闭锁
- ◆ 负荷开关和接地开关位置指示
- ◆ 开关本体带有容性电压指示器
- ◆ SF₆ 气体压力表, 并可装设密度继电器
- ◆ 接地开关与电缆室前面板联锁
- ◆ 630A main busbar
- ◆ Load switch: FLN36-12D/T100-50
- ◆ Three-position load switch (closing, isolation, grounding)
- ◆ The ground switch at the beginning and end of the fuse is mechanically linked
- ◆ Fuse tripping indication and signal remote transmission
- ◆ The switch operation end is equipped with visual window
- ◆ The main switch and ground switch are equipped with two separate operation holes, which are mutually locked
- ◆ Load switch and ground switch position indication
- ◆ The switch body is equipped with capacitive voltage indicator
- ◆ SF₆ gas pressure gauge, and density relay can be equipped with
- ◆ The ground switch is interlocked with the front panel of the cable room

可选配置与特性 Optional configuration and features

- ◆ 预留母线扩展
- ◆ 负荷开关操作电动机: AC220V/110V DC220V/110V/48V
- ◆ 短路及接地故障指示器
- ◆ 测量 CT 及表计
- ◆ 失压跳闸 AC220V
- ◆ 过流继电器: GL25/5
- ◆ 辅助接点: 主开关 4NO+4NC 接地开关 2NO+NC
- ◆ 跳闸线圈: AC220V/110V DC220V/110V/48V
- ◆ 熔断器熔断 (故障信号): 1NO
- ◆ 带信号的压力表: 1NO
- ◆ Reserved busbar expansion
- ◆ Load switch operation motor: AC220V/110V DC220V/110V/48V
- ◆ Short circuit and ground fault indicator
- ◆ Measuring CT and meter
- ◆ Voltage loss trip AC220V
- ◆ Overcurrent relay: GL25/5
- ◆ Auxiliary contact: main switch 4NO+4NC ground switch 2NO+NC
- ◆ Trip coil: AC220V/110V DC220V/110V/48V
- ◆ Fuse blown (fault signal): 1NO
- ◆ Pressure gauge with signal: 1NO



XGN □ -12(F·R)-II

方案示例 Scheme example

一次方案 Primary scheme

主母线 TMY-3(40×8) Main busbar TMY-3 (40×8)	D03
XGN □ -12 一次系统图 XGN □ -12 Primary system diagram	
配置 Configuration	母联柜 (提升柜) Bus-tie cabinet (lifting cabinet)
负荷开关 FLN36-12 Load switch FLN36-12	
负荷开关 FLRN36-12D Load switch FLRN36-12D	
带电显示器 DXN-Q Voltage indicator DXN-Q	1
电流互感器 LZZBJ9-10 Current Transformer LZZBJ9-10	
熔断器 XRNT □ A Fuse XRNT □ A	
电压互感器 JDZ-10/0.1kV Voltage transformer JDZ-10/0.1kV	
避雷器 HY5WS-17/50 Lightning arrester HY5WS-17/50	
熔断器 XRNP-10/ □ A Fuse XRNP-10/ □ A	
计量仪表 Metering instrument	
保护方式 Protection method	
辅助功能 Auxiliary function	
操作方式 Operation method	
柜体 宽×深×高(mm) Cabinet W×D×H (mm)	375×1000×1635

标准配置与特性 Standard configuration and features

- ◆ 630A 主母线
- ◆ 容性电压指示器
- ◆ 联接套管及母线
- ◆ 电缆室前面板联锁
- ◆ 630A main busbar
- ◆ Capacitive voltage indicator
- ◆ Connecting sleeve and busbar
- ◆ Cable room front panel interlock

可选配置与特性 Optional configuration and features

- ◆ 预留母线扩展
- ◆ 短路及接地故障指示器
- ◆ 测量 CT 及表计
- ◆ 防雷装置 (配电型、电站型、脱扣型)
- ◆ Reserved busbar expansion
- ◆ Short circuit and ground fault indicator
- ◆ Metering CT and meter
- ◆ Lightning protection device (distribution type, power station type, trip type)



XGN □ -12



方案示例 Scheme example

一次方案 Primary scheme

主母线 TMY-3(40×8) Main busbar TMY-3 (40×8)	D04
XGN □ -12 一次系统图 XGN □ -12 Primary system diagram	
配置 Configuration	计量柜 Metering cabinet
负荷开关 FLN36-12 Load switch FLN36-12	
负荷开关 FLRN36-12D Load switch FLRN36-12D	
带电显示器 DXN-Q Voltage indicator DXN-Q	1
电流互感器 LZZBJ9-10 Current transformer LZZBJ9-10	2
熔断器 XRNT □ A Fuse XRNT □ A	
电压互感器 JDZ-10/0.1kV Voltage transformer JDZ-10/0.1kV	2
避雷器 HY5WS-17/50 Lightning arrester HY5WS-17/50	
熔断器 XRNP-10/ □ A Fuse XRNP-10/ □ A	3
计量仪表 Metering instrument	
保护方式 Protection method	
辅助功能 Auxiliary function	
操作方式 Operation method	
柜体 宽×深×高 (mm) Cabinet W×D×H (mm)	750×1000×1635

标准配置与特性 Standard configuration and features

- ◆ 2只 LZZBJ9 型电流互感器
- ◆ 2只 JDZ 型电压互感器
- ◆ 保护 PT 熔断器
- ◆ 电缆室 前面板联锁
- ◆ 2 LZZBJ9 current transformers
- ◆ 2 JDZ type voltage transformers
- ◆ Protective PT fuse
- ◆ Cable room front panel interlock

可选配置与特性 Optional configuration and features

- ◆ 1只带转换开关的电压表
- ◆ 1只带转换开关的电流表
- ◆ 3只 CT
- ◆ 3只 PT
- ◆ 指示开关柜带电的容性电压指示器
- ◆ 电度表
- ◆ 负控
- ◆ 1 voltmeter with transfer switch
- ◆ 1 ammeter with transfer switch
- ◆ 3 CTs
- ◆ 3 PTs
- ◆ Capacitive voltage indicator indicating that the switchgear is live
- ◆ Electric meter
- ◆ Load control



XGN □ -12(J)

负荷开关柜结构、基本组件 Structure and basic component of load switchgear

XGN □ -12 (II) 型柜体结构 XGN □ -12 (II) Cabinet structure

- ◆ 母线室
- ◆ 负荷开关
- ◆ 电缆室
- ◆ 操动机构、联锁机构和低压控制室
- ◆ Busbar room
- ◆ Load switch
- ◆ Cable room
- ◆ Operating mechanism, interlocking mechanism and low-voltage control room

负荷开关 Load switch

开关室内装有一个三工位负荷开关，负荷开关的外壳为环氧树脂浇注而成，充六氟化硫 (SF₆) 气体为绝缘介质，开关室内可根据客户要求装设 SF₆ 气体密度表或带报警触点的气体密度器。

There is a three-position load switch installed in the switch room, and the shell of the load switch is made of epoxy resin casting, filled with sulfur hexafluoride (SF₆) gas as the insulation medium. SF₆ gas density meter or gas density meter with alarm contact can be installed in the switch room according to customer requirement.

电缆室 Cable room

负荷开关柜有充裕的电缆室，主要用于电缆连接，使单芯或三芯电缆可以采用简单的非屏蔽电缆头进行连接，同时充裕的空间还可以安装避雷器、电流互感器、下接地开关等元件。按标准设计，柜门有观察窗和安全联锁装置，电缆室底板配密封盖和带支撑架的大小相宜的电缆夹。电缆室底板和门前框可以拆下，方便电缆安装。

The load switch cabinet has a spacious cable compartment, mainly used for cable connection, allowing single-core or three-core cables to be connected with simple unshielded cable head. Meanwhile, the ample space can also be used to install components such as lightning arrester, current transformer and ground switch. According to the standard design, the cabinet door has observation window and safety interlock device. The bottom plate of the cable room is equipped with sealing cover and cable clamp of appropriate size with support frame. The bottom plate and front frame of the cable room can be removed for easy cable installation.

操动机构、联锁机构和低压控制室 Operating mechanism, interlocking mechanism and low-voltage control room

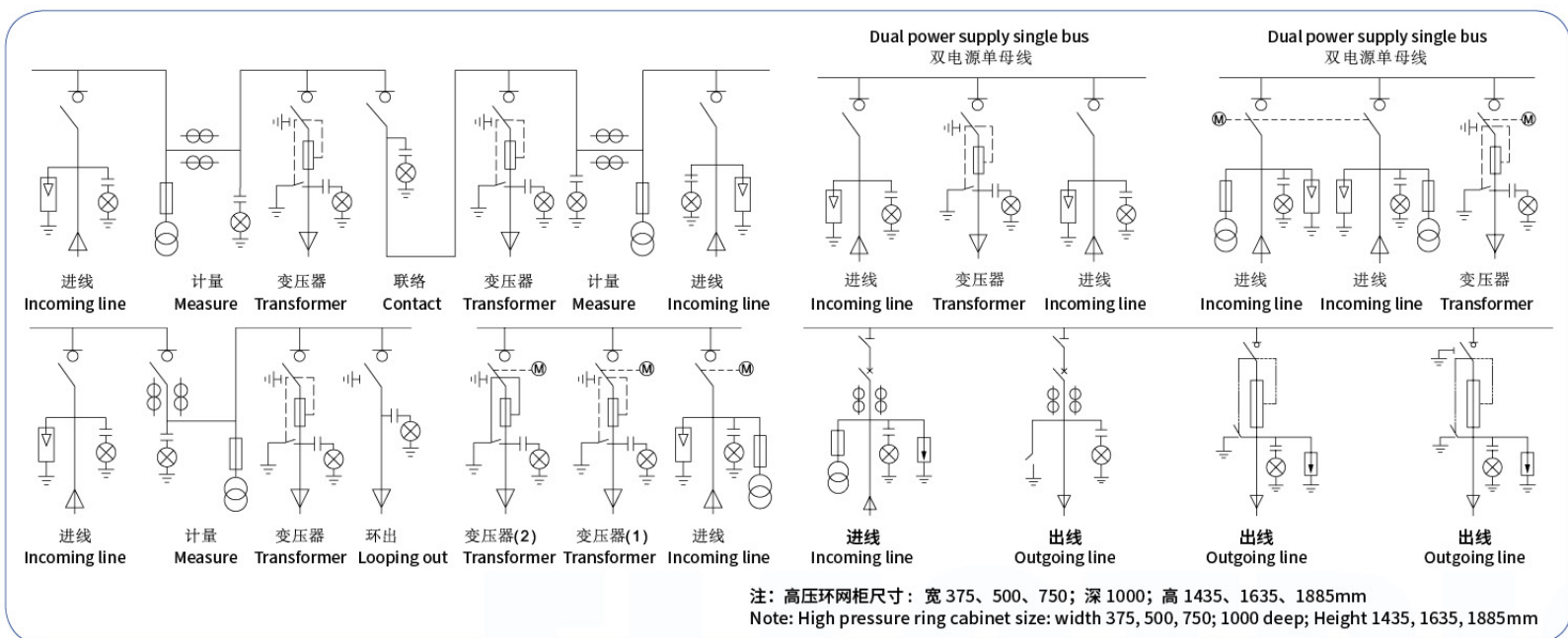
带联锁的低压室同时起到控制盘的作用，低压室内装有带位置指示器的弹簧操动机构和机械联锁、装置，也可装设辅助触点、跳闸线圈、紧急跳闸机构、电容式带电显示器、钥匙锁和电动操作装置，同时低压室空间还可供装设控制回路、计量仪表和保护继电器，750mm 宽柜有两个相同的低压室，可装更多附件。

整个 XGN15 开关柜可分成上下两个部分，柜的上部包括母线室、负荷开关、操动机构和低压室，与下部电缆室分隔开来。因此，可以安全、方便地对装于上部单元内的设备进行检修及改造，并可更换整个上部单元。

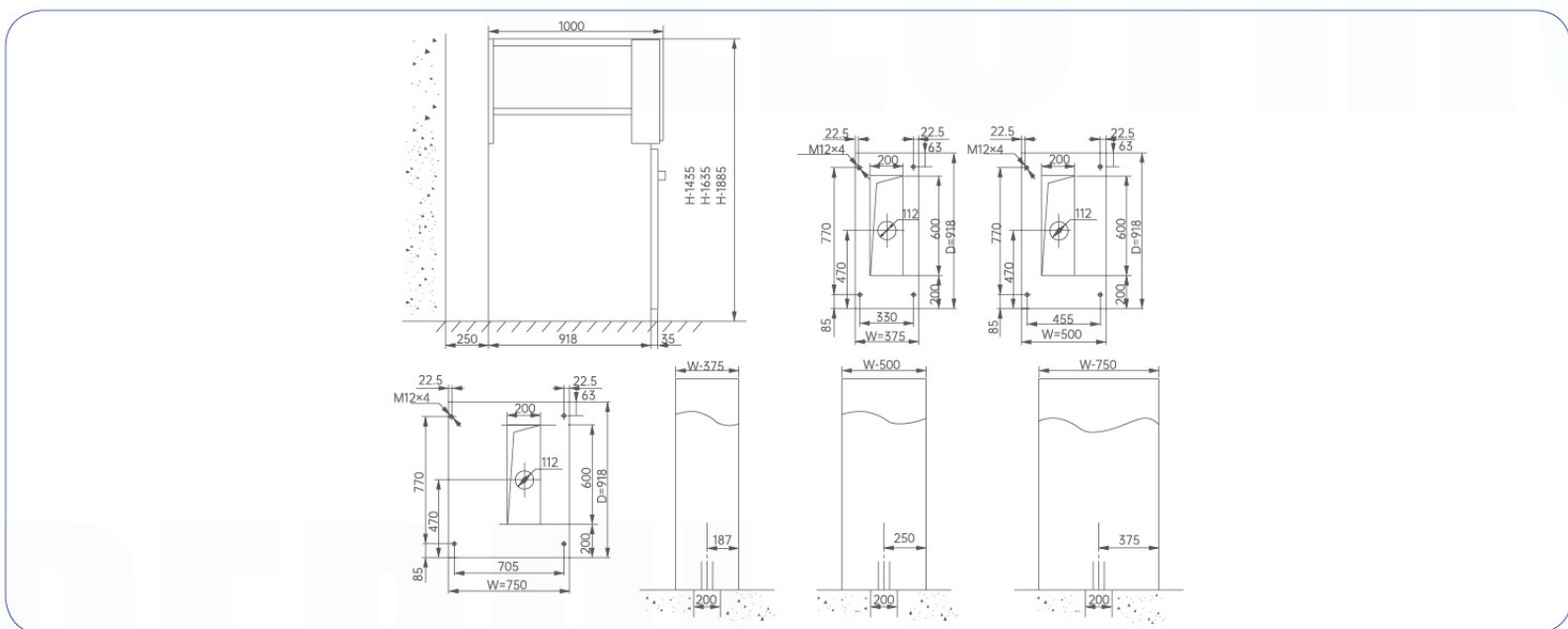
The low-voltage room with interlocking also serves as control panel. The low-voltage room is equipped with spring operated mechanism with position indicator and mechanical interlock and device, as well as auxiliary contact, trip coil, emergency trip mechanism, capacitive voltage indicator, key lock and electric operation device. The low-voltage room space can also accommodate control circuit, metering instrument and protective relay. The 750mm wide cabinet has two identical low-voltage rooms that can accommodate more accessories.

The entire XGN15 switch cabinet can be divided into upper and lower parts, with the upper part of the cabinet including the busbar room, load switch, operating mechanism and low-voltage room, separated from the lower cable room. Therefore, the equipment installed in the upper unit can be safely and conveniently inspected and modified, and the entire upper unit can be replaced.

开关柜方案应用实例 Application example of switch cabinet solution



XGN □ -12 型柜外形安装尺寸 XGN □ -12 Cabinet outline and installation dimension



DR-XGN □ -24
箱型交流金属封闭环网开关设备

DR-XGN □ -24 Box-Type Ac Metal-Enclosed Ring Network Switchgear



产品简介 Product introduction

DR-XGN □ -24 箱型交流金属封闭环网开关设备, 是新一代以六氟化硫负荷开关为主, 可配置断路器、隔离开关、电流互感器、电压互感器、避雷器等电器元件。整体采用空气绝缘、适用于配电自动化、既紧凑又可扩充的金属封闭开关设备, 具有外形美观、结构简单、体积小、操作灵活、联锁可靠等特点。

本环网柜适用于额定电压 24kV 的环网供电系统中, 广泛应用于工业及民用电网环网及供电末端工程。特别适用于以下场所: 城市居民区配电、小型二次变电站、开闭所、工矿企业、商场、机场、地铁、隧道、风力发电等。

DR-XGN □ -24 box type AC metal closed ring switch equipment, is a new generation of sulfur hexafluoride load switch, can be configured circuit breaker, isolation switch, current transformer, voltage transformer, arrester and other electrical components. The whole cabinet adopts air insulation, suitable for distribution automation, both compact and expandable metal closed switchgear, with beautiful appearance, simple structure, small size, flexible operation, reliable interlock and other characteristics.

The ring network cabinet is suitable for the ring network power supply system with rated voltage of 24kV, and is widely used in industrial and civil cable ring network and power supply terminal projects. Especially suitable for the following places: power distribution in urban residential areas, small secondary substations, opening and closing offices, industrial and mining enterprises, shopping malls, airports, subways, tunnels, wind power generation, etc.

型号含义 Model meaning



正常使用条件 Normal service condition

◆ 海拔高度	≤ 1000m	◆ Altitude	≤ 1000m
◆ 最高环境温度	+40°C	◆ Maximum ambient temperature	+40°C
◆ 最低环境温度	-35°C	◆ Minimum ambient temperature	-35°C
◆ 最大日温差	25K	◆ Maximum daily temperature difference	25K
◆ 日平均相对湿度	≤ 95%	◆ Daily average relative humidity	≤ 95%
◆ 月平均相对湿度	≤ 90%	◆ Monthly average relative humidity	≤ 90%
◆ 抗震能力	8 级	◆ Earthquake resistance	level 8
◆ 系统额定频率	50Hz	◆ System rated frequency	50Hz
◆ SF ₆ 年泄露率	≤ 0.1%	◆ SF ₆ leakage rate	≤ 0.1%
◆ 外壳防护等级	IP3X	◆ Enclosure protection class	IP3X

主要特点 Main feature

- ◆ 增加主变容量, 提高变电站供电能力。
- ◆ 提高配电线路的送电能力, 减少配电线路数量。
- ◆ 增大中压线路的供电半径。

此电压等级早前在小区试运行, 经国网公司要求, 由江苏省级试点推广 20kV 电压等级, 现南网也准备在广东等地开始推广 20kV 电压等级, 可以预测, 最终 24kV 设备将会主导市场。

- ◆ Increase the main transformer capacity and improve the power supply capacity of the substation.
- ◆ Improve the power transmission capacity of distribution lines and reduce the number of distribution lines.
- ◆ Increase the power supply radius of the medium voltage line.

This voltage level earlier in a small area trial operation, by the requirements of the State grid company, by Jiangsu provincial pilot promotion of 20kV voltage level, now the southern network is also ready to start promoting 20kV voltage level in Guangdong and other places, it can be predicted that the final 24kV equipment will dominate the market.

符合标准 Meet the standard

- ◆ IEC298 ◆ IEC265 ◆ IEC129 ◆ IEC694
- ◆ IEC420 ◆ IEC56 ◆ IEC529 ◆ IEC932
- ◆ GB3804 ◆ GB3906 ◆ GB11022

主要技术参数 Main technical parameters

项目 Item	单位 Unit	20kV SF ₆ 环网开关设备 Ring switchgear		
额定电压 Rated voltage	kV	24		
额定频率 Rated frequency	Hz	50		
额定电流 Rated current	A	630A ≤ 100 (负荷开关 - 熔断器组合柜)(Load switch-fuse combination cabinet)		
额定短路开断电流 Rated short-circuit breaking current	kA	31.5		
额定关合电流 (峰值) Rated closing current (peak)	kA	50		
额定热稳定电流 Rated heat stable current	kA/3S	20		
额定动稳定电流 (峰值) Rated dynamic stable current (peak)	kA	50		
绝缘水平 Insulation level	工频耐压 Power frequency withstand voltage	相间及对地 Phase to phase and ground to ground	kV/1min	65
		断口 Fracture	kV/1min	79
	雷电冲击耐压 Lightning impulse withstand voltage	相间及对地 Phase to phase and ground to ground	kV	125
		断口 Fracture	kV	145
额定有功负载开断电流 Rated active load breaking current	A	630		
额定电缆充电开断电流 Rated cable charging breaking current	A	25		
主回路电阻 Main loop resistance	μΩ	≤ 300		
动力机能 Kinetic function		弹簧式 Spring type:DC/AC 220V/48V		
额定转移电流 Rated transfer current	A	1400		
机械寿命 Mechanical life		负荷开关 Load switch: 3000 次; 接地开关 Ground switch: 2000 次		

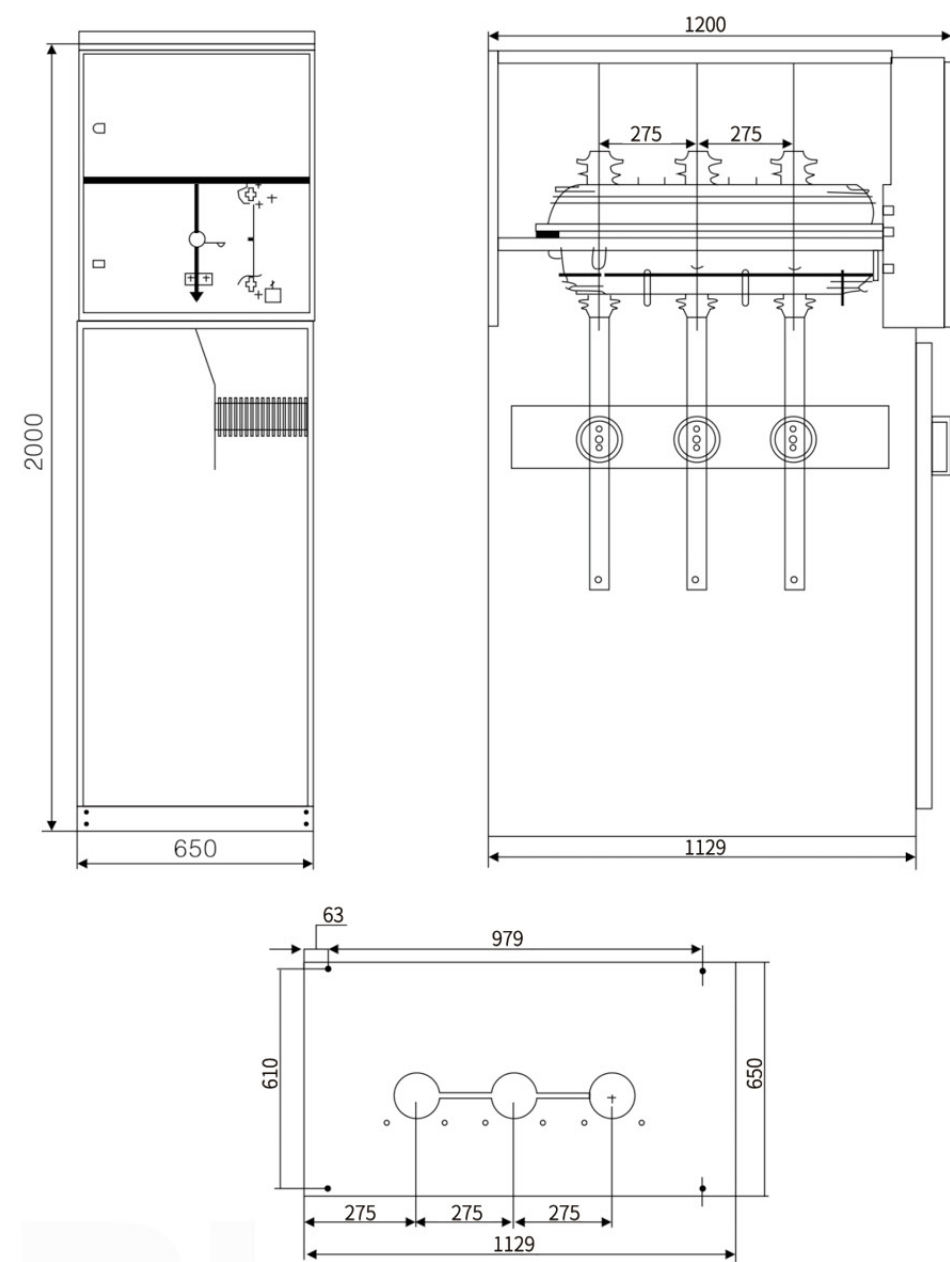
一次方案 Primary scheme

一次方案编号 Primary plan number	DC01	一次方案编号 Primary plan number	DC08
主母线 TMY-3 (40×8) Main bus TMY-3 (40×8)		主母线 TMY-3 (40×8) Main bus TMY-3 (40×8)	
DR-XGN □ -24 一次系统图 DR-XGN □ -24 Primary system diagram		DR-XGN □ -24 一次系统图 DR-XGN □ -24 Primary system diagram	
配置 Disposition	进线柜 Incoming cabinet	配置 Disposition	出线柜 Outlet cabinet
负荷开关 FLN □ -24D Load switch FLN □ -24D	1	负荷开关 FLN □ -24D Load switch FLN □ -24D	
负荷开关 FLRN □ -24D Load switch FLRN □ -24D		负荷开关 FLRN □ -24D Load switch FLRN □ -24D	1
带电显示器 DXN-T/Q Live display DXN-T/Q	1	带电显示器 DXN-T/Q Live display DXN-T/Q	1
电流互感器 LZZBJ9-24 The current transformer		电流互感器 LZZBJ9-24 The current transformer	
熔断器 XRNP-24/ □ A Fuse XRNP-24/ □ A		熔断器 XRNP-24/ □ A Fuse XRNP-24/ □ A	
电压互感器 JDZ-24 Voltage transformer JDZ-24		电压互感器 JDZ-24 Voltage transformer JDZ-24	3
避雷器 HY5WS-33/85 Lightning arrester HY5WS-33/85	3	避雷器 HY5WS-33/85 Lightning arrester HY5WS-33/85	
熔断器 XRNT-24/ □ A Fuse XRNT-24/ □ A		熔断器 XRNT-24/ □ A Fuse XRNT-24/ □ A	3
计量仪表 Measuring instrument		计量仪表 Measuring instrument	
保护方式 Protection mode		保护方式 Protection mode	
辅助功能 Auxiliary function		辅助功能 Auxiliary function	
操作方式 Mode of operation	手动操作 Manual operation	操作方式 Mode of operation	手动操作 Manual operation
柜体 宽×深×高 (mm) Cabinet width x Depth x height (mm)	650×1200×2000	柜体 宽×深×高 (mm) Cabinet width x Depth x height (mm)	650×1200×2000

