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为更好的维护北京北开电气股份有限公司用户的合法权益，公司决定在2007年10月26日起实施防伪标识。凡是北京北开电气股份有限公司的出厂产品都贴有防伪标识。



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XGN-40.5型箱式气体绝缘金属封闭开关设备
 XGN-40.5 Box-Type Gas Insulated Metal Closed Switchgear

北京北开电气股份有限公司

北京北开电气股份有限公司的前身为北京开关厂，是国家生产高低压电器，高低压成套装置的重点企业，有着六十年丰富的制造技术和管理经验。北开艰苦奋斗励精图治，成为国家机械行业中重点骨干企业。公司在同行业率先通过了ISO9001质量体系认证、GJB/Z9001A军工产品质量体系认证、ISO14001环保体系认证、GB/T28001职业健康安全认证和3C体系认证，使“北开牌”成为电气市场中极具竞争力的品牌，为我国电力事业的发展及城乡电网改造，做出了卓越的贡献。

2003年公司迁至北京经济技术开发区永昌南路5号。占地面积14.7万平方米，员工1200余人。

公司致力于高、中、低压开关控制设备、超导、机电一体化开关控制设备技术的研究、项目的投资管理、销售、制造及安装维修服务。公司为城乡电网、发电厂、变电站、石油、化工、钢铁、造船、核电、电气化铁道、轻轨铁道、地铁、垃圾电站及环保等产业、城乡建设、特种行业、国防建设提供优质的产品和服务。

公司主要产品有：
 SF₆封闭式组合电器
 SF₆瓷柱式断路器
 SF₆罐式断路器
 真空断路器及真空接触器
 低压框架式陆用、船用、舰用空气断路器
 高低压成套配电装置及核电站控制设备

公司拥有一批经验丰富，多年从事高低压电器及其成套配电装置的研究、设计、制造和试验的工程技术人员和管理人员，在产品研发方面采用了Solid-works三维制图软件，提高了设计水平和速度，形成了与市场相应的产品结构。

公司设有国家级技术中心——北京高压电器设备研究所，进行广泛的科学研究和技术开发工作。进一步提高了产品竞争力，加速了产品更新换代。



为了确保产品质量，公司设有测试手段完善、实验设备先进、齐全的专门检验机构——北京高压电器设备检测站。公司在组织生产中实施了现代化ERP管理。严格的工艺流程，标准化体系，紧紧围绕用户需求，缩短订单执行周期，减少周期费用，降低管理成本，提高合同执行率，生产精确率和产品质量，使广大用户倍感北开管理的先进和快捷，提高用户对北开的忠诚度和信任度。

公司坚持“用户是恒星，北开是行星，行星永远围绕恒星运行”的经营哲学思想，秉承和发扬“99+‘1’=0”的管理理念，即“研发零隐患，生产零缺陷，管理零失误，服务零投诉，沟通零距离”的五零管理，恪守“诚实守信，公正公平”的道德原则。我们热诚欢迎国内外用户选用本公司产品，保证质量，信守合同，并提供周到的技术服务。

北开主打理念：世界品质尽在开合一瞬间
 用心灵的光和热献给人类

北开企业目标：具有国际竞争力的中国输配电行业旗舰

北开精神：创新无界 敢问天高

企业使命：为客户创造价值 为家人创造幸福
 为股东创造利益 为国家创造财富
 为员工创造机会 为社会创造文化

Beijing Beikai Electric Co., Ltd.

Beijing Beikai Electric Co., Ltd. (BBE) is one of china most influential suppliers of electric power switches and maintaining a leading position, it has always been working for researching and producing high-, medium-and low-voltage switching equipment, devices of mechanical & electric, on-line intelligent monitoring products, automatic distribution network system and other associated products.

In 2003, the company has moved to the BDA of Beijing DaXing, covered an area of 110 hundred square meters, and located the sales company in CBD commercial area. The company now boasts a staff team of over 1200, among which 500 are technicians, with total assets near one billion RMB.

Products range:
 SF₆ Gas Insulated Switchgear (GIS)
 SF₆ Live Tank Circuit Breaker
 SF₆ Dead Tank Circuit Breaker
 Vacuum Circuit Breaker & Vacuum Contactor
 Low Voltage Air Circuit Breaker for Land & Ship Use
 H&L Voltage Assembly Distribution Panel & Unclear Power Station Control gear

BBE insists on implementing the managerial philosophy of “99+ ‘1’ =0”, Beikai brand products enjoy high reputation both in domestic and international market.

The products are widely used in the field of suburban and urban electrical networks, petrochemical industry, steel and iron industry, shipping industry, nuclear power, environment protection, railway and national defense.

Mission of BBE: integrating modern technique and effective management, and creating a perfect system in of power transmission and distribution.

Application of products: offering excellent products and service to power net, power factory, oil industry, chemical industry, steel, shipping, nuclear power, electric power, light track railway, subway, garbage power station, sewage treatment and other environmental protection industrial, special trade, city building and national defense construction.

Philosophy of management: users' satisfaction is our eternal pursuit.

New equation of BBE: “99+ ‘1’ =0”
 Researching no hidden danger
 Producing no flaw
 Managing no fault
 Servicing no complaint
 Communicating no distance



概述 / Overview



- 我公司的XGN-40.5型箱式气体绝缘金属封闭开关设备（C-GIS充气柜）适用于40.5kV三相交流50Hz单母线系统，作为接收和分配电能之用，并对电力系统正常运行和故障情况下实行控制、保护、测量、监视、通讯。该充气柜为户内装置，广泛适用于发电厂、输变电系统变电所的受配电、工矿企业事业配电及城网地铁、轻轨铁路、高原铁路等场合，特别适用于运行条件比较恶劣、高湿度、重污秽的场所，是免维护产品。

XGN-40.5 Box-Type Gas Insulated Metal Closed Switchgear (C-GIS Inflatable Cabinet) is applicable to 40.5kV three-phase AC 50Hz single bus-bar system, for the power energy receiving and distributing purpose, and for control, protection, measurement, monitor, and communication under normal operation and failure conditions of electric power systems. This inflatable cabinet is an indoor device, mainly used for power reception and distribution for house power use at power plants, substations of transmission and transformation systems, and power distribution at industrial enterprises, mines, and public institutions, as well as at urban network of subways, light railways, and highland railways, etc, especially applicable to sites of relatively atrocious operating conditions, high humidity, and heavy pollution, as a maintenance-free product.

