



**ZTELEC GROUP**  
Powered Green & Reliability

# High voltage switch equipment

## 高压开关设备





Founded in 1958, Henan ZhongTian Electric Equipment Group (hereinafter referred to as Ztelec Group) was formerly owned by the Ministry of Light Industry. Ztelec Group adheres to the core value concept of "Vision, Innovation and Responsibility", takes "Power the world with green and reliability" as its own responsibility. Focusing on production and manufacturing over 50 years, the group has developed into an integrated group company specializing in four industries: Electric equipment, Composite materials, Enameled copper wires and Photovoltaic energy. The Ztelec Group company is represented by 7 manufacturing bases across 5 cities (Xuchang, Zhengzhou, Guiyang, Chengdu, Dongguan) in China, with more than 1500 employees world wide.

河南中天电气装备集团（以下简称中天电气集团）成立于1958年，前身为轻工业部所有的企业。集团秉承愿景、创新和责任”的核心价值理念，以“为世界提供绿色和可靠的能源”为己任。专注于生产和制造超过50年，中天集团现已发展成为一家专注于四大行业的综合性集团公司：电气设备、复合材料、漆包铜线和光伏发电。现在在中国5个城市（许昌、郑州、贵阳、成都、东莞）拥有7个制造基地，在全球拥有1500多名员工。



Oil type transformer  
油浸式变压器

Dry type transformer  
干式变压器

Phase-shift rectifier transformer  
移相整流变压器

HV and LV switchgear  
高、低压开关设备

Ztelec Group focuses on the manufacturing of high-voltage variable frequency control equipment, complete sets of equipment for medium and low voltage power transmission and distribution networks, smart grids, ESS pre-installed energy storage stations (ESS), and distributed power generation systems. Ztelec owns 1 national postdoctoral research station, 2 provincial technology centers, closely cooperates with National Advanced Materials Laboratory of Beihang University and Institute of Plasma of Chinese Academy of Sciences, promoting intelligent manufacturing level and digitization transformation.

Ztelec is a Chinese enterprise committed to the development of globalization, committed to promoting an open technology and partner ecosystem, and actively practicing the common values of meaning, inclusiveness and empowerment.

中天集团专注于高压变频控制设备，中低压输、配电网成套装备，智能电网，预装配储能系统（ESS）以及分布式发电系统的制造。拥有 1 个国家博士后研究站，2 个省级技术中心，与北航国家先进材料实验室和中国科学院等离子体研究所紧密合作，推动智能制造水平的提升和数字化转型。

中天是一家致力于全球化发展的中国企业，致力于促进开放的技术和合作伙伴生态系统，并积极践行意义、包容和赋权的共同价值观。

A

7

Manufacturing bases  
生产制造基地

1

National postdoctoral  
research station  
国家博士后科研站

1500+

Number of employees  
员工数量

2

Provincial technology  
centers  
省级技术中心



“ It is our responsibility to help customers create maximum value by providing highly reliable and appropriate products. Adhering to innovation based on customer needs, embracing changes, we accept challenges together with our customers.

通过提供高度可靠和合适的产品，帮助客户创造最大价值是我们的责任。秉承基于客户需求的创新，拥抱变化，与客户一起接受挑战。

**Mr. ALan Zhang**

PHD, General Manager, Group Board Member

An aerial photograph of a dense, vibrant green forest. A light-colored, winding river or stream meanders through the trees, creating a series of curves and loops. The lighting is bright, highlighting the various shades of green in the foliage.

## 02

## SUSTAINABILITY AT ZTELEC

### 可持续发展

The continuous improvement of economics and environment in our community and the promotion life quality of our staff and their families are the sustained aims of Ztelec.

持续提高我们所在地区的经济发展水平、改善当地环境、提高员工及其家庭的生活品质是我们一直追求的目标。

In order to achieve these aims, Ztelec has made great efforts on the balance among economic developments and environment protection, including how to design and manufacture product; how to refine product and service provided; how to cooperate with local suppliers and to evaluate risks and opportunities; how to fulfill its responsibility and so on.

为了实现这些目标，中天集团努力在经济发展和环境保护之间实现平衡，这包括如何设计和制造产品、如何提升产品和服务、如何与本地供应商合作、如何评估风险和机遇，以及如何在社区履行自己的责任等等。

## 03 Our purpose / 我们的策略



## + Our culture / 我们的文化

### Customer First 客户第一

- Partner with our customers  
与客户成为伙伴
- Listen firstly  
先要倾听
- Always smile and Enthusiasm  
保持微笑与热情

### Embrace Changes 拥抱变化

- More choices, more laughs  
更多选择, 更多微笑
- Believe there is always a better way  
相信总有一个更好的方式
- Learn from failures as well as successes  
从失败和成功中学习

### Devotion 奉献

- Grow faster with more shares  
越分享, 越成长
- Proud of your team  
为团队而骄傲
- Speak up and ask for help  
积极寻找帮助

### Care with Respect 尊重下的关怀

- Take care of our people as well as their family  
关怀员工及他们的家庭
- Respect and value differences  
尊重不同
- Direct speak and Act with integrity  
诚信与直言



## 04 Industrial development history / 工业领域发展历程



Introduced complete testing equipment and manufacturing machines, started to produce power equipment including 10kV & 35kV oil immersed transformers & 10kV switchgear.

引进全部检测和生产设备，开始生产 10kV&35kV 的油浸式变压器和 10kV 级的开关柜。

**2003**



Won multiple bids with total amount about \$6 million on bids on the power transmission and transformation projects from State Grid Corporation of China.

在国家电网公司成功中标多个输配电项目总计约 600 万美金。

**2009**

**2006**

Successfully obtained ISO9001:2008 and ISO14001 certifications; full series of 6kV, 10kV, 35kV transformers passed the type test and special test from Suzhou Electric Appliance Research Institute.

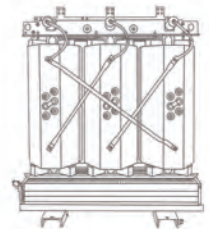
取得了 ISO9001 国际质量管理体系认证，和 ISO14001 组织环境体系认证；6kV,10kV,35kV 级 S10 系列变压器通过苏州电科院型式试验和特殊试验的全套试验。



**2010**

Started the the production of S11 and S13 series cast resin dry-type transformers. Made significant progress in the S15 series of high-efficiency amorphous alloy transformers.

开始生产 S11 和 S13 系列铸造树脂干式变压器。S15 系列高效非晶合金变压器取得了重大进展。





Through the cooperation with CNOOC, developed transformers for offshore power supply system under marine operation environment.  
通过与中海油的合作，研发适用于海洋作业环境的海上平台供电系统使用的变压器。

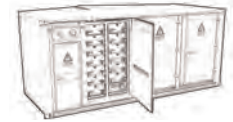
2012



Successfully passed the audit of SAM supplier management system from Schneider Electric and became their supplier in the field of Variable frequency transformer.

通过施耐德电气 (Schneider Electric) 的 SAM 体系审核，成为变频变压器领域的供应商。

2017



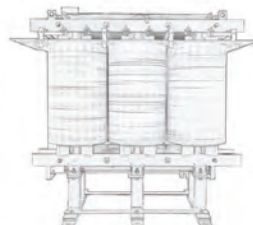
Began to provide container-type or box-type step-up integrated equipment for energy storage power stations (CESS), which integrates 35kV high-voltage switchgear, low-voltage switchgear and dry-type isolation transformers.  
开始为储能电站 (CESS) 配套集装箱式或箱变式升压一体设备，该集成了 35kV 高压控制柜，低压柜和干式隔离变压器。

2022

2014

It has gradually formed four product production lines, including oil immersed transformer, dry type transformer, high and low voltage switch gear, and box type substation. Meanwhile, started the sample making and market development of mining transformer, open type transformer and variable frequency transformer.

开始逐渐形成油浸变压器，干式变压器，高低压开关柜，箱式变电站等 4 种产品生产线。同时，开始矿用变压器，敞开式变压器和变频变压器的打样和市场开拓。



2019

Started batch production of traction transformer for railway, prefabricated photovoltaic intelligent substation and photovoltaic power generation system equipment.

开始批量生产铁路牵引变压器、预装光伏智能变电站和光伏发电系统设备。



2023

## 05 Flexible & high efficient manufacture / 高效灵活的制造工艺

Make quick response to the customer's special requirements on environment, appearance, efficiency, delivery time, transportation, special quality and others, provide personalized design, and shorten the delivery cycle time.

根据客户在使用环境、外观、效率、交付时间、运输以及特殊的质量要求，进行快速响应，个性化设计，缩短交货周期。

Organize production in accordance with GB and international (IEC) standards, implement full-process

control concept from warehousing raw material control to finished products inspection, focus on customer's experiences and core needs, and provide products and services that exceed customers' expectation.

严格按照国家标准和国际标准组织生产，从原材料自产到成品出库实行全过程控制，关注客户的使用体验和核心诉求，提供超过客户期望的产品和服务。



### + Manufacturing equipment

生产设备

- 1 Vacuum casting system  
真空浇注系统
- 2 Cut-to-length line for core sheets  
硅钢片横剪生产线
- 3 Vacuum drying equipment  
真空干燥设备
- 4 Winding equipment  
绕线设备







## + Implementation of TQM and System

全面质量管理体系 TQM 与 SAM

Introduced lean production concept, we established 50 lean improvement quality criteria (LS). Each process is provided with operation instructions and standardized operations criteria to implement the production plan, through timely management (SIM) to improve communication efficiency and continuously shorten delivery time. TPS with core of production process management (MPS) has gradually been developed by connecting sales, materials, planning, supply chain, services and so on.

引进精益 (Lean) 生产理念，建立起 50 条精益改进质量准则 (LS)。每道工序有作业指导书和标准化作业下进行实施生产计划，通过及时化管理 (SIM) 提高沟通效率，不断缩短交付时间。逐步涵盖销售、物料、计划、供应链、服务等，建立起以生产流程管理 (MPS) 为核心的全面质量管控体系 (TPS)。



Kanban System



Design



Test



Service

## 06 Testing / 测试

### Regular Tests 常规试验

- + Voltage ratio measurement  
电压比测量
- + Applied withstand voltage test  
外施耐压试验
- + Induced withstand voltage test  
感应耐压试验
- + Partial discharge measurement  
局部放电测量
- + No load loss and current measurement  
空载损耗和电流测量
- + Winding resistances measurement  
绕组电阻测量
- + Insulation resistance test  
绝缘电阻测试
- + Load loss and short circuit impedance measurement  
负载损耗和短路阻抗测量
- + Transformer oil test  
变压器油品测试

### Type Tests 型式试验

- On customer requirements  
根据客户需求
- + Temperature rise test  
温升实验
  - + Lightning impulse test  
雷电冲击实验
  - + Noise level test  
噪音实验

### Special Tests 特殊试验

- On customers' requirements, below parameters can be checked  
根据客户要求, 可检查以下参数
- + Zero-sequence impedance  
零序阻抗
  - + No-load voltage harmonic  
空载电压谐波
  - + Parallel capacity of windings  
绕组并联容量
  - + Anti-corrosion protection checking  
防腐检查
  - + Short circuit test  
突发短路试验

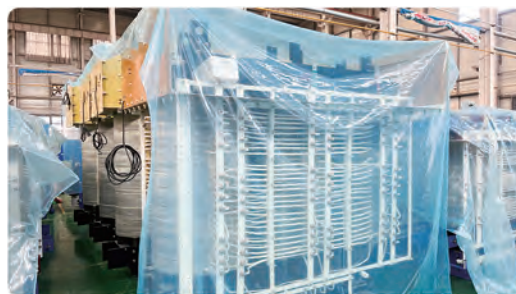


## 07 Installation and Service / 安装与服务

### Warehouse 仓储

- + In the warehouse, transformer should be protected from the pollution of water droplets, dust and sand. If provided with plastic cover, the transformer should be covered during storage.

在仓库中，变压器应避免水滴、灰尘或沙粒的污染，如果提供塑料罩，变压器在存储期间，应用塑料罩盖着。



### Transport 装运

- + The transformer is equipped with safety transport devices. The transformer without shell shall be lifted with lifting lugs, the medium and small dry transformers with shell shall be lifted with lifting rings, and the large transformer shall be lifted with special lifting device for foundation channel steel.

变压器配有安全运输装置。不带外壳的变压器用吊耳吊起，带外壳的中小型干式变压器用吊环吊起，大型变压器用地脚槽钢专用的起吊装置吊起。



### Shipping 运输

- + The product is ready for shipping either by truck or seafreight once it has passed the tests. We take care of all official documents, depending on destinations and delivery terms. We also provide different packaging for special applications or conditions.

一旦产品通过测试，就可以用卡车或海运发货。我们会根据目的地和交货条件保管所有官方文件。我们也为特殊应用或条件提供不同的包装。



### Installation 安装

- + We supply the installation guide and user manual for each transformer. Under normal conditions, check the transformer once a year and clear the dust by vacuum cleaner. The frequency of cleaning depends on the running conditions.