一次方案 Primary scheme

一次方案编号 Primary plan number	DC07	一次方案编号 Primary plan number	DC04
主母线 TMY-3 (40×8) Main bus TMY-3 (40×8)		主母线 TMY-3 (40×8) Main bus TMY-3 (40×8)	
DR-XGN □ -24 一次系统图 DR-XGN □ -24 Primary system diagram		DR-XGN □ -24 一次系统图 DR-XGN □ -24 Primary system diagram	
配置 Disposition	联络柜 Liaison cabinet	配置 Disposition	计量柜 Measuring tank
负荷开关 FLN □ -24D Load switch FLN □ -24D	1	负荷开关 FLN □ -24D Load switch FLN □ -24D	
负荷开关 FLRN □ -24D Load switch FLRN □ -24D		负荷开关 FLRN □ -24D Load switch FLRN □ -24D	
带电显示器 DXN-T/Q Live display DXN-T/Q	1	带电显示器 DXN-T/Q Live display DXN-T/Q	1
电流互感器 LZZBJ9-24 The current transformer		电流互感器 LZZBJ9-24 The current transformer	2
熔断器 XRNP-24/ □ A Fuse XRNP-24/ □ A		熔断器 XRNP-24/ □ A Fuse XRNP-24/ □ A	3
电压互感器 JDZ-24 Voltage transformer JDZ-24		电压互感器 JDZ-24 Voltage transformer JDZ-24	2
避雷器 HY5WS-33/85 Lightning arrester HY5WS-33/85	3	避雷器 HY5WS-33/85 Lightning arrester HY5WS-33/85	
熔断器 XRNT-24/ □ A Fuse XRNT-24/ □ A		熔断器 XRNT-24/ □ A Fuse XRNT-24/ □ A	
计量仪表 Measuring instrument		计量仪表 Measuring instrument	2
保护方式 Protection mode		保护方式 Protection mode	
辅助功能 Auxiliary function		辅助功能 Auxiliary function	
操作方式 Mode of operation	手动操作 Manual operation	操作方式 Mode of operation	
柜体 宽×深×高 (mm) Cabinet width x Depth x height (mm)	650×1200×2000	柜体 宽×深×高 (mm) Cabinet width x Depth x height (mm)	650×1200×2000

外形尺寸 Overall dimension



HXGN □ -12

箱型固定式交流金属封闭环网开关设备

HXGN □ -12 Box-Type Fixed Ac Metal-Enclosed Ring Network Switchgear

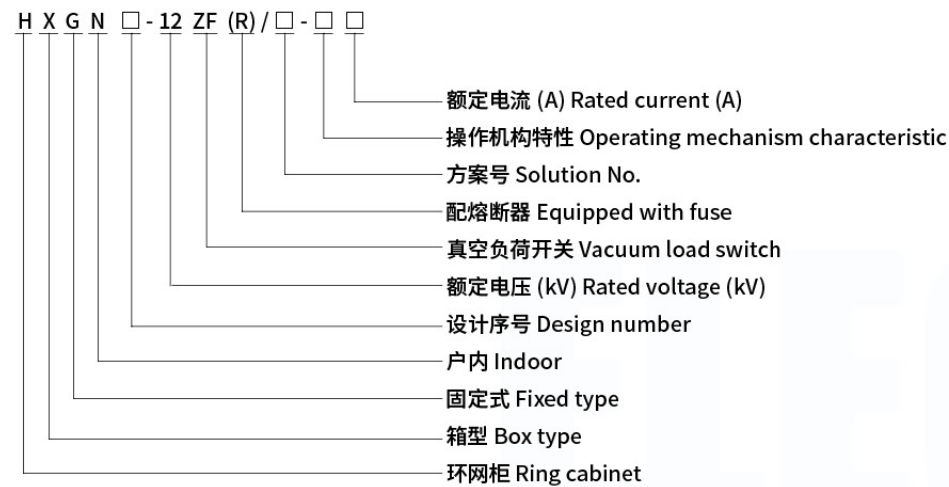


产品简介 Product introduction

HXGN □ -12ZF(R) 交流金属封闭环网开关设备（简称环网柜）适用于交流 50Hz，12kV 的网络作为开断负荷和短路及关合短路电流用，本环网柜配手动、电动弹簧机构来操作负荷开关，接地开关和隔离开关配用手动操作机构。本环网柜成套性强、体积小、无火灾和爆炸危险，具有可靠“五防”功能。

HXGN □ -12ZF (R) AC metal enclosed ring main unit (referred to as ring main unit) is suitable for use in AC 50Hz, 12kV network as load and short-circuit breaking and short-circuit current closing device. This ring main unit is equipped with manual and electric spring mechanisms for operation of the load switch, ground switch and isolation switch are equipped with manual operating mechanism. This ring main unit has strong completeness, small size, no fire and explosion hazards and reliable "five prevention" function.

型号含义 Model meaning



正常使用条件 Normal service condition

- ◆ 环境温度上限 +40℃，下限 -25℃；
- ◆ 海拔高度不超过 2000m；
- ◆ 空气相对湿度日平均值不大于 95%，月平均值不大于 90%；水蒸汽日平均值不大于 2.2×10^{-3} Mpa，月平均值不大于 1.8×10^{-3} Mpa；
- ◆ 周围空气不受腐蚀或可燃气体、水蒸汽等明显污染；
- ◆ 无经常性的剧烈振动。
- ◆ The upper limit of ambient temperature is +40℃, and the lower limit is -25℃;
- ◆ Altitude should not exceed 2000m;
- ◆ The daily average relative humidity of the air should not exceed 95%, and the monthly average should not exceed 90%; The daily average value of water vapor shall not exceed 2.2×10^{-3} Mpa, and the monthly average value shall not exceed 1.8×10^{-3} Mpa;
- ◆ The ambient air should not be significantly polluted by corrosive or flammable gas, water vapor, etc;
- ◆ No frequent severe vibration.

主要技术参数 Main technical parameters

项目 Item name	单位 Unit	参数 Argument	
额定电压/最高工作电压 Rated voltage/maximum operating voltage	kV	10/12	
额定电流 Rated current	A	630	
主母线电流 Main busbar current	进线柜 Incoming cabinet 出线柜 Outgoing cabinet	630	
		125	
额定短时耐受电流 Rated short-time withstand current	kA	20	
额定短路持续时间 Rated short-circuit duration	s	4	
额定峰值耐受电流 Rated peak withstand current	kA	50	
额定短路关合电流 Rated short-circuit making current	kA	50	
额定有功负载开断电流 Rated active load breaking current	A	630	
闭环开断电流 Closed-loop breaking current	A	630	
额定电缆充电电流 Rated cable charging current	kA	20	
接地开关额定短时耐受电流 Rated short-time withstand current of ground switch	kA	20	
接地开关额定短路持续时间 Rated short-circuit duration of ground switch	s	4(2)	
接地开关额定峰值耐受电流 Rated peak withstand current of ground switch	kA	50	
接地开关额定短路关合电流 Rated short-circuit making current of ground switch	kA	50	
1min 额定工频耐受电压 1min rated power frequency withstand voltage	相间、相对地、真空负荷开关断口 Phase-phase, phase-ground, isolating distance of vacuum load switch	kV	42
	隔离开关断口 Isolating distance of isolation switch		48
额定雷电冲击耐受电压 Rated lightning impulse withstand voltage	相间、相对地、真空负荷开关断口 Phase-phase, phase-ground, isolating distance of vacuum load switch	kV	75
	隔离开关断口 Isolating distance of isolation switch		85
机构寿命 Mechanical life	真空负荷开关 Vacuum load switch	次 Time	10000
	接地开关 (刀)、隔离开关 (刀) Ground switch (knife), isolation switch (knife)		2000
交接电流 Take-over current	A	3150	

技术要求 Technical requirement

装有 FZN □ -12/630 型真空负荷开关的环网柜应能满足 FZN-12/630 型真空负荷开关的所有相应的技术要求。

本环网柜是以空气为绝缘介质的、主要配装 FZN □ -12/630 型真空负荷开关，主要方案有进线柜和出线柜等。

◆ 进线柜方案

柜内主回路有一台 FZN □ -12/630 型真空负荷开关，它配装有隔离刀，酌情还配装接地刀所组成，三者共装在一个机架上，并互有联锁。因此可实现接通母线、隔离、接地三个工位的操作，柜内还可灵活配装 CT、PT 等元件。

◆ 出线柜方案

柜内主回路有一台 FZRN □ -12/T200 型真空负荷开关和带撞击器的熔断器（有隔离开关的作用）及接地刀所组成，也可实现三工位操作。柜内还可灵活配装 CT/PT 和 YH 系列避雷器等元件，因此有时可省去计量柜。进、出线柜均配有与接地开关联锁的绝缘防护隔板，柜内各开关与隔板及柜门间采用机械联锁，并达到“五防”要求，柜体外壳防护等级为 IP2X。

The ring main unit equipped with FZN □ -12/630 vacuum load switch should be able to meet all the corresponding technical requirements of FZN-12/630 vacuum load switch.

This ring main unit is insulated with air and mainly equipped with FZN □ -12/630 vacuum load switch. The main solutions include incoming and outgoing cabinets.

◆ Incoming cabinet solution

The main circuit of the cabinet has one FZN □ -12/630 vacuum load switch, which is equipped with isolation knife and ground knife if necessary. The above three are installed on one frame and interlocked with each other. Therefore, it can achieve the operation of connecting the busbar, isolating and grounding three workstations, and the cabinet can also be flexibly equipped with CT, PT and other components.

◆ Outgoing cabinet solution

The main circuit inside the cabinet consists of a FZRN □ -12/T200 vacuum load switch, a fuse with a striker (acting as an isolation switch) and a ground knife, which can also achieve three-station operation. The cabinet can also be flexibly equipped with components such as CT/PT and YH series lightning arrester, so sometimes the metering cabinet can be omitted. Both the incoming and outgoing cabinets are equipped with insulation protective partitions interlocked with the ground switch. The switches, partitions and cabinet doors inside the cabinet are mechanically interlocked and meet the "five prevention" requirement. The protection level of the cabinet shell is IP2X.

产品的使用 Use of product

◆ 使用

请务必严格按照下列步骤操作，否则易造成损害。

◆ 负荷开关的操作顺序

- ◇ 合闸：当负荷开关处于分闸状态时，将操作手柄插入负荷开关操作孔内顺时针转动（约 180 度），使其合闸。
- ◇ 分闸当负荷开关处于合闸状态时，可由手动脱扣按钮或脱扣电磁铁操作使负荷开关分闸，对配有带撞击器的熔断器的负荷开关，熔断器熔断后，其撞击器也可使负荷开关分闸。

◆ 停电操作顺序

- ◇ 将负荷开关分闸，使它与隔离和接地开关之间的联锁解除。
- ◇ 将操作手柄插入隔离和接地开关操作孔内，按顺时针方向转动（约 90 度），隔离刀被打开。
- ◇ 再按顺时针方向转动（约 90 度）后，接地开关快速闭合。
- ◇ 插入绝缘隔板，使门联锁解除。
- ◇ 开门检修。

◆ 送电操作顺序

- ◇ 关闭柜门。
- ◇ 抽出绝缘隔板，柜门锁住。
- ◇ 将操作手柄插入隔离和接地开关操作孔内，逆时针转动（约 90 度），使接地开关分断。
- ◇ 将操作手柄沿逆时针方向转动（约 90 度），使接地开关分断。
- ◇ 对负荷开关进行操作，合闸送电。

◆ Usage

Please strictly follow the following steps, otherwise it may cause damage.

◆ Operation sequence of load switch

- ◇ Closing: When the load switch is in the open status, insert the operating handle into the operating hole of the load switch and turn it clockwise (about 180°) to close it.
- ◇ When the load switch is in the closed status, it can be operated by manual trip button or trip electromagnet to switch off the load switch. For load switch equipped with fuse with striker, after the fuse is blown, the striker can also switch off the load switch.

◆ Power outage operation sequence

- ◇ Switch off the load switch to release the interlock between it and the isolation and ground switch.
- ◇ Insert the operating handle into the isolation and ground switch operating hole, and turn it clockwise (about 90°) to open the isolation knife.
- ◇ After rotating clockwise (about 90°) again, the ground switch quickly switches on.
- ◇ Insert the insulation partition to release the door interlock.
- ◇ Open the door for maintenance.

◆ Power transmission operation sequence

- ◇ Close the cabinet door.
- ◇ Remove the insulation partition and lock the cabinet door.
- ◇ Insert the operating handle into the isolation and ground switch operating hole, rotate counterclockwise (about 90°) to disconnect the ground switch.
- ◇ Rotate the operating handle counterclockwise (about 90°) to disconnect the ground switch.
- ◇ Operate the load switch and switch it on to transmit power.

故障处理 Fault handling

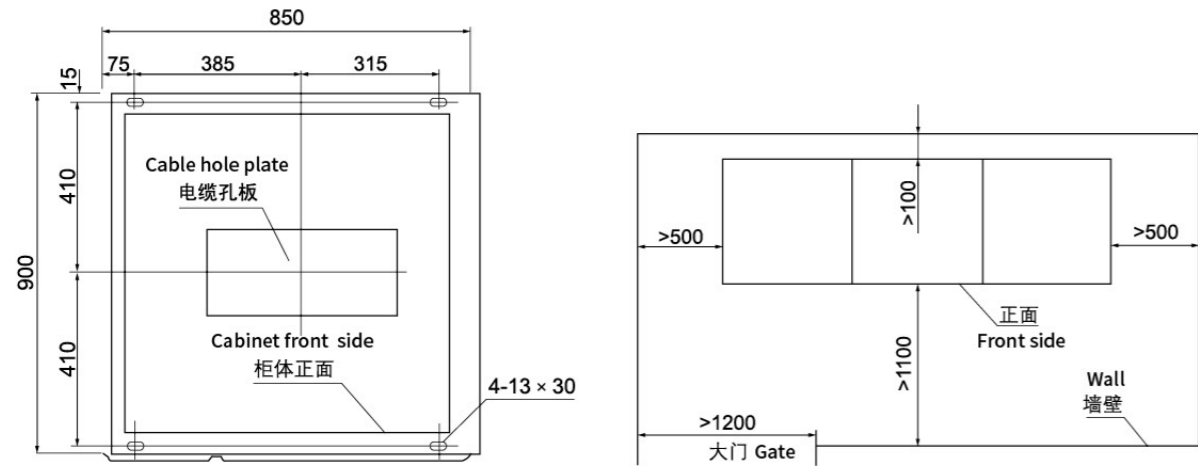
◆ 故障处理

环网柜在工作过程中，如果出现紧固件松动，机械部分润滑不良，真空灭弧室真空度下降等故障，在停电后采用紧固、加润滑剂、打耐压等方法来检查和消除以上故障。

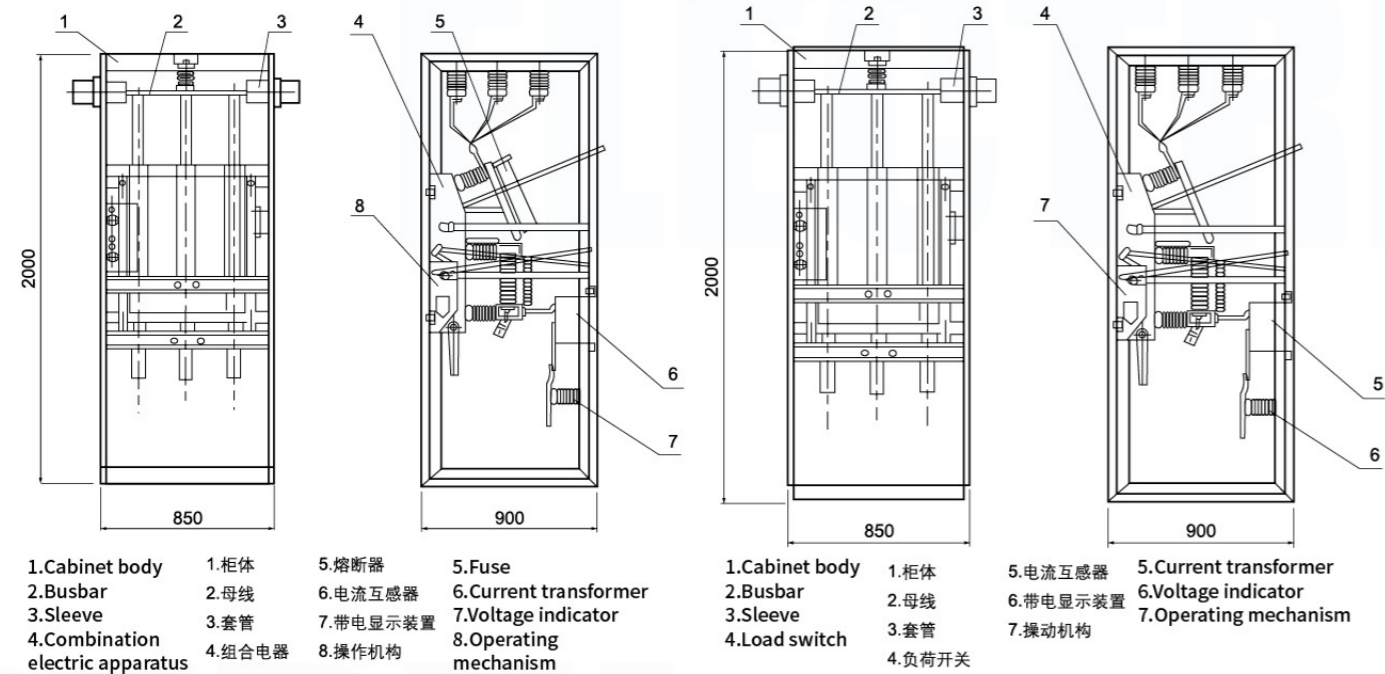
◆ Fault handling

If the fasteners of the ring main unit become loose, the mechanical parts are poorly lubricated, and the vacuum degree of the vacuum extinguishing chamber decreases during operation, methods such as tightening, adding lubricant and applying pressure resistance should be used to check and eliminate the above faults after power outage.

外形及安装尺寸 Outline and installation dimension



环网柜安装 (图 1)
Installation of ring main unit (Figure 1)



- | | | | |
|----------------------------------|--------|----------|-----------------------|
| 1.Cabinet body | 1.柜体 | 5.熔断器 | 5.Fuse |
| 2.Busbar | 2.母线 | 6.电流互感器 | 6.Current transformer |
| 3.Sleeve | 3.套管 | 7.带电显示装置 | 7.Voltage indicator |
| 4.Combination electric apparatus | 4.组合电器 | 8.操作机构 | 8.Operating mechanism |

组合电器柜 (图 2)

Combination electric apparatus cabinet (Figure 2)

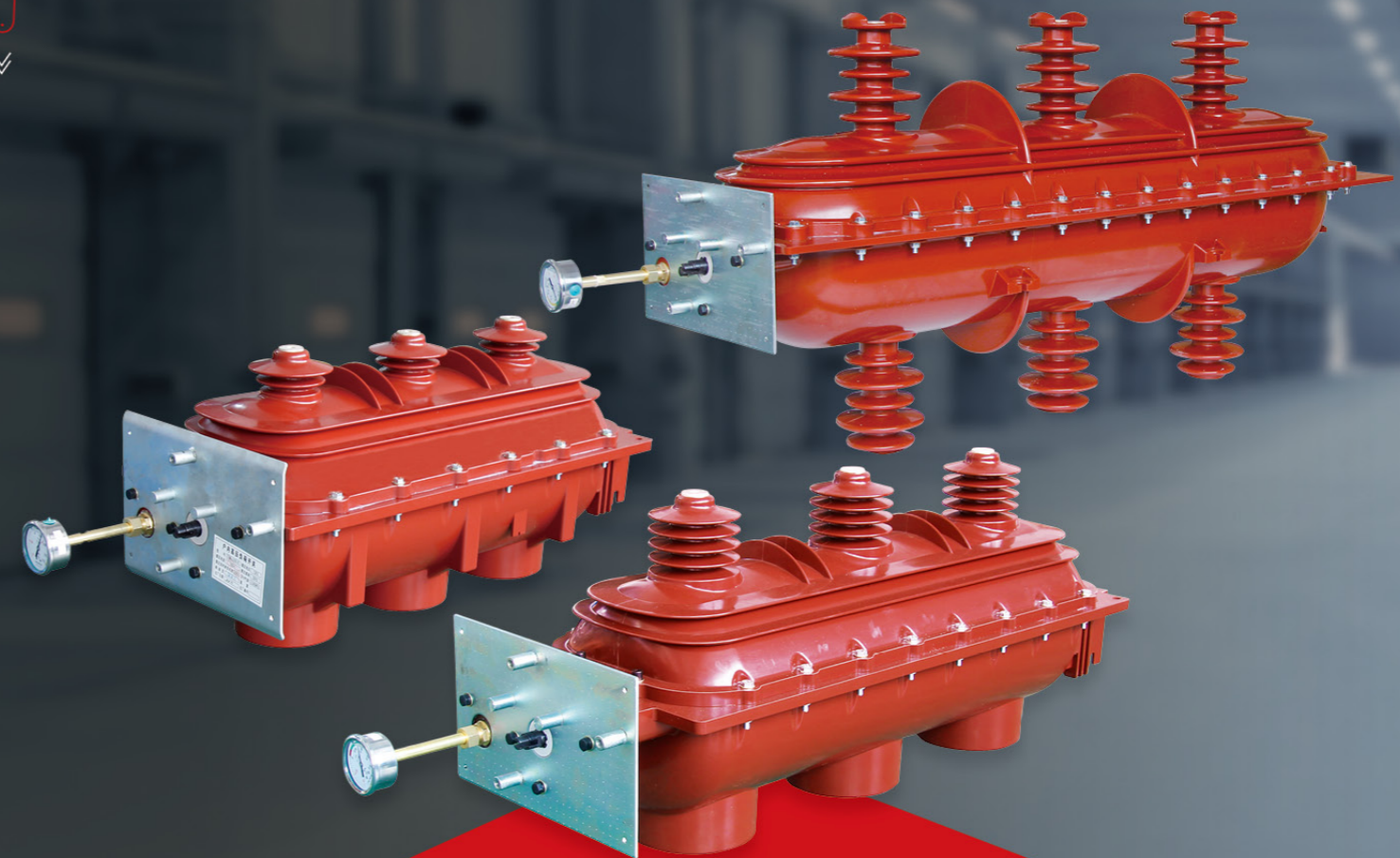
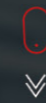
- | | | | |
|----------------|--------|----------|-----------------------|
| 1.Cabinet body | 1.柜体 | 5.电流互感器 | 5.Current transformer |
| 2.Busbar | 2.母线 | 6.带电显示装置 | 6.Voltage indicator |
| 3.Sleeve | 3.套管 | 7.操作机构 | 7.Operating mechanism |
| 4.Load switch | 4.负荷开关 | | |

负荷开关柜 (图 3)

Load switch cabinet (Figure 3)

FL(R)N36(12-40.5kV) 负荷开关

FL(R)N36(12-40.5kV)load break switch



产品简介 Product introduction

FL(R)N36(12-40.5kV) 六氟化硫 (SF₆) 高压负荷开关是额定电压为 12-40.5kV 的开关设备, 采用 SF₆ 气体作为灭弧和绝缘介质, 开关内部有合闸、分闸和接地三个工位, 具有体积小, 安装使用方便和环境适应性强等特点。

本系列负荷开关分为 FL(R)N36(12-40.5kV) (K 型单弹簧操作机构) 和 FL(R)N36(12-40.5kV)(A 型双弹簧操作机构) 两种。FL(R)N36(12-40.5kV) 型可组合成负荷开关 + 熔断器组合电器并具有控制和保护功能, 可供供电及变电所作为用电设备的保护和控制之用, 尤其适用于环网柜、电缆分接箱和配电开闭所。

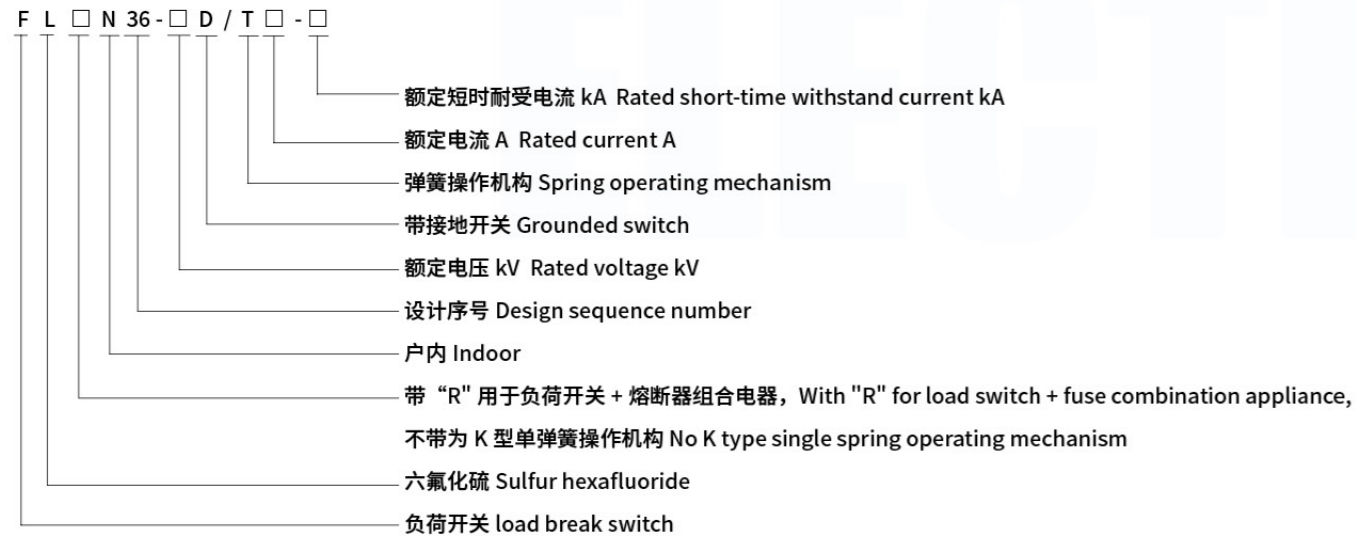
符合标准 IEC60265、IEC62271、GB3804、GB16926 等。

FL(R)N36(12-40.5kV) sulfur hexafluoride (SF₆) high-voltage load break switch is rated voltage of 12-40.5kV switching equipment, using SF₆ gas as the arc extinguishing and insulating medium, the switch inside the closing, opening and grounding three stations, with small size, easy installation and use and environmental adaptability.