- XGN-40.5具有占地面积小、不受外界环境影响、可靠性高等特点，因此在石化冶金、矿山、城市轨道交通、高层建筑及高海拔地区的应用越来越多。

XGN-40.5 is characterized by small land occupancy area, free from external environment influence, high reliability, and other features, and therefore it has been more and more applied to petrochemistry, metallurgy, mine, urban rail traffic, and high-rise building, as well as high-altitude areas.

- 根据电气主接线方式不同可分为：进出线柜、母联柜、保护柜。
According to the difference in electrical main wiring methods, it can be divided into inlet/outlet wire cabinet, bus tie cabinet, and protection cabinet.

- 用户可以根据自己需求将几种柜组成不同方案组合，以满足一次方案的需求。下图为典型一次方案示例。

Combinations of different schemes can be formed by users according to their own demands, to meet the requirements of a single scheme. The following diagram is a typical demonstration of primary scheme.

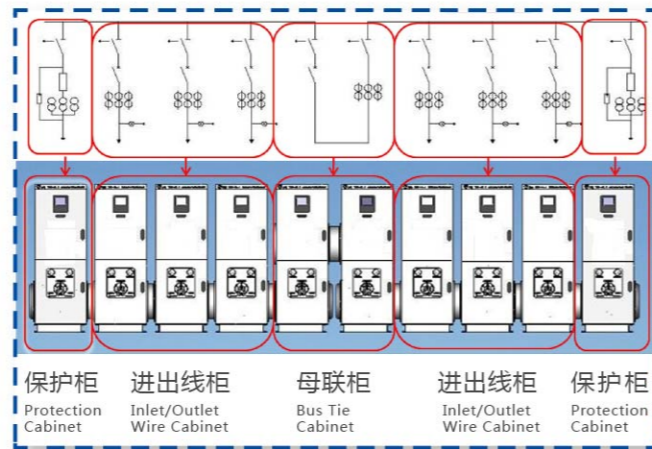


图1 一次设计方案示意
Fig 1 Schematic Diagram of Primary Design Plan

主要特点 / Main Features

1. 外壳模块化设计，模块化装配，采用铸铝合金材质，避免了钢板焊接、不锈钢板焊接所存在的箱体变形、漏气、后期维修更换困难等缺点；
2. 柜体连接采用连通气室方案，现场安装更简便、长时间运行更可靠，避免了母线连接器(即固体绝缘母线)柜体连接要求敏感，长时间运行硅橡胶绝缘介质易老化造成的放电隐患；
3. 充气压力最低，仅为0.04MPa(表压)，更环保，故障隐患小；
4. 绝缘能力强，该产品在SF₆绝缘气体零表压下1min工频耐受电压103kV，雷电冲击电压199kV(国标要求1min工频耐受电压95kV，雷电冲击电压185kV)；
5. 完善的机械闭锁，其机械传动敏感部位均采用磁流体密封技术，提供更可靠的密封保障；
6. 适用于3000米高海拔的地区，适用于高污秽，高湿度等恶劣的运行环境的要求。

1. Shell are designed by modular, modular assembly, used the cast aluminum alloy material ,to avoid the shell deformation ,leakage and the after-sell maintenance and so on other difficult ;
2. It used connect and through gas room program between switchgear , more easy installation on site , running reliable in long time , to avoid discharge hidden danger by cabinets connect sensitive which bus connector (namely solid insulation bus) , and long time running silicone rubber insulation medium aging ;
3. The lowest gas pressure, was only 0.04 MPa (table pressure), more environmental protection, less hidden trouble;

4. High insulation withstand voltage level , this product's 1 min power frequency withstand voltage 103kV , lightning impulse voltage 199kV at SF₆ gas zero table press ; (international require , 1 min power frequency withstand voltage 95kV , lightning impulse withstand voltage 185kV);
5. Perfect mechanical locking, it' s mechanical drive sensitive part adopts magneto fluid seal technology, provide more reliable seal guarantee ;
6. It is suit for 3000 meters high altitude area, the high impurity, high humidity and so on the operating conditions of requirements.

主要技术参数 / Main Technical Parameters

1. 主要技术参数 / 1. Main Technical Parameters

项 目 Item		单 位 Unit	参 数 Parameter
额定电流 Rated Current		A	630/1250/1600/2000/2500
额定电压 Rated Voltage		kV	40.5
额定频率 Rated Frequency		Hz	50
额定峰值耐受电流(峰值) Rated Peak Withstand Current (Peak Value)		kA	80
额定短路关合电流(峰值) Rated Short Circuit Making Current (Peak Value)		kA	31.5
额定短路开断电流(有效值) Rated Short Circuit Breaking Current (Effective Value)			
额定短时耐受电流(有效值) Rated Short Time Withstand Current (Effective Value)			
额定短时耐受时间 Rated Short Time Withstand Time		S	4
额定绝缘水平 Rated Insulation Level	额定雷电冲击耐受电压(峰值) Rated Lightning Impulse Withstand Voltage (Peak Value)	相对地、相间 Phase to Ground, and Phase to Phase	185
		隔离断口 Isolating Fracture	215
	1min工频耐压(有效值) 1min Power Frequency Withstand Voltage (Effective Value)	相对地、相间 Phase to Ground, and Phase to Phase	95
		隔离断口 Isolating Fracture	118
辅助控制回路 Auxiliary Control Circuit		额定电压 Rated Voltage	DC : 110、220
		1min工频耐压 1min Power Frequency Withstand Voltage	AC : 110、220
			2000
SF ₆ 气体额定压力(20℃表压) SF ₆ Gas Rated Pressure (Gauge Pressure at 20℃)		MPa	0.04
SF ₆ 气体最高压力(20℃表压) SF ₆ Gas Max. Pressure (Gauge Pressure at 20℃)		MPa	0.06

SF ₆ 气体报警压力(20°C表压) SF ₆ Gas Warning Pressure (Gauge Pressure at 20°C)	MPa	0.02
年漏气率 Annual Gas Leakage Rate		≤0.5%
隔离、接地开关机械寿命 Isolation and Ground Switch Mechanical Service Life	次 Times	2000
外形尺寸(宽×深×高) Overall Dimension (W×D×H)	mm	600×1380×2300
总重量 Gross Weight	T	1.5
防护等级 Ingress Protection	柜体 Cabinet	IP4X IP4X
	气室 Gas Chamber	IP65 IP65

