天耀电气
TIANYAO ELECTRIC
河南天耀智能电气有限公司
HENAN TIANYAO INTELLIGENCE ELECTRIC CO.,LTD
地址：河南省商丘市梁园区凯旋商城21号楼1-3号
电话：0370-2021133 15333703690
Http://www.tianyaozhineng.com
E-mail: 787275399@qq.com

公司官网
Company official website

技术支持
Technical support

电子样本
Electronic sample

成套电器选型手册 河南天耀智能电气有限公司

天耀电气
TIANYAO ELECTRIC

成套电器选型手册

COMPLETE ELECTRICAL EQUIPMENT MANUAL

科技创新 共赢未来

Technological innovation Win-win future

绿色能源 Green energy　电网系统 Grid system　风能发电 Wind power generation　光伏发电 Photovoltaic power　轨道交通 Rail transit

河南天耀智能电气有限公司
HENAN TIANYAO INTELLIGENCE ELECTRIC CO.,LTD

INTRODUCTION
企业简介

天耀电气
TIANYAO ELECTRIC

河南天耀智能电气有限公司位于商丘市示范区，是一家集研发、生产、销售、服务、安装与一体的新技术企业，公司主要生产销售智能型电网设备、高低压成套设备、箱式变电站、母线槽、管廊防滑支架、抗震支架、吊架、电力UPS不间断电源、EPS应急电源、直流屏、交、直流智能充电桩(站)；以风光互补路灯、LED灯具为主的市政、工矿、景观照明系统:以智能逆变器、箱式变电站为主的光伏、风力发电设备、发电机、桥架、电线电缆等电力电气产品，是中国电器工业协会通用会员单位，电力电子协会会员单位。

公司拥有一支长期致力于电气智能化控制设计的高科技人才研发队伍，“优质创新”是全体天耀人推崇的核心文化理念，与施耐德电气、ABB集团等世界500强电气企业签订了产品合作协议。与郑州大学、河南电力高等专科学校、河南机电高等专科学校等省内电力名校也有着密切的技术合作。在产品开发创新，产品质量的稳定性方面，彰显出较强的技术优势，为配电控制和用电安全提供了确实可靠的保障。

天耀电气公司始终坚持“以质量求生存，以市场为导向，以信誉求发展，以管理创效益”的经营理念，不断强化管理，提升企业形象，坚持高新技术产业与科研开发之路。如今的天耀以过硬的产品质量、超前的创新思维、准确的市场定位，换来了业内的金牌口碑，成为高端市场的优秀企业。

公司率先通过了ISO9001质量管理体系、ISO14001环境管理体系、OHSAS18001职业健康安全管理体系的三大体系认证，所有产品均通过了权威部中国质量认证中心的CQC认证和CCC认证。

天耀电气将准确把握“生态环境”与“人文关怀”的和谐发展目标，顺应时代的发展要求，肩负起改造电网、优化电网的重要责任和使命，在未来的几年内，我们将着力于智能化电网的研发和建设工作，继续发扬务实、诚信、创新、共赢的企业精神，为全球绿色电力事业而努力。

Henan TIANYAO Intelligent Electric Co., Ltd., located in the demonstration area of Shangqiu City, is a new technology enterprise integrating R & D, production, sales, service and installation The company mainly produces and sells smart grid equipment, high and low voltage complete sets of equipment, box type substation, bus duct, pipe gallery anti-skid support, anti-seismic support Hanger, UPS, EPS emergency power supply, DC panel, AC and DC intelligent charging pile (station): Take scenery complementary street lamps and LED lamps as an example Main municipal, industrial, mining and landscape lighting systems: photovoltaic, wind power generation equipment, generators, bridges and wires dominated by intelligent inverters and box substations Cables and other power and electrical products are general member units of China Electric Appliance Industry Association and member units of Power Electronics Association.

The company has a R & D team of high-tech talents who have long been committed to electrical intelligent control design. "High quality innovation" is the core respected by all TIANYAO people We have signed product cooperation agreements with Schneider Electric, ABB group and other world top 500 electrical enterprises. Zhengzhou University, Henan Electric Power University Colleges, Henan electrome chanical college and other famous electric power schools in the province also have close technical cooperation. In product development and innovation, the stability of product quality In terms of safety, it shows strong technical advantages and provides a reliable guarantee for power distribution control and power safety.

TIANYAO electric company always adheres to the business philosophy of "survival by quality, market-oriented, development by reputation and benefit by management"Strengthen management, enhance corporate image, and adhere to the road of high-tech industry and scientific research and development. Today's TIANYAO has excellent product quality and advanced innovative thinking Dimensional and accurate market positioning has won the gold medal reputation in the industry and become an excellent enterprise in the high-end market.

The company took the lead in passing the certification of ISO9001 quality management system, ISO14001 environmental management system and OHSAS18001 occupational health and safety management system Three system certification, all products have passed the CQC certification and CCC certification of China Quality Certification Center of the authoritative department.

TIANYAO Electric will accurately grasp the harmonious development goal of "ecological environment" and "humanistic care", comply with the development requirements of the times, and shoulder the responsibility of transforming the power gridThe important responsibility and mission of optimizing the power grid. In the next few years, we will focus on the R & D and construction of intelligent power grid, and continue to carry forward pragmaticThe enterprise spirit of integrity, innovation and win-win will strive for the global green power industry.

REMARKABLE & STABLE MANUFACTURING
卓越稳定 精工制造







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产品目录

天耀电气 TIANYAO ELECTRIC

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105 YB□-12/0.4型户外预装式变电站(欧式) Outdoor Preinstalled Transformer Substation(European Style)
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121 DFW高压电缆分支箱(欧式普通) High Voltage Cable Branch Box (European Style, Common)
122 DFW高压电缆分支箱(美式普通) High Voltage Cable Branch Box (American Style, Common)

E 三箱类 Distribution box




123 综合配电箱(动力/补偿/控制/终端/照明) Integrated Distribution Box (power/ Compensation/ Control/ Terminal/ Illumination)


营业执照

（副 本）

统一社会信用代码

名　　称	河南天耀智能电气有限公司	注册资本	陆仟捌佰捌拾万圆整
类　　型	有限责任公司（自然人独资）	成立日期	2018年05月04日
法定代表人	姚增个	营业期限	2018年05月04日至2038年05月03日
经营范围	智能电网设备生产、销售及技术研发；高低压配电柜、配电箱、箱式变电站、母线槽、UPS不间断电源、EPS应急电源、直流屏、充电桩、管道防滑支架、抗震支架的生产，销售；高低压电气元件、照明设备、五金交电、电线电缆、发电机、防爆电器、电子产品、电力仪器的销售；城市及道路照明工程设计、施工。（依法须经批准的项目，经相关部门批准后方可开展经营活动）	住　　所	河南省商丘市……交叉口北500米路西

登记机关

2020 年 11 月 24 日

国家市场监督管理总局监制


开户许可证

核准号：J5060001619702

编号：4910-03200007

经审核，河南天耀智能电气有限公司符合开户条件，准予开立基本存款账户。

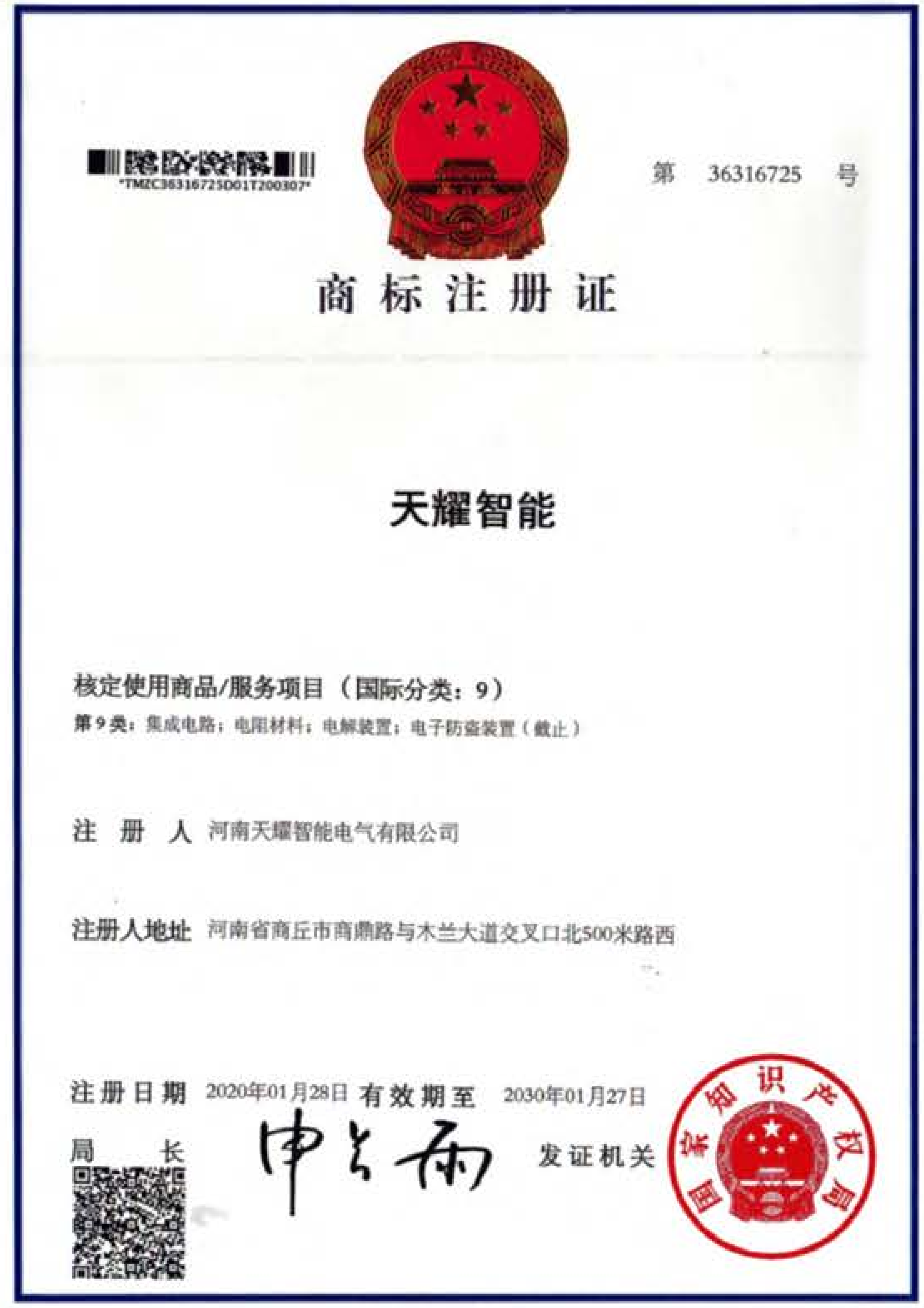
法定代表人（单位负责人）姚增个

开户银行 中国农业银行股份有限公司商丘平台分理处

账号 16496001040003457

发证机关（盖章）

2018 年 05 月 23 日


第 36316725 号

商标注册证

天耀智能

核定使用商品/服务项目（国际分类：9）

第9类：集成电路；电阻材料；电解装置；电子防盗装置（截止）

注 册 人　河南天耀智能电气有限公司

注册人地址　河南省商丘市商鼎路与木兰大道交叉口北500米路西

注册日期　2020年01月28日　有效期至　2030年01月27日

局　　长

发证机关

第 40784754 号

TMZC40784754D01T200511

商标注册证

晟天耀

核定使用商品/服务项目（国际分类：9）

第9类： 电缆；电线；变压器（电）；配电箱（电）；集电器；电站自动化装置；电解装置；电子防盗装置；电瓶；蓄电池（截止）

注 册 人 河南天耀智能电气有限公司

注册人地址 河南省商丘市商鼎路与木兰大道交叉口北500米路西

注册日期 2020年04月21日 **有效期至** 2030年04月20日

局 长

发证机关

资质证书
Qualification certificate
天耀电气 TIANYAO ELECTRIC

第 36315836 号

TMZC36315836D01T200203

商标注册证

天耀智能

核定使用商品/服务项目（国际分类：35）

第35类： 广告宣传；通过网站提供商业信息；为商品和服务的买卖双方提供在线市场；人事管理咨询；商业企业迁移；将信息编入计算机数据库；计算机数据库信息系统化；绘制账单、账目报表；寻找赞助（截止）

注 册 人 河南天耀智能电气有限公司

注册人地址 河南省商丘市商鼎路与木兰大道交叉口北500米路西

注册日期 2020年01月14日 **有效期至** 2030年01月13日

局 长

发证机关

证　书

CERTIFICATE

兹证明

河南天耀智能电气有限公司

魏增个

参加了中国质量认证中心举办的低压成套开关设备产品认证风险防控知识培训班及考核，特颁此证。

培训时间：2019 年 5 月 30-31 日　　证书编号：CQC\47\DYCT\1902-0111

CCAA002

签发：

中国质量认证中心

CHINA QUALITY CERTIFICATION CENTRE

资质证书
Qualification certificate
天耀电气 TIANYAO ELECTRIC

认 证 证 书

证书号：11419Q45222R0S

兹证明

河南天耀智能电气有限公司

统一社会信用代码：91411400MA456NTT6T

河南省商丘市商鼎路与木兰大道交叉口北 500 米路西

质量管理体系符合标准

GB/T19001-2016/ISO9001:2015

适用范围

高压配电柜、低压配电柜（该企业自愿性声明范围内）、箱式变电站的组装及销售

初次发证日期　2019 年 11 月 15 日
证书颁发日期　2019 年 11 月 15 日
证书换发日期　2022 年 04 月 02 日
证书有效期至　2022 年 11 月 14 日

签发：

北京东方纵横认证中心有限公司

中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C114-M

在证组织必须定期接受监督审核并经审核合格此证书方继续有效。本证书信息可在北京东方纵横认证中心有限公司网站（www.eacc.com.cn）和国家认证认可监督管理委员会官方网站（www.cnca.gov.cn）上查询，也可扫描右下角的二维码查询。

认证机构地址：北京市通州区中关村科技园区通州园金桥科技产业基地景盛南四街17号121号楼一层 101102

认 证 证 书

证书号：11419E45223R0S

兹证明

河南天耀智能电气有限公司

统一社会信用代码：91411400MA456NTT6T

河南省商丘市商鼎路与木兰大道交叉口北 500 米路西

环境管理体系符合标准

GB/T24001-2016/ISO14001:2015

适用范围

高压配电柜、低压配电柜（该企业自愿性声明范围内）、箱式变电站的组装及销售及其所涉及场所的相关环境管理活动

初次发证日期　2019 年 11 月 15 日
证书颁发日期　2019 年 11 月 15 日
证书换发日期　2022 年 04 月 02 日
证书有效期至　2022 年 11 月 14 日

签发：

北京东方纵横认证中心有限公司

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资质证书
Qualification certificate
天耀电气 TIANYAO ELECTRIC

认 证 证 书

证书号：11419S25224R0S

兹证明

河南天耀智能电气有限公司

统一社会信用代码：91411400MA456NTT6T

河南省商丘市商鼎路与木兰大道交叉口北 500 米路西

职业健康安全管理体系符合标准

GB/T 45001-2020/ISO 45001:2018

适用范围

高压配电柜、低压配电柜（该企业自愿性声明范围内）、箱式变电站的组装及销售及其所涉及场所的相关职业健康安全管理活动

初次发证日期　2019 年 11 月 15 日
证书颁发日期　2019 年 11 月 15 日
证书换发日期　2022 年 04 月 02 日
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诚信经营示范单位
Demonstration Unit of Integrity Management
证书编号：ZGXY-1880209924
河南天耀智能电气有限公司
针对该企业的信用记录、经营状况、债务风险、发展前景，结合社会口碑、公众认可度，经审核评估，确定该企业诚信经营示范单位等级为：
AAA
颁发日期：2020年07月15日
Date of issue
有效期至：2023年07月14日
Date of expiry
公示查询：www.xy315gov.com
Enquiring website
公示平台
招标信用
Notes
Re-examination records


企业信用等级证书
Enterprise credit rating certificate
河南天耀智能电气有限公司
针对该企业的信用记录、经营状况、债务风险、发展前景，结合社会口碑、公众认可度，经审核评估，确定该企业信用等级为：
AAA
Date of issue
Date of expiry
公示平台
招标信用
Notes
Re-examination records


企业资信等级证书
Enterprise credit rating certificate
河南天耀智能电气有限公司
AAA
Date of issue
Date of expiry
Enquiring website
公示平台
招标信用
Notes
Re-examination records


质量服务诚信单位
Quality Service Integrity Unit
河南天耀智能电气有限公司
AAA
Date of issue
Date of expiry
Enquiring website
公示平台
招标信用
Notes
Re-examination records


重服务守信用单位
Units that value service and keep promises.
证书编号：ZGXY-1880209926
河南天耀智能电气有限公司
针对该企业的信用记录、经营状况、债务风险、发展前景、结合社会口碑、公众认可度，经审核评估，确定该企业重服务守信用等级为：
AAA
Date of issue
Date of expiry
Enquiring website
公示平台
招标信用
证书说明：
Notes
Re-examination records:


重合同守信用企业
Enterprises that Respect Contracts and Keep Promises
证书编号：ZGXY-1880209923
河南天耀智能电气有限公司
针对该企业的信用记录、经营状况、债务风险、发展前景、结合社会口碑、公众认可度，经审核评估，确定该企业重合同守信用等级为：
AAA
Date of issue
Date of expiry
Enquiring website
公示平台
招标信用
证书说明：
Notes
Re-examination records:


重质量守信用单位
Units that value quality and keep promises
证书编号：ZGXY-1880209925
河南天耀智能电气有限公司
针对该企业的信用记录、经营状况、债务风险、发展前景、结合社会口碑、公众认可度，经审核评估，确定该企业重质量守信用等级为：
AAA
Date of issue
Date of expiry
Enquiring website
公示平台
招标信用
证书说明：
Notes
Re-examination records:

证书号第14469226号

实用新型专利证书

实用新型名称：一种便于采用自然风降温的低压配电柜

发　明　人：朱齐合

专　利　号：ZL 2021 2 0510411.0

专利申请日：2021年03月11日

专 利 权 人：河南天耀智能电气有限公司

地　　址：476000 河南省商丘市[redacted]交叉口北500米路西

授权公告日：2021年10月26日　　授权公告号：CN 214506125 U

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申长雨

国家知识产权局
2021年10月26日

其他事项参见续页

资质证书
Qualification certificate
天耀电气 TIANYAO ELECTRIC

证书号第14353602号

实用新型专利证书

实用新型名称：一种具有防潮防尘功能的低压配电柜

发　明　人：朱齐合

专　利　号：ZL 2021 2 0510712.3

专利申请日：2021年03月11日

专 利 权 人：河南天耀智能电气有限公司

地　　址：476000 河南省商丘市商鼎路与木兰大道交叉口北500米路西

授权公告日：2021年10月08日　　授权公告号：CN 214379428 U

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国家知识产权局
2021年10月08日

其他事项参见续页

证书号第14361355号

实用新型专利证书

实用新型名称：一种具有散热功能的组合式安装的抽屉柜

发　明　人：魏增个

专　利　号：ZL 2021 2 0519329.4

专利申请日：2021年03月12日

专利权人：河南天耀智能电气有限公司

地　　址：476000 河南省商丘市商鼎路与木兰大道交叉口北500米路西

授权公告日：2021年10月08日　　授权公告号：CN 214379706 U

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申长雨

2021年10月08日

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其他事项参见续页

证书号第14394429号

实用新型专利证书

实用新型名称：一种可高温自动断电的高压柜

发　明　人：魏增个

专　利　号：ZL 2021 2 0519027.7

专利申请日：2021年03月12日

专利权人：河南天耀智能电气有限公司

地　　址：476000 河南省商丘市商鼎路与木兰大道交叉口北500米路西

授权公告日：2021年10月15日　　授权公告号：CN 214411852 U

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2021年10月15日

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其他事项参见续页

证书号第14477410号

实用新型专利证书

实用新型名称：一种具有减震防护功能的高压柜

发　明　人：魏增个

专　利　号：ZL 2021 2 0519330.7

专利申请日：2021年03月12日

专利权人：河南天耀智能电气有限公司

地　　址：476000 河南省商丘市商鼎路与木兰大道交叉口北500米路西

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申长雨

国家知识产权局
2021年10月26日

第1页(共2页)

其他事项参见续页

资质证书
Qualification certificate
天耀电气 TIANYAO ELECTRIC

证书号第14486678号

实用新型专利证书

实用新型名称：一种具有绝缘监测功能的箱式变电站

发　明　人：魏增个

专　利　号：ZL 2021 2 0519028.1

专利申请日：2021年03月12日

专利权人：河南天耀智能电气有限公司

地　　址：476000 河南省商丘市商鼎路与木兰大道交叉口北500米路西

授权公告日：2021年10月26日　　授权公告号：CN 214506265 U

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2021年10月26日

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其他事项参见续页

中华人民共和国国家版权局
计算机软件著作权登记证书

证书号:软著登字第5006263 4号

软 件 名 称： 配电柜巡检系统
V1.0

著 作 权 人： 河南天耀智能电气有限公司

开发完成日期： 2020年11月18日

首次发表日期： 2020年11月21日

权利取得方式： 原始取得

权 利 范 围： 全部权利

登 记 号： 2020SRE024938

根据《计算机软件保护条例》和《计算机软件著作权登记办法》的规定，经中国版权保护中心审核，对以上事项予以登记。

中华人民共和国国家版权局
计算机软件著作权登记专用章
2020年12月29日

No. 07111637

中华人民共和国国家版权局
计算机软件著作权登记证书

证书号:软著登字第5006251 6号

软 件 名 称： 智能用电
V1.0

著 作 权 人： 河南天耀智能电气有限公司

开发完成日期： 2020年11月15日

首次发表日期： 2020年11月16日

权利取得方式： 原始取得

权 利 范 围： 全部权利

登 记 号： 2020SRE024820

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计算机软件著作权登记专用章
2020年12月29日

No. 07111515

中华人民共和国国家版权局
计算机软件著作权登记证书

证书号：软著登字第[illegible]号

软 件 名 称： 智能用电
V1.0

著 作 权 人： 河南天耀智能电气有限公司

开发完成日期： 2020年11月15日

首次发表日期： 2020年11月16日

权利取得方式： 原始取得

权 利 范 围： 全部权利

登 记 号： 2020SRE024820

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2020年12月29日

No. 07111515

资质证书
Qualification certificate

中华人民共和国国家版权局
计算机软件著作权登记证书

证书号： 软著登字第7188870号

软 件 名 称： 低压成套开关设备操作员站控制系统
V1.0

著 作 权 人： 河南天耀智能电气有限公司

开发完成日期： 2020年04月10日

首次发表日期： 2020年04月30日

权利取得方式： 原始取得

权 利 范 围： 全部权利

登 记 号： 2021SR0466244

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2021年08月29日

No. 07685175


中国国家强制性产品认证证书

中国质量认证中心

2488912


产品认证证书

中国质量认证中心

0291300


产品认证证书
II型自愿认证

中国质量认证中心

0036962


PRODUCT CERTIFICATION
TYPE II CQC CERTIFICATION

CHINA QUALITY CERTIFICATION CENTRE

0036962


中国国家强制性产品认证证书

中国质量认证中心

2463357


产品认证证书

中国质量认证中心

0291299


产品认证证书
II型自愿认证

中国质量认证中心

0036961


PRODUCT CERTIFICATION
TYPE II CQC CERTIFICATION

CHINA QUALITY CERTIFICATION CENTRE

0036961

资质证书

Qualification certificate


中国国家强制性产品认证证书
证书编号：2019010301204422
中国质量认证中心
2335903


产品认证证书
证书编号：CQC2019010301204422
中国质量认证中心
0291296


产品认证证书
II型自愿认证
中国质量认证中心
0036948


PRODUCT CERTIFICATION
TYPE II CQC CERTIFICATION
CHINA QUALITY CERTIFICATION CENTRE
0036948

资质证书
Qualification certificate


中国国家强制性产品认证证书
证书编号：2019010301204891
中国质量认证中心
2349521


产品认证证书
证书编号：CQC2019010301204891
中国质量认证中心
0291297


产品认证证书
II型自愿认证
中国质量认证中心
0036949


PRODUCT CERTIFICATION
TYPE II CQC CERTIFICATION
CHINA QUALITY CERTIFICATION CENTRE
0036949

资质证书
Qualification certificate

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Qualification certificate


产品认证证书
II型自愿认证
中国质量认证中心


PRODUCT CERTIFICATION
TYPE II CQC CERTIFICATION
CHINA QUALITY CERTIFICATION CENTRE


产品认证证书
中国质量认证中心


PRODUCT CERTIFICATION
CHINA QUALITY CERTIFICATION CENTRE


国家强制性产品认证
试验报告


国家强制性产品认证
试验报告


国家强制性产品认证
试验报告


国家强制性产品认证
试验报告
申请编号：A2019CCC0301-2908900
产品名称：交流低压配电柜
型　　号：GCD
检测机构：山东省产品质量检验研究院
（国家节能产品质量监督检验中心、国家低压电器
元件及成套开关控制设备质量监督检验中心）


国家强制性产品认证
试验报告


CQC 产品认证
型式试验报告
申请编号：V2020CQC0200356-590063
产品名称：组合配电箱
型　　号：JP
检测机构：

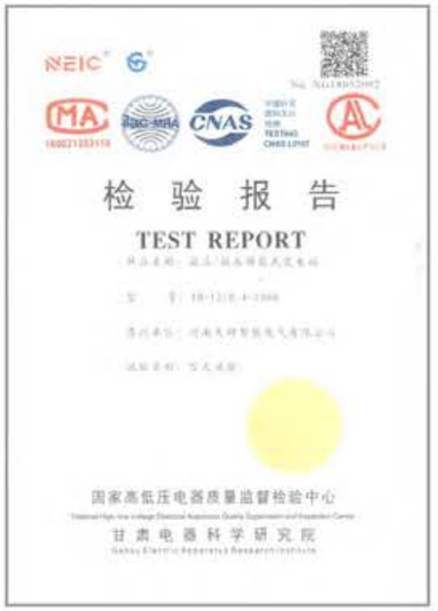

CQC 产品认证
型式试验报告
申请编号：V2020CQC107501-767007
产品名称：户内配电箱
型　　号：PZ30
检测机构：


CQC 产品认证
型式试验报告
申请编号：V2020CQC107501-767006
产品名称：配电箱
型　　号：JXF
检测机构：


检 验 报 告
TEST REPORT
国家高低压电器质量监督检验中心
甘肃电器科学研究院


检 验 报 告
TEST REPORT
国家高低压电器质量监督检验中心
甘肃电器科学研究院


检 验 报 告
TEST REPORT
国家高低压电器质量监督检验中心
甘肃电器科学研究院


检 验 报 告
TEST REPORT
国家高低压电器质量监督检验中心
甘肃电器科学研究院


检 验 报 告
TEST REPORT

产品名称 组合式变压器
型号规格 ZGS13-H-800/10
委托单位 河南天耀智能电气有限公司
检验类别 委托检验

国家电器安全质量监督检验中心(浙江)
（浙江方圆电气设备检测有限公司）


检 验 报 告
TEST REPORT

产品名称 高压室预分支箱
型号规格 DFW-12/630-25
委托单位 河南天耀智能电气有限公司
检验类别 型式试验

国家电器安全质量监督检验中心(浙江)
（浙江方圆电气设备检测有限公司）


检 验 报 告
TEST REPORT

产品名称 SF6 全绝缘全密封气体绝缘环网柜
型号规格 XGN-F12/325-31.5
委托单位 河南天耀智能电气有限公司
检验类别 型式试验

国家电器安全质量监督检验中心(浙江)
（浙江方圆电气设备检测有限公司）


检 验 报 告
TEST REPORT

产品名称 SF6 全绝缘全密封气体绝缘环网柜
型号规格 XGN-V12/630-25
委托单位 河南天耀智能电气有限公司
检验类别 型式试验

国家电器安全质量监督检验中心(浙江)
（浙江方圆电气设备检测有限公司）


检 验 报 告
TEST REPORT

产品名称 SF6 全绝缘全密封气体绝缘环网柜
NAME OF SAMPLE
型号规格 XGN-C12/630-25
MODEL
委托单位 河南天耀智能电气有限公司
CUSTOME
检验类别 型式试验
TEST CATEGORY

国家电器安全质量监督检验中心(浙江)
STATE CENTER OF SUPERVISION TEST FOR ELECTRICAL SAFETY(ZHEJIANG)
（浙江方圆电气设备检测有限公司）

KYN61-40.5

铠装移开式交流金属封闭开关设备

Steel-Clad Removable-Type AC Metal-Enclosed Switchgear

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天耀电气 TIANYAO ELECTRIC

KYN61-40.5

铠装移开式交流金属封闭开关设备

Steel-Clad Removable-Type Ac Metal-Enclosed Switchgear

概述 General

KYN61-40.5 开关设备配置性能优良的 ZN85A，VD4 真空断路器，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。

KYN61-40.5 开关设备使用在 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外，还可以使用于频繁操作的场所。使用环境条件按 GB3906《3.6- 40.5kV 交流金属封闭开关设备》所规定的正常使用条件。

KYN61-40.5 switchgear is equipped with advanced ZN85A vacuum circuit breaker. VD4 vacuum circuit breaker cabinet uses the assembly structure to increases the quality of appearance and manufacturing precision; Bus bar uses heat insulation materials or the insulation of the epoxy coating methods to optimize the electrode shape, compact the structure of the cabinet, and possess perfect function of “five prevention”

KYN61-40.5 Switchgear is applicable in the power system of 40.5kV three-phase AC 50Hz, which is used to receive and distribute power as well as control, protect and monitor the circuit of power plant, substation and industrial and mining enterprises and high-rise buildings. In addition to the widely used for general power system, it can also be used in place of frequent operation. Using environment conditions are according to GB3906 “3.6-40.5kV AC Metal-enclosed Switchgear”.

型号含义 Type Designation

K Y N 61- 40.5 (Z)

- 真空断路器 Vacuum Circuit Breaker
- 额定电压 Rated Voltage
- 设计序号 Design No.
- 户内 Indoor Type
- 移开式 Removable Type
- 金属铠装式 Steel-clad Type

正常使用条件 Working Conditions

- 周围空气温度：最高温度 +40℃，最低温度 -15℃。
  Ambient temperature: -15~+40℃
- 相对湿度：日平均相对湿度：≤ 95%
  Humidity: daily average ≤ 95%
  日平均水蒸气压力不超过 2.2kPa;
  daily vapor pressure ≤ 2.2kPa
  月平均相对湿度：≤ 90%
  monthly average ≤ 90%
  月平均水蒸气压力不超过 1.8kPa;
  monthly vapor pressure ≤ 1.8kPa
- 海拔高度：1000m 以下。
  Altitude: ≤ 1000m
- 地震烈度：不超过 8 级。
  Earthquake intensity: ≤ magnitude 8
- 周围空气应不受腐蚀性或可燃气体、水蒸气等明显污染。
  It is applicable in the place without corrosive or flammable gas, vapor and so forth pollution.
- 无剧烈振动场所。
  It can not be used in violent vibration places.
- 超出 GB3906 规定的正常条件下使用时，由用户和制造厂协商
  Customer and manufacturer need to discuss when the environment conditions are not according to GB3906

结构特点 Structure Features

- 全金属模块化组装式结构
  All metal modular assembly type structure
- 柜体采用防腐蚀能力强的进口敷铝锌板制造
  Cabinet manufactured by imported anti-corrosion aluminium zinc plate
- 无需表面处理
  Without surface treatment
- 经 CNC 高精度设备加工
  CNC precision processing equipment
- 采用先进的多重折边工艺
  Advanced multiple folding process
- 连接用拉铆螺母、高强度螺栓连接
  Connection with riveting nut and high strength bolt
- 精度高、重量轻
  High precision, light weight

KYN61-40.5
铠装移开式交流金属封闭开关设备

主要技术参数 Specifications

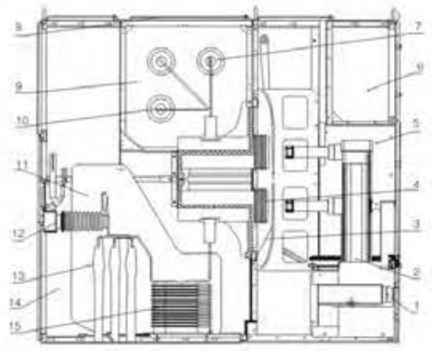
项目 Item			单位 Unit	数据 Data
额定电压 Rated Voltage			kV	40.5
额定频率 Rated Frequency			Hz	50
断路器额定电流 Rated Current of Circuit Breaker			A	1250、1600、2000、2500
开关设备额定电流 Rated Current of Switchgear			A	1250、1600、2000、2500
额定短时耐受电流（4s） Rated Short-time Withstand Current (4s)			kA	20、25、31.5
额定峰值耐受电流（峰值） Rated Peak Withstand Current (Peak Value)			kA	50、63、80
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 Closing Current (Peak Value)			kA	50、63、80
额定绝缘水平 Rated Insulation Level	1min 工频耐受电压 1min Power Frequency Withstands Voltage	极间、极对地间 Between Phases, Between Phase and Earth	kV	95
		断口间 Between Fractures	kV	110
	雷电冲击耐受电压（峰值） Lightning Impact Withstands Voltage (Full Wave)	极间、极对地间 Between Phases, Between Phase and Earth	kV	185
		断口间 Between Fractures	kV	215

防护等级 外壳为 IP4X，隔室间、断路器室门打开时为 IP2X。
Protection grade of the shell is IP4X. When the door of compartment and circuit breaker room open, the protection grade of the shell is IP2X.