This series of load break switch are divided into FL(R)N36(12-40.5kV)(K-type single-spring operating mechanism) and FL(R)N36(12-40.5kV)(A-type double-spring operating mechanism). FL(R)N36(12-40.5kV) can be combined into load break switch + fuse combination and has control and protection functions, for power supply and substation as electrical equipment protection and control, especially suitable for ring network cabinet, cable distribution box and distribution opening and closure.

Comply with the standards IEC60265, IEC62271, GB3804, GB16926, etc.

型号含义 Model meaning



正常使用条件 Normal service condition

- ◆ 环境温度: 最高温度 +40°C, 最低温度 -40°C
- ◆ 湿度: 日相对湿度最大平均值 ≤ 95%, 月相对湿度最大平均值 ≤ 90%
- ◆ 海拔高度: ≤ 2000 米
- ◆ 抗震能力: 8 度
- ◆ 周围空气应不受腐蚀性、可燃性气体、水蒸气等明显污染, 应无经常性剧烈震动。
- ◆ 年泄漏率: ≤ 0.1%
- ◆ 特殊条件

当负荷开关在海拔高度 2000 米以上使用时, 需特别注明, 以便制造时对设计方案进行调整。

(目前本公司制造的负荷开关已有在海拔高达 3000 米左右安全运行的先例)

- ◆ Ambient temperature: maximum temperature +40°C, minimum temperature -40°C
- ◆ Humidity: Maximum average daily relative humidity ≤ 95%, maximum average monthly relative humidity ≤ 90%
- ◆ Altitude: ≤ 2000 meters
- ◆ Seismic capacity: 8 degrees
- ◆ The surrounding air should be free from corrosive, flammable gas, water vapor and other obvious pollution, there should be no frequent violent vibration.
- ◆ Annual leakage rate: ≤ 0.1%
- ◆ Special Conditions

When the load break switch is used at an altitude of more than 2000 meters, it needs to be specially noted so that the design scheme can be adjusted during manufacturing.

(At present, the load break switch manufactured by the company has a precedent of safe operation at an altitude of about 3,000 meters)

结构原理 Structural principle

FLN36-12D 负荷开关主回路及接地回路均密封在由环氧树脂采用 APGI 艺浇注制成的绝缘壳体中, 具有绝缘性能好、抗污秽环境等优点。绝缘壳体由上下两绝缘罩组合而成, 内部充有相对压力为 0.4bar 的 SF₆ 气体, 下绝缘罩具有防爆措施, 确保万一事故情况下过压的 SF₆ 气体直接喷向柜后通道, 保证人身安全。

FLN36-12D load break switch main circuit and ground circuit are sealed in the epoxy resin made of APGI art cast insulation shell, with good insulation performance, anti-pollution environment and other advantages. The insulation shell is composed of the upper and lower insulation covers and is filled with SF₆ gas with a relative pressure of 0.4bar. The lower insulation cover has explosion-proof measures to ensure that the overpressurized SF₆ gas is directly sprayed into the rear channel of the cabinet in case of an accident, ensuring personal safety.

灭弧原理 Arc-extinguishing principle

SF₆ 气体具有良好的灭弧性能, 为了使电弧迅速熄灭, 开关在开断电流过程中, 动静触头刚分离时便产生电弧, 此时, 由于永久磁铁的磁场作用, 驱动电弧围绕动静触头迅速去游离和冷却, 在电流过零时熄灭, 熄弧后形成双断口开距具有隔离断口的绝缘水平。这种永磁式旋弧原理, 熄灭能力很强, 触头烧伤很轻, 延长了电气寿命。

SF₆ gas has good arc extinguishing performance. In order to extinguish the arc quickly, the switch generates an arc when the static and static contacts are just separated during the process of breaking the current. At this time, due to the magnetic field of the permanent magnet, the arc is driven around the static and static contacts to rapidly dissociate and cool, and is extinguished when the current is over zero. This permanent magnet rotating arc principle has strong extinguishing ability, light contact burn, and prolongs electrical life.

结构特点 Structural characteristics

负荷开关和组合电器由相同的绝缘驱壳开关本体、相同的弹簧操动机构、熔断器触头座和熔断器动作撞击脱扣系统组成。装可触摸型电缆前接头负荷开关由专用的绝缘驱壳开关本体、通用的弹簧操动机构组成。

上下驱壳由环氧树脂注射而成，构成充气内腔，公用动触头作旋转运动可循序完成“合-分-接地”三种工作状态，在基本手力弹簧储能操动机构上可加装电动合、分闸，实现遥控操作，供用户选择。

机构箱正面设有 SF₆ 气体压力表和位置指示，压力表用于监视 SF₆ 气体压力变化。位置指示装置直接与动触头传动轴联接，指示动触头的工作位置绝对可靠。

驱壳后部设有安全隔膜，满足压力系统要求，具有释压排逸功能，当灭弧室内可能会发生某种事故造成压力过高时，过压气体可冲破隔膜得到释放。气体直接喷向背部，避免了向前喷射或其他现象，从而确保人身安全。

负荷开关与接地开关、接地开关与前门（开关有此连锁，供配电时使用）均有可靠的机械连锁。

The load break switch and the combined appliance are composed of the same insulated body switch body, the same spring operating mechanism, the fuse contact holder and the fuse action impact trip system. The load break switch of the front connector of the touchable cable is composed of a special insulated body switch body and a general spring bath moving mechanism.

The upper and lower body is injected by epoxy resin to form an inflatable inner cavity. The rotating movement of the public moving contact can complete the three working states of "make-break - ground" in order. The electric closing and opening can be installed on the basic hand spring energy storage operating mechanism to achieve remote control operation for users to choose.

The front of the mechanism box is provided with SF₆ gas pressure gauge and position indication. The pressure gauge is used to monitor SF₆ gas pressure changes. The position indicating device is directly connected with the driving shaft of the moving contact, and the working position of the indicating moving contact is absolutely reliable.

The rear part of the body is equipped with a safety diaphragm to meet the requirements of the pressure system, and has the function of pressure release and escape. When some kind of accident may occur in the arc extinguishing room, the pressure is too high. Overpressurized gas can break through the diaphragm and be released. The gas is sprayed directly to the rear, avoiding forward injection or other phenomena, thus ensuring personal safety.

The load break switch and the ground switch, the ground switch and the front door (the switch has this interlock for cabinet allocation) have reliable mechanical interlocks.

订货须知 Order instructions

订货时应注明：

- ◆ 产品型号、名称、规格、数量；
- ◆ 额定电压、额定电流；
- ◆ 是否配电动操作机构；
- ◆ 备品、配件的名称及数量；
- ◆ 特殊使用条件。

The order should indicate:

- ◆ Product model, name, specification, quantity;
- ◆ Rated voltage, rated current;
- ◆ Whether it is equipped with electric operating mechanism;
- ◆ Name and quantity of spare parts and accessories;
- ◆ Special conditions of use.

技术参数 Technical parameter

项目 Item	单位 Unit	参数 Argument		
额定电压 Rated voltage	kV	12	24	40.5
额定频率 Rated frequency	Hz	50/60		
额定电流 Rated current	A	630		
1min 工频耐压，相对地、相间 / 断口 1min power frequency withstand voltage, relative ground, phase/fracture	kV	42/48	65/79	95/110
雷电冲击耐压 (峰值) 相对地、相间 / 断口 Lightning impulse withstand voltage (peak) relative to ground, phase/fracture	kV	75/85	125/145	185/215
主回路 额定热稳定电流 Main circuit rated heat stable current	kA/3s	20		
接地回路 额定热稳定电流 Rated heat stable current of ground loop	kA/2s	20		
额定动稳定电流 (峰值) Rated dynamic stable current (peak)	kA	50		
额定短路关合电流 Rated short-circuit closing current	kA	50		
额定闭环开断电流 Rated closed-loop breaking current	A	630		
额定有功负载开断电流 Rated active load breaking current	A	630		
额定电缆充电开断电流 Rated cable charging breaking current	A	10		
额定短路开断电流 Rated short-circuit breaking current	kA	20		
额定转移电流 Rated transfer current	A	1750	1400	1000
机械寿命 负荷开关 / 接地开关 Mechanical life load break switch/ground switch	次 Time	3000/2000		
SF ₆ 气体压力 (20°C时相对压力) SF ₆ gas pressure (relative pressure at 20°C)	Mpa	0.045		

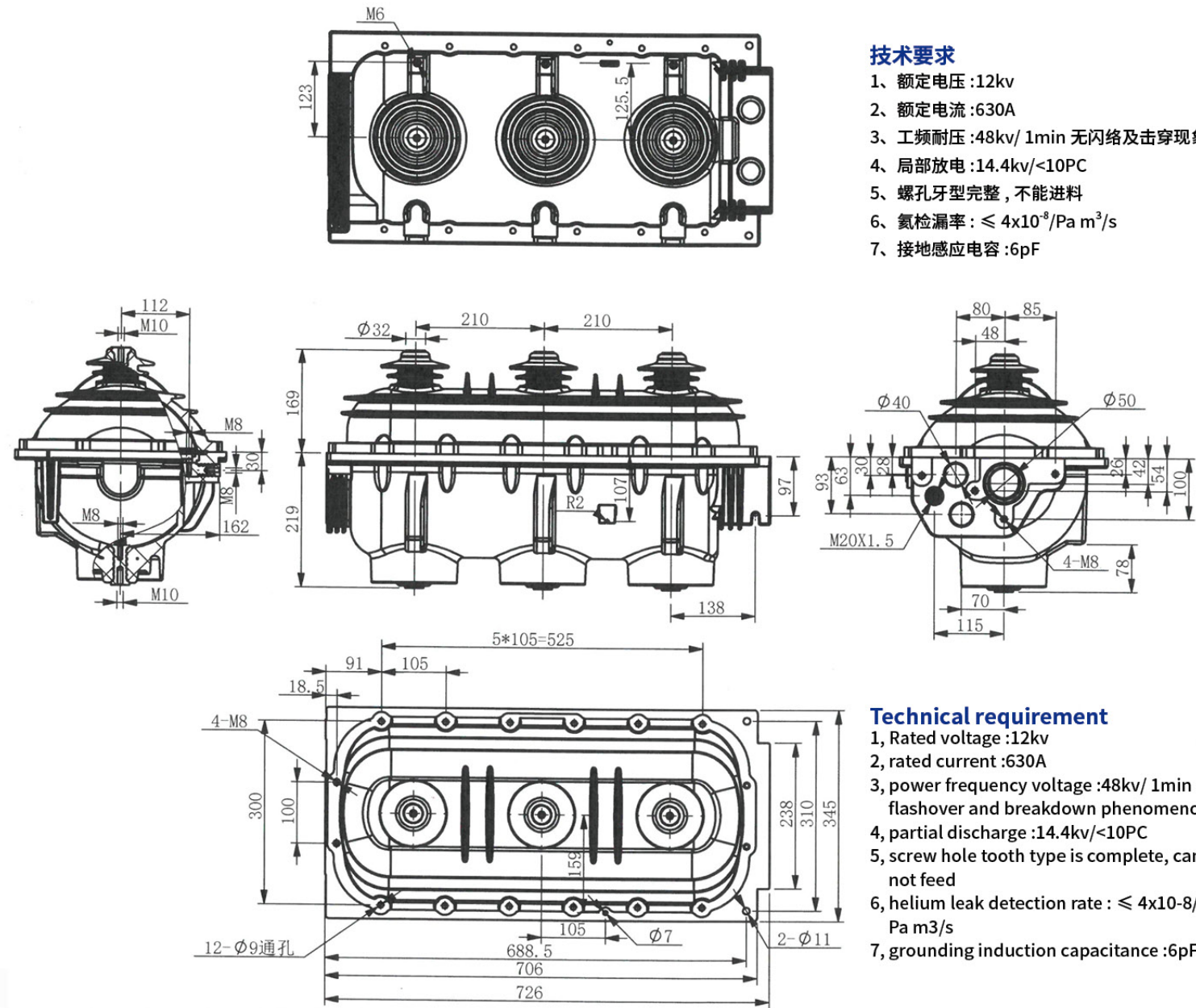
* 如需要选用产品，须经相关试验。

当开关内的气体压力为零表压时，负荷开关仍能进行额定电流的合分闸操作。

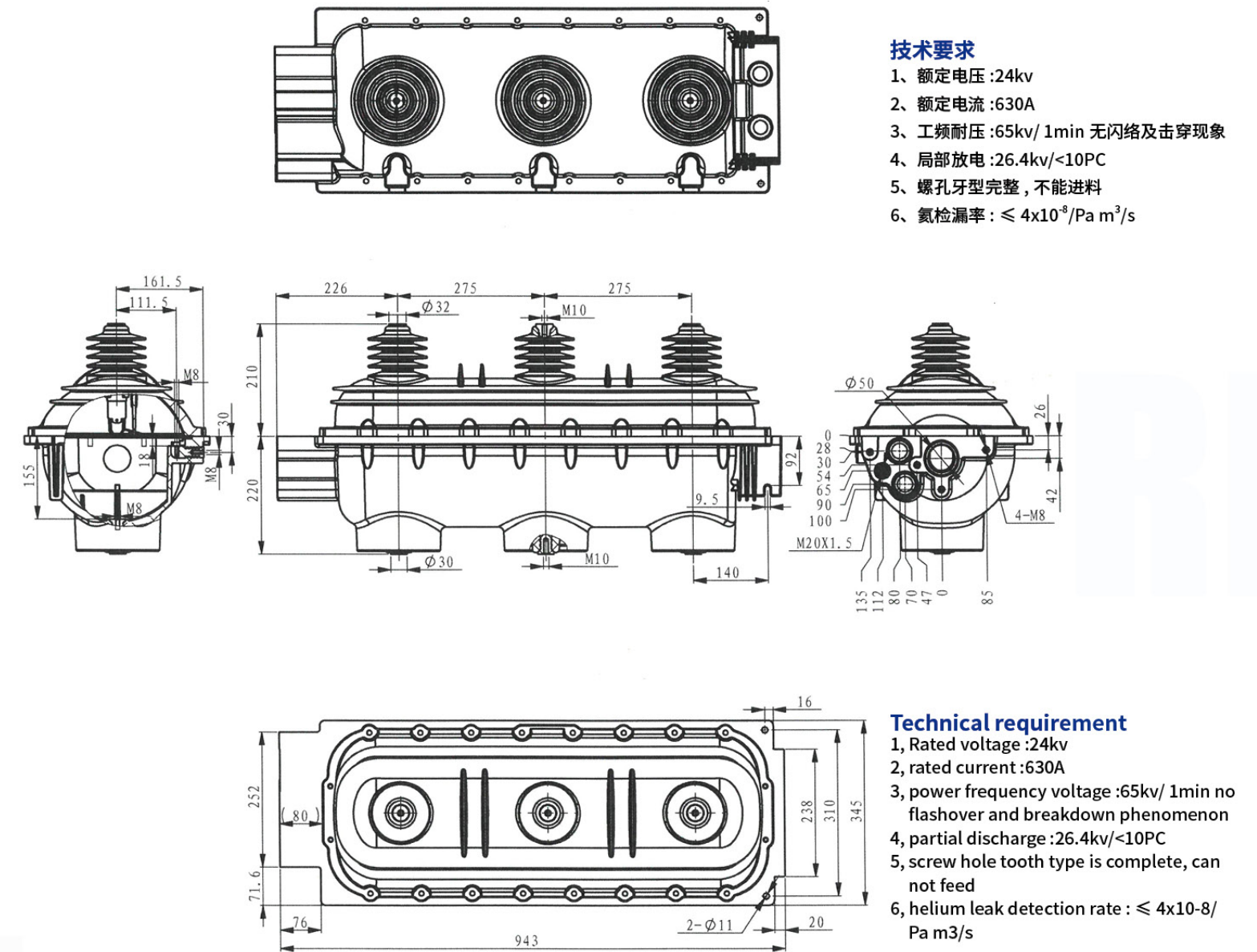
* If you need to choose products, subject to relevant tests.

When the gas pressure in the switch is zero gauge pressure, the load switch can still operate the rated current.

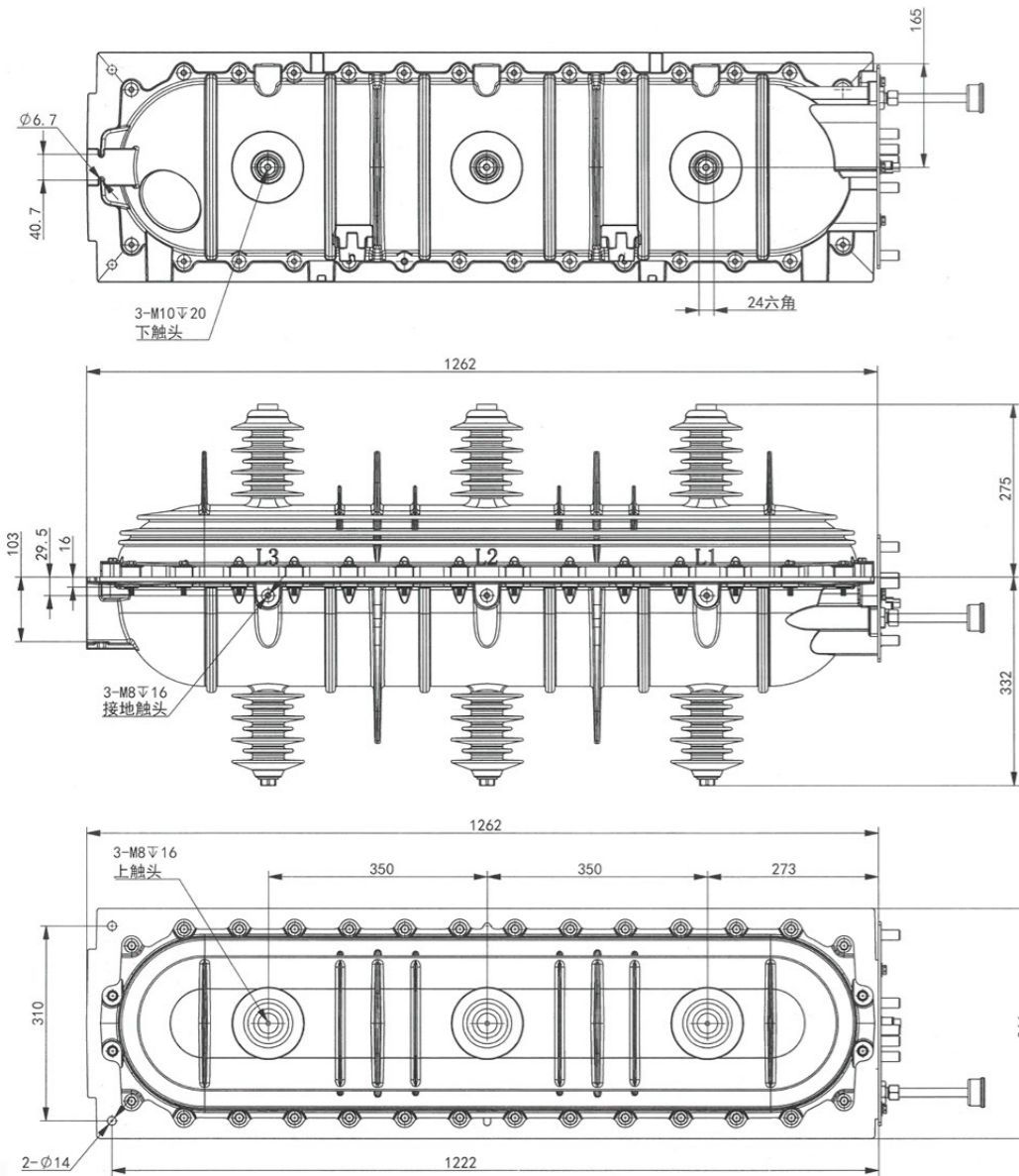
12kV 外形及安装尺寸 12kV profile and mounting dimensions



24kV 外形及安装尺寸 24kV profile and mounting dimensions



35kV 外形及安装尺寸 35kV profile and mounting dimensions



技术要求

- 1、额定电压 :35kV
- 2、额定电流 :630A
- 3、对地 / 相间工频耐压 :70kV/1min
- 4、断口工频耐压 :80kV/1min

Technical requirement

- 1, Rated voltage :35kV
- 2, rated current :630A
- 3, to the ground/phase frequency voltage :70kV/1min
- 4, the fracture frequency withstand voltage :80kV/1min

GCS
低压抽出式成套开关设备

GCS Low voltage withdrawable complete switchgear

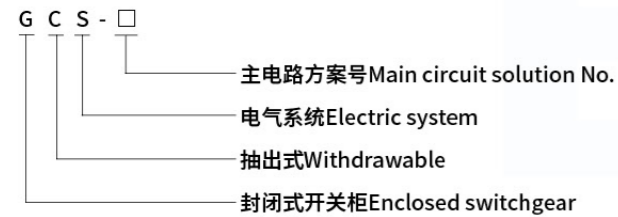


概述 Overview

GCS 型低压抽出式开关柜(以下简称开关柜)是原电力工业部和机械工业部两部联合设计组于九十年代末设计研制成功的新产品。它符合国情,具有较高技术性能指标,能够适应电力市场发展的需要并可与现有引进产品竞争,已受到广大电力用户的重视和选用。该开关柜适用于三相交流50Hz,额定电压380V(400V),额定电流 4000A 及以下的三相四线制及三相五线制电力系统。广泛被发电厂、变电站、工矿企业、大楼宾馆、机场、码头等电力用户作为电能分配、转换、控制和无功功率补偿之用,它包含有动力中心(PC)和电动机控制中心(MCC)之功能,并可设计成固定柜和抽屉混合柜型,满足不同的供配电需要。开关柜具有分断能力高、动热稳定性好、结构新颖合理、电气方案系列完善、防护等级高等特点,是理想的更新换代产品。

GCS type low-voltage withdrawable switchgear (hereinafter referred to as the switchgear) is a new product that was not successfully designed and developed by the joint design team of the former Ministry of Electric Power Industry and the Ministry of Machinery Industry in the 1990s. It is in line with the national conditions, has high technical performance, can adapt to the needs of the development of the electricity market, and can compete with existing imported products, so that it has been highly valued and selected by a large number of electricity users. This switchgear is suitable for three-phase four-wire and three-phase five-wire power system with frequency of three-phase AC 50Hz, rated voltage of 380V (400V), rated current of 4000A and below. It's widely used by power plants, substations, industrial and mining enterprises, buildings, hotels, airports, docks and other electricity users for energy distribution, conversion, control and reactive power compensation, it includes the functions of power center (PC) and motor control center (MCC), and can be designed as mixed fixed and withdrawable cabinet to meet different power supply and distribution needs. The switchgear has the characteristics of high breaking capacity, good dynamic and thermal stability, novel and reasonable structure, complete electric solution series, and high protection level, making it an ideal replacement product.

型号含义 Model meaning



使用条件 Conditions of use

- ◆ 海拔高度: ≤ 2000m;
- ◆ 空气温度: 周围空气温度上限为 +40°C, 下限为 -5°C。并且在 24 小时内平均温度不高于 +35°C 在贮存、运输条件下最低温度为 -30°C。
- ◆ 相对湿度: 最高温度 +40°C 时不超过 50%; 在较低温度时允许有较高的相对湿度(例如: +20°C 时为 90%); 但应考虑到由于温度的变化可能会偶尔产生凝露的影响。
- ◆ 安装场所: 设备安装时垂直面的倾斜不超过 5° 应安装在无剧烈震动和冲击以及不足以使电器元件受到腐蚀的场所。
- ◆ 注: 当上述正常使用条件不能满足使用要求时, 由用户与制造厂协商。
- ◆ Altitude: ≤ 2000m;
- ◆ Air temperature: The upper limit of ambient air temperature is +40°C, and the lower limit is -5°C. The average temperature within 24 hours should not exceed +35°C, the minimum temperature under storage and transportation conditions is -30°C.
- ◆ Relative humidity: it doesn't exceeds 50% at a maximum temperature of +40°C; higher relative humidity is allowable at lower temperatures (e.g. 90% at +20°C); however, it should be considered that occasional condensation may occur due to temperature change.

