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RENLE

Professional Manufacturer of
Smart Grid·New Energy·Electric Drive

KYN28A-12 户内交流型

金属铠装中置式开关
Metal Armor Movable Closedown Switch



创芯科技·智惠全球
股票代码：833586



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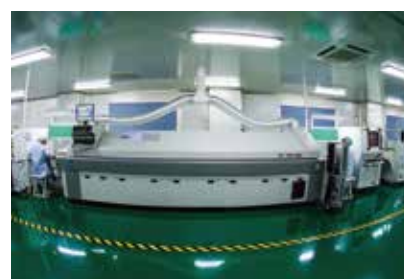


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企业简介 Enterprise Introduction

Shanghai RENLE Science & Technology Co., Ltd is located in the High & New Technology Industrial Park of Jiading District, Shanghai, China. The company covers a total area of 100,000 square meters, including 85,000 square meters of workshops. Its products include HV/LV motor soft starter, HV/ LV frequency inverter, intelligent electricals, new-energy electricals, HV/LV complete equipment for electric power transmission distribution and so on. Its products are widely used in electric power, metallurgy, petroleum chemistry, military industry, mining, chemical industry, construction, light industry, pharmaceuticals, municipal construction, textile printing and dyeing, papermaking, rubber and plastic, electrified railway construction and other industries. Its products sell well in many countries and regions of the world.

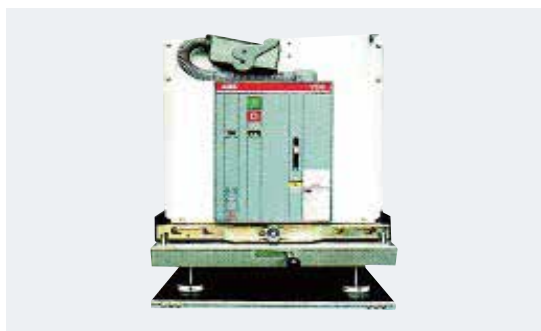
The company products are used in many projects, such as Expo 2010 Shanghai China, 2008 Beijing Olympic Games, Yangshan Deepwater Port Project of Shanghai International Shipping Center, Shanghai Pudong Airport, Shanghai Hongqiao Airport, the Three Gorges Project, Gansu Satellite Launching Center, South-to-North Water Diversion Project, West-to-East Natural Gas Transmission Project, China National Petroleum Corp., SINOPEC, Double Coin Holdings, Shandong Linglong Tyre and other national key supporting projects. Its premium products and excellent after-sales service are favored by the clients.

Renle always lays emphasis on quality control so as to attain perfection. The company has passed the certification of ISO9001 Quality Management System, ISO 14001 Environment System, OHSAS 18001 Occupational Health and Safety Management System, CE, TUV, GOST and national CCC etc. RENLE has been continuously introducing internationally advanced production and test equipment to establish laboratories and provide R&D experiment base to domestic universities and colleges. The company, paying much attention to independent innovation, has established powerful new product R&D technical center.

The company shall keep developing products of energy-saving, efficiency, precision and humane. With the specialized and unique control technology, advanced and applicable innovative products, and deep-integrated solutions, the company helps clients in realizing economic transformation, industry upgrading and speedy internalization. With its high-qualified products, the company aims to be the world-renowned specialized manufacture of intelligent electrical equipment.

户内交流型 金属铠装中置式开关

Indoor Communication Type Metal Armor Movable Closedown Switch



配ABB公司VD4型 户内真空断路器



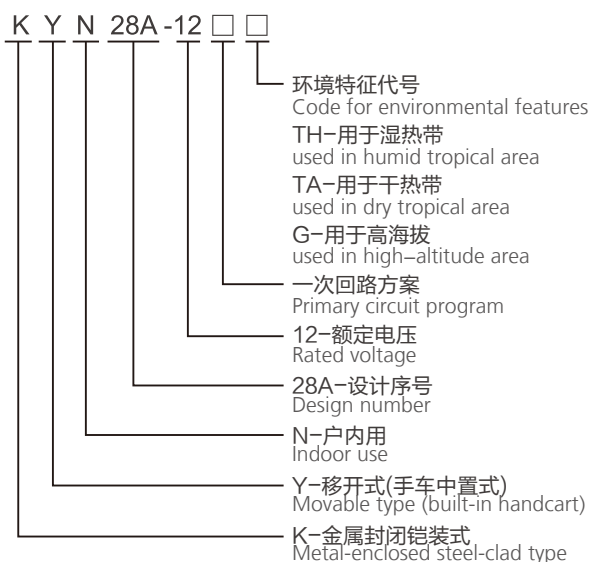
VS1型户内真空断路器

► 产品概述 Introduction

KYN28A-12系列户内金属铠装中置移开式开关设备系三相交流50Hz单母线分段系统或双母线分段系统的户内成套配电装置。用于接受和分配3—12kV的网络电能，并对电力电路实行控制保护、监视和测量。本产品符合GB3906《3~35kV交流金属封闭开关设备》、GB11022《高压开关设备通用技术条件》，同时满足IEC298《额定电压1kV~50kV交流金属封闭开关设备和控制设备》标准。

KYN28-12 metal armor movable closedown switch device is the indoor electric apparatus with three-phase 50Hz single main line subsection system or double main line subsection system. The device is for receiving and distributing 3.6V-12kV network electric power, and control, protect, monitor and measure the power circuit. The products are all in accordance with the GB3906 Alternating-current Metal-enclosed Switchgear and Controlgear for Rated Voltages above 3 kV and up to and including 35kV, the GB11022 Common Specifications for High-voltage Switchgear and Controlgear Standards and the IEC298A.C. Metal-enclosed Switchgear and Controlgear for Rated Voltages above 1 kV and up to and including 50 kV.