外形尺寸 Dimension

高度 Height		2600
宽度 Width	额定电流 1600A 及以下 Rated Current ≤ 1600A	1400
深度 Depth	电缆进出线 Outlet and inlet line of cable	2870
	架空进出线 Overhead Outlet and inlet line	3000

设备结构图 Structure Chart



1、二次插头 secondary plug
2、断路器手车 circuit breaker
3、活门 valve
4、触头盒 contact box
5、断路器室 circuit breaker chamber
6、仪表室 instrument chamber
7、母线套管 bus bar bushing
8、泄压盖 relief cap
9、母线室 busbar chamber
10、主母线 main busbar
11、绝缘隔板 isolating partition
12、接地开关 earthing switch
13、电力电缆 power cable
14、电缆室 cable chamber
15、电流互感器 current transformer

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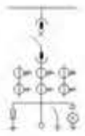
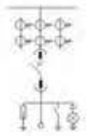
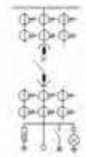
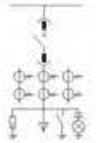
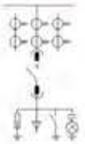
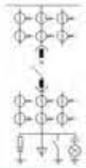
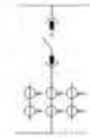
主电路方案图 Primary Wiring Scheme

方案号 Scheme Number		01	02	03	04	05
主电路方案图 Primary Wiring Scheme						
主要电器元件 Main Electric Component	真空断路器 ZN85-40.5 Vacuum Circuit Breaker ZN85-40.5	1	1	1	1	1
	电流互感器 LDJ5-35 Current Transformer LDJ5-35		3	3	6	
	电压互感器 JDJ9-35 Voltage Transformer JDJ9-35					
	避雷器 HY5WZ Lightning Arrester HY5WZ	0 或 3 选用 Choose 0 or 3	0 或 3 选用 Choose 0 or 3	0 或 3 选用 Choose 0 or 3	0 或 3 选用 Choose 0 or 3	0 或 3 选用 Choose 0 or 3
	接地开关 JN22-40.5 Grounding Switch JN22-40.5	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1
	带电显示 Charged Display	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1
	熔断器 XRNP-35 Fuse XRNP-35					
	变压器 SC9 Transformer SC9					
用途 Application		架空进（出）线 Overhead Inlet (outlet) Line	架空进（出）线 Overhead Inlet (outlet) Line	架空进（出）线 Overhead Inlet (outlet) Line	架空进（出）线 Overhead Inlet (outlet) Line	电缆进（出）线 Inlet (outlet) Line of Cable

方案号 Scheme Number		06	07	08	09	10
主电路方案图 Primary Wiring Scheme						
主要电器元件 Main Electric Component	真空断路器 ZN85-40.5 Vacuum Circuit Breaker ZN85-40.5	1	1	1	1	1
	电流互感器 LDJ5-35 Current Transformer LDJ5-35	2-3	2-3	2-6		2-3
	电压互感器 JDJ9-35 Voltage Transformer JDJ9-35					
	避雷器 HY5WZ2 Lightning Arrester HY5WZ2	0 或 3 选用 Choose 0 or 3	0 或 3 选用 Choose 0 or 3	0 或 3 选用 Choose 0 or 3		
	接地开关 JN22-40.5 Grounding Switch JN22-40.5	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1		
	带电显示 Charged Display	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1		
	熔断器 XRNP-35 Fuse XRNP-35					
用途 Application		电缆进（出）线 Inlet (outlet)	电缆进（出）线 Inlet (outlet)	电缆进（出）线 Inlet (outlet)	左（右）联络 Left (right) Connection	左（右）联络 Left (right) Connection

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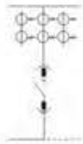
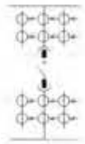
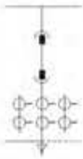
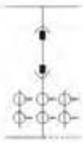
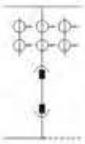
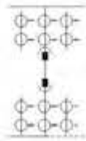
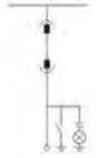
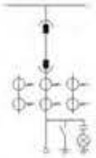
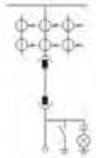
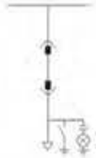
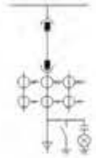
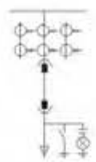
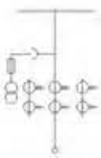
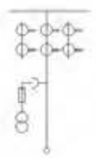
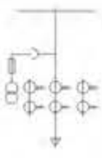
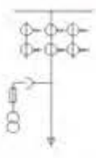
主电路方案图 Primary Wiring Scheme

方案号 Scheme Number		11	12	13	14	15
主电路方案图 Primary Wiring Scheme						
主要电器元件 Main Electric Component	真空断路器 ZN85-40.5 Vacuum Circuit Breaker ZN85-40.5	1	1	1	1	1
	电流互感器 LDJ5-35 Current Transformer LDJ5-35	2-3	4-6	0	2-3	
	电压互感器 JDJ9-35 Voltage Transformer JDJ9-35					
	避雷器 HY5WZ Lightning Arrester HY5WZ					
	接地开关 JN22-40.5 Grounding Switch JN22-40.5					
	带电显示 Charged Display					
	熔断器 XRNP-35 Fuse XRNP-35					
用途 Application		左(右)联络 Left (right) Connection	左(右)联络 Left (right) Connection	架空进(出)线 Overhead Inlet (outlet) Line	架空进(出)线 Overhead Inlet (outlet) Line	电缆进(出)线 Overhead Inlet (outlet) Line

方案号 Scheme Number		16	17	18	19	20
主电路方案图 Primary Wiring Scheme						
主要电器元件 Main Electric Component	真空断路器 ZN85-40.5 Vacuum Circuit Breaker ZN85-40.5					
	电流互感器 LDJ5-35 Current Transformer LDJ5-35	2-3		2-3	2-3	4-6
	电压互感器 JDJ9-35 Voltage Transformer JDJ9-35					
	避雷器 HY5WZ2 Lightning Arrester HY5WZ2					
	接地开关 JN22-40.5 Grounding Switch JN22-40.5					
	带电显示 Charged Display					
	熔断器 XRNP-35 Fuse XRNP-35					
用途 Application		电缆进(出)线 Overhead Inlet (outlet) Line	左(右)联络 Left (right) Connection	左(右)联络 Left (right) Connection	左(右)联络 Left (right) Connection	左(右)联络 Left (right) Connection

主电路方案图 Primary Wiring Scheme

方案号 Scheme Number		21	22	23	24	25
主电路方案图 Primary Wiring Scheme						
主要电器元件 Main Electric Component	真空断路器 ZN85-40.5 Vacuum Circuit Breaker ZN85-40.5					
	电流互感器 LDJ5-35 Current Transformer LDJ5-35		2-3	2-3		2-3
	电压互感器 JDJ9-35 Voltage Transformer JDJ9-35					
	避雷器 HY5WZ Lightning Arrester HY5WZ					
	接地开关 JN22-40.5 Grounding Switch JN22-40.5	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1
	带电显示 Charged Display	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1	0 或 1 选用 Choose 0 or 1
	熔断器 XRNP-35 Fuse XRNP-35					
用途 Application		架空进(出)线 Overhead Inlet (outlet) Line	架空进(出)线 Overhead Inlet (outlet) Line	架空进(出)线 Overhead Inlet (outlet) Line	电缆进(出)线 Overhead Inlet (outlet) Line	电缆进(出)线 Overhead Inlet (outlet) Line

方案号 Scheme Number		26	27	28	29	30
主电路方案图 Primary Wiring Scheme						
主要电器元件 Main Electric Component	真空断路器 ZN85-40.5 Vacuum Circuit Breaker ZN85-40.5					
	电流互感器 LDJ5-35 Current Transformer LDJ5-35	2-3	2-3	2-3	2-3	4-6
	电压互感器 JDJ9-35 Voltage Transformer JDJ9-35		2	2	2	2
	避雷器 HY5WZ2 Lightning Arrester HY5WZ2					
	接地开关 JN22-40.5 Grounding Switch JN22-40.5	0 或 1 选用 Choose 0 or 1				
	带电显示 Charged Display	0 或 1 选用 Choose 0 or 1				
	熔断器 XRNP-35 Fuse XRNP-35		3	3	3	3
用途 Application		电缆进(出)线 Inlet (outlet) Line of Cable	计量兼架空进线 Measuring and Overhead Inlet Line	计量兼架空进线 Measuring and Overhead Inlet Line	计量兼电缆进线 Metering and cable access	计量兼电缆进线 Metering and cable access

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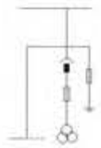
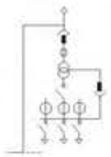
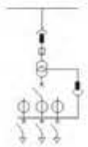
铠装移开式交流金属封闭开关设备

主电路方案图 Primary Wiring Scheme

方案号 Scheme Number		31	32	33		
主电路方案图 Primary Wiring Scheme						
主要电器元件 Main Electric Component	真空断路器 ZN85-40.5 Vacuum Circuit Breaker ZN85-40.5					
	电流互感器 LDJ5-35 Current Transformer LDJ5-35					
	电压互感器 JDJ9-35 Voltage Transformer JDJ9-35	2-3				
	避雷器 HY5WZ2 Lightning Arrester HY5WZ2	3				
	接地开关 JN22-40.5 Grounding Switch JN22-40.5					
	带电显示 Charged Display					
	熔断器 XRNP-35 Fuse XRNP-35	3				
变压器 SC9 Transformer SC9			1	1		
用途 Application		电压互感器 Voltage transformer	所变兼进线 Change and Inlet	所变 Change		

订货须知 Ordering Information

- 主电路方案编号、用途和主电路方案、配电室平面布置图及排列配置图等。
  The serial number and application of the main wiring scheme and the drawings of the main wiring scheme, the layout chart and arrangement diagram of the electric distribution room;
- 开关设备控制、测量及保护功能的要求以及其他封闭和自动装置的要求。
  The requirement of controlling, measuring and protecting of switch cabinet, as well as the requirement of close-lock and automatic system;
- 开关设备电器元件的型号、规格、数量。
  The type, specification and quantity of the main electric elements of the switch cabinet;
- 如开关设备之间或进线柜需要母线桥连接，应提供母线桥的额定载流量，母线桥的跨度，距地高度等具体要求数据。
  If the busbar-bridge connection between the switch cabinet or in-cable cabinet is needed, the detailed data such as rated current capacity of the busbar-bridge, the span and the height etc should be attached.
- 开关设备使用在特殊环境条件时，应在订货时详细说明。
  If the switch cabinet is used in special environment conditions, it must be declared when ordering.
- 其它特殊要求同本公司协商。
  Other special requirements need to be discussed when ordering.

天耀电气 TIANYAO ELECTRIC

KYN28A-12
铠装移开式金属封闭开关设备
Steel-Clad Removable-type Metal-enclosed Switchgear

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更多详情请登陆：
http://www.tianyaozhineng.com

KYN28A-12
铠装移开式交流金属封闭开关设备

概述 General

KYN28A-12 型铠装移开式交流金属封闭开关设备（以下简称开关设备），适用于户内三相 50/60Hz、额定电压 10kV 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。

KYN28A-12 型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，开关设备配置性能优良的 VS1、VD4 系列中置式高压交流真空断路器及固封式真空断路器。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，该开关设备是技术先进、性能稳定、结构合理、使用方便、安全可靠的配电设备。

KYN28A-12 Steel-Clad Removable-type Metal-enclosed Switchgear (hereinafter called switchgear for short) is applicable in the power system of three phases 50/60Hz, which is used to receive and distribute power as well as control, protect and monitor the circuit of power plant, substation and industrial and mining enterprises and high-rise buildings.

KYN28A – 12 switchgear has the function of preventing various wrong operations including preventing loading mobile handcart, preventing grounding switch to circuit the breaker in closed position, preventing to close the charged grounding switch and preventing straying into charged compartment and other functions. Switchgear is equipped with excellent mid-set type of VS1, VD4 series high voltage vacuum circuit breaker and enclosed type vacuum circuit breaker. The secondary loop configuration of the switchgear is advanced and reliable control protection devices; Busbar with heat insulation materials or the insulation of the epoxy coating methods, optimizes the electrode shape and compacts the structure. The switchgear is safe and reliable power distribution equipment with advanced technology, stable performance, reasonable structure and easy usage.

型号含义 Type Designation

K Y N 28A -12 (Z)

- 真空断路器 Vacuum Circuit Breaker
- 额定电压 Rated Voltage
- 设计序号 Design No.
- 户内 Indoor Type
- 移开式 Removable Type
- 金属铠装 Steel-clad type

正常使用条件 Working Conditions

- 环境条件：最高温度：+40℃，最低温度：-15℃，且在24h内测得的平均值不超过35℃。
  Ambient temperature: -15~+40℃ and the daily average temperature is below 35℃
- 温度条件如下：日相对湿度的平均值不超过 95%；
  Humidity: daily average ≤ 95%
  月相对湿度的平均值不超过 90%；
  monthly average ≤ 90%
  日水蒸气压力的平均值不超过 2.2kPa；
  daily vapor pressure ≤ 2.2kPa
  月水蒸气压力的平均值不超过 1.8kPa；
  monthly vapor pressure ≤ 1.8kPa
- 海拔不超过 1000m。 Altitude: ≤ 1000m
- 周围空气没有明显地受到尘埃、烟、腐蚀性和 / 或可燃性气体、蒸汽或盐雾的污染。
  It is applicable in the place without obvious dust, smoke, corrosive or flammable gas, vapor, salt mist and so forth pollution.
- 来自开关设备和控制设备外部的振动或地动是可以忽略的。
  The external vibration or ground shaking outside the switchgear and control equipment is negligible.
- 在二次系统中感应的电磁干扰的幅值不超过 1.6kV。
  In the secondary system of induction electromagnetic interference amplitude is less than 1.6 kV.

特殊使用条件 Special service conditions

- 在超过 GB/T11022 规定的正常环境条件下使用时，本公司和用户可就超出正常运行条件的特殊运行条件进行协商，并达成协议。
  Customer and manufacturer need to discuss when the environment conditions are not according to GB/T11022

主要技术参数 Specifications

名称 Item		单位 Unit	参数 Data
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
开关柜额定电流 Rated Voltage of Switchgear		A	630,1250,1600,2000,2500,3150
额定动稳定电流 (4s) Rated short-time withstand current (4s)		kA	16,20,25,31.5,40,50
额定稳定电流（峰值）Rated Peak Withstand Current (Peak Value)		kA	40,50,63,80,100,125
额定短路开断电流 Rated Short-circuit Breaking Current		kA	16,20,25,31.5,40,50
额定短路关合电流（峰值）Rated Short-circuit Closing Current		kA	40,50,63,80,100,125
1min 工频耐受电压 1min Power Frequency Withstands Voltage	额定绝缘水平 Rated Insulation Leve	kV	24,32,42
雷冲击耐受电压 Lightning Withstands Voltage		kV	40,60,75
防护等级 Protection Grade		外壳 IP4X、隔离间、断路器室门打开时为 IP2X Shell is IP4x, Shell is IP2X when compartment and circuit breaker doors are open	

结构和工作原理 Structure and Operating Principle

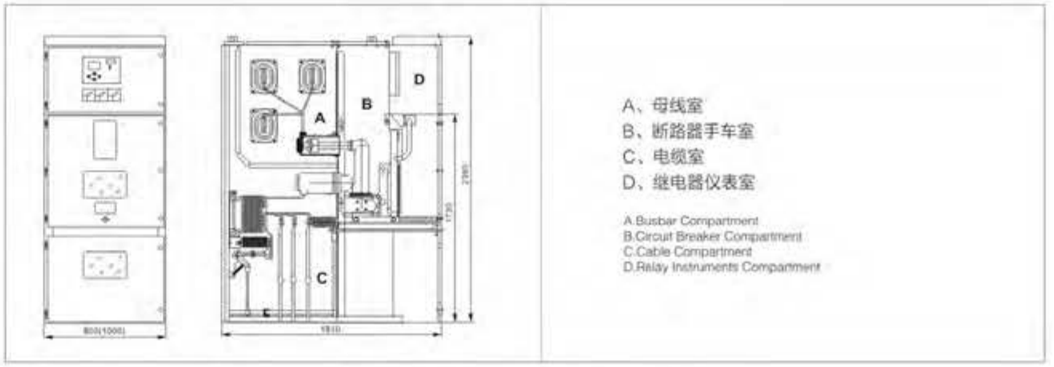
KYN28A-12 型开关设备由柜体和可移开部件（俗称手车）两大部分组成。柜体用金属隔板分成多个功能隔室，如母线室、断路器室、电缆室和继电器仪表室等。

开关设备的可移开部件可配置真空断路器手车、电压互感器手车、避雷器手车、隔离手车和熔断器手车等。

KYN28A-12 switchgear is composed of two parts: cabinet and removable components (commonly known as handcart). Cabinet is separated into several functional compartments by steel plates, such as busbar compartment, circuit breaker compartment, cable compartment and relay instruments compartment, etc.

The removable components of the switchgear are configured vacuum circuit breaker handcart, voltage transformer handcart, lightning arrester handcart, isolation handcart and fuse handcart, etc.

设备结构图 Structure Chart



图一 KYN28A-12 型开关设备结构示意图
Picture 1: Sketch of Switchgear Structure of KYN28A Switchgear

KYN28A-12
铠装移开式交流金属封闭开关设备

主要结构特征

◆开关设备可以背靠背组成双重排列，提高了开关设备的安全性和灵活性，减少占地面积。

◆外壳

开关设备的外壳选用进口敷铝锌钢板，经 CNC 机床加工，采用多重折边工艺制作而成。整个柜体具有精度高和很强的抗腐蚀与抗氧化性能，而且由于采用多重折边工艺，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，用拉铆螺母和高强度的螺栓连接而成。使加工生产周期缩短，零部件通用性强，占地面积少，便于组织生产。

◆手车

手车骨架采用薄钢板经 CNC 机床加工后组装而成。手车与柜体配合精度高，机械联锁安全、可靠、灵活。手车根据用途不同分为断路器手车、电压互感器手车、计量手车、隔离手车等，同规格的手车可以自由互换。手车在柜体内有断开 / 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。各种手车均采用丝杆推进、推出，操作轻便、灵活，适合值班人员操作。当手车需要移开柜体时，用一台专用转运车，就可方便取出，以便进行各种检查和维护。

当手车用运转车运入柜体断路器室时，便能可靠锁定在断开 / 试验位置，并且柜体位置指示灯显示其所在位置。只有手车完全锁定后，才能摇动丝杆推动结构，将手车推向工作位置。手车到达工作位置时，推进手柄操作力突然加大并摇转不动，其对应位置指示灯便显示其所在位置。手车的机械联锁能可靠保证手车只有在工作位置或试验位置，断路器才能进行合闸；而且断路器只有在分闸状态，手车才能移动。

◆隔室

开关设备主要电气元件都有其独立的隔室，既：断路器手车室、母线室、电缆室、继电器仪表室。各隔室间防护等级都达到 IP2X。除继电器仪表室外，其他三个隔室都分别有泄压通道。由于采用了中置式形式，电缆室空间大为增加，因此设备可并接多路电缆。

a、母线隔室 A：主母线是单台拼接相互贯穿连接，通过分支母线（静触头盒）及主母线绝缘套管固定。主母线和联络母线为矩形截面的铜排，用于大电流负荷时采用双母排。对于特殊需要。母线可用热缩套管和定制的绝缘罩盒覆盖。相邻柜母线间安装有绝缘套管，如果出现内部故障电弧时，套管能有效把事故限制在隔室内而不向其它间隔蔓延。

b、断路器隔室 B：隔室两侧安装了轨道，供手车在柜内由断开 / 试验位置移动至工作位置。静触头盒的隔板（活门）安装在手车室的后壁处，当手车从断开 / 试验位置移动到工作位置过程中，静触头盒口上的上、下活门与手车联动自动打开；当反向移动时，活门则自动闭合，直至手车退至一定位置而完全覆盖住静触头盒，形成有效的隔离。由于上、下活门之间不联动，在检修时，可锁定带电侧的活门，从而保证检修维护人员不触及带电体。在断路器室门关闭时，手车同样能被操作。通过门上的观察窗，可以观察隔室内手车所处位置，合、分闸指示及储能状况。

c、电缆隔室：开关设备采用中置式，因而电缆室空间较大。电流互感器、接地开关装在隔室后壁上（接地开关也可根据客户需要装在开关柜的中部），避雷器安装于隔室后下部。将手车和可抽出式水平隔板移开后，施工人员能从正面进入柜内安装和维护。电缆室内的电缆连接导体，每相可接 1~3 根电缆，必要时每相可并接 6 根电缆，电缆隔室的柜底配制可卸式开缝的金属封板或不导磁金属板，确保施工方便。

d、继电器仪表室：继电器仪表室内可安装继电保护元件、仪表、带电显示指示器以及特殊要求的二次设备。控制线路敷设在线槽内，线槽有全属板，可使二次线与高压元件隔离。左前侧线槽是为控制电缆的引进和引出预留的，底板相应部位开有二次电缆穿线孔。在继电器仪表室的顶板上还留有便于施工的母线穿越孔。接线时仪表室顶盖板可以翻开，便于小母线的安装。

Structure Features

◆ Switchgear can be composed of double back-to-back arrangement, hence the security and flexibility of the switchgear improves, and the area reduces.

◆ Shell

The shell of the switchgear chooses imported aluminium zinc steel plate, processes through CNC machine and adopts multiple folding processes. The whole cabinet is featured with high precision and strong resistance to corrosion and oxidation. As a result of multiple folding process, the cabinet is lighter, stronger and neater than other similar cabinet. The cabinet uses packaged structure and connects each part with pull rivet nuts and high strength bolts. Short production cycle, versatile components and parts and less area are easy to organize production.

◆ Handcart

The framework of the handcart is made of thin steel plate after CNC machine tool processing for assembling. Handcart and cabinet match up with high precision and safe, reliable and flexible mechanical interlocking. Handcarts are divided into different kinds by usage, such as circuit breaker handcart, voltage transformer handcart, metering handcart, isolation handcart, etc. and handcarts with same specification can be freely interchangeable. Handcart in the cabinet has disconnect/test position and work location with positioning device respectively to ensure reliable interlocking. Each handcart adopts screw rod to push in and pull out, hence such convenient and flexible operation is suitable for the personnel on duty. When the handcart needs to be removed from the cabinet, the personnel just uses a special transport vehicle to pull it out. It is very convenient for all kinds of inspection and maintenance.

When the handcart is pushed into the circuit breaker compartment by the transport vehicle, the circuit breaker is in the disconnection/test position, and the indicator lights of the cabinet show its location. Only after the handcart completely locked, the screw structure can be derived and the handcart can be pushed into working position. When the handcart arrives at working position and the sudden increase of the pushing handle operating force stays motionless, its corresponding position indicator will show its location. The mechanical interlock of the handcart guarantees the circuit breaker to close only in working/test position. And the handcart can be removed only when the circuit breaker is separate.

◆ Compartment

The main electric components of the switchgear have their own independent compartment, such as circuit breaker handcart compartment, busbar compartment, cable compartment and relay instruments compartment. The protection grade of each compartment is IP2X. In addition to relay instruments compartment, the other three compartments all have pressure relief channel respectively. Due to the adoption of mid-set type, the space of the cable compartment greatly increases, so the device can receive multi-channel cables.

a, busbar compartment A: main busbar is a single joint mutual connection structure and fixed through the branch busbar (static contact box) and main busbar insulation casing pipe. Main busbar and busbar connection adopt rectangular cross section copper platoon, and double busbar is used in high current load. For special needs, the busbar can be covered by heat shrinkable casing pipe and customization insulation cover box. The insulation casing pipes are equipped between adjacent busbars. If there is an internal fault arc, the casing pipe can effectively limit the accident in the compartment and not spread to other compartments.

b, the circuit breaker compartment B: Tracks are installed tracks on both sides of the compartment for the handcart to move from disconnection/test position to working position. The clapboard (valve) of static contact box is installed on its back wall of the compartment. When the handcart in the process of moving from disconnection/test position to working position, the upper and lower valve above the static contact box and handcart linkage automatically are open.
When the handcart moves reverse, the valve is closed automatically until the handcart retreat to a certain position and completely covered the static contact box to form the effective isolation. Because there is no linkage between upper and lower valve, when the personnel to maintain the switchgear needs to lock the charged side of the valve, so as to ensure the personnel do not touch the charged body. When the door of the circuit breaker compartment is closed, the handcart can also be operated. The position, the indication of close or open and the status of the energy storage can be observed through the observation window on the door.

c, cable compartment: The switchgear adopts mid-set type, thus the space of the cable compartment is larger. Current transformer and grounding switch are installed on the back wall of the compartment (grounding switch can also be installed in the central part of the switchgear according to customer needs), while the lightning arrester is installed below the compartment. Maintenance personnel can enter into the cabinet to install and maintain from the front when the handcart and the withdrawable type level clapboard are removed. Cable conductor in the cable compartment can access 1 ~ 3 cables for each phase. 6 cables when necessary. At the bottom of the cable compartment is equipped with removable slotted metal plate or steel metallic plate to ensure that the convenient construction.

d, relay instruments compartment: relay instruments compartment can be installed relay protection devices, instruments, charged display indicators and special requirements of secondary equipment. Controlling circuits are equipped in the slot, and the slot has a metal plate, which can isolate the secondary lines and the high pressure components. The slot at the left lateral in the front is reserved for the access for cables, and there are corresponding secondary cable threading holes in the back plate. On the roof of the relay instruments compartment, there are holes reserved for busbars. The roof cover can be removed for convenient wiring connection.

KYN28A-12
铠装移开式交流金属封闭开关设备

主要结构特征

◆泄压装置

在手车室、母线室和电缆室的上方均设有泄压装置，当隔室内发生故障产生电弧时，开关柜内部气压升高，装设在前门上的特殊密封圈把柜门封闭起来，顶部装备的泄压金属板被自动打开，释放压力和高温气体，确保操作人员和开关设备的安全。

◆二次插头与手车的位置联系

开关设备和手车的二次连线是通过二次插头的联络实现的，二次插头通过一根尼龙波纹伸缩管与手车相联，二次插座装设在开关柜手车的右上方。手车只有在试验 / 断开位置时，才能插上或拔除二次插头。手车进入工作位置时二次插头被锁定。配装合闸闭锁电磁铁的断路器手车，在二次插头接通之前，手车的合闸机构被电磁铁锁定，仅能分闸，无法进行合闸操作。

◆带电显示装置

开关设备可装检测一次回路运行的带电显示装置，该装置由高压传感器和显示器两部分组成。该装置可以提示高压回路带电状况，还可以与电磁锁配合，对操作手柄、柜门和闸柜实现强制闭锁，达到防止带负荷移动隔离手车、防止带电关合接地开关、防止误入带电间隔的目的，提高配套产品的防误性能。

◆防止凝露

为了防止在高湿度和温度变化较大的环境中产生凝露，在断路器室和电缆室分别装设电加热器，以便在上述运行条件下防止绝缘事故的发生。

◆接地装置

在电缆室内单独设有 5X40mm² 的接地铜排，且贯穿相邻各柜并与柜体良好连接，供直接接地之元器件使用。由于整体柜体用敷铝锌板相拼连，这们使整个柜体都处在良好的接地状态中，确保运行操作人员触及柜体时的安全。

◆防止误操作联锁装置及工作原理

开关设备内装有安全可靠的联锁装置，完全满足“五防”的要求。

a、仪表室门上装有提示性的按钮型转换开关以防止误合、误分断路器。

b、断路器手车只有在试验或工作位置时，断路器才能进行合、分操作，而且在合闸后，手车被锁住无法移动，防止带负荷时推、拉手车。

c、仅当接地开关处在分闸位置时，下门断路器手车从试验 / 断开位置移至工作位置；仅当断路器手车处于试验 / 断开位置时，接地开关才能进行合闸操作（接地开关可带电压显示装置），这样实现了防止接地开关处在闭合位置时开合断路器以及防止带电误合接地开关。

d、接地开关处于分闸位置时，下门及后门被锁定，防止误入带电间隔。

e、按客户要求配置合闸闭锁电磁铁的断路器手车，在未使闭锁装置解锁的情况下，能阻止手动或电动合闸操作。

f、断路器手车在工作位置时，二次插头被锁定不能拔除。

g、各柜间可装电气联锁。

本开关设备还可在接地开关操作机构上加装电磁铁锁定装置以提高可靠性，并可按用户要求提供后柜门与接地开关操作的反向联锁装置，订货时按用户的需求选择。

◆开关设备电气控制接线原理

真空断路器的二次控制原理分别由储能回路、合闸回路、分闸回路、闭锁回路和辅助开关回路等部分组成，闭锁电磁铁可供选用。断路器手车在试验位置或工作位置，有操作电源时闭锁电磁铁 Y1 带电吸合，限位开关 SP5 接点 13-14 闭合，合闸线圈 HQ 可以正常进行电气合闸操作，并且闭锁电磁铁 Y1 吸合后合闸弯板被解锁，也可以手动合闸。因此，在二次控制电源未接通情况下，闭锁电磁铁能阻止手动或电动合闸操作。

Structure Features

◆ Pressure Relief Device

At the top of the handcart compartment, busbar compartment and cable compartment are all equipped with pressure relief devices. When the compartments go wrong to produce arc, the pressure inside the cabinet increases and the door will be enclosed by a special sealing ring equipped in front door. And then the pressure relief plate at the top is automatically opened to release pressure and high temperature gas to ensure the safety of operators and switchgear.

◆ Connection between Second Plug and the Location of the Handcart

The connection between switchgear and the secondary wiring is achieved by the second plug. The second plug combines with handcart through a nylon corrugated expansion tube. And the secondary socket is installed in upper right of the handcart. The second plug can be plug in or pull out only the handcart in the test/disconnected position. The second plug is locked when the handcart is in working position. If the switchgear is equipped with closure magnet circuit breaker handcart, before the second plug connects, handcart switch is locked by the electromagnet, only can break but unable to close.

◆ Charged Display Device

Switchgear can be installed a charged display device for testing the primary loop. Such device consists of two parts: high pressure sensor and display and show the condition of the high voltage loop and can also cooperate with electromagnetic lock to forcefully close the operating handle, door of cupboard and adjacent tank to prevent to move the loading isolation handcart, to prevent to close the charged grounding switch, to avoid straying into charged compartments, and to improve performance of error prevention.

◆ To Prevent Condensation

In order to prevent the condensation in the environment of high humidity and temperature largely changes, the circuit breaker compartment and cable compartment are respectively installed with the electric heater, so that when the switchgear is used in the conditions mentioned above can prevent insulation.

◆ Grounding Device

In the cable compartment alone has 5X40mm2 grounding copper bar through the adjacent cabinet to connect each cabinet for the use of direct grounding of the components. Because the whole cabinet is coated with aluminium zinc plate, which are making the whole cabinet is in a good state of grounding and ensuring the safety of the operation personnel when they touch the cabinet.

◆ Interlocking Device to Prevent Wrong Operation and Its Working Principle

A safe and reliable interlocking is attached to the switchgear and it is fully meet the requirements of "five prevention".

a, Suggestive button switch is equipped at the door of the relay instruments compartment to prevent wrong close and open.

b, Circuit breaker handcart only can be closed or open when it is in the test/working position, and after the close, the handcart can not be removed, so that the handcart can not be draw in or draw out with loading.

c, Only when the grounding switch is in breaking position, the circuit breaker handcart moves from the test/disconnected position to the working position. Only when the circuit breaker handcart is in the test/disconnected position, the grounding switch can be closed (grounding switch can be equipped with voltage display unit), so that the circuit breaker can not be closed or opened when the grounding switch is closed and also prevent to close the grounding switch with charge.

d, When grounding switch is in breaking position, the door below and at the back are locked to prevent straying into charged compartments.

e, The switchgear can be equipped with circuit breaker handcart with closed electromagnet according to the demand of customers so that in the case of failure to unlock the lock device to prevent the manual or electric closing operation.

f, When the circuit breaker handcart is in the working position, the second plug is locked and cannot pull out.

g, The electric interlocking can be equipped among each cabinet.

This switchgear can also add electromagnet locking devices on the grounding switch in order to improve the reliability and also can provide reverse interlocking device between back door and grounding switch according to the requirements of customers. Customers need to choose a suitable one when place the order.

◆ Wiring Principle for Switchgear Electrical Control

The principle of the secondary control of vacuum circuit breaker consists of the energy storage circuit, closing circuit, breaking circuit, locking circuit and auxiliary switching circuit, and closed electromagnet can be used or not. When the circuit breaker handcart is in test/working position, the charged electromagnet Y1 is closed by the operation power and limit switch SP5 contact 13-14 close, and closing coil HQ can be normal for electrical closing operation, and after the closing of the electromagnet Y1, the closing bending plate is unlocked (also be manually closing).Therefore, when the second control power is out of power, the closed electromagnet can prevent the manual or electric closing operation.

运输、安装和调试

◆运输和存放注意事项

a、产品在装卸、运输时不准倾翻、倒置和遭受剧烈振动，吊绳应置于包装箱或开关设备指定的部位。

b、防止雨淋，以免产品受潮。

c、开关设备抵达现场时，收货人应检查货物外包装是否完整，货物有无受到损坏或短缺，必要时应通知供货方到现场共同检查。d、产品的搁置应平稳，不得随意拆卸电器元件及零部件。

◆开关设备的安装

a、基础框架表面应平整且高出地坪 2~4mm，框架平整度和直线度允许公差为 1mm。

b、在基础框架上逐台调整开关柜的位置依次拼接，垂直度不超过 2mm。到开关柜数量多于 10 台时最好从中间开始安装。

c、开关柜与基础框架采用螺栓连接或焊接。

d、为方便主母线的安装，开关设备的拼柜安装宜与主母线安装交替进行。

e、用预装的接地母排逐柜连接开关设备的主接地母线，将开关设备主接地母线与配电室的接地极相连。

f、一次电缆和二次电缆安装完成后，要封堵电缆穿孔周边的空隙，并装好封板和隔板。

◆开关设备的调试

a、检查隔离触头和插入深度和接触是否良好。

b、开关设备安装后要进行操作试验，手动操作断路器、手车和接地开关等部件，并检查机械联锁全部程序的操作，动作要准、确，应灵活无卡滞现象。

c、检查断路器的机械特性是否符合要求，并按规定的最高、最低操作电压进行操作试验，合分应正常。

d、对二次回路进行通电试验，检查保护、控制和信号回路动作的正确性。

e、主回路电阻测量，断路器的回路电阻应不超过标准规定值。

f、主回路相间和相对地间工频耐压试验，按交接验收规定进行。

g、二次回路绝缘强度试验 2000V/1min。应无击穿闪络现象。二次回路中的电子器件部分，试验电压由用户与制造厂商定。

Transportation ,Installation and Adjustment

◆ Transportation and Storage

a. When loading and unloading, and during the transportation, the switchgear can not be allowed to be tilting, inversing, and violently vibrating. The wire should be placed in the specified area of the packing or switchgear.

b. The switchgear should be away from the rain in order to avoid the product be affected with damp.

c. When the switchgear arrives at the scene, the consignee should check whether the outer packing of goods is complete, whether the goods is damage or shortage. Customers shall notify the supplier to the site inspection if necessary.

d. The Switchgear should be placed in a flat ground smoothly and shall not arbitrarily remove electrical components and parts.

◆ Installation

a. The surface of the basic framework should be smooth and 2~4mm higher than the floor. The tolerance of the framework of flatness and straightness is 1mm.

b. The tolerance of vertical degree is no more than 2mm when the switchgears are in the basic framework by adjusting the position of the switch cabinet in turn. If the cabinets are over 10, it would be better to adjust from the middle.

c. The switchgear and basic frame are connected by bolts or welding.

d. For the convenient installation of the busbar, the installation of the cabinets and busbars would be better to carry out alternately.

e. Connect the cabinets to main grounding busbar of the switchgear with preinstalled grounding busbar. And then connect the main grounding busbar to the grounding electrode in distribution compartment.

f. After the installation of the primary cable and secondary cable, the cable surrounding space should be sealed, and equipped with sealing plate and clapboard.

◆ Adjustment

a. Check out if the isolating contacts and insert depth and contacts are in good condition.

b. After the installation, the switchgear should do the operation tests: manually operate the circuit breaker, handcart, grounding switch and so forth components, and test all the mechanical interlocking and make sure the operation is correct and the reaction of the devices are smooth.

c. Check whether the circuit breaker's mechanical properties is conform to the requirements, and operate in accordance with the highest and the lowest operating voltage test to make sure it is normal.

d. Do the electric test for the secondary circuit to make sure the protection, controlling and signal loop are in right way.

e. Measure the primary loop resistance, and the loop resistance of circuit breaker should be not more than standard specified value.

f. The power frequency withstand voltage test between phases and between phase and earth should be in accordance with acceptance inspection.

g. The secondary loop dielectric strength test of 2000V/1min should be no breakdown flashover phenomenon. The test voltage for electronics part of secondary loop should be agreed by the users and manufacturers.