2. 真空断路器主要技术参数 / 2. Vacuum Circuit Breaker Main Technical Parameters

项目 Item	单位 Unit	参数 Parameter
额定电压 Rated Voltage	kV	40.5
额定电流 Rated Current	A	630/1250/1600/2000/2500
额定频率 Rated Frequency	Hz	50
额定绝缘水平 Rated Insulation Level	1min工频耐压(有效值) 1min Power Frequency Withstand Voltage (Effective Value)	kV 95
	雷电冲击耐压(峰值) Lightning Impulse Withstand Voltage (Peak Value)	kV 185
额定短时耐受电流 Rated Short Time Withstand Current	kA	31.5
额定峰值耐受电流 Rated Peak Withstand Current	kA	80
额定短路持续时间 Rated Short Circuit Lasting Time	s	4
额定短路开断电流 Rated Short Circuit Breaking Current	kA	31.5
额定短路关合电流 Rated Short Circuit Making Current	kA	80
额定操作顺序 Rated Operating Sequence		O-0.3s-CO-180s-CO
额定短路开断电流开断次数 Rated Short Circuit Breaking Current Breaking Times	次 Times	20
异相接地故障开断电流 Out-Phase Ground Fault Breaking Current	kA	27.3
额定电缆充电开断电流 Rated Cable Charging Breaking Current	A	50
额定单个电容器组开断电流 Rated Individual Capacitor Bank Breaking Current	A	400

额定背对背电容器组开断电流 Rated Back-to-Back Capacitor Bank Breaking Current	A	400
机械寿命 Mechanical Service Life	次 Times	10000
操动机构类型 Operating Mechanism Type		弹簧操动机构 Spring Operating Mechanism

3. 正常使用条件 / 3. Normal Operating Conditions

使用环境条件 Operating Environment Condition	
使用地点 Operating Place	户内 (无火灾、爆炸危险、无化学腐蚀及剧烈震动的场所) Indoors (Sites Free from Fire/Explosion Hazard, Free from Chemical Corrosion, and Violent Shake)
环境温度 Ambient Temperature	-25°C ~ +40°C
海拔 Altitude	≤3000m
空气湿度 Air Humidity	日平均相对湿度≤95%,月平均相对湿度≤90% Daily Average Relative Humidity≤95%, and Monthly Average Relative Humidity≤90%
二次系统中感应的电磁干扰幅值 Amplitude of Electromagnetic Interference Induced in Secondary System (kV)	≤1.6
地震强度 Earthquake Intensity	>8(水平加速度≤0.4 垂直加速度≤0.2) >8(Horizontal Acceleration≤0.4 Vertical Acceleration≤0.2)

XGN-40.5进出线柜 / XGN-40.5 Inlet/Outlet Wire Cabinet

1. XGN-40.5 进出线柜功能简介 / 1. XGN-40.5 Inlet/Outlet Wire Cabinet Functional Brief Introduction

- XGN-40.5进出线柜由母线室、断路器室、电缆室和仪表室四部分组成，在电力系统正常运行和故障情况下实现控制、测量、监视、通讯功能。
XGN-40.5 inlet/outlet wire cabinet is composed of four parts including bus-bar chamber, circuit breaker chamber, cable chamber, and instrument chamber, to achieve control, measurement, monitor, and communication functions under normal operation and failure conditions of electric power systems.

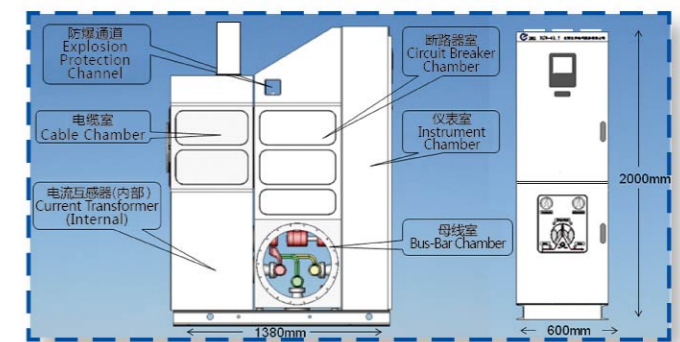


图 2 XGN-40.5 进出线柜整体结构图
Fig 2 XGN-40.5 Inlet/Outlet Wire Cabinet Structure Chart

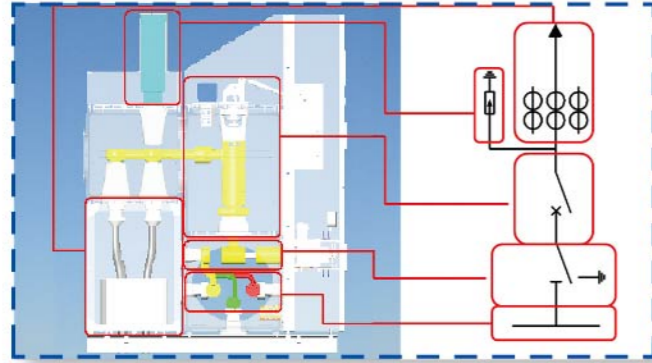


图3 内部结构图及线路对照图
Fig 3 Internal Structure Chart and Circuit Comparison Chart

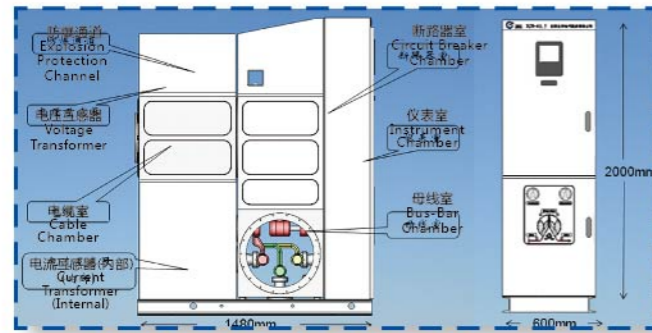


图4 XGN-40.5 进出线柜整体结构图 (内置电压互感器)
Fig 4 Inlet/Outlet Wire Cabinet Overall Structure Chart (Built-in Voltage Transformer)

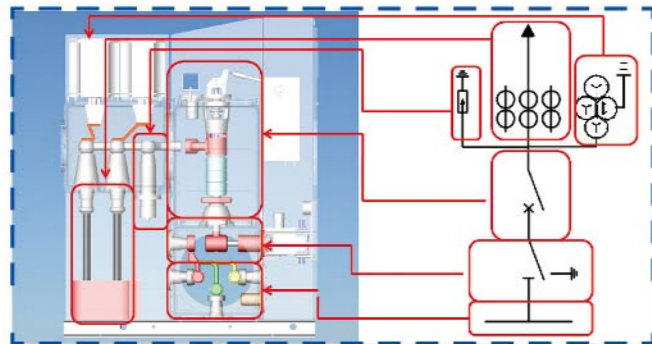


图5 内部结构图及线路对照图 (内置电压互感器)
Fig 5 Internal Structure Chart and Circuit Comparison Chart (Built-in Voltage)

2. 母线室 2. Bus-Bar Chamber

- 母线室为单独气室，由导体、三工位隔离开关、吸附剂装配和充气阀门组成。
Bus-bar chamber is an independent gas chamber, composed of conductor, 3-station isolating switch, adsorbent assembly, and air inflating valve.