我们提供每台变压器出厂时的安装指南和用户手册。正常情况下，每年检查一次变压器，并用吸尘器清除灰尘。清洗频率取决于运行环境。



### Service 服务

- + When some parts need to be replaced or any information is required, the main parameters on the nameplate must be provided, especially the serial number. We provide stock in regular quantities of spare parts, in case of customer needs.

当某些零件需要更换或需要任何信息时，必须提供铭牌上的主要参数，尤其是序列号。我们提供备品、备件的常规数量库存，以备客户之需。



## 08 Customer case / 客户案例



Subway Line 01, Zhengzhou 2014



Xinzheng Airport Terminal



A carrier rocket with Shenzhou-11 spacecraft, CASA, 2016



SAIF 225MW Gas Turbine Combined Cycle Power Project, Pakistan



Yuzhou Peak Photovoltaic Power Station Project



Khutul, "CEMENT-SHOKHO" JSC, Mongolia, 2015

### Other achievements (in no particular order) 其他业绩 (排名不分先后)

#### Aerospace and military projects: 航天军工项目:

- + Xinxiang Aviation Industry Group  
新乡航空工业集团
- + Guilin Aerospace Electronics Co., Ltd.  
桂林航天电子有限公司
- + Guizhou Aerospace Electric Co., Ltd.  
贵州航天电器股份有限公司
- + AVIC Chengdu Aircraft Industry Group  
航空工业成飞集团

#### Wind and light new energy projects: 风、光新能源项目:

- + Mahayana Wind Power Project  
大乘山风电工程
- + Mahayana Wind Power Project  
隆基股份光伏电站
- + Mingyang Electric Co., Ltd.  
明阳电气股份有限公司
- + Xuchang City Public Traffic Power Charging Construction  
许昌市公共交通充电系统建设项目

#### Automation field: 自动化领域:

- + Huichuan Technology Co., Ltd.  
汇川技术股份有限公司
- + Hekang New Energy Technology Co., Ltd.  
合康新能源科技有限公司
- + Wolong Electric Group Co., Ltd.  
卧龙电气集团股份有限公司
- + Leadford Electric Technology Co., Ltd.  
利德华福电气技术有限公司
- + Shandong Xinfeng Electronics Technology Co., Ltd.  
山东新风光电子科技股份有限公司
- + Shenzhen Kumark Drier & Automation  
库马克自动化
- + Shanghai Dongfang Electric  
上海东方电气

#### Metallurgy and petrochemical: 冶金石化:

- + Shenhua Group  
神华集团
- + Yongfeng Iron and Steel Group Co., Ltd.  
永锋钢铁集团有限公司
- + Harbin Electric Wind Energy Co., Ltd.  
哈电风能有限公司
- + China Pingmei Shenma Group  
平煤神马集团
- + China Shenhua Coal  
中国神华煤业
- + Baosteel Group  
宝钢集团
- + Anyang Iron and Steel  
安阳钢铁
- + State Grid Henan Electric Power Company  
国网河南省电力公司



Business school program:

商业学校项目:

- + Xinzheng South China City  
新郑华南城
- + Xinzheng Wuyue Plaza  
新郑吾悦广场
- + The main venue of the National Peasant Games  
全国农运会主场馆
- + Zhengshang Stock Business Centers  
正商股份
- + Jianye Group  
建业集团
- + Yongwei Group  
永威集团
- + CRCC No.18 Bureau Group  
中铁十八局集团
- + Country Gradend Holdings Group  
碧桂园控股集团
- + Henan National University Science Park  
河南省国家大学科技园

Industrial manufacturing project:

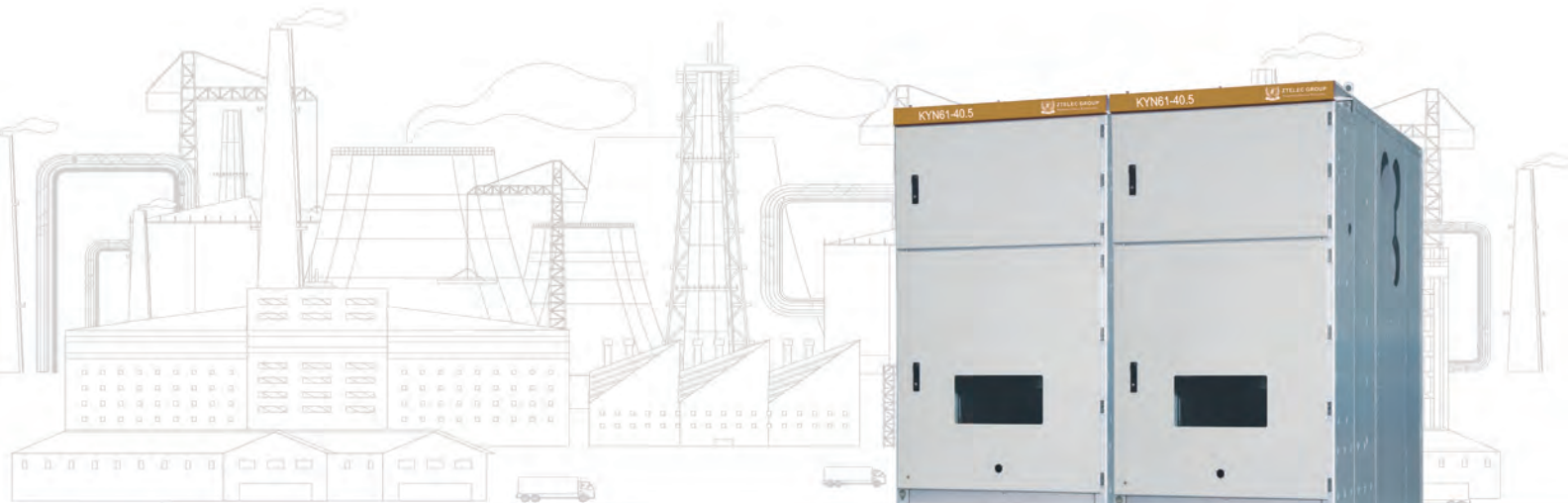
工业制造项目:

- + Puyang Longfeng Power Plant  
濮阳龙丰电厂
- + Xuchang Jinhui Stainless Steel Group Co., Ltd.  
许昌金汇不锈钢集团有限公司
- + Henan Zhigu Industrial Park  
河南智谷工业园
- + Vietnam Tinh Bac Ninh Solar Project  
越南北宁光伏项目
- + Philippine Paper Mill Powering System  
菲律宾造纸项目
- + Geely Automobile Zhejiang Intelligent Plant  
吉利汽车浙江智能化工厂电气项目

Pulp & Paper:

制浆造纸:

- + Huatai Group  
华泰集团
- + Chenming Group  
晨鸣集团
- + Hengan Group  
恒安集团
- + Yinge Group  
银鸽集团
- + Lee & Man Paper Mill  
理文纸业
- + Henli Group  
亨利纸业
- + Yilin Paper Mill  
一林纸业



## KYN61-40.5(Z)

Armored removable AC metal enclosed switchgear  
铠装移开式交流金属封闭开关柜



### Overview 概述

G

KYN61-40.5(Z) Armored removable AC metal enclosed switchgear (hereinafter referred to as switchgear) is an indoor complete set of power distribution unit of three-phase AC 50Hz and rated voltage of 40.5 kV used for receiving and distributing the electric energy in power plants, transformer substations, mining and industrial enterprises etc., it controls, protects and detects the circuits, also is applicable to frequent operation locations. This switchgear complies with GB/T11022-2020, GB3906-2020, DL404-2020, etc.

KYN61-40.5(Z) 型铠装移开式交流金属封闭开关柜（以下简称开关柜）系三相交流 50Hz，额定电压 40.5kV 的户内成套配电装置。作为发电厂、变电站及工矿企业接收和分配电能之用。对电路起到控制、保护和检测等功能，还可用于频繁操作的场所。本开关柜符合 GB/T11022-2020, GB3906-2020, DL404-2020 等标准。

### Type description 型号说明

K	Y	N	61	—	40.5	(Z)	□	/	□	□		
											Rated short-circuit breaking current (kA)	额定短路开断电流 (kA)
											Rated current	额定电流
											Type of circuit breaker	断路器种类
											Vacuum SF6 sulfur hexafluoride	真空 SF6 六氟化硫
											Rated voltage (kV)	额定电压 (kV)
											Design number	设计序号
											Indoor	室内
											Removable	移开式
											Metal armored	金属铠装式

▶ Features 特点

- + Cabinet structure adopts assembled type, the circuit breaker adopts floor type handcart structure;  
柜体结构采用组装式，断路器采用手车落地式结构；
- + Equipped with brand new composite insulated vacuum circuit breaker, featured with good interchangeability, and easy to change;  
配备全新型复合绝缘真空断路器，并具有互换性好更换简单的特点；
- + The hand cart frame is mounted with lead screw nut propelling mechanism, it is able to move the handcart easily, and prevent damage of propelling mechanism caused by misoperation;  
手车车架中装有丝杠螺母推进机构，可轻松移动手车，并防止误操作而损坏推进机构；
- + All operations can be carried out when the cabinet door is closed;  
所有的操作均可在柜门关闭状态下进行；
- + Interlocking among the main switch, handcart and switchgear adopts compulsory mechanical locking mode, meeting the "five preventions" function;  
主开关、手车、开关柜门之间的联锁采用强制性机械闭锁方式，满足“五防”功能；
- + Cable chamber is large enough, it could connect multi cables.  
电缆室空间充裕，可连接多根电缆。



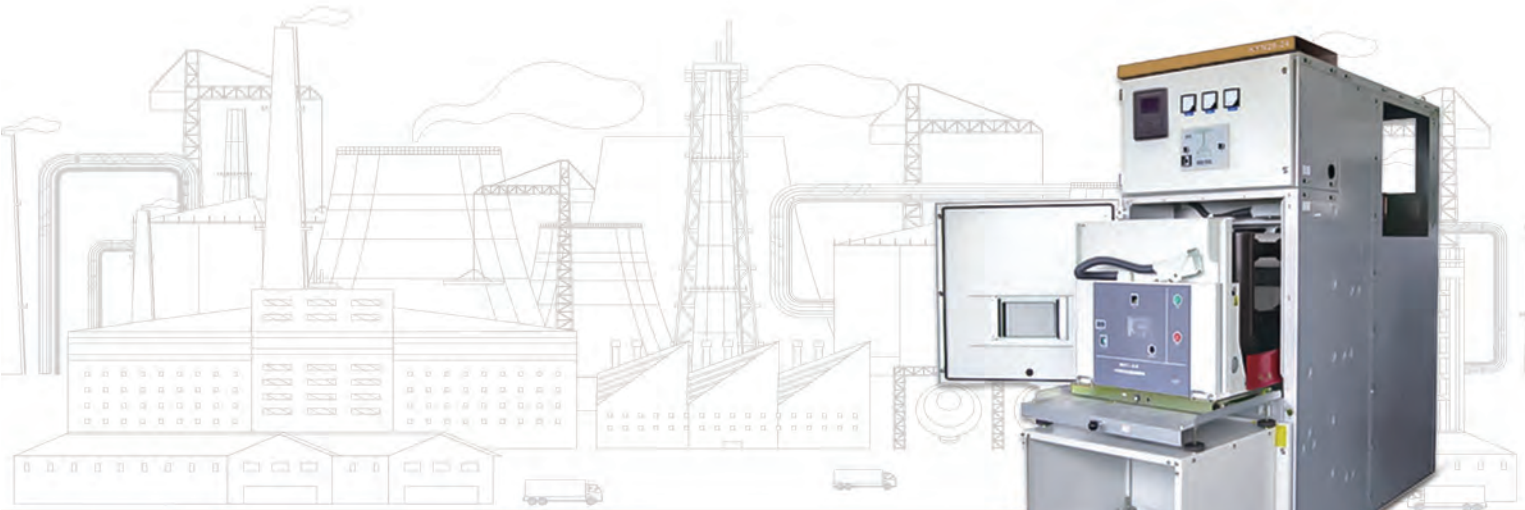
▶ Vacuum switchgear main technical parameter 真空开关柜主要技术参数

Name 名称	Unit 单位	Value 数值
Rated voltage 额定电压	kV	40.5
Rated current 额定电流	A	1250 1600 2000
Rated frequency 额定频率	Hz	50
Rated short-time withstand current 额定短时耐受电流	kA	20 25 31.5
Rated peak withstand current 额定峰值耐受电流	kA	50 63 80
Rated power frequency withstand voltage 额定工频耐受电压	kV	95/1min
Rated lightning impulse withstand voltage 额定雷电冲击耐受电压	kV	185
Rated short-circuit duration 额定短路持续时间	s	4
Degree of protection 防护等级		IP3X