开关设备的操作程序

虽然开关设备设计有保证各部分操作程序正确的联锁装置，但是操作人员对开关设备仍应严格按操作规程和本技术文件的要求进行操作，不应随意操作，更不应在操作受阻时不加分析强行操作，否则容易造成设备损坏，甚至引起事故。

◆无接地开关的断路器柜操作

a、将断路器可移开部件装入柜体：把断路器手车装在转运车上并锁定好，将转运车推到柜前，把小车升到合适位置后，将转运车前部定位锁板插入柜体中隔板插口并将转运车与柜体锁定，打开断路器小车锁定钩，将断路器手车平稳推入柜体同时锁定，当确认已将手车与柜体锁定之后，解除转运车与柜体的锁定，将转运车拉开。

b、手车在柜内操作：断路器手车装入柜体后即处于断开位置，将辅助回路二次插头插好后手车处于试验位置。若通电则仪表室面板上试验位置指示灯亮，此时主回路接通，断路器处于工作位置，可通过控制回路对其进行合、分操作。

◆若准备将小车从工作位置退出，首先应确认断路器已处于分闸关态，插入手车操作摇把，逆时针转动直到摇把明显受阻并听到清脆的辅助开关切换，小车便回到试验位置。此时，主回路已经完全断开，金属活门关闭。

a、从柜中取出手车：从柜内取出手车时要确定断路器处于分闸状态，然后解除辅助回路二次插头和锁在手车架上，此时将转运推至柜前（与手车装入柜内时相同）并锁定，然后将手车解锁并向外拉出。当手车完全进到转运车上并确认与转运车锁定后，解除运转车与柜体的锁定，把转运车向后拉出。如手车要用转运车运输较长距离时，在推动转运小车过程中要格外小心，以避免运输过程中发生倾翻等事故。

b、断路器手车在柜内的分、合闸状态确认：分、合闸状态可由断路器手车面板上的分、合指示牌及仪表室面板上分、合闸指示灯来判定。若透过柜体中面板观察看到手车面板上绿色的分闸指示牌则判定断路器处于分开状态，此时如果辅助回路二次插头接通操作电源，则仪表面板上分闸指示灯亮。

◆有接地开关的断路器柜操作

将断路器手车推入柜内取出手车程序，与无接地开关的断路器柜的操作程序完全相同。仅将手车在柜内操作和接地开关操作过程中要注意的地方叙述如下：

a、在柜外操作时：当准备将手车推入工作位置时，除了要遵守 5.1b) 中提请注意的诸项要求外，还应确认接地开关要处于分闸状态，否则下一步操作无法完成。

b、分、合接地开关操作：若要合接地开关，首先应确定手车已退到试验 / 断开位置，并取下推进摇把，然后按下接地开关操作孔的联锁弯板，插入接地开关操作手柄，顺时针转动 90°，接地开关处于合闸状态。若再逆时针转动 90°，便将接地开关分闸。

◆一般隔离柜操作

隔离插头不具备接通和断开负荷电流的能力，因此在带负荷的情况下不允许移动手车。在进行隔离操作手车作时，必须保证先将与之相配合的断路器分闸（见 5.1 中 d），断路器分闸后其辅助触点转换解除与之融合的隔离手车上的电气联锁，只有这时才能操作隔离手车。具体操作程序与断路器手车操作程序相同。

KYN28A-12 型开关设备是以机械联锁实现其“防误”功能。联锁操作过程中如发现操作阻力增大，应在排除有误操作可能的前提下，及时检查联锁装置。

Operation Program

Although the design of the switchgear guarantees right procedures of every part with interlock devices, but the operator still should operate in strict accordance with the procedures and the requirements of this technical document, and should not be operate at will, and even should not operate violently without analysis, otherwise it will cause the damage of the equipment, even cause accidents.

◆ Operation for Circuit Breaker without Grounding Switch

a, Put the removable parts of the circuit breaker into cabinet: lay the circuit breaker handcart in the transfer vehicle and lock it up, push the transfer vehicle in front of the cabinet, put the transfer vehicle up to the right place, plug the location lock plate of the transfer vehicle into the clapboard socket and lock the transfer vehicle and the cabinet, open the lock hook of circuit breaker handcart, push the circuit breaker handcart smoothly into the cabinet and lock it at the same time, after confirming lockage between the handcart and cabinet, unlock the lock between the transfer vehicle and the cabinet, and pull the transfer vehicle away.

b, Handcart is operated in the cabinet: after the circuit breaker handcart installed in the cabinet, the position is breaking. After plug the second plug of auxiliary loop in the right place, the handcart is in test position. If it is charged, the signal light on the plate of relay instruments compartment is light and the main loop is closed and the circuit breaker is in working position and closing and breaking can be controlled through loop.

◆ If quit the handcart from the working position, should first confirm the circuit breaker is breaking, then insert the handcart operation crank, and rotate counterclockwise until the crank is blocked and heard the handover sound of auxiliary switch, then the handcart goes back to the test position. Now, the main circuit has been completely disconnected, and the metal valve closed.

a, Draw out the handcart from the cabinet: make sure the circuit breaker is breaking when pull the handcart from the cabinet, then unplug the second plug of auxiliary loop and lock it in the handcart, now pull the transfer vehicle to the front cabinet (same position to install the handcart) and lock it, and then unlock the handcart and pull it out. If it is long distance for carrying the handcart with transfer vehicle, the operation must be much more careful in case to turn upside down during transferring.

b, Confirm the closing and breaking position of the circuit breaker in the cabinet: the closing and breaking position can be showed in the plate of circuit breaker handcart and also in the plate of the relay instruments compartment. If the indicator light is green when observed through the plate, the circuit breaker is in breaking position. Now if the second plug of the auxiliary loop is charged, the indicator light of breaking lights.

◆ Operation for Circuit Breaker with Grounding Switch

Processes are same to the operation for circuit breaker without grounding switch. Only list the items needed more attention attached as follows:
a. Operate outside the cabinet: when it is ready to push the handcart into the working location, apart from the requirements mentioned in 5.1b), we still need to confirm whether the grounding switch is in the breaking position, otherwise we can not move for the next step.

b, Closing and breaking operation of grounding switch: if the grounding switch needs to be closed, make sure the handcart has backed to the test/breaking position first, then take down the boosting crank, and then press the interlocking plate in the hole of the grounding switch, then insert the operation handle of the operation handle, turn clockwise 90°, and the grounding switch will be in the closing state. If the handle turns anticlockwise 90°, the grounding switch is in breaking state.

◆ Operation for General Isolation Cabinet

The isolation plug is not capable to close or break the loading current, so the handcart can not be moved when it is loaded. When operate the isolation handcart, the corresponding circuit breaker must be in breaking state (see item d in 5.1). After the breaking of the circuit breaker, its auxiliary contacts change the electric interlocking of isolation handcart. Only under this condition, the isolation handcart can be operated. And the detailed operation processes are same to the circuit breaker handcart.

KYN28A-12 switchgear uses mechanical interlocking to achieve its function of error prevents. When meet the increasing obstruction from the interlocking operation, after ruling out the error operations, check the interlocking devices immediately.

KYN28A-12
铠装移开式交流金属封闭开关设备

开关设备的维护和保养 Maintenance

设备 / 元件（如易损件）的检查和维护周期，取决于其运行时间的长短、操作频繁程度和故障开断的情况等。根据运行条件和现场环境，每 3~5 年对开关设备进行一次检查和保养。
The check-out and maintenance period of the switchgear and its components depends on the working hours, frequency of the operation and the closing and condition of breakout. Normally, every 3 to 5 years, the switchgear needs to be checked out and maintained according to the operation condition and the field environment.

a、按真空断路器使用说明书的要求，检查断路器和操作机构的工作情况，并进行必要的调整和润滑。
a. Check out the working condition of the circuit breaker and operating mechanism and adjust and oil it if necessary according to the operation instruction of the vacuum circuit breaker.

b、检查手车进车、出车全过程的工况，必要时进行调整和润滑。
b. Check out the working condition of drawing out and drawing in the handcart and adjust and oil it if necessary.

c、检查联锁装置是否灵活可靠；必要时进行调整和润滑。
c. Check out the flexibility and reliability of the interlocking devices and adjust and oil it if necessary.

d、检查动、静隔离触头接触表面有无损伤，插入深度是否符合要求，弹簧压力有无减弱，表面镀层有无异常氧化现象，并更 换隔离触头上的陈旧导电膏。
d. Check out if there is any damage at the surface of the moving isolation contacts and static isolation contacts, if the depth of plug in is accord to requirement, if the spring pressure reduces, and if the clad layer oxidize unusually. And change the old conductive paste.

e、检查母线和各导电连接部位的接触情况并紧固连接，发现表面有发热现象要进行处理。
e. Check out the connections between each busbar and cable and tighten it if necessary. Deal with the heated surface.

f、检查接地回路部分的情况，如接地触头、主接地线及过门接地线的接触情况，保证其导电的连续性。
f. Check out the condition of grounding loop, such as grounding contacts, main grounding cable and grounding cable through the door, and make sure their conductive continuity.

g、用软布擦拭真空灭弧室和绝缘件表面的灰尘。如因凝露致使出现局部放电现象，可以在放电表面涂一层薄的硅脂作为临时修补。
g. Use a soft cloth to wipe dust on vacuum interrupter and insulation parts surface. If partial discharge happens due to condensation, smear a thin layer of silicone grease as temporary fix.

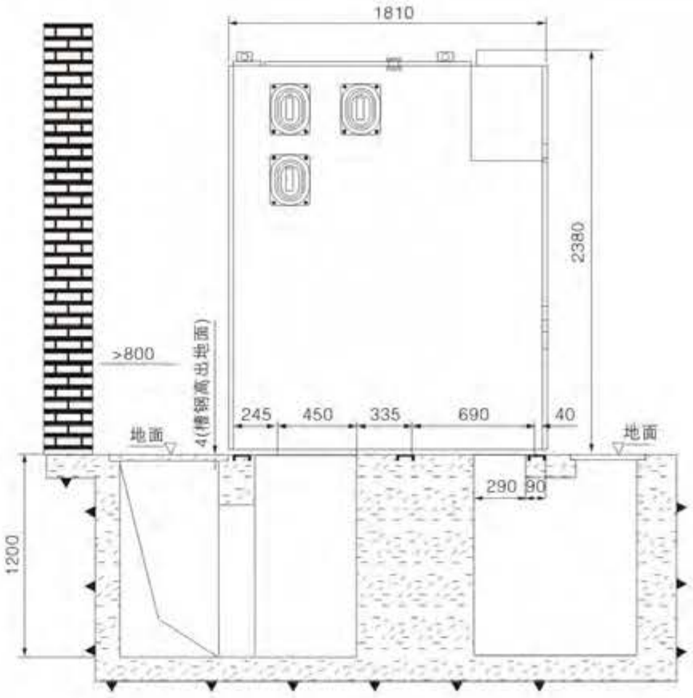
随机文件 Attached Documents

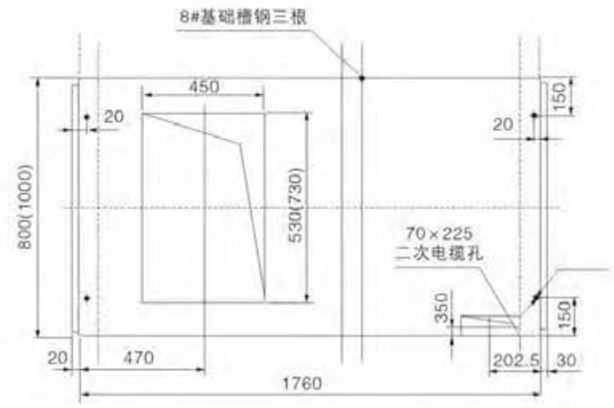
- ◆产品合格证。
  Product Qualification Certificate
- ◆出厂检验报告。
  Delivery Inspection Report
- ◆安装使用说明书。
  Operation Instruction
- ◆二次接线图。
  Secondary Connection Diagram
- ◆装箱单。
  Packing List
- ◆专用工具。
  Special Tools
- ◆开关设备主要元件的使用说明书等技术文件和附件。
  Instruction of Main Components

订货须知 Ordering Information

- ◆主接线方案图。
  Primary Wiring Scheme
- ◆开关设备排列和配电室平面布置图。
  Layout Chart of the Arrangement of the Switchgears and Distribution Compartment
- ◆开关设备内主要电器设备的型号、规格和数量。
  Model, Specification and Quantity of Main Devices
- ◆二次回路图。
  Secondary Circuit Diagram
- ◆开关设备在特殊环境条件使用时，应在订货时说明。
  If the switchgear is used in special conditions, it must be declared when ordering.
- ◆其他特殊要求。
  Other Special Requirements

产品尺寸图 Product size chart



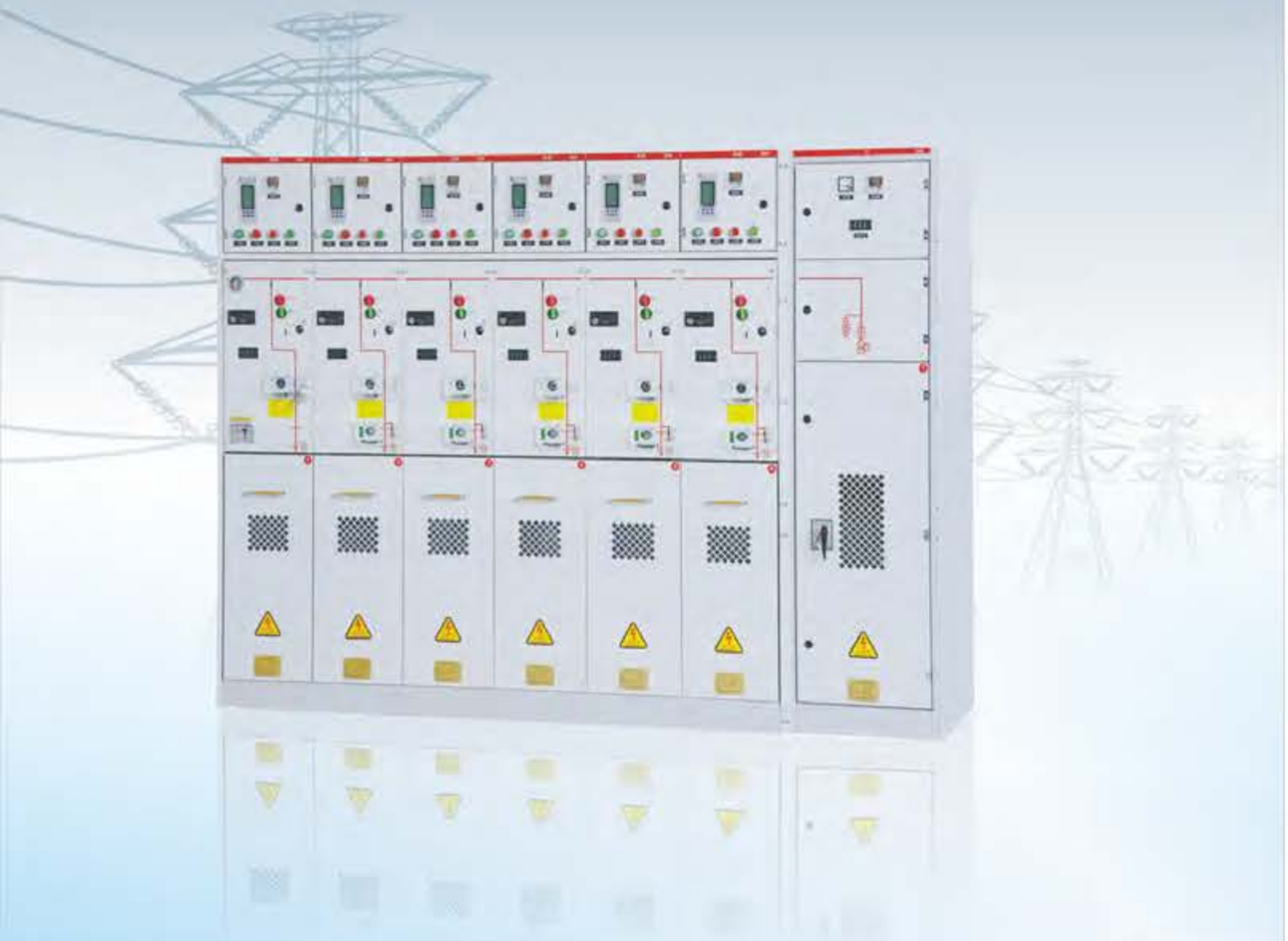


图二 开关设备安装基础及底板开孔尺寸图
Picture 2: Basic Installation Diagram and Baseboard Hole Size Diagram

XGN-□12

系列全绝缘充气式环网开关设备

XGN-□12 Series of fully insulated pneumatic ring network switchgear



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概述 General

本公司自主研发的XGN-□12全绝缘充气式环网开关设备，已经通过国家高压电器试验中心型式试验。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。

XGN-□12全绝缘充气式环网开关设备是一个完全密封的系统，其所带电部件以及开关封闭在不锈钢的本体内。整个开关装置不受外部环境条件影响，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，确保了可靠性和安全性。XGN-□12全绝缘充气式环网开关设备同时可以提供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。

XGN-□12全绝缘充气式环网开关设备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可扩展性，因而具有极特殊的灵活性。

XGN-□12全绝缘充气式环网开关设备执行GB标准。在室内条件下(20℃)运行的设计寿命超过30年。

XGN-□12 fully insulated inflatable ring network switchgear independently developed by the company has passed the type test of the national high voltage apparatus test center. The products are widely used in 10kV / 6kV power distribution Power system is the preferred switching product of power transformation and distribution system for various users in urban and rural areas.

The switch cabinet is a modular unit mode, which can be combined according to different purposes; It consists of fixed unit combination and expandable unit to meet the requirements of various substations for compact switches The need for flexible use of cabinet.

The main body of XGN-□12 is a fully enclosed stainless steel inflatable switch system. The entire switchgear is not affected Affected by external environmental conditions, so as to ensure operation reliability and personal safety. And realize maintenance free. By selecting expandable bus, any combination can be realized to achieve full mode Blocking. The safety insulation and shielding of the expansion bus ensure the reliability and safety.

XGN-□12 fully insulated inflatable ring network switchgear can provide TV automation solution at the same time The concept of intelligent switch is formed, and the workload of on-site installation and commissioning is minimized.

XGN-□12 fully insulated inflatable ring network switchgear is divided into non expandable standard configuration and expandable standard configuration. Due to the combination of full module and half module and self scalability Therefore, it has very special flexibility.

XGN-□12 fully insulated inflatable ring network switchgear shall comply with GB standard. The design life for operation under indoor conditions (20 ℃) is more than 30 years.

型号含义 Type Designation

XGN - □ - 12 / □ □ □

- 电缆进出线方式 Cable inlet and outlet mode
  - L：左边电缆进出线 L:Left cable inlet and outlet　R：右边电缆进出线 R: Right cable inlet and outlet
  - LR：两边电缆进出线 LR: incoming and outgoing cables on both sides　空白：正面进出线 Blank: front incoming and outgoing lines
- 扩展类型 Extension type
  - I：左边扩展 I: Left extension　D：右边扩展 D: Right extension
  - ID：两边扩展 ID: two side extension　空白：不可扩展 Blank: not extensible
- 额定电流 Rated current
  - 630 额定电流630A 630 rated current 630A
  - 1250 额定电流1250A 1250 rated current 1250A
- 额定电压 Rated voltage
  - 12 额定电压12KV 12 rated voltage 12KV
  - 24 额定电压24KV 24 rated voltage 24KV
- 柜型名称 Cabinet type name
  - C：负荷开关柜 C: Load switch cabinet　F：熔断器组合柜 F: Fuse combination cabinet
  - V：真空断路器柜 V: Vacuum circuit breaker cabinet　SV,SL,母线分段柜 SV, SL, bus section cabinet
  - M：计量柜 M: Metering cabinet　PT：PT柜cabinet
  - (共箱柜由C,F,V,SV,SL任意组合而成。) (the total cabinet is composed of any combination of C, F, V, SV and sl.)
- 全绝缘充气式环网开关设备 Fully insulated inflatable ring network switchgear

XGN-□12
系列全绝缘充气式环网开关设备

性能指示 Performance indication

单元代号 Unit code	意义 significance
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 combination unit
V	断路器单元 Circuit breaker unit
D	电缆进线单元(不带开关) Cable incoming 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
RT	PT单元 PT unit
1K1(4)	双套管出线的负荷开关单元 Load switch unit with double bushing outgoing line

主要技术参数 Specifications

型号 model		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 Combined electrical apparatus	真空开关 vacuum switch	隔离/接地开关 Disconnector / earthing switch	真空断路器 Vacuum circuit breaker	隔离/接地开关 Disconnector / earthing switch
额定电压 Rated voltage	kV	12	12	12	12	12	12
额定频率 Rated frequency	Hz	50	50	50	50	50	50
工频耐受电压(相间/端口) Power frequency withstand voltage (phase to phase / port)	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)	630		1250/630	
额定闭环开断电流 Rated closed-loop breaking current	A	630					
额定电流充电开断电流 Rated current charging breaking current	A	135/135					
额定短路关合电流(峰值) Rated short-circuit making current (peak)	A	50	80				
额定峰值耐受电流 Rated peak withstand current	kA	50					
额定短时耐受电流 Rated short-time withstand current	kA/3s	20					
额定短路开断电流 Rated short-circuit breaking current	kA		31.5	20		25	
额定转移电流 Rated transfer current	A		1750				
配用熔断器最大电流 Maximum current of matched fuse	A	–	125				
回路电阻 Loop resistance	μΩ	≤300	≤600				
机械寿命 Mechanical life	second 次	5000	3000	5000	2000	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.

非扩展标准模块 Non extended standard module

共提供以下十五种标准组合

XGN-□12气体绝缘环网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”中标准配置特性

◆ C柜-负荷开关模块

◇ “负荷开关模块”中标准配置特性

◆ 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”中标准配置特性

◆ V柜-真空开关模块

◇ “真空开关模块”中标准配置特性

The following fifteen standard combinations are provided:

Each module of XGN-□12 gas insulated ring main cabinet has the following configuration

◆ cabinet D – lifting module

◇ standard configuration features in "cable connection module without grounding knife"

◆ cabinet C – load switch module

◇ standard configuration features in "load switch module"

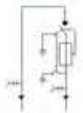
◆ f cabinet – load switch fuse combination module

◇ standard configuration characteristics in "load switch fuse combination module"

◆ V cabinet – vacuum switch module

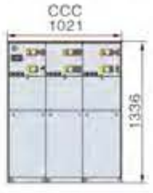
◇ standard configuration features in "vacuum switch module"

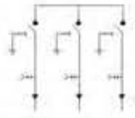
DF
696



标准2路DF(260kg)
Standard 2-way DF (260kg)

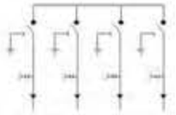
CCC
1021





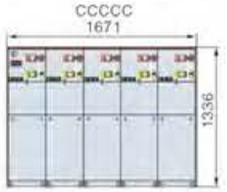
标准3路CCC(300kg)
Standard 3-way CCC (300kg)

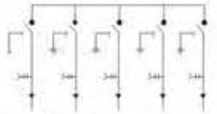
CCCC
1346



标准4路CCCC(390kg)
Standard 4-way CCCC (390kg)

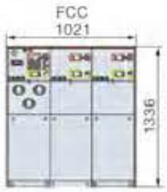
CCCCC
1671

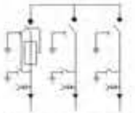




标准5路CCCCC(480kg)
Standard 5-way CCCCC (480kg)

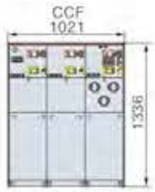
FCC
1021

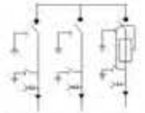




标准3路FCC(320kg)
Standard 3-way FCC (320kg)

CCF
1021





标准3路CCF(320kg)
Standard 3-way CCF (320kg)

XGN2-12

箱型固定式交流金属封闭开关设备

Box Irremovable-type AC Metal-enclosed Switchgear

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XGN2-12

箱型固定式交流金属封闭开关设备

Box Irremovable-type AC Metal-enclosed Switchgear

概述 General

XGN2-12 箱型固定式交流金属封闭开关设备（简称开关柜），用于额定电压为 3.6-12kV、三相交流 50Hz，额定电流 630-3150A 的电力系统中作为接受与分配电能之用，特别适用于频繁操作的场合，其母线系统为单母线，可派生出单母线带旁路和双母线系统。

本开关柜符合国家标准 GB3906《3-35kV 交流金属封闭开关设备》及国际标准 IEC298 的要求，并且具有完善的防误操作功能。本开关柜的主开关采用 ZN28A-12 系列、ZN28-12 系列等真空断路器，隔离开关采用 GN30-12 旋转式隔离开关、GN22-12 大电流隔离开关和 GN30-12 旋转式大电流隔离开关系列产品。

XGN2-12 Box Irremovable-type AC Metal-enclosed Switchgear (switchgear for short) is used in electric system of rated voltage 3.6-12kV three-phase AC 50Hz and rated current 630-3150A to receive and distribute power, especially used in frequent operating conditions. The busbar system is single busbar, but it can be derived into single busbar with bypass and double busbar system.

The switchgear meets the national standard GB3906 "3-35 kV AC Metal-enclosed Switchgear" and the requirement of international standard IEC298, and has perfect function of error prevention. The switchgear mainly adopts ZN28A-12, ZN28-12 and so forth vacuum circuit breakers. Isolation switch adopts GN30-12 rotary isolator, GN22-12 large current isolation switch and GN30-12 rotary large current isolation switch.

型号含义 Type Designation

X G N 2-12 □□□ / □ - □

- 额定短路开断电流 kA — Rated Short-circuit Breaking Current kA
- 额定电流 A — Rated Current A
- 操动机构类型（D 电磁，T 弹簧） — Operating Mechanism Type (D for Electromagnetism;T for Spring)
- 主回路方案代号 — Primary Loop Code
- 断路器类型 — Circuit Breaker Type
- 额定电压 kV — Rated Voltage kV
- 设计序号 — Design No.
- 户内 — Indoor Type
- 固定式 — Irremovable Type
- 箱式结构 — Box Type

正常使用条件 Working Conditions

- ◆环境温度：上限 +40℃，下限 -10℃。
  Ambient temperature: -10~+40℃
- ◆海拔高度不超过 1000m（超过 1000m 时可与我公司协商）。
  Altitude: ≤ 1000m (Altitude over 1000m can be negotiated with the company)
- ◆相对湿度：日平均值小大于 95%，月平均值不大于 90%。
  Humidity: daily average ≤ 95%, monthly average ≤ 90%
- ◆地震烈度不超过 8 级。
  Earthquake intensity: ≤ magnitude 8
- ◆没有火灾、爆炸危险、严重污秽、化学腐蚀及剧烈震动的场合。
  It is applicable in the place without fire disaster, explosion hazard, serious pollution, chemical corrosion and violent vibration.

XGN2-12
箱型固定式交流金属封闭开关设备

结构特点

XGN2-12 开关柜为金属封闭箱式结构，柜体骨架由角钢焊接而成，柜内分为断路器室、母线室、电缆室、继电器室等。室与室之间用钢板隔开。

断路器室在柜体前下部，断路器的转动由拉杆与操动机构连接，断路器上接线端子与上隔离开关连接，断路器下接线端子与电流互感器连接，电流互感器与下隔离开关的母排连接，断路器室还设有压力释放通道，若内部电弧发生时，气体可通过排气通道将压力释放。

母线室在柜体后上部，为了减小柜体高度，母线呈品形排列，以 3750N 抗弯强度的瓷质绝缘子支持，母线与上隔离开关母排连接，相邻两母线室之间可隔离。

电缆室在柜体下部的后方，电缆室内支持绝缘子可设有电压监视装置，电缆固定在支架上，对于主接线为联络方案时，本室则为联络小室。 继电器室在柜体上部前方，室内安装板可安装各种继电器等，室内有端子排支架，门上可安装指示仪表、信号元件等二次元件，顶部还可布置二次小母线。

断路器的操动机构装在下面左边位置，其上方为隔离开关的操作及联锁机构。开关柜为双面维护，前面检修继电器室的二次元件，维护操动机构，机械联锁及传动部分，检修断路器。后而维修主母线和电缆终端，在断路器室和电缆室均有照明灯。前门的下方设有与柜宽方向平行的接地铜母线，其截面为 4X40mm^2。

机械联锁：为了防止带负荷分合隔离开关，防止误分误合断路器，防止误入带电间隔；防止带电合接地开关；防止带接地刀合闸，开关柜采用相应的机械联锁，机械联锁的动作原理如下：

◆停电操作（运行一检修）

开关柜处于工作位置，即上下隔离开关、断路器处于合闸状态，前后门已锁好，并处于带电运行之中，这时的小手柄处于工作位置。先将断路器分闸后，再将小手柄扳到“分断闭锁”位置，这时断路器不能合闸，将操作手柄插入下隔离的操作孔内从上往下拉，拉到下隔离分闸位置，再将手柄拿下，再插入上隔离操作孔内，从上往下拉，拉到上隔离分闸位置。再将操作手柄拿下，插入接地开关操作孔内，从下向上推，使接地开关处于合闸位置，这时可将小手柄扳到“检修”位置。可先打开前门，取出门后边钥匙打开后门，停电操作完甲，检修人员对断路器室及电缆室进行维护和检修。

◆送电操作（检修一运行）

若已检修完毕，需要送电，其操作程序如下：将后门关闭，钥匙取出后关前门，将小手柄从“检修”位置扳到“分断闭锁”位置，这时前门被锁定，断路器不能合闸，用操作手柄插入接地开关操作孔内，从上向下拉，使接地开关处于分闸位置，将操作手柄拿下，再插入上隔离的操作孔内，从下向上推，使上隔离处于合闸位置，将操作手柄拿下，插入下隔离的操作孔内，从下向上推使下隔离处于合闸位置，取出操作手柄，将小手柄扳至工作位置，这时可将断路器合闸。

安装、调整与维修

◆真空断路器在分闸时产生的动载荷，向上、向下约为 7840N，此数据提供设计基础时估算基础应力。

安装程序及注意事项：

a、将开关柜按排列顺序放置在基础上，调整好成组开关柜的直线度，垂直度、水平度，然后用 MI2 螺栓或是点焊方法将开关柜紧固在基础槽钢上。

b、用 M12×30 螺栓进行柜间连结。

c、安装主母线，打开母线室顶盖板进行安装，安装好后紧固顶盖板，连接母线时接触面应平整、无污物，有污物时应除净，涂中性凡士林。

d、安装一次电缆，电缆头制作完后，将电缆头固定在支架上，电缆与母线接触面应平整，接触面上涂中性凡上林后即可连接，并予以紧固，电缆施工完后应将电缆室与电缆沟封隔。

e、连接柜间接地母线，使之沿开关柜排列方向连成一体，检查工作接地和保护接地是否有遗漏，接地回路是否连续导通，工作接地电阻应不大于 1000μΩ，保护接地电阻不大于 4Ω。

f、安装二次回路电缆，电缆由机构左侧底穿入，顺侧壁进入继电器室，分接到相应的端子排上，施工时，应注意电缆号、端子号，不要漏穿或穿错，二次电缆施工完后，注意勿忘封盖电缆孔。

Structure Features

XGN2-12 switchgear is metal-enclosed box-type structure. The framework of the cabinet is welded by Angle steel. And the cabinet can be divided into circuit breaker compartment, busbar compartment, cable compartment, relay instruments compartment and so forth. Each compartment is separated by steel plates.

Circuit breaker compartment is at the bottom of the front cabinet. The rotation of the circuit breaker is connected with operating mechanism by a pull rod. The upper terminals on the circuit breaker are attached to the upper isolation busbar, while the lower terminals on the circuit breaker are attached to current transformer, and the current transformer connects to lower isolation busbar. The circuit breaker compartment is also equipped with pressure release tunnel. If there is any ark, the gas can be released through the tunnel.

Busbar compartment is located in the upper part of the back cabinet. In order to reduce the height of cabinet, the arrangement of the busbar shapes like a. Busbar connects to upper isolation switch busbar. Thanks to support of porcelain insulator with 3750N bending strength, adjacent busbar compartments can be isolated.

Cable compartment is at the bottom of the back cabinet. The supported insulator inside the cable compartment can be equipped with voltage monitoring device. Cables are fixed on the bracket. When the main wiring scheme takes as the connection plan, this compartment becomes the small compartment for connection. Relay instruments compartment is on the upper part of front cabinet. Indoor installation plates can be installed with all kinds of relays. Terminal row is inside the door where indicator instruments, signal components and such secondary components can be installed. Secondary small busbar can be arranged at the top of the compartment.

Circuit breaker operation mechanism is installed below the left position, and above it are isolation switch and its interlock mechanism. Switchgear can be maintained at both sides——in front, maintain the secondary components of the relay instruments compartment, operation mechanism, mechanical interlock and drive parts, and circuit breaker; at the back, maintain main busbar and cable terminals. Both circuit breaker compartment and cable compartment are lighting. Down to the bottom of the front door is equipped with grounding copper busbar which is parallel to the width of the cabinet and the cross section is 4X40mm^2.

Mechanical interlocking: in order to prevent closing and breaking the isolating switch when it is loading, prevent false closing and breaking of the circuit breaker, avoid straying into charged compartments, prevent to close the charged grounding switch, and prevent to close with grounding knife. The switchgear adopts the coresponding mechanical interlocking, and its action principle is as follows:

◆ Power-off Operation (Operation-Maintenance)

Switchgear is in the working position, that is to say the upper and lower isolation switches and the circuit breaker are in the closing state, and the front door has locked, so the switchgear is charged and now the small handle is also in the working position. When the circuit breaker is breaking and then the small handle could be turned into "breaking and interlock" position, and now the circuit breaker can not be closed. Insert the operating handle into the operation hole of the lower isolation switch and pull it down to the breaking position of the lower isolation switch, and then take down the handle and insert it into the operation hole of the upper isolation switch, then pull it down to the breaking position of the upper isolation switch. Take down the handle again, and insert it into the operation hole of the grounding switch and push it up to the closing position of the grounding switch. Now the small handle can be turned into "maintenance" position. First, open the front door, and take down the key to the back door to open the back door, and finish the power-off operation, so the staff can enter into the circuit breaker compartment and cable compartment to maintain.

◆ Power-on Operation (Maintenance-Operation)

If staff has already finished maintenance, the switchgear needs to be charged again, and its operating procedures are as follows: close the back door, and take down the key, then close the front door and turn the small handle from "maintenance" position into "breaking and interlock" position, and now the front door has been locked, so the circuit breaker can not be closed. Insert the operation handle into the operation hole of the grounding switch and pull it down to the breaking position of the grounding switch. Take down the operation handle, and insert it into the operation hole of the upper isolation switch and push it up to the closing position of the upper isolation switch. Take down the operation handle again, and insert it into the operation hole of the lower isolation switch and push it up to the closing position of the lower isolation switch. Take down the operation handle and turn the small handle back to working position, and now the circuit breaker can be closed.