- 本产品中母线室、断路器室、电缆室等壳体均为铝合金铸造而成，气密性强、工艺性好，有效地防止了涡流的产生。
The bus-bar chamber, circuit breaker chamber, cable chamber, and other housings in this product are all manufactured through aluminum alloy foundry, typical of strong air tightness and good process, which has effectively prevented generation of eddy current.

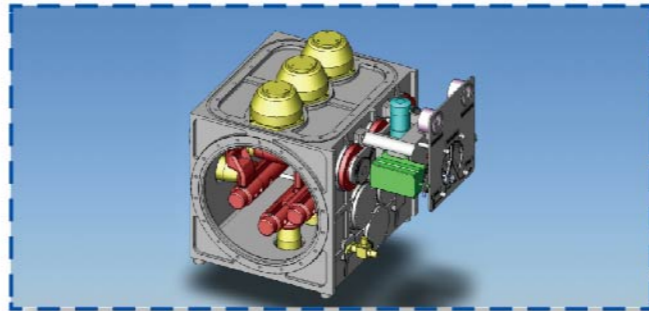


图6 母线室外观图
Fig 6 Bus-Bar Appearance Drawing

- 连通气室拼装方案
Scheme for Joint with Gas Chamber
- 母线室1与母线室2采用过渡母线与过渡筒连接，实现整套充气柜的母线室为同一气室。
Bus-bar chamber 1 and bus-bar chamber 2 are connected by using transition bus bar and transition tube, for the bus-bar chamber of the complete set of inflatable cabinet to be achieved as the same gas chamber.

3. 断路器室 3. Circuit Breaker Chamber

- 断路器室为单独气室，内装有真空断路器，弹簧机构产生的动力通过连杆及拐臂传递到真空断路器，实现开断功能。

The circuit breaker chamber is an independent gas chamber, with vacuum circuit breaker installed inside, and the power generated through spring mechanism is transmitted to the vacuum circuit breaker through connecting rod and curved arm, to achieve the breaking function.

- 相柱顶端装有波纹管，保证了气密性，同时减少了弹簧机构振动对断路器室产生的影响，有效地提高了产品的可靠性。
Corrugated pipe is mounted on the top end of the phase post, which has ensured the air tightness, and at the same time reduced the influence generated by vibration of spring mechanism over circuit breaker chamber, having effectively improved the product reliability.

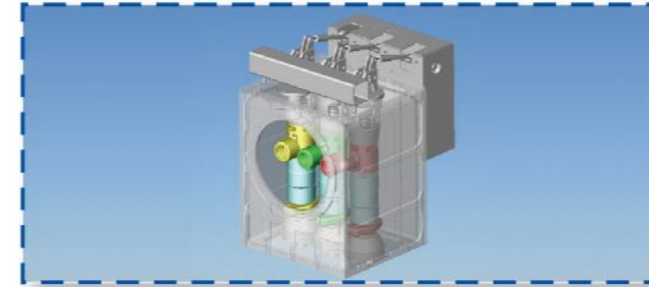


图7 断路器室外观图
Fig 7 Circuit Breaker Chamber Appearance Drawing

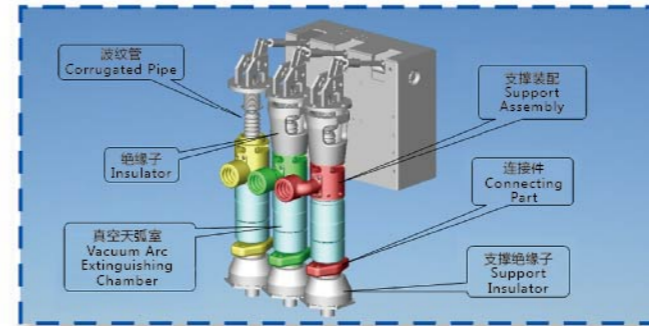


图8 断路器室内部结构
Fig 8 Circuit Breaker Chamber Internal Structure

4. 电缆室 4. Cable Chamber

- 电缆室由避雷器、导体、内锥绝缘子、电流互感器和电缆组成。避雷器可在产品遭受雷电冲击过电压或操作过电压时起到保护作用；电流互感器可实现对主回路电流测量与实时监控功能。

The cable chamber is composed of lightning arrester, conductor, internal conical insulator, current transformer, and cable. Lightning arrester is able to play the protective function when the product is subjected to overvoltage of lightning impulse or during overvoltage operation, while the current transformer is able to achieve the main circuit current measurement and real-time monitoring functions.