▶ Vacuum circuit breaker main technical parameters 真空断路器主要技术参数

Name 名称	Unit 单位	Value 数值
Rated voltage 额定电压	kV	40.5
Rated frequency 额定频率	Hz	50
Rated power frequency withstand voltage 额定工频耐受电压	kV	95/1min
Rated lightning impulse withstand voltage 额定雷电冲击耐受电压	kV	185
Rated current 额定电流	A	1250 1600 2000
Rated short-time withstand current 额定短时耐受电流	kA	20 25 31.5
Rated short-time breaking current 额定短时开断电流	kA	20 25 31.5
Rated peak withstand current 额定峰值耐受电流	kV	50 63 80
Rated short-circuit duration 额定短路持续时间	ms	4
Opening time 分闸时间	ms	$30 \leq t \leq 60$
Closing time 合闸时间	s	$50 \leq t \leq 100$
Rated short-circuit breaking current times 额定短路开断电流次数	times	20
Mechanical life 机械寿命	times	10000





## KYN28-24(Z)

Armored removable AC switchgear  
铠装移开式交流金属封闭开关设备

### ► Overview 概述

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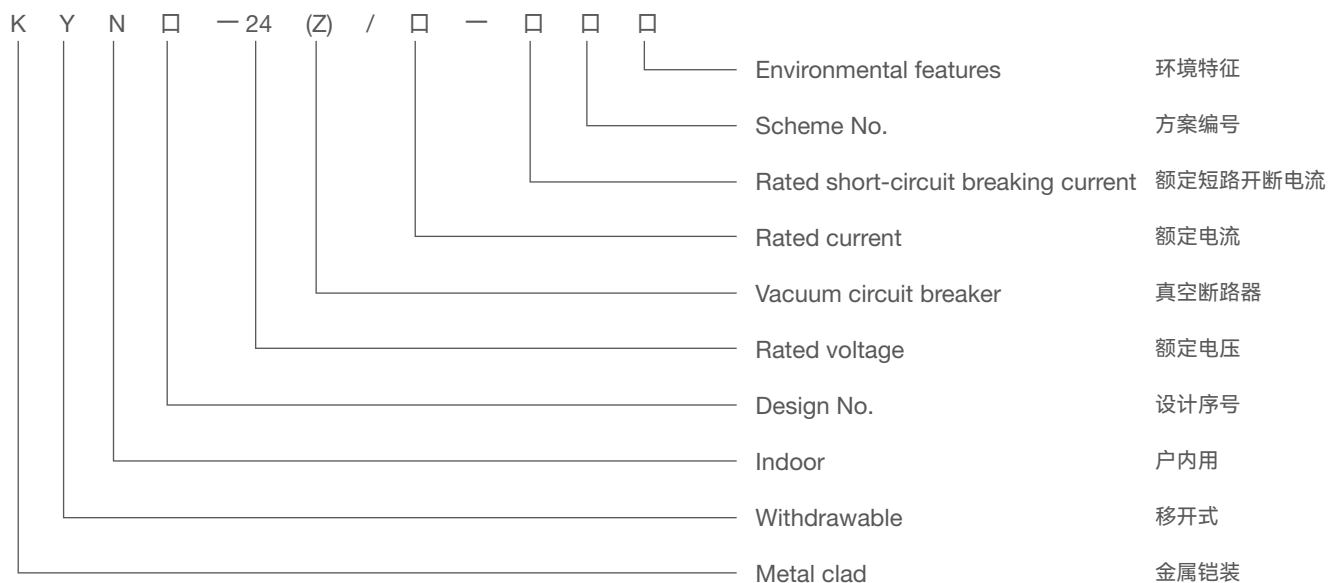
KYN28-24(Z) series armored moveable AC metal switchgear (hereinafter referred to as "switchgear") is a complete power distribution device for 20kV three-phase AC 50(60)Hz single bus and single bus section system. It is mainly used in power plants, power transmission of small and medium-sized generators, power distribution of industrial and mining enterprises, and power receiving and transmission of secondary substations in electrical systems, as well as starting of large high voltage motors, etc., to implement control protection and monitoring.

KYN28-24(Z) 系列铠装移开式交流金属开关设备 (以下简称“开关设备”), 系 20kV 三相交流 50(60)Hz 单母线及单母线分段系统的成套配电装置。主要用于发电厂、中小型发电机送电、工矿企事业单位配电以及电业系统的二次变电所的受电、送电及大型高压电动机起电等, 实行控制保护、监测之用。

The switchgear has the "five prevention" interlock function of preventing from pushing and pulling circuit breaker with load, preventing the circuit breaker from opening and closing by mistake, preventing the ground switch from closing when the ground switch is in the closed position, preventing from going into the live compartment mistakenly and preventing the ground switch from opening by mistake when the power is on. In fact, it is a power distribution device with superior performance. The product adopts GB3906, GB/T11022, IEC60298 and other standards.

本开关设备具有防止带负荷推拉断路器手车、防止误分合断路器、防止接地开关处在闭合位置时关合断路器、防止误入带电隔室、防止在带电时误合接地开关的“五防”联锁功能, 实为一种性能优越的配电装置。该产品采用 GB3906、GB/T11022、IEC60298 等标准要求。

▶ Type description 型号说明



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▶ Environmental conditions 使用环境

- a** Ambient air temperature: - 15°C ~+40°C ;  
周围空气温度: -15°C ~+40°C ;
- b** Altitude: ≤1000m;  
海拔高度: 1000m 及以下;
- c** Relative humidity; daily≤95%, monthly≤90%;  
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%;
- d** Seismic intensity: ≤ 8°;  
地震烈度: 不超过 8°;
- e** The installation site should be free of fire, explosive danger, serious pollution, chemical corrosion or severe vibration;  
无火灾、爆炸危险、严重污秽、化学腐蚀及剧烈振动的场所;

Note: Please negotiate with us if your product is used beyond the range of above conditions.  
在超过 GB3906 规定的正常环境条件下使用时, 请用户与我公司协商。

## ▶ The main technical parameters 主要技术参数

Name 名称	Unit 单位	Value 数值
		Matched circuit breaker 配用断路器
Rated voltage 额定电压	kV	24kV
1min power frequency withstand voltage 1分钟工频耐受电压	kV	(50)65
Rated impulse withstand voltage(peak) 额定冲击耐受电压(峰值)	kV	125
Rated frequency 额定频率	Hz	50(60)
Rated current 额定电流	A	630 1250 1600 2000 2500 3150
Rated current of branch busbar 分支母线额定电流	A	630 1250 1600 2000 2500
Rated short-time withstand current 额定短时耐受电流	kA	16 20 25 31.3
Rated peak withstand current 额定峰值耐受电流	kA	40 50 63 80
Rated short circuit duration 额定短路持续时间	s	4
Protection level 防护等级		The enclosure is IP4x and it is IP2X when the compartment door and circuit breaker chamber door are opened 外壳为 IP4X, 隔室门、断路器室门打开时为 IP2X
Weight 重量	kg	800 1000 Rated current above 1600A 800 1000 (额定电流 1600A 以上)

## ▶ Product structure performance characteristics 产品结构性能特点

### 1. Switchgear of 24kV with compact volume

#### 体积小巧的 24kV 开关设备

Structure of this product is similar to that of mid-set switchgear of 12kV, the product is applicable to systems of 20kV and doesn't need composite insulation or interphase separator, bringing outstanding insulation performance.

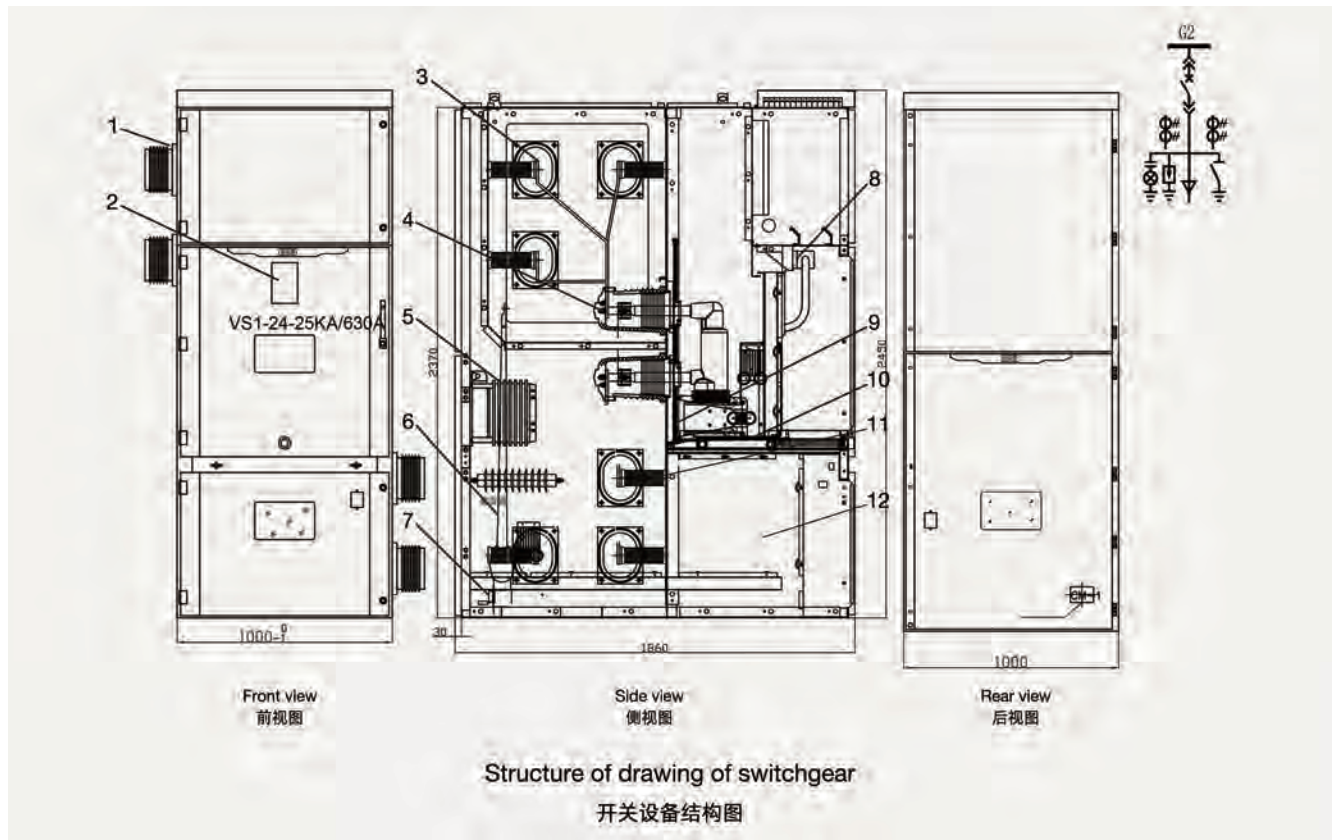
本产品结构型式与 12kV 中置开关设备类同, 用在 20kV 的系统中, 不需要复合绝缘, 不需要加相间隔板, 因此产品的绝缘水平优越。

## 2. Safe structure, flexible installation

### 结构安全、安装灵活

This switchgear is composed of two parts: cabinet body and mid-set withdrawable part (ie. handcart). The cabinet body is divided into four separate compartments, protection degree of the enclosure is IP4X, and it is IP2X when compartment doors and circuit breaker chamber door are opened. It has overhead incoming and outgoing line, cable incoming and outgoing lines and other function schemes, it can become a power distribution unit of different schemes and forms after permutation and combination. This switchgear can be installed, debugged and maintained from the front side, so it can be arranged in duplex by means of back-to-back or arranged against the wall, which not only improves its safety and flexibility, but also reduces the floor space.

开关设备由柜体和中置可抽式部件（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，各小室外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。



① Wall bushing  
穿墙套管

② Analog primary diagram  
模拟一次图

③ Main busbar  
主母线

④ Contact box  
触头盒

⑤ Current transformer  
电流互感器

⑥ Primary cable  
一次电缆

⑦ Earthing busbar  
接地母排

⑧ Secondary interlocking assembly  
二次连锁装配

⑨ Valve mechanism  
活门机构

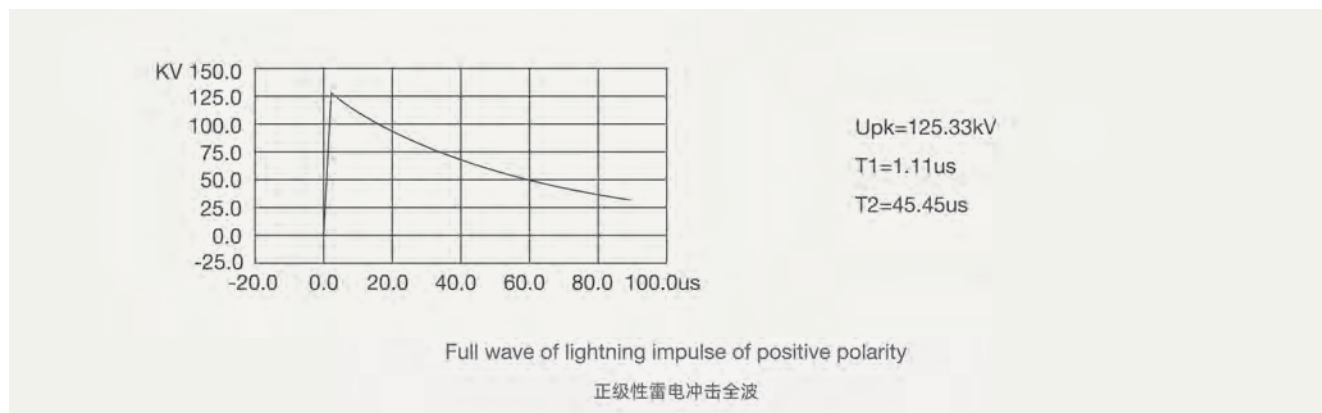
⑩ Handcart of circuit breaker  
断路器手车

⑪ Insulator  
绝缘子

⑫ Framework of cabinet body  
柜体框架

### 3. Lightning impulse resistant capacity

抗雷电冲击能力



### 4. Various handcart, convenient operation

手车种类多样、操作方便

The frame of the handcart is also made of thin steel plate and assembled after being processed by CNC machine. The handcart is insulated with the cabinet, and the mechanical interlock is safe, reliable and flexible. According to the same purpose, handcart can be divided into circuit breaker handcart, voltage transformer handcart, isolation handcart, the same specifications of the car can be replaced.