- ◆ Installation location: When installing the equipment, the inclination of the vertical plane should not exceed 5°. It should be installed in a place without severe vibration and impact and with medium not enough to corrode electrical component.
- ◆ Note: When the above normal service conditions cannot meet the usage requirement, it shall be negotiated between the user and the manufacturer.

产品特点 Product characteristics

- ◆ 结构通用性强、组装灵活: 开关柜为全拼装式组合结构, 侧面分别有模数为 20mm 和 100mm 的 Φ9.2mm 的安装孔, 内部安装灵活方便。
- ◆ 开关柜的隔室可分为功能单元室、母线室和电缆室, 各功能单元的功能作用相对独立且区域之间由连续接地的金属板或阻燃型塑料板压制的功能板严格分隔, 保证使用安全且防止事故蔓延。
- ◆ 开关柜内所有结构件作镀锌钝化处理。开关柜四周的门板、侧板均采用优质冷轧钢板经数控机床加工成型, 然后表面经过酸洗、磷化等处理, 再进行静电喷塑, 抗磨耐腐。既有牢固的机械强度, 又有可靠的接地保护连续性。
- ◆ 开关柜抽屉具有连结位置、试验位置、断开位置、抽出位置和隔离位置。各抽与开关设有机机械联锁装置: 当开关处于分断状态时, 抽屉才能进行抽出和插入, 当开关处于合闸状态时, 抽屉不能抽出和插入为防止未经允许的操作, 操作机构手柄可以用挂锁将开关锁定在分断位置上。同规格的功能单元抽屉可以方便地实现互换, 每一个功能单元抽屉最多对应有 36 对辅助接点, 能满足异地操作控制、电度计量和计算机接口的自动化监测系统的需要。
- ◆ 水平主母线采用柜后平置式排列方式, 以增强母线抗电动力的能力, 是使装置的主电路具备高短路强度能力的基本措施: 垂直母线组装在绝缘功能板中, 可防止开关电弧引起的对垂直母线的相间放电, 提高了产品的电击防护能力和安全运行率: 电缆隔室的设计使电缆上下进出均十分方便。
- ◆ Strong commonality of structure and flexible assembly: The switchgear is a fully assembled combination structure, with installation holes of 20mm and 100mm modules on the side, with diameter of Φ9.2mm, making internal installation flexible and convenient.
- ◆ The compartments of the switchgear can be divided into functional unit room, busbar room and cable room. The functions of each functional unit are relatively independent, and the areas are strictly separated by continuously grounded metal plate or pressed flame-retardant plastic plate to ensure safe use and prevent the spread of accident.
- ◆ All structural components inside the switchgear shall be galvanized and passivated. The door panels and side panels around the switchgear are made of high-quality cold-rolled steel plates processed and formed by CNC machine tool, and then the surface is treated with acid washing, phosphating, and electrostatic spraying for wear and corrosion resistance. It has both strong mechanical strength and reliable grounding protection continuity.
- ◆ The draw-out unit of the switchgear has connection position, test position, disconnection position, draw-out position and isolation position. Each draw-out unit and switch is equipped with mechanical interlock device: the draw-out unit can only be pulled out and inserted when the switch is in the open state, and cannot be pulled out or inserted when the switch is in the closed state. To prevent unauthorized operation, the operating mechanism handle can be locked in the open position with a padlock. Functional draw-out units of the same specification can be easily interchanged, with each draw-out unit corresponding to a maximum of 36 pairs of auxiliary contacts, which can meet the needs of remote operation control, electricity metering and computer interface automation monitoring system.
- ◆ The horizontal main busbar is flatly arranged at the back of cabinet to enhance the busbar's ability to resist electric power, which is a basic measure to make the main circuit of the device have high short-circuit strength. The vertical busbar is assembled in insulated functional board to prevent phase discharge caused by switch arcing on the vertical busbar, improving the product's electric shock protection ability and safe operation rate. The design of the cable compartment makes it very convenient for cables to enter and exit both up and down.

技术参数 Technical parameter

额定绝缘电压(V) Rated insulation voltage (V)	AC660
额定工作电压(V) Rated working voltage (V)	AC380V(AC400)
水平母线额定电流(A) Rated current of horizontal busbar (A)	≤4000A
垂直母线额定电流(A) Rated current of vertical busbar (A)	1000A
抽屉回路最大电流(A) Maximum current of draw-out circuit (A)	400A
额定频率(Hz) Rated frequency (Hz)	50(60)
水平母线峰值耐受电流(kA) Peak withstand current of horizontal busbar (kA)	105,176
水平母线短时耐受电流(kA/1S) Short time withstand current of horizontal busbar (kA/1S)	50,80
垂直母线峰值耐受电流(kA) Peak withstand current of vertical busbar (kA)	105
垂直母线短时耐受电流(kA/1S) Short time withstand current of vertical busbar (kA/1S)	50
额定工频耐受电压(V/1 min) Rated power frequency withstand voltage (V/1 min)	2500
二次工频耐受电压(V/1 min) Secondary power frequency withstand voltage (V/1 min)	2500
外壳防护等级 Enclosure protection level	IP40
外壳尺寸(mm) Enclosure dimension (mm)	宽600(800,1000)×深 800(1000)×高2200 Width 600(800,1000)×Depth 800(1000)×Height 2200
功能单元有效高度(mm) Effective height of functional unit (mm)	1760

开关柜及抽屉式类型 Switchgear and draw-out types

按用途可分为:进线柜、母线联络柜、馈电柜(电动机集中控制柜、照明配电柜)和无功补偿柜。按进线方式可分为:上进上出、上进下出、下进上出及下进下出四种。抽屉高度规格有五种,都是以160mm 高度为单元基准:1/2单元、1单元、3/2 单元、2 单元、3 单元五个尺寸系列。抽屉回路电流 400A及以下。

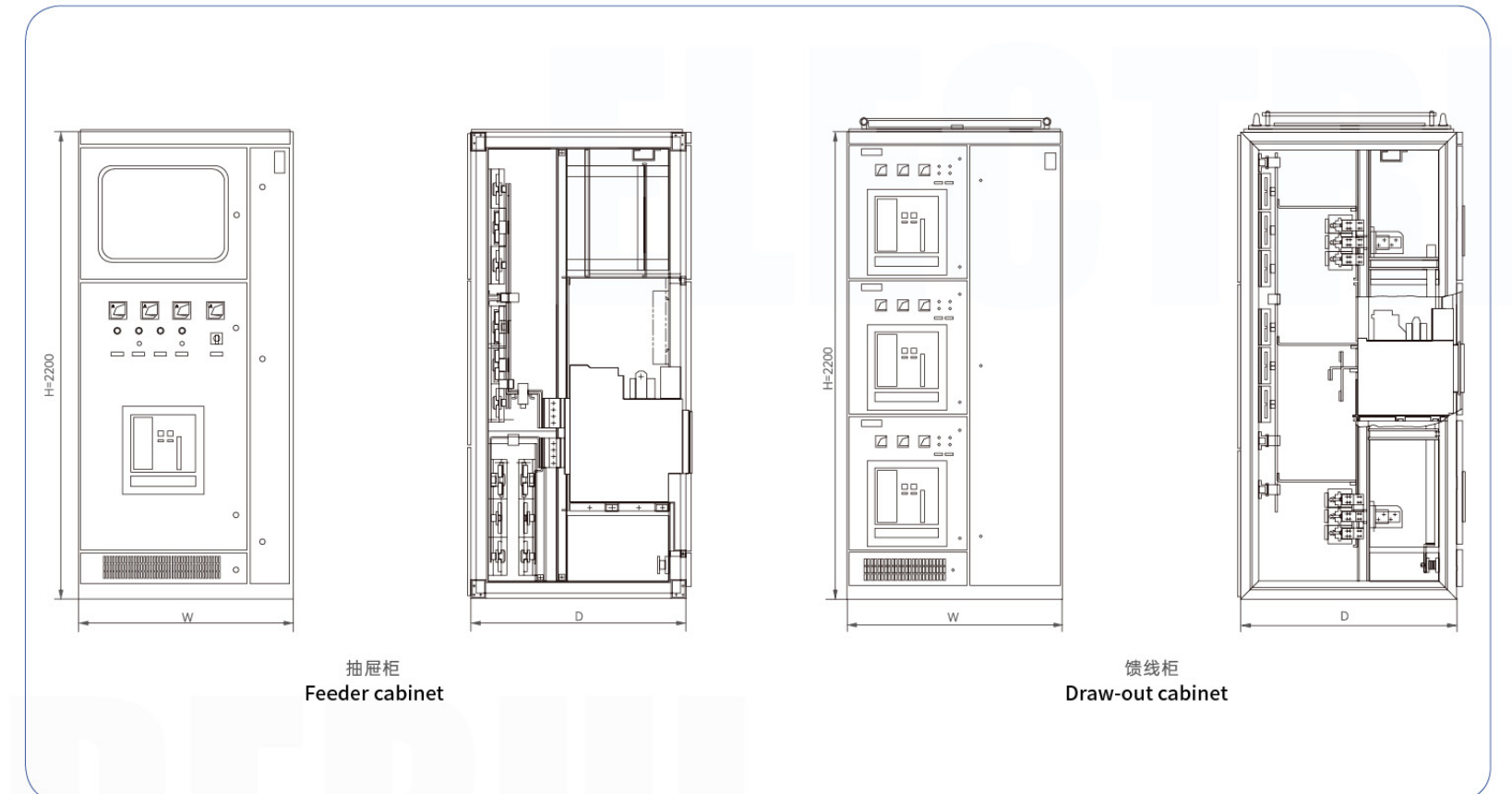
According to the purpose, it can be classified into: incoming cabinet, bus-tie cabinet, feeder cabinet (motor centralized control cabinet, lighting distribution cabinet), and reactive power compensation cabinet. According to the incoming method, it can be classified into four types: upper incoming and upper outgoing, upper incoming and lower outgoing, lower incoming and upper outgoing, and lower incoming and lower outgoing. There are five specifications for draw-out unit height, all based on a unit height of 160mm: 1/2 unit, 1 unit, 3/2 unit, 2 unit and 3 unit in five sizes. Draw-out circuit current is 400A or below.

开关柜外形尺寸及安装尺寸 Outline and installation dimension of switchgear

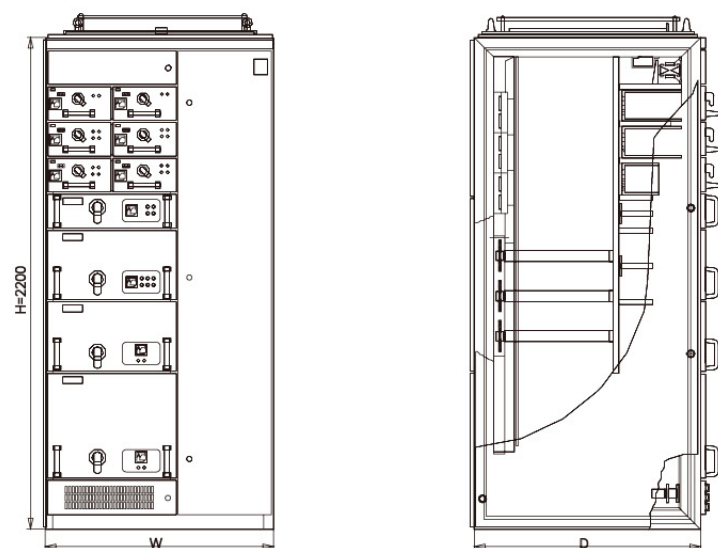
开关柜名称 Name of switchgear	宽度(W) Width (W)	深度(D) Depth (D)	高度(H) Height (H)	电缆出线口(F×G) Cable outlet (FXG)
进线柜 Incoming cabinet	600、800、1000	800、1000	2200	200×400、400×400
联络柜 Bus-tie cabinet	800、1000			
馈电柜 Feeder cabinet	800、1000			
抽屉柜 Draw-out cabinet	800、1000			
补偿柜 Compensation cabinet	800、1000			
				200×350、400×350

注:以上是推荐尺寸,用户有特殊尺寸要求可与本公司协商解决

Note: The above are recommended sizes. Users with special size requirement can negotiate with our company

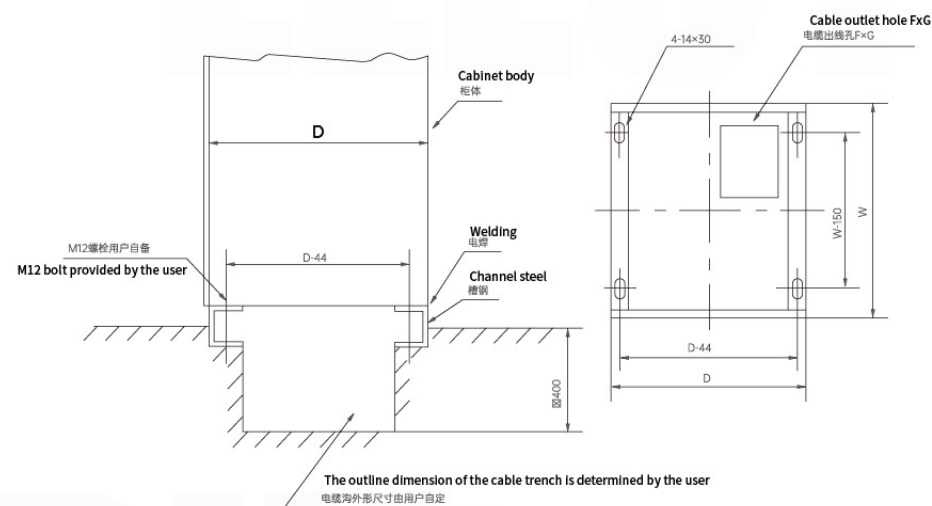


安装尺寸 Mounting dimension



抽屉柜
Draw-out cabinet

安装示意图 Installation diagram



注：柜体底脚固定可采用电焊或 4-M12 螺栓
Note: The bottom of the cabinet can be fixed with welding or 4-M12 bolt

GCK
低压抽出式成套开关设备

GCK Low voltage withdrawable complete switchgear

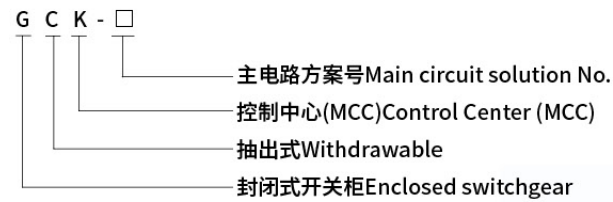


概述 Overview

GCK型低压抽出式开关柜(以下简称开关柜)适用于三相交流 50Hz, 额定电压 380V(400V), 额定电流4000A及以下的三相四线制及三相五线制电力系统。广泛被发电厂、变电站、工矿企业、大楼宾馆、机场码头等电力用户作为电能分配、转换、控制和无功功率补偿之用。它包含有动力中心(PC)和电动机控制中心(MCC)之功能,并可设计成固定柜和抽屉柜混合柜型,满足不同的供电需要。开关柜具有分断能力高、热稳定性好、结构新颖合理、电气方案系列完善、防护等级高等特点,是理想的更新换代产品。

GCK low-voltage withdrawable switchgear (hereinafter referred to as the switchgear) is suitable for three-phase four-wire and three-phase five-wire power system with frequency of three-phase AC 50Hz, rated voltage of 380V (400V), rated current of 4000A and below. It's widely used by power plants, substations, industrial and mining enterprises, buildings, hotels, airports, docks and other electricity users for energy distribution, conversion, control and reactive power compensation, it includes the functions of power center (PC) and motor control center (MCC), and can be designed as mixed fixed and withdrawable cabinet to meet different power supply and distribution needs. The switchgear has the characteristics of high breaking capacity, good dynamic and thermal stability, novel and reasonable structure, complete electric solution series, and high protection level, making it an ideal replacement product.

型号含义 Model meaning



使用条件 Conditions of use

- ◆ 海拔高度: ≤2000m;
- ◆ 空气温度: 周围空气温度上限为 +40°C, 下限为 -5°C。并且在 24小时内平均温度不高于 +35°C
在贮存、运输条件下最低温度为 -30°C;
- ◆ 相对湿度: 空气清洁, 相对湿度在最高温度为 +40°C时不超过50%; 在较低温度时允许有较高的相对湿度 (例如 +20°C时为 90%); 但应考虑到由于温度的变化可能会偶尔产生凝露的影响;
- ◆ 安装场所: 设备安装时垂直面的倾斜不超过 5°, 应安装在无剧烈震动和冲击以及不足以使电器元件受到腐蚀的场所。
- ◆ Air temperature: The upper limit of ambient air temperature is +40°C, and the lower limit is -5°C. The average temperature within 24 hours should not exceed +35°C, the minimum temperature under storage and transportation conditions is -30°C.
- ◆ Relative humidity: in clean air, it doesn't exceed 50% at a maximum temperature of +40°C; higher relative humidity is allowable at lower temperatures (e.g. 90% at +20°C); however, it should be considered that occasional condensation may occur due to temperature change.
- ◆ Installation location: When installing the equipment, the inclination of the vertical plane should not exceed 5°. It should be installed in a place without severe vibration and impact and with medium not enough to corrode electrical component.

产品特点 Product characteristics

- ◆ 结构通用性强、组装灵活: 开关柜为全拼装式组合结构, 基本骨架用FA型钢拼装而成。柜体骨架和零件的外形尺寸以及开孔尺寸均按基本模数E=25mm变化。
- ◆ 开关柜的隔室可分为功能单元室、母线室和电缆室, 各功能单元的功能作用相对独立且区域之间由连续接地的金属板严格分隔, 保证使用安全且防止事故蔓延。
- ◆ 开关柜内所有结构件作镀锌钝化处理。开关柜四周的门板、封板均采用优质冷轧钢板经数控机床加工成型然后表面经过酸洗、磷化等处理, 再进行静电喷塑, 抗防腐。既有牢固的机械强度, 又有可靠的接地保护连续性。

- ◆ 开关柜抽屉具有连结位置、试验位置和分离位置。各抽与开关设有机械联锁装置: 当开关处于分断状态时, 抽屉才能进行抽出和插入, 当开关处于合闸状态时, 抽屉不能进行抽出和插入。为防止未经允许的操作, 操作机构手柄可以用挂锁将开关锁定在分断位置上。同规格的功能单元抽可以方便地实现互换, 每一个功能单元抽屉最多对应有20对辅助接点能满足异地操作控制、电度计量和计算机接口的自动化监测系统的需要。

- ◆ Strong commonality of structure and flexible assembly: The switchgear is a fully assembled combination structure, with the basic framework assembled by FA steel. The outline dimension and opening dimension of the cabinet framework and components vary according to the basic modulus E=25mm.
- ◆ The compartments of the switchgear can be divided into functional unit room, busbar room and cable room. The functions of each functional unit are relatively independent, and the areas are strictly separated by continuously grounded metal plate to ensure safe use and prevent the spread of accident.
- ◆ All structural components inside the switchgear shall be galvanized and passivated. The door panels and side panels around the switchgear are made of high-quality cold-rolled steel plates processed and formed by CNC machine tool, and then the surface is treated with acid washing, phosphating, and electrostatic spraying for wear and corrosion resistance. It has both strong mechanical strength and reliable grounding protection continuity.
- ◆ The draw-out unit of the switchgear has connection position, test position and disconnection position. Each draw-out unit and switch is equipped with mechanical interlock device: the draw-out unit can only be pulled out and inserted when the switch is in the open state, and cannot be pulled out or inserted when the switch is in the closed state. To prevent unauthorized operation, the operating mechanism handle can be locked in the open position with a padlock. Functional draw-out units of the same specification can be easily interchanged, with each draw-out unit corresponding to a maximum of 20 pairs of auxiliary contacts, which can meet the needs of remote operation control, electricity metering and computer interface automation monitoring system.

技术参数 Technical parameter

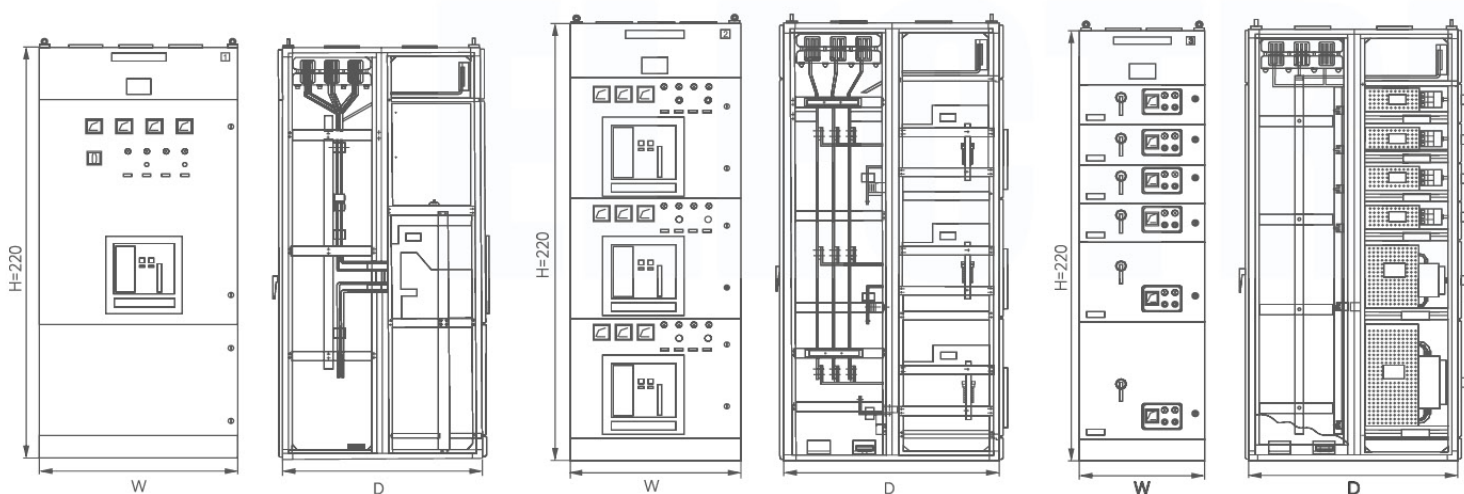
额定绝缘电压 Rated insulation voltage	AC690V
额定工作电压 Rated working voltage	AC380V(AC400V)
水平母线额定电流 Rated current of horizontal busbar	1250A, 1600A, 2000A, 3200A, 4000A
垂直母线额定电流 Rated current of vertical busbar	1000A
馈电电路最大电流 Maximum current of feeding circuit	2500A
抽屉回路最大电流 Maximum current of draw-out circuit	630A
控制电机最大容量 Maximum capacity of control motor	320kW
额定频率 Rated frequency	50Hz
水平母线峰值耐受电流 Peak withstand current of horizontal busbar	105kA, 176kA
水平母线短时耐受电流(1s) Short time withstand current of horizontal busbar (1s)	50kA, 80kA
垂直母线峰值耐受电流 Peak withstand current of vertical busbar	63kA, 105kA
垂直母线短时耐受电流(1s) Short time withstand current of vertical busbar (1s)	30kA, 50kA
额定工频耐受电压(1min) Rated power frequency withstand voltage (1min)	2500V
二次工频耐受电压(1min) Secondary power frequency withstand voltage (1min)	2500V
外壳防护等级 Enclosure protection level	IP40
外壳尺寸(mm) Enclosure dimension (mm)	宽600(800,1000) X深800(1000) X高2200 Width 600(800,1000) X Depth 800(1000) X Height 2200
功能单元有效高度(mm) Effective height of functional unit (mm)	1800

开关柜外形尺寸及安装尺寸Outline and installation dimension of switchgear

开关柜名称Name of switchgear	宽度(W) Width (W)	深度(D) Depth (D)	高度(H) Height (H)
进线柜Incoming cabinet	600、800、1000	800、1000	2200
联络柜Bus-tie cabinet	600、800、1000		
馈电柜Feeder cabinet	600、800、1000		
抽屉柜Draw-out cabinet	600、800		
补偿柜Compensation cabinet	600、800、1000		

注:以上是推荐尺寸,用户有特殊尺寸要求可与本公司协商解决

Note: The above are recommended sizes. Users with special size requirement can negotiate with our company



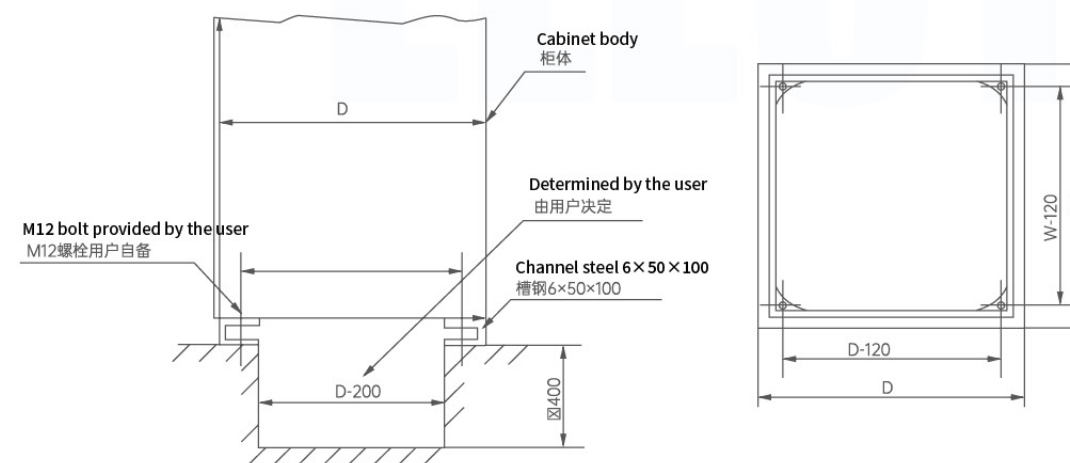
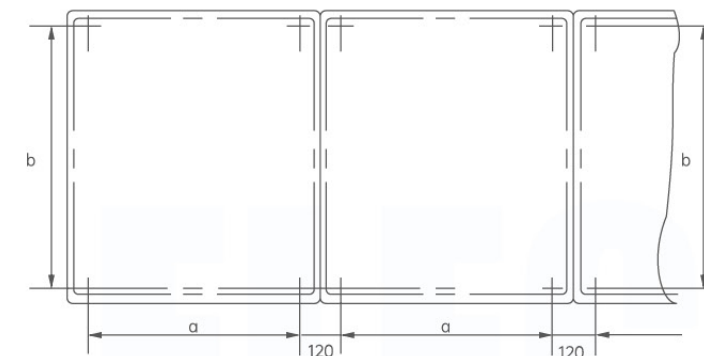
进线柜
Incoming cabinet

馈线柜
Feeder cabinet

抽屉柜
Draw-out cabinet

GCK 串屏安装尺寸GCK serial screen installation dimension

外形尺寸(mm) Outline dimension (mm)		a	b
宽 Width	600	480	
	800	680	
	1000	880	
深 Depth	800		680
	1000		880



安装示意图
Installation diagram



产品概述

本系列低压抽出式开关柜适用于发电厂、变电站、石油化工、冶金轧钢、交通能源、轻工纺织等厂矿企业和住宅小区、高层建筑等场所、作为交流 50-60Hz, 额定工作电压交流 660V 及以下的电流系统的配电设备的电能转换、分配及控制之用。

This series of low-voltage withdrawable switchgear is suitable for power plants, substations, petrochemicals, metallurgical steel rolling, transportation energy, light industry, textile and other factories and mining enterprises, residential areas, high-rise buildings and other places. It is used for power conversion, distribution and control of distribution equipment for power system with frequency of AC 50-60Hz and rated working voltage of AC 660V and below.