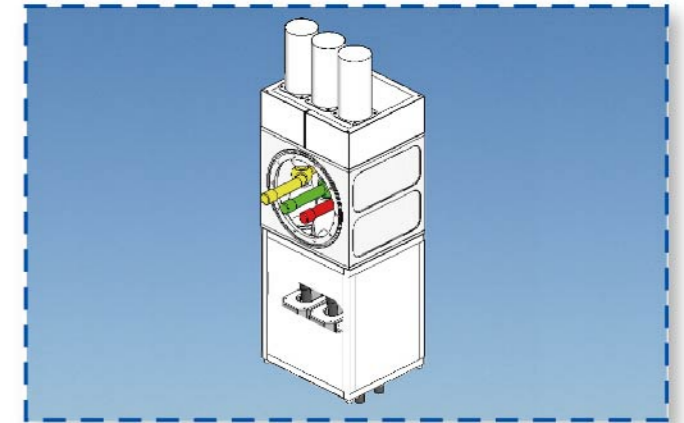


图9 电缆室外观图
Fig 9 Cable Chamber Appearance Drawing

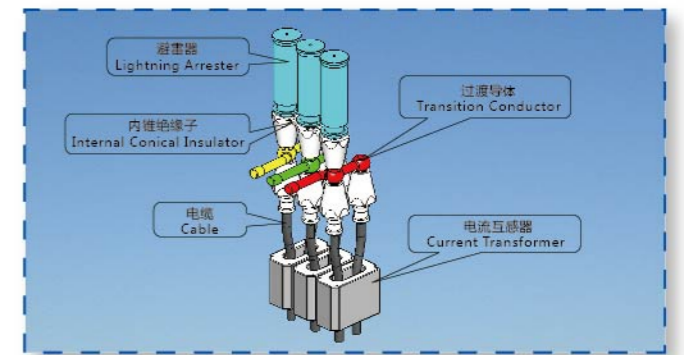


图10 电缆室内部结构图
Fig 10 Cable Chamber Internal Structure Chart

5. 仪表室 5. Instrument Chamber

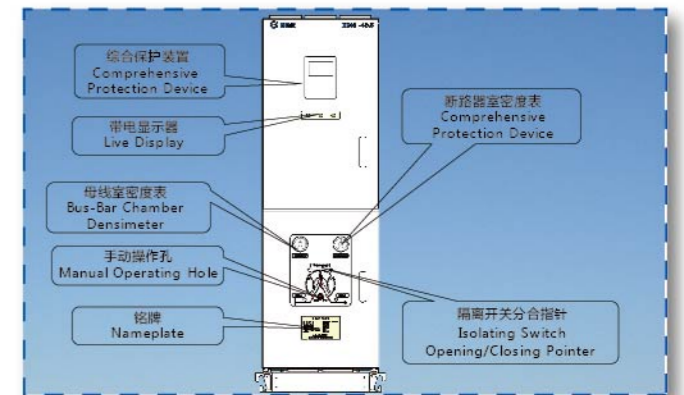


图11 仪表室外观图
Fig 11 Instrument Chamber Appearance Drawing

母线联络柜 / Bus Tie Cabinet

- XGN-40.5母线联络柜在主回路中起到主母线开断联络功能，同时配备电流互感器和两个三工位隔离接地开关。

The XGN-40.5 bus tie cabinet plays the main bus tie breaking function in the main circuit, and at the same time is equipped with current transformer and two 3-station isolating ground switches.

- XGN-40.5母线联络柜由母联断路器柜和母联提升柜两部分组成。母联断路器柜主结构与进出线柜相同，主要功能为开断母线间的联络。母联提升柜不含断路器，在断路器室中由一段导电杆代替，主要功能是将柜体上端电缆室的导体引到下端的母线室中与主母线连接。

The XGN-40.5 bus tie cabinet is composed of two parts including bus tie breaker cabinet and bus tie riser cabinet. The main structure of the bus tie breaker cabinet is the same as the structure of the inlet/outlet wire cabinet, and its main function is to break the tie between bus bars. The bus tie riser cabinet doesn't include circuit breaker, while it is substituted by a section of electric conducting rod in the circuit breaker chamber, and its main function is to lead the conductor in the upper-end cable chamber on the cabinet to the bus-bar chamber on the lower end, to be connected with the main bus bar.

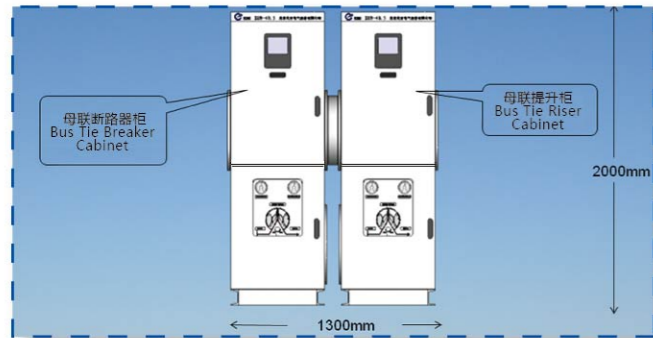


图 12 母线联络柜外观图
Fig 12 Bus Tie Cabinet Appearance Drawing

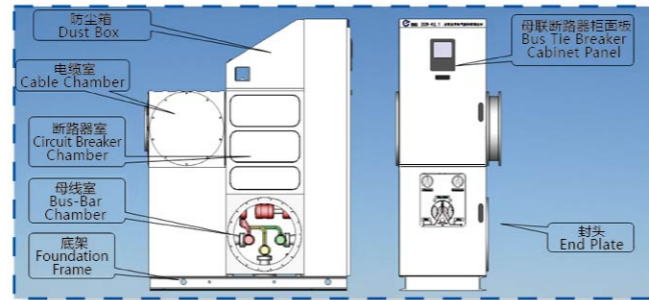


图 13 母联断路器柜外观图
Fig 13 Bus Tie Breaker Cabinet Appearance Drawing

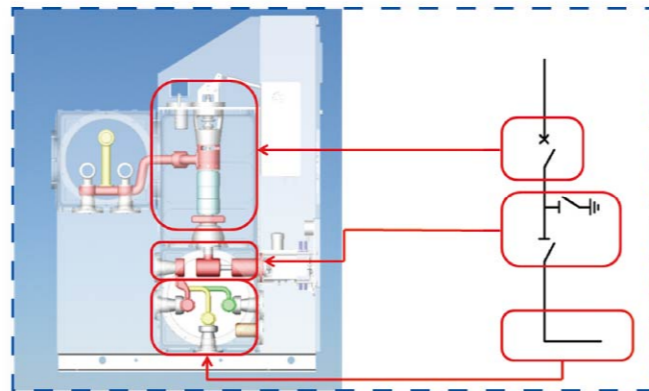


图 14 母联断路器柜与主接线对照图
Fig 14 Bus Tie Breaker Cabinet and Main Electrical Scheme Comparison Chart

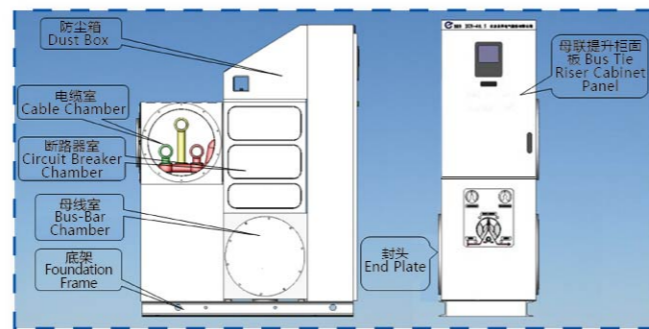


图 15 母联提升柜外观图
Fig 15 Bus Tie Riser Cabinet Appearance Drawing

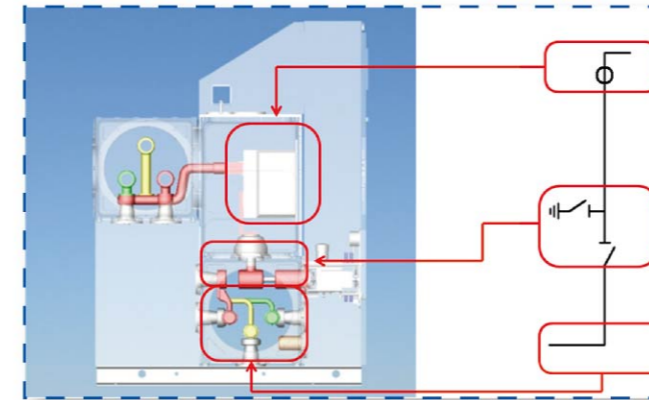


图 16 母联提升柜与主接线对照图
Fig 16 Bus Riser Cabinet and Main Electrical Scheme Comparison Chart