手车骨架也采用薄钢板经 CNC 机床加工后组装而成。手车与柜体绝缘配合，机械联锁安全、可靠、灵活。根据用途相同手车可以分为断路器手车、电压互感器手车、隔离手车，同规格手车可以互换。

The handcart has a disconnect position, a test position and a working position in the cabinet body, and each position has a positioning device to ensure the reliability of interlocking. It must be operated according to the interlocking anti-misoperation procedure. All kinds of handcart can be drawn in and out by screw. The operation is easy and flexible for operators. When the cabinet needs to be removed by hand, a special transfer handcart can be used to conveniently take it out for various inspection and maintenance; and it adopts mid-set type, the size is small, with convenient inspection and maintenance.

手车在柜体内有断开位置、试验位置和工作位置，每一位置都分别有定位装置，以保证联锁可靠，必须按联锁防误操作程序进行操作。各种手车均采用丝杆摇动推进、退出。操作轻便、灵活，适合于各种值班人员操作。手车当需要移开柜体时，用一台专用转运车，就可以方便取出，进行各种检查、维护；而且采用中置式，整个手车体积小，检查、维护都极为方便。



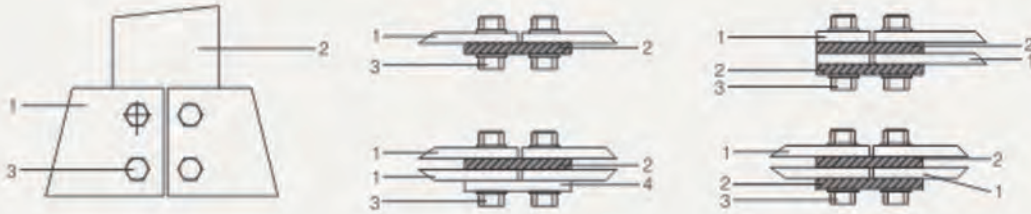
Circuit breaker  
断路器



Isolation handcart  
隔离手车



Voltage transformer handcart  
电压互感器手车







Connection mode between busbar and branch busbar  
母线与支母线连形式

- 1 Main bus  
主母线
- 2 Small branch bus  
分支小母线
- 3 Bolt  
螺栓
- 4 Cushion block  
垫块





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▶ The main circuit scheme diagram 主要电路方案图

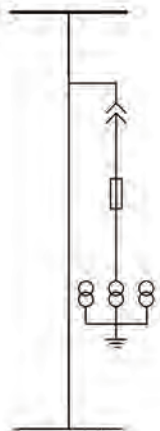

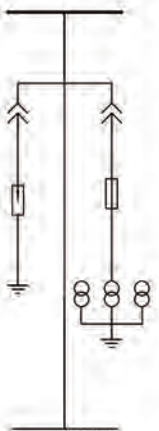
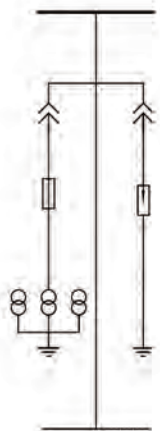
Scheme number 方案编号		01	02	03	04
Primary wiring diagram 一次接线图					
Dimension (W×D×H) mm 柜体尺寸(宽×深×高)mm		1000×1820×2300	1000×1820×2300	1000×1820×2300	1000*1820*2300
Main electrical components 主电气元件	Rated current (A) 额定电流	630-3150A			
	Vacuum circuit breaker 真空断路器	1	1	1	1
	Current transformer 电流互感器	2-3	2-3	2-3	2-3
	Voltage transformer 电压互感器				1
	High-voltage fuse 高压熔断器				
	Earthing switch 接地开关			1	1
	Lightning arrester 避雷器			3	
Application 用途	Power receiving & feeding 受电, 馈电	Power receiving & feeding 受电, 馈电	Power receiving & feeding 受电, 馈电	Power receiving & feeding 受电, 馈电	Power receiving & feeding 受电, 馈电
Remark 备注					


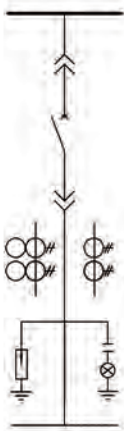
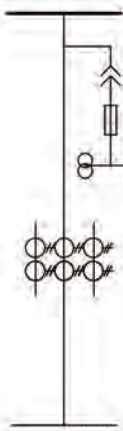
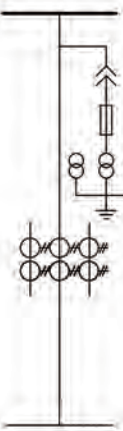



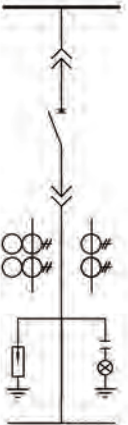
Scheme number 方案编号		05	06	07	08
Primary wiring diagram 一次接线图					
Dimension (WxDxH) mm 柜体尺寸 (宽 × 深 × 高)mm		1000×1820×2300	1000×1820×2300	1000×1820×2300	1000*1820*2300
Main electrical components 主要电器元件	Rated current (A) 额定电流	630-3150A			
	Vacuum circuit breaker 真空断路器	1	1	1	
	Current transformer 电流互感器	3	3	3	
	Voltage transformer 电压互感器	1			
	High-voltage fuse 高压熔断器	2			
	Earthing switch 接地开关			1	
	Lightning arrester 避雷器	3	3	3	
Application 用途	Power receiving & feeding 受电, 馈电	Power receiving & feeding 受电, 馈电	Power receiving & feeding 受电, 馈电	Isolation 隔离	
Remark 备注					

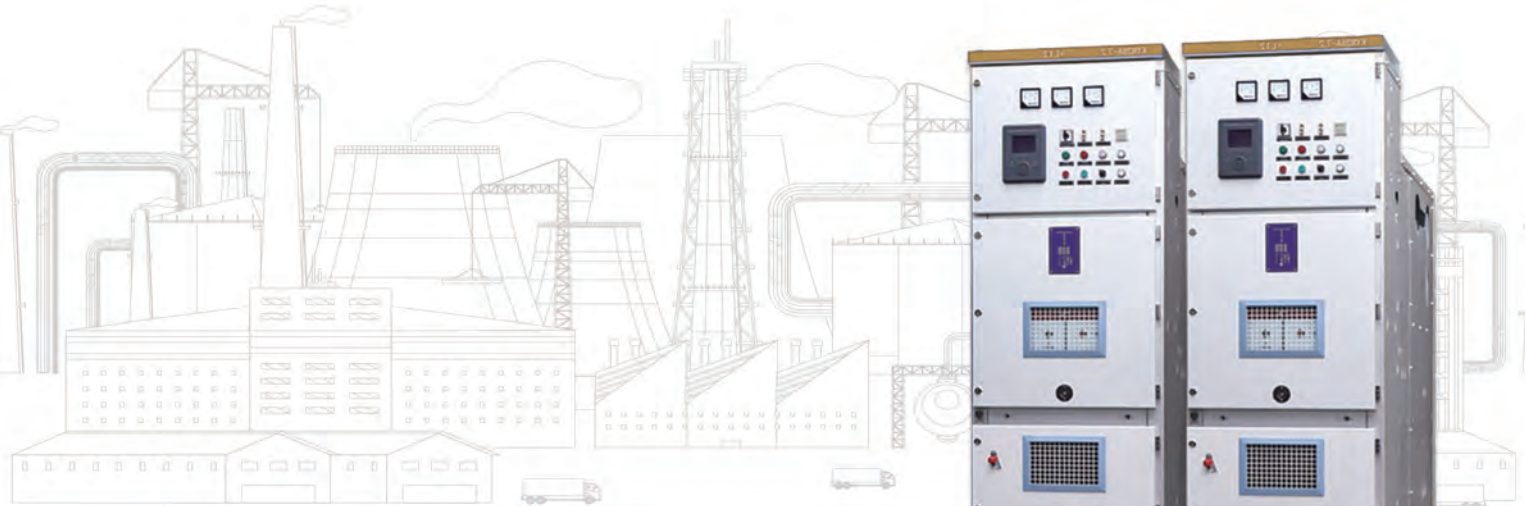


Scheme number 方案编号		09	10	11	12
Primary wiring diagram 一次接线图					
Dimension (WxDxH) mm 柜体尺寸(宽×深×高)mm		1000×1820×2300	1000×1820×2300	1000×1820×2300	1000×1820×2300
Main electrical components 主要电器元件	Rated current (A) 额定电流	630-3150A			
	Vacuum circuit breaker 真空断路器				
	Current transformer 电流互感器				
	Voltage transformer 电压互感器		2-3	3	2-3
	High-voltage fuse 高压熔断器		3	3	3
	Earthing switch 接地开关				
	Lightning arrester 避雷器				3
Application 用途	Buscouple isolation 母联隔离	Voltage measurement 电压测量	Voltage measurement 电压测量	Voltage measurement 电压测量	
Remark 备注					

Scheme number 方案编号		13	14	15	16
Primary wiring diagram 一次接线图					
Dimension (WxDxH) mm 柜体尺寸 (宽 × 深 × 高)mm		1000×1820×2300	1000×1820×2300	1000×1820×2300	1000*1820*2300
Main electrical components 主电气元件	Rated current (A) 额定电流	630-3150A			
	Vacuum circuit breaker 真空断路器				
	Current transformer 电流互感器				
	Voltage transformer 电压互感器	3		3	3
	High-voltage fuse 高压熔断器	3	3	3	3
	Earthing switch 接地开关				
	Lightning arrester 避雷器			3	3
Application 用途	Measurement +liaison 测量 + 联络	Fuse 熔断器	Measurement +liaison 测量 + 联络	Measurement +liaison 测量 + 联络	
Remark 备注					

Scheme number 方案编号		17	18	19	20
Primary wiring diagram 一次接线图					
Dimension (WxDxH) mm 柜体尺寸 (宽 × 深 × 高)mm		1000×1820×2300	1000×1820×2300	000×1820×2300	1000*1820*2300
Main electrical components 主要电器元件	Rated current (A) 额定电流	630-3150A			
	Vacuum circuit breaker 真空断路器	1	1		
	Current transformer 电流互感器	2-3	2-3	3	3
	Voltage transformer 电压互感器			2	3
	High-voltage fuse 高压熔断器			3	3
	Earthing switch 接地开关				
	Lightning arrester 避雷器		3		
Application 用途	Liaison 联络	Liaison 联络	Liaison+metering 联络 + 计量	Liaison+metering 联络 + 计量	
Remark 备注					

Scheme number 方案编号		21	22	23	24
Primary wiring diagram 一次接线图					
Dimension (WxDxH) mm 柜体尺寸(宽×深×高)mm		1000×2150×2300	1000×2150×2300		
Main electrical components 主要电器元件	Rated current (A) 额定电流	630-3150A			
	Vacuum circuit breaker 真空断路器	1	1		
	Current transformer 电流互感器	2-3	3		
	Voltage transformer 电压互感器				
	High-voltage fuse 高压熔断器				
	Earthing switch 接地开关				
	Lightning arrester 避雷器		3		
Application 用途	Liaison 联络	Overhead incoming line 架空进线			
Remark 备注					



## KYN28A-12

Armored removable AC metal enclosed switchgear

铠装移开式交流金属封闭开关设备

### ► Overview 概述

This device is an indoor metal armored withdrawable switchgear (hereinafter referred to as switchgear), and it is a complete power distribution device for 3.6-12 kV three-phase AC 50Hz single busbar and single busbar segmental system. It is mainly used in power plants, small and medium-sized generators for power transmission, and power distribution for industrial and mining enterprises, and power reception and transmission of secondary substations in electrical systems, as well as starting of large high-voltage motors, etc. It is used for control, protection and monitoring.