使用条件 Conditions of use

- ◆ 周围空气温度不高于+40°C, 不低于-5°C, 并且24h 内其平均温度不高于+35°C;
- ◆ 大气条件: 空气清洁, 相对湿度在最高温度为+40°C时不超过50%, 在较低温度时允许有较高的相对湿度, 例如+20°C时为90%, 但应考虑到温度变化, 有可能会偶然地产生凝露;
- ◆ 海拔高度不超过2000m;
- ◆ 本装置适应于以下温度的运输和储存过程:-25°C至+55°C的范围之间, 在短时间内(不超过24h)可达+70°C, 在这些极限温度下装置不应遭到任何不可恢复的损伤, 而且在正常条件下应能正常工作;
- ◆ 如果上述使用条件不能满足时, 应由用户和制造厂协商解决。
- ◆ 当本装置使用于海上石油钻采平台和核电站时, 应另行签订技术协议。
- ◆ The ambient air temperature shall not be higher than +40°C and not lower than -5°C, and its average temperature within 24 hours shall not be higher than +35°C;
- ◆ Relative humidity: in clean air, it doesn't exceed 50% at a maximum temperature of +40°C; higher relative humidity is allowable at lower temperatures (e.g. 90% at +20°C); however, it should be considered that occasional condensation may occur due to temperature change.
- ◆ Altitude shall not exceed 2000m;
- ◆ This equipment is suitable for transportation and storage at temperatures ranging from -25°C to +55°C, and it can reach +70°C in a short period of time (not exceeding 24 hours). At these extreme temperatures, the equipment should not suffer any irreparable damage and should be able to function normally under normal condition;
- ◆ Note: When the above normal service conditions cannot meet the usage requirement, it shall be negotiated between the user and the manufacturer.
- ◆ When this equipment is used on offshore oil drilling platforms and nuclear power plants, separate technical agreement should be signed.

技术参数 Technical parameter

额定绝缘电压 Rated insulation voltage	AC690V	
额定工作电压 Rated working voltage	AC400V	
主母线额定电流 Rated current of main busbar	≤6300A	
主母线额定耐受电流(1s) Rated withstand current of main busbar (1s)	50kA, 80kA	
主母线额定峰值耐受电流 Rated peak withstand current of main busbar	105kA, 176kA	
配电母线(垂直母线)最大工作电流 Maximum working current of distribution busbar (vertical busbar)	1000A	
配电母线(垂直母线峰值电流) Distribution busbar (peak current of vertical busbar)		
	标准型 Standard type	105kA(最大值 maximum)/0.1s
	加强型 Enhanced type	176kA(最大值 maximum)/0.1s

防护等级Protection level

符合IEC529、DIN40050标准

IP30对大于Φ2.5MM固体防护

IP40对大于Φ1.0MM固体防护

IP54对尘埃和任意方向喷溅作防护

订购IP54防护等级时应与制造厂协商

Compliant with IEC529 and DIN40050 standards

IP30 provides protection for solid larger than Φ2.5MM

IP40 provides protection for solid larger than Φ1.0MM

IP54 provides protection against dust and splash in any direction

When ordering IP54 protection level, it should be negotiated with the manufacturer

柜体结构Cabinet structure

开关柜柜体基本结构是由C型材装配组成。C型材是以E=25mm为模数安装孔的钢板弯制而成。

全部框架及内层隔板都作镀锌钝化处理。四周门板,侧板则作高压静电喷塑。

柜体基本结构见图1所示:柜体基本尺寸见图2,表1、表2。

The basic structure of the switchgear cabinet is assembled by C-shaped profiles. C-shaped profiles are made by bending steel plates with E=25mm as the modular installation hole.

All cabinet frames and inner partitions are treated with galvanized purification. The surrounding door panels and side panels are coated with high-voltage electrostatic spraying.

The basic structure of the cabinet is shown in Figure 1: the basic dimensions of the cabinet are shown in Figure 2, Tables 1 and 2.

开关柜类型Switch cabinet type

动力配电中心柜(PC):可采用 Emax, MT, 3WN, AH, ME系列等断路器。

电动机控制中心柜(MCC):由大小抽屉组装而成,各回路主开关采用高分断塑壳断路器

或旋转式带熔断器的负荷开关。功率因数自动补偿柜(带有手动、自动及远动功率因数补偿装置)

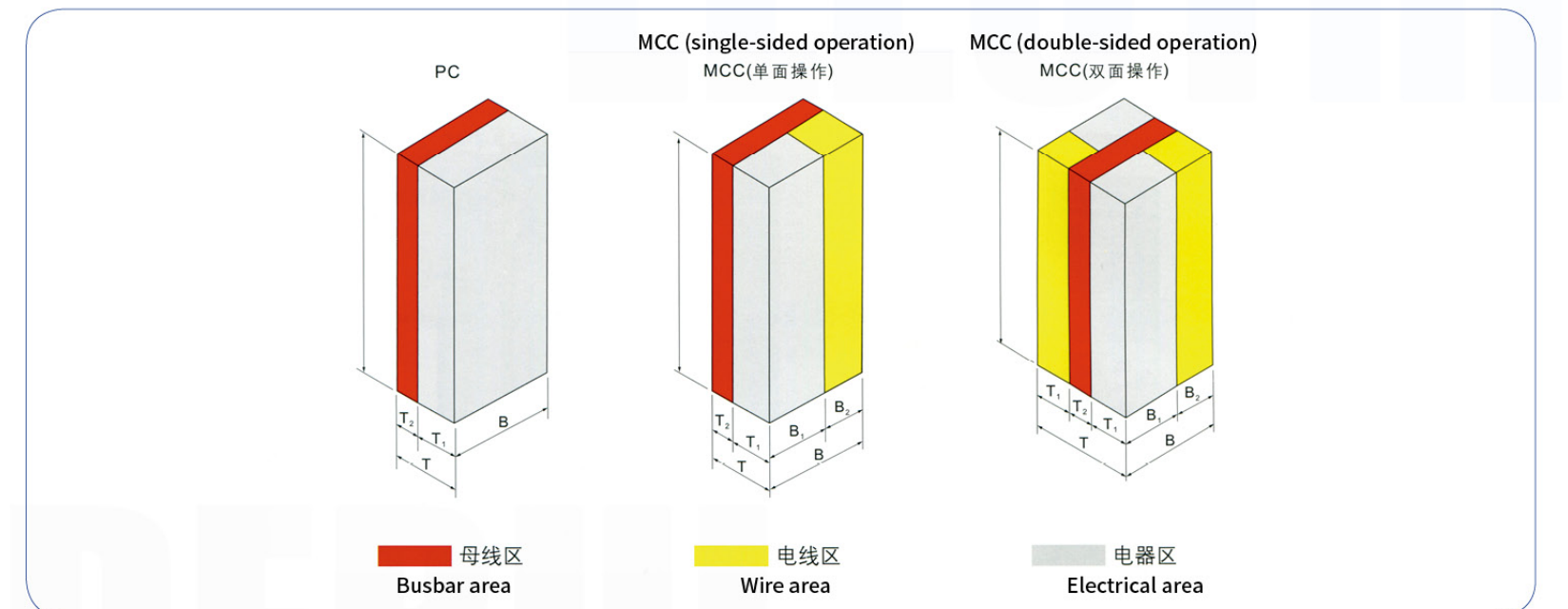
Power distribution center cabinet (PC): Emax, MT, 3WN, AH, ME series circuit breakers can be used.

Motor control center cabinet (MCC): Assembled from draw-out units of various sizes, the main switch of each circuit adopt high breaking molded case circuit breaker or rotary load switch with fuse. Power factor automatic compensation cabinet (with manual, automatic and remote power factor compensation device)

C型型材组成的柜架结构(图1)Cabinet frame structure composed of C-shaped profiles (Figure 1)



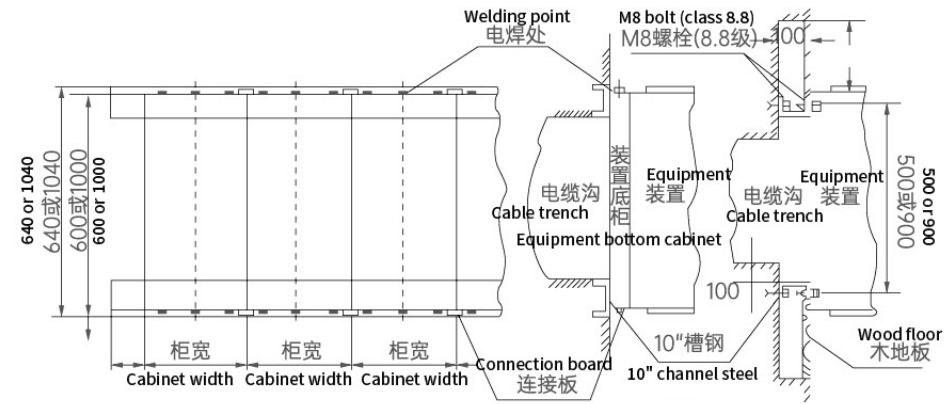
柜体示意图(图2)Cabinet schematic diagram (Figure 2)



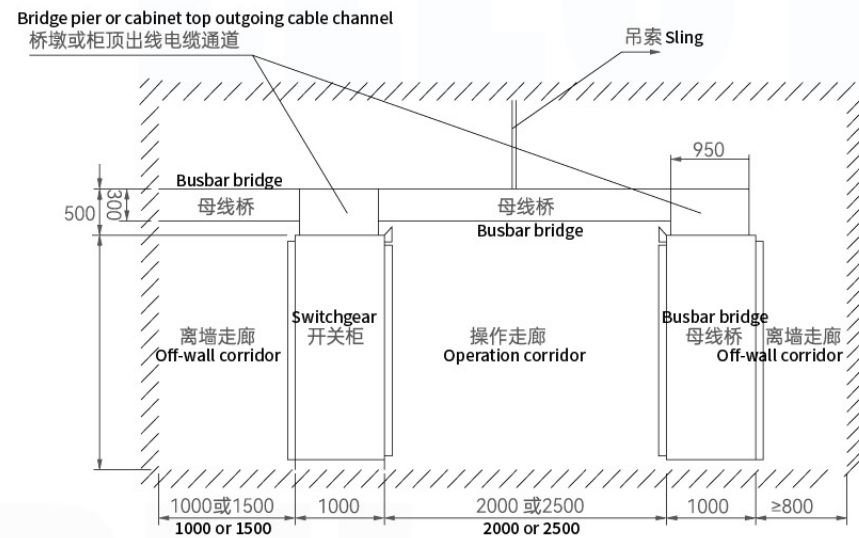
安装示意图 Installation diagram

方案一 焊接安装 Solution 1: Welding installation

方案二 螺栓安装 Solution 2: Bolt installation



母线桥安装示意图 Installation diagram of busbar bridge



注：制作厂可以根据用户要求提供各种形式的母线。
Note: The manufacturer can provide various forms of busbars according to user requirement.

GGD
交流低压配电柜

GGD Ac low-voltage power distribution cabinet

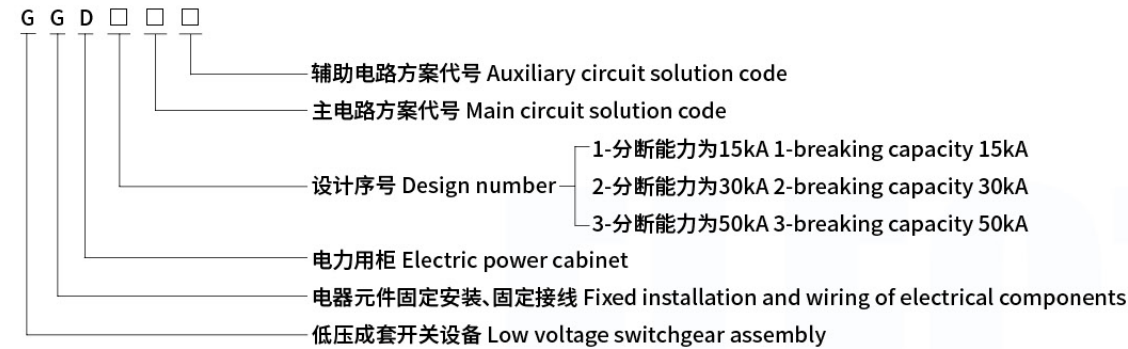


概述 Overview

GGD 型交流低压配电柜适用于发电厂、变电站、工矿企业等电力用户的交流 50Hz, 额定工作电压 400V, 额定工作电流 4000A 的配电系统, 做为动力、照明及配电设备的电能转换、分配与控制之用。产品具有分断能力高、动热稳定性好、电气方案灵活、组合方便、实用性强、结构新颖、防护等级高等特点。可作为低压成套开关设备的更新换代产品使用。

GGD type AC low voltage distribution cabinet is suitable for power plants, substations, industrial and mining enterprises and other power users' distribution system with frequency of AC 50Hz, rated working voltage of 400V and rated working current of 4000A. It is used for power conversion, distribution and control of power, lighting and distribution equipment. The product has the characteristics of high breaking capacity, good dynamic and thermal stability, flexible electrical solution, convenient combination, high practicality, novel structure and high protection level. It can be used as a replacement product for low voltage switchgear.

型号含义 Model meaning



使用条件 Conditions of use

- ◆ 海拔高度: ≤ 2000m;
- ◆ 环境温度: 周围空气温度上限+40°C, 下限-5°C。24h以内的平均温度不得高于+35°C
- ◆ 相对湿度: 周围空气相对湿度在最高温度为+40°C时不超过50%, 在较低温度时允许有较大的相对湿度。(例如+20°C时为90%)应考虑到由于温度变化可能会偶然产生凝露的影响。
- ◆ 安装场所: 设备安装时与垂直面的倾斜度不超过 5°。设备应安装在无剧烈震动和冲击的地方, 以及不足以使电器元件受到腐蚀的场所。
- ◆ 注: 当上述正常使用条件不能满足使用要求时, 由用户与制造厂协商。
- ◆ Altitude: ≤ 2000m;
- ◆ Ambient temperature: The upper limit of ambient air temperature is +40°C, and the lower limit is -5°C. The average temperature within 24 hours should not exceed +35°C
- ◆ Relative humidity: it doesn't exceeds 50% at a maximum temperature of +40°C; higher relative humidity is allowable at lower temperatures (e.g. 90% at +20°C); however, it should be considered that occasional condensation may occur due to temperature change.
- ◆ Installation location: When installing the equipment, the inclination of the vertical plane should not exceed 5°. The equipment should be installed in a place without severe vibration and impact and with medium not enough to corrode electrical component.
- ◆ Note: When the above normal service conditions cannot meet the usage requirement, it shall be negotiated between the user and the manufacturer.

基本电气参数 Basic electrical parameter

型号 Model	额定电压(V) Rated voltage (V)	额定电流(A) Rated current (A)			额定短路开关电流(kA) Rated short-circuit switching current (kA)	额定短时耐受电流(1S) (kA) Rated short-time withstand current (1S) (kA)	额定峰值耐受电流(kA) Rated peak withstand current (kA)
		A	B	C			
GGD1	380	1000	600(630)	400	15	15	30
GGD2	380	1500(1600)	1000	600	30	30	63
GGD3	380	3150	2500	2000	50	50	105

主电路方案 Main circuit solution

主电路方案是征求了广大设计使用部门的意见选编的, 增加了发电厂需要的方案。额定电流增加到3150A, 适合2000kVA及以下的配电变压器选用。此外, 为适应无功补偿的需要设计了GGJ1、GGJ2 电容补偿柜, 其主电路4个方案, 共12个规格。

The main circuit solution is selected based on the opinions of various design and usage departments, and additional solutions are added to meet the needs of the power plant. The rated current has been increased to 3150A, making it suitable for distribution transformer of 2000kVA and below. In addition, GGJ1 and GGJ2 capacitor compensation cabinets are designed to meet the needs of reactive power compensation, with 4 main circuit solutions and a total of 12 specifications.

辅助电路方案 Auxiliary circuit solution

辅助电路的设计分供电方案和发电厂方案两部分, GGD柜内有足够的空间安装二次元件。

The design of auxiliary circuit is divided into two parts: power supply solution and power plant solution. There is enough space in GGD cabinet to install secondary components.

电器元件选择 Selection of electrical components

- GGD柜主要采用国内已能批量生产的较先进的电器元件, 如ME、DW15等, 同时也根据经济、合理的原则, 在充分考虑可行性的前提下保留了部分可用的老产品如DZ20等。不选用已淘汰的产品
 - HD13BX和HS13BX型旋转操作式刀开关为满足GGD柜独特结构的需要而设计的专用元件, 它改变了机构的操作方式, 保留了考产品的优点, 是一种实用新型的电器元件。
 - 如设计部门根据用户需要, 选用性能更优良、技术更先进的新型电器元件时, 因GGD柜具有良好的安装灵活性, 一般不会因更新电器元件造成制造和安装方面的困难。
 - 为进一步提高主电路的动稳定能力, 配用GGD柜专用的ZMJ型组合形组合式母线夹和绝缘支撑件母线夹由高强度、高阻燃型PPO合金材料热塑成型, 绝缘强度高、自熄性能好、结构独特, 只需调整积木式间块即可方便地组合成单母线夹或双母线夹、绝缘支撑时套筒式模压结构, 成本低、强度高解决了老产品爬电距离不够的缺陷。
- The GGD cabinet mainly adopts advanced electrical components that can be mass-produced domestically, such as ME, DW15, etc. Meanwhile, based on the principle of economy and rationality, some available old products such as DZ20 are retained while fully considering feasibility. Do not use obsolete products.
 - The HD13BX and HS13BX rotary operated knife switches are specialized components designed to meet the unique structural requirement of GGD cabinet, it changes the operating mode of the mechanism while retaining the advantages of the product, making it a new practical 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, the ZMJ type combined busbar clamp and insulation support busbar clamp specially equipped for GGD cabinet are 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 single busbar clamp or double busbar clamp by adjusting the cordwood type interblock, and the sleeve type molded structure for insulation support. The low cost and high strength solve the problem of insufficient creepage distance in old products.

结构简介 Structure introduction

GGD型交流低压配电箱的柜体采用通用柜的形式, 构架采用C型材组装而成, 构架零件及专用配套零件由型钢定点生产厂配套供货, 以保证柜体的精度和质量。通用柜的零部件按模块原理设计, 并有20模的安装孔。

通用系数高, 可以使工厂实现预生产, 既缩短了生产制造周期也提高了工作效率。

GGD柜设计时充分考虑到柜体运行中的散热问题。在柜体上下两端均有不同数量的散热槽孔, 当柜内电器元件发热后, 热量上升, 通过上端槽孔排出, 而冷风不断地由下端槽孔补充进柜, 使密封的柜体自下而上形成一个自然风道, 达到散热的目的。

GGD柜按照现代工业产品造型设计的要求, 采用黄金分割比的方法设计柜体外形和各部分的分割尺寸使整柜美观大方, 面目一新。

柜门用转轴活动铰链与构架相连, 安装、拆卸方便, 门的折边处均嵌有一根山型塑条, 关门时门与框架之间的嵌条有一定压缩行程, 能防止门与柜体直接碰撞, 也提高了门的防护等级。

装有电器元件的仪表门用多股软铜线与框架连接, 柜内的安装件与柜架间用滚花螺钉连接, 整柜构成完整的接地保护电路。

柜体表面采用喷塑, 附着力强, 质感好, 整柜呈亚光色调, 避免了眩目效应, 给值班人员创造了较舒适的视觉环境。

柜体的顶盖在需要时可拆除, 便于现场母线的装配和调整, 柜顶的四角装有吊环, 用于起吊和装运。

柜体的防护等级为IP30, 用户也可根据使用环境的要求在IP20-IP40之间选择。

The cabinet body of the GGD type AC low voltage distribution cabinet adopts the form of universal cabinet, and the framework is assembled with C-shaped profiles. The framework parts and specialized supporting parts are supplied by designated steel production plants 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 modular mounting holes.

The high universal coefficient enables the factory to achieve preproduction, shortening the production cycle and improving work efficiency.

The design of GGD cabinet fully considers the heat dissipation issue 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 heat rises and is discharged through the upper slot, and cold air is continuously replenished into the cabinet through the lower slot, forming a natural air duct from bottom to top in the sealed cabinet and achieving the purpose of heat dissipation.

The GGD cabinet is designed according to the requirement of modern industrial product styling, it uses the golden ratio method to design the cabinet body shape and the division dimension of each part, making the whole cabinet beautiful and elegant, with a brand-new look.

The cabinet door is connected to the framework with a pivot hinge, which is easy to assemble and disassemble. A mountain shaped plastic strip is embedded at the folded edge of the door, when the door is closed, the strip between the door and the framework 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.

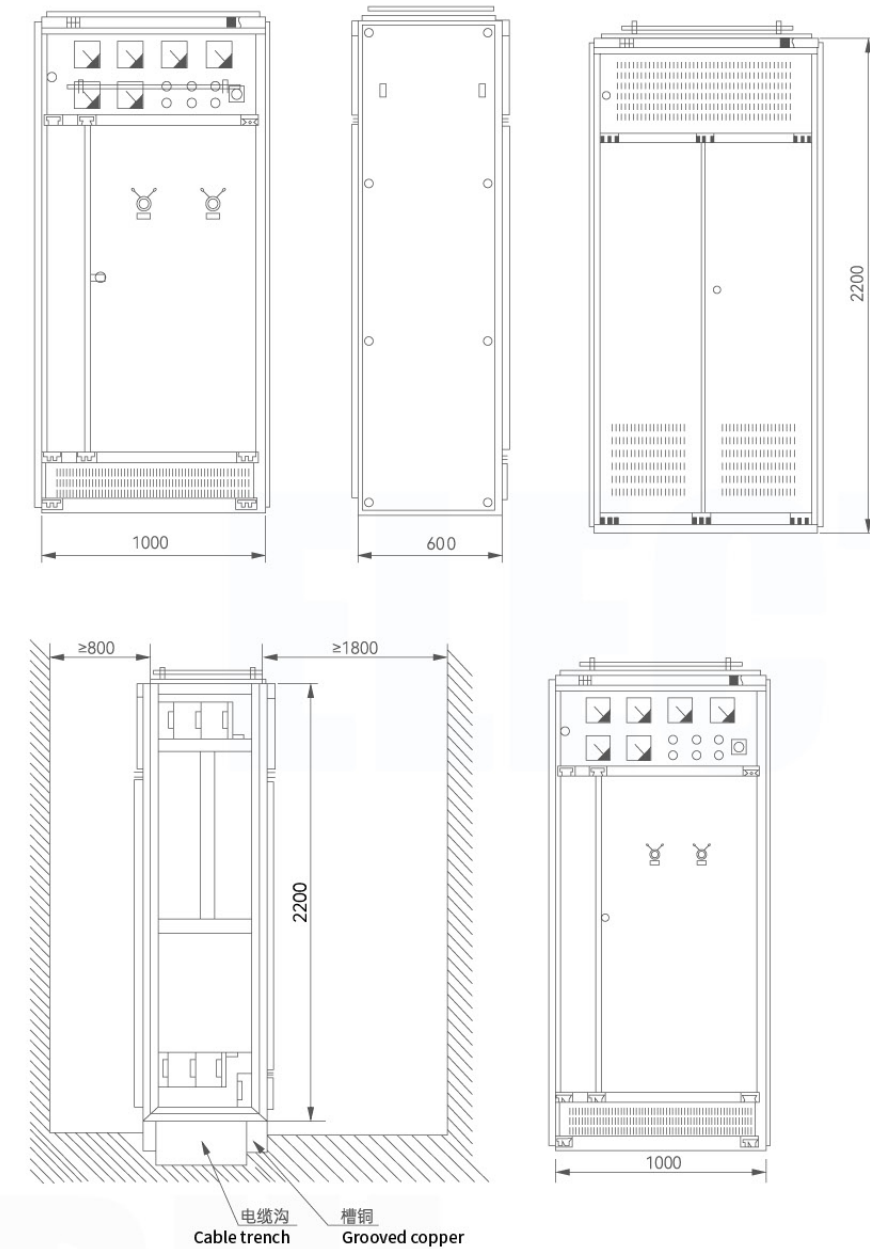
The instrument door equipped with electrical components is connected to the framework with multiple strands of soft copper wire, and the installation parts inside the cabinet are connected to the cabinet framework with knurled screws, forming a complete grounding protection circuit for the entire cabinet.