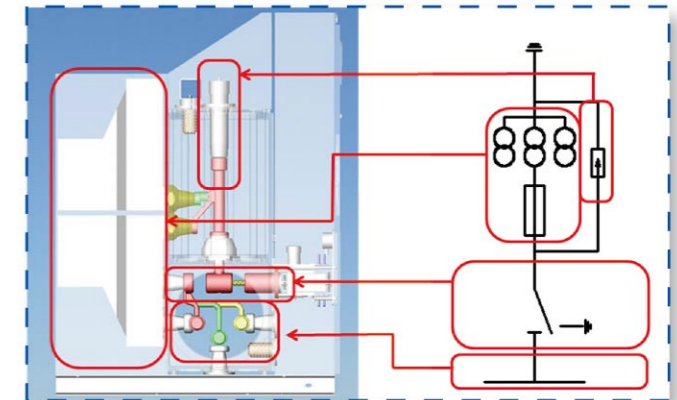


图 18 主要元件剖视图及线路对照图
Fig 18 Main Component Cutaway View and Circuit Comparison Chart

保护柜 / Protection Cabinet

- 保护柜包括三工位隔离开关、电压互感器、避雷器、汇控箱等元件，整体尺寸小，结构更简单，可靠性、安全性更好。电压互感器和避雷器的连接方式采用插接式，方便安装与检修。

The protection cabinet includes three 3-station isolating switches, voltage transformer, lightning arrester, integrated control box, and other components, typical of a small overall dimension, simpler structure, higher reliability, and better safety. Plug-in connection is used as the way for connection of voltage transformer and lightning arrester, to facilitate installation as well as examination and maintenance.

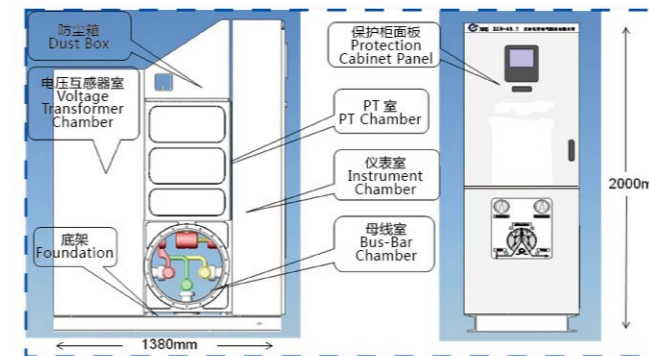


图 17 保护柜外观图
Fig 17 Protection Cabinet Appearance Drawing

安装和调试 / Installation and Adjustment

- 充气柜安装前，首先应检查安装基础是否合格（应符合GB50171的要求）。充气柜平面布置图及安装基础图参见图19、图20。要保证基础构件的安装质量，特别是平面度和直线度公差，应作为确保充气柜高质量安装的先决条件。框架安装的平面度要求为±1mm/m²，直线度允许公差最大1mm/m，框架全长内不超过2mm。

Before inflatable cabinet is installed, it is firstly required to examine whether or not the installation foundation is qualified (to be in compliance with the requirements of GB50171). Refer to Fig 19 and Fig 20 for layout plan and installation foundation drawing of the inflatable cabinet. It is required to ensure the quality for installation of foundation components, especially the tolerances for flatness and straightness shall be taken as the preconditions for high-quality installation of the inflatable cabinet. The flatness for installation of the frame is required to be ±1mm/m², and the allowable tolerance for straightness is maximally 1mm/m, not exceeding 2mm within the entire length of the frame.

- 本型充气柜是系不靠墙安装。
This type of inflatable cabinet is not to be installed against the wall.

- 拆箱后，应首先保管好配套的文件资料，并根据装箱单检查随柜备件、附件是否齐全，并作相关记录，然后检查充气柜有没有明显的损坏。如没有问题，可吊装就位进入安装。

After unpacking, it is firstly required to keep well the attachment documents and data, and examine whether or not the spare parts and accessories attached with the cabinet are complete according to packing list, with relevant records made, before the inflatable cabinet is examined as to whether or not obvious damage exists with it. It can be properly hoisted for installation, if no problem is found.

- 将充气柜端柜按工程图纸要求放置在基础上的端柜位置并用螺栓或焊接方式固定，将O型密封圈放入母线过渡筒两端的密封槽内，找正后将母线过渡筒与充气柜的母线室用螺栓连接并紧固，再将下一面充气柜的母线室找正后与母线过渡筒用螺栓连接并固定，充气柜底部基础槽钢用螺栓或焊接方式固定。其余充气柜按此种方式完成安装。

After unpacking, it is firstly required to keep well the attachment documents and data, and examine whether or not the spare parts and accessories attached with the cabinet are complete according to packing list, with relevant records made, before the inflatable cabinet is examined as to whether or not obvious damage exists with it. It can be properly hoisted for installation, if no problem is found.

- 充气柜按工程图纸并列安装完成后，将各柜间的接地母线连接，将端柜引出的接地母线与现场预设接地网连接。

After cabinets have been installed in parallel, the main ground bus bars between respective cabinets shall be connected together, to be connected with the ground grid prefabricated for the building in a proper place.

- 安装电缆的充气柜，可先打开电缆箱后盖板，将一次电缆通过柜底电缆孔穿出，安装电缆贯穿式电流互感器(如需要)后进行电缆端头的制作及封装，然后取出电缆堵头，将电缆与柜体连接。电缆引入后，安装电缆箱后盖板并在柜底用适量的电力电缆防火泥对柜底进行密封。

As to installation of inflatable cabinet for cables, the cable cover plate on the back bottom of the cabinet may be opened, to take off the rubber jacket. Open proper wire holes on the jacket, according to the size for installation of cables. After cables are led in, mount the jacket properly and set on the cover plate properly.

- 充气柜全部安装好后，将各母线室的吸附剂法兰打开，装入规定量的吸附剂，并将吸附剂法兰封好。对母线室进行抽真空后充入SF₆气体至额定压力0.04MPa(表压)。

After the inflatable cabinet is completely fixed, fit the seal cap of the bus-bar chamber into the seal ring to be properly sealed. Charge the SF₆ insulated gas to the bus-bar chamber up to the rated pressure of 0.04MPa (gauge pressure).