本装置系户内金属铠装抽出式开关设备(以下简称开关设备),系3.6-12千伏三相交流50Hz单母线及单母线分段系统的成套配电装置。主要用于发电厂,中小型发电机送电、工矿企业事业配电以及电业系统的二次变电所的受电、送电及大型高压电动机起动等。实行控制保护、监测之用。

This switchgear meets the requirements of IEC298, GB3906 and other standards. It has the interlock function of preventing the handcart of the circuit breaker from being drew in and out under load, preventing the circuit breaker from being opened and closed by mistake, preventing the circuit breaker from being closed when the grounding switch is in the closed position when it is charged, preventing mistaken entry into the electrified room, and preventing the grounding switch from being closed by mistake when it is charged. It can be equipped with VSI vacuum circuit breaker and ABB's VD4 vacuum circuit breaker. It is a power distribution device with superior performance.

本开关设备满足IEC298、GB3906等标准要求,具有防止带负荷推拉断路器手车、防止误分合断路器、防止接地开关处在闭合位置时关合断路器、防止误入带电室、防止在带电时误合接地开关的联锁功能,既可配用VSI真空断路器,又可配用ABB公司的VD4真空断路器,实为一种性能优越的配电装置。

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## ▶ Environmental conditions 使用环境

- a** Ambient air temperature: upper limit +40°C, lower limit -10°C;  
周围环境空气温度: 上限 +40°C, 下限 -10°C;
- b** Altitude: ≤1000m;  
海拔高度: 1000m 及以下;
- c** Relative humidity: the daily average relative humidity is not more than 95%, and the monthly average relative humidity is not more than 90%;  
相对环境湿度: 日平均相对湿度不大于 95%, 月平均相对湿度平均不大于 90%;
- d** Earthquake: the magnitude does not exceed 8;  
地震: 强度不超过 8 级;
- e** The surrounding air should not be polluted by corrosive or combustible gases, water vapor, etc;  
周围空气应不受腐蚀性或可燃气体、水蒸汽等明显污染;
- f** There is no serious pollution and frequent severe vibration, and the severity design meets the requirements of category 1 under severe conditions.  
无严重污秽及经常性的剧烈振动, 严酷条件下抗严酷设计满足 1 类要求。

## ▶ Structure introduction 结构简介

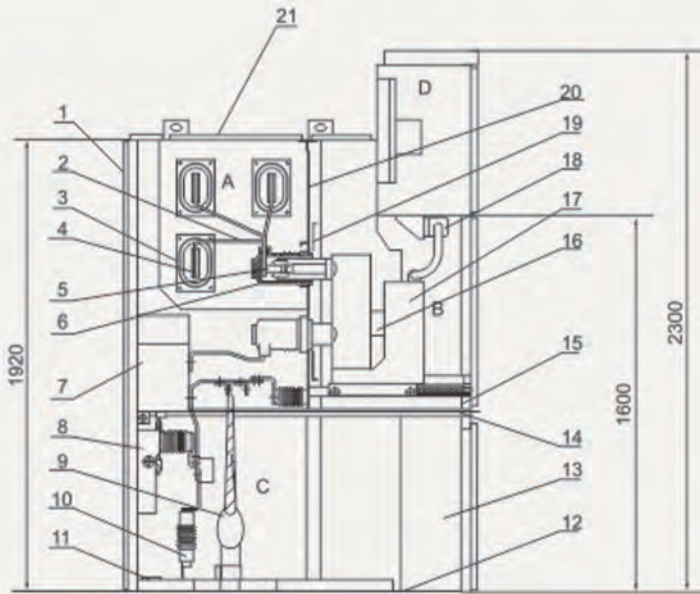
The switchgear is designed according to the armored metal-enclosed switchgear in GB3906-91. The rectifier body is composed of two parts: the cabinet body and the central withdrawable part (handcart), as shown in Figure 1. The cabinet is divided into four separate compartments, and the protection level of the outer shell is IP4X and it is IP2X when the door of each small room and the door of the circuit breaker is opened. With overhead incoming and outgoing lines, cable incoming and outgoing lines and other functional schemes, it can be a power distribution device in various schemes after arrangement and combination. The switchgear can be installed, debugged and maintained from the front, so it can be double-arranged back to back and installed against the wall, which improves the safety and flexibility of the switchgear and reduces the floor space.

开关设备按 GB3906-91 中的铠装式金属封闭开关设备而设计。整流器是由柜体和中置式可抽出部件（即手车）两大部分组成，见图 1。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，提高开关设备的安全性、灵活性，减少了占地面积。

▶ The main technical parameters 主要技术参数

Name 名称	Unit 单位	Data 数据	
		Matched circuit breaker 配用断路器	
		ZN63A-12(VS1)	VD4
Rated voltage 额定电压	KV	12	12
1 min power frequency withstand voltage 1 分钟工频耐受电压	kV	42	42
Rated impulse withstand voltage(peak) 额定冲击耐受电压 (峰值)	kV	75	75
Rated frequency 额定频率	Hz	50	50
Rated current 额定电流	A	630、1250、1600、2000、2500、3150、4000、5000	
Rated current of branch busbar 分支母线额定电流	A	630、1250、1600、2000、2500、3150、4000、5000	
Rated short-time withstand current (virtual value) 额定短时耐受电流 (有效值)	kA	16、20、25、31.5、40、50	16、20、25、31.5、40、50
Rated peak withstand current 额定峰值耐受电流	kA	40、50、63、80、100、125	40、50、63、80、100、125
Rated short circuit duration 额定短路持续时间	S	4	
Protection level 防护等级		The sell is IP4X and it is IP2X when the compartment door and handcart door is opened 外壳为 IP4X, 隔室门, 手车室门打开时为 IP2X	
Weight 重量	kg	700-1200	700-1200

▶ Switchgear structure diagram 开关设备结构图

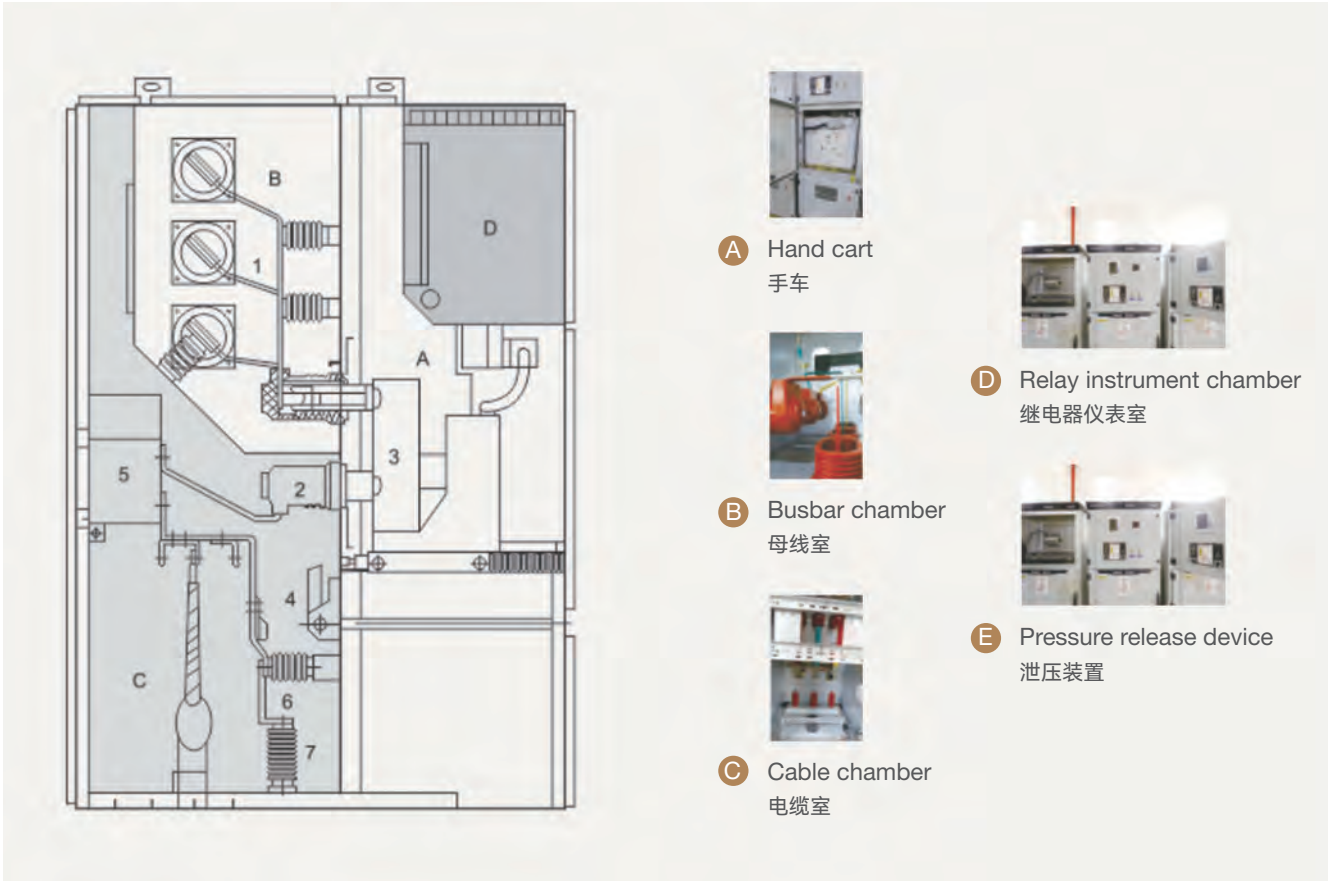


- Ⓐ Busbar room  
母线室
- Ⓑ Circuit breaker handcart room  
断路器手车室
- Ⓒ Cable room  
电缆室
- Ⓓ Relay instrument room  
继电器仪表室

- |  |  |  |
|--|--|--|
| <ul style="list-style-type: none"> <li>① Shell<br/>外壳</li> <li>② Branch small busbar<br/>分支小母线</li> <li>③ Busbar bushing<br/>母线套管</li> <li>④ Main busbar<br/>主母线</li> <li>⑤ Static contact device<br/>静触头装置</li> <li>⑥ Contact box<br/>触头盒</li> <li>⑦ Current transformer<br/>电流互感器</li> </ul> | <ul style="list-style-type: none"> <li>⑧ Earthing switch<br/>接地开关</li> <li>⑨ Cable<br/>电缆</li> <li>⑩ Lightning arrester<br/>避雷器</li> <li>⑪ Earthing main busbar<br/>接地主母线</li> <li>⑫ Baseplate<br/>底板</li> <li>⑬ Control small busbar<br/>控制小母线</li> <li>⑭ Earthing switch operating mechanism<br/>接地开关操作机构</li> </ul> | <ul style="list-style-type: none"> <li>⑮ Withdrawable horizontal partition<br/>可抽出式水平隔板</li> <li>⑯ Heating device<br/>加热装置</li> <li>⑰ Circuit breaker handcart<br/>断路器手车</li> <li>⑱ Secondary plug<br/>二次插头</li> <li>⑲ Partition (valve)<br/>隔板 (活门)</li> <li>⑳ Detachable partition<br/>装卸式隔板</li> <li>㉑ Pressure release channel<br/>泄压通道</li> </ul> |
|--|--|--|



▶ Switchgear Boundary Dimensions 开关柜外形尺寸图



A. Handcart  
手车

The frame of the handcart is made of thin steel plates processed by CNC machine tools and then riveted and welded. According to the application, handcarts can be divided into circuit breaker handcarts, voltage transformer handcarts, isolation handcarts, metering handcarts, etc. Handcarts of the same specification can be replaced. The handcart has an isolation position, a test position and a working position in the cabinet, and each position is equipped with a positioning device to ensure that the handcart cannot be moved casually when it is in the positions mentioned above, and the interlock must be released when the handcart is moved.

手车骨架系采用薄钢板经 CNC 机床加工后经铆、焊而成的。根据用途，手车可分为断路器手车、电压互感器手车、隔离手车、计量手车等等，相同规格的手车能方便互换。手车在柜内有隔离位置、试验位置和工作位置，每一位置均设有定位装置，以保证手车处于以上位置时不能随便移动、而移动手车时必须解除联锁。

## B. Busbar chamber

### 母线室

The busbar is led from one switchgear to another, and fixed by the branch busbar and the static contact box. The flat branch busbar is connected to the static contact box and the main busbar by bolts, without any other clamp or insulator connection. When the user and project have special needs, the connecting bolts on the busbar can be encapsulated with insulation and end caps. When the busbar passes through the partition of the switch cabinet, fix it with the busbar bushing. If an internal fault arc occurs, it can limit the accident from spreading to adjacent cabinets and ensure the mechanical strength of the busbar.

母线从一个开关柜引至另一开关柜，通过分支母线和静触头盒固定。扁平的分支母线通过螺栓连接于静触头盒和主母线，不需要任何其它的线夹或绝缘子联接。当用户和工程特殊需要时，母线排上的联接螺栓可用绝缘和端帽封装。在母线穿越开关柜隔板时，用母线套管固定。如果出现内部故障电弧，能限制事故蔓延到邻柜，并能保障母线的机械强度。

## C. Cable chamber

### 电缆室

Current transformers, grounding switches, lightning arresters and cables can be installed in the chamber, and a detachable aluminum plate with slots can be prepared at the bottom to ensure convenient construction on site.