The surface of the cabinet is sprayed with plastic, which has strong adhesion and good texture. The entire cabinet is in a matte color tone, avoiding glare effects and creating a comfortable visual environment for the personnel on duty.

The top cover of the cabinet body 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 requirement of the usage environment.

安装尺寸 Installation dimension



XGN □ -12(40.5)

高压交流金属固定式开关设备

XGN □ -12(40.5) high-voltage AC metal fixed switchgear



概述Overview

XGN□-12(40.5)箱型(户内)固定式交流金属封闭开关设备(以下简称开关柜)是新一代高压电气成套产品,与以前GG 1(A)型开关柜相比具有较高的绝缘水平和防护等级;产品用于3-35kV单母线,单母线带旁路系统中作为接受和分配电能的高压成套设备。该产品吸收了国外的先进技术,针对目前我国现有同类开关柜在运行中发生的事故障率较高和体积庞大等问题而自行设计研制的。断路器性能好,可靠性高,“五防”联锁机构可靠、简单等优点。广泛用于变电站、开闭所、工矿企业、风力发电、发电厂等。

产品各项指标符合GB3906《3-35kV交流金属封闭开关》、IEC298《1kV 以上52kV以下交流金属封闭开关设备和控制设备》和电力行业DLT404《户内交流高压开关柜订货技术条件》技术标准。

XGN□-12(40.5) box type (indoor) fixed AC metal enclosed switchgear (hereinafter referred to as switchgear) is a new generation of high-voltage electrical complete set product, which has higher insulation level and protection level compared with the previous GG1 (A) switchgear; the product is used as high-voltage switchgear assembly for receiving and distributing electrical energy in 3-35kV single busbar with bypass system. This product has absorbed advanced technology from abroad and has been independently designed and developed to solve the high accident rate and large size of similar switchgear in operation in China. The circuit breaker has good performance, high reliability and the advantages of reliable and simple "five prevention" interlocking mechanism. It's widely used in substations, switch stations, industrial and mining enterprises, wind power plant, power plants, etc.

All indexes of the product comply with the technical standards of GB3906 A.C. metal-enclosed switchgear for rated voltages of 3~35kV, IEC298 High-voltage switchgear and controlgear-Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV, and DL/T404 Technical Conditions for Ordering Indoor AC High Voltage Switchgear in the power industry.

型号含义Model meaning



使用条件Conditions of use

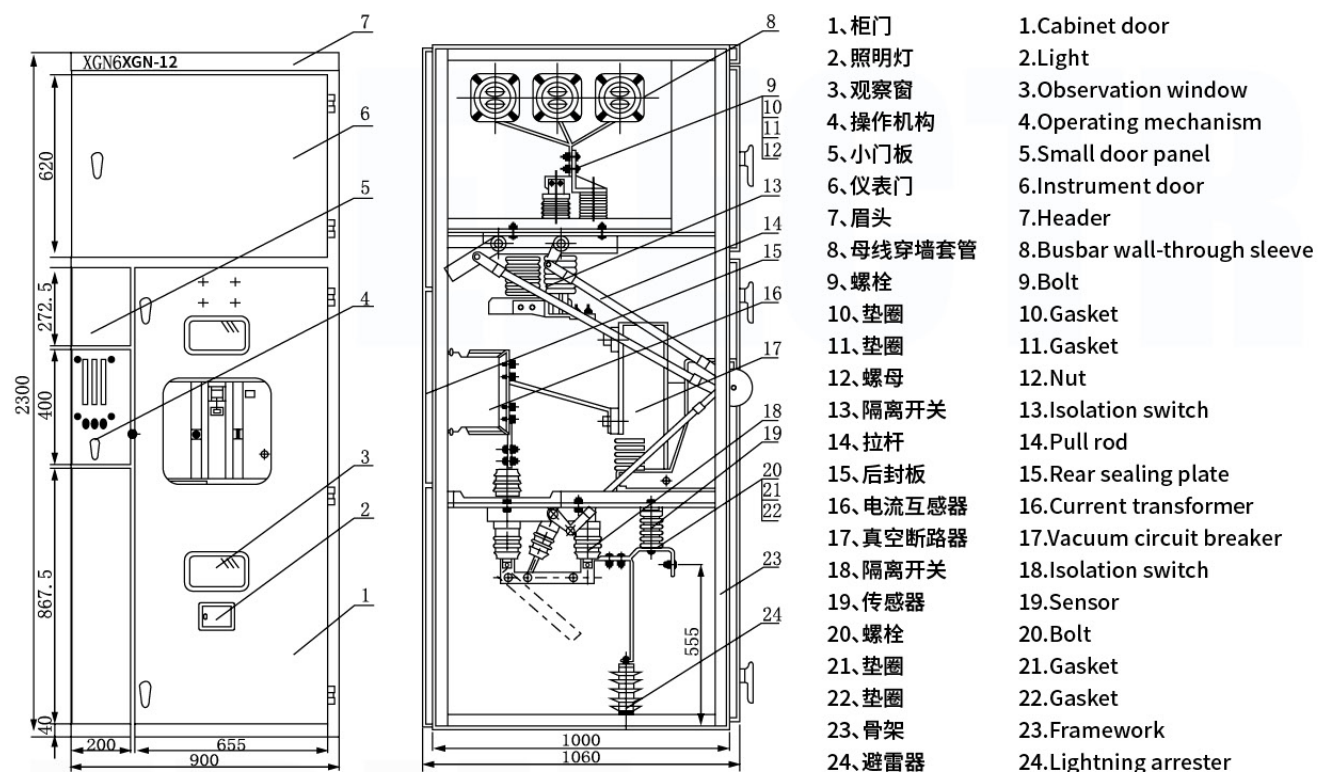
- ◆ 海拔高度: ≤1000m
- ◆ 环境温度: 上限为+40°C, 下限为-15°C
- ◆ 环境湿度: 日平均不大于95%, 月平均值不大于90%
- ◆ 地震烈度: 不超过8度
- ◆ 周压空气应不受腐蚀性可燃性气体水蒸气污染
- ◆ 无经常性的剧烈震动的场所
- ◆ Altitude: ≤1000m
- ◆ Ambient temperature: upper limit +40°C, lower limit -15°C
- ◆ Ambient humidity: daily average shall not exceed 95%, monthly average shall not exceed 90%
- ◆ Seismic intensity: ≤8 degrees
- ◆ The ambient air should not be contaminated by corrosive and flammable gas or water vapor
- ◆ In places without frequent severe vibration

产品特点Product characteristics

- ◆ 柜体采用优质角钢焊接而成。
- ◆ 本开关柜外形设计美观、外观质量好、内部结构紧凑布置科学合理且易于检修。
- ◆ 该柜采用空气绝缘, 不同隔室之间均有金属隔板相间, 每个隔室均有独立的泄压通道, 防护可靠、检修安全。
- ◆ 本柜配套的VS1-12(ZN12-40.5)真空断路器为固定式安装, 性能稳定、运行可靠, 设计参数高, 且与开关柜具有良好的闭锁功能。

- ◆ 本柜使用的经过改进的GN30-12(GN27-35)型系列带地刀隔离开关,设计科学、合理,操作灵活,程序可靠。
- ◆ 操作机构闭锁采用改进的GTXGN-12(JSXGN-35)闭锁连锁机构,简单可靠方便实用。使本柜的“五防”功能达到了完美的效果,确保了本柜检修的安全、可靠性。
- ◆ The cabinet is welded with high-quality angle steel.
- ◆ The appearance design of this switchgear is beautiful, the appearance quality is good, the internal structure is compact, the layout is scientific and reasonable, and it is easy to maintain.
- ◆ The cabinet adopts air insulation, with metal partitions between different compartments. Each compartment has an independent pressure relief channel, ensuring reliable protection and safe maintenance.
- ◆ The VS1-12 (ZN12-40.5) vacuum circuit breaker matched with this cabinet is fixedly installed, with stable performance, reliable operation, high design parameters and good interlocking function with the switchgear.
- ◆ The improved GN30-12 (GN27-35) series with ground knife isolation switch used in this cabinet is designed scientifically and reasonably, with flexible operation and reliable program.
- ◆ The locking mechanism of the operating mechanism adopts improved GTXGN-12 (JSXGN-35) interlocking mechanism, which is simple, reliable, convenient and practical. The "five prevention" function of this cabinet has achieved perfect effect, ensuring the safety and reliability of its maintenance.

产品结构图Product structure drawing



技术参数Technical parameter

项目Item	单位Unit	参数Argument
额定电压 Rated voltage	kV	40.5
额定频率 Rated frequency	Hz	50
额定电流 Rated current	A	630, 1250, 1600, 2000
工频耐压一次主回路1min Power frequency withstand voltage of primary main circuit 1 min	kV	95
控制回路工频耐受电压 Power frequency withstand voltage of control circuit	V	2000
雷电冲击耐压 Lightning impulse withstand voltage	kV	185
额定开断电流(有效值) Rated breaking current (effective value)	kA	25, 31.5
额定关合电流(峰值) Rated making current (peak value)	kA	63, 80
额定动稳定电流(峰值) Rated dynamic stability current (peak value)	kA	63, 80
额定4s热稳定电流(有效值) Rated 4s thermal stability current (effective value)	kA	25, 31.5
辅助控制回路额定电压 Rated voltage of auxiliary control circuit	V	DC110, DC220, AC110, AC220
防护等级 Protection level		IP2X
外形尺寸(宽×深×高) Outline dimension (Width×Depth×Height)	mm	1818×3100×3200

技术参数Technical parameter

项目Item	单位Unit	参数Argument
额定电压 Rated voltage	kV	12
额定频率 Rated frequency	Hz	50
额定电流 Rated current	A	630, 1250, 1600, 2000
工频耐压一次主回路1min Power frequency withstand voltage of primary main circuit 1 min	kV	42
控制回路工频耐受电压 Power frequency withstand voltage of control circuit	V	200
雷电冲击耐压 Lightning impulse withstand voltage	kV	75
额定开断电流(有效值) Rated breaking current (effective value)	kA	25, 31.5
额定关合电流(峰值) Rated making current (peak value)	kA	63, 80
额定动稳定电流(峰值) Rated dynamic stability current (peak value)	kA	63, 80
额定4s热稳定电流(有效值) Rated 4s thermal stability current (effective value)	kA	25, 31.5
辅助控制回路额定电压 Rated voltage of auxiliary control circuit	V	DC110, DC220, AC110, AC220
防护等级 Protection level		IP2X
外形尺寸(宽×深×高) Outline dimension (Width×Depth×Height)	mm	900×1000×2300

KYN28A-12

铠装移开式交流金属封闭开关柜

KYN28A-12 Armored movable AC metal enclosed switchgear



概述Overview

KYN28A-12型(GZS1)户内金属铠装中置移开式开关设备(以下简称开关柜)系三相交流50Hz的户内成套配电装置,用于接受和分配N电能并对电路实行控制保护及监测。本产品继电器小室面板上可安装各种类型的微型综合继电保护装置,并可实现系统的智能化控制,具有遥控、遥测、遥信及遥调功能,通过带有通信接口的CAN总线控制现场网络。并具有防止误操作断路器、防止带负荷推拉手车、防止带电关合接地开关、防止接地开关在接地位置送电和防止误入带电间隔,即简称的“五防”功能。可配VS1(ZN63A)真空断路器和ABB公司的VD4和施耐德HVX系列断路器,以满足不同用户需要。

G83906《3-35kV交流金属封闭开关设备》、GB11022《高压开关设备通用技术条件》、EC298《额定电压1kV以上72.5kV及以下交流金属封闭开关设备和控制设备》、DL404《户内交流高压开关柜订货技术条件》

KYN28A-12 (GZS1) indoor metal armored mid-mounted withdrawable switchgear (hereinafter referred to as the switchgear) is a complete set of indoor distribution equipment of three-phase AC 50Hz, it's used to receive and distribute N electric energy and control, protect and monitor the circuit. This product's relay chamber panel can be equipped with various types of microcomputer-based comprehensive relay protection devices, and can achieve intelligent control of the system. It has remote control, remote metering, remote signaling and remote adjustment functions, and controls the on-site network through CAN bus with communication interface. It also has the functions of preventing misoperation of circuit breaker, preventing pushing trolley with load, preventing live closing of ground switch, preventing ground switch from transmitting power in the grounding position, and preventing accidental entry into live interval, which is also known as the "five prevention". It can be equipped with VS1 (ZN63A) vacuum circuit breaker, ABB's VD4 and Schneider's HVX series circuit breaker to meet the needs of different users.

G83906 A.C. metal-enclosed switchgear for rated voltages of 3~35kV, GB11022 Common specifications for high-voltage alternating-current switchgear and controlgear standards, IEC298 High-voltage switchgear and controlgear-Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV, and DL/T404 Technical Conditions for Ordering Indoor AC High Voltage Switchgear

型号含义Model meaning



使用条件Normal service condition

- ◆ 环境温度:最高温度+40°C,最低温度-10°C
- ◆ 周围湿度:日平均值不大于95%,月平均值不大于90%
- ◆ 海拔高度:≤1000m
- ◆ 抗地震度:地震烈度不超过8度
- ◆ 周围空气应不受腐蚀性 可燃性气体 水蒸气污染
- ◆ 无经常性的剧烈震动的场所
- ◆ 在超过GB3906 规定的正常的环境条件下使用时,由用户和我公司协商

- ◆ Ambient temperature: maximum temperature +40°C, minimum temperature -10°C
- ◆ Ambient humidity: daily average doesn't exceed 95%, monthly average doesn't exceed 90%
- ◆ Altitude: ≤1000m
- ◆ Seismic intensity: The seismic intensity does not exceed 8 degrees
- ◆ The ambient air should not be contaminated by corrosive and flammable gas such as water vapor
- ◆ In places without frequent severe vibration
- ◆ When used beyond the normal service conditions specified as GB3906, the user shall negotiate with our company

产品特点Product characteristics

开关设备按GB3906-91 中的铠装式金属封闭开关设备而设计。整体是由柜体和中置式可抽出部件(即手车)两大部分组成。柜体分四个单独的隔室,外壳防护等级为IP4X,各小室间和断路器室门打开时防护等级为IP2X。具有架空进出线、电缆进出线及其它功能方案,经排列、组合后能成为各种方案形式的配电装置。本开关设备可以从正面进行安装调试和维护,因此它可以背靠背组成双重排列和靠墙安装,提高了开关设备的安全性、灵活性,减少了占地面积。

开关设备的外壳是选用进口铝锌薄钢板,经CNC 机床加工,并采取多重折边工艺。这样使整个柜体不仅具有精度高、抗腐蚀与抗氧化强作用,而且由于采用多层折边工艺,使柜体比其他同类设备柜体整体重量轻、机械强度高、外形美观。柜体采用组装式结构,用拉铆螺丝和高强度的螺栓联接而成。这样使加工生产周期短、零部件通用性强、占地面积少、便于组织生产。

The switchgear is designed according to the armored metal enclosed switchgear in GB3906-91. The overall structure consists of two main parts: cabinet body and mid-mounted withdrawable component (i.e. trolley). The cabinet is divided into four separate compartments, with protection level of IP4X for the outer shell. When the doors of each compartment and circuit breaker compartment are open, the protection level is IP2X. It's a power distribution device with various functional solutions such as overhead incoming and outgoing lines, cable incoming and outgoing lines and others after being arranged and combined. This switchgear can be installed, debugged and maintained from the front, so it can be arranged back-to-back into double arrangement and installed against the wall, improving the safety and flexibility of the switchgear and reducing the floor space.

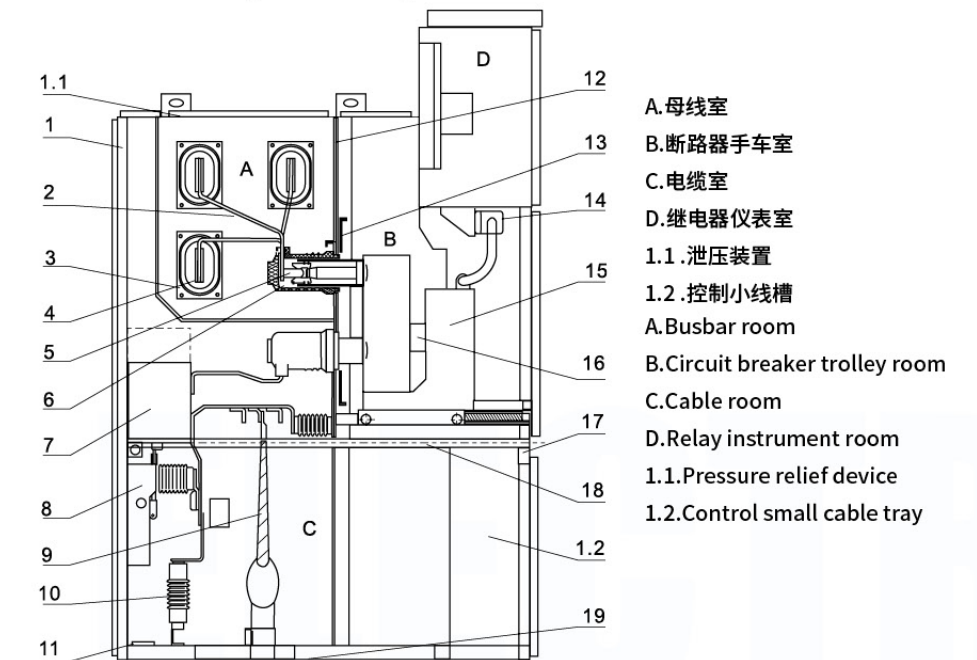
The outer shell of the switchgear is made of imported aluminum zinc coated thin steel plate, processed by CNC machine and subjected to multiple folding processes. This not only makes the entire cabinet have high precision, strong corrosion and oxidation resistance, but also, due to the use of multi-layer folding technology, makes the cabinet lighter in weight, higher in mechanical strength, and more aesthetically pleasing than other similar cabinets. The cabinet adopts assembled structure, connected by riveted screws and high-strength bolts. This makes the processing and production cycle shorter, the parts more versatile, the floor space less, and production organization easier.

技术参数Technical parameter

项目Item	单位Unit	参数Argument			
额定电压 Rated voltage	kV	3.6	7.2	12	
额定频率 Rated frequency	Hz	50			
断路器额定电流 Rated current of circuit breaker	A	630、1250、1600、2000、2500、3150、4000			
开关柜额定电流 Rated current of switchgear	A	630、1250、1600、2000、2500、3150、4000			
额定热稳定电流(4s) Rated thermal stability current (4s)	kA	16、20、25、31.5、40、50			
额定动稳定电流(峰值) Rated dynamic stability current (peak value)	kA	40、50、63、80、100、125			
额定短路开断电流 Rated breaking current	kA	16、20、25、31.5、40、50			
额定短路关合电流(峰值) Rated short-circuit making current (peak value)	kA	40、50、63、80、100、125			
额定绝缘水平 Rated insulation level	1min工频耐受电压 1min power frequency withstand voltage	kV	24	32	42
	雷电冲击耐受电压 Lightning impulse withstand voltage	kV	40	60	75
防护等级 Protection level		IP4X/IP2X			

开关柜结构示意图Switch cabinet structure diagram

开关设备结构示意图
Schematic diagram of switchgear structure



- | | | | |
|---------|-------------------------|--------------------------------------|---|
| 1.外壳 | 1.Outer shell | 8.接地开关 | 8.Ground switch |
| 2.分支小母线 | 2.Branch small busbar | 9.电缆 | 9.Cable |
| 3.母线套管 | 3.Busbar sleeve | 10.避雷器 | 10.Lightning arrester |
| 4.主母线 | 4.Main busbar | 11.接地主母线 | 11.Grounding main busbar |
| 5.静触头装置 | 5.Static contact device | 12.装卸式隔板 | 12.Assembled and disassembled partition |
| 6.静触头盒 | 6.Static contact box | 13.隔板(活门) | 13.Partition (valve) |
| 7.电流互感器 | 7.Current transformer | 14.二次插头 | 14.Secondary plug |
| | 15.断路器手车 | 15.Circuit breaker trolley | |
| | 16.加热器装置 | 16.Heater device | |
| | 17.可抽出式水平隔板 | 17.Withdrawable horizontal partition | |
| | 18.接地开关操作机构 | 18.Ground switch operating mechanism | |
| | 19.底板 | 19.Bottom plate | |

KYN28-24

户内交流金属铠装移开式开关设备

KYN28-24 Indoor AC Metal Armored Removable Switchgear



概述 Overview

KYN28-24户内交流金属铠装移开式开关设备(以下简称开关设备),适用于户内三相50Hz、额定电压24kV的电力系统中,主要应用于发电厂、变电所、工矿企业及高层建筑中,作为接受和分配电能并对电路实行控制、保护和监测。

开关设备具有各种防止误操作的功能,包括防止带负荷移动手车,防止接地开关闭合位置合断路器,防止带电合接地开关和防止误入带电隔室等功能。

开关设备二次回路配置先进可靠的控制保护元件;母线采用热缩绝缘材料或环氧涂覆的绝缘手段,优化电极形状,柜体结构紧凑,是技术先进、性能稳定、结构合理、使用方便、安全可靠的配电设备。

KYN28-24 indoor AC metal armored removable switchgear (hereinafter referred to as switchgear) is suitable for indoor three-phase power system with frequency of 50Hz and rated voltage of 24kV. It is mainly used in power plants, substations, industrial and mining enterprises and high-rise buildings to receive and distribute electric energy, and to control, protect and monitor circuit.

This switchgear has various functions to prevent misoperation, including preventing the trolley from moving with load, preventing the ground switch from closing the circuit breaker in closed position, preventing the live ground switch from closing, and preventing accidental entry into live compartments.

The secondary circuit of the switchgear is equipped with advanced and reliable control and protection components; the bus adopts heat shrinkable insulation material or epoxy coating insulation to optimize the electrode shape. With compact structure, the cabinet is a power distribution equipment with advanced technology, stable performance, reasonable structure, convenient use, and high safety and reliability.

型号含义 Model meaning



产品标准 Product standard

- ◆ GB311.1高压输变电设备的绝缘配合
- ◆ GB1984高压交流断路器
- ◆ GB39063.6kV~40.5kV 交流金属封闭开关设备和控制设备
- ◆ GB/T11022高压开关设备和控制设备标准的共用技术要求
- ◆ IEC60694高压开关设备和控制设备标准的共用技术要求
- ◆ IEC62271-200:2003高压开关设备和控制设备第200部分:额定电压1kV以上52kV及以下的交流金属封闭开关设备和控制设备
- ◆ GB311.1 Insulation co-ordination-Part 1: Definitions, principles and rules
- ◆ GB1984 High-voltage alternating-current circuit-breakers
- ◆ GB3906 Alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6 kV and up to and including 40.5 kV
- ◆ GB/T11022 Common specifications for high-voltage alternating-current switchgear and controlgear standards
- ◆ Common specifications for high-voltage switchgear and controlgear standards
- ◆ IEC62271-2000: 2003 High-voltage switchgear and controlgear-Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV

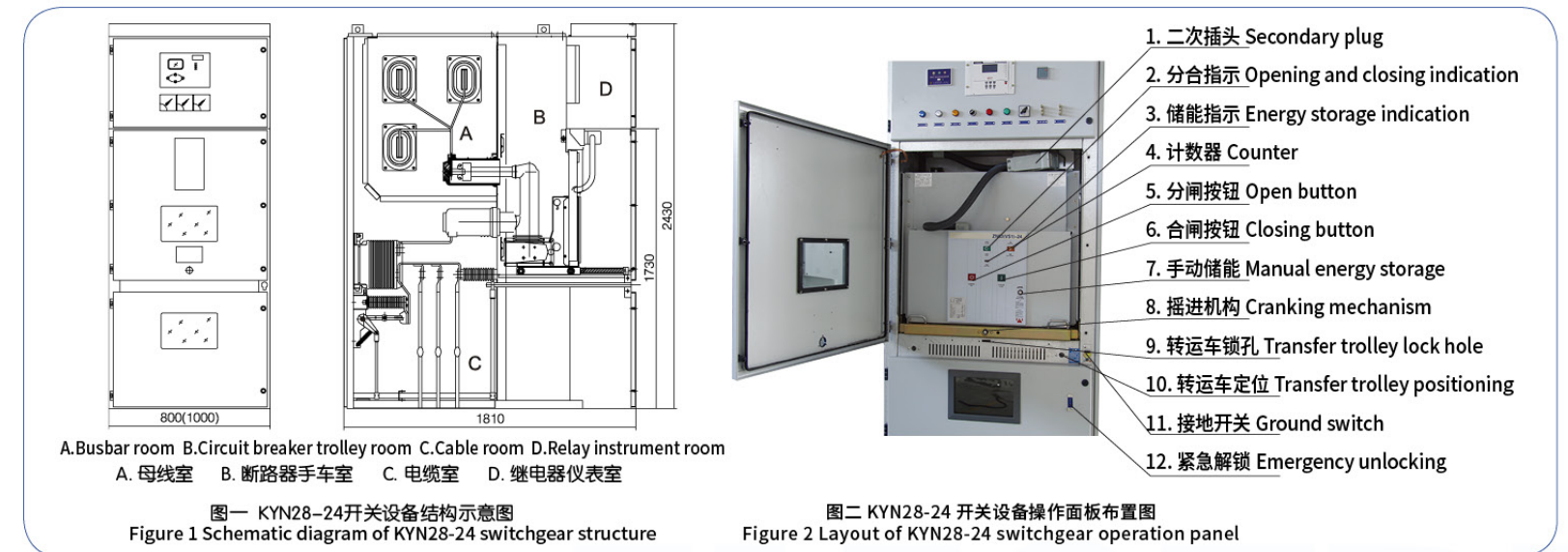
使用条件Conditions of use

- ◆ 海拔高度: ≤ 1000m;
- ◆ 环境温度: 周围空气温度上限+40°C, 下限-15°C;
- ◆ 相对湿度: 日平均相对湿度不大于95%; 月平均相对湿度不大于90%;
- ◆ 地震水平: 地震烈度不超过8度
- ◆ 不适用于有腐蚀性或可燃性气体、水蒸气等明显污染的场所。
- ◆ 超出上述正常使用条件时, 用户可与制造厂协商确定。
- ◆ Altitude: ≤ 1000m;
- ◆ Ambient temperature: upper limit of ambient air temperature +40°C, lower limit -15°C;
- ◆ Relative humidity: The daily average relative humidity shall not exceed 95%; monthly average relative humidity shall not exceed 90%;
- ◆ Seismic intensity: The seismic intensity does not exceed 8 degrees
- ◆ It's not suitable for places with obvious pollution such as corrosive or flammable gas and water vapor, etc.
- ◆ When the above normal service conditions are not met, the user can negotiate with the manufacturer.