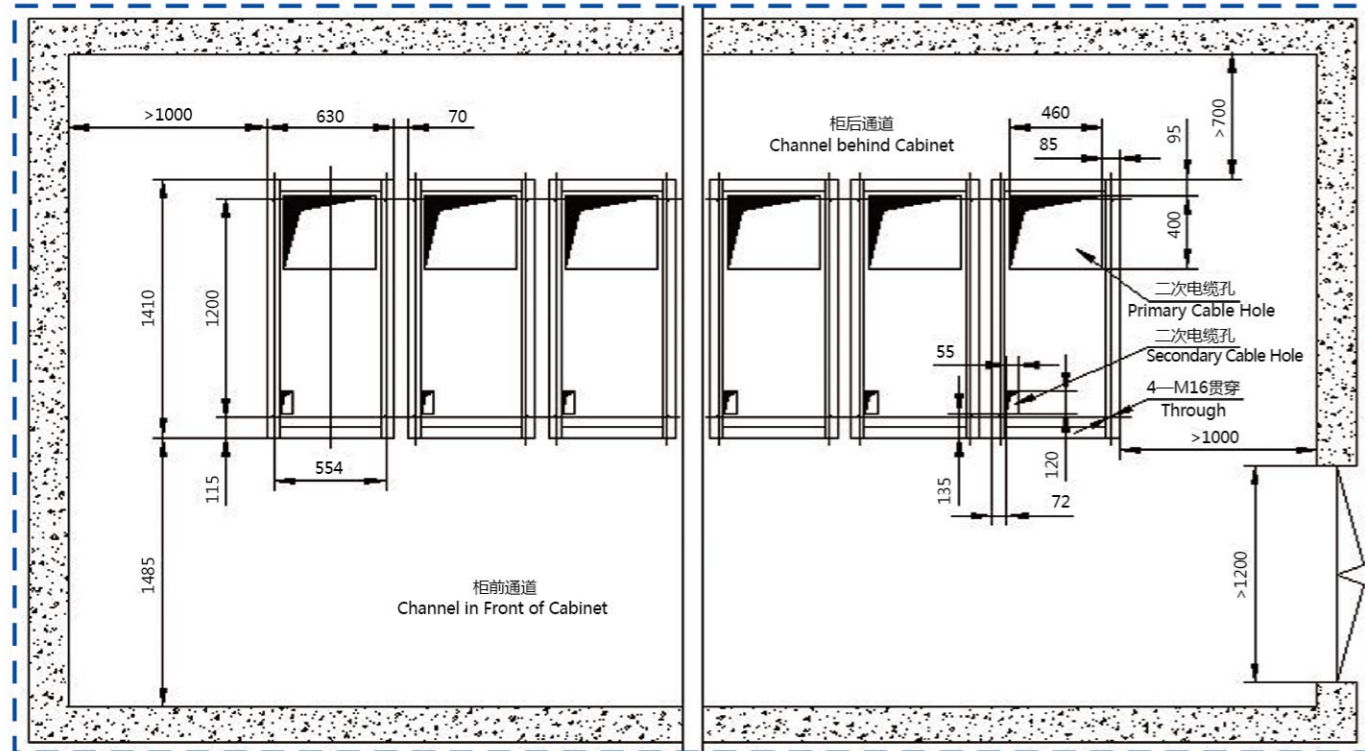


图 19 充气柜平面布置图
Fig 19 Inflation Cabinet Layout Plan

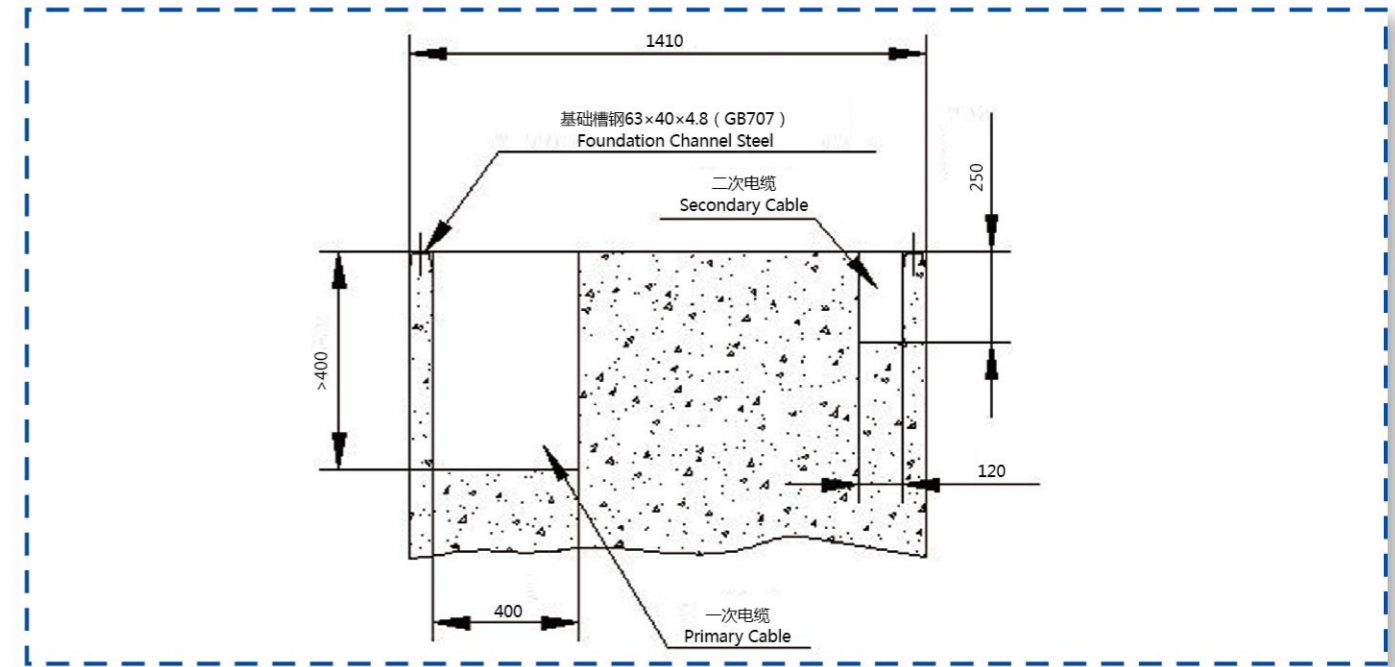


图 20 充气柜安装基础
Fig 20 Inflation Cabinet Installation Foundation

操作和维修 / Operation and Maintenance

- 充气柜在运行中，运行人员除应遵守有关规程外，还应注意以下问题。

During the operation of the inflatable cabinet, the operators shall pay attention to the following issues, in addition to observing related rules.