电缆室内可安装电流互感器、接地开关、避雷器以及电缆，并在其底部配制开缝的可卸铝板，以确保现场的施工方便。

## D. Relay instrument chamber

### 继电器仪表室

The relay instrument chamber is used to install various components such as relays, instruments, signal indicators, and operation switches. In addition, a small busbar room can be added on the top of the instrument room according to users' requirements, and sixteen control small busbars can be laid.

继电器仪表室用于安装各类继电器、仪表、信号指示、操作开关等元器件。此外可根据用户要求在仪表室顶部增加小母线室，可敷设十六路控制小母线。

## E. Pressure relief device

### 泄压装置

There is a pressure relief device above the handcart room, busbar room, and cable room. When an internal fault arc occurs in the circuit breaker, main busbar, and cable room, the internal air pressure of the switchgear rises with the occurrence of the arc. After reaching a certain pressure, the pressure of the top device is released, the metal plate will be opened automatically to release the pressure and discharge the gas to ensure the safety of the operator and the switchgear.

在手车室、母线室、电缆室的上方设有泄压装置，当断路器或主母线、电缆室内发生内部故障电弧时，伴随电弧的出现，开关柜内部气压上升，达到一定的压力后，顶部装置的压力释放，金属板将被自动打开，释放压力和排泄气体，以确保操作人员和开关柜安全。

## Lock device

### 锁扣结构

The connection between the middle door and the cabinet body adopts a lock structure, and is equipped with a lifting mechanism, which makes the opening of the middle door more convenient. When the middle door is closed, the connection strength between it and the cabinet body is better, which enhances the ability to effectively combat internal arcing faults.

中门与柜体之间的联接采用锁扣结构，并配以提升机构，使中门开启更为方便，当中门处于关闭状态时，其与柜体的联接强度更好，增强了有效抗击内部燃弧故障的能力。



## HXGN □ -12(SF6)

Unit type AC metal enclosed ring main unit switchgear

单元式交流金属封闭环网开关设备

### ► Overview 概述

HXGN □ -12(SF6) Unit type AC metal enclosed ring main unit (hereinafter refer to as ring network cabinet) is a new generation of high-voltage electric appliance product designed and developed independently by our company according to the requirement of the domestic agricultural electricity and the city net transformation after introduction of overseas advanced technology. Each technical performance index completely reaches the IEC298 and GB3906 standard.

HXGN □ -12(SF6) 型单元式交流金属封闭环网开关设备（以下简称环网柜）是我们在引进国外先进技术并按照国内农电及城网改造之要求而自行设计、研制成功的新一代高压电气产品。各项技术性能指标全部达到 IEC 298 和 GB3906 标准。

The main switch, operation mechanism and components of ring main unit is made of the ABB Corporation original parts or the SFL-12/24 switch equipment imported overseas and assembled at home. We can also install the ABB Corporation original parts of HAD/US type SF according to the request of users. The operation of circuit breaker or VD 4-S vacuum circuit breaker is divided into two modes: manual and electrical operation.

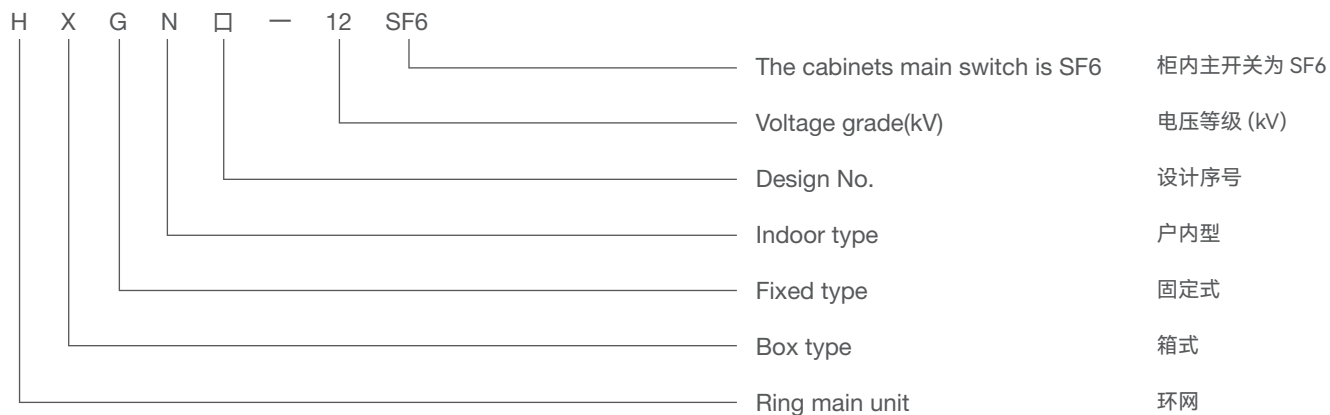
环网柜的主开关、操作机构及元器件采用 ABB 公司原装件或采用进口部件国内组装生产的 SFL-12/24 型开关设备，也可根据用户需要配装 ABB 公司原装 HAD/US 型 SF。断路器或 VD 4-S 型真空断路器，其操作方式分为手动、电动两种。

The cabinet body is riveted after processed by CNC machine tool with reliable mechanical interlocking and misoperating prevention function. The protection level reaches IP3X. This product has the remarkable characteristics such as the small volume, light weight, attractive appearance, simple operation, long life, high parameter with no pollution and maintenance-free.

柜体经数控机床加工后铆接而成，防护等级达到 IP3X，并有可靠的机械联锁和防误操作功能。本产品具有体积小、重量轻、外形美观、操作简便、寿命长、参数高、无污染、免维护等显著特点。

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▶ Type description 型号说明



▶ Environmental conditions 使用环境

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- a** Surrounding air is free from corrosive gas or flammable gas, steam and other obvious pollution;  
周围空气不受腐蚀性气体或可燃性气体、水蒸气等明显污染;
- b** Relative temperature: the daily average value  $\leq 95\%$ , the monthly average value  $\leq 90\%$ ;  
相对温度: 日平均值不大于 95%, 月平均值不大于 90%;
- c** The altitude should not exceed 2000m;  
海拔不超过 2000m;
- d** Without frequent vibration;  
无经常性的剧烈振动;
- e** Surrounding air temperature:  $-25^{\circ}\text{C} \sim +40^{\circ}\text{C}$ .  
周围空气温度: 上限  $+40^{\circ}\text{C}$  下限  $-25^{\circ}\text{C}$ 。

▶ Application 用途

HXGN □ -12 (SF6) unit type AC metal ring-network switchgear is suitable for AC 50Hz, 12Kv, serving as device of receiving and distribution of electrical energy.

HXGN □ -12 (SF6) 型单元式交流金属环网开关设备, 适用于交流 50Hz, 12Kv 中作为电能的接收和分配之用。

## ▶ Structural features and working principle 结构特点及工作原理

This ring network type cabinet makes air as the insulating medium and it is mainly assembled with ZFN □ -10/630 type vacuum load switch. And there are two cabinet schemes-incoming cabinet and outgoing cabinet.

本环网柜以空气为绝缘介质，主要配装 ZFN □ -10/630 型真空负荷开关，主要方案有进线柜和出线柜等。

### 1. Incoming cabinet scheme

#### 进线柜方案

There is a ZFN □ -10/630 type vacuum load switch on the main circuit inside the cabinet with isolating knife, and grounding knife. They are all installed in one machine stand and they are interlocked, realizing the connection of three working stations of busbar, isolation and grounding. Inside the cabinet, components such as CT, PT can be installed flexibly.

柜内主回路有一台 ZFN □ -10/630 型真空负荷开关，它配装有隔离刀、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。

### 2. Outgoing cabinet scheme

#### 出线柜方案

There is a ZFN □ -10/630 type vacuum load switch, fuse with striker (used as isolating switch) and grounding knife on the main circuit inside cabinet, and the three working stations operation can be realized. Inside the cabinet the components such as CT/PT and ZNO arrester can be installed flexibly, so the metering cabinet can be removed. Inside the incoming cabinet and outgoing cabinet, there is insulating protecting baffle interlocked with grounding switch. And inside the cabinets, the mechanical interlocks are adopted between each switch and baffle as well as the cabinet door with the requirement of "five-prevention" and IP2X of the protection degree of the cabinet enclosure.

柜内主回路由一台 ZFN □ -10/630 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 ZNO 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。

## ▶ Maintenance and repair 维修与修理

**1** After the cabinet is opened, check all of the insulation parts and disassemble the damp ones, put them into 70-80°C drying box, and take out for debugging again after 48 hours drying.

开箱后，应对所有绝缘件进行检查，对已受潮的元件，应将其拆下，放入 70-80°C 的烘箱内，烘 48 小时后，取出装上重新调试。

**2** If the product is damp or rusty during the storage, please clean it at once and protect it well.

产品储放期间，如发现受潮或腐蚀，应立即进行清理，清理后做好防护处理。

**3** Maintenance and inspection should be done regularly to ring network cabinet during operation.

运行中的环网柜应进行定期维修检查。

(1) Vacuum degree of vacuum arc-extinguishing room;

真空灭弧室的真空度；

(2) Contact abrasion degree;

触头磨损情况；

- (3) Whether the fastening pieces are loose or not;  
机械紧固件是否松动;
- (4) Mechanical electric parameter such as opening range, overrun;  
开距超程等机械电气参数;
- (5) Whether the running is flexible or not;  
操作转动是否灵活;
- (6) Whether the interlock is reliable or not;  
联锁是否可靠;
- (7) Whether all of the parts are clean, especially the insulation fittings.  
所有零部件, 特别是绝缘件是否清洁。

**4** Conduct overall examination and debugging to ring network cabinet in following conditions:  
下列情况时, 应对环网柜进行全面检查和调试:

- (1) Routine examination and cleaning once a year;  
每年一次的例行检查和清洁工作;
- (2) After every 2000 times operation of load switch.  
负荷开关每动作 2000 次后。

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▶ Storage 储存

Ring network cabinet should be stored in the dry and ventilated warehouse with temperature of  $-30^{\circ}\text{C} \sim +40^{\circ}\text{C}$ .  
环网柜应储存在干燥通风, 温度在  $-30^{\circ}\text{C} \sim +40^{\circ}\text{C}$  的仓库中。

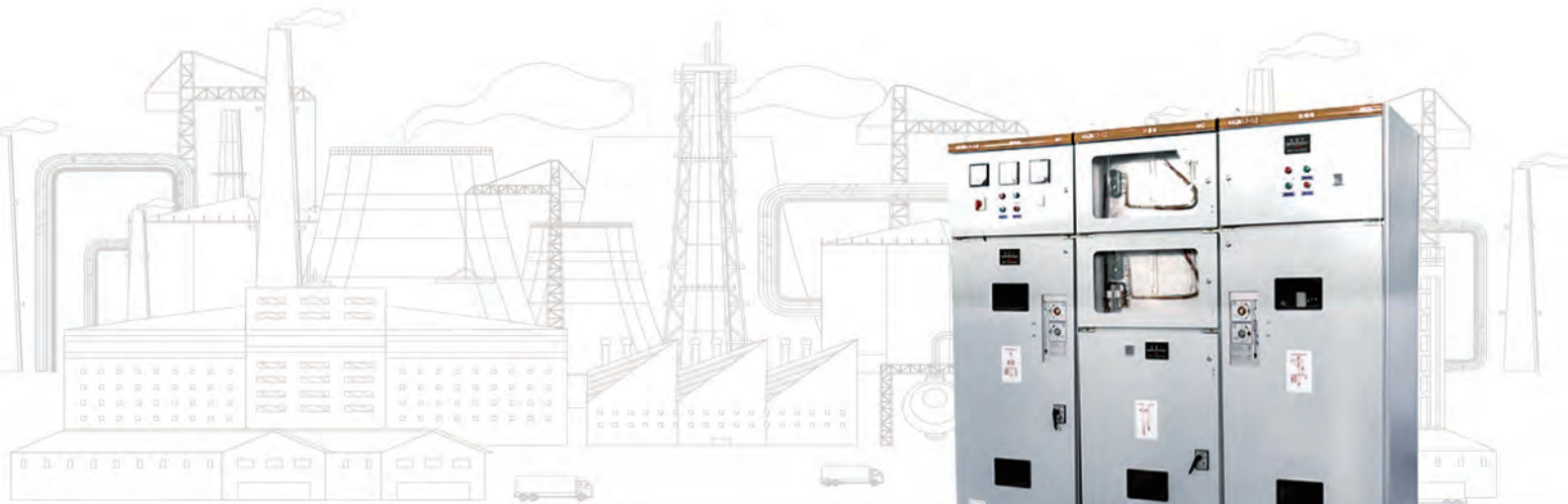
▶ Accompanying documents 随机文件

- 1** Certificate of quality  
产品合格证
- 2** Installation and operation instruction  
安装使用说明书
- 3** Packing list  
装箱单
- 4** Appending accessories list  
随机附件清单
- 5** Secondary connection diagram  
二次接线图