Installation ,Adjustment and Maintenance

◆ When the vacuum circuit breaker is in breaking position, the dynamic load will arouse, and the power upward and downward is about 7840N, and such data is provided to estimate the foundation stress for basic design.

Installation procedures and matters needing attention:

a, Place the switchgear according to the order on the basis, and adjust the straightness, verticality and levelness of the group cabinets, then use MI2 bolt or spot welding method to tighten the switchgear in basic channel steel.

b, Connect the cabinets with M12X30 bolt.

c, Install the baubar: open the roof cover plate of the busbar compartment to install and then tighten the top cover plate. The interface should be leveled off and without dirt when connecting the busbar. If there is any dirt, neutral Vaseline should be used to clean out.

d, Install the primary cable: after the production of the cable heads, fix them on the bracket. The interface should be leveled off and can be connected when it covers neutral Vaseline, and then fasten them and seal the cable compartment and cable duct.

e, Install the grounding busbar between the cabinets: line the busbar up with the direction of the switchgear. Check whether the working grounding and protecting grounding is complete and whether the grounding loop is continuously conductive. The working grounding resistance should be not more than 1000 mu Ω, and the protecting grounding resistance is not more than 4Ω.

f, Install the secondary loop cable through the left bottom along the wall into the relay instruments compartment, and connects to the terminal bars respectively. Pay attention to the cable number and terminal number and don't make mistakes by corresponding the wrong number or missing any of them. After the installation of the secondary cable, do not forget to seal the cable hole.

维护与检修 Inspection and Maintenance

◆开关投入运行后，监视和维护工作如下：
When the switchgear starts to operate, inspection and maintenance work are as follows:

a、观察主母线和电气连接处母线，如发现母线过热变色应进行检修。
a、Observe the busbar and the busbar connected to electrical components. Maintain them if they change the color for overheating.

b、观察照明、控制、信号电源足否正常供电。
b、Observe whether the lighting, control, signal power is normal power supply.

c、记录断路器的动作次数。
c、Record operation times of circuit breaker.

检修 Maintenance

◆开关柜检修，有故障检修和定期检修，故障检修是防止故障运行和防止事故扩大，在发现故障出现或断电即将出现时，立即对故障部位进行检修，及时排除故障。定期检修，按运行规定按时进行，检修内容如下：

There are two kinds of maintenance of the switchgear: corrective maintenance and preventive maintenance. Corrective maintenance is to prevent the
failure operation and prevent accident expanding. When power failure occurs or is about to appear, maintaining the trouble location immediately. Preventive
maintenance maintains at a regular time and its maintenance contents are as follows:

a、清扫各部位尘土，特别是绝缘表而的尘土。
a. Clean the dust of each part, especially the dust on the insulation surface.

b、检修程序锁和机械连锁，运作保持灵活可靠，程序正确。
b. Maintain whether the program lock and mechanical interlock operates flexibly, reliably and correctly.

c、按断路器、隔离开关、操动机构等电器的规定进行检修、调试。
c. Maintain and adjust according to the regulation of the circuit breaker, disconnecting switch and operating mechanism.

d、检查电器接触部位，接触情况是否良好，检测接地回路，保持连续导通。
d. Check whether the electrical contact position is good and whether the grounding loop keeps continuous conduction.

e、紧固螺钉。
e. Fasten screws.

随机文件包括 Attached Documents

◆产品合格证。
Product Qualification Certificate
◆安装使用说明书。
Operation Instruction
◆二次施工接线图。
Secondary Connection Diagram
◆装箱单。
Packing List

易损件、附件及备件 Expendable Parts , Accessories and Spare Parts

◆应有断路器等电器的易损件。
The product should include expendable parts for circuit breaker etc.
◆开关柜的易损件、由用户与制造厂协商确记。
The expendable parts are decided by the user and the manufacturer.
◆开关柜的附件，备件用户从制造厂订购。
The accessories and spare parts need to be purchased from the manufacturer.

产品的验收及保管 Acceptance Inspection

◆产品运输过程中，只准直立放置不得倒置、倾翻、翻滚、溜放。
During the transportation, the switchgear shall stand and not upside down, tilting, rolling and falling.
◆按产品装箱单、对整机、附件等进行验收。
Accept the whole set and accessories according to the packing list.
◆保管。
Keeping.
◆产品在安装前，应以原包装存放在库房中，如不能入库房，应防止雨淋，防止受潮；不得随意拆卸电器元件及零部件。
Before installation, the switchgear should be kept with the original packaging in warehouse. If it can not be kept in the warehouse, should prevent it from rain and damp. Shall not disassemble the electric components and accessories arbitrarily.

订货须知 Ordering Information

◆主接线方案编号及单线系统图，排列图。
Primary wiring schema number and single wiring diagram and ranging chart.
◆二次回路接线原理图，端子排列图，如端子无排列图时按制造厂提供。
Secondary circuit wiring diagram and terminal ranging diagram (if it is not provided, it will be manufactured according the manufacturer).
◆开关柜内的电器元件的型号、规格、数量。
Model, specification and quantity of electrical components.
◆主母线、支母线的材质、规格，否则按制造厂规定供应。
Material and specification of main and branch busbar (if it is not provided, it will be manufactured according the manufacturer).
◆开关柜使用在特殊环境条件，应在订货时提出。
Environmental conditions for using the switchgear shall be declared when ordering.
◆需要附件，备件时，应提出其种类和数量。
Types and quantity of the accessories and spare parts if needed.

开关柜的技术数据 Specifications

项目 Item	单位 Unit	技术参数 Data					
额定电压 Rated Voltage	kV	3.6,7.2,12					
额定电流 Rated Current	A	630	1000	1250	2000	2500	3150
额定短路开断电流 Rated Short-circuit Breaking Current	kA	20		31.5		40	
额定短时耐受电流 Rated Short-time Withstands Current	kA	20		31.5		40	
额定峰值耐受电流 Rated Peak Withstands Current	kA	50		80		100	
额定短路关合电流 Rated Short-circuit Closing Current	kA	50		80		100	
额定短时耐受电流持续时间 Duration of Rated Short-time Withstand Current	s	4					
防护等级 Protection Degree		IP2X					
母线系统 Busbar System		单母线、单母线带旁路、双母线 single busbar、single busbar with bypass、double busbar					
操作方式 Operating Type		电磁式、弹簧储能式 Electromagnetism type、Spring Stored Energy type					
外形尺寸 宽 × 深 × 高 Dimension width X depth X height	mm	1100X1200X2650(1250A 以下)					
重量 Weight	kg	1000					

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箱型固定式交流金属封闭开关设备

ZN28A-12真空断路器及操作机构技术参数 Specifications of ZN28A-12 Vacuum Circuit Breaker

名称 Item				单位 Unit	ZN28A-12/630-20 1000-20		ZN28A-12/1250-31.5 2000-31.5		ZN28A-12/2500-40 3150-40	
额定电压 Rated Voltage				kV			12			
额定频率 Rated Frequency				Hz			50			
额定电流 Rated Current				A	630	1000	1250	2000	2500	3150
额定短路开断电流 Rated Short-circuit Breaking Current				kA	20		31.5		40	
额定短路关合电流 Rated Short-circuit Closing Current				kA	50		80		100	
额定短时耐受电流 Rated Short-time Withstands Current				kA	20		31.5		40	
额定峰值耐受电流 Rated Peak Withstands Current				kA	50		80		100	
额定短时耐受电流持续时间 Duration of Rated Short-time Withstands Current				s			4			
机械寿命 Mechanical Life				次			10000			
额定短路开断电流开断次数 Times of Rated Short-circuit Breaking Current				次			30 (50)			
燃弧时间 Arc Time				ms			≤ 20			
配电机构 Distribution Mechanism	直流电磁 DC Electromagnetism	型号 Type					CD10 I		CD10 II		CD10 III	
		工作电压 Working Voltage	合闸线圈 Closing Coil				110.220					
			分闸线圈 Breaking Coil				24,48,110 ,220					
		工作电流 Working Current	合闸 Closing	110	V		196		240		294	
				220	V		98		120		147	
			分闸 Breaking	24	V		37					
				48	V		18.5					
				110	V		5					
				220	V		2.5					
	弹簧储能 Spring Stored Energy	型号 Type					CT8-I CT8-II					
		工作电压 Working Voltage	储能电机 Stored Energy Motor				~ 110, ~ 220, ~ 380					
			分励脱扣 Shunt Release				~110,~ 220,~ 380,~48					
			失压脱扣 Under-voltage Release				~110(1000),~220,~380					
		储能时间 Stored Energy Time		s			≯ 6					
		过流脱扣 Overcurrent Release		A			5					
合闸时间 Closing Time				s			直流电磁 >0.20 弹簧储能 >0.15 DC Electromagnetism>0.20; Spring Stored Energy>0.15					
合闸时间 Closing Time				s			≯ 0.06					

CD17 机构主要技术数据 Specification of CD17 Mechanism

规格 Type		合闸线圈 Closing Coil		分闸线圈 Breaking Coil		匹配真空断路器额定 Rated Short-circuit Breaking Current of Matched Vacuum Circuit Breaker
		电流 (A) Current (A)	电阻 (Ω) Resistance (Ω)	电流 (A) Current (A)	电阻 (Ω) Resistance (Ω)	短路开断电流 (kA) Short-circuit Breaking Current(kA)
CD17-I	-220V	55	4 ± 0.24	1.5	146 ± 8	20
CD17-II	-220V	71	3.1 ± 0.2	1.5	146 ± 8	31.5
	-110V	142	0.77 ± 0.05	3.0	36.5 ± 2	
CD17-III	-220V	128	1.72 ± 0.1	1.5	146 ± 8	40
	-110V	256	0.43 ± 0.03	3.0	36.5 ± 2	

CD17机构主要技术数据 Specifications of CD17 Mechanism

额定工作电压 (V) Rated Working Voltage(V)		~110	~220	~380	~48	~110	~220
额定工作电流 (A) Rated Working Current (A)	分	2.8	1.6			2.3	1.2
	合	1.3	0.8			1.3	0.55
额定电功率 (W) Rated Power(W)	分	308	352			255	264
	合	143	176			143	121
20℃时线圈电阻值 (Ω) Coil Resistance at 20℃ (Ω)	分	12 + 0.6	48 ± 2.4			48 ± 2.4	190 ± 10
	合	22 ± 1	85 ± 4			85 ± 4	398 ± 20
正常工作电压范围 Range of Normal Working Voltage	合闸 :85%~10% 额定工作电压 Closing: 85%~10% Rated Working Voltage 分闸 :65%~120% 额定工作电压，小于 30% 的额定工作电压时不得分闸 Breaking: 65%~120% Rated Working Voltage (it can not break under 30% Rated Working Voltage)						
匹配真空断路器额定短路开断电流 (KA) Rated Short-circuit Breaking Current of Matched Vacuum Circuit Breaker	CT19-I	20					
	CT19-II	31.5					
	CT19-III	40					

隔离开关的技术参数 Specifications of Isolation Switch

名称 Item		单位 Unit	GN30-12/400 GN30-12D/400	GN30 12/630 GN30 12D/630	GN30-12/1250 GN30-12D/1250
额定电压 (最高工作电压) Rated Voltage (Highest Working Voltage)		kV		12	
额定电流 Rated Current		A	400	630	1250
短时耐受电流 (4s) Short-time Withstands Current (4s)		kA	12.5	20	31.5
额定峰值耐受电流 (峰值) Rated Peak Withstands Current (Peak Value)		kA	31.5	50	80
雷电冲击耐压 Lightning Impulse Withstand Voltage	相对地、相间 Phase to Earth、Phase to Phase	kV		75	
	断口间 Fracture to Fracture	kV		85	
1min 工频耐压 Power Frequency Withstand Voltage for 1min	相对地、相间 Phase to Earth、Phase to Phase	kV		42	
	断口间 Fracture to Fracture	kV		48	

隔离开关的技术参数 Specifications of Isolation Switch

名称 Item		单位 Unit	GN22-12/2000	GN22-12/3150
额定电压 (最高工作电压) Rated Voltage (Highest Working Voltage)		kV	12	
额定电流 Rated Current		A	2000	3150
短时耐受电流 (4s) Short-time Withstands Current (4s)		kA	40	50
额定峰值耐受电流 (峰值) Rated Peak Withstands Current (Peak Value)		kA	100	125
雷电冲击耐压 Lightning Impulse Withstand Voltage	相对地、相间 Phase to Earth; Phase to Phase	kV	75	
	断口间 Fracture to Fracture	kV	85	
1min 工频耐压 Power Frequency Withstand Voltage for 1min	相对地、相间 Phase to Earth; Phase to Phase	kV	42	
	断口间 Fracture to Fracture	kV	48	

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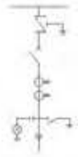
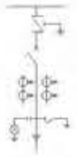
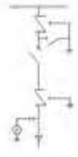
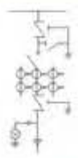
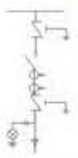
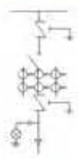
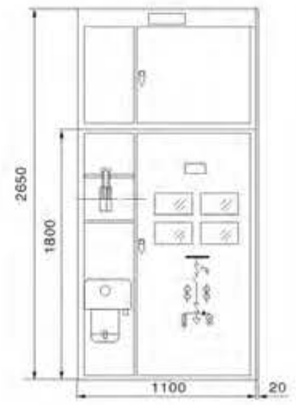
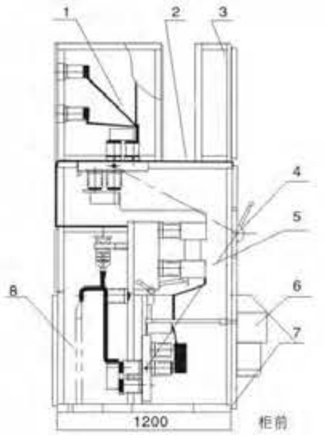
主电路方案图 Primary Wiring Scheme

方案号 Scheme Number		01	02	03	04	05	06
主电路方案图 Primary Wiring Scheme							
主要电器元件 Main Electric Component	旋转式隔离开关 GN30-10D Rotating Type Isolation Switch GN30-10D					1	1
	电流互感器 LZJC-10，LZZJ-10 Current Transformer LZJC-10, LZZJ-10		1	2	3		1
	真空断路器 Vacuum Circuit Breaker	1	1	1	1	1	1
	操动机构 CD10、CD17 或 CT8、CT19 Operation Mechanism CD10, CD17 or CT8, CT19	1	1	1	1	1	1
	旋转式隔离开关 GN30-10 Rotating Type Isolation Switch GN30-10	1	1	1	1	1	1
	接地开关 JN4-10 Grounding Switch JN4-10	1	1	1	1	1	1
	带电显示装置 DXN6-10 Charged Display Device DXN6-10	1	1	1	1	1	1
额定电流 (A) Rated Current (A)		630、1000					
用途 Application		电缆进出线 Outlet and Inlet of Cable					

方案号 Scheme Number		07	08	09	10	11	12
主电路方案图 Primary Wiring Scheme							
主要电器元件 Main Electric Component	旋转式隔离开关 GN30-10D Rotating Type Isolation Switch GN30-10D	1	1				
	电流互感器 LZJC-10，LZZJ-10 Current Transformer LZJC-10, LZZJ-10	2	3		1	2	3
	真空断路器 Vacuum Circuit Breaker	1	1	1	1	1	1
	操动机构 CD10、CD17 或 CT8、CT19 Operation Mechanism CD10, CD17 or CT8, CT19	1	1	1	1	1	1
	旋转式隔离开关 GN30-10 Rotating Type Isolation Switch GN30-10	1	1	2	2	2	2
	带电显示装置 DXN6-10 Charged Display Device DXN6-10	1	1	1	1	1	1
额定电流 (A) Rated Current (A)		630、1000					
用途 Application		电缆进出线 Outlet and Inlet of Cable					

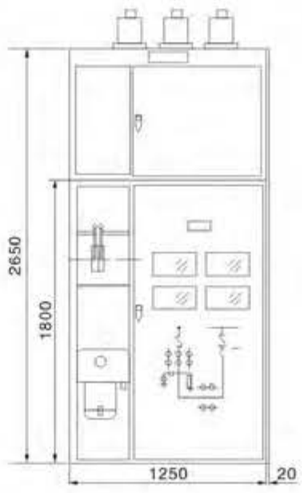
XGN2-12-07D 外形图 XGN2-12-07D Outline Drawing

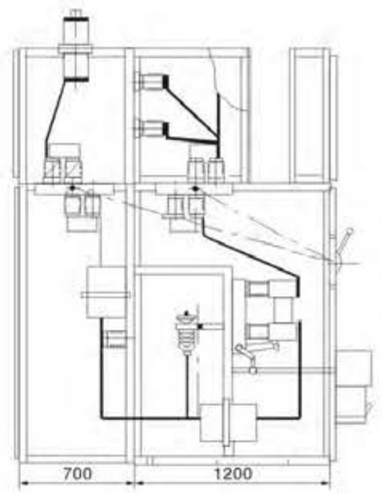




1、母线室
Busbar Compartment
2、压力释放通道
Pressure Release Tunnel
3、仪表室
Relay Instruments Compartment
4、手力操作及连锁机构
Manual Operating and Interlocking Mechanism
5、主开关室
Main Switch Compartment
6、电磁或弹簧机构
Electromagnetism or Spring Mechanism
7、接地母线
Grounding Busbar
8、电缆室
Cable Compartment

XGN2-12(Z)-72 外形图(大电流架空进线柜) XGN2-12(Z)-72 Outline Drawing(Large Current -in Cabinet)





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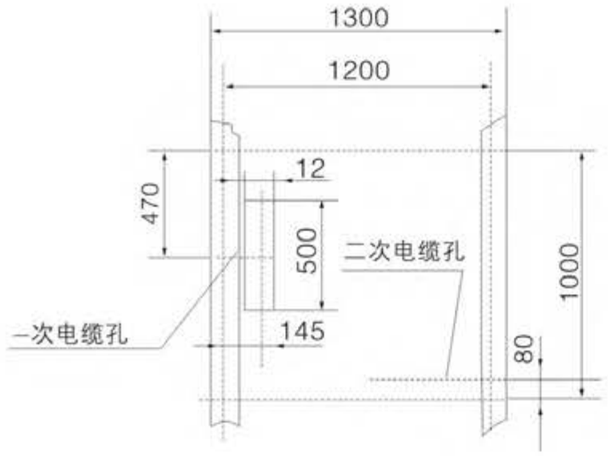
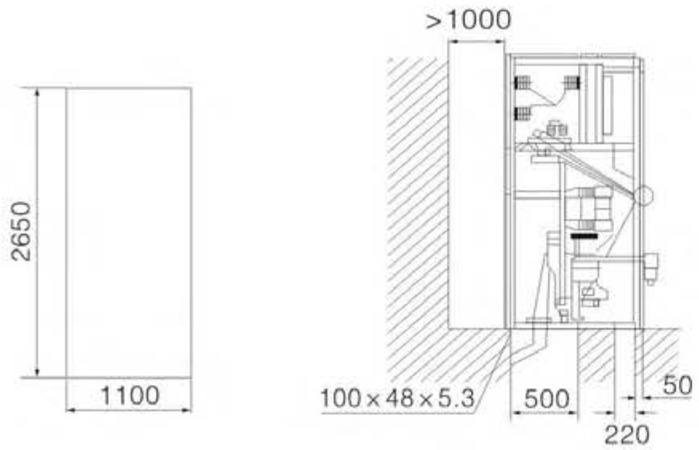
箱型固定式交流金属封闭开关设备

XGN2-12 型安装尺寸图 XGN2-12 Installation Dimension Drawing



XGN2-12 型基础示意图 XGN2-12 Sketch Map



XGN15-12(SF6)

箱式固定式交流金属封闭开关设备

Box Irremovable-type AC Metal-enclosed Switchgear

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XGN15-12(SF6)
箱型固定式交流金属封闭开关设备

概述 General

XGN15-12(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器产品。各项技术性能指标全 IEC62271-200:2003 和 GB3906 标准。

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 型开关设备，也可根据用户需要配装 ABB 公司原装 SFL 型 SF6, 断路器或 VD4-S 型真空断路器。其操作方式分为动、电动两种。

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、外型美观、操作简便、长寿命、高参数、无污染、少维护等极具显著的特点。

XGN15-12(SF6) 型单元式交流金属封闭环网开关设备，适用于交 50Hz、12kV 的电力网络中，作为电能的接受和分配之用。
柜内主开关为 SF6 开关

XGN15-12 (SF6) Unit AC Metal-enclosed Ring Network Switchgear (hereinafter called ring network switchgear) adopts foreign advanced technology and accords to the demands of the domestic rural and urban network reconstruction. And it is a new generation of high voltage electrical product through independent design and development. All the technical performance meets the standards of IEC62271-200, 2003 and GB3906.

The main switch, operating mechanism and other components of the ring network switchgear adopt original imported ABB equipments or SFL-12 switch equipment which uses original imported parts to assemble in China. We can also use original imported ABB equipments: SFL type----SF6, circuit breaker or VD4-S type vacuum circuit breaker. Its operation mode can be divided into two kinds: manual and electric.

Cabinet is processed by numerical control machine tool and connected by rivets. Its protection degree is IP3X. It has reliable mechanical interlock and operation function of error preventing. The product has small volume, light weight, beautiful appearance, easy operation, long life, high parameter, no pollution and less maintenance as its extremely remarkable features.

XGN15-12 (SF6) Unit AC Metal-enclosed Ring Network Switchgear is used in the power system of AC 50Hz 12kV to receive and distribute power. The main switch in the cabinet is SF6 switch.

型号含义 Type Designation

X G N 15 -12 (SF6)

- 柜内主开关为 SF6 开关 The main switch in the cabinet is SF6 switch
- 电压等级 (kV) Voltage Classes (kV)
- 设计序号 Design No.
- 户内型 Indoor Type
- 固定式 Irremovable Type
- 箱式 Box Type

正常使用条件 Working Conditions

- ◆ 环境温度：上限 +40℃，下限 -25℃。
  Ambient temperature: -25~+40℃
- ◆ 海拔高度：海拔高度不超过 2000mm。
  Altitude: ≤ 2000m
- ◆ 相对湿度：日平均值不大于 95%；月平均值不大于 90%。
  Humidity: daily average ≤ 95%, monthly average ≤ 90%
- ◆ 周围环境：周围空气不受腐蚀气体或可燃性气体、水蒸气等明显污染。
  It is applicable in the place without corrosive or flammable gas, vapor and so forth pollution
- ◆ 无经常性的剧烈振动。
  It can not be used in violent vibration places.

结构特点 Structure Features

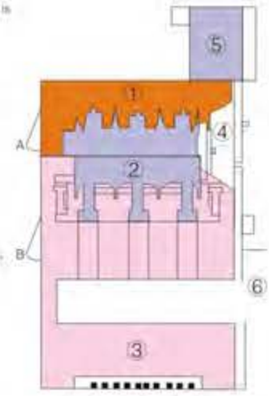
◆ 柜体结构
环网柜体采用 2mm 厚敷铝锌板（或冷轧板喷塑后）铆接成型，柜后设有二处压力释放孔，其一是针对电缆室，另一个针对负荷开关 / 母线室。此结构能够最大限地保障人身安全和运行设备的可靠。
◆ Cabinet Structure
Ring network switchgear is made by 2mm thick coated aluminium zinc plate (or cold-rolled sheet after powder coating). The cabinet is equipped with two pressure relief holes at the back of it----one is for the cable compartment, and another is for load switch/busbar compartment.
This structure is the best one to guarantee personal safety and reliable operation of the equipment.

◆ 母线室
母线室位于柜的顶部并连接相邻开关柜。
负荷开关是独立单元，内部充以 SF6 气体。
◆ Busbar Compartment
Busbar compartment is at the top of the cabinet and connects the adjacent cabinets. Load switch is an independent unit filled with SF6 gas.

◆ 电缆室
大约 75% 空间是用于电缆连接、熔断器、接地开关和 CT、PT 安装。
◆ Cable Compartment
About 75% of the cable compartment is used to connect cables and install fuses, grounding switches and CT and PT.

◆ 机构小室与联锁
小室包含操作机构和机构联锁以及位置指示、辅助接点、脱扣线圈、带电显示器和联锁。
◆ Small Compartment of Operating Mechanism and Interlocking
Small compartment includes operating mechanism, mechanical interlocking, indicator of positions, auxiliary contacts, release coils, charged display and its interlocking.

◆ 继电器箱
继电器箱在柜的顶部，是可选的。小室用来安装特殊的装置诸如仪表、继电器和马达单元。
◆ Relay Instruments Compartment
Relay instruments compartment is at the top of the cabinet. It is optional. There is a small compartment to install special devices such as instruments, relay and motor unit.



◆ 断路器室
一个断路器 (SF6 或真空) 能置于负荷开关之下方。
◆ Circuit Breaker Compartment
The circuit breaker (SF6 or VCB) can be installed below the load switch.

◆ 压力释放
上面的压力释放是用于释放母线和负荷开关室内部电弧事故时产生的气体压力。
下面的压力释放是用于释放电缆小室内部电弧事故时产生的气体压力。
◆ Pressure Release
The upper pressure release device releases the pressure from the arc accident of busbar and load switch compartment.
The lower pressure release device releases the pressure from the arc accident inside the cable small compartment.

主要技术参数 Specifications

名称 Item	单位 Unit	数值 Data
额定电压 Rated Voltage	kV	12
额定频率 Rated Frequency	Hz	50
主母线额定电流 / 熔断器最大额定电流 Rated Current of Main Busbar/Maximum Rated Current of Fuse	A	630，125
主回路、接地回路额定短时耐受电流 Rated Short-time Withstands Current of Main Loop and Grounding Loop	kA/s	20，3
主回路、接地回路额定峰值耐受电流 Rated Peak Withstand Current of Main Loop and Grounding Loop	kA	50
主回路、接地回路额定短路关合电流 Rated Short-circuit Closing Current of Main Loop and Grounding Loop	kA	50
负荷开关满容量开断数 Breaking Times of Load switch with Full Capacity	次	100
熔断器开断电流 Fuse Breaking Current	kA	31.5，40
额定闭环开断电流 Rated Closed Loop Breaking Current	A	630
额定转移电流 Rated Transfer Current	A	1600
机械寿命 Mechanical Life	次	2000
1min 工频耐压（峰值）相间、对地 / 隔离断口 1min Power Frequency Voltage (Peak Value) (Phase to Phase and Phase to Earth/Isolating Fracture)	kV	42,48
雷电冲击耐受电压（峰值）相间、对地 / 隔离断口 Lightning Impluse Withstand Voltage (Peak Value) (Phase to Phase and Phase to Earth/Isolating Fracture)	kV	75,85
二次回路 1min 工频耐压 1min Power Frequency Voltage of Secondary Loop	kV	2
防护等级 Protection Degree		IP3X

XGN15-12(SF6)
箱型固定式交流金属封闭开关设备

基本组件

◆SFL 型负荷开关 (ABB 原装件)

SFL 型负荷开关为双断点、旋转式动触头，以 SF6 气体为灭弧介质，动静触头置于加强结构的模铸环氧树脂外壳中。在操作轴引出端是一个透明的热压成型的塑料端盖，透过端盖可以观察状态。

每个开关充以 1.4 帕气压的 SF6 气体后是永久密封的 (SFL 意“永远密封”)，用氦检测器可以检查有无气体渗漏。

开关垂直或水平安装不限，在单元式柜内，典型的安装方式是在电缆室和母线室之间置一钢隔板，水平安装。这种安装方式将开关外壳封在接地的钢板内并将母线与电缆接头之间相隔离，以符合运行维护的最严格安全要求。

假若内部发生燃弧，在外壳后部有一个结构薄弱点，它将被冲开，把电弧气体导出开关之外，随后柜上面的泄弧活门被冲开并将过压气体导向柜外。

◆可选的装备 – 辅助触点 2 常闭 2 常开 + 扩展 2 常开 2 常闭

– 分励脱扣线圈供带 A 机构的 SFL。

◆选 K 机构的开关 SFL12/17.5　　IVDP575305RI

SFL24K　　IVDP575304RI

◆选 A 机构的开关 SFL12/17.5　　IVDP575303RI

SFL24A　　IVDP575302RI

◆VD4-S 真空断路器 (ABB 原装件)

VD4-S 型真空断路器是专为单元开关柜设计的，其开断容量足以应付各种状态，包括正常投切设备或分支网络的操作以及特殊情况下开断短路等。

真空断路器对在工作电流范围内频繁操作的网络尤为适用。VD4-S 真空断路器配有弹簧操作机构具有重合闸功能 (分 -0.3s- 合分 -180s- 合分)，并且动作可靠，寿命长。整个断路器包括三只真空开关，外部是树脂绝缘筒，立式结构。

电弧的熄灭是由于灭弧触头的螺旋型沟槽使电弧产生强制性移位的结果。由于开关绝缘筒内最低静态真空度是 10-4 至 10-8 帕，所以尽管开关触头间相对只有不大的间隙，却可以得到很高的绝缘强度。电弧在短路电流第一个零点时熄灭。由于触头间隙小，电弧压降处金属气体等离子区导电率高，加上燃弧时间短，使得电弧能量极低，这对触头乃至整个开关寿命的延长都是有利的。

◆HAD型 SF6 断路器 (ABB 原装件)

HAD型 SF6 断路器是专为环网开关柜设计的，其开断容量足以应付各种状态，包括正常投切设备或分支网络的操作以及在特殊情况下开断短路等。新一代 HAD 具有最新的 SF6 开断工艺，加之结构简单，只需很小的操作能量，如此简单的储能式操作机构具有使用时机械寿命长的特点。断路器选用弹簧操作机构可以实现自动重合闸操作。

开关开断部分的特殊结构能够使电气寿命延长得到异乎寻常的保证。开关是做成分体独立柱式结构，立式安放。开关采用自能吹弧式原理，即用电弧自身能量来灭弧。当断路器分闸时，在灭弧室内的动静触头间产生电弧，电弧产生的高温和电离高效应使 SF6 气体压力在灭弧室内迅猛升高，随着压力的增强和燃弧触头的渐次分开将气体经由喷嘴强行喷向灭弧室外，于是使电弧变稀疏、冷却、遮断，并阻止重燃，因此开关运动部分只需要很少的能量，更加增进了长期运行的可靠性。

Basic Components

◆ SFL type load switch (ABB original unit)

SFL type load switch with double breakpoints and rotary moving contact uses SF6 gas as arcing extinction medium. Moving and static contacts are placed in the strengthened molded epoxy resin shell. In the output end of operation shaft is a transparent hot-pressing molding plastic end cover. Through the end cover can observe state.

Each switch is filled with 1.4pa pressure of SF6 gas and is sealed forever (SFL means "seal forever"). The helium detector can check the gas leakage.

Switch can be installed either vertically or horizontally. In the cabinet, the typical installation is horizontal installation and to put a steel between cable compartment and busbar compartment. Such installation can seal the shell of the switch in the grounding steel and separate busbar and cable joints. And such installation accords to the highest standard of safety.

If internal arc occurs, there is a structural weakness at the rear of the shell. It will be opened, and lead the arc gas outside the switch, then the overvoltage gas releases when the arc discharge valve at the top of the cabinet opens.

◆ Optional Equipments----auxiliary contacts (2 normally close, 2 normally open + extended 2 normally open, 2 normally close)

----shunt release coil are provided for SFL with A mechanism

◆ SFL24K IVDP575304RI

SFL switch with K mechanism: SFL12/17.5 IVDP575305RI

SFL24K IVDP575304RI

◆ SFL24A IVDP575302RI

SFL switch with A mechanism: SFL12/17.5 IVDP575303RI

SFL24A IVDP575302RI

◆ VD4-S Vacuum circuit breaker (ABB original unit)

VD4-S type vacuum circuit breaker is specially designed for unit cabinet. Its breaking capacity is enough to cope with various states, including normal switching devices or operating branch network as well as breaking circuit breaker in special cases.

Vacuum circuit breaker is particularly applicable for the frequent operating network within the scope of working current. VD4-S vacuum circuit breaker with spring operating mechanism is capable to reclose (breaking-0.3s-closing breaking-180s-closing breaking) with reliable operation and long service life. The circuit breaker with three vacuum switches is vertical structure coated with resin insulated tube.

Arc extinguishing is the result of mandatory shift from the spiral groove of the arc extinction contact. Due to the minimum static vacuum degree in the switch insulation tube is 10-4 to 10-8 pa, so despite the relatively narrow gap between the switch contacts, the dielectric strength is still very high. The arc extinguished at the first zero point of the short-circuit current. Thanks to the narrow gap between the contacts, the high electric conductivity of the metal gas plasma zone at the arc decompressurization and the short arc time, the arc energy is extremely low, so it is favorable for longer life of the contact and the switch.

◆ HAD type SF6 circuit breaker (ABB original unit)

HAD type SF6 circuit breaker is specially designed for the looped network switchgear. Its breaking capacity is enough to cope with various states, including normal switching devices or operating branch network as well as breaking circuit breaker in special cases. The new HAD with the latest breaking technology of SF6 has longer mechanical life for such simple structure and minimal operating energy. The spring operating mechanism can reclose the circuit breaker.

The special structure for switch breaking can make the electrical life extremely longer. Switch is made into vertical independent pillar type structure. The switch uses self-energy arc extinction principle, that is to say use the arc energy to extinct the arc. When the circuit breaker is breaking, the arc arouses between the moving and static contacts in the arc chute. The arc produces high temperature and ionization efficiency so the SF6 gas pressure in arc chute soars. As the increase of the pressure, the arc contact gradually separates and the gas is forced to spray out of the arc chute through the nozzle, then the arc becomes sparse, cool and interrupting, so that to prevent it to restrike. Therefore just a little bit of energy of the switch moving parts improves the reliability of long-term operation.

外型尺寸 Dimension

名称 Item	单位 Unit	数值 Data
断路器柜宽 Width of Circuit Breaker Cabinet	mm	750
其它柜宽 Width of Other Cabinets	mm	375,500
高 Height	mm	1600,1850
深 Depth	mm	980,900
继电器箱高 Height of Relay Instruments Compartment	mm	450

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SFL 技术数据 Specifications of SFL				
额定电压 Rated Voltage	kV	12	17.5	24
冲击耐压 Impulse Withstand Voltage	kV	75	95	125
一分钟工频耐压 1min Power Frequency Withstand Voltage	kV	28	38	50
额定电流 Rated Current	A	630	630	630
关合容量 Closing Capacity	kA	50	50	40
热稳定电流 Thermal Stability Current	kA/s	20.3	–	–
开断容量 Breaking Capacity	A	1700	–	–
最大熔断器 Maximum Fuse	A	125	–	–
极距 Polar Distance	mm	210	210	210

VD4-S 技术数据 Specifications of VD4-S				
额定电压 Rated Voltage	kV	12	17.5	24
冲击耐压 Impulse Withstand Voltage	kV	75	95	125
工频耐压 Power Frequency Withstand Voltage	kV	28	38	50
额定电流 Rated Current	A	630	630	630
热稳定电流 Thermal Stability Current	kA/s	20.3		
极距 Polar Distance	mm	210	210	210

本开关有许多优点 Advantages

a、燃弧持续时间短，灭弧室内的绝缘强度恢复迅速。
a, Short duration of arc and quick recovery of dielectric strength in arc chute;

b、即使在最苛刻的环境中也保证安全可靠。
b, Safe and reliable even in harshest environment;

c、可开断低值的感性、容性电流。
c, Capable breaking reactive current and capacitative current at low value;

d、操作机构简单，能快速分合，机械寿命长。
d, Simple operating mechanism, quick breaking and closing, and long mechanical life;

e、减少了触头和来弧室的耗损，也即延长了电寿命。
e, Less damage for contacts and arc chute, longer electrical life;

f、允许操作次数多，但维护工作量很小。
f, More operation times, less maintenance work;

g、轻型结构，紧凑，稳固。
g, Light, compacted and steady structure.