产品特点Product characteristics

- ◆ 开关柜完全金属铠装及全封闭结构设计。
- ◆ 开关柜内部被分隔为断路器室、母线室、电缆室和继电器仪表室四个隔室之间各自独立, 各功能单元采用金属板封隔, 并设有独立的压力释放通道和释放门。
- ◆ 开关柜柜体选用优质冷轧钢板经数控钣金加工成形后, 通过高强度螺栓螺母和铆螺母连接而成, 构件表面采用喷塑或镀锌工艺; 可配VS1(ZN63A)真空断路器和ABB公司的VD4和施耐德HVX系列断路器, 以满足不同用户需要。
- ◆ 开关柜可在柜门关闭的情况下进行断路器分合、推进/移出, 接地开关分合等。
- ◆ 开关柜具有防止误操作断路器、防止带负荷推拉手车、防止接地开关在接地位置送电和防止误入带电间隔, 满足了“五防功能”设计。
- ◆ 开关柜方便的门板观察窗, 可察看断路器分合状态、手车位置、储能位置、接地开关分合状态。
- ◆ 开关柜手车具有良好的互换性, 二次导线设于宽敞的线槽内, 美观且便于查找, 一次电缆连接方便。
- ◆ 外壳防护等级为IP4X, 各小室间和断路器门打开时防护等级为IP2X, 柜体的安装维护可在正面进行, 也可在背面进行, 开关柜不仅可安装成面对面或背对背双排排列, 而且可根据具体项目要求靠墙安装, 节省占地面积, 提高了开关设备的安全性、灵活性、减少了占地面积。
- ◆ The switchgear is designed with complete metal armor and fully enclosed structure.
- ◆ The interior of the switchgear is divided into four independent compartments: circuit breaker room, busbar room, cable room and relay instrument room. Each functional unit is sealed with metal plates and equipped with independent pressure release channel and release door.
- ◆ The switch cabinet body is made of high-quality cold-rolled steel plate processed by CNC sheet metal forming, and connected by high-strength bolts, nuts and rivet nuts. The surface of the components is sprayed or galvanized; it can be equipped with VS1 (ZN63A) vacuum circuit breaker and ABB's VD4 and Schneider's HVX series circuit breakers to meet the needs of different users.
- ◆ The switchgear can perform circuit breaker opening and closing, moving-in/out, and ground switch opening and closing with the cabinet door closed.
- ◆ The switchgear is designed to prevent misoperation of circuit breaker, prevent pushing trolley with load, prevent ground switch from transmitting power at the grounding position, and prevent accidental entry into live compartments, meeting the "five prevention" functions.
- ◆ The convenient door panel observation window of the switchgear allows for viewing of the circuit breaker's on/off status, trolley position, energy storage position, and ground switch's on/off status.
- ◆ The switchgear trolley has good interchangeability, and the secondary wires are located in spacious cable tray, which are beautiful and easy to find. The primary cable connection is convenient.
- ◆ The protection level of the outer shell is IP4X, while the protection level is IP2X between small rooms and when the circuit breaker door is open. The installation and maintenance of the cabinet can be carried out on the front or back. The switchgear can not only be installed in a face-to-face or back-to-back double row arrangement, but also can be installed against the wall according to specific project requirements, which saves floor space and improves the safety and flexibility of the switchgear.

开关柜结构示意图Schematic diagram of switchgear structure



技术参数Technical parameter

项目Item	单位Unit	参数Argument				
额定电压Rated voltage	kV	24				
额定频率 Rated frequency	Hz	50/60				
额定绝缘水平 Rated insulation level	1min工频耐受电压(有效值) 1min power frequency withstand voltage (effective value)	kV	相间相对地 Phase- phase, phase-ground	65	隔离断口 Isolating distance	79
	雷电冲击耐受电压(峰值) Lightning impulse withstand voltage (peak value)	kV		125		145
	辅助控制回路工频耐受电压 Power frequency withstand voltage of auxiliary control circuit	V	2000			
额定电流 Rated current	A	630, 1250, 1600, 2000, 2500, 3150				
额定短路开断电流 Rated short-circuit breaking current	KA	20	25	31.5		
额定短路关合电流(峰值) Rated short-circuit making current (peak)	KA	50	63	80		
额定短时耐受电流(4s) Rated short-time withstand current (4s)	KA	20	25	31.5		
额定峰值耐受电流 Rated peak withstand current	KA	50	63	80		
辅助控制回路额定电压 Rated voltage of auxiliary control circuit	V	直流或交流110V/220V DC or AC 110V/220V				
防护等级 Protection level		IP4X/IP2X				
外形尺寸(宽X深X高) Outline dimension (Width×Depth×Height)	mm	800×1810×2430 / 1000×1810×2430				
重量 Weight	kg	840-1440				

KYN61-40.5

铠装移开式交流金属封闭开关设备

KYN61-40.5 Armored Removable AC Metal Enclosed Switchgear



概述 Overview

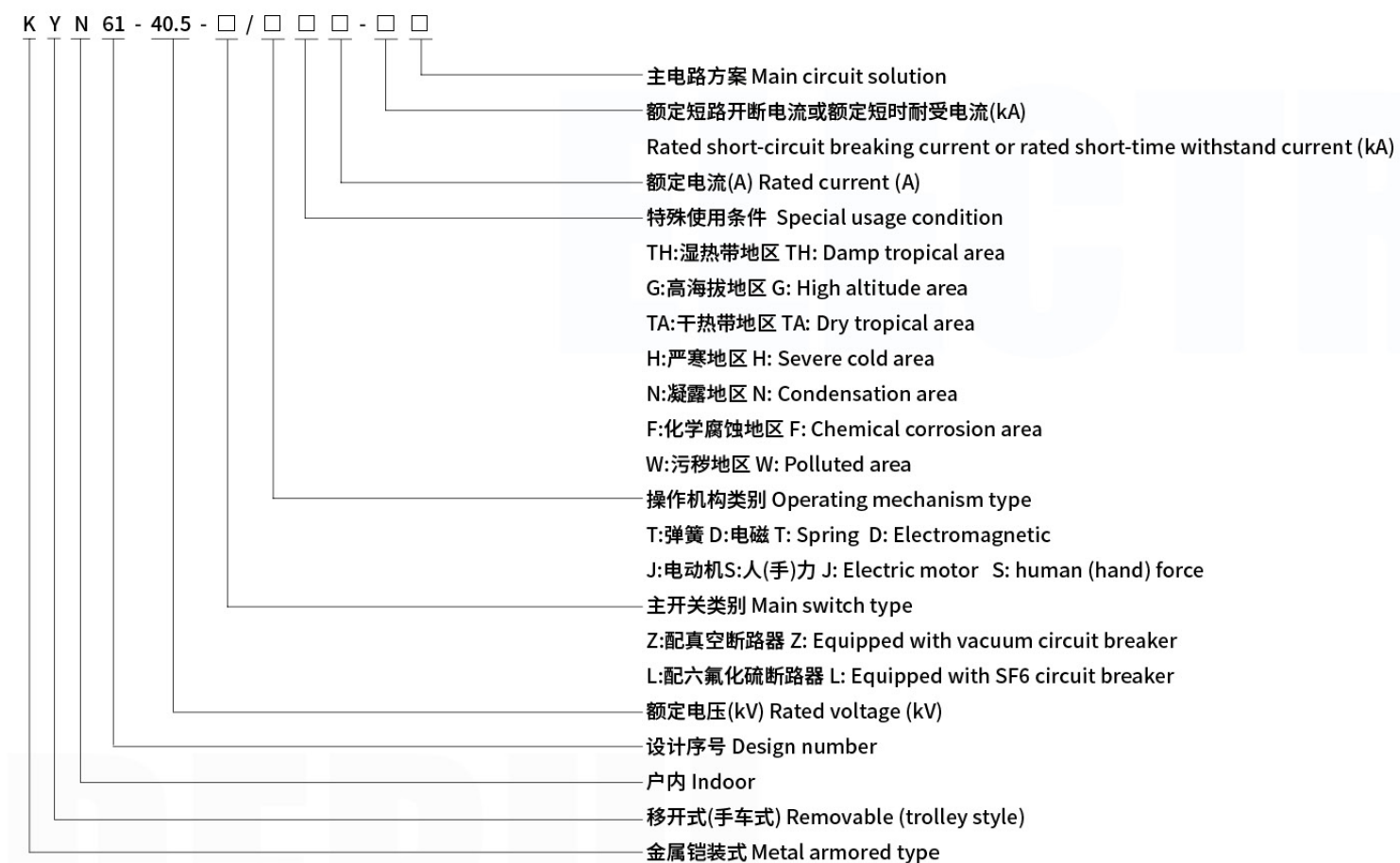
KYN61-40.5铠装移开式交流金属封闭开关设备(简称开关柜)适用于40.5kV 三相交流 50Hz电力系统中,作为发电厂,变电所及工矿企业的配电室接受与分配电能之用;对电路具有控制、保护和监测等功能。除广泛用于一般电力系统,还可以使用于频繁操作的场所。

柜体采用组装结构,提高了外观质量和制造精度;母线采用热缩绝缘材料或环氧涂覆的绝缘手段,优化电极形状。柜体结构紧凑,并具备完善的“五防”功能。本开关柜满足GB3096、GB/T11022、IEC60298、DTL404等相关标准。

KYN61-40.5 armored removable AC metal enclosed switchgear (referred to as switchgear) is suitable for use in three-phase AC 50Hz 40.5kV power system as distribution room for power plants, substations and industrial and mining enterprises to receive and distribute electric energy; it has functions such as control, protection and monitoring for circuits. In addition to being widely used in general power systems, it can also be used in places with frequent operations.

The cabinet adopts an assembled structure, which improves the appearance quality and manufacturing accuracy; the busbar adopts insulation methods such as heat shrinkable insulation material or epoxy coating to optimize the electrode shape. The cabinet structure is compact and has complete "five prevention" functions. This switchgear meets relevant standards such as GB3096, GB/T11022, IEC60298, DT/L404, etc.

型号含义 Model meaning



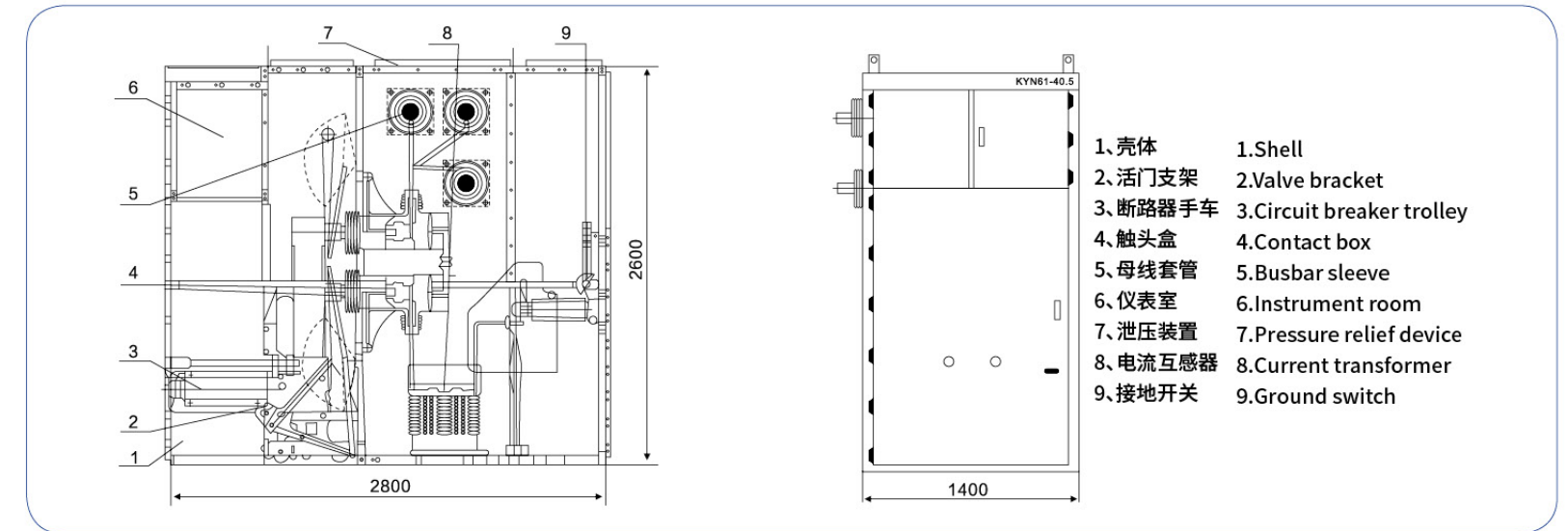
使用条件Conditions of use

- ◆ 海拔高度: ≤ 1000m;
- ◆ 环境温度: 周围空气温度上限+40°C, 下限-15°C;
- ◆ 相对湿度: 日平均相对湿度不大于95%; 月平均相对湿度不大于90%;
- ◆ 地震水平: 地震烈度不超过8度
- ◆ 不适用于有腐蚀性或可燃性气体、水蒸气等明显污染的场所。
- ◆ 超出上述正常使用条件时, 用户可与制造厂协商确定。
- ◆ Altitude: ≤ 1000m;
- ◆ Ambient temperature: upper limit of ambient air temperature +40°C, lower limit -15°C;
- ◆ Relative humidity: The daily average relative humidity shall not exceed 95%; monthly average relative humidity shall not exceed 90%;
- ◆ Seismic intensity: The seismic intensity does not exceed 8 degrees
- ◆ It's not suitable for places with obvious pollution such as corrosive or flammable gas and water vapor, etc.
- ◆ When the above normal service conditions are not met, the user can negotiate with the manufacturer.

产品特点Product characteristics

- ◆ 开关柜完全金属铠装及全封闭结构设计。
- ◆ 开关柜内部被分隔为断路器室、母线室、电缆室和继电器仪表室四个隔室之间各自独立, 各功能单元采用金属板分隔, 并设有独立的压力释放通道和释放门。
- ◆ 开关柜柜体选用优质冷轧钢板经数控钣金加工成形后, 通过高强度螺栓螺母和铆螺母连接而成, 构件表面采用喷塑或镀锌工艺; 可配ZN85A真空断路器和法国施耐德SF1、SF2型及阿尔斯通FP系列六氟化硫断路器, 以满足不同用户需要。
- ◆ 开关柜可在柜门关闭的情况下进行断路器分合、推进/移出, 接地开关分合等。
- ◆ 开关柜具有防止误操作断路器、防止带负荷推拉手车、防止接地开关在接地位置送电和防止误入带电间隔, 满足了“五防功能”设计。
- ◆ 开关柜方便的门板观察窗, 可察看断路器分合状态、手车位置、储能位置、接地开关分合状态。
- ◆ 开关柜手车具有良好的互换性, 二次导线设于宽敞的线槽内, 美观且便于查找, 一次电缆连接方便。
- ◆ 外壳防护等级为IP4X, 各小室间和断路器门打开时防护等级为IP2X, 柜体的安装维护可在正面进行, 也可在背面进行, 开关柜不仅可安装成面对面或背对背双排排列, 而且可根据具体项目要求靠墙安装, 节省占地面积, 提高了开关设备的安全性、灵活性、减少了占地面积。
- ◆ The switchgear is designed with complete metal armor and fully enclosed structure.
- ◆ The interior of the switchgear is divided into four independent compartments: circuit breaker room, busbar room, cable room and relay instrument room. Each functional unit is sealed with metal plates and equipped with independent pressure release channel and release door.
- ◆ The switch cabinet body is made of high-quality cold-rolled steel plate processed by CNC sheet metal forming, and connected by high-strength bolts, nuts and rivet nuts. The surface of the components is sprayed or galvanized; it can be equipped with ZN85A vacuum circuit breaker and French Schneider's SF1, SF2 type and Alstom FP series SF6 circuit breaker to meet the needs of different users.
- ◆ The switchgear can perform circuit breaker opening and closing, moving-in/out, and ground switch opening and closing with the cabinet door closed.
- ◆ The switchgear is designed to prevent misoperation of circuit breaker, prevent pushing trolley with load, prevent ground switch from transmitting power at the grounding position, and prevent accidental entry into live compartments, meeting the "five prevention" functions.
- ◆ The convenient door panel observation window of the switchgear allows for viewing of the circuit breaker's on/off status, trolley position, energy storage position, and ground switch's on/off status.
- ◆ The switchgear trolley has good interchangeability, and the secondary wires are located in spacious cable tray, which are beautiful and easy to find. The primary cable connection is convenient.
- ◆ The protection level of the outer shell is IP4X, while the protection level is IP2X between small rooms and when the circuit breaker door is open. The installation and maintenance of the cabinet can be carried out on the front or back. The switchgear can not only be installed in a face-to-face or back-to-back double row arrangement, but also can be installed against the wall according to specific project requirements, which saves floor space and improves the safety and flexibility of the switchgear.

开关柜结构外形尺寸和示意图Outline dimension and schematic diagram of switchgear structure



技术参数Technical parameter

项目Item	单位Unit	参数Argument		
额定电压 Rated voltage	kV	40.5		
额定频率 Rated frequency	Hz	50		
主母线额定电流 Rated current of main busbar	A	630, 1250, 1600, 2000		
分支母线额定电流 Rated current of branch busbar	A	630, 1250, 1600		
		相间、相对地 Phase-phase, phase-ground	断口 Isolating distance	
额定绝缘水平 Rated insulation level	1min工频耐受电压(有效值) 1min power frequency withstand voltage (effective value)	kV	95	115
	雷电冲击耐受电压(峰值) Lightning impulse withstand voltage (peak value)	kV	185	215
辅助控制回路1min工频耐受电压 1min power frequency withstand voltage of auxiliary control circuit	V	2000		
额定短路开断电流 Rated short-circuit breaking current	kA	25, 31.5		
额定短路关合电流(峰值) Rated short-circuit making current (peak value)	kA	63, 80		
额定短时耐受电流(4S) Rated short-time withstand current (4S)	kA	25, 31.5		
额定峰值耐受电流 Rated peak withstand current	kA	63, 80		
辅助控制回路额定电压 Rated voltage of auxiliary control circuit	V	交流或直流110V/220V AC or DC 110V/220V		
防护等级 Protection level		IP4X/IP2X		
外形尺寸(宽×深×高) Outline dimension (Width×Depth×Height)	mm	1400x2800(3000) x2800 (*括号内数字为SF6手车方案) (* number in parentheses represents SF6 trolley solution)		
重量 Weight	kg	约2300 About 2300		

YB □ -12

高压 / 低压预装式变电站

YB □ -12 High voltage/low voltage prefabricated substation

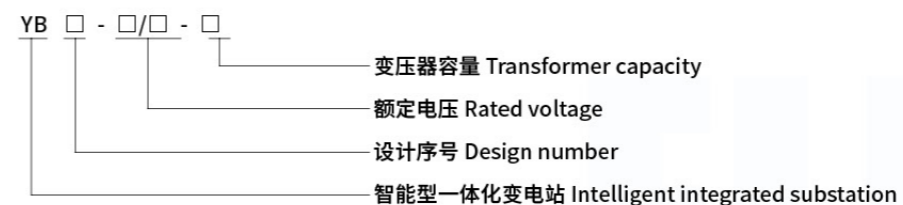


概述 Overview

YB □ -12 系列智能型一体化变电站(俗称欧变),是一种高压开关设备配电变压器和低压配电装置,按一定接线方案排成一体的工厂预制户内、户外紧凑型配电设备,即将高压受电、变压器、低压配电等功能有机地组合在一起,安装在一个防潮、防锈、防尘、防鼠、防火、防盗、隔热、全封闭、可移动的钢结构或非金属箱体,机电一体化全封闭运行;广泛用于城市电网改造、住宅小区、高层建筑、工矿、宾馆、商场、机场、铁路、油田、码头、高速公路以及临时性用电设施等户内外场所。

YB□-12 series intelligent integrated substation (commonly known as European type substation) is a high-voltage switchgear distribution transformer and low-voltage distribution device. It is a factory prefabricated indoor and outdoor compact distribution equipment arranged in one whole according to a certain wiring solution. It organically combines high-voltage power receiving, transformer, low-voltage distribution and other functions together, and is installed in a moisture-proof, rust proof, dust-proof, rodent proof, fireproof, anti-theft, isolated, fully enclosed, movable steel structure or non-metal box. It operates in a fully enclosed mechanical and electrical integration; it 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, as well as temporary power facilities and other indoor and outdoor places.

型号含义 Model meaning



使用条件 Conditions of use

- ◆ 海拔高度 ≤ 1000m;
- ◆ 环境温度周围空气温度上限 +40°C, 下限 -25°C;
- ◆ 相对湿度: 日平均值不大于 95%, 月平均值不大于 90%;
- ◆ 安装场所: 无火灾、爆炸危险、导电尘埃、化学腐蚀性气体及剧烈震动的场所;
- ◆ 当上述正常使用条件不能满足使用要求时, 由用户与制造厂协商。
- ◆ Altitude: ≤ 1000m;
- ◆ Ambient temperature: upper limit of ambient air temperature +40°C, lower limit -15°C;
- ◆ Relative humidity: The daily average relative humidity shall not exceed 95%; monthly average relative humidity shall not exceed 90%;
- ◆ Installation location: in places without fire, explosion hazard, conductive dust, chemical corrosive gas and severe vibration;
- ◆ When the above normal service conditions cannot meet the usage requirements, the user shall negotiate with the manufacturer.

产品特点Product characteristics

箱变的基本结构分为“目”字形和“品”字形,箱体骨架采用优质槽钢和角钢焊接而成,具有较高的机械强度箱体采用铝合金型材制作,具有较好的防腐能力,整体美观的外形经喷漆着色可与周围环境相协调,精心设计的底部起吊装置,给安装运输移动提供了极大的方便。

箱变内有独立的高压室、变压器室和低压室,各室照明随门的开启自动打开。高压室内装有高压环网开关设备,可根据用户需要选用压气式、真空式负荷开关,且具有“五防”功能,当采用限流型高压熔断器时有某相熔断器熔断时,负荷开关自动分闸,避免了因缺相运行而引起故障。

变压器室采用自然通风和自动控制的强迫散热风冷装置,具有随温度变化而自动控制的排风系统,能有效控制降低箱内温度,满足运行要求,根据用户要求还可采用防凝露的装置,可沿有轨道能方便地从变压间室两侧从大门进出。箱体材料能防止雨水和污物进入,具备长期户外使用的条件,确保防腐防水,防尘性能,使用寿命长,维护简单,外形美观。

The basic structure of the substation is classified into "目" and "品" shapes. The box framework is welded with high-quality channel steel and angle steel, with high mechanical strength. The box is made of aluminum alloy profiles, which have good anti-corrosion ability. The overall beautiful appearance can be coordinated with the surrounding environment through painting and coloring. The carefully designed bottom lifting device provides great convenience for installation, transportation and movement.

There are independent high-voltage room, transformer room and low-voltage room inside the substation, and the lighting in each room automatically opens with the opening of the door. The high-voltage room is equipped with high-voltage ring main unit, which can be selected as compressed air type or vacuum load switch according to user needs, and it also has the "five prevention" function. When current-limiting high-voltage fuse is used, if a phase fuse is blown, the load switch will automatically open, avoiding faults caused by phase loss operation.

The transformer room adopts natural ventilation and automatic control forced cooling device, with exhaust system that automatically controls with temperature changes, which can effectively control and reduce the temperature inside the box to meet operational requirement. According to user requirements, anti-condensation device can also be used, which can be easily accessed from both sides of the transformer room through the door along the track. The box material can prevent rainwater and dirt from entering, and has the conditions for long-term outdoor use, ensuring anti-corrosion, waterproof and dustproof performance, long service life, simple maintenance, as well as beautiful appearance.