▶ The main technical parameters 主要技术参数

Item 项目	Unit 单位	Parameters 参数
Rated voltage 额定电压	kV	12
Rated frequency 额定频率	Hz	50
Rated current of main busbar /Max rated current of fuse 主母线额定电流 / 熔断器最大额定电流	A	630/125
Rated short time withstand current of main circuit and earth circuit 主回路、接地回路额定短时耐受电流	kA/s	20/3
Rated peak withstand current of main circuit and earth circuit 主回路、接地回路额定峰值耐受电流	kA	50
Rated short-circuit making current of main circuit and earth circuit 主回路、接地回路额定短路关合电流	kA	50
The opening times of the load switch with full capacity 负荷开关满容量开断数	次	100
Fuse breaking current 熔断器开断电流	kV	31.5&40
Rated closed loop breaking current 额定闭环开断电流	A	630
Rated transfer current 额定转移电流	A	1600
Mechanical life 机械寿命	次	2000
1 min power frequency withstand voltage (peak value) between phases, phase and earth / phase and isolation fracture 1 分钟工频耐压 (峰值) 相间、对地 / 隔离断口	kV	42/48
Lighting impulse withstand voltage (peak value) between phases, phase and earth / phase and isolation fracture 雷电冲击耐受电压 (峰值) 相间、对地 / 隔离断口	kV	75/85
Secondary loop 1 min power frequency withstand voltage 二次回路 1 分钟工频耐压	kV	2
Protection level 防护等级	IP3X	

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## XGN7-12

Box type fixed metal enclosed switchgear

箱型固定式金属封闭开关设备

### Overview 概述

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XGN7-12 box fixed type metal-enclosed switchgear (switch cabinet for short) is used to receive and distribute electrical energy in 3.6, 7.2, 12kV three phase AC 50Hz system, specially in the frequent operation occasion, its busbar system is single busbar (it can derive single busbar with branch and double busbar structure).

XGN7-12 箱型固定式金属开关设备 (简称开关柜), 用于 3.6、7.2、12kV 三相交流 50Hz 系统中作为接受与分配电能之用, 特别适合于频繁操作的场合, 其母线系统为单母线 (并可派生出单母线带旁路和双母线结构)。

This switch cabinet conforms to the requirement of national standard GB 3906-91 "3-35kV AC Metal-enclosed switchgear" and the international standard IEC 298, and has the function of "five prevention".

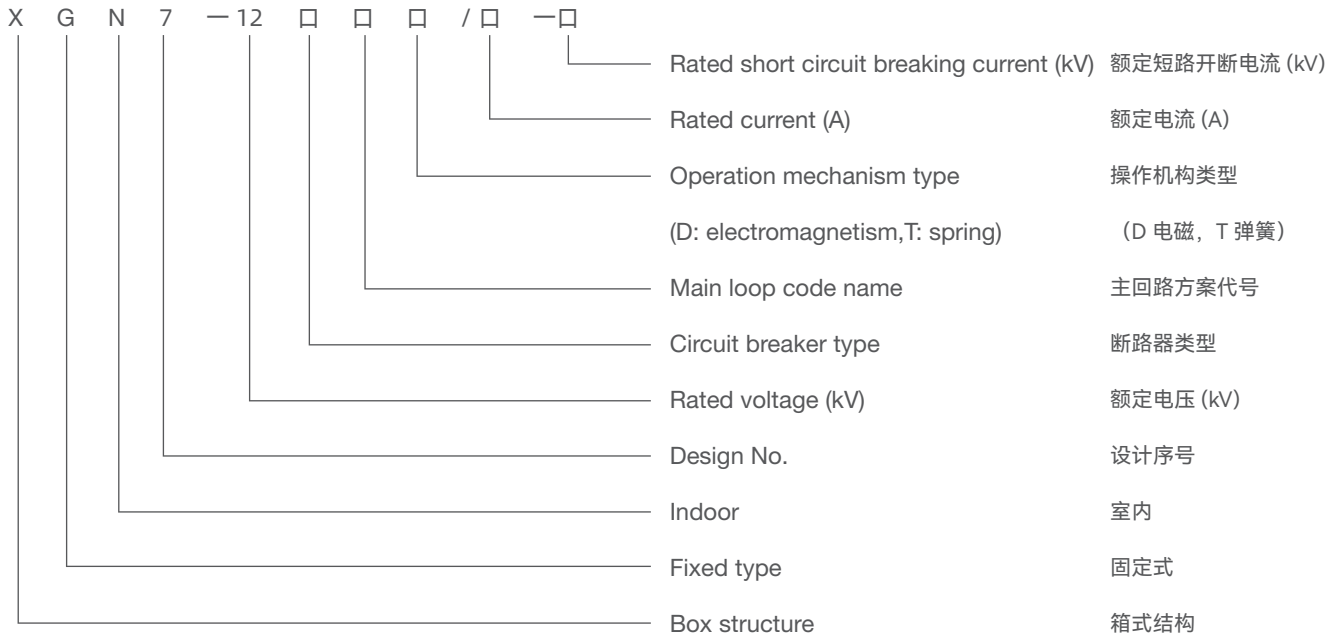
本开关柜符合国家标准 GB 3906《3-35kV 交流金属封闭开关设备》及国际标准 IEC 298 的要求, 并达到“五防”闭锁功能。

This switch cabinet's main switch adopts ZN28A-12 or the ZN22-12 series vacuum circuit breaker, equipped with CD17A electromagnetic operating mechanism and CT19B spring operating mechanism. Disconnecting switch adopts GN30-12 rotary type and GN22-10 heavy current series products.

本开关柜的主开关采用 ZN28A-12 或 ZN22-12 系列真空断路器, 配用 CD17A 电磁操作机构和 CT19B 弹簧操作机构, 隔离开关采用 GN30-12 旋转式隔离开关、GN22-10 大电流隔离开关系列产品。

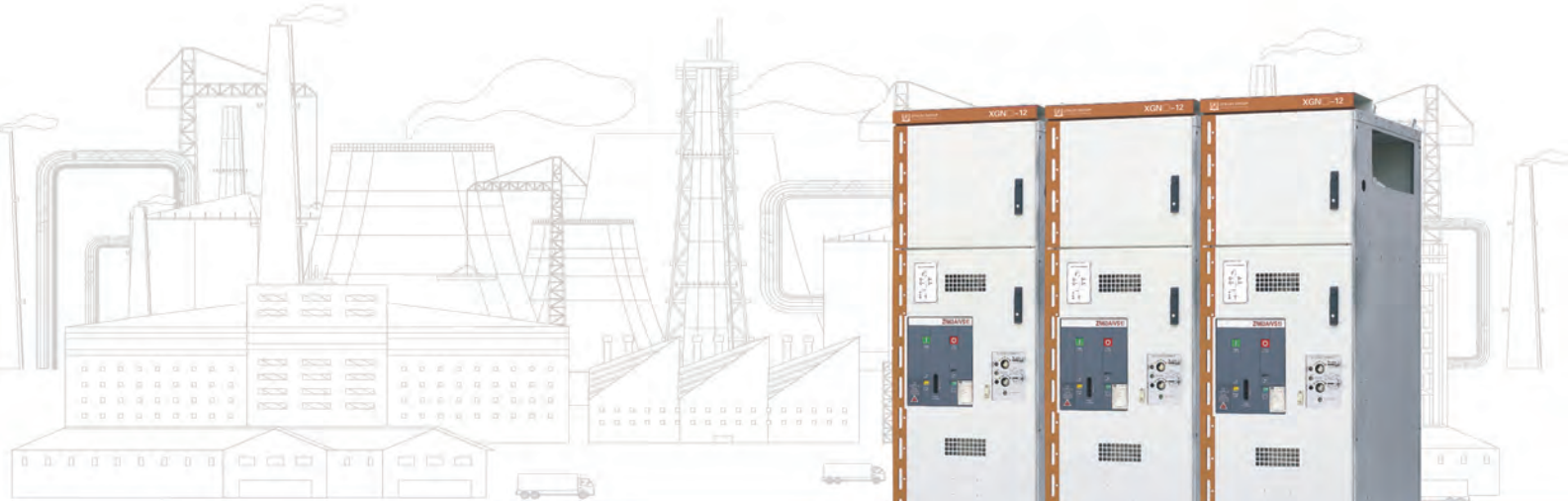


▶ Type description 型号说明



▶ Environmental conditions 使用环境

- a** Ambient temperature: -25°C ~+40°C ;  
环境温度: 上限 +40°C, 下限 -25°C;
- b** Altitude ≤ 1000m;  
海拔高度不超过 1000m;
- c** Relative environment humidity: The daily relative humidity average ≤95%; The monthly relative humidity average ≤ 90%;  
相对湿度: 日平均值不大于 95%; 月平均值不大于 90%;
- d** The earthquake magnitude ≤ 8;  
地震烈度不超过 8 级;
- e** Places free of fire, explosion, chemical corrosion and fierce vibration and the pollution grade not beyond 3 level.  
无火灾、爆炸危险、化学腐蚀和剧烈振动场所, 污染等级不超过 3 级。



## XGN □ -12

Fully sealed fully insulated inflatable ring main unit switchgear

XGN □ -12 全密封全绝缘充气式环网开关设备

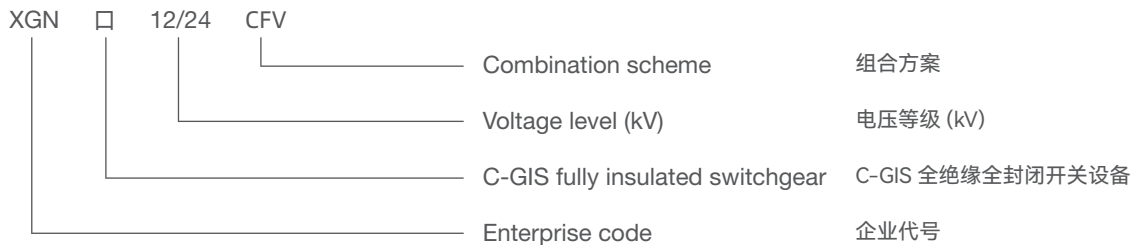
### Overview 概述

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XGN □ -12 series fully insulated and enclosed ring network switchgear is SF6 gas insulated metal common box closed switchgear, which is composed of load switch unit, load switch and fuse combination electrical unit, vacuum circuit breaker unit, busbar incoming line unit and other modules. It uses a range of advanced technologies and materials, and has excellent electrical properties and machinery. The performance is slightly affected by the environment and climate. It is small and compact, easy for operation, no maintenance and has flexible combination. Clear and intuitive design ensures easy and direct operation. Feeder wiring capacity is large and suitable for a variety of wiring systems.

XGN □ -12 系列全绝缘全封闭环网开关设备是 SF6 气体绝缘的金属共箱式封闭开关设备，该设备可由负荷开关单元、负荷开关熔断器组合电器单元、真空断路器单元、母线进线单元等模块组成。采用一系列先进技术和材料：具有优异的电气性能和机械性能，受环境和气候影响小，体积小，易于安装，操作方便，无需维护，且具有灵活的组合方式。清晰直观的设计保证操作简单、直接。馈线接线容量大，适合多种接线系统。

### Type description 型号说明



## ▶ Four core competitiveness 四大核心竞争力

### 1 Operational safety. Through the following security measures, we can provide users with special security guarantee:

操作安全。通过以下安全措施，我们可为用户提供特别的安全保障：

- (a) Integrated three-position load switch;  
一体化三工位负荷开关；
- (b) Circuit breaker adopts load switch instead of isolation switch, which is safer and more reliable;  
断路器采用负荷开关替代隔离开关，更安全可靠；
- (c) Primary-side fully enclosed design provides protection against accidental contact;  
一次侧全密闭设计提供意外接触的保护；
- (d) Mechanical interlock to meet the requirements of five-prevention;  
满足五防要求的机械连锁；
- (e) Charged display can provide instructions for electrification on the incoming and outgoing lines.  
带电显示器可提供进出线路带电指示。

### 2 Reliable operation. Fully sealed design, all 10kV switches and busbar charged bodies are sealed in the air box welded with 3mm stainless steel plate; equipped with silicone rubber cable plug to realize the cable head sealed, so that it is not affected by dust, moisture, small animals and other external environment:

运行可靠。全密闭设计，所有 10kV 开关及母线带电体均密封在 3mm 不锈钢板焊接成的气箱中；配硅橡胶电缆插头，实现电缆头全绝缘全密封从而不受灰尘、潮湿、小动物等外界环境影响：

- (a) Spring energy storage operating mechanism, can be manually or electrically operated;  
弹簧储能操作机构，可人工或电动操作；
- (b) Panel model line diagram provides switch position indication;  
面板模线图提供开关位置指示；
- (c) Cabinet is made of galvanized sheet, electrostatic spraying on the surface to enhance corrosion resistance;  
柜体用镀锌板制作，表面静电喷涂，增强抗腐蚀性能；
- (d) The pressure gauge monitors the safe pressure range of SF6 gas in the box.  
压力表监视箱体内 SF6 气体安全压力范围。