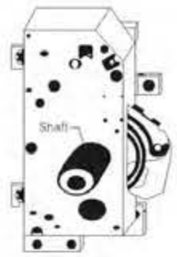
K机构

标准装备 Standard Equipments:

- 电动操作 Motor-drive operation
- 手动操作 Manual operation
- 辅助接点 (2 常开 2 常闭)
  Auxiliary contacts (2 normally open and 2 normally close)
- 分励跳闸，带位置接点
  Shunt trip with location contacts
- 分励合闸线圈
  Shunt closing coil
- 信号接点的气体压力控制
  Gas pressure control for signal contacts

可选装备 Operational Equipments:

- S5 固体过流继电器
  S5 solid over current relay
- PR511-PR512 过流继电器
  PR511-PR512 over current relay
- 低电压脱扣器
  Under voltage release
- 联锁线圈
  Interlocking coil



A机构

熔断器选择参考表 Reference Chart for Choosing Fuse

工作电压 (kV) Working Voltage (kV)	变压器额定容量 Rated Capacity of Transformer															
	50	75	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000
	熔断器选择 (标称值为 A) Choose Fuse (Standard Value is A)															
3	25	25	40	40	63	63	63	80	100	100	160					
5	16	16	25	25	40	40	63	63	63	80	100	100	160			
6	16	10	25	25	25	40	40	63	63	63	80	100	100	160		
10	10	10	16	16	25	25	25	40	40	63	63	63	80	100	100	
12	10	10	16	16	16	25	25	25	40	40	63	63	63	80	100	
15	10	10	16	16	16	16	25	25	25	40	40	63	63	63	100	
20	10	10	10	10	16	16	16	25	25	25	40	40	63	63	63	80
24	10	10	10	10	16	16	16	15	25	25	25	40	40	63	63	63

技术数据 Specifications

额定电压 Rated Voltage	kV	12	17.5	24
冲击耐压 Impulse Withstand Voltage	kV	75	95	125
一分钟工频耐压 1min Power Frequency Withstand Voltage		42	55	65
额定电流 Rated Current	A	630	630	630
关合容量 Closing Capacity	kA	50	50	40
热稳定电流 Thermal Stability Current	kA/s	20/3	–	–
开断容量 Breaking Capacity	A	1700	–	–
最大熔断器 Maximum Fuse	A	125	–	–
极距 Polar Distance	mm	210	210	210

操作机构 Operating Mechanism

◆双功能机构：K 型 – 开关功能
利用操作杆或电机独立地进行分合闸操作
辅助触点：开关 (20 + 2C)/ 开关 (20 +3C) 和接地开关 (10+1C)Double functional mechanism: function of K type switch
Use operating rod or motor to break or close independently.
Auxiliary contacts: switch (2 normally open + 2 normally close)/switch (2 normally open + 3 normally close) and grounding switch (1 normally open + 1 normally close)

◆接地开关功能
利用操作杠杆独立地进行分合闸操作操作能量由压缩弹簧提供，该弹簧释放后，使触头快速闭合或断开。
机械指示：组件中熔断器熔断时的机械显示器 / 电机选择 / AC220V / DC220V

◆Function of grounding switch
Use operating rod or motor to break or close independently. The operating energy is provided by spring. When the spring releases, the contacts will close or break quickly.
Mechanism instruction: machinery monitors when the fuse burns out in components/ motor selection/ AC220V/ DC220V.

◆双功能操作机构：A 型 – 开关功能
利用操作杆或电机独立地进行分合闸操作，操作能量由压缩弹簧提供，该弹簧释放后，使触头闭合。
利用按钮 (O) 或脱扣单元独立进行分合闸操作。

◆Double functional mechanism: function of A type switch
Use operating rod or motor to break or close independently. The operating energy is provided by spring. When the spring releases, the contacts will close.
Use button (O) or release unit to operate closing and breaking independently.

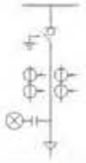
◆接地开关功能
利用操作杆独立地进行分合闸操作，操作能量由压缩弹簧提供，该弹簧释放后。使触头快速闭合或断开。
辅助触点：开关 (20+ 2C) 和接地开关 (10+1C) / 选电机时的开关 (1C) 和接地开关 /(10+1C)/ 熔断器烧断 (1C)/ 机械指示 / 脱分励脱扣 / 欠电压 / 电机选择

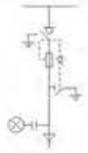
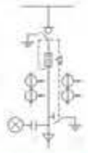
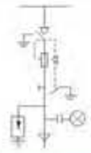
◆Function of grounding switch
Use operating rod or motor to break or close independently. The operating energy is provided by spring. When the spring releases, the contacts will close or break quickly.
Auxiliary contacts: switch (2 normally open + 2 normally close) and grounding switch (1 normally open + 1 normally close)/switch for motor selection (1 normally close) and grounding switch/(1 normally open +1 normally close)/fuse burnout (1 normally close)/mechanism instruction/shunt release/under voltage/motor selection

XGN15-12(SF6)

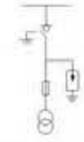
箱型固定式交流金属封闭开关设备

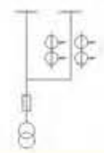
主电路方案图 Primary Wiring Scheme

方案号 Scheme Number		1	1-1	1-2	1-3
主电路方案图 Primary Wiring Scheme					
主要电器元件 Main Electric Component	负荷开关 FLN36-12D Load Switch FLN36-12D	1	1	1	1
	熔断器 Fuse				
	电流互感器 LZZJ2-12 Current Transformer LZZJ2-12		2		
	高压带电显示装置 DXN6-T High Voltage Charged Display Device DXN6-T	1	1	1	1
	避雷器 HY5WZ 或 HY5WS Lightning Arrester HY5WZ or HY5WS			3	
宽 × 深 × 高 (mm) Width × Depth × Height (mm)		420/500 × 845 × 1600/1800	500 × 845 × 1600/1800	500 × 845 × 1600/1800	420 × 845 × 1600/1800
用途 Usage		进出线 Inlet and Outlet of Line	进出线 Inlet and Outlet of Line	进出线 Inlet and Outlet of Line	进出线（右或左） Inlet and Outlet of Line（left or right）

方案号 Scheme Number		2	2-1	2-2
主电路方案图 Primary Wiring Scheme				
主要电器元件 Main Electric Component	组合电器 FLRN36-12D Combinatorial electrical apparatus	1	1	1
	熔断器 Fuse	S□LAJ	S□LAJ	S□LAJ
	电流互感器 LZZJ2-12 Current Transformer LZZJ2-12		1~3	
	高压带电显示装置 DXN6-T High Voltage Charged Display Device DXN6-T	1	1	1
	避雷器 Lightning Arrester			HY5WZ
	接地开关 Grounding Switch	1	1	1
宽 × 深 × 高 (mm) Width × Depth × Height (mm)		500 × 845 × 1600/1800	500 × 845 × 1600/1800	500 × 845 × 1600/1800
用途 Usage		保护变压器 Protect Transformer	保护变压器 Protect Transformer	保护变压器 Protect Transformer

主电路方案图 Primary Wiring Scheme

方案号 Scheme Number		3	4	5	6
主电路方案图 Primary Wiring Scheme					
主要电器元件 Main Electric Component	负荷开关 FLN36-12D Load Switch FLN36-12D	1			1（不带接地开关） 1 (without grounding switch)
	熔断器 Fuse	3（保护电压互感器） 3 (Protect Voltage Transformer)			
	电流互感器 LZZJ2-12 Current Transformer LZZJ2-12	2-3			
	高压带电显示装置 DXN6-T High Voltage Charged Display Device DXN6-T	1		1	
	避雷器 Lightning Arrester	HY5WZ			
宽 × 深 × 高 (mm) Width × Depth × Height (mm)		500 × 845 × 1600/1800	420 × 845 × 1600/1800	420 × 845 × 1600/1800	420 × 845 × 1600/1800
用途 Usage		PT+ 避雷器 PT + Lightning Arrester	母线联络 Busbar Connection	电缆进线 Inlet of Cable	联络 Connection

方案号 Scheme Number		7		
主电路方案图 Primary Wiring Number				
主要电器元件 Main Electric Component	熔断器 Fuse	3		
	电流互感器 LZZJ2-12 Current Transformer LZZJ2-12	2		
	电压互感器 JDZ-10 Voltage Transformer JDZ-10	2		
宽 X 深 X 高 (mm) Width × Depth × Height (mm)		500X845X1600/1800		
用途 Usage		计量 Measure		

XGN15-12(SF6)
箱型固定式交流金属封闭开关设备

联锁 Interlocking

◆ 开关设备具备以下联锁：
The interlocking of the switch are as follows:
◆ 负荷开关在合闸位置时，接地开关操作被锁住。
Grounding switch can not be operated when load switch is in closing position.
◆ 接地开关在合闸位置时，负荷开关操作被锁住。
Load switch can not be operated when grounding switch is in closing position.
◆ 只有当接地开关合闸时，才允许打开环网柜前门，其它情况下前门被锁住。
The looped network cabinet only can be opened when grounding switch is in closing position.

操作 Operation

对于配负荷开关的开关设备，用专用操作手柄在开关设备正面操作，操作机构的正面有上、下两操作孔，上部为接地开关操作孔，下部为负荷开关操作孔。操作时，手柄向顺时针方向旋转为开关合闸方向，逆时针方向旋转为开关分闸方向。也可加装电动分、合闸装置，进行遥控操作。（注意：有时负荷开关不带接地开关，接地开关操作孔被当作柜门解锁之用）。

对于配组合电器的开关设备，除负荷开关分闸操作用手动分闸按钮外，其它与上述操作顺序一样。组合电器柜另设的下接地开关，通过连杆与上接地开关同分同合。在合闸时释放下熔断器座上的残余小电流，以提高更换熔断器时的安全性。

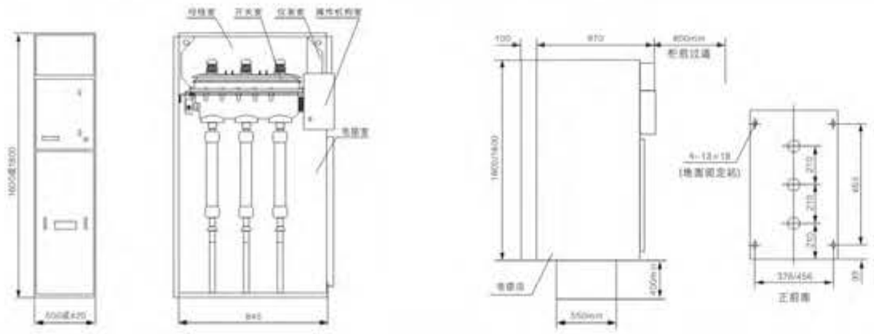
The switchgear with load switch is equipped with exclusive handles to operate in front of the cabinet. There are two operating holes in front of the operating mechanism: the upper one is operating hole of the grounding switch and the lower one is the operating hole of the load switch. The handle rotates clockwise which is the direction for closing the switch while the handle rotates counterclockwise which is the direction for breaking the switch. It can also be equipped with electric breaking and closing device for remote control. (Note: sometimes the load switch is without grounding switch, so the operation hole of grounding switch is used to unlock the cabinet).

The switchgear with composite apparatus has the same operation processes with the above one, except the breaking operation is manual one. The lower grounding switch of the composite apparatus is breaking and closing at the same time with the upper one through a connecting rod. When it is in breaking position, the small remnant current of the fuse base is released in order to improve the safety when replace the fuse.

订货须知 Ordering Information

◆ 主电路方案编号、主结线系统图、排列图、平面布置图。辅助回路电气原理图、端子排列图。
Primary wiring scheme number, main line connection system chart, pareto chart, layout chart, auxiliary loop electric schematic diagram and terminal arrangement chart;
◆ 开关设备内电器元件的型号、规格、数量。
Model, specification and quantity of electrical components;
◆ 备品、配件的名称及数量。
Type and quantity of spare components and accessories;
◆ 有特殊要求情与本公司协商。
Special requirements need to be discussed with the manufacturer.

外形及安装尺寸 Outline Overall and Installation Dimensions



天耀电气 TIANYAO ELECTRIC

C 低压开关设备

MNS
低压抽出式开关柜
MNS Low Voltage Withdrawable Type Switchgear

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Http://www.tianyaozhineng.com

MNS
低压抽出式开关柜

型号含义 Type Designation

正常使用条件 Working Conditions

◆周围空气温度不高于 +40℃，不低于 -5℃，并且 24h 内其平均温度不高于 +35℃。
Ambient temperature: -5~+40℃ and the average temperature in 24h must below 35℃

◆周围空气相对湿度在最高温度为 +40℃时不超过 50%，在较低温度时有较高的相对湿度，如 +20℃时为 90%，但考虑到由于温度的变化有可能会偶然产生适度的凝露。
Humidity: ≤ 50% at the highest ambient temperature +40℃, lower temperature with higher humidity, such as ≤ 90% at 20℃, mild condensation occasionally happens for the variations of the temperature.

◆户内使用，使用地点的海拔高度不得超过 2000m。
Altitude: ≤ 2000m (outdoor type)

◆应安装在无剧烈震动和冲击，以及不使电器元件受到腐蚀的场所。
It is applicable in the place without violet vibration and irrpulsion and corrosive pollution.

主要技术参数 Specification

名称 Item	GB7251.1-2013 低压成套开关设备和控制设备 (TTA) GB7251.1-2013 Low Voltage Whole Set Switch and Control Devices (TTA) IEC61439《低压成套开关设备和控制设备》 IEC61439 "Low Voltage Whole Set Switch and Control Devices
过电压类别 Overvoltage Type	IV III
污染等级 Pollution Degree	3
额定工作电压 (Ue)(V)Rated Working Voltage (Ue)(V)	400/660
额定绝缘电压 (Ui)(V)Rated Isolation Voltage (Ui)(V)	660/1000
额定频率 (Hz)Rated Frequency (Hz)	50(60)
额定电流 Rated Current	≤ 5000A
额定短时耐受电流 (Icw)(kA)Rated Short-time Withstand Current (Icw)(kA)	50,65,80(Is 有效值) (Is effective value)
额定峰值耐受电流 (Ipk)(kA)Rated Peak Withstand Current (Ipk)(kA)	105,140,176(0.1s 最大值) (0.1s maximum value)
额定最大工作电流 Rated Maximum Working Current	≤ 1000A
额定短时耐受电流 Rated Short-time Withstand Current	50kA
额定峰值耐受电流 Rated Peak Withstand Current	105kA
外壳防护等级 Protection Degree of Shell	IP30 IP40(特殊说明) (special illustration)

结构特征 Structure Features

本开关柜由于引进了瑞士 ABB 的先进技术，并在其原有基础上加以技术改进，使其更符合我国国情。柜体采用 25mm 为模数的 C 型材通过连接件来组成各种得以满足各种需求的柜架结构和抽屉单元，在 MCC 柜中采用高强度的阻燃型工程塑料组件，使其安全性能更可靠，同时加之将国外的功能板加以改型，以 200mm 为模数加以组合，使其更有利于 PC 柜与 MCC 柜混装柜体的设计需求，抽出单元与柜体具有可靠的联锁装置，以防止在开关通电状态下带负荷拉闸，提高了其安全性，另外该柜体一般均采用冷轧钢板进行钝化处理后组装而成，也可根据用户的不同需求采用敷铝锌钢板。

The switchgear introduces the advanced technologies of ABB and improves it with our original technology to make it more in line with China's national conditions. Cabinets adopt 25mm for the modulus of C sectional material and becomes each kind of frame structure and draw unit that needed by means of connection. MCC cabinet uses the high strength of flame retardant engineering plastics components to make its safety performance more reliable. At the same time, it is more suitable for the design requirement of mixing the PC cabinet and MCC cabinet by remolding the foreign function board with 200mm for the modulus. Withdrawable unit and the cabinet have reliable interlocking devices to prevent the switch to break with load when it is charged, so the safety of the cabinet improves. In addition, the cabinet adopts cold-rolled steel sheet after passivation for assembly and can also adopt aluminium zinc steel plate according to the different needs of users.

◆开关柜类型
受电、母联柜
采用国内外的各种类型的框架式断路器如 RMW1、CW1、NA1、DW45、CDW7、MT、E 等系列断路器作为总开关，实现受电或母联功能。

◆Cabinet Type
◆Power Receiving and Busbar Connecting Cabinet
Use various domestic and foreign types of frame type circuit breaker, such as RMW1, CW1, NA1, DW45, CDW7, MT, E series etc. circuit breaker as the main switch to achieve the function of power receiving or busbar connecting.

◆动力中心柜 (PC) Power Center Cabinet (PC)
采用国内外的各种类型的框架式断路器如 DW45、NA1、CDW7MT、E 系列断路器进行配电。
Use various domestic and foreign types of frame type circuit breaker, such as DW45, NA1, CDW7MT, E series etc. circuit breaker to distribute power.

◆电动机控制中心 (MCC)
由大小抽屉组装而成，各回路主开关采用高分断能力的塑壳断路器或旋转式带熔断器的负荷开关。
无功功率补偿柜

◆Motor Control Center (MCC)
MCC is assembled by various sizes of drawers and its main loop switch adopts molded case circuit breaker with high breaking capacity or load switch with rotating type fuse.
Reactive Power Compensation Cabinet

◆抽屉类型
有五种尺寸都是以 8E(200mm) 高度，进行模块化结构设计，其有效元器件安装高度为 1800mm，使柜体整体布局更合理，更美观。
8E/4: 高 200 x 宽 150 x 深 400 高度空间平行组合 4 个抽屉单元
8E/2: 高 200 x 宽 300 x 深 400 高度空间平行组合 2 个抽屉单元
8E: 高 200 x 宽 600 x 深 400 高度空间组装 1 个抽屉单元
16E: 高 400 x 宽 600 x 深 400 高度空间组装 1 个抽屉单元
24E: 高 600 x 宽 600 x 深 400 在 24E(600mm) 高度空间组装 1 个抽屉单元
以上五种抽屉单元可在一个柜体中作单一组装，也可做混合组装 (见图一)

◆Drawer Type
The five dimensions all are 8E (200 mm) height, modular structure designed and installation height of effective components is 1800 mm, so its whole layout is more reasonable and more beautiful.
8E/4: 200 x 150 x 400 (Height × Width × Depth) height space parallel combines 4 drawer units
8E/2: 200 x 300 x 400 (Height × Width × Depth) height space parallel combines 2 drawer units
8E: 200 x 600 x 400 (Height × Width × Depth)height space assembles 1 drawer units
16E: 400 x 600 x 400 (Height × Width × Depth) height space assembles 1 drawer units
24E: 600 x 600 x 400 (Height × Width × Depth) in 24E (600 mm) height space assembles 1 drawer units
The above five kinds of drawer units may be in one cabinet as a single assembly as well as a mixed assembly (see picture 1)

柜体简介 Brief Introduction

柜体基本尺寸 Basic Dimension

抽屉型式 Drawer Type	8E/4	8E/2	8E	16E	24E
最多容纳单元数 Maximum Units	36	18	9	4+8E	3

受电柜及联络柜 Power Receiving and Busbar Connecting Cabinet

	主母线转接柜 Main Busbar Transferring Cabinet	受电柜及联络柜 Power Receiving and Busbar Connecting Cabinet
高 (mm)Height (mm)	2200	2200
宽 (mm)Width (mm)	400	600 800 1000
深 (mm)Depth (mm)	800 1000	800 1000
备注 Remarks		

MNS
低压抽出式开关柜

动力中心 (PC) 柜 Power Center (PC) Cabinet

	2 台断路器 2 Circuit Breakers	3 台断路器 3 Circuit Breakers
高 (mm) 3 Circuit Breakers	2200	2200
宽 (mm) Width (mm)	800 1000	800 1000
深 (mm) Depth (mm)	800 1000	800 1000
备注 Remarks	DW45-2000 及以下载流量且体积较小的同类断路器 DW45-2000 and other similar circuit breakers with lower carrying capacity and smaller size	DW45-2000 及以下载流量且体 积较小的同类断路器 DW45-2000 and other similar circuit breakers with lower carrying capacity and smaller size

电动机控制中心 (MCC) 柜及电容补偿柜 Motor Control Center (MCC) Cabinet and Capacity Compensation Cabinet

	MCC 柜 MCC Cabinet			电容补偿柜 Capacity Compensation Cabinet
高 (mm) Height (mm)	2200			2200
宽 (mm) Width (mm)	600	800	1000	600 800 1000
深 (mm) Depth (mm)	1000 800	1000 800	1000 800 600	800 1000 600

柜体分区设计 Cabinet Design

◆MCC 柜根据需要可组成单面操作柜或双面操作柜，每一柜体又固定分隔成三个小室。即主母线室、电器室和电缆室。（具体见图 2）

◆安全保护系统

每柜都有一块阻燃型的高密度聚氨脂塑料功能板，或经过电镀的隔板安装在主母线室与电器室之间，其作用为有效防止开关元件因故障引起的飞弧与母线之间短路造成的事故，使操作更安全。

上下层抽屉之间都有带有通风孔的镀锌金属底板相隔离，对相邻回路之间具有较强的隔离作用。

柜内采用了多种塑料组件以支撑带电部份，这些组件要求是无卤素的，并具有 CTI300 等级的防漏电性能。

柜内设有独立的 PE 接地系统和 N 中性导体，都贯穿整个装置，各回路接地或接零都可就近联接。整个母线系统安装见图 3 所示。框架结构件采用自攻螺钉联接，具有较高的接地可靠性。（具体见图 3）


8E/4


8E/2


8E


16E


24E

◆MCC cabinet can be composed of one size operation cabinet or double sizes operation cabinet according to different needs. Each cabinet normally is divided into three small compartments, i.e. main busbar compartment, electrical equipment compartment and cable compartment. (See picture 2)Safety Protection System

◆Each cabinet has a function plate made by flame retardant high-density polyurethane plastic or clapboard after electroplating which can be installed between the main busbar compartment and electrical equipment compartment. Its role is to effectively prevent the arc caused by switch components fault and short-circuit accident between busbars, and to make the operation more secure.

Between the upper and the lower drawers, there is a galvanized metal base plate with a vent hole to efficiently isolate between the adjacent loops.
Cabinet uses a variety of plastic components to support the charged parts. These components require halogen free, and CTI300 grades of leakage prevention performance.

Cabinet is equipped with independent PE grounding system and N neutral conductor all throughout the entire device. The grounding line or null line of each loop can be connected to the nearest. The busbar system installed as shown in picture 3. Frame structures connect with self tapping screw to guarantee its high grounding reliability. (See picture 3)

◆母线系统

开关柜的水平母线布置在开关柜的水平母线隔离室内，可置于柜后或柜顶，后出线结构的柜体中水平母线置于柜顶。配电母线（垂直母线）组装在阻燃型塑料功能板中，既可防止电弧引起的放电，又能防止人体接触，通过联接件与主母线联接。

◆Busbar System

The horizontal busbar of the switchgear is arranged in the horizontal busbar isolation compartment, which can be placed at the top or at the rear of the cabinet. In back outlet connecting cabinet, the horizontal busbar is placed at the top. Distribution busbar (vertical busbar) is assembled in the function plate made by flame retardant plastics to prevent arc caused by discharge and to prevent the body contact. It connects with the main busbar through connections.

◆抽屉的电气和机械联锁

抽屉单元有可靠的机械联锁装置，通过操作手柄控制，具有明显的分闸、合 闸、试验、抽出和隔离位置。
为加强安全防范，操作手柄定位后可加上挂锁，最多可加三把锁。

◆Electrical and Mechanical Interlocking of Drawer

Drawer units have reliable mechanical interlocking devices, controlled by operating handle. It has obvious breaking, closing, test, and withdrawable and isolation position.
To strengthen security, the operating handle can be locked when it fixed. And the locks are up to three.

◆后出线开关柜结构

柜后出线可以减少开关柜排列宽度。后出线开关柜的主母线水平安装在开关柜的顶部，柜的后半部为电缆室，进出线电缆均在柜后电缆室连接。开关柜的正面为装置小室，安装开关设备的功能单元。该系统设计将开关柜侧面的电缆室移至后半柜，大大减少了开关柜的排列宽度，以进一步满足变电站空间布置的要求。

馈电柜柜宽 600mm，深 1000mm，顶部为独立的母线室，与装置小室隔离。正面装置小室有效安装高度为 72E(E = 25mm)，经多功能板与后部电缆室隔离，充分利用了开关柜的安装空间，结构紧凑，单元配置灵活。后面电缆室带门，安装及维护方便。外型见图 4。

进线柜的宽度按进线单元的框架电流确定，推荐宽度为 400、600、800、1000mm，柜深 1000mm。

◆Rear Outlet Line Cabinet Structure

Rear outlet lines can reduce the width of switchgear arrangement. The main busbar of rear outlet lines cabinet is installed at the top of the cabinet. The second back part of the cabinet is cable compartment, connecting all the inlet and outlet cables. The front of the switchgear is a small device compartment to install the function units. The advantage of this switchgear is to arrange the cable compartment at the rear of the cabinet, so the width of the switchgear arrangement greatly reduces, in order to meet the requirements of substation space layout.
Power feeding cabinet (depth: 600mm; width: 1000mm) has an independent busbar compartment at the top of it and isolates from the small device compartment (efficient installation height: 72E, and E=25mm) which is isolated from cable compartment through function plate, so the space is fully used. The compact structure makes the arrangement of units much more flexible. The rear door of the cable compartment is convenient for maintenance. (See picture 4)
The width of the inlet line cabinet is according the framework current of inlet line unit. The recommended widths are 400mm, 600mm, 800mm, 1000mm and the depth of the cabinet is 1000mm.

图 3 MNS 母线系统
Picture 3: MNS Busbar System

安装示意图 Installation Instruction

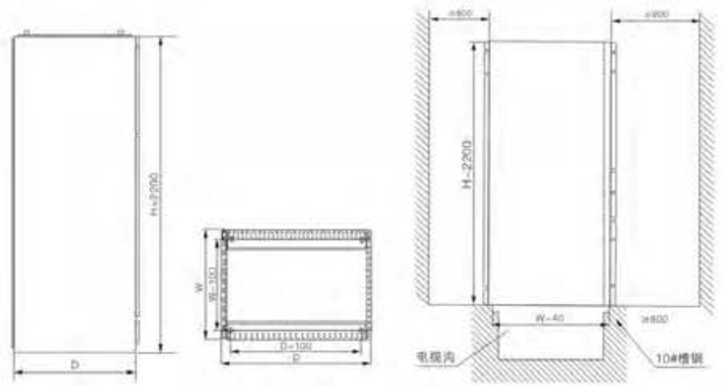

图 5 安装示意图
Picture 5: Installation Instruction

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概述 General

GCS 型低压抽出式开关柜，（以下简称装置）是两部联合设计组根据行业主管部门、广大电力用户及设计单位的要求设计研制出的符合国情，具有较高技术性能指标、能够适应电力市场发展需要并可与现有引进产品竞争的低压抽出式开关柜。该装置目前已被电力用户广泛选用。

装置适用于发电厂、石油、化工、冶金、纺织、高层建筑等行业的配电系统，在大型发电厂、石化系统等自动化程度高，要求与计算机接口的场所，作为三相交流频率为 50(60)Hz、额定工作电压为 380(400)V, (660)V, 额定电流为 5000A 及以下的发、供电系统中的配电、电动机集中控制、无功功率补偿使用的低压成套配电装置。装置的基本组织形成见附图 1。装置的设计符合下列标准 IEC439-1《低压成套开关和控制设备》GB7251.1-2013《低压成套开关设备》。

GCS low-voltage withdrawable switchgear (hereinafter referred to as device) is designed by two joints according to the requirements from the departments in charge of industry, the majority of power users and design units in accordance with national conditions, with high technical performance indicators. It can adapt to the development requirements of the power market and can compete with the low voltage withdrawable switchgear from other countries. The device has been widely used by power users.

Device is suitable for power distribution system of power plant and petroleum, chemical, metallurgical, textile industries and high-rise building and other industries. Device (three phases; AC frequency: 50(60)Hz; rated working voltage: 380(400)V, (660)V; rated current: 5000A and below) can be used as the power distribution of power generating and supplying system and as the low voltage switchgear distribution device for motor centralized control and reactive power compensation. The basic organization form of the device sees picture 1. The design of the device meets the following standards: IEC439-1 "Low Voltage Whole Set Switching and Controlling Equipment" and GB7251.1-2013 "Low Voltage Switchgear"

型号含义 Type Designation

G C S
- 森源电气系统 Senyuan Electrical System
- 抽出式 Withdrawable Type
- 封闭式开关柜 Sealed Switchgear

正常使用条件 Working Conditions

◆周围空气温度不高于 +40℃，不低于 -5℃，24 小时内平均温度不得高于 +35℃。超过时，需根据实际情况降容运行。
Ambient temperature: -5~+40℃ and the average temperature in 24h must below 35℃. If it is over the regulation, the device should be used by reducing capacity.

◆户内使用，使用地点的海拔高度不得超过 2000m。
Altitude: ≤ 2000m (outdoor type)

◆周围空气相对湿度在最高温度为 +40℃时不超过 50%，在较低温度时允许有较大的相对湿度，如 +20℃时为 90%，应考虑到由于温度的变化可能会偶然产生凝露的影响。
Humidity: ≤ 50% at the highest ambient temperature +40℃, lower temperature with higher humidity, such as ≤ 90% at 20℃, mild condensation occasionally happens for the variations of the temperature.

◆装置安装时与垂直面的倾斜度不超过 5° 且整组柜列相对平整。
The inclination to the vertical plane is not more than 5° and the whole set cabinets should be relatively level.

◆装置应安装在无剧烈震动和冲击以及不足以使用电器元件受到不应有腐蚀的场所。
It is applicable in the place without violet vibration and impulsion and corrosive pollutions.

◆用户有特殊要求时，可以与制造厂协商解决。
Other special requirements need to be discussed when ordering.

GCS
低压抽出式开关柜

主要技术参数 Specifications

名称 Item		参数 Data
主电路额定电压 (V)Rated Voltage of Main Circuit (V)		交流 380(400)、(660) AC 380(400)、(660)
辅助电路额定电压 Rated Voltage of Auxiliary Circuit (V)		交流 220、380(400)、直流 110、220 AC 220、380(400)、DC 110、220
额定频率 (Hz)Rated Frequency (Hz)		50(60)
额定绝缘电压 (V)Rated Isolation Voltage (V)		660(1000)
额定电流 (A) Rated Current (A)	水平母线 Horizontal Busbar	≤ 5000
	垂直母线 (MCC)Vertical Busbar (MCC)	1000
母线额定短时耐受电流 (kA/1s) Rated Short-time Withstand Current of Busbar (kA/1s)		50,80
母线额定峰值耐受电流 (kA/0.1s) Rated Peak Withstand Current (kA/0.1s)		105,176
工频试验电压 (V/1 min) Power Frequency Testing Voltage (V/1min)	主电路 Main Circuit	2500
	辅助电路 Auxiliary Circuit	2000
母线 Busbar	三相四线制 Three Phases and Four Lines	A.B.C.PEN
	三相五线制 Three Phases and Five Lines	A.B.C.PEN
防护等级 Protection Degree		IP30,IP40

主电路 Main Circuit

◆装置主电路方案共 36 组 87 个规格，不包括由于辅助电路控制与保护的变化而派生的方案和规格。

◆主电路方案是征求了广大设计、制造、试验和使用部门的意见而选编的，包括了发电、供用电和其它电力用户的需要，额定工作电流为 5000A，适合 2500kVA 及以下的配电变压器选用。

◆此外，为适应供用电提高功率因数的需要而设计了电容器补偿柜，考虑综合投资的需要而设计了电抗器柜。

There is 36 sets and 87 regulations of the main circuit scheme of the device, not including the derived ones by changing the auxiliary circuit control and protection.

Main circuit scheme is selected from the opinions of the departments of design, manufacture, test and use, including power generation, power supply and other power users' needs. Its rated working current is 5000A, suitable for distribution transformer of 2500kVA and below.

In addition, in order to adapt to the needs of improving power factor of the power supply, the capacitor compensation cabinet is designed. The electric reactor cabinet is designed for considering the need of the comprehensive investment.

母线 Busbar

◆为提高母线动热稳定能力和改善接触面的温升，装置全部采用 TMY-T2 系列硬铜排、铜排的连接部分必须压麻、搪锡，推荐采用全长搪锡。也可选用全长镀银铜母线。

◆水平母线置于柜后部母线隔室内。3150A 及以上为上下双层布置，2500A 及以下为单层布置，每相由 4 条或 2 条母排组成，大大提高了母线的短路强度。

In order to improve the busbar moving and thermal stability and the temperature of the interface, the device adopts TMY-T2 series hard copper bar whose connection parts must be pressed and with hot dip coating tin. The total length of hot dip coating tin is recommended. And the total length of silver plated copper busbar is also for choosing.

The horizontal busbar is placed in busbar compartment at the back of the cabinet. 3150A and above is double arrangement with upper and lower busbar. 2500A and below is single arrangement. Each phase is composed of 4 or 2 busbars to improve short-circuit strength of busbar.

装置水平母线铜排选用如下表 Selection Chart of Horizontal Busbar Installation

额定电流 (A) Rated Current (A)	铜排规范 Specification of Copper Bar
630 1250	2(50x5)
1600	2(60x5)
2000	2(60x10)
2500	2(80x10)
3150	2x2(60x6)
4000	2x2(60x10)

垂直母线
用于抽屉柜的垂直母线采用“L”形硬铜母线。
L 形母线规格
(高 x 厚)+(底 x 厚) (50x5)+(30x5) 额定电流 1000A

Vertical Busbar
The vertical busbar for withdrawable cabinet uses "L" shape hard copper busbar.
Specification of "L" shape busbar:
(High x thickness) + (bottom x thickness) » (50 x 5) + (30 x 5) : rated current:1000A

中性接地母线
采用硬铜排
贯通水平中性接地 (PEN) 或接地 + 中性线
(PE+N) 规格如表：

Neutral Grounding Busbar
Using hard copper bar
Cut-through with horizontal neutral grounding line (PEN) or grounding line+ neutral line

(PE+N)规格如表 (PE+N) Specification:

相导线截面积 (mm^2) Sectional Area of Phase Conductor (mm^2)	选用 PE(N) 线截面 (mm^2) Sectional Area of PE(N) Line (mm^2)
500~720	40x5
1200	60x6
>1200	60x10

装置内垂直 PEN 线或 PE+N 线的规格全部选用 40x5 Vertical PEN line or PE+N line in the device are all use 40X5.