1. 操作程序

虽然充气柜设计有保证柜内各部分操作程序正确的联锁，但是操作人员对充气柜各部分的投入和退出仍应严格按操作规程和本技术文件的要求进行，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。

1. Operating Procedure

Though correct interlocking for operating procedures of respective parts inside the protection cabinet is ensured with the design of the inflatable cabinet, the operators are still required to strictly follow the requirements of the operating rules and this technical document for launch and exit of respective parts of the inflatable cabinet. Random operation is not allowed, and forced operation is furthermore not allowed without analysis when operation is hindered. Otherwise, it will easily cause equipment damage, and even give rise to accident.

- 2. 维护和检修
- 2. Maintenance and Reconditioning

2.1 维护

- 观察照明、控制和信号电源是否正常供电；
- 记录断路器的动作次数；
- 观察压力表的数值，当低于0.02MPa(表压)时，应及时补气到额定值。

2.1 Maintenance

- Observe whether or not normal power supply is available with illumination, control and signal powers.
- Note down the acting times of circuit breaker.
- Observe the numerical value of the pressure gauge, and when it is lower than 0.02MPa (gauge pressure), it is required to timely fill air to the rated value.

2.2 检修

充气柜的一次高压元件密封在充气隔室中，一般免维护；检修只对二次控制室的二次线及断路器和三工位隔离开关操动机构进行。检修的内容如下：

- 检查闭锁功能，动作正确、可靠；
- 检查断路器、三工位隔离开关的操动机构的情况，并进行必要的调整；

c) 检查各部分紧固件，如有松动，应及时紧固。

2.2 Reconditioning

The primary high-voltage components of the inflatable cabinet are sealed inside the inflation cell, free from maintenance in general. Only the secondary wire as well as the operating mechanisms for circuit breaker and 3-station isolating switches shall be reconditioned, and the reconditioning items are given as follows:

- a) Examine the locking function, for action to be correct and reliable.
- b) Examine the situations for the operating mechanisms of the circuit breaker and the 3-station isolating switch, and make adjustment when necessary.
- c) Examine the fasteners for respective parts, to be timely fastened if any loosening is found.

包装与运输 / Package and Transport

1. 充气柜的包装符合产品包装规范的要求，出口产品的包装应满足出口产品包装技术条件的要求。
2. 充气柜现场安装采用吊运或铲运。搬运时不允许倾斜、倒置和遭受剧烈运动。
3. 充气柜（即使是带有外包装的）不宜长期在户外存放，一般不超过一年。较长时期不用的充气柜，应储存在干燥、通风的户内仓库中。

1. Package of the inflatable cabinet shall comply with the requirements of the product packaging specifications, and the package for export product shall comply with the requirements of the packaging technical conditions for the export products.
2. Swing handling or forklift handling shall be used for site installation of inflatable cabinet. Tilting, inversion, and acute movement are not allowed during handling.
3. It is improper for inflatable cabinet (even if with external package) to be stored outdoors on a long-term basis, not exceeding one year in general. The inflatable cabinet not to be used for a relatively long time shall be stored inside the dry and ventilated indoor warehouse.

产品的成套性 / Product Completeness

- 产品在交货时应具备以下文件和附件：

Following documents and accessories shall be available with the product during delivery:

- a) 产品合格证明书
- b) 安装使用说明书
- c) 装箱单
- d) 产品的工程设计资料（包括系统图，二次接线图，设备明细表等）
- e) 开关柜钥匙、断路器储能摇把、三工位隔离开关操作摇把。
- f) 开关柜内主要元件的安装使用说明书等技术文件和附件。

- a) Certificate for Product Conformity
- b) Installation and Operation Manual
- c) Packing List
- d) Product Engineering Design Data (including System Drawing, Secondary Wiring Diagram, and Equipment List)
- e) Switch Cabinet Key, Circuit Breaker Energy Storage Crank Rocker, and 3-Station Isolating Switch Operation Crank Rocker.
- f) Installation and Operation Manual for Main Components inside Switch Cabinet as well as other Technical Documents and Accessories.

订货须知 / Notices for Order Placement

- 订货时用户应提供下述资料：

The undermentioned data shall be provided by user during order placement:

- a) 主回路接线图，注明各元件的技术参数
 - b) 辅助回路原理图
 - c) 设备表
 - d) 平面布置图
 - e) 其它特殊需要的图纸和资料
- a) Main Circuit Wiring Diagram, with Technical parameters of respective components specified
 - b) Auxiliary Circuit Schematic Diagram
 - c) Equipment List
 - d) Layout Plan
 - e) Other Special Required Drawings and Data

方案图 Scheme Diagram	01	02	03	04	05	06	07	08	09
主接线图 Main Wiring Diagram									
三工位隔离开关 GN-40.5D Three-Station Isolating Switch GN-40.5D	1	1	1	1	1	1	1	1	1
真空断路器 ZN-40.5 Vacuum Circuit Breaker ZN -40.5	1	1	1	1		1			1
电流互感器 KSOHO3608 Current Transformer KSOHO3608	3	2	3	2			3	3	
电压互感器 GBEA36ASLsize2 Voltage Transformer GBEA36ASLsize2					3				
高压熔断器 (PT内置) High Voltage Fuse XRNP-35 (PT Built-in)					3				
避雷器 CY5W - 51 Lightning Arrester CY5W - 51			3	3	3			3	
带电显示装置 Live Display Device	1	1	1	1				1	
额定电流 (A) Rated Current (A)	2000	2000	2000	2000		2000	2000	2000	
用途 Purpose	电缆进 出线 Cable Inlet/ Outlet	电缆进 出线 Cable Inlet/ Outlet	电缆进 出线 Cable Inlet/ Outlet	电缆进 出线 Cable Inlet/ Outlet	PT	联络 Contact	联络 Contact	隔离 Isolation	母线接地 Bus Ground
备注 Remarks									

主回路方案 Main Circuit Scheme

本说明书所涉及的内容，包括文字、图形、参数等，如做任何修改，恕不另行通知！

We will not inform you separately if there are any changes in specifications and data.

注意人身健康与安全，加强环境保护意识，做好包装物及废弃物的处理！

Please dispose the package and castoff in right place to keep the environment clean and safe for everyone.