### 3 Economy:

经济性：

- (a) Maintenance-free;  
免维护；
- (b) High reliability;  
高度可靠；
- (c) Service life up to 20 years.  
使用寿命可达 20 年。

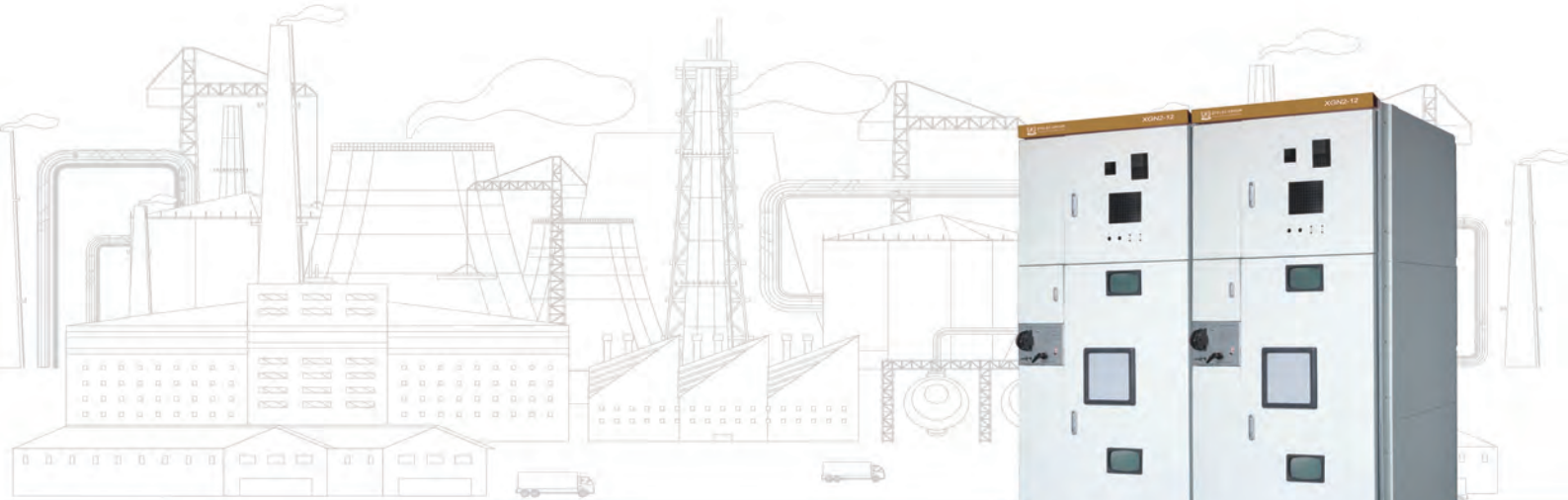


#### 4 The program is flexible:

方案灵活:

- (a) Multiple incoming ways from left, right, up or front;  
多种进线方式, 可实现左、右、上或前进线;
- (b) Multiple combinations, any combination between the units can be achieved;  
多种组合方式, 各单元之间可实现任意组合;
- (c) Insulation busbars can be used to combine front and back cabinets or left and right cabinets;  
采用绝缘母线, 可实现前后并柜或左右并柜;
- (d) Flexible design;  
设计方案灵活;
- (e) Optional arrangement of spring mechanism and permanent magnet mechanism.  
弹簧机构与永磁机构可选配置。





## XGN-12

Intelligent solid insulation cabinet

XGN-12 智能固体绝缘柜

### ▶ Overview 概述

XGN-12 series solid fully insulated and closed ring network switchgear is a kind of solid insulation vacuum switchgear with full insulation, full seal and maintenance-free. All high-voltage live parts are casted and moulded using epoxy resin material with excellent insulating property, which organically integrates the vacuum arc extinguishing chamber, main electric circuit and insulation support, and the functional units are connected by fully insulated solid busbars. Therefore, the whole switchgear is not affected by external environment, which can ensure the reliability of equipment operation and the safety of operators.

XGN-12 系列固体全绝缘封闭式环网开关设备是一种全绝缘、全密封、免维护的固体绝缘真空开关设备。所有高压带电部分均用绝缘性能优良的环氧树脂材料浇注成型，将真空灭弧室、主导电回路、绝缘支撑等有机结合为一整体，功能单元通过全绝缘固体汇流母线连接。因此，整个开关设备不受外部环境影响，可确保设备运行的可靠性和操作人员的安全性。

The ring network cabinet has the characteristics of simple structure, flexible operation, reliable interlocking and convenient installation. It is suitable for 50Hz and 12kV power systems and is widely used in industrial and civil cable ring networks and distribution network terminal engineering, as the receiving and distribution of electric energy. And it is especially suitable for power distribution in urban residential areas, small substations, opening and closing stations, cable branch boxes, box-type substations, industrial and mining enterprises, shopping malls and airports, subways, windpower generation, hospitals, stadiums, railways, tunnels and other places.

该环网柜具有结构简单、操作灵活、联锁可靠、安装方便等特点，适用于 50Hz，12kV 的电力系统，广泛应用于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，特别适用于城市居民区配电、小型变电站、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。

Because the product has the advantages of full insulation, full sealing and full shielding, it is especially suitable for the places with high altitude, high temperature, damp heat, severe cold and severe pollution.

由于该产品具有全绝缘、全密封、全屏蔽的优点，所以特别适用于高海拔、高温、湿热、严寒、污染严重等环境恶劣的地区使用。

G

## ▶ Type description 型号说明

XGN -12	Rated voltage (kV)	额定电压 (kV)
	Fixed type	固定式


## ▶ Category 产品分类

According to switches type, it is divided into load switches with grounding assembly (C module for short), load switches without grounding assembly (CB module for short) and circuit breakers with grounding assembly (V module for short), circuit breaker without grounding assembly (VB module for short), circuit breaker interconnection switch (VZ module for short), load switch+fuse combination electrical switch assembly (F module for short) and isolating switch assembly (G module for short).

根据开关类型，分为负荷开关带接地组装件（简称 C 模块），负荷开关不带接地组装件（简称 CB 模块），断路器带接地组装件（简称 V 模块），断路器不带接地组装件（简称 VB 模块），断路器联络开关（简称 VZ 模块），负荷开关 + 熔断器组合电器开关组装件（简称 F 模块），隔离开关组装件（简称 G 模块）。

## ▶ Environmental conditions 使用环境

- a** Ambient temperature : -45°C to +45°C;  
环境温度: -45°C ~ +45°C;
- b** Humidity : Maximum average relative humidity, with a daily average of 95% or below and a monthly average of 90% or below;  
湿度: 最大平均相对湿度, 日平均 ≤ 95%、月平均 ≤ 90%;
- c** Altitude : below 2000 meters;  
海拔高度: ≤ 2000 米;
- d** Seismic resistance : 8 degree;  
抗震能力: 8 度;
- e** Protection level : live body seal IP67, fuse barrel IP67, switch cabinet shell IP3X.  
防护等级: 带电体密封 IP67, 熔断器筒 IP67, 开关柜外壳 IP3X。

 Application fields 应用领域

- + Low temperature and cold areas: there is no application of SF6 gas, so it can run normally at -45°C without considering the low temperature operation of SF6.  
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。
- + Plateau area: it is unnecessary to consider the influence of plateau atmospheric pressure on insulation performance.  
高原地区: 无需考虑高原大气压对绝缘性能的影响。
- + Strong sandstorm area: the safety protection level of the solid insulation ring network cabinet body is IP67, and the control loop room adopts special treatment to ensure long-term operation in strong sandstorm areas.  
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。
- + Coastal wet area: sealed with epoxy resin, resistant to moisture and salt spray corrosion, ensuring long-term use in coastal areas.  
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。
- + Areas with high environmental protection requirements: The influence of SF6 gas on atmospheric warming has been paid great attention to, and SF6 gas has been eliminated in solid ring network cabinets, thus causing no pollution and harm to the environment and people.  
高环保要求地区: SF6 气体对大气温暖化影响已经高度引起重视, 固体环网柜取消了 SF6 气体, 对环境和人体无任何污染和伤害。
- + In the smart grid: since the main switch and isolating switch can be electrically operated, remote control, telemetry, and telecommunication of switching equipment and substation sites can be realized, which can not only carry out decentralized control, but also facilitate centralized control.  
智能电网中: 由于主开关, 隔离开关都能实现电动, 可对开关设备和变电站现场进行遥控、遥测、遥讯, 既能进行分散控制, 又能方便集中控制。

▶ The main technical parameters 主要技术参数

Projects 项目		Unit 单位	Parameters 参数
Conventional	常规		
Rated voltage	额定电压	kV	12
Rated frequency	额定频率	Hz	50
Power frequency withstand voltage	工频耐压	kV/min	42/48
Lightning impulse withstand voltage	雷电冲击电压	kV	75/85
Arc duration	燃弧持续时间	S	≥0.5
Protection grade of primary components (except metering cabinet)	一次部件防护等级 (计量柜除外)		IP67
Cabinet protection level	柜体防护等级		IP4X
Protection level between compartments	隔室间防护等级		IP2X
Operating supply voltage	操作电源电压	V	DC24、48、110、220
			AC110、220
Busbar system	母线系统		
Rated current	额定电流	A	630(1250)
Rated short-time withstand current	额定短时耐受电流	kA/s	20/4(25/4)
Rated peak withstand current	额定峰值耐受电流	kA	50(63)
Load switch unit	负荷开关单元		
Rated current	额定电流	A	630
Rated short circuit making current	额定短路关合电流	kA	50
Rated short-time withstand current	额定短时耐受电流	kA/s	20/4
Mechanical life of load switch	负荷开关机械寿命	times	
Electrical life of load switch	负荷开关电气寿命	times	E3
Partial discharge	局部放电	PC	≤5
Circuit breaker unit	断路器单元		
Rated current	额定电流	A	630(1250)
Rated short circuit breaking current	额定短路开断电流	kA	20(25)



▶ The main technical parameters 主要技术参数

Projects 项目		Unit 单位	Parameters 参数
Rated short circuit making current	额定短路关合电流	kA	50(63)
Rated short-time withstand current	额定短时耐受电流	kA/s	20/4(25/4)
Mechanical life of circuit breaker	断路器机械寿命	times	20000
Circuit breaker electrical life	断路器电气寿命	times	E2
Rated operating sequence	额定操作顺序		O-0.3s-CO-180s-CO
Partial discharge	局部放电	PC	≤5
Load switch-fuse combination electric unit	负荷开关 - 熔断器组合电气单元		
Rated current(maximum)	额定电流 (最大)	A	200
Rated short circuit breaking current	额定短路开断电流	kA	31.5
Rated short circuit closing current	额定短路关合电流	kA	80
Partial discharge	局部放电	PC	3150
Isolating switch	隔离开关		
Rated current	额定电流	A	630/1250
Rated short-term withstand current	额定短时耐受电流	kA	20/25
Rated short time duration	额定短时持续时间	s	4
Rated withstand current peak	额定峰值耐受电流	kA	50/63
Mechanical life	机械寿命	times	3000
Earthing switch	接地开关		
Rated current	额定电流	A	630/1250
Rated short-term withstand current	额定短时耐受电流	K	20/25
Rated short time duration	额定短时持续时间	s	4
Rated peak withstand current	额定峰值耐受电流	K	50/63
Rated short-circuit making current (peak value)	额定短路关合电流 (峰值)	kA	50
Rated short-circuit making current (times)	额定短路关合电流 (次数)	times	2
Mechanical life	机械寿命	times	3000



## Order Information / 订货须知

### ▶ Normal use conditions for the product 产品正常使用条件

- a** Environment temperature: highest temperature 40°C , lowest -30°C .  
环境温度：最高气温 40°C，最低温度 -30°C
- b** Elevation: no more than 1000m.  
海拔：不超过 1000m
- c** Relative humidity: daily average≤95%, monthly average≤90%.  
相对湿度：日平均≤ 95%，月平均≤ 90%
- d** Maximum wind speed (outdoor): 35m/s (10m above the ground and average value over 10 min).  
最大风速（户外）：35m/s（距地面 10m 高 10min 平均值）
- e** Anti-earthquake performance (with stand): 8.  
抗地震能力（带机座）：按 8 级

### ▶ Order Information 订货须知

In order to provide you with better service, the following data are required when ordering.  
为了给您提供更好地服务，订货时需提供以下数据：

- |                                   |                           |
|-----------------------------------|---------------------------|
| + Specification and type<br>规格及型号 | + Tapping range<br>调压范围   |
| + High voltage<br>高压电压            | + Rated frequency<br>额定频率 |
| Low voltage<br>低压电压               | Vector group<br>联结组别      |
| + Coil material<br>线圈材质           | Insulation grade<br>绝缘等级  |
| Phases<br>相数                      | Noise<br>噪音               |
| +                                 | +                         |

Note: Please specify your requirements for special products.  
注：特殊产品请注明特殊要求。



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