主要电器元件选择 Main Electric Components

◆装置主要选用技术性能指标先进，采用引进技术国内已能批量生产的电器元件。
Device mainly chooses volume produced electric components with advanced technologies from other countries.

◆主开关 630A 及以下的电源进线及馈线开关，主选 AH 系列，也可以用 SW1(2)、CW1(2) 系列、AE 系列、3WE 系列或 ME 系列。认为有必要时，也可以选用进口的 M 系列或 F 系列。
Power supply inlet line and feeder line switch (630A and below) mainly chooses AH series and also can choose SW1(2) and CW1(2) series, AE series, 3WE series or ME series, or imported M series or F series if necessary.

◆630 以下的馈线和电动机控制用开关，主要选用 RMM1 系列、CM1 系列，塑壳开关也可选用 NZM 系列、TM30A 系列塑壳断路器。
Feeder line and motor control switch (630A and below) mainly chooses RMM1 series, CM1 series. MCCB can choose NZM series and TM30A series.

◆交流接触器，主要选用 B 系列、LCI 系列、3TB 系列的接触器以及与之配套的热继电器、联锁机构。
AC contactor mainly chooses B series, LCI series and 3TB series and matched thermo relay and interlocking mechanism.

◆电流互感器全部采用 SDH 系列、SDL 系列、SDLI 系列。
Current transformer all adopts SDH series, SDL series and SDLI series.

◆熔断器选用高分断能力 NT00 系列。
Fuse chooses NT00 series with high breaking capacity.

◆为提高主电路的动稳定能力，设计了 GCS 系列专用的 CMJ 型组合式母线夹和绝缘支撑件，采用高强度、阻燃性的合成材料压塑成型，绝缘强度高，自熄性能好，结构独特，只需调正积木式间隔即可适用不同规格的母线。
To improve the dynamic stability of the main circuit, CMJ type combined busbar clamp and insulating support parts are exclusively designed for the GCS series by using high strength and flame retardant synthetic material for molding with high dielectric strength, good self-extinguishing capability, unique structure which can be suit for any regulation busbar by adjusting the gap with building block type.

◆为降低功能单元的间隔板、接插件、电缆头的温升，设计了 GCS 柜专用的转接件，与同类产品比较转接件 热容量增大，温升低。
To reduce the temperature of spacing board, plug-in components and cable terminals in the function unit, transferring components are exclusively designed for the GCS switchgear with larger capacity and lower heat comparing with the similar products.

◆如设计部门根据用户需要，选用性能优良、技术更先进的新型电器元件时，因 VGCS 系列柜具有良好的通用性，不会因更新的元器件，造成制造和安装方面的困难。
Due to the excellent generality of VGCS series cabinets, there is no problem to replace the components with better quality and more advanced ones.

结构特点 Structure Features

◆装置的主构架采用 8MF 型钢，构架采用拼装和部份焊接两种结构形式。主构架上均有安装模数孔 E=20mm。
The main frame of the device adopts 8MF type steel. It has two structures: pieces together and partially weld. Installation hole is E=20mm in each main frame.

◆装置各功能室严格分开，其隔室主要分为功能单元室、母线室、电缆室，各单元的功能作用相对独立。
Every function compartments are strictly separated. Function unit compartment, busbar compartment, cable compartment and other compartments are relatively independent.

◆装置采用将水平主母线置于柜顶或柜后的最新设计方案，使电缆室上下均有出线通道。解决了老产品无法上出线的难题。
The device designs the horizontal busbar at the top of or at the back of the cabinet to make the outlet line access both in upper and lower cable compartment. It solves the problem of the old design which can not satisfy the requirement of outlet lines from the upper cable compartment.

GCS
低压抽出式开关柜

柜体的尺寸如下表 Cabinet Dimension

高 (mm) Height (mm)	宽 (mm) Width (mm)	深 (mm) Depth (mm)
2200	400	800
		1000
	600	800
		1000
	800	600
		800
		1000
	1000	600
		800
		1000

功能单元 Function Unit

◆一个抽屉为一个独立功能单元。
One drawer is one independent unit.

◆抽屉分为二分之一单元、一单元、三 / 二单元、二单元、三单元五个尺寸系列。回路的额定电流在 400A 及以下一个单元抽屉的尺寸为 :160(高) x560(宽)x410(深)，二分之一单元抽屉的宽为 :280，二单元、三单元均为高度做二倍、三倍的变化，其余尺寸均同一单元。
The drawer has five series: 1/2 unit, 1 unit, 3/2 units, 2 units and 3 units. The dimension of 1 unit drawer (rated current of the loop is 400A and below) is 160 x 560 x 410 (Height × Width × Depth). The width of the 1/2 unit is 280, and the height of 2 units and 3 units are double and triple it but other dimensions are same to 1 unit.

◆功能单元的抽屉可以方便的实现互换。
The drawer of function unit can be changed conveniently.

◆装置的每柜内可以配置 11 个一单元的抽屉或 22 个二分之一单元的抽屉。
Each cabinet can be quipped with 11 of 1 unit drawer or 22 of 1/2 unit drawer.

◆抽屉进出线根据回路电流大小采用不同片数的同一规格片式接插件，一般一片接插件≤ 220A。
The size of plug-in components is same. The quantity of plug-in components changes according to the loop current. Normally one plug-in component is no more than 220A.

◆二分之一抽屉与电缆室的转接采用背板式结构的转接件。单元抽屉与电缆室转接采用棒式结构的转接件。
The transferring components of 1/2 unit drawer and cable compartment is back plate structure. The transferring components of 1 unit drawer and cable compartment are bar structure.

◆抽屉面板有合、断、试验、抽出等位置的明显标志，抽屉设有机械联锁装置。
The plate of the drawer with mechanical interlocking device shows closing, breaking, testing and draw-out position.

外形及安装基础示意图 Outline Overall and Installation Dimensions

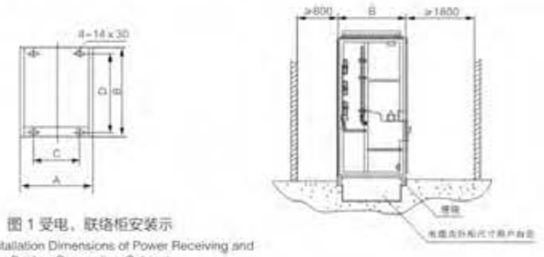
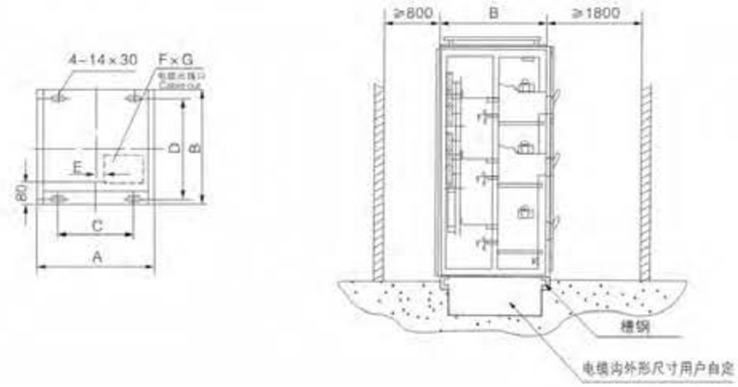


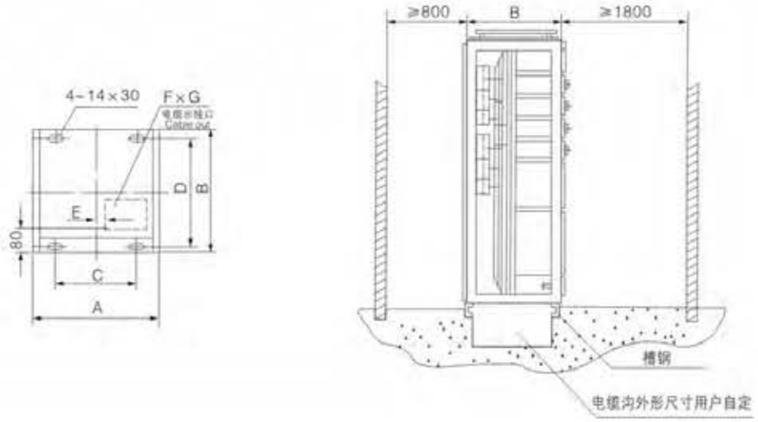
图 1 受电、联络柜安装示
Picture 1: Installation Dimensions of Power Receiving and Busbar Connecting Cabinet

通用柜代号 General Cabinet Number	A	B	C	D	备注 Remarks
GCS	1000	1000	850	956	联络柜 Busbar Connecting Cabinet
GCS	800	1000	650	956	受电柜 Power Receiving Cabinet
GCS	800	800	650	756	受电柜 Power Receiving Cabinet
GCS	600	800	450	756	受电柜 Power Receiving Cabinet

外形及安装基础示意图 Outline Overall and Installation Dimensions



通用柜代号 General Cabinet Numbe	A	B	C	D	E	FxG
GCS	1000	1000	850	956	60	400x400
GCS	800	1000	650	956	160	200x400
GCS	1000	800	850	756	60	400x400
GCS	800	800	650	756	160	200x400



通用柜代号 General Cabinet Numbe	A	B	C	D	E	FxG
GCS	1000	600	850	556	60	400x350
GCS	800	600	650	556	160	200x350

GCK
低压抽出式开关柜
GCS Low Voltage Withdrawable Type Switchgear

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GCK
低压抽出式开关柜
GCK Low Voltage Withdrawable Type Switchgear

概述 General

GCK 低压抽出式开关柜广泛适用于发电厂、冶金轧钢、石油化工、 轻工纺织、港口码头、大楼宾馆等场所作为交流三相四线或五线制、电压 380V、660V, 频率为 50Hz、额定电流为 5000A 及以下的供电系统中的配电和电动机集中控制之用。

GCK 是经过全面型式试验，并获得 CCC 认证，是组装而成的高级型低压开关柜设计符合下列标准：国家标准 GB7251.1-2013《低压成套开关设备》国际标准 IEC61439.1《低压成套开关设备和控制设备》

GCK low voltage withdrawable type switchgear is widely used in power plant and metallurgical, petroleum, chemical, textile industries and port and high-rise buildings and hotels. GCK (three phases and four or five lines; voltage: 380V, 660V; frequency: 50Hz; rated current: 5000A and below) can be used as the power distribution and motor centralized control in power generating and supplying system.

GCK passed all the tests and gained CCC certificate. The advanced design of GCK meets the following standards: GB7251.1-2013 "Low Voltage Switchgear" and IEC61439.1 "Low Voltage Whole Set Switching and Controling Equipment".

型号含义 Type Designation

GCK-□

- 主电路方案 Primary Wiring Scheme
- 用途代号 Usage Number
- 抽出式 Withdrawable Type
- 封闭式开关柜 Sealed Switchgear

正常使用条件 Working Conditions

- ◆周围空气温度不高于 +40℃，不低于 -5℃，在 24 小时内平均温度不高于 +35℃。
  Ambient temperature: -5~+40℃ and the average temperature in 24h must below 35℃.
- ◆相对温度在最高温度 +40℃时不超过 50%，在较低温度时允许有较高的相对温度，如 +20℃时为 90%。
  Humidity: ≤ 50% at the highest ambient temperature +40℃, lower temperature with higher humidity, such as ≤ 90% at 20℃, mild condensation occasionally happens for the variations of the temperature.
- ◆空气清洁，无腐蚀性及爆炸性气体，无导电及能破坏绝缘的尘埃。
  It is applicable in the place with clean air and without corrosive and explosive gases and without the non-conductive and de-isolation dusts.
- ◆无显著掘动和冲击振动的场合，垂直安装，倾斜度不应大于 5 度。
  The inclination to the vertical plane is not more than 5 ° and the switchgear should be operated in the conditions without obvious shaking and violet vibration.
- ◆海拔高度不超过 2000 米。
  Altitude: ≤ 2000m
- ◆开关柜适用于以下温度运输和储存：-25℃至 +55℃，在短时间内（不超过 24 小时）不超过 +70℃。
  Temperature for Transferring and Storing: -25~+55℃ and short-term temperature in 24h must below 70℃.
- ◆用户对上述条件不能满足时应与制造厂协商。
  Other special requirements need to be discussed when ordering.

GCK
低压抽出式开关柜

主要技术参数 Specifications

◆额定绝缘电压 660V/1000V
Rated Insulation Voltage 660V/1000V
◆额定工作电压 400V/660V
Rated Working Voltage 400V/660V
◆辅助电路额定工作电压：交流 380V、220V，直流 110V、220V
Rated Working Voltage of Auxiliary Circuit: AC 380V, 220V, DC 110V, 220V
◆母线额定电流：1000A，1250A、1600A、2000A、2500A、3200A、4000A、5000A
Rated Current of Busbar: 1000A, 1250A, 1600A, 2000A, 2500A, 3200A, 4000A, 5000A
◆母线额定短时耐受电流：50kA、80kA（有效值）1 秒
Rated Short-time Withstand Current of Busbar (Valid Value in 1s): 50kA, 80kA
◆母线额定峰值耐受电流：105kA/0.1s、140kA/0.1s、176kA/0.1s
Rated Peak Withstand Current of Busbar (0.1s): 105kA, 140kA, 176kA
◆分支母线额定电流：630A、1000A、1250A, 1600A
Rated Current of Branch Busbar: 630A, 1000A, 1250A, 1600A
◆分支母线额定短时耐受电流：30kA、50kA（有效值）1 秒
Rated Short-time Withstand Current of Branch Busbar (Valid Value in 1s): 30kA, 50kA
◆分支母线额定峰值耐受电流：63kA、105kA/0.1s
Rated Peak Withstand Current of Branch Busbar (0.1s): 63kA, 105kA
◆外壳防护等级：IP30、IP40
Protection Degree of Shell: IP30, IP40
◆母线设置：三相四线制、三相五线制
Busbar Arrangement: three phases and four lines, three phases and five lines
◆操作方式：就地、远方、自动
Operating Mode: local, remote, automatic

开关柜的分类 Cabinet Types

◆受电柜
Power Receiving Cabinet
◆母线联络柜
Busbar Connecting Cabinet
◆馈电柜
Feeder Cabinet
◆电动机控制柜
Motor Control Cabinet
◆电源切换柜
Power Transfer Cabinet

结构特点 Structure Features

◆GCK 的基本柜架为组合装配式结构，柜架的全部结构件都经过镀锌，喷塑处理，通过螺钉紧固互相连接成基本柜架，在按需要加上门，档板、隔板、抽屉、安装支架以及母线和电器组件等零件，组装成一台完整的控制中心柜，本柜结构有下列特点：
The basic frame structure of GCK is assembly type. All the parts of the frame have been processed through zinc plating and powder coating and connected through screws and bolts. The complete control center includes door, slide board, clapboard, drawer, installation frame, busbar and electric components. The structure features of GCK are as follows:
◆柜架 Frame
◆柜架采用 C 型材组装而成，柜架零件及专用配套零件由本公司配套供货，保证柜体的精度和质量。
The frame is assembled by C type material. And the matched components are provided by the company to make sure the accuracy and quality of the frame.
◆零部件的成型尺寸，开孔尺寸，设备间隔实行模数化（模数 E=20mm，下同）。
The dimensions of components, holes and intervals are modulated (moduln E=20mm, the same below)
◆内部结构件采用镀锌处理。
Inner structures are processed through zinc plating.
◆柜体顶盖为可拆卸式，柜顶的四角装有吊环，用于起吊和装运。
The cover of the roof is removable. The flying rings at the four corners at the top of cabinet are for craning, loading and transporting.
◆柜架分成母线室、功能单元室、电缆室三个相互隔离区间，可防止事故扩散。
The frame is separated into three independent compartments: busbar compartment, function unit compartment and cable compartment to prevent accident to spread.

结构特点 Structure Features

功能单元（抽屉部分）

抽屉单元高度模数为 200mm，分为 1/2 单元、1 单元、1.5 单元、2 单元、3 单元五个尺寸系列。单元回路额定电流 630A 及以下。

Function Unit (Drawer)

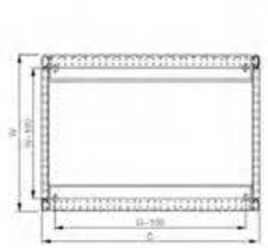
The height module of drawer unit is 200mm. There are five series of function unit: 0.5 unit, 1 unit, 1.5 units, 2 units and 3 units. The rated current of the unit circuit is 630A and below.

◆每台 MCC 柜最多能安装 9 个 1 单元的抽屉或 18 个 1/2 单元的抽屉。
Each MCC cabinet can be installed with 9 of 1 unit drawer and 18 of 0.5 unit drawer at most.
◆操作机构与抽屉进行机械连锁，主开关在合闸位置时，抽屉不能抽出。
Operating mechanism and the drawer are interlocked. When the switch is in closing position, the drawer can not be drawed out.
◆抽屉的操作机构可用一把挂锁锁定在合闸或分闸位置，可安全地进行电器设备的维修。
The lock of operation mechanism can lock the drawer in breaking or closing position for safety maintenance.
◆功能单元背面具有主电路进出线插头、辅助电路二次插头。
The plugs of main circuit inlet and outlet lines and auxiliary circuit secondary lines are at the back of the function unit.
◆功能单元隔室采用金属隔板隔开。
Function unit is separated by metal plate.
◆抽屉单元采用旋转式推进机构，具有三位置功能，操作简单可靠。
The drawer unit uses rotating feed mechanism and has three functional positions for easy and reliable operations.
◆GCK 抽屉推进机构采用螺旋轨迹沿定位件运动方式，实现功能单元推进抽出，在功能单元推进和抽出过程中，实现三位置显示和机械联锁并配有微动开关，试验位置时可进行电气联锁。
The draw-in and draw-out function are achieved through the positioning movement in helical track. During the processes of draw-in and draw-out, the three functional positions are indicated and mechanical interlocking works. The drawer is equipped with microswitch. The electrical interlocking happens when it is in test position.

外形尺寸与安装 Outline Overall and Installation Dimensions

名称 Item	宽 (W) Width	深 (D) Depth	高 (H) Heigh
抽屉 Drawer Cabinet	600	800、1000	2200
进线柜 Cable-in Cabinet	600、800、1000	800、1000	2200
电容柜 Capacity Cabinet	600、800、1000	800、1000	2200

安装尺寸图 Installation Dimensions



附图一
Picture 1

附图二
Picture 2

安装 GCS 系列开关柜属非靠墙垂直安装，其后面为柜体的出线电缆沟，为便于维护，后面距墙通常为 1000-1200mm，正面距离安装见图 2。
GCS series cabinet can not be installed against the wall; because at the back of the cabinet is the outlet cable duct. The back of the cabinet is normally installed 1000-1200mm away from the wall for convenient maintenance. The installation for the front of the cabinet sees picture 2.

GGD
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GGD Low Voltage Whole Set Switchgear

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GGD Low Voltage Whole Set Switchgear

概述 General

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 380V，额定工作电流 3150A 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 型交流低压配电柜符合 IEC439《低压成套开关设备和控制设 备》GB7251《低压成套开关设备》等标准。

GGD AC low voltage distribution cabinet is suitable for power plant, transformer substation, and industrial and mining enterprises etc., used in distribution system of AC 50Hz, rated working voltage: 380V, rated working current: 3150A for powering, lighting and transferring, distributing and controlling the distribution devices. High breaking capacity, good moving and heat stability, flexible scheme, convenient assembly, strong utility, new structure and high protection degree are the advantages of GGD. It can be used as the replacement equipment for low voltage whole set switchgear.

GGD AC low voltage distribution cabinet meets the following standards: IEC439-1 "Low Voltage Whole Set Switching and Controlling Equipment" and GB7251.1-2013 "Low Voltage Switchgear"

型号含义 Type Designation

GGD□□□

- 辅助电路方案代号 Auxiliary Wiring Scheme Number
- 主电路方案代号 Primary Wiring Scheme Number
- 设计序号 1- 分断能力为 15kA
  1-breaking capacity: 15kA
  2- 分断能力为 30kA
  2-breaking capacity: 30kA
  3- 分断能力为 50kA
  3-breaking capacity: 50kA
- 电力用柜 Power Cabinet
- 电器元件固定安装、固定接线 Fix Installation and Connection of Electrical Components
- 交流低压配电柜
  AC Low Voltage Distribution Cabinet

正常使用条件 Working Conditions

- ◆周围空气温度不高于 +40℃，不低于 -5℃。24h 以内的平均温度不得高于 +35℃。
  Ambient temperature: -5~+40℃ and the average temperature in 24h must below 35℃
- ◆户内安装使用，使用地点的海拔高度不得超过 2000m。
  Altitude: ≤ 2000m (indoor type)
- ◆周围空气相对湿度在最高温度为 +40℃时不超过 50%，在较低温度时允许有较大的相对湿度。（例如 +20℃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。
  Humidity: ≤ 50% at the highest ambient temperature +40℃, lower temperature with higher humidity, such as ≤ 90% at 20℃, mild condensation occasionally happens for the variations of the temperature.
- ◆设备安装时与垂直面的倾斜度不超过 5%。
  The inclination to the vertical plane is not more than 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。
  It is applicable in the place without violet vibration and impulsion and corrosive pollution
- ◆用户有特殊要求时与制造厂协商解决。
  Other special requirements need to be discussed when ordering.

GGD
低压成套开关柜

基本电气参数 Specifications

型号 Item	额定电压 (V) Rated Voltage (V)	额定电流 (A) Rated Current (A)	额定短路开断电流 (kA) Rated Short-circuit Breaking 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)
GGD1	380	A 1000 B 600(630) C 400	15	15	30
GGD2	380	A 1500(1600) B 1000 C 600	30	30	63
GGD3	380	A 3200 B 2500 C 2000	50	50	105

◆主电路方案

GGD 柜的主电路设计了 129 个方案，共 298 个规格（不包括辅助电路的功能变化及控制电压的变化而派生的方案和规格）。其中 GGD1 型 49 个方案 123 个规格，GGD2 型 53 个方案 107 个规格，GGD3 型 27 个方案 68 个规格。

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 3200A，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。

◆ Primary Wiring Scheme

There are 129 sets and 298 regulations of the main circuit scheme of GGD cabinet (not including the derived ones by changing the auxiliary cirult control and protection).GGD1: 49 sets and 123 regulations,GGD2: 53 sets and 107 regulations,GGD3: 27 sets and 68 regulations.

Primary wiring scheme is selected from the opinions of the departments of design and use and add the schemes for power plants. Rated current is up to 3200A to cater to the distribution transformer with 2000kVA and below. In addition, to cater to the need of reactive compensation, GGJ1 and GGJ2 capacity compensation cabinet (4 sets and 12 regulations) are designed.

◆辅助电路方案

辅助电路的设计分供用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。

◆ Auxiliary Wiring Scheme

There are two parts of the auxiliary wiring scheme: power supply scheme and power plant scheme. GGD cabinet has enough space for installing secondary components.

◆电器元件选择

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, DW17、DW45、CM1、NM1 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 DZ2 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，保留了老产品的优点，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 型组合型组合式母线夹和绝缘支撑件。母线夹由高强度、高阻燃型热塑成型，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。

◆ Electrical Components Selection

GGD cabinet adopts advanced electric components which can be volume produced domestically, such as ME, DW15, DW17, DW45, CM1, NM1 etc. Meanwhile, the old types such as DZ2 are still reserved for economical and practical consideration. Obsolete products are not chosen.

HD13BX and HS13BX types rotating operating switch are exclusively designed for the special structure of GGD cabinet. They are new types of electric components reserved advantages of the old types and with new operation mechanism.

Due to the excellent flexibility of GGD cabinet, there is no trouble for manufacturing and installing of updated electric components with better performance and technology according to the users' needs.

ZMJ type combined busbar clamp and isolating support parts are equipped in GGD cabinet for further improving the moving stability of the main circuit. The combined busbar clamp is composed of high strength and flame retardant synthetic material for moulding with high dielectric strength, good self-extinguishing capability, and unique structure which can become single busbar clamp or double busbar clamp by adjusting the gap with building block type.

结构简介 Structure Introduction

◆GGD 型交流低压配电柜的柜体采用通用柜的型式，构架用 8MF 冷弯型钢局部焊接组装而成，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 type AC low voltage distribution cabinet adopts general cabinet types. The frame is made of 8MF cold forming sectional steel by partially welding. Frame accessories and exclusively matched accessories are supplied by pointed structural steel plant to guarantee the accuracy and quality of the cabinet. Accessories of the general cabinet are moulding designed and there are 20 moulding installation holes. So the general coefficient is high enough to let the company to pre-produce, then the period of manufacturing shortens and the working efficiency improves.

◆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型成一个自然风道，达到散热的目的。
The design of the GGD cabinet takes full consideration of cooling during its operation, so there are a lot of cooling holes at top of and at bottom of the cabinet. When the electric components inside the cabinet heats, the temperature rises and it can be released through the upper cooling holes. Then the cold wild can be sucked into the cabinet through the lower cooling holes. Such natural air system in the sealed cabinet achieves the purpose of cooling.

◆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型和各部分的分割尺寸，使整柜美观大方，面目一新。
GGD cabinet is modeling designed according to the requirements of modern industrial products which adopt the method of golden section to design the cabinet outline and inner parts to make the whole set new elegant appearance.

◆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橡塑条，关门时门与框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。
Cabinet door is connected to the frame by revolving hinge for convenient installation. There is a mountain shape plastic bar at the edgefold of the door, so there is a certain compression stroke between door and frame when the door is closing to prevent direct impact and improve the protection degree of the door.

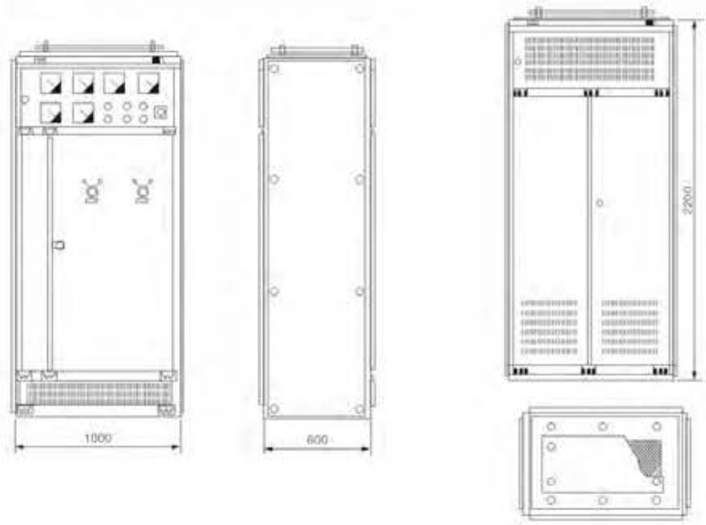
◆装有电器元件的仪表门用多股软铜线与框架连接，柜内的安装件与柜架间用滚花螺钉连接，整柜构成完整的接地保护电路。
The instrument door, equipped with electric components connects to the frame by soft copper wire. The installation parts connect to the frame by knurled screw. The whole set has complete grounding circuit.

◆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。
The surface of the cabinet is coated with strong adhesion, good texture and muted tone powder, which avoid dazzling and make a comfortable visual environment for the staff on duty.

◆柜体的顶盖在需要时可拆除，便于现场主母线的装配和调整，柜顶的四角装有吊环，用于起吊和装运。
The cover of the roof is removable for site installation and adjustment of main busbar. The flying rings at the four corners at the top of cabinet are for craning, loading and transporting.

◆柜体的防护等级为 IP30，用户也可根据使用环境的要求在 IP20~IP30 之间选择。
The protection degree of the cabinet is IP30 and it also can be chosen from IP20 to IP30 according to the requirement of the users.

外形及安装尺寸示意图 Outline Overall and Installation Dimensions



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外形及安装尺寸示意图 Outline Overall and Installation Dimensions

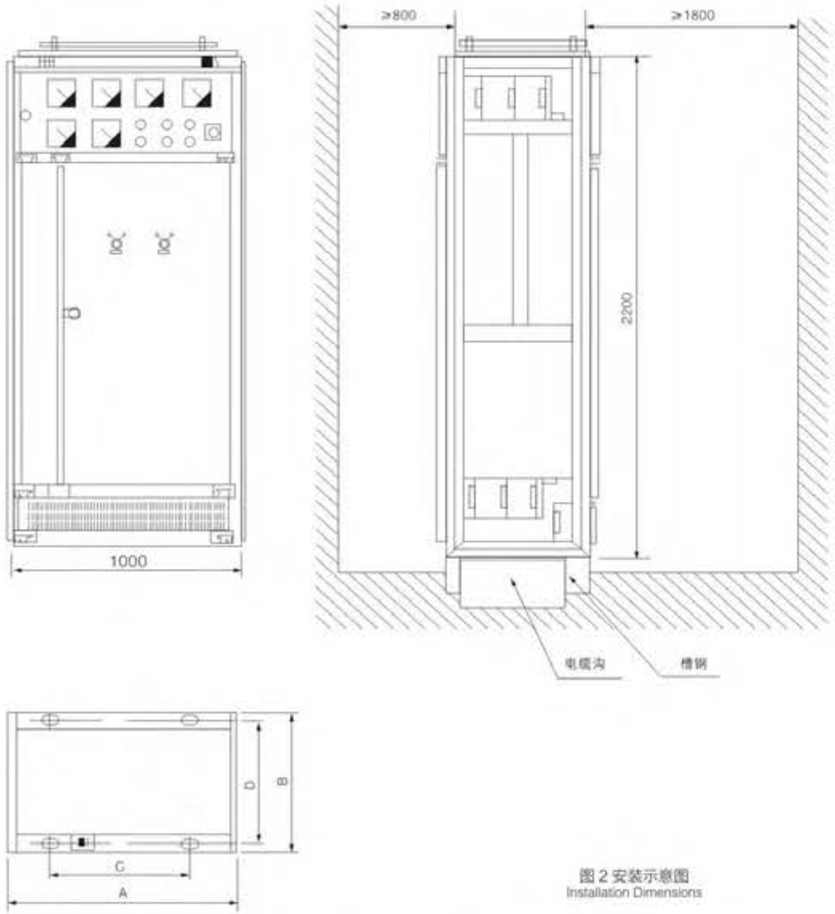

图 2 安装示意图
Installation Dimensions

产品代号 Product Number	A	B	C	D
GGD	600	600	450	556
GGD	600	800	450	756
GGD	800	600	650	556
GGD	800	800	650	756
GGD	1000	600	850	556
GGD	1000	800	850	756
GGD	1200	600	1050	556
GGD	1200	800	1050	756

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GGJ
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GGJ
低压无功智能补偿装置

概述 General

GGJ 低压无功智能补偿装置采用计算机辅助设计 (CAD), 引入微电脑控制，对无功量实行智能化跟踪补偿，其结构合理，技术先进，广泛应用低压电网，提高功率因数，减少无功损耗，改善供电质量，是新的节电产品。专用于容量 130-630kVA 三相变压器的无功功率补偿。

GGJ low voltage reactive intelligent compensation device uses computer aided design (CAD) and introduces the microcomputer control for intelligent tracking on reactive power compensation. It has reasonable structure, advanced technology and is widely used among low voltage power grid to improve power factor, reduce reactive loss and improve the quality of power supply. It is a new energy-saving product which is exclusively used to reactive power compensation for 130-600 kVA three-phase transformers.

结构特点 Structure Features

- ◆采用智能控制器控制，功能齐全，性能可靠，补偿方式自动；可将功率因数提高致 0.9 以上。
  The device is controlled by intelligent controller with complete functions, reliable performance, and automatic compensation ways. The power factor can be up to above 0.9.
- ◆实时显示电网功率因数，显示范围：滞后 (0.00-0.99), 超前 (0.00-0.99)。
  The device can real-time display power factor of the network. Its display range: (0.00-0.99) lag, (0.00-0.99) in advance.
- ◆具有过电压、过谐波、过补偿、系统故障、缺相、过载等多种综合保护功能。
  The device has over voltage, over harmonic, over compensation, system failure, and lack of phase, overload, and so forth comprehensive protection functions.
- ◆记忆已设定的参数，系统停电后不会丢失参数，电网恢复正常后，自动进入运行状态，无须人员值守。
  Memories of the device have set parameters. When the system is out of power, the parameters will not be lost. And when the grid comes back to normal, it will enter the running state automatically, so there is no need to watch out.
- ◆可根据电网负荷平衡状况，采取分相补偿或混合补偿。
  The device can adopt the split-phase compensation or mixture compensation according to the load balance of power grid.
- ◆抗干扰能力强，能抵御从电网直接输入的幅值 2000V 干扰脉冲，高于国家专业标准。
  The device has strong anti-interference ability to resist 2000V interference pulse directly inputted from the power grid. The standard is above the national ones.

正常使用条件 Working Conditions

- ◆海拔高度：≤ 2000m。
  Altitude: ≤ 2000m.
- ◆环境温度：-20℃ ~+45℃。
  Ambient temperature: -20~+45℃
- ◆相对湿度：20℃时≤ 90%。
  Humidity: ≤ 90% at 20℃
- ◆安装环境：无有害气体和蒸汽，无导电性或爆炸性尘粒及严重霉菌。
  Installation Environment: It is applicable in the place without polluted gas and vapor, non-conductive and flammable dust and serious mold.

主要技术参数 Specifications

- ◆额定电压：0.38~0.66kV。
  Rated Voltage:0.38~0.66kV.
- ◆额定频率：50Hz。
  Rated Frequency:50Hz.
- ◆额定容量：1~600kvar。
  Rated Capacity:1~600kvar.
- ◆适用电压范围：(0.85~1.1) 倍额定电压。
  Voltage Range: (0.85~1.1) X rated voltage.
- ◆最大允许电流：1.3 倍额定电流。
  Maximum Permissable Current:1.3 X rated current.
- ◆控制回路：1~16 回路。
  Control Loop:1~16 loops.
- ◆投切时间：1~150s/ 次，可调。
  Switching Time:1~150s/times, adjustable.
- ◆工作方式：自动，连续运行。
  Manner of Working: automatic and continuous.

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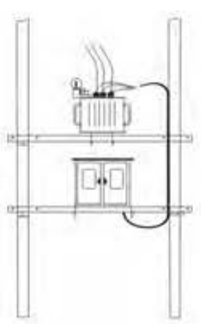
可配电网监测功能 Configurable Monitor Function

- ◆实时测量和整点纪录变压器低压侧的三相电压、电流、频率、有功功率、无功功率、功率因数、有功电度、无功电度；电压电流总畸变率和 2-25 次谐波含量。
  Real time measures and integral points record the voltage of three phases, current, frequency, reactive power, power factor, active electricity, reactive electricity, voltage and current distortion rate and the 2-25 times harmonic content of the low voltage side of the transformer.
- ◆具有 RS-232 和 RS-485 接口，可进行掌上电脑数据抄录，也可通过远程通讯功能实现无线抄表，装置测试，参数设置和时实测量数据及纪录数据的读取。
  With RS-232 and RS-485 interface, the datas can be displayed in the palmtop, and the meter datas reading, devices testing, parameter setting and real-time measuring and recording also can be achieved through remote communication function without wires.
- ◆数据分析功能：可对运行负荷数据进行分析处理、统计查询；综合分析供电质量，计算电压合格率，供电负荷率，可靠率及最大负荷率；分时段查询功率因数、有功功率和无功功率；绘制各相电压、电流、功率因数等曲线图；打印综合分析及统计报表。
  The device is equipped the function of data analysis: analysis, process, count and inquire the operating load datas; analysis qualified rate of voltage, the quality, load rate, reliable rate and maximum load rate of power supply comprehensively; inquire power factor, active power and reactive power in each time period; draw the curve charts of each phase, current, power factor etc.; and print the analysis and statistic report forms.