► 型号及其含义 Type & Meanings



► 使用环境温度 Ambient Temperature

- 环境温度：最高温度 + 40℃最低温度 - 25℃；
Environment temperature: the highest temperature is +40℃ and the lowest temperature is -25℃;
- 环境湿度：日平均相对湿度 ≤ 95%；月平均相对湿度 ≤ 90%；
Environment humidity: daily average humidity shall be no more than 95%; and the monthly average humidity shall be no more than 90%;
- 海拔高度：1000m以下；
Altitude: below 1000m;
- 抗地震度：地震烈度不超过8度。
Degree of earthquake resistance: earthquake intensity shall not be over 8 degree.
- 周围空气应不含腐蚀性或可燃气体、水蒸气等明显污染。
There shall be no corrosive or combustible gas, vapor and other contaminations in the surrounding air.
- 无严重污秽及经常性的剧烈振动，严酷条件下严酷度设计满足1类要求；
No severe pollution or frequent vibration, the severe degree under dire condition shall be designed to meet the Class 1 requirements;
- 在超过GB3906规定的正常的环境条件下使用时，由用户和制造厂协商。
When used in the normal environment stipulated in the GB3906 regulation, the user shall negotiate with the manufacturer.

注：1、相对湿度大于70%时应接通电加热器。
Note: 1. Heater shall be turned on when the relative humidity is over 70%.

- 2、凡海拔高度超过1000m的地方，按JB/Z102—71规定处理。
2.Places with a altitude of over 1000m, it shall be dealt with according to the JB/Z102-71 regulation.

► 技术参数 Technical Parameters

► 开关设备技术参数 Technical parameters of switchgear

表1 Sheet 1

项目 Project	单位 Unit	参数 Parameters			
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 for circuit breaker	A	630、1250、1600、2000、2500、3150			
开关柜额定电流 Rated current for switchgear	A	630、1250、1600、2000、2500、3150			
额定热稳定电流 (4s) Rated thermal stability current	kA	25、31.5、40、50			
额定动稳定电流 (峰值) Rated dynamic stable current (peak value)	kA	50、63、80、100、130			
额定短路开断电流 Rated short circuit breaking current	kA	20、25、31.5、40、50			
额定短路关合电流 (峰值) Rated short-circuit making current (peak value)	kA	50、63、80、100、130			
额定绝缘水平 Rated insulation level	1min工频耐受电压 Power frequency withstand voltage for 1 min	kV	24	32	42
	雷电冲击耐受电压 Lightning impulse withstand voltage	kV	40	60	75
防护等级 Protection level	外壳为IP4X, 隔室间、断路器室门打开时为IP2X The shell is IP4X, and IP2X when doors of compartment and circuit breaker room open.				

► VD4、VS1-12真空断路器技术参数 Technical parameters of circuit breaker

表2 Sheet 2

项目 Project	单位 Unit	参数 Parameters
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 for circuit breaker	A	630、1250、1600、2000、2500、3150
额定热稳定电流(4s) Rated thermal stability current	kA	20、25、31.5、40、50
额定动稳定电流(峰值) Rated dynamic stable current (peak value)	kA	50、63、80、100、130
额定短路开断电流 Rated short circuit breaking current	kA	20、25、31.5、40、50
额定短路关合电流(峰值) Rated short-circuit making current (peak value)	kA	50、63、80、100、130
额定绝缘水平 Rated insulation level	1min工频耐受电压 Power frequency withstand voltage for 1 min	kV 42
	雷电冲击耐受电压 Lightning impulse withstand voltage	kV 75
额定操作顺序 Standard operation		分-0.3s-合分-180s-合分 Off-0.3s-On-off-180s-On-off
额定短路开断电流开断次数 Rated breaking times during short circuit	次 time	50
机械寿命 Service life		VD4: 20000 V : S1 10000

► VD4、VS1真空断路器机械特性 Mechanical features of the VD4 and VS1vacuum breaker

表3 Sheet 3

名称 Name	单位 Unit	数值 Value	
触头开距 Clearance between open contacts	mm	11 ± 1	
超行程 Over stroke		4 ± 0.5	
相间中心距离 Interphase center distance		210 ± 0.5, 250 ± 0.5, 275 ± 0.5	
合闸触头弹跳时间 Bounce time of contact in switch-on	ms	2	
三相分闸不同期性 Asynchronism of triphase switch-off		2	
分闸时间当操作电压为 The voltage for switch-off		最高 Max	50
		额定 Rated	50
		最低 Min	60
合闸时间 Switch-on time		75	
平均合闸速度 Average switch-on rate	m/s	0.9~1.2	
平均分闸速度 Average switch-off rate		0.6~0.8	
各相导电回路受阻 Blocked circuit in various phases	μ	40	
触头压力 Contact pressure	N	3200 ± 100	

当断路器用于控制3~10kV电动机时,若启动电流小于600A,必须加金属氧化物避雷器,其具体要求由用户与制造厂联系协商;当断路器用于开断电容器组时,电容器组的额定电流不应大于断路器额定电流的80%。

In controlling the 3~10kV motor, the start-up current of the circuit breaker is less than 600A, it is necessary to add a metal zinc-oxide arrester. The detailed requirements of the arrester shall be decided after the negotiation between the user and the manufacturer. When the circuit breaker is used for breaking the capacitors group, the rated current of the capacitors shall not be larger than 80% of the rated ones.