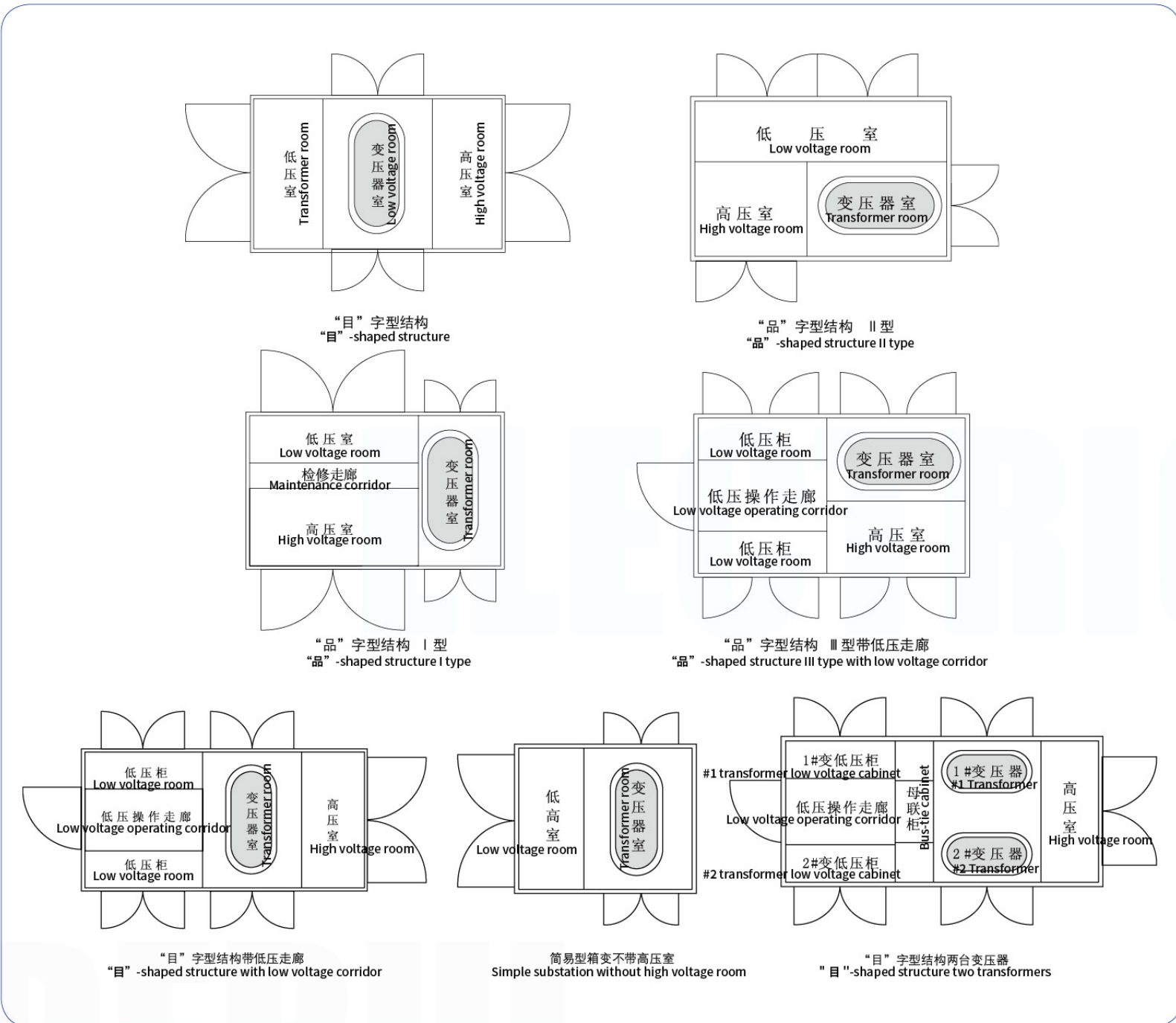
- ① 变压器可采用干式或油浸式变压器。
- ② 低压室具有低压成套开关设备的总体功能,供用户挑选,任意组合。
- ③ 外壳材料:外壳材料有复合板、不锈钢复合板、镀铝锌板、不锈钢板、金属雕花板。
- ④ 结构特点:高压结构合理紧凑,可选用HXGN17、XGN15环网柜,全部具有五防联锁功能。变压器自然通风和自动通风冷系统可适用干式和油式变压器,
- ⑤ 低压室:可根据用户要求采用多种结构的配电方案,有动力配电,照明配电,无功自动补偿,电能计量等各种功能,装有自动照明系统。

- ① Transformers can be dry-type or oil immersed type.
- ② The low voltage room has the overall function of low-voltage switchgear, which can be selected and combined by users at will .
- ③ Outer shell material: including composite plate, stainless steel composite plate, aluminum zinc plated plate, stainless steel plate and metal carved plate.
- ④ Structural feature: The high-voltage structure is reasonable and compact, and HXGN17 and XGN15 ring main units can be selected, all of which have five prevention interlocking functions. The natural ventilation and automatic ventilation cooling system for transformer can be applied to dry-type and oil-type transformers,
- ⑤ Low voltage room: Multiple structural distribution solutions can be adopted according to user requirements, including power distribution, lighting distribution, reactive power automatic compensation, energy metering and other functions, and it's equipped with an automatic lighting system.

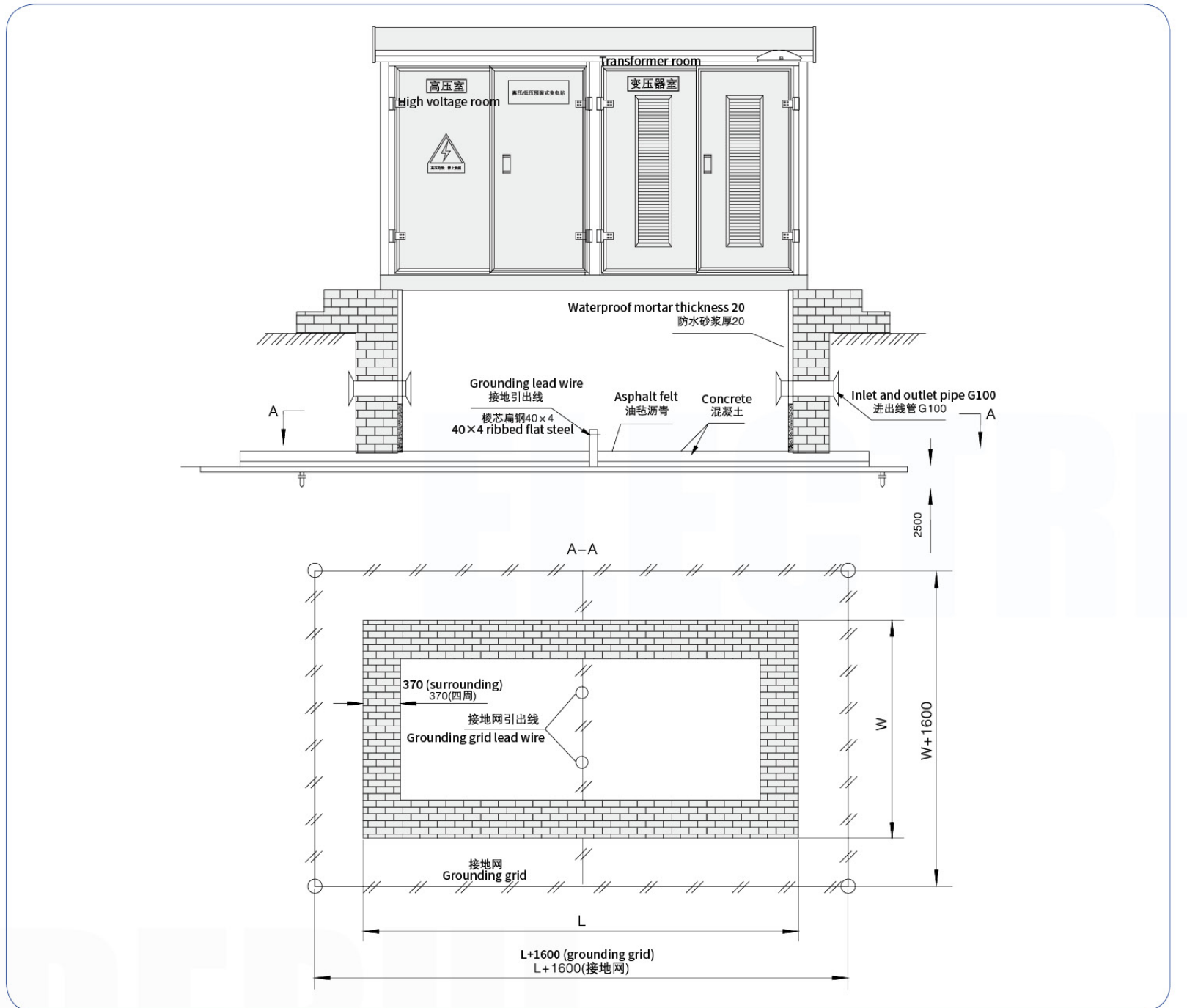
箱变性能参数Substation performance parameter

序号No.	项目Item	单位Unit	参数Parameter
高压单元 High voltage unit	额定频率 Rated frequency	Hz	50
	额定电压 Rated voltage	kV	7.2、12
	额定电流 Rated current	A	400、630
	转移电流 Transfer current	A	1200~3150
	工频耐受电压 对地和相间/隔离断口 Power frequency withstand voltage (phase-ground, phase-phase/isolating distance)	kV	42/48
	雷电冲击耐受 对地和相间/隔离断口 Lightning impulse withstand voltage (phase-ground, phase-phase/isolating distance)	kV	75/85
	额定短路开断电流(限流熔断器) Rated short-circuit breaking current (current-limiting fuse)	kA	31.5
	额定容量 Rated capacity	kVA	30~2000
	分接范围 Tap range		±2x2.5%、±5%
	变压器单元 Transformer unit	联结组别 Connecting group	%
阻抗电压 Impedance voltage		%	4、4.5
低压单元 Low voltage unit	额定电压 Rated voltage	V	220、380
	主回路额定电流 Rated current of main circuit	A	50~4000
	支路电流 Branch current	A	5~800
外壳 Outer shell	防护等级(常规产品) Protection level (conventional product)		IP33D
	噪音水平 Noise level	db	≤ 50

变电站平面布置图 Substation layout plan



基础图与平面布置图 Basic drawing and layout plan





概述 Overview

ZGS□系列组合式变压器(俗称美式箱变),其结构为“品”字型结构,变电器与高、低压设备相互紧密连为一体,其中,变压器三面外露空气中,散热条件好,且能与高低压设备壳体分离,便于检修。

变压器采用片式油箱、无油枕、全封闭的S□系列油浸式变压器,高低压套管,分接开关,油位指示压力放阀、放油阀等均装在高压舱本体端板上,位置合理、便于观察、操作。

高压舱、低压舱之间采用钢板隔开,高压舱、低压舱变压器既相对独立,又保持一个完整的箱变整体结构紧凑、体积小,重量轻。高低压侧安装好配电开关设备。

The ZGS□ series combination substation (commonly known as American type box substation) has a "品"- shaped structure, and the transformer is closely connected to high and low voltage equipment as a whole. Among them, the transformer is exposed to the air on three sides, with good heat dissipation conditions, and can be separated from the high and low voltage equipment shell for easy maintenance.

It adopts a fully enclosed Sseries oil immersed transformer adopting chip type oil tank without oil conservator, with high and low voltage bushings, tap changer, oil level indication pressure relief valve, oil relief valve, etc., which are all installed on the end plate of the high voltage compartment body in a reasonable position, and are easy to observe and operate.

The high/low-voltage compartments are separated by steel plate, and the transformer in the high/low-voltage compartments are relatively independent while maintaining a complete box transformer. The overall structure of the transformer is compact, small and lightweight. Distribution switch equipment should be mounted well on the high and low voltage sides.

型号含义 Model meaning



使用条件 Conditions of use

- ◆ 冷却条件:空气自冷;
 - ◆ 海拔高度:≤ 1000m;
 - ◆ 环境温度:户外环境温度不高于 40°C, 不低于 -45°C,月平均温度不超过 30°C,年平均温度不超过 20°C;
 - ◆ 相对湿度:在 25°C时,空气相对湿度不超过 95%,月平均不超过90%;
 - ◆ 防震水平:水平加速度不大于 0.3m/s²,垂直加速度不大于 0.15m/s²;
 - ◆ 周围环境:安装环境应无明显污秽,爆炸性,腐蚀性气体和粉尘;
 - ◆ 安装场所:应无剧烈振动冲击,要求安装在水泥台或其它平整、坚实的平台上;
 - ◆ 当上述正常使用条件不能满足使用要求时,由用户与制造厂协商。
- ◆ Cooling condition: Air self-cooling;
 - ◆ Altitude: ≤1000m;

- ◆ Ambient temperature: The outdoor ambient temperature shall not exceed 40°C, and not be lower than -45°C, the monthly average temperature shall not exceed 30°C, and the annual average temperature shall not exceed 20°C;
- ◆ Relative humidity: At 25°C, the relative humidity of the air does not exceed 95%, and the monthly average does not exceed 90%;
- ◆ Seismic intensity: horizontal acceleration shall not exceed 0.3m/s², vertical acceleration shall not exceed 0.15m/s²;
- ◆ Ambient environment: The installation environment should be free of obvious pollution, explosive, corrosive gas and dust;
- ◆ Installation site: There should be no severe vibration or impact, and it is required to be installed on a cement platform or other flat and solid platform;
- ◆ When the above normal service conditions cannot meet the usage requirements, the user shall negotiate with the manufacturer.

产品特点 Product characteristics

- ◆ 体积小、结构紧凑、安装方便; ◆ Small size, compact structure, easy installation;
- ◆ 可用于环网,也可用于终端,可靠保护人身安全; ◆ It can be used for ring network and terminal, and it can reliably protect personal safety;
- ◆ 低损坏、低噪音、性能优越; ◆ Low damage, low noise, superior performance;
- ◆ 温升低,负荷能力强。 ◆ Low temperature rise and high load capacity.

美变高压保护用熔断器配置情况一览表 List of fuse configuration for high voltage protection of American type transformer

变压器额定容量 (kVA) Rated capacity of transformer (kVA)	低压侧 (0.4kV) 额定电流 (A) Low voltage side (0.4kV) rated current (A)	高压侧 (10kV) 额定电流 (A) High voltage side (10kV) rated current (A)	插入式熔断器容量 (A) Plug-in fuse capacity (A)	后备熔断器容量 (A) Backup fuse capacity (A)	低压配置主开关容量 (A) Low voltage equipped main switch capacity (A)
50	72.2	2.89	4 或 6	10	100
80	115.5	4.62	10	20	160
100	144.3	5.77	10	20	200
125	180.4	7.22	10	25	250
160	230.9	9.24	15	40	315
200	288.7	11.55	20	40	400
250	360.8	14.43	25	50	500
315	454.7	48.19	31.5	80	630
400	577.4	23.09	40	80	800
500	721.7	28.87	50	100	1000
630	909.3	36.37	65	125	1250
800	1154.7	46.19	80	125	1600
1000	1443.4	57.75	100	200	2000
1250	1804.2	72.17	125	250	2500
1600	2309.4	92.38	160	320	3200

主要技术参数表 Main technical parameter table

6kV、10kV 级 S□ 系列油浸式配电变压器技术参数

Technical parameter of 6kV and 10kV S□ series oil immersed distribution transformer

额定容量 kVA Rated capacity kV A	电压组合 kV Voltage combination kV		联结组 标号 Connection group symbol	损耗 kV Loss kV		空载电流 % Off-load current %	短路阻抗 % Short circuit impedance %	重量 kg Weight kg			外形尺寸 mm L(长)x B(宽)x H(高) Outline dimension mm L(length)×W(width)×H(height)	轨距 纵向/横向 Track gauge longitudinal/transverse
	高压 HV	低压 LV		空载 Off-load	负载 75°C Load			器身重 Body weight	油重 Oil weight	总重 Total weight		
30	10.5 10 6.3 6	0.4	Dyn11 Yzn11 Yyn0	0.08	0.63/0.6	1.5	4.0	185	70	310	790×660×925	550/400
50				0.1	0.91/0.87	1.3		255	85	395	820×675×1030	550/400
63				0.11	1.09/1.04	1.2		280	95	430	845×690×1065	550/400
80				0.13	1.31/1.25	1.2		320	100	480	865×715×1075	550/550
100				0.15	1.58/1.5	1.1		380	110	540	880×720×1120	550/550
125				0.17	1.89/1.8	1.1		444	115	600	910×750×1110	550/550
160				0.2	2.31/2.2	1.0		510	130	690	910×750×1200	550/550
200				0.24	2.73/2.6	1.0		640	150	840	1220×745×1220	550/550
250				0.29	3.2/3.05	0.90		720	190	950	1240×775×1345	660/660
315				0.34	3.83/3.65	0.90		835	200	1065	1230×750×1345	660/660
400				0.41	4.52/4.3	0.80		1010	240	1255	1330×825×1375	660/660
500				0.48	5.41/5.15	0.80		1170	260	1485	1455×915×1390	660/660
630				0.57	6.2	0.60		1375	320	1800	1540×920×1510	660/660
800				0.7	7.5	0.60		1620	365	2120	1650×1035×1555	820/820
1000				0.83	10.3	0.60		1780	405	2450	1855×1235×1600	820/820
1250				0.97	12.0	0.50		2065	560	2855	1925×1285×1680	820/820
1600	1.17	14.5	0.50	2470	650	3400	2025×1355×1730	820/820				
2000	1.55	18.3	0.40	2700	695	4460	2190×1900×1950	820/820				
2500	1.83	21.2	0.40	3230	870	5330	2240×1940×1980	1070/1070				

注:① 表中斜线上方的负载损耗值适用于 Dyn11 或 Yzn11 联结组,斜线下方的负载损耗值适用于 Yn0 联结组。

② 外形尺寸仅供选型时参考,最终尺寸以产品外形图为准。

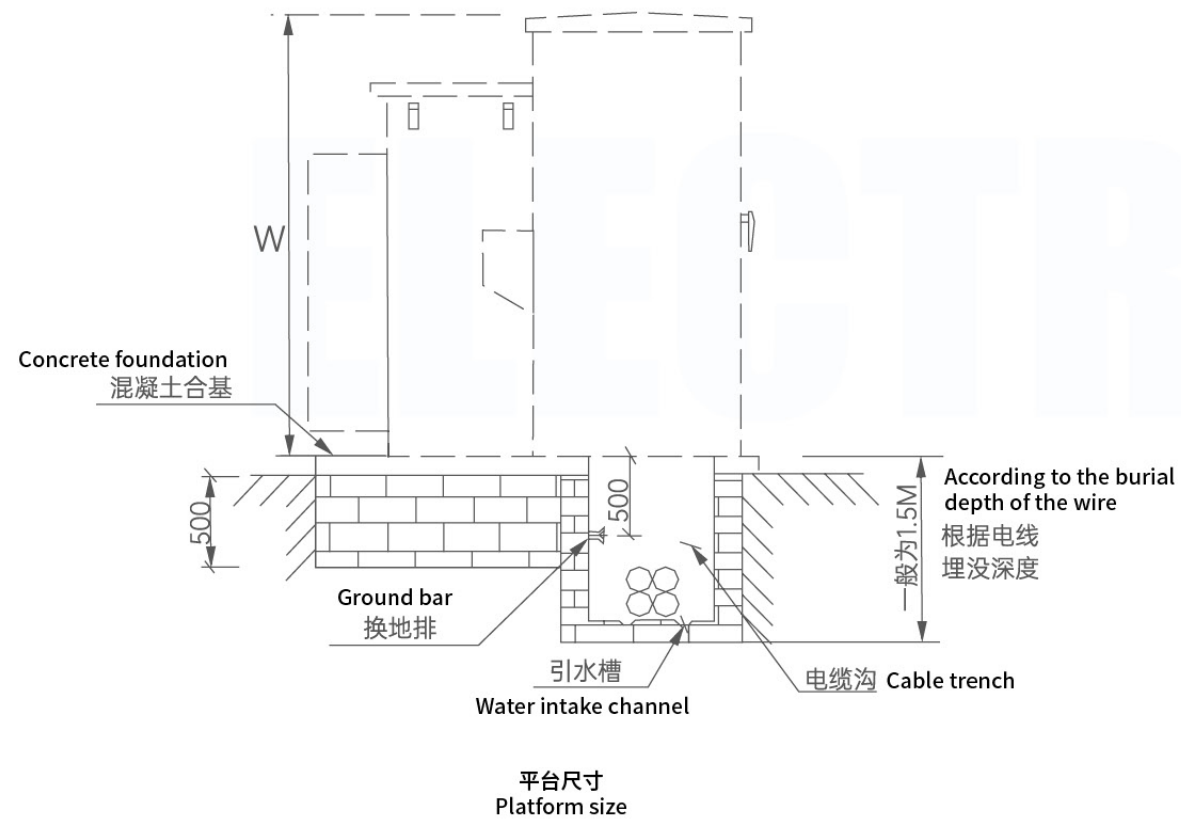
Note: ① The load loss values above the diagonal line in the table are applicable to the Dyn11 or Yzn11 connection group, and the load loss values below the diagonal line are applicable to the Yn0 connection group.

② The outline dimensions are for reference only during selection, and the final dimensions are subject to the product's outline drawing.

基础构造 Basic structure

箱式变电站应安装在水平混凝土台面上,台面应保证承受其重量。因箱式变的大部分重量集中在装有变压器器身的箱体后部,前面柜体大部分是空的,重量比较轻,为此平台后部要结实,能承受组合变的重量同时也要求前、后部台面平整(一般地,不易做到平整的,可以使前侧柜体的基础略低于后侧变压器主体的基础,就位后以混凝土封闭),确保箱式变安装平稳。

The box substation should be installed on a horizontal concrete platform, which should be able to withstand the weight. Due to the fact that most of the weight of the box substation is concentrated at the rear of the box containing the transformer body, the front cabinet is mostly empty and relatively light in weight. Therefore, the rear of the platform should be sturdy and able to withstand the weight of the combined transformer. Meanwhile, it is also required that the front and rear countertops be flat (generally, it is not easy to achieve flatness, so the foundation of the front cabinet can be slightly lower than that of the rear transformer body, and after being in place, it can be sealed with concrete) to ensure smooth installation of the box substation.



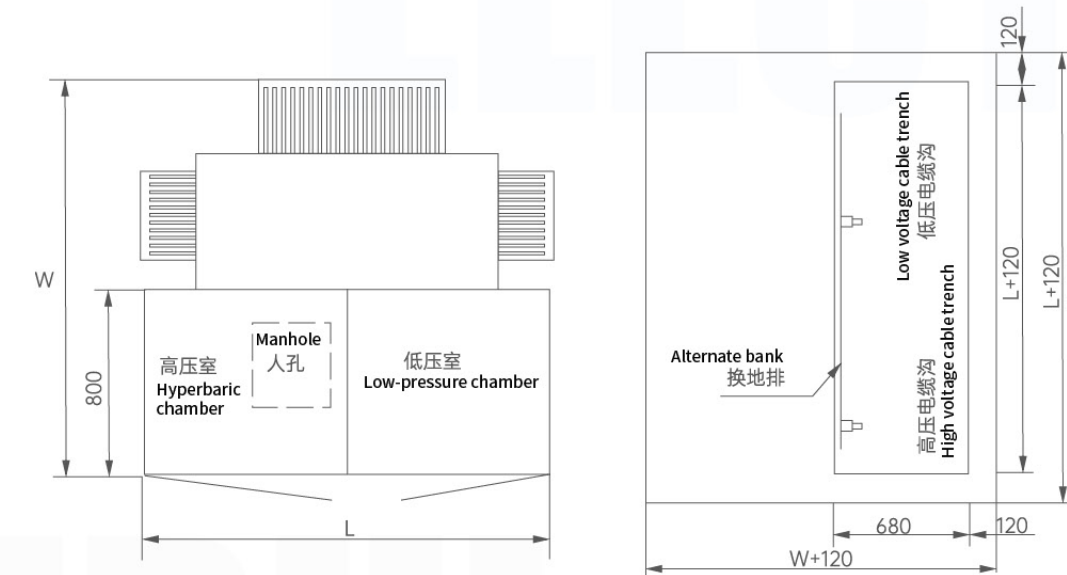
技术要求

- ① 有关尺寸参加组合尺寸;
- ② 混凝土台基应表面平整,组合变电站安装完毕后,底座四周用水泥抹封;
- ③ 接地排和电缆固定支架的形可根据实际情况而定;
- ④ 电缆固定架和接地排应预埋;
- ⑤ 进出线电缆孔的位置根据具体情况而定;
- ⑥ 组合变安装后开关正面必须有不小于1.5m的空隙,以利操作;
- ⑦ 接地网可用 12 镀圆钢或 30x4 镀锌扁钢制作,接地线电阻应符合电力部门的要求。

注:L、W、H尺寸按实际工程配置确定。

- ① Regarding the combination size of dimensions;
- ② The concrete foundation should have a smooth surface. After the installation of the combined substation, the surrounding area of the base should be sealed with cement;
- ③ The shape of ground bars and cable fixing brackets can be determined according to the actual situation;
- ④ Cable fixing brackets and ground bars should be pre-embedded;
- ⑤ The position of the cable holes for incoming and outgoing lines depends on the specific situation;
- ⑥ After the installation of the combination substation, there must be a gap of no less than 1.5m on the front of the switch to facilitate operation;
- ⑦ The grounding grid can be made of 12 plated round steel or 30×4 galvanized flat steel, and the ground wire resistance should meet the requirements of the power department.

Note: The dimensions of L, W and H are determined according to the actual engineering configuration.



BUSINESS OUTLOOK

企业展望

展望未来,以“打造绿色能源,提供综合服务”为目标;绿色能源是社会发展趋势,世界各国都在加大绿色可持续发展能源的开发和利用,可再生能源电力得到更广泛的应用。我国电力改革任重而道远,电力将会走向日趋成熟的市场化道路,电力单位及企业迎来前所未有的机遇和挑战。

我们将再接再厉,全面提升公司和员工能力,打造行业一流企业,培养专业顶尖人才,以崭新形象迎接市场和广大客户。

Looking ahead to the future, with the goal of "creating green energy and providing comprehensive services"; Green energy is a social development trend, and countries around the world are increasing the development and utilization of green and sustainable energy, with renewable energy electricity being more widely used. China's power reform is a long and arduous task, and the power industry will move towards an increasingly mature market-oriented path. Power departments and enterprises will face unprecedented opportunities and challenges.

We will continue to work hard, comprehensively enhance the capabilities of our company and employees, build a first-class enterprise in the industry, cultivate top professionals, and welcome the market and customers with a new image.