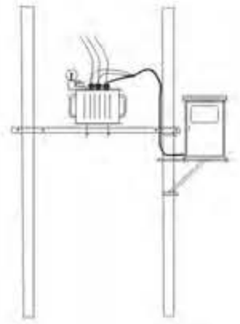
订货须知 Ordering Information

- ◆确定变压器额定容量，二次侧额定电压，二次侧电流互感器变比。
  Rated capacity of the transformer, rated voltage and current transformer ratio of the secondary side;
- ◆确定无功负荷状况和受电自然功率因素，被补偿系统和设备的工作总电流及波动范围；负荷特性为冲击性负荷、波动负荷还是常规稳态负荷。
  The power factor in reactive loading and power receiving, the working current and the working current range of the system and devices which are compensated; the type of load features: impact load, fluctuate load or routine steady load.
- ◆装置型号、类型、总容量。
  Model, type, and gross capacity of the device;
- ◆装置为户外箱式，所用材料：普钢 / 不锈钢以及箱体的颜色。
  For outdoor type cabinet, the material (common steel/stainless steel) and the color;
- ◆装置为户内柜式，装置的颜色；若需与其他配电柜并柜，需说明其他配电柜的型号、拼柜方式。
  For indoor type cabinet: the color; model; cabinet connection type needed when it combines with other cabinets;
- ◆户外柱上安装，可单杆安装或双杆安装。
  The outdoor pillar installation types: single rod installation or double rods installation.

户外柱上安装方式(下图) Outdoor pillar installation types(See picture below)



双柱式安装
Single rod installation



单柱式安装
Double rods installation

GZDW-□

直流屏

GZDW-06 Direct Current Panel

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GZDW-□ 直流屏

Direct Current Panel

概述 General

GZDW-06 型镉镍蓄电池直流屏是我厂总结了多年的制造试验，搜集了数百个变电站的运行记录，广泛征求设计和使用单位意见，针对目前国内同类产品普遍存在的一些问题而设计更新换代型产品。适用于电力系统中小型发电厂、变电站及以下工矿企业配电室，作为高压断路器直流操作机构的分合闸电源及控制回路、继电保护、信号回路、事故照明的直流电源。

GZDW-06 direct current panel with cadmium nickel storage battery is the updating products for the result of many years of manufacturing experience,of collecting hundreds of substation operation records, of widely adopting the opinions from units of design and use, and of solving the problems for old type products. It is applicable to small and medium-sized power plants in power system, transformer substations, and the distribution of industrial and mining enterprises, as the switching power supply of high voltage DC circuit breaker operating mechanism, loop control, relay protection, signal circuit, and DC power supply of emergency lighting.

工作原理 Operating Principles

GZDW 型直流屏内装有 2-3 套高频开关整流装置。其中一套高频开关按稳压方式运行，直接向控制母线供电。另一套高频开关按稳流方式运行，承担对蓄电池组的主充及浮充任务。蓄电池组直接向合闸母线供电，蓄电池组经挂链降压向控母供电，以确保控制母线在任何情况下都保持电压连续。

GZDW type direct current panel is equipped with 2 or 3 sets of high frequency switch rectifier device. One set of high frequency switch supplies the power to the control busbar directly in the way of voltage stabilization. Another set of high frequency switch charges the storage battery mainly and floatingly in the way of current stabilization. So the storage battery can supply the closing busbar directly or the storage battery can supply the control busbar by lowering voltage through hanging chains to ensure that the control busbar can keep continuous voltage under any circumstances.

基本参数和技术指标 Specifications

- ◆额定输入交流电压 :380V ± 15%V、频率 :50Hz ± 10% Hz
  Rated Input AC Voltage: 380V ± 15%V. Frequency: 50Hz ± 10% Hz
- ◆额定直流输出电压 :220V、110V
  Rated Output DC Voltage: 220V、110V
- ◆额定直流输出电流 :8、12、15、20、30、40、50A
  Rated DC Output Current: 8、12、15、20、30、40、50A
- ◆蓄电池额定容量：镉镍蓄电池高倍率额定容量 :10Ah-200Ah
  Rated Capacity of Storage Battery: High-rate Rated Capacity of Cadmium Nickel Storage Battery: 10Ah-200Ah
- ◆直流母线绝缘电阻不小于 10MQ; 绝缘强度工频 2KV, 耐压 1min 内不击穿
  DC Busbar Isolation Resistance ≥ 10MQ; Isolation Strength Power Frequency 2KV, Withstand Voltage in 1min will not breakdown.
- ◆稳定精度≤ 1%
  Stabilization Accuracy ≤ 1%
- ◆稳流精度≤ 2%
  Precision of Steady Current ≤ 2%
- ◆纹波系数≤ 2%
  Ripple Factor ≤ 2%
- ◆噪声≤ 55dB
  Noise ≤ 55dB
- ◆ 柜体尺寸
  2200mmx800mm(1000、1200)mm x600(800)mm
  2300mm x 800mm(1000、1200)mm x 600(800)mm
  Cabinet Dimension:
  2200mmx800mm(1000、1200)mm x600(800)mm
  2300mm x 800mm(1000、1200)mm x 600(800)mm

结构特点 Structure Features

- ◆用高频开关代替了传统产品中的铁磁饱和式主充机，浮充机，克服了传统产品稳压、稳流精度低噪声大、温升高等缺点。
  High frequency switch replaces ferromagnetic saturation type main charge machine and floating charge machine of the traditional products and overcomes low stabilization accuracy, low precision of steady, loud noise, and high temperature rise of the traditional products.
- ◆备用通道的调入施工采用无触点开关动投入。
  The transferred part of the spare channel adopts non-contact switch to switch in.
- ◆本系列直流屏对蓄电池的充电采用最佳的充电方式，前期恒流，后期恒压，并可实现充电状态的自动转换。
  This direct current panel uses the best way to charge the storage battery: constant current for earlier period, constant voltage for later period and these two periods can exchange automatically.
- ◆本系列直流屏设有自动稳流，动稳压、限流、短路保护及过压保护功能。
  The direct current panel has such protection functions: stabilize current automatically, stabilize voltage dynamically, limit current, protect circuit, and protect over voltage.
- ◆整机可对外输出母线电压高低，母线接地，充电机故障等信号接点。
  The whole cabinet can output signal contacts of busbar voltage, busbar grounding, and battery charger fault etc.

YB□-12/0.4

型户外预装式变电站(欧式)

Outdoor Preinstalled Transformer Substation(European Style)

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型户外预装式变电站（欧式）

Outdoor Preinstalled Transformer Substation(European Style)

概述 General

YB□系列箱式变电站是将高压电器设备、变压器、低压电器设备等组合成紧凑型成套配电装置，用于城市高层建筑、城乡建筑、居民小区、高新技术开发区、中小型工厂、矿山油田以及临时施工用电等场所，作配电系统中接受和分配电能之用。

本产品具有成套性强、体积小、结构紧凑、运行安全可靠、维护方便、以及可移动等特点，占地面积仅为同容量常规土建式变电站的，1/10-1/5，大大减少了建设费用。在配电系统中可用于环网配电系统，也可用于双电源或放射终端配电系统，是目前城乡变电站建设和改造的首选新型成套设备。本产品符合 GB/T17467《高压 / 低压预装式变电站》标准和 IEC1330 标准。

YB□ series box-type substation combines high voltage electrical equipment, transformer, low voltage electrical equipment into a compact switchgear for power distribution It is used for high-rise buildings in cities, urban and rural constructions, residential area, high and new technology development zone, small and medium-sized factories, mines, oil fields, and temporary constructions etc, for receiving and distributing power in power distribution system.

This product has strong complete sets, small size, compact structure, safe and reliable running, convenient maintenance, as well as the feature of mobile. The floor area is only 1/10 to 1/5 of the regular civil engineering type substation with same capacity, greatly reducing the construction costs. It can be used in the ring network distribution system, and also can be used in dual power supply or radiation terminal power distribution system. It is the first selection of building and reforming the transformer substations in urban and rural areas. The design of the device meets the following standards: GB/T17467 "High/Low Voltage Preinstalled Switchgear" and IEC1330 standards.

型号含义 Type Designation

产品使用环境 Working Conditions

- 海拔高度：低于 1000m;
  Altitude: ≤ 1000m
- 周围环境温度最高不超过 +40℃；最低不低于 -25℃
  Ambient temperature: -25~+40℃, and the average temperature in 24h must below 35℃
- 24 小时周期内平均温度不超过 +35℃
  The average temperature within 24 hours is not more than +35℃
- 地震水平加速度不大于 0.4m/s^2，垂直加速度不大于 0.2m/s^2。
  Earthquake Acceleration: horizontally ≤ 0.4m/s^2; vertically ≤ 0.2m/s^2
- 无剧烈振动和冲击及爆炸危险场所。
  It is applicable in the place without violent vibration and the potential explosion.

YB□-12/0.4
型户外预装式变电站(欧式)

主要技术参数 Specifications

序号 No.	项目 Item	单位 Unit	高压电器 High Voltage Electric Equipment	变压器 Transformers	低压电器 Low Voltage Electric Equipment
1	额定电压 Rated Voltage	kV	7.2、12	6/0.4;12/0.4	0.4
2	额定容量 Rated Capacity	kVA		I 型 50~630 II 型 80~1600	
3	额定电流 Rated Current	A	630		100~2000
4	额定开断电流 Rated Breaking Current	A	负荷开关 630A/SF6 开关 630A Load Switch 630A/SF6 Switch 630A		15~63
5	额定开断电流 Rated Breaking Current	kA	组合电器取决于熔断器 Composite apparatus depends on fuse		15~63
6	额定短时耐受电流 Rated Short-time Withstand Current	kA	20X2	200~400kVA	15X1
7	额定短时耐受电流 Rated Short-time Withstand Current	kA	12.5X4	>400kVA	30X1
8	额定峰值耐受电流 Rated Peak Withstand Current	kA	31.5;50	200~400kVA	30
9	额定峰值耐受电流 Rated Peak Withstand Current	kA	31.5;50	>400kVA	63
10	额定关合电流 Rated Closing Current	kA	31.5;50		
11	工频耐压 (1min) Power Frequency Withstand Voltage (1min)	kV	相对地及相间 42 Phase to earth and phase to phase 42	油浸式 35 Oil type35	<300 V,2
12	工频耐压 (1min) Power Frequency Withstand Voltage (1min)	kV	隔离断门 48 Isolating fracture 48	干式 28 Dry type28	>300V 2.5
13	雷电冲击耐压 Lightning Impulse Withstand Voltage	kV (峰值)	相对地及相间 75 Phase to earth and phase to phase 75	75	
14	雷电冲击耐压 Lightning Impulse Withstand Voltage	kV (峰值)	隔离断口 85 Isolating fracture 85	75	
15	箱体防护等级 Protecton Degree of Cabinet		IP3X	IP2X	IP30
16	噪声水平 Noise Degree	dB		油浸式 <55 干式 <65 Oil type<55 Dry type<65	
备注	变压器容量小于 200KVA 时，项目 5 和 6 不作要求 When the capacity of the transfer is lower 200kVA, the item 5 and 6 are not required				

结构特点 Structure Features

◆本产品由高压配电装置，变压器及低压配电装置联接而成。分成三个功能隔室，即高压室、变压器室和低压室。高压室功能齐全，高压室由 HXGN-□12 环网柜组成一次供电系统，可布置成环网供电、终端供电、双电源供电等多种供电方式，还可装设高压计量元件，满足高压计量的要求，变压器可选择 S9-M、SC(B) 型以及其他低损耗油浸变压器或干式变压器。变压器室设自动强迫风冷系统及照明系统，低压室根据用户要求可采用面板或柜装式结构组成用户所需供电方案，有动力配电、照明配电、无功功率补偿、电能计量等多种功能，满足用户的不同要求，并方便用户的供电管理和提高供电质量。

This product is composed of high voltage electrical equipment, transformer, low voltage electrical equipment. It is divided into three function compartments: high voltage compartment, transformer compartment and low voltage compartment. High voltage compartment has complete functions. The high voltage compartment uses HXGN-□12 ring network cabinet to compose the primary power supply system and can be arranged into various way to supply power: ring network power supply, terminal power supply and dual power supply etc., and can be equipped with high voltage measuring components to meet the need. Transformer can choose S9-M, SC(B) and other oil or dry types of transformers with low loss. Transformer compartment is equipped with automatic forced air cooling system and lighting system. Low voltage compartment adopts panel installation or cabinet installation according to the customer needed power supply scheme. Low voltage compartment is composed with power distribution, lighting distribution, reactive power compensation, power metering and other functions to meet different requirements of users and facilitate the management of power supply and improve the quality of power supply.

◆高压室结构紧凑合理，并且有全面防误操作联锁功能。各室均有自动及强迫照明装置。另外，高、低压室所选用全部元件性能可靠，操作方便，使产品运行安全可靠，操作维护方便。

High voltage compartment has compact and reasonable structure and complete function of error preventing operation mechanism. There are automatic and forced lighting devices in each compartment. Additionally, all the components that are used in high and low voltage compartments have reliable performance, convenient operation to make sure the safe operation and easy maintenance.

◆采用自然通风和强迫通风两种方式。使通风冷却良好。变压器室和低压室均有通风道，排风扇有温检装置，按整定温度能自动启动和关闭，保证变压器满足负荷运行。

It adopts natural air cooling and forced air cooling types to ensure the excellent air cooling performance. Transformer compartment and low voltage compartment are both equipped with air cooling channel, cooling fan and temperature detecting device which can be operated and closed automatically to make sure the load for running the transformer is enough.

◆箱体结构能防止雨水和污物进入，并采用热镀锌彩钢板或防锈铝合金板制作，经防腐处理。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，同时外形美观。

The structure of the cabinet prevents the rain and other pollusion. The cabinet is made of hot dipping zinc colorful steel or rust protection aluminum alloy plate processed through corrosion prevention. So it is suitable for outdoor use for a long term to ensure the performance of corrosion prevention, water prevention and dust prevention and the service life and elegant appearance.

YB□-12/0.4
型户外预装式变电站 (欧式)
Outdoor Preinstalled Transformer Substation(European Style)






订货须知 Ordering Information

◆订货时须提供以下资料：变电站型号、数量。
Model and quantity of the transformer substation;
◆变压器的型号、数量。
Model and quantity of the transformer;
◆高压和低压一次接线方案及主要元件的型号和参数。
Primary wiring scheme of high voltage and low voltage; models and parameters of the main electric components;
◆外壳的材料及颜色。
Material and color of the shell.

YB□-12/0.4
型户外预装式变电站（欧式）
Outdoor Preinstalled Transformer Substation (European Style)

TY-1

TY-2

TY-3

TY-4

TY-5

TY-6

YB□-12/0.4
型户外预装式变电站（欧式）
Outdoor Preinstalled Transformer Substation(European Style)

TY-7

TY-8

TY-9

TY-10

TY-11

TY-12

YBW-12

美式预装式箱式变电站

YBW-12 American Type Preinstalled Transformer Substation

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D 箱式变电站

YBW-12

美式预装式箱式变电站

American Type Preinstalled Transformer Substation

概述 General

本产品是吸收国外最新先进技术，结合国内实际情况研制开发的，整台产品具有体积小、安装维护简便、低噪音、低损耗、防盗、过负荷能力强、全保护等特点。适用于新建小区、绿化带、公园、车站宾馆、工地、机场等场所。

YBW-12 系列美式预装式箱式变电站，适用于 10kV 环网供电，双电源供电或终端供电系统中，作为变电、计量、补偿控制和保护装置。本产品符合下列标准：GB/T17467-2010《高压低压预装式变电站》DL/T537-93《6-35KV 箱式变电站订货技术条件》

This product develops from adopting the latest foreign advanced technology, and combining domestic actual situation. The product has small size, convenient installation and maintenance, low noise, low loss, burglary prevention, strong overload ability, and full protection etc. It is applicable in new-built communities, green belts, parks, station hotel, construction sites and airports etc.

YB / - 12 series American type preinstalled transformer substation is applicable to 10 kV ring network power supply, power supply system of dual power supply or terminal power supply system as power transforming, measuring, compensation controlling and protecting devices. This product meets the following standards: GB/T17467-2010 "High and Low Voltage Preinstalled Transformer Substation" and DL/T537-93 "6 to 35 kV Box Type Transformer Substation Ordering Technology Specifications"

型号含义 Type Designation

YB W - □ / □ - □

- 变压器额定容量 (kVA) Rated Capacity of Transformer (kVA)
- 低压侧额定电压 (kV) Rated Voltage of Low Voltage Side (kV)
- 高压侧额定电压 (kV) Rated Voltage of High Voltage Side (kV)
- 户外 Outdoor
- 预装式变电站 Preinstalled Transformer Substation

结构特点 Structure Features

- ◆全绝缘、全密封、免少维护、可靠保证人身安全。
  Completed isolation, omnisealed, less maintenance, and reliable security;
- ◆结构紧凑、体积仅为同容量欧变的 1/3-1/5, 高度低。
  Compact structure, low height, small size (1/3-1/5 of the European type transformer substation with same capacity);
- ◆可采用分箱式结构，避免变压器油箱内油的污染。
  Detached box type can be adopted to avoid the pollution from the oil in transformer.
- ◆高压侧采用双熔丝全范围保护，大大降低成本。
  Double fuses protects the high voltage side to lower the cost of the whole set.
- ◆即可用环网，也可用于终端，电缆头可在 200A 负荷电流时紧急插拔。
  Either ring network or terminal can be used. Cable heads can be plug in and out urgently under the 200A load current.
- ◆箱体采用蜂窝式双夹层复合板，隔温又散热的功能。
  Cabinet uses cellular double composite panels for insulating and cooling.
- ◆低压侧加装电子缺相保护器，当系统内出现不正常电压时，可快速分断主进开关。
  Electronic protector of lack phase at the low voltage side can quickly break the main switch when there is any unnormal voltage happens.
- ◆高压侧油浸式负荷开关或 SF6 负荷开关，可电动升级，为实现配网自动化打下基础。
  Oil type load switch or SF6 load switch at the high voltage side can be electrically upgraded for the basic automation of distribution network.
- ◆采用油浸式 S9 或性能更优的 S11 系列变压器。
  Oil type S9 or S11 (with better performance) is adopted as the transformer.

正常使用条件 Working Conditions

- ◆海拔高度不超过 1000m。
  Altitude: ≤ 1000m
- ◆环境温度：-35℃ ~ +40℃。
  Ambient temperature: -35~+40℃
- ◆相对湿度：日平均值不大于 95%, 月平均值不大于 90%。
  Humidity: daily average ≤ 95%, monthly average ≤ 90%
- ◆安装场所：无火灾、爆炸危险、化学腐蚀性气体及通风良好的场所，地面倾角不大于 3 度。
  Installation Place: It is applicable in the place without fire, possible explosion corrosive and chemical corrosive gas and with good ventilation and the inclination to the floor can not be over 3°.

YBW-12
美式预装式箱式变电站

预装式变电站技术参数表 Specifications of Transformer Substation

名称 Item	单位 Unit	技术参数 Data
额定电压 Rated Voltage	kV	10/0.4(高压 / 低压)10/0.4(high voltage/low voltage)
最高工作电压 Maximum Working Voltage	kV	12(高压侧) 12(high voltage side)
额定频率 Rated Frequency	Hz	50
额定容量 Rated Capacity	kVA	50~1600
1 分钟工频耐压 1min Power Frequency Withstand Voltage	kV	35
雷电冲击电压 Lightning Impulse Voltage	kV	75
冷却方式 Cooling Type		油浸自冷 Oil type with self cooling
高压后备熔断器开断电流 Breaking Current of High Voltage Backup Fuse	kA	50
插入式熔断器开断电流 Breaking Current of Plug-in Fuse	kA	2.5
环境温度 Temperature	℃	-35~+40
线圈允许温升 Coil Allowable Temperature Rise	℃	65
无载调压 No-load Tap Changer		±5% 或 ±2x2.5%
噪声等级 Noise Degree	dβ	50
防护等级 Protection Degree		IP43

变压器技术参数表 Specifications of Transformer

选用新型 S9 系列变压器器身，损耗低，过载能力好，抗短路能力强，所有紧固件均经过防松处理，免吊芯；也可选用性能更优良的 S10 系列及 S11 系列变压器

S9 series transformer has low loss, good overload ability, strong anti-circuit performance, tightened fastener, and no suspended core. And also S10 series and S11 series with better performance can be chosen.

容量 kVA Capacity kVA	电压 kV Voltage kV 高压 High Voltage	电压 kV Voltage kV 低压 Low Voltage	联接组标号 Connecting Group Number	空载电流% No-load Current % S9	S10	S11	空载损耗 kW No-load Loss kW S9	S10	S11	阻抗电压% Impedence Voltage %	负载损耗 W Load Loss W S9	S10	S11
50				2.0	1.9	0.75	0.17	0.15	0.12		0.87	0.83	0.87
63				1.9	1.8	0.7	0.2	0.18	0.14		1.04	0.99	1.04
80				1.9	1.7	0.7	0.25	0.22	0.175		1.25	1.2	1.25
100				1.8	1.55	0.65	0.29	0.26	0.2		1.5	1.42	1.5
125				1.7	1.45	0.65	0.34	0.3	0.235		1.8	1.72	1.8
160	10±5% 或 ±2x2.5%		Dyn11 或 YynO	1.6	1.3	0.6	0.4	0.36	0.27		2.2	2.12	2.2
200				1.5	1.2	0.55	0.48	0.43	0.33	4.0	2.6	2.5	2.6
250		0.4		1.4	1.1	0.5	0.56	0.5	0.39		3.05	2.9	3.05
315	10±5% or ±2x2.5%		Dyn11 or YynO	1.4	1.0	0.45	0.67	0.29	0.465		3.65	3.45	3.65
400				1.3	1.0	0.4	0.8	0.71	0.56		4.3	4.15	4.3
500				1.2	1.0	0.4	0.96	0.85	0.67		5.15	4.82	5.15
630				1.1	0.8	0.4	1.2	1.6	0.81		6.2	5.86	6.2
800				1.0	0.7	0.35	1.4	1.23	0.98		7.5	7.2	7.5
1000				1.0	0.6	0.3	1.7	1.5	1.15	4.5	10.3	9.8	10.3
1250				0.9	0.6	0.27	1.95	1.72	1.36		12.0	12.2	12.0

负荷开关技术参数表 Specifications of Load Switch

负荷开关为油浸式、三相联动开关、弹簧操作机构；可带负荷分合闸操作，其分合速度与操作力大小无关，型式有二工位、四工位 T 型、四工位 V 型等可供选择。

Load switch is oil type with three phase connecting and spring operating mechanism. It can do breaking operation with load. The speed of breaking and closing has nothing to do with the operating force. Two positions, four positions with T shape four positions with V shape etc. are for choosing.

名称 Item		单位 Unit	四工位环网负荷开关 Four Positions Ring Network Load Switch	二工位负荷开关 Two Positions Load Switch
额定电流 Rated Current		A	630	315
额定短路关合电流 Rated Short-circuit Closing Current		kA	31.5	31.5
额定短时耐受电流 Rated Short-time Withstand Current		kA	12.5	12.5
额定短时耐受时间 Rated Short-time Withstand Time		s	2	2
机械寿命 Mechanical Life		次	2000	2000
雷电冲击耐受电压峰值全波 Lightning Impulse Withstand Voltage Peak Value Full Wave	相间对地 Phase to Earth	kV	75	75
	隔离断口 Isolating Fracture		85	85
1min 工频耐受电压 1min Power Frequency Withstand Voltage	相间对地 Phase to Earth	kV	42	42
	隔离断口 Isolating Fracture	kV	48	48
额定峰值耐受电流 Rated Peak Value Withstand Current		kA	31.5	31.5

熔断器技术参数(本公司油浸式熔断器选用配置推荐表)

美式箱变高压侧由后备保护熔断器和插入式熔断器串联提供全范围保护，原理简单，经济可靠；后备保护熔断器为油浸式高压限流熔断器，开断容量大，仅在变压器内部故障时动作，插入式熔断器内装双敏熔丝，可提供电流与温度双重保护，双敏熔丝熔断后，可在现场方便地更换熔芯。

The high voltage side of the American type box type transformer substation provides full range protection through series connection of backup protection fuse and plug-in fuse. So it is very easy, economical and reliable. Backup protection fuse is oil type high voltage current limiting fuse with large breaking capacity. It only operates when there is any fault inside the transformer. Plug-in fuse with double sense fuses inside can provide double protection both for current and temperature. If the double sense fuses break, it can be easily replaced at the site.

三相变压器容量 (kVA) Capacity of Three Phases Transformer (kVA)	变压器初级电压 (10kV) Primary Voltage of Transformer (10kV) XRNT 额定电流 (A) XRNT Rated Current (A)	PRNT1 过载保护额定电流 (A) PRNT1 Rated Current of Overload Protection (A)
30	10	6
50	16	8
80	16	10
100	20	15
125	25	15
160	31.5	25
200	40	25
250	50	40
315	63	40
400	63	40
500	80	50
630	100	50、65
800	125	65
1250	160	100
1600	200	140

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美式预装式箱式变电站

箱变结构 Structure of Transformer Substation

该产品箱体结构由高压间隔、低压间隔、油箱间隔三部份组成。高压间隔内包括高压电缆附件、负荷开关、无载调压分接开关、插入 式熔断器、压力释放阀、油位计、油温计、放油阀。低压间隔内包括低压套管、低压计量表计、断路器、电容补偿。油箱间隔内包括变压器绕组和铁芯、散热器、高压负荷开关及熔断器均在油箱内，根据方案需要箱变结构可设计成品字型或目字型见下图。

The cabinet is composed of high voltage compartment, low voltage compartment and oil tank compartment. High voltage compartment includes high voltage cable accessories, load switch, no-load tap changer voltage switch, plug-in fuse, pressure release valve, oil level indicator, oil temperature indicator, and oil drain valve. Low voltage compartment includes low voltage bushing, low voltage meter, circuit breaker and capacity compensation. Oil tank compartment includes transformer winding and iron core, radiator, high voltage load switch and fuse. The structure of the transformer substation can be designed into 品 shape or 目 shape according to the needs. (See picture below)

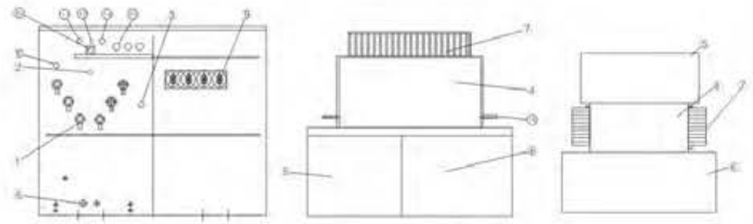


图 1: 预装式变电站结构图
Picture 1:Structure of Preinstalled Transformer Substation

1、高压绝缘套管 High Voltage Isolation Bushing
2、负荷开关 Load Switch
3、分接开关 Tap-changer Switch
4、变压器 Transformer
5、高压室 High Voltage Compartment
6、低压室 Low Voltage Compartment
7、散热器 Radiator
8、放油阀 Oil Drain Valve
9、低压套管 Low Voltage Bushing
10、油温计 Oil Temperature Indicator
11、压力表 Pressure Meter
12、压力释放阀 Pressure Release Valve
13、油位计 Oil Level Indicator
14、注油孔 Oil Filler Hole
15、插入式熔断器 Plug-in Fuse
16、吊钩 Lifting Hook

图 2：四工位“V”型负荷开关工作原理图
Picture 2: Working Principle Sketches of Four Positions "V" Shape Load Switch

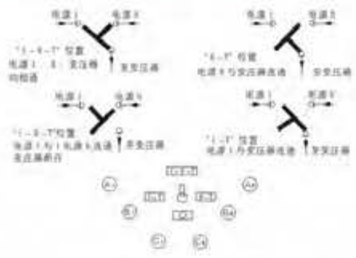


图 3：四工位“T”型负荷开关工作原理图
Picture 3: Working Principle Sketches of Four Positions "T" Shape Load Switch

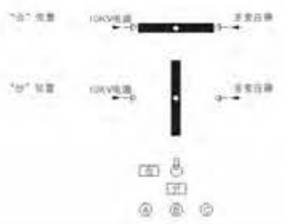


图 4：二工位负荷开关工作原理图
Picture 4: Working Principle Sketches of Two Positions Load Switch

操作说明 Operating Instruction

◆负荷开关的操作：

美式箱变所用的油浸式负荷开关根据其实现的功能不同有二工位、四工位 T 型、四工位 V 型三种，可供选择其中一种，三种的操作分别如下：

◆四工位 V 型负荷开关参见图 2，动力片结构是“V”型结构，见图中黑色部分，图中“I、II”为环网供电进出线，“T”为经后备熔断器、插入熔断器接变压器高压进线。环网负荷开关带负荷对网路进行切换。负荷开关的四个工作状态：

a、“I-II-T”位置时，“I”和“II”两网连通，变压器有电；（变电站起环网作用）

b、“I-T”位置时，“I”网与变压器连通；（变电站起终端）

c、“II -T”位置时，“II”网与变压器连通；（变电站起终端）

d、“O”位置时，“I、II”网与变压器均断开；（全部不带电）

◆用专用操作手柄插入负荷开关转轴，顺时针或逆时针方向旋转约 130° ，负荷开关每操作一次，动力片即转动一档。开关操作举例：由 电源“I”供电改为电源“II”供电。

将专用操作手柄插入开关轴内；

顺时针转动开关一次，此时开关“V”型刀片处于“I- II -T”位置；

顺时针方向再转动一次，此时“V”型刀片处在“II-T”之间为电源“II”供电；操作完成。

◆操作方法二：

将专用操作手柄插入开关轴内；

逆时针转动开关一次，此时开关“V”型刀片处于“0”位置；

逆时针方向再转动一次，此时“V”型刀片处在“II-T”之间为电源“II”供电；操作完成。

◆采用以上两种方法均可以完成从电源“I”转换到电源“II”供电，但第二种方法更安全、合理。电源“I”切断后不会被再送电，同 时若电源“II”出现故障也不会造成合到故障上。而采用方法一，则会出现双电源供电，当电源“I”转换到电源“II”时，若电源相位不同等原因造成故障。

◆四工位环网型负荷开关 (T 型)

四工位“T”型负荷开关工作原理见图 3，原理操作同 V 型。

◆二工位终端负荷开关

其结构图见图 4，图中“I”与高压进线端子相连。用户在操作时，将专用操作手柄插入负荷开关转轴中，逆时针方向转动“90° ”，负荷开关转到“分”闸位置，终端负荷开关只用终端供电方式中切断变压器支路，或在更换插入式熔断器熔芯时工作，因此终端负荷开关仅分、合两位置，且由于体积较小，操作力也轻小，使用操作均很方便。为减少油箱内的油污染，建议用户在操作负荷开关前先断开低压总开 关或出线开关以切除低压侧负荷。

◆电缆头

12kV 预装式变电站的高压进出线采用电缆进出线，由环氧浇注的绝缘套管将高压电源引到油箱外，为便于厂家进行试验及用户验收试验，绝缘套管本身具有承受工频耐压和雷电冲击耐压的能力。

选用与电缆截面相匹配的肘型或 T 型电缆头，将其内外表面及绝缘套管表面用无水乙醇清洗干净，涂少许 7501 型的真空硅脂在套管表面，并按照电缆工区的专用安装规范，将其安装好。电缆头的安装见随机说明书。

◆插入式熔断器的更换

插入式熔断器是可外部更换熔芯的元件，更换时，首先将上油箱压力释放阀的按钮拉一下，使油箱内外压力平衡。为确保操作人员及设备的安全，插入式熔断器不带负荷时插拔，故先将低压开关断电，以切除低压侧全部负荷，再用操作手柄将负荷开关切换到电源和变压器断开位置，然后用操作手柄将熔断器座上的手柄旋松，再旋转约 90 度，以消除密封垫和外壁间的粘附作用，并向斜上方拉出熔断器的熔体 70~80mm, 停留几秒钟，待熔体上的油流掉一些后，再拔出熔体，以免油滴在油箱外的其它元件上；用干净的棉布将熔体表面擦干净，再更换熔芯。更换时，一定注意熔芯上标明的参数，不同参数不可代用。更换步骤见图 5。将更换好熔芯后熔体，用力插入到熔断器支座上，将熔体上的手柄旋至锁住位置时，确保垫圈紧靠在熔断器支座上，手柄扣在凸台上，以保证变电站全密封，不进潮气。然后将高压负荷开关、低压开关再重新合闸，此时即可恢复供电。

因为变电站是三相系统，无论是后备保护熔断器或插入式熔断器，当一相熔体熔断后，一般三相熔体均要更换，除非能确定仅有一相熔体通过了故障电流。

操作说明 Operating Instruction

◆ Operation of Load Switch:

American box type uses oil type load switch. There are three types according to different functions: two positions, four positions with T shape and four positions with V shape. The users can choose any one of them and their operations are as follows:

◆ Four positions V shape load switch sees picture 2. The structure of the power piece is "V" shape, seeing the black part in the picture. "I、II" in the picture is for the inlet and outlet cable of ring network power supply. "T" is the inlet high voltage cable for backup fuse and plug-in fuse to connect into transformer. Ring network load switch changes the network with load. Four working states of load switch are as follows:

a, When in the position of "I-II-T", "I" and "II" are linked, so the transformer is with charge. (The function of transformer substation: ring network);
b, When in the position of "I-T", "I" is linked to transformer. (The function of transformer: terminal);
c, When in the position of "II -T", "II" is linked to transformer. (The function of transformer: terminal);
d,When in the position of "O", "I", "II" and transformer are all disconnected. (None of them is with charge.)

◆ Insert the exclusive operating handle into load switch shaft and turn about 130° clockwisely or anti-clockwisely. Each operation time of the load switch turns the power piece into next grade.
For example: change the power supply mode from power "I" into power "II".

◆ Operation Mode 1:

Insert the operation handle into switch shaft;
Rotate the switch clockwisely for one time, the switch with "V" shape blade is in the position of "I - II - T";
Rotate the swich clockwisely again, the "V" shape blade is between "II-T" and supply power through power "II". The operation is done.

◆ Operation Mode 2:

Insert the operation handle into switch shaft;
Rotate the switch anti-clockwisely for one time, the switch with "V" shape blade is in the position of "O";
Rotate the swich anti-clockwisely again, the "V" shape blade is between "II-T" and supply power through power "II". The operation is done.

◆ The two modes above both can achieve the power supply from power "I" into power "II". But the second mode is more safety and reasonable. Because when power "I" broke, it can not supply power any more. Meanwhile, if there is any fault of power "II", the fault will not expand into the whole cabinet. However, the first mode will arouse double power supply faults. When change from power "I" into power "II", if the phases of power are not same and so forth reasons, the faults will arouse.