► VD4、VS1-12真空断路器技术参数 Technical parameters of the VD4 and VS1 vacuum breaker

表4 Sheet 4

名称 Name		单位 Unit	数值 Value
额定操作电压 Rated operation voltage	合闸线圈 Close coil	V	DC220, 110, AC220, 110
	分闸线圈 Open coil	V	AC220, 110, DC220, 110
线圈功率 Coil power	合闸线圈 Close coil	W	245
	分闸线圈 Open coil	W	245
储能电机功率 Energy storage motor power		W	50
储能电机额定电压 Rated voltage for energy storage motor		V	DC220, 110, AC220, 110
储能时间 Storage time		S	10

► 结构特点 Structure & Features

开关设备按GB3906-2013中的铠装金属封闭开关设备而设计。整体是由柜体和中置式可抽出部件〔即手车〕大部分组成（见图1）。柜体分四个单独的隔室，外壳防护等级为IP4X,各小室间和断路器室门打开时防护等级为IP2X。具有架空进出线、电缆进出线及其它功能方案，经排列、组合后形成一套完整的配电系统装置。本开关设备可以从正面进行安装、调试和维护，因此它可以背靠背、组成双重排列和靠墙安装，提高了开关设备的安全性、灵活性、减少了占地面积。

The switch equipment is designed according to the armored metal closed switch equipment in the GB3906-2013. The whole equipment is made up of the cabinet body and the movable parts (i.e. handcart) (see figure 1). The cabinet is divided into four separate compartments. Its protection level of the shell is IP4X; the protection level of each compartment and circuit breaker room with an open door is IP2X. A whole complete distribution system device is formed after arrangement and combination of overhead incoming and outgoing lines, cable incoming and outgoing lines and other functional programs. The switchgear can be installed, tested and maintained from the front, and it can be installed back-to-back to form a double arrangement, and against the wall, which improves the safety, flexibility and reduces the floor area of the switchgear.

外壳及其它 Shell & Others

开关设备的主柜架是选用进口敷铝锌薄钢板，经CNC机床加工，并采取多重折边工艺。使整个柜体不仅具有精度高、很强的抗腐蚀与抗氧化作用的优点，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。柜体采用组装结构，用铆螺母和高强度的螺栓联接而成，这样使加工生产周期短、零部件通用性强、占地面积少，便于组织生产。

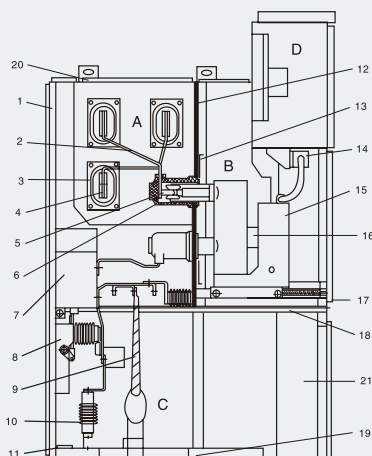
The main cabinet of the switchgear is made of imported aluminum and zinc coated steel sheet, treated after the CNC machine tools and multiple folding process, enabling the whole cabinet body have high precision and resist to corrosion and oxidation, and be lighter, more mechanical and beautiful than others of the same kind. The cabinet body is assembled in structure with rivet nuts and high-strength bolts, which makes the production cycle shorter, the accessories be universal, products occupy lesser floor area and easy to be organized and produced.

手车 Handcart

手车骨架也采用薄钢经CNC机床加工后组装而成。手车与柜体绝缘配合，机械联锁安全、可靠、灵活。根据用途不同，手车分断路器手车、电压互感器手车、计量手车、隔离手车。各类手车按模数，积木式变化，同规格手车可以百分之百自由互换。手车在柜体内有断开位置、试验位置和工作位置，每一位置都分别有定位装置，以保证联锁可靠，心须按联锁防误操作程序进行操作。各种手车均采用螺母、丝杆摇动推进、退出，其操作轻便、灵活，适合于各种值班人员操作。手车当需要移开柜体时，用一辆专用转运车，就可以方便抽出，进行各种检查、维护；由于采用中置式，整个小车体积小，检查、维护都极方便。

The frame of the handcart is also made of thin steel after the CNC machine tools assembly. The handcart matches with the cabinet body insulation. The mechanical interlocking is safe, reliable, and flexible in function. According to different uses, the handcart is divided into circuit breaker handcart, voltage transformer handcart, metering handcart and isolation handcart. The handcarts of same specification can be interchangeable. The handcart has three positions for disconnection, test and working inside the cabinet. Each position is installed with a positioning device respectively to ensure reliable interlocking and programmed operation.

All the handcarts are pulled by the nuts and stick, which is easy and flexible to operate by all kinds of people on duty. In case of removing from the cabinet body for all kinds of checks and maintenance, the handcart can be freed by a special transport car. The whole car is small in size, easy to conduct inspection and maintenance due to being removable type.



- | | |
|--|--|
| A 母线室 Bus room | 10 避雷器 Arrester |
| B 断路器手车室 Circuit breaker handcart room | 11 接地主母线 Main grounding busbar |
| C 电缆室 Cable room | 12 装卸式隔板 Removable partition |
| D 继电器仪表室 Relay meter room | 13 隔板 (活门) Partition (valve) |
| 1 外壳 Shell | 14 二次插头 Secondary plug |
| 2 分支母线 Branch busbar | 15 断路器手车 Circuit breaker handcart |
| 3 母线套管 Busbar bushing | 16 加热装置 Heating device |
| 4 主母线 Main busbar | 17 可抽出式水平隔板 Drawn-out horizontal partition |
| 5 静触头盒 Static contact box | 18 接地开关操作机构 Controlling gear of grounding switch |
| 6 静触头 Static contact | 19 二次线槽 Secondary wire |
| 7 电流互感器 Current transformer | 20 泄压装置 Pressure-relief device |
| 8 接地开关 Grounding switch | |
| 9 电缆 Cable | |

图1 开关设备结构示意图

Figure 1: Structure Diagram of the Switch Equipment

► 隔室 Compartment

开关设备主要电气元件都有其独立的隔室，即：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至IP2X；除及继电器室外，其它三隔室都分别有其泄压通道。由于采用了中置式形式，电缆室空间大大增加，因此设备可接多路电缆。

抽出式断路器移开后，断路器隔室内的静触头被金属活门遮蔽，断路器隔室被保护。

Main electrical components of the switchgear have their own compartment, namely, circuit breaker handcart room, bus room, cable room, relay meter room. The protection level of each compartment reaches IP2X. Apart from the outdoor relay, the other three compartments have their own channels for pressure relief. The space of the cable room is greatly increased for wiring with more cables because of adopting the movable type in structure.

After removing the draw-out circuit breaker, the static contacts in the circuit breaker compartment are shielded by metal valves, and the circuit breaker compartment shall be protected.



► 断路器隔室 Circuit Breaker Room

隔室两侧安装了轨道，供手车15在柜内由断开位置、试验位置移动滑行至工作位置。静触头盒6的隔板13〔活门〕安装在手车室的后壁后。当手车从断开位置、试验位置移动到工作位置过程中，上、下静触头盒上的活门与手车联动，同时自动打开；当反方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，形成有效隔离。由于上、下活门可分别操作，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，通过中门观察窗，可以观察室内手车所处合、分闸位置及显示储能状况。

Tracks are installed on both sides of the compartment for the handcart 15 sliding from the positions disconnection and test to position working inside the cabinet. The partition 13 (valve) of the static contact box 6 is installed behind the rear of the handcart compartment. When the handcart moves from the positions disconnection and test to the position working, the valves on the upper and lower static contact box connect with the handcart and open automatically at the same time; When moving in the opposite direction, the valve will automatically close until the handcart retreat to a certain position and completely covers the static contact box, forming an effective isolation. Since the upper and lower valves can be operated separately, the valves on the live side can be locked during maintenance, so as to ensure that the maintainer do not touch the live body. When the door of circuit breaker room is closed, the handcart can also be operated. By observing the window in the middle door, positions of opening and closing and the status of energy storage can be seen.



在断路器隔室内，打开金属活门检查静触头
Open the metal valve to check the static contacts inside the circuit breaker room

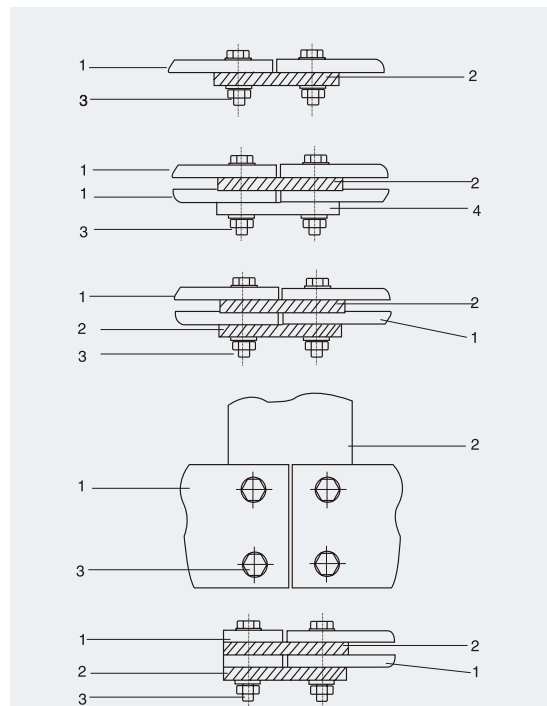
► 母线隔室 Bus Room

主母线4是单台拼接相互贯穿联接〔见图2〕。通过支母线2和静触头盒固定。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根母排拼成。支母线通过螺栓联接于静触头盒6和主母线，不需要其他支撑。对于特殊需要，母线可用热缩套管和联接螺栓绝缘套和端帽覆盖，相邻柜母线用套管3固定。这样联接母线间所保留的空气缓冲，在如果出现内部故障电弧时，能防止其熔化，套管3能有效把事故限制在本柜内而不向其它柜蔓延。

The main busbar 4 is a single entity by joining and interconnecting. (See the Figure 2). It is fixed through the busbar 2 and the static contact box. The main busbar and the connecting busbar are copper rows with rectangular section. Two rows of busbars shall be adopted for the large current load. The branch busbar connects with the static contact box 6 and main busbar through bolts with no needs of other supports. For special needs, the busbar can be covered with heat-shrinkable bushing, connecting bolt insulator sleeve and end cap. For those in the neighboring cabinets, they shall be fastened by bushing 3. In this way, the air buffer reserved between the connecting busbars can prevent the arc from melting if there is an internal fault, and bushing 3 can effectively limit the size of damage inside the cabinet without affecting other cabinet.

► 电缆隔室 Cable Room

开关设备采牛中置式，因而电缆室空间较大。电流互感器7、接地开关8装在隔室后壁上，避雷器10安装于隔室后下部。将手车15和可抽出式水平隔板17移开后，施工人员就能从下面讲入柜内安装和维护。电缆室内的电缆连接导体，每相可并1~3根单芯电缆。必要时每相可并接6根单芯电缆，联接电缆的柜底配制开的可卸式非金属封板或不导磁金属封板，确保了施工方便。



1.主母线 2.分支小母线 3.螺栓 4.垫块
1.Main busbar 2.Small busbar 3.Bolt 4.Pad

图2 母线与支母线的联接形式

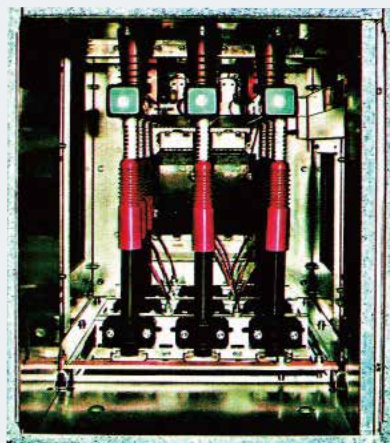
Fig.2 The connection way of the busbar and its branches

Switch equipment has larger cable room as the movable type. The current transformer 7 and grounding switch 8 are installed on the back wall of the compartment, and the arrester 10 is installed on the lower part of the rear compartment. After removing the handcart 15 and the drawn-out horizontal partition 17, the worker can install and maintain through the access below inside the cabinet. The cables in the cable room connect with conductors, and each phase can be connected with 1~3 single-core cables. When necessary, each phase can be connected with 6 single-core cables. The removable non-metal sealing plate or non-magnetic metal sealing plate equipped on the cabinet bottom of the connecting cable ensures convenient construction.

► 继电器仪表室 Relay meter room

继电器仪表室可安装继电保护元件、仪表、带电监察指示器，以及特殊要求的二次设备。控制线路敷设在足够空间的线槽内，并有金属盖板，可使二次线与高压室隔离。其左侧线是为控制小线的引进和引出预留的，开关柜自身内部的小线敷设在右侧。在继电器仪表室的顶板上还留有便于施工的小母线穿越孔。接线时，仪表室顶盖板可供翻转，便于小线的安装。

Relay meter room can be installed with relay protection components, meters, live monitoring indicators and special secondary equipment of special needs. The control line is laid inside a slot with enough space and covered with a metal cover to isolate the secondary line from the high voltage room. The left side line is reserved for controlling the installation of the small line, and the small line inside the switch cabinet itself is laid on the right side. The roof of the relay instrument room is also provided with a small hole for the small busbar, which benefits the construction. The top cover plate of the instrument room can be flipped to facilitate the wiring of small wires.



有三根电缆并接的电缆终端隔室
Terminal cable room connected with three cables in parallel

► 防止误操作联锁装置 Interlocking Device

开关设备内装有安全可靠的联锁装置，完全满足“无防”的要求。

a 仪表室门上装有提示性的按钮或者kk型转换开关，以防止误合、误分断路器。

b 断路器手车在试验或工作位置时，断路器才能进行合分操作，而且在断路器合闸后，手车无法移动，防止了带负荷推拉断路器。

c 仅当接地开关处在分闸位置时，断路器手车才能从断开、试验位置移到工作位置。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置)。这样实现了防止带电误合接地开关，同时防止了接地开关处在的合位置时合断路器。

d 接地开关处于分闸位置时，下门及后门都无法打开，防止了误入带电间隔。

e 断路器手车确实在试验或工作位置，而没有控制电压时，仅能手动分闸，不能合闸。

f 断路器手车在工作位置时，二次插头被锁定不能拔除。

g 柜体可装有电气联锁。

本开关设备还可以在接地开关操作机构上加装电磁锁定装置以提高可靠性，其订货按用户的需求选择。

The safe and reliable interlocking device installed in the switch equipment completely satisfies the requirements of No Protection.

The door of the meter room is installed with instructive button or kk changeover switch to prevent misoperation of the circuit breaker.

The circuit breaker can only be opened or closed at the test or working positions. After the circuit close, the handcart is unable to move for the prevention of pulling under load statue.

The circuit breaker handcart can only be moved into the working position when the grounding switch is in the open position. The grounding switch can only be closed when the handcart is in the positions of test and disconnection. Thus, we can prevent closing grounding switch during power, and closing circuit breaker when the grounding switch is in close position.

The doors in below and rear are unable to be open when the grounding device is in the close position to prevent accidental intrusion into the live compartment.

The switch can be manually closed only when the circuit breaker handcart is confirmed to be in the test or working position with no controlling voltage.

The secondary plug is clocked when the circuit breaker handcart is in the working position.

The cabinet body can be installed with electric interlocking.

This switch equipment can also be added with electromagnet locking device on the grounding switch to improve its reliability according to the user's demands.

► 泄压装置 Pressure-relief device

在断路器手车室，母线室和电缆室的上方均设有泄压装置，当断路器或母线发生内部故障电弧时，伴随电弧的出现，开关柜内部气压升高，装在门上的特殊密封圈把前面封闭起来，顶部装备的泄压金属板将被自动打开，释放压力和排泄气体，以确保操作人员 and 开关柜的安全。

Pressure-relief devices are designed on the top of the circuit breaker handcart room, busbar room and cable room. The pressure inside the switch cabinet increases along with the electric arc caused by faulted circuit breaker or busbar, and the special seal ring installed on the door closes, and then the metal plate for pressure-relief of the top device shall be opened automatically to release the pressure and gas, making sure the safeties of the operator and switch cabinet.

► 二次插头与手车的位置联锁 Position interlocking of secondary plug and handcart

开关设备上的二次线与断路器手车的二次线的联络是通过手动二次航空插头来实现的。二次插头的动触头通过一个尼龙波纹伸缩管与断路器手车相联，二次静触头座装在开关柜手车室的右上方。断路器手车只有在试验、断开位置时。才能插上和解除二次插头，断路器手车处于工作位置时由于机械联锁作用，二次插头被锁定，不能被解除。由于断路器手车的合闸机构吸电磁铁锁，断路器手车在二次插头未接涌之前仅能进行分闸，而无法使其合闸。

The secondary wiring between the switch equipment and circuit breaker handcart is realized through the manual secondary aviation plug. The moving contact of the secondary plug links with circuit breaker handcart through one nylon corrugated expansion tube. The secondary static contact, installed on the right top of the handcart room of the switch cabinet, gets plugged-in or unplugged from the secondary plug only when the circuit breaker handcart is in the test and disconnection positions. When the circuit breaker handcart is in the position of working, the secondary plug is lockdown. Due to the electromagnetic iron lock, the circuit breaker handcart can only be open before the secondary plug gets connected.

► 带电显示装置 Live display device

如果用户有需求时，开关柜内可设有检测一次回路运行的可选件即带电显示装置。该装置由高压传感器和可携带式显示器两单元组成，经户外接导线连接为一体。该装置不但可以提示高压回路通电状况，而且还可以与电磁锁配合。实现强制闭锁接地开关手柄、网门，达到防止带电关合接地开关、防止误入带电间隔，从而提高配套产品的防误性能。

The live display device, an optional component for the operation test of primary loop inside the switch cabinet, shall be installed according to the user. This device is comprised of two units, high-voltage sensor and portable displayer, which can be connect into one entity by the outdoor conductive lines. This device displays not only the power statues in the high voltage loop, but also can realize forced lockdown with switch handle and net door by the combination of electromagnetic lock, preventing misoperation of grounding device during power, entering the live compartment, and improving the device performance.

► 防止凝露和腐蚀 Anti-condensation and anti-corrosion

为了防止在高湿度或温度变化较大的气候环境中产生凝露带来之危险，在断路器和电缆室内分别装设加热器，以便在上述环境中使用和防止腐蚀发生。

To avoid the danger rising from condensation in the humid environment, a heater shall be separately installed inside the circuit breaker room and cable room.

► 接地装置 Grounding device

在电缆室内单独设立有5*40mm²的接地铜排能贯穿相邻的开关柜，并与柜体良好接触。此接地排供直接接地之元器件使用。同时由于整个柜体用敷铝锌板相拼联，这样使整个柜体都处在良好接地状态之中，确保运行操作人员触及柜体安全。

A separate grounding copper bar is installed in the cable room to run through the neighboring switch cabinet, and get well connected with the cabinet body. This grounding bar is for the use of parts in direct grounding. Meanwhile, the whole cabinet body is assembled and connected with the Al-Zn-plated steel sheet to achieve well grounding and ensure the safeties of the operator and cabinet body.

► 开关设备外形尺寸见图3、表5 See the Figure 3 and Table 5 for the dimension of switch equipment

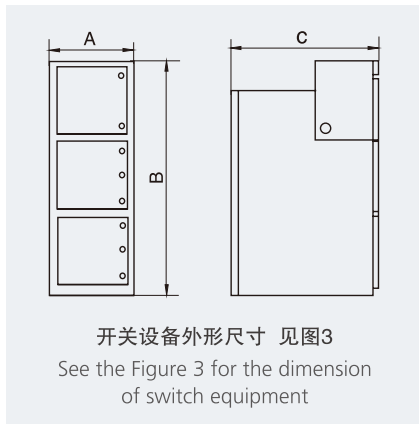


表 Table 5

单位 Unit: (mm)

高度 Height B		2370
宽度 Width A	分支母线额定电流达到1250A及以上，热稳定电流40kA The rated current of the branch busbar reaches 1250A, and thermal stability current reaches 40kA	800
	分支母线额定电流达到1600A及以上 The rated current of the branch busbar reaches 1600A	1000
深度 Depth C	电缆进出线 Cable incoming line	1500
	架空进出线 Overhead incoming line	1660

► 开关设备安装和调试 Installation and test of switch equipment

► 开关设备地基尺寸见表6、图4

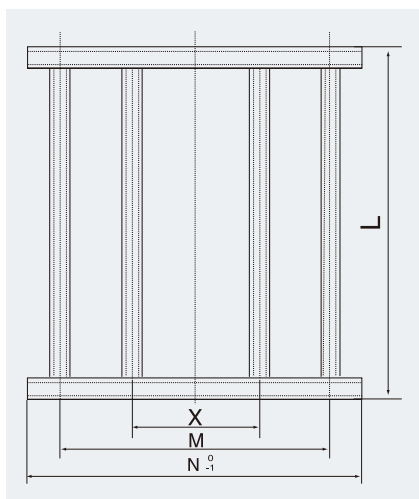
Foundation size of the switch cabinet shall be seen in the Table 6 and Fig. 4

► 开关设备的安装基础尺寸与安装尺寸（见图5、图6、表7、表8）

The installation size of the switch equipment shall be seen in the Figures 5 and 6, Tables 7 and 8;

(mm)表 Table 6

柜宽A Cabinet width A	柜深B Cabinet Depth B	M	N	L	X
800	1500电缆 Cable	630	800	1450	
800	1660架空 Overhead	630	800	1610	
1000	1500电缆 Cable	830	1000	1450	
1000	1660架空 Overhead	830	1000	1610	



开关设备地基安装图 见图4

Please seen the Fig. 4 for the foundation installation diagram of the switch equipment

(mm)表 Table 7

柜深 Cabinet Depth	L
1500	1450
1660	1610

(mm)表 Table 8

柜宽A Cabinet width A	柜深B Cabinet Depth B	L1	L2	L3
800	1500电缆 Cable	530	630	470
	1660架空 Overhead			630
1000	1500电缆 Cable	730	830	470
	1660架空 Overhead			630

► 开关设备安装和调试 Installation and test of switch equipment

a 柜体单列时，柜前操作走廊以2.5米为宜，双列布置时，柜间操作走廊以3米为宜。

It is advisable to choose the 2.5 meter corridor before cabinet In double row arrangement, the operation corridor between cabinets shall be 3 meters for advice.

b 按工程需要与纸标明，将开关柜运至它们特定的位置，如果一排较长的开关柜排列为(10台以上)，拼柜工作应从中间部位开始。

The switch cabinets shall be delivered to a certain place according to the project needs and paper design. If there are more than 10 cabinets in one row, it is suggested to assemble the cabinet from the middle.

c 开关设备在运输过程时，应使用特定的运输工，如吊车或叉车，严禁使用滚筒撬棍；且严禁将断路器手车推入柜体一起搬运。断路器手车(以及其它手车)只有在柜体安装好以后在推入相应小室。

Specific transportation tools, such as crane or forklift, shall be used for delivery of the switch equipment. It is forbidden to use roller or crowbar. It is strictly forbidden to push the circuit breaker handcart inside the cabinet body for packaged delivery. The circuit breaker handcart and other handcarts can be pushed into the small chamber only after packing the cabinet body.

d 松开母线室前面松开固定螺栓，卸去顶盖。

Get ride of the top cover by loosening the bolts in the front of busbar room.

e 在母线室前门松开固定螺栓，卸下装知式隔板12

Disassemble the clapboard 12 by loosening the bolts in the front door of the busbar room

f 松开断路器手车室下面的可抽出式水平隔板17的固定螺栓，并将水平隔板卸下。

Loose and disassemble the draw-out horizontal clapboard 17 beneath the circuit breaker handcart.

g 松开和移去电缆盖板20

Loosen and remove the cable cover plate 20

h 从开关设备左侧制小线槽移去盖板。右前方控制线槽盖板亦同时卸下。

Remove the cover plate from the small groove on the left side of the switchgear. The cover plate in the groove of the right front is also removed.

i 卸下吊装板及紧固件。

Unload the hoisting plate and fastenings.

j 在此基础上，一个接一个地安装开关柜，包括水平和垂直两方面，开关柜安装不平度不得超过 2mm。

On that basis, install the switch cabinet one by one, both horizontally and vertically. The slope of the switch cabinet installed shall not be more than 2mm.

k 当开关设备已完全组合（拼接）好时，可用 M12的地脚螺栓将其与基础框架相联或用电焊与基础框架焊牢。

Once the switch equipment is completely assembled, it is feasible to use the M12 foundation bolt to link it with the base framework or be welded into the base framework.

► 母线的安装 Busbar installation

开关设备中的母线采用矩形母线，且为分段形式，当选用不同电流时所选用的母线只是数量规格不一，因而在安装时须遵照下列的步骤：

The busbar in the switch equipment adopts the rectangular ones in fragments. There is only difference in quantity and specification for the chosen busbar used in different current, so following steps shall be followed in installation.

a 用清洁干燥的软布擦揩母线，检查绝缘套管有否损伤，在连接部位涂上电膏或者是中性凡士林。

Use clean dry soft cloth to brush the busbar to check whether the insulation bushing is damaged or not, and put grease or Vaseline in the joint.

b 一个柜接一个柜地安装母线，将母线段和对应的分支小母线接在一起，拴接时应插入合适的垫块，用螺栓拧紧。主母线与分支母线的联接形式见图6。

The busbar shall be installed one cabinet after another. In connecting the busbar fragment with the corresponding branch small busbar, a proper pad shall be inserted before fastening the bolts. The connection way of main and branch busbars shall be seen in the Figure 6.

► 开关设备的接地装置 Grounding Device for Switch Equipment

a 用预设的连接板将各柜的接地母线11连接在一起。

Connect the grounding busbar 11 in all cabinet with the junction plate pre-designed.

b 在开关柜内部联接所有需要接地的引线。

Connect all the leading wires to be grounded inside the switch cabinet.

c 将基础框架与接地排相连，如果柜子排列超过10台以上，必须有两个以上的接地排。

Connect the base framework with the grounding bar. If there are more than 10 cabinets in a row, more than two grounding bars is a must.

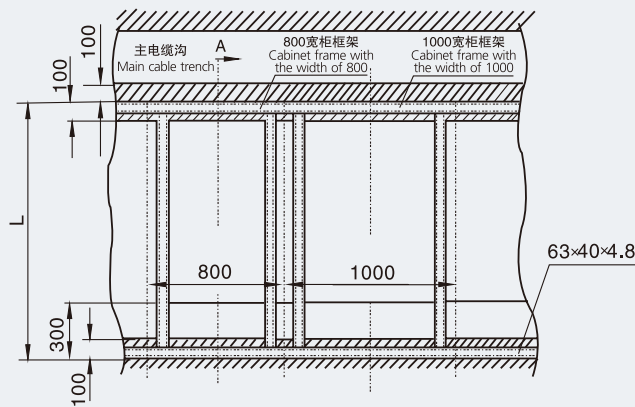
d 将接地开关的接地线与开关柜接地主母线联接

Connect the grounding wire of the grounding switch with the grounding main busbar of the switch cabinet.

► 开关设备安装后的检查 Switch equipment check after installation

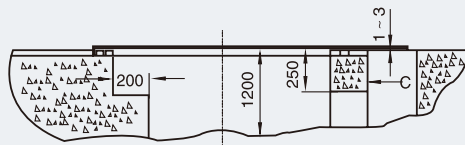
当开关设备安装就位后，清除柜内设备上的灰尘杂物，然后检查全部紧固螺栓有无松动，接线有无脱落。将断路器在柜中进，推出，并进行分合闸动作，观察有无异常，将仪表的指针调整到零位，根据线路图检查二次接线是否正确。对继电器进行调整，检查联锁是否有效。

Once the switch equipment is installed in position, clear the dust inside the cabinet equipment, then check if there are any loose bolts, any peeling wiring or not. Move, close and open the circuit breaker to observe any abnormalities. Set the needle of the meter into zero position. Check the secondary wiring is corrected or not according to the schematic diagram. Adjust the relay to check whether the interlock is valid or not.



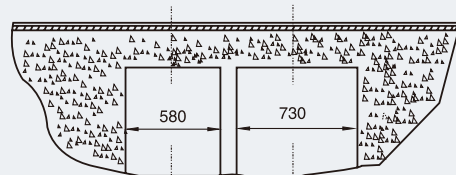
A-A旋转，设备无靠墙安装

A-A rotation, equipment installation against no wall



A-A旋转，设备靠墙安装

A-A rotation, equipment installation against wall



C向视图
To view the C

图5: 开关设备安装尺寸示意图

Fig. 5 Installation Diagram of the Switch Equipment

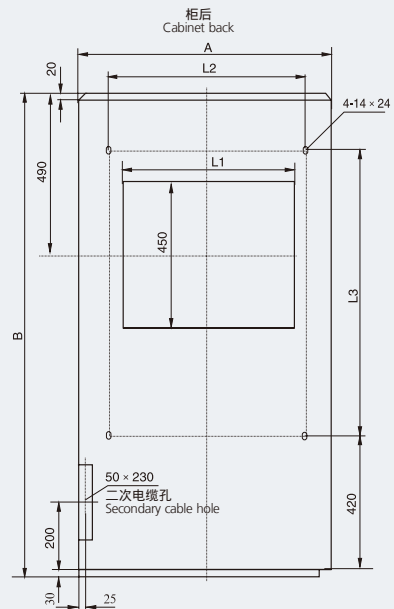
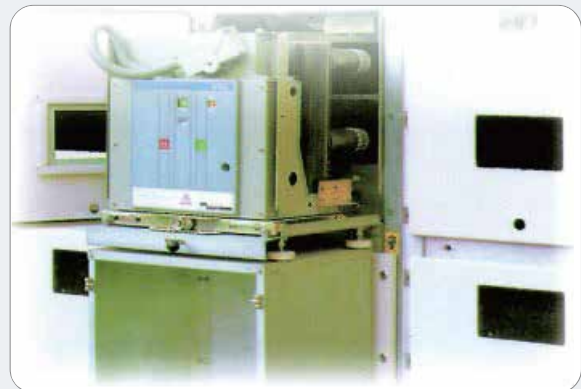


图6: 开关设备安装尺寸示意图

Fig. 6 Installation Diagram of the Switch Equipment



► 使用与维护 Use and Maintenance

开关柜在运行中，运行人员除应遵守有关规程外，还应注意以下问题。

The following points shall be noted during the functional switch cabinet for the operator, apart from some stipulated rules.

► 操作程序 Operation Procedure

虽然开关设备设计有保证开关设备各部分操作程序正确的联锁，但是操作人员对开关设备各部门的投入和退出，仍应严格按照操作规程和本技术文件和要求进行，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。

Though the switch equipment is designed to ensure the correct interlocking in all parts during operation, the operator shall strictly handle in accordance with procedures, technical document and requirements with regard to the use of the switch equipment. No random operation, nor blind operation. Otherwise, equipment shall be damaged and cause an accident.

► 无接地开关的断路器柜的操作 Operate the circuit breaker cabinet with no grounding switch

a 将断路器可移开部件装入柜体，断路器小车准备由柜外推入柜内前，应认真检查断路器是否完好，有无漏装部件，有无工具等杂物放在机构箱或开关内，确认无问题后将小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，将转运车前部位锁板插入柜体中隔板插口并将转运车与柜体锁定之后，打开断路器小车的锁定钩，将小车平稳推入柜体同时锁定。当确认已将小车与柜体锁好之后，解除转运车与柜体的锁定，将转运车推开。

Check the circuit breaker carefully to make sure about any breakage or leakage, any tools left inside the box or cabinet before assembling its parts into the cabinet body. Put the small cart in the transportation car and lock it down after no problems found in the inspection. Move the transportation car in front of the cabinet, and lift the small cart into a proper place. After inserting the lock plate of the front part of the transport car into the socket of the cabinet, locking the transport car and the cabinet, open the lock hook of the circuit breaker small car and push the small car smoothly into the cabinet body and lock it at the same time. After confirming the small car and the cabinet have been locked, remove the lock of the transfer car and the cabinet and push the transfer car away.

b 小车在柜内操作：小车在从转运车装入柜体后，即处于柜内断开位置，若想将小车投入运行，首先使小车处于试验位置，若想将小车投入运行，首先使小车处于试验位置，应将辅助回路插头插好，若通电则仪表室面板上试验位置指示灯亮，此时可在回路未接通的情况下对小车进行电气操作试验，若想继续进行操，首先必须把所有柜门关好，用钥匙插入锁孔，把门关好，并确认断路器处于分闸状态（见d条）。此时可将手车操作摇把插入中面板上操作孔内，顺时针转动摇把，直到摇把明显受阻并听到清脆的辅助开关切换声，同时仪表室面板上工作位置指示灯亮，然后取出摇把。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状态（见d条），插入手把操作摇把，逆时针转动直到摇把受阻并听到清脆的辅助开关切换声，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。

Small car operation inside the cabinet: After loading the small cart into the cabinet body through the transfer car, which means the internal cabinet is in the breaking position. In order to plunge the small car into service, we shall first put it in the test position, and connect all plugs in the supplementary loops. The indicator in the test position of the meter room panel illuminates after power-ing-on. And we can conduct the electrical test on the small car under the circumstance of dead loop. If we want to continue the above operation, first all cabinet doors shall be confirmed to be closed, insert the key into the keyhole, and close the door, and confirm the circuit breaker is switched off (see the d). At this time, inside the operation handle of the handcart into the hole on the panel, turn it clockwise until being blocked and the supplementary switch gives out a crisp sound, meanwhile the indicator of the operating position in the meter room panel illuminates, and the remove the handle. At this point, the main circuit is powered on, and the circuit breaker is in the operation position, which shall be opened and closed by the control loop.

Withdraw the small car from the operating position. To do that, first, the circuit breaker shall be confirmed to be in the switch-off status (See the d), insert the operation handle, and turn it count-erclockwise until being blocked and the supplementary switch gives out a crisp sound, the small car is back into the test position. At this time, the main circuit is in the state of complete open, and the metal valve is closed.

c 从柜中取出小车：若准备从柜内取出小车，首先应确定小车已处于试验位置，然后解除辅助回路插头，并将动插头扣锁在手车架上，此时将转运车推到柜前锁定（与把小车装入柜内时相同），然后将手车解锁并向外拉出。当手车完全进入转运车并确认转运车锁，解除转运车与柜体的锁定，把转运在向后拉出适当距离后，轻轻放下停稳。如小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意外事故。

Withdraw the small car from the cabinet: the small car shall be confirmed to be in the test position before removing from the cabinet. Then get ride of the plugs of the supplementary loop, and lock the jack-plug in the handcart frame. At this juncture, push the transportation car in front of the cabinet for lockdown (similar to the operation of loading the small car inside the cabinet). Then unlock the handcart and pull it out. When the handcart is inside the transportation car, confirm the locking of the transportation cart. Unlock the transportation car with the cabinet body, and then put it down gently after being in a distance away from the body. If the small car