◆ Four Positions Ring Network Load Switch (T Shape)

Working principle of four positions "T" shape load switch sees picture 3. Operating principle is same to V shape.

◆ Two Positions Load Switch

The structure of it sees picture 4. "I" links to high voltage inlet cable terminal. When the users operate it, insert the operating handle into the switch shaft, rotate 90° anti-clockwisely to breaking position of the load switch, so the terminal load switch can only use terminal power supply to cut the branches of transformer, or can only work when replace the plug-in fuse. To reduce the oil pollution of the oil tank, we advise the users to break the main low voltage switch or break the outlet cable switch to cut the load of the low voltage side before operating the load switch.

◆ Cable Head

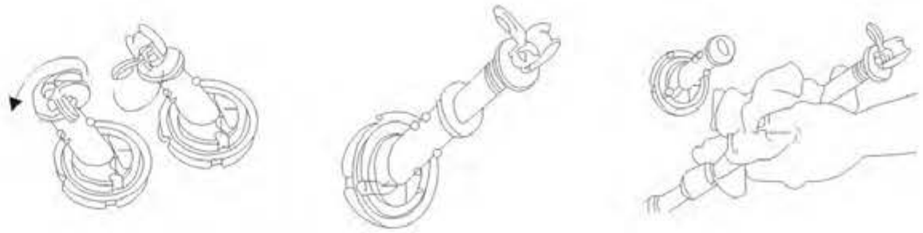
The inlet and outlet wire of the high voltage in 12kV preinstalled type transformer substation uses cable for inlet and outlet wire, which is introduced the high voltage power outside the oil tank by isolation bushing with epoxy pouring. The isolation bushing can afford power frequency withstand voltage and lightning impulse withstand voltage for convenient test of the manufacturers and acceptance test of users.
Choose elbow type or T type cable head which matches to the cable section and wash the surface of the cable head and isolation bushing by absolute ethyl alcohol and paint a little bit of 7501 type vacuum silicone grease at the surface of the bushing and install it according to the installation regulations of cable working zone. The installation of the cable head sees the installation specifications attached.

◆ Replacement of Plug-in Fuse

Plug-in fuse is such a component that its fuse core can be replaced externally. First, push the button of the pressure release valve of the oil tank to balance the pressure in and out of oil tank. To make sure the safety of the staff and the equipment, the plug-in fuse plugs in and out without load, so the low voltage switch needs to cut the power off first to cut all the load of low voltage side, then use the operation handle to switch the load switch into the breaking position of power and transformer, and then use the operation handle to loose the handle in fuse base, and rotate about 90 degrees in order to eliminate the adhesion effect between sealed gasket and shell, and pull out the melt of fuse to ramp above 70-80mm, then stay for a few seconds to wait for the oil to flow then the fuse can be pulled out so as to avoid oil drops on other components outside the oil tank. Clean the fuse with a clean cotton cloth, and then change the fuse core. During replacement, must pay attention to the parameters shown on the fuse core. Fuses with different parameters cannot be substituted. The steps of replacing sees picture 5. After replacing the fuse core and melt, forcefully insert them into the fuse base and rotate the handle in melt into locked position to guarantee the gasket touches the fuse base. And handle is on the convex plate to guarantee the transformer is sealed without damp. Then reclose the high voltage load switch and low voltage switch, now the cabinet can supply power again.
Because of the transformer is a three-phase system, so no matter any one of the fuse melt in backup protection fuse or plug-in fuse breaks, all the three fuse melts need to change together, unless the fuse melt passed fault current is certain.

插入式熔断器更换步骤 Steps of Replacing Plug-in Fuse

◆低压总开关分闸。
Break the main low voltage switch.
◆高压负荷开关分闸。
Break high voltage load switch.
◆拉压力释放阀圆环使其释压。
Release pressure by pull the pressure release valve ring.
◆钩住操作孔向上旋转 90 度。
Rotate 90degrees of hooking operation hole.
◆向上 100mm, 停一下，然后全部拉出用干净的棉布擦干。
Pull it out above 100mm, stop for a while, then pull all of it and clean it with clean cotton cloth.
◆按下图更换熔芯。
Change the fuse core according to the picture below.
◆快速将更换的熔芯插入原孔，并扣住。
Quickly insert the replaced fuse core back to the fuse base and buckle it.



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美式预装式箱式变电站

运输、安装及维护 Transportation, Installation and Maintenance

◆运输 Transportation

出厂的变电站应按油箱中油位计指示注满 25#(或 45#) 变压器油 . 运输和装卸时，不准倒置和翻转，不得撞击零件，不准强烈震动。

变电站在吊装移位时应特别注意，起吊钩应钩在油箱的吊钩上，要缓缓起吊，以免钢丝绳将变电站表面油漆损伤，甚至引起整台变电站重心偏移、倾斜、跌落。

Transportation Substation should be filled with 25# (or 45#) transformer oil to the full indication of the oil level indicator. During the transportation and load and unload, it can not be upside down or overturned, and without impact and violet vibration.

Transportation Substation should be paid more attention when it is lifted. The lifting hook should be hooked to the lifting hooks of the oil tank with slow movement to prevent the steel wire rope to scratch the painting of the transformer substation or even worse to cause the whole substation center-of gravity shift, tilt and fall.

◆安装 Installation

变电站在现场安装时，应注意柜体表面油漆的保护，不允许气压表、油位计、温度计、插入式熔断器的手柄和绝缘套管元件有碰撞、裂痕等，螺钉无松动。

将变电站外部、柜门内、绝缘套管表面的尘埃、污物清除干净。

检查变电站的铭牌数据、产品合格证是否与订货单相符，并根据装箱单检查文件、备件是否遗漏。

变电站电缆进出线土建图见图 6。

When install the transformer substation at the site, the painting, pressure meter, oil level indicator, temperature meter, handle and isolating bushing of the plug-in fuse should be protected from crash and scratch, and screws are tightened.

Clean the dust and other dirty things at the surface of the substation and bushing, and inside the cabinet door.

Check the name plate and manufacture certificate of the transformer substation conforms to the purchasing order. And check the documents and pare parts according to the packing list.

Inlet and outlet cable construction layout drawing of the transformer substation sees picture 6.

◆维护 Maintenance

出厂的产品已经过严格的装配调整。在安装时不需要重新拆卸，以免影响性能，维护仅限于下列情况：

每年进行一次变压器油抽样分析。

发现油位降低应及时补充，油的牌号与箱体中的油相同。

熔断器熔断后应查明原因，更换熔芯时应注意其规格型号应与原规格型号相同。

The product has been strictly preinstalled and adjusted in the factory, so there is no need to reinstall to affect its performance. Only can be maintained for following situations:

Analyse transformer oil sampling analysis annually.

Fill the oil tank with the same type oil in name plate when the oil is lower.

Find out the reason of fuse blow. The replaced model should be same to the former one.

验收、投运前的实验 Acceptance Test

◆开箱后，检查文件和附件是否齐全。
Open the box to check whether the documents and the accessaries are complete.

◆油位计指示的油位是否符合产品规定；分接开关是否处于正确档位。
Oil level indicator indicates the oil level need to accord to the regulation of the product; tap changer should be in the right position.

◆对负荷开关进行顺时针、逆时针操作，各进行四次，应无“拒分、拒合”等不正常现象。
Operate the load switch clockwisely and anti-clockwisely each for four times. There should not be "reject to break and close" such unusual conditions.

◆高低压侧直流电阻的测量。
Measure the resistance of the high voltage side and low voltage side.

◆变压器变比的测量。
Measure the transformer ratio.

◆绝缘电阻的测量及工频耐压试验 (按出厂时的百分之八十)。
Measure the isolating resistance and do the power frequency withstand test (80% of the original product before delivery).

出厂资料 Attached Documents

制造厂供货时应提供下列文件及附件
Manufacturer should provide the following documents and accessories before delivery

◆发货清单
Shipping list

◆产品合格证及出厂试验报告
Manufacture certificate and test report

◆使用说明书
Instruction

◆有关电气图纸
Electric installation drawing

◆主要元件说明书
Specifications of main components

◆柜门钥匙，操作予柄及合同单规定的备品备件。
Key of the door, operation handle and other spare parts that regulated in contract.

订货须知 Ordering Information

◆订货时须向我公司提供以下资料：
The following information is needed when ordering:

◆产品型号、数量。
Model and quantity of transformer substation;

◆变压器型号、容量。
Model and capacity of transformer;

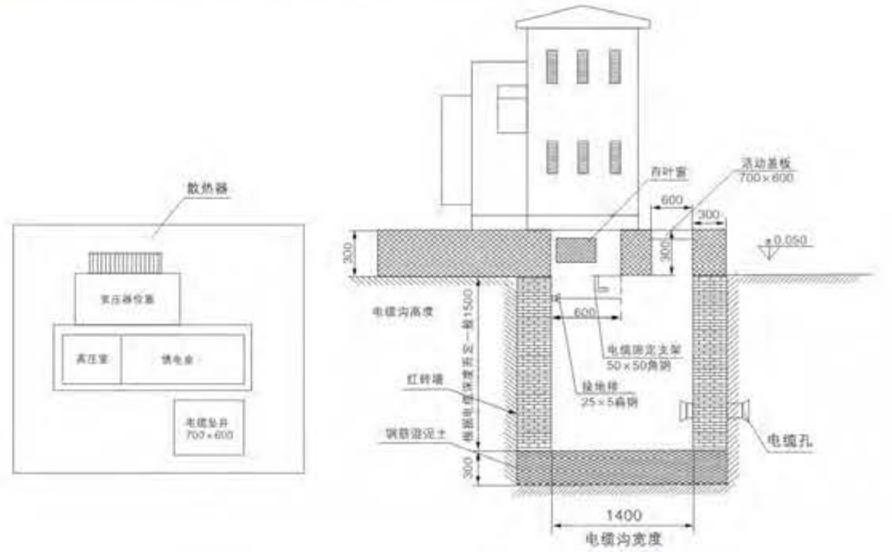
◆变压器油 (25#, 45#, 高燃点油)。
Transformer oil type (25#, 45#, or high burning point oil);

◆高低压侧一次接线方案及主要元件参数。
Primary wiring scheme of high voltage side and parameter of the main components;

◆高压进线电缆截面。
High voltage inlet cable section;

◆所需的备件。
Spare parts that needed.

变电站电缆进出线土建图(YBW-12)技术要求：



◆有关尺寸参见组合变实际尺寸；
The dimensions refer to actual size of compound transformer substation.

◆混凝土台基应表面平整，组合变电站采用压板固定的方式固定在台基上。
Compound transformer substation uses clamp to be fixed on the concrete stylobate whose surface should be smooth.

◆接地排和电缆固定支架的型式可根据实际情况而定。
The types of grounding busbar and holder for supporting cable can be chosen according to the real situation.

◆电缆固定架和接地排应预埋。
Cable support holder and grounding busbar should be embedded.

◆进出线电缆孔的位置根据具体情况而定。
The hole position of inlet and outlet cable can be designed according to the real situation.

◆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。
There must be over 1.5m gap in front of the compound transformer substation for convenient operation.

◆接地网可用 12 镀锌圆钢或 40x4 镀锌扁钢制作，接地电阻应符合电力部门要求。
The grounding network can be composed of 12 zinc-plated round steel or 40X4 Galvanized flat steel. Grounding resistance conforms to the requirement of the power department.

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DFW

高压电缆分支箱（欧式普通）

High Voltage Cable Branch Box (European Style, Common)

概述 General

DFW 型欧式普通电缆分支箱是近几年来广泛用于电力配网系统中的电缆化工程设备，它的主要特点是双向开门，利用绝缘穿墙套管作为连接母排，具有长度小，电缆排列清楚，三芯电缆不需大跨度交叉等显著优点，一般采用额定电流 630A，螺栓固定连接电缆接头，所采用的电缆接头符合 DIN47636 标准

DFW type European common cable branch box is the cable project equipment widely used for electric power distributing network. Its main features are quite visual, for instance, open the door with two directions, take the insulating wall bushing as the connecting bus bar, quite short, clear arrangement of cable, the three-core cable ne edrnt large span cross, etc. In general, this product is provided with rated current 630A, its cable joint is in line with standard DIN 47636, which is fastened by bolts.

基本技术参数 Basic technical parameters

额定电压 Rated voltage	12KV
额定电流 Rated current	630A
额定短时耐受电流（有效值） Rated short-time withstand current (virtual value)	20(3s)KA
额定峰值电流 Rated peak withstand current	50(0.3s)KA
额定热稳定电流 Rated thermal stability current	20(3s)KA
额定动稳定电流（峰值） Rated dynamic stability current (peak, value)	50(0.3s)KA
局部放电 Partial discharge	≤ 10(试验电压 Test voltage 13kV)
适用电缆截面 Applicable cable sectional area	≤ 400
壳体防护等级 Protection level of enclosure	IP33

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TIANYAO ELECTRIC

DFW

高压电缆分支箱（美式普通）

High Voltage Cable Branch Box (American Style, Common)

概述 General

1. 全绝缘，全密封，免维护，可靠的人身安全保障。
2. 简化城市电缆网络系统节省投资。
3. 户外型、防尘、防潮、抗洪水、耐腐蚀、环境适应性强，组合灵活，进出线从二路到八路，满足多种接线要求。
4. 体积小、结构紧凑、外型美观大方、安装简单、免维修且有带电显示器。可带短路指示器，可带避雷器。
5. 占地小、商度低、外型美观，能与周围环境协调一致；接线方案灵活多样，安装操作极为方便。
6. 200A 电缆头可带负荷插拔，同时具备隔离开关的功能。可安装短路故障指示器，迅速确定故障位置。

1. Full insulated, full sealed, free from maintenance, reliable human insurance.
2. Simplify urban cable network system and save the investment.
3. Outdoor type, dustproof, dampproof, anti-floodwater, corrosion resistance, strong adaptability to environment, flexible in combination, the incoming and outgoing wires goes from 2-way to 8-way, which can meet different wiring requirements.
4. Small volume, compact structure, nice and graceful appearance, simple installation, free from maintenance, equipped with charged display, available for mounting with short-circuit indicator and arrester.
5. Small space required, quite low nice appearance, harmonious with ambient environment; flexible and variable wiring schemes, rather convenient in installation and operation.
6. Cable head of 200A can be equipped with load plug, and possesses the function of isolating switch. Provided with short-circuit fault indicator that can find the fault position rapidly.

综合配电箱(动力/补偿/控制/终端/照明)

Integrated Distribution Box (power/ Compensation/ Control/ Terminal/ Illumination)

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综合配电箱（动力 / 补偿 / 控制 / 终端 / 照明）

Integrated Distribution Box (Power/Compensation/Control/Terminal/Illumination)

概述 General

JP 系列户外综合配电箱，是集计量、出线、无功补偿等多功能于一体达到户外综合配电装置，具有短路、过载、过电压、漏电保护等功能，体积小、外型美观、经济实用，安装于户外柱上变压器的电杆上，是城乡电网改造的新一代理想配电产品。

JP series outdoor integrated distribution box concentrates the functions of measuring, outlet wiring, reactive compensation etc. to an integrated box to protect short circuit, overload, over voltage, electricity leakage etc with small size, beautiful appearance and economical usage. It is installed on the pole which is also for installing the outdoor pole type transformers. It is an ideal distribution product for urban and rural power grid renovation.

型号含义 Type Designation

JP - □ / □

- 主回路方案号 Main Circuit Scheme
- 变压器容量 Transformer Capacity
- 综合配电箱 Integrated Box

结构特点 Structure Features

箱体结构分立式和卧式，外壳采用 2mm 优质不锈钢板经多重折边工艺弯制（或采用蜂窝结构的不锈钢双夹层复合板，具有阻燃、环保、隔热、防凝露等性能），采用特殊不锈钢焊接工艺，箱体成型后整体强度高，表面光洁如镜，不留焊缝痕迹；内部安装梁（板）为热镀锌工艺处理，确保二十年内不锈蚀；箱体前后开门，便于用户操作和检修，门四周镶有高弹力耐老化密封胶条，每扇门均装有明暗两种门锁，明锁配有防堵防锈的遮雨罩；计量室全封闭带铅封装置；箱体侧面装有防雨防异物的进线电缆穿管，底部冲有通风孔和电缆出线孔，顶部设有通风道和丝网，具有防水、防锈、防 尘、防异物的功能，防护等级：IP54。

The box has two types------horizontal type and vertical type. The shell of the box uses 2m high quality stainless steel plate bending by the multiple folding craft (or cellular structural stainless steel double composite panels with flame retardant, environmental protection, thermal insulation, condensation prevention etc. performances) through special stainless steel welding technology. After shaping up, the surface of the box is bright and clean as a mirror without any trace of welding. Internal box installs hot galvanizing processed beam (plate) to ensure that 20 years does not rust. The box can be open in both front and back sides for convenient operation and maintenance. High elastic aging resistance sealing strip is edged around the door. There are two kinds of locks for every door------obvious lock and secret lock. Obvious lock is equipped with rain shield to prevent block and rust. Measuring compartment is a fully lead sealed device. At the side of the box, there are inlet cable channels with rain prevention and foreign matter prevention. At the bottom of the box, there are air hole and outlet cable hole. At the top of the box, there are ventilation channel and silk screen with the functions of waterproof, antirust, dust prevention, foreign matter prevention. Its protection degree is IP54.

正常使用条件 Working Conditions

- ◆环境温度：-25℃ +40℃。
  Ambient temperature: -25~+40℃
- ◆空气相对湿度：日平均值不大于 90%, 月平均值不大于 90%。
  Humidity: daily average ≤ 95%, monthly average ≤ 90%
- ◆海拔高度：不大于 2000m。
  Altitude: ≤ 2000m
- ◆安装在无剧烈震动和冲击、无腐蚀性气体的场所。
  It is applicable in the place without violent vibration and corrosive gas.

综合配电箱
(动力/补偿/控制/终端/照明)

主要技术参数 Specification

名称 Item	单位 Unit	参数 Data
变压器容量 Transformer Capacity	kVA	30~400
额定工作电压 Rated Working Voltage	V	AC400
辅助回路工作电压 Working Voltage of Auxiliary Loop	V	AC220，AC380
额定频率 Rated Frequency	Hz	50
额定电流 Rated Current	A	≤ 630
额定漏电动作电流 Rated Action Current of Electricity Leakage	mA	30~300 可调 30~300 adjustable
防护等级 Protection Degree		IP54

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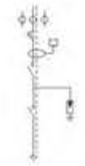
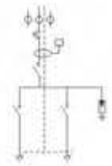
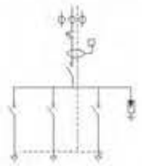
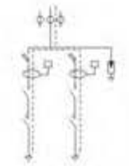
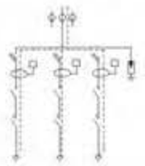
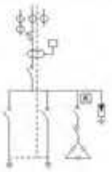
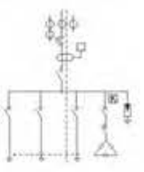
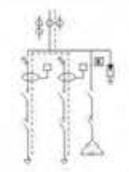
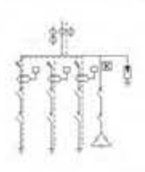
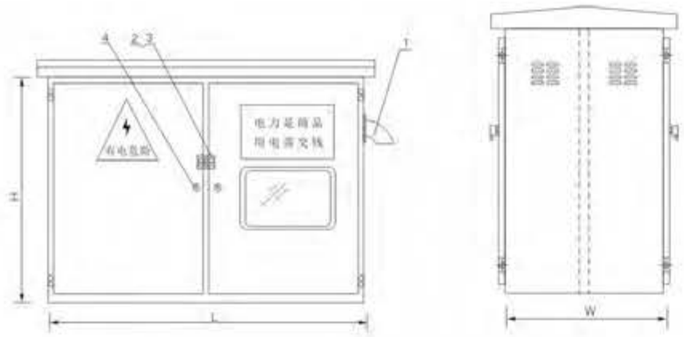
主回路方案图 Main Loop Scheme

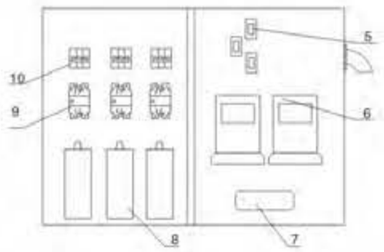
方案号 Scheme No.	01	02	03	04	05
主回路单线图 Single Wiring Chart of Mian Loop					
说明 illustration	总计量 / 一回出线 / 漏保 General Metering/ First Loop Outlet Cable/ Electricity Leakage Protection	总计量 / 总漏保 / 二回出线 General Metering/ General Electricity Leakage Protection/ Second Loop Outlet Cable	总计量 / 总漏保 / 三回出线 General Metering/ General Electricity Leakage Protection/ Third Loop Outlet Cable	总计量 / 二回出线 / 分支漏保 General Metering/ Second Loop Outlet Cable/ Branched Electricity Leakage Protection	总计量 / 三回出线 / 分支漏保 General Metering/ Third Loop Outlet Cable/ Branched Electricity Leakage Protection

方案号 Scheme No.	06	07	08	09	10
主回路单线图 Single Wiring Chart of Mian Loop					
说明 illustration	总计量 /- 回出线 / 漏保带补偿 General Metering/ First Loop Outlet Cable/ Electricity Leakage Protection/ Compensation	总计量 / 总漏保 / 二回出线 / 带补偿 General Metering/ General Electricity Leakage Protection/ Second Loop Outlet Cable/ Compensation	总计量 / 总漏保 / 三回出线 / 带补偿 General Metering/ General Electricity Leakage Protection/ Third Loop Outlet Cable/ Compensation	总计量 / 二回出线 / 分支漏保 / 带补偿 General Metering/ Second Loop Outlet Cable/ Branched Electricity Leakage Protection/ Compensation	总计量三回出线 / 分支漏保 / 带补偿 General Metering/ Third Loop Outlet Cable/ Branched Electricity Leakage Protection/ Compensation

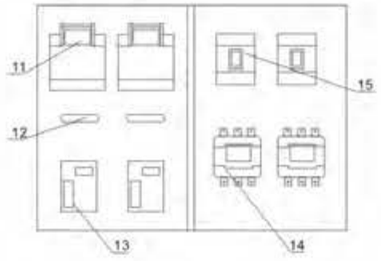
箱体结构示意图 Structure Sketch Map of Box



1、进线电缆穿管 Inlet Cable Channel
2、门锁（明锁） Door Lock (Obvious Lock)
3、门锁防雨盒 Lock Waterproof Box
4、门锁（暗锁） Door Lock (Secret Lock)



内部元件布置（正面）
Inner Arrangement of Components (Front)

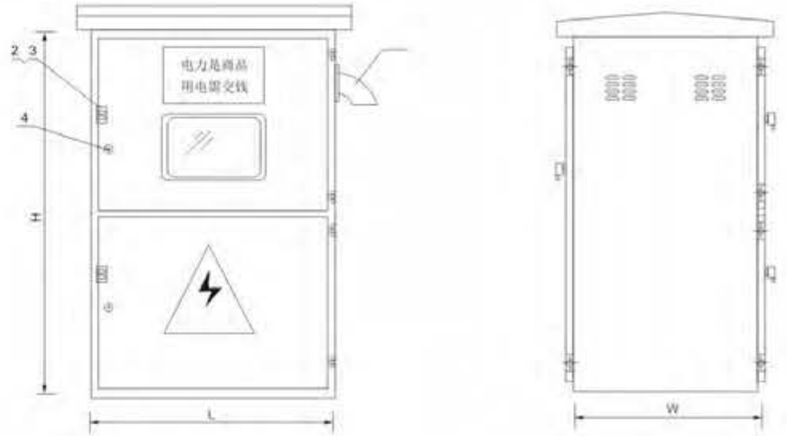


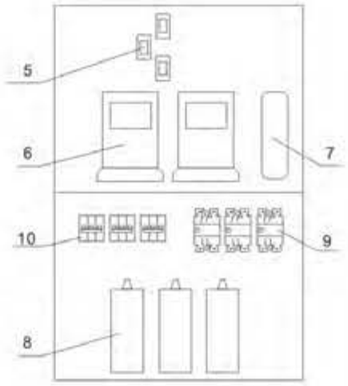
内部元件布置（背面）
Inner Arrangement of Components (Back)

5、电流互感器 Current Transformer
6、计量表 Meter
7、接线盒 Terminal Box
8、电容器 Capacitor
9、切换电容接触器 Capacity Switch Contactor
10、小型断路器 Miniature Circuit Breaker
11、隔离开关 Isolation Switch
12、零序互感器 Zero Sequence Mutual Inductor
13、漏电继电器 Electricity Leakage Relay
14、出线交流接触器 Outlet Contactor
15、出线空气开关 Outlet Air Switch

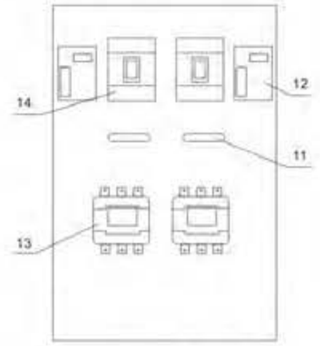
图一：户外箱结构示意图（卧式）
Picture 1: Structure Sketch Map of Outdoor Box (Horizontal Type)

箱体结构示意图 Structure Sketch Map of Box





内部元件布置（正面）
Inner Arrangement of Components (Front)



内部元件布置（背面）
Inner Arrangement of Components (Back)

1、进线电缆穿管 Inlet Cable Channel
2、门锁（明锁） Door Lock (Obvious Lock)
3、门锁防雨盒 Lock Waterproof Box
4、门锁（暗锁） Door Lock (Secret Lock)
5、电流互感器 Current Transformer
6、计量表 Meter
7、接线盒 Terminal Box
8、电容器 Capacitor
9、切换电容接触器 Capacity Switch Contactor
10、小型断路器 Miniature Circuit Breaker
11、零序互感器 Zero Sequence Mutual Inductor
12、漏电继电器 Electricity Leakage Relay
13、出线交流接触器 Outlet Contactor
14、出线空气开关 Outlet Air Switch

图二：户外箱结构示意图（立式）
Picture 2: Structure Sketch Map of Outdoor Box (Vertical Type)

箱体外形尺寸 Dimensions of the Box

卧式箱体外形尺寸 Dimensions of Horizontal Type Box

变压器容量 Transformer Capacity	方案号 Scheme No.	L	W	H
30~100kVA	01、06	800	450	700
30~250kVA	02、04、07、09	900	500	700
100~400kVA	03、05、08、10	1100	600	800

立式箱体外形尺寸 Dimensions of Vertical Type Box

变压器容量 Transformer Capacity	方案号 Scheme No.	L	W	H
30~100kVA	01、06	600	450	1000
30~250kVA	02、04、07、09	700	500	1000
100~400kVA	03、05、08、10	800	600	1100

以上尺寸仅供参考 Dimensions above are just for reference.

订货须知 Ordering Information

- ◆产品型号、数量。
  Model and quantity;
- ◆产品结构型式（立式、卧式）。
  Structure type (vertical or horizontal);
- ◆主要元器件的型号、技术参数。
  Model and datas of the main components;
- ◆其它特殊要求。
  Other special requirements.

JN-1

JN-2

JN-3

XL-21
框架式动力柜
Framed Power Distributing Cabinet

概述 General

XL-21 系列框架式低压配电柜适用于工业与民用建筑中，作交流频率为 50Hz、电压 500V 及以下，三相四线电力系统的动力配电和照明配电用。对线路的过载、短路及漏电提供保护，并对电路进行正常转换。该产品系户内封闭式装置，其外壳防护等级为 IP20。产品符合 GB7251.1 及 IEC61439-1 等标准。

XL-21 framed LV distributing cabinet, is used for power distribution and lighting distribution at three-phase four-wire power system of AC frequency 50Hz, 500V and below in the industrial and civil buildings, takes effect on preventing the overload, short circuit and leakage as well as converting the circuit normally. This product is a kind of indoor enclosed device, its enclosure protection level reaches IP20, conforms to standards GB7251.1 and IEC61439-1.

基本技术参数 Basic technical parameters

额定工作电压 Rated working Voltage	300V
额定绝缘电压抽屉 Rated insulation Voltage	660V
额定工作频率 Rated working Frequency	50Hz
额定工作电流 Rated working current	630-1000A
额定短路开断电流 Rated short-circuit breaking Current	15kA
额定短时耐受电流 Rated short-time withstand Current	15kA/1s
额定峰值耐受电流 Rated peak withstand Current	30kA

XL-21

安全型配电柜

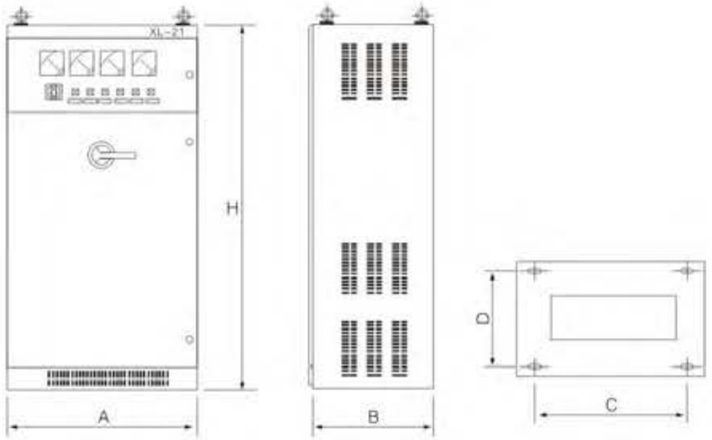
XL-21 Safety Type LV Distributing Cabinet

概述 General

XL-21 系列安全型配电柜是我公司根据顾客反馈信息以及市场调查基础上自行开发出的新产品，符合 GB7251,1-1997 标准。本产品体积小，容量大，安装方便，维护方便，外观美观大方。所有操作手柄在内外操作，保证了人身安全。
安全型低压配电柜上母排的结构得到合理改进，动力柜合平模块化的设计要求，XL-21 动力柜主要用建筑，工厂，商场，学校，医院，机关等各类场所。亦可作为线路频繁转换以及消防，双电源的动力线路中的过载，短路，漏电，欠压，保护之用。

XL-21 series safety type LV distributing cabinet is a new product that is developed on the basis of customer' s feedback information and market investigation data，conforms standard GB7251.1-1997. This product fully shows its merits like compact structure, large capacity, convenience of installation and maintenance, nice and graceful appearance, besides, its all operation handles are operated outside the internal door, so that people can be protected.
The bus bar structure of safety type LV distributing cabinet is improved and quite reasonable, and the power cabinet meets the design requirement on the aspect of modularization. XL-21 power cabinet is mainly used in the building, factory, emporium, school, hospital, institution, etc. to serve for converting the circuit frequently and protecting the fire-control circuit and power circuit with dual-power supply against overload, short circuit，leakage, under voltage and so on.

箱体外形及安装尺寸 Box shape and installation dimension



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

天耀电气 TIANYAO ELECTRIC

双电源切换箱 Double Power Shift Box

- ◆本产品符合 :GB72511/IEC439 标准
  The product conforms to GB72511/IEC439 standards.
- ◆额定工作压 :380V 660V
  Rated working voltage: 380V 660V;
- ◆额定电流：≤ 250A
  Rated current: ≤ 250A;
- ◆防护等级 :IP30
  Protection degree: IP30.

水泵控制箱 Water Bump Control Box

- ◆本产品符合 :GB72511/IEC439 标准
  The product conforms to GB72511/IEC439 standards.
- ◆额定工作电压 :380V 660V
  Rated working voltage: 380V 660V;
- ◆额定电流：≤ 250A
  Rated current: ≤ 250A;
- ◆IP30
  Protection degree: IP30.

消防风机控制箱 Fire Protection Fan Control Box

- ◆本产品符合 :GB72511/IEC439 标准
  The product conforms to GB72511/IEC439 standards.
- ◆额定工作电压 :380V 660V
  Rated working voltage: 380V 660V;
- ◆额定电流 : ≤ 250A
  Rated current: ≤ 250A;
- ◆防护等级 :IP30
  Protection degree: IP30.

终端配电箱 Terminal Distribution Box

- ◆本产品符合 :GB72511/IEC439 标准
  The product conforms to GB72511/IEC439 standards.
- ◆额定作电压 :380V 660V
  Rated working voltage: 380V 660V;
- ◆额定电流 : ≤ 250A
  Rated current: ≤ 250A;
- ◆防护等级 :IP30
  Protection degree: IP30.

不锈钢配电柜 Stainless Steel Distribution Cabinet

该产品融自动补偿和配电为一体，集漏电保护、电能计量、过流、过压、缺相保护等多功能为一体的新型户外低压控制柜。

This product is new outdoor low voltage control cabinet, integrated with automatic compensation and distribution to protect electricity leakage, measure power, protect over current, over voltage, lack of phase etc.

保护开关箱 Protection Switch Box

该产品改善电力线路的运行性能、抑制电网冲击性和波动性的大功率负载对电网造成的电压波动、降低电能损耗，对提高供电网络的电压质量，有良好的效果。适用于工业、农业供电网络及户外安装的变馈电，自动 (手动) 就地作业。

This product can effectively improve the performance of running, keep the power network from the impacting and waving high power load aroused voltage fluctuation, lower the loss of power, improve the voltage quality of the power network. It is applicable for industrial and agricultural power networks and outdoor installed transformer and feeder operated automatically(manually).

PZ30 不锈钢 PZ30 Stainless Steel

分明装和暗装两种，用于户内的服务设施，装修用或改造工程的配电，及分配电用，最大容量为 100A。

This product has two installation types: obvious type and secret type. It can be used for power distribution of the indoor service devices, decoration or modification projects. The maximum capacity is 100A.

PZ40电表箱(多户) PZ40 Electric Meter Box(Multiple Users)

PZ40 计量箱是一种安装单相电表 (220V) 的终端配电箱，内部电器开关元件全部选用模数为 9mm 开关，主要用于民用建筑。
PZ40 分明暗两种类型
XJM 系列电度表箱

PZ40 meter box is a terminal power distribution box for installing single-phase electric meter (220V). The inner electrical components are all chosen module 9mm switches. It is mainly used for civil architecture.
PZ40 has two installation types: obvious type and secret type.
XJM series Electric Meter Box

控制箱(户外) Control Box (Outdoor)

本产品采用优质冷轧钢板折弯焊接而成，表面经过环氧树脂静电喷涂处理，美观耐用。在箱体 V 型箱上装有密封橡胶条，防止灰尘、雨水渗入；箱体上下两侧备有活动的敲落孔，并已加密封。

This product adopts excellent electrolytic steel plate bended and welded. Its surface is processed through electrostatic coating of epoxy resin to make the box beautiful and durable. In the V shape box of the cabinet, there is sealed rubber strip to protect dust and water. On both sides of the box, there are mobile knock-off holes which are sealed.

透明电表箱 Transparent Electric Meter Box

单相电表 (220V) 的终端配电箱，内部电器开关元件全部选用模数为 9mm 开关，主要用于民用建筑。
It is the terminal distribution box for single-phase electric meters (220V). The inner electrical components are all chosen module 9mm switches. It is mainly used for civil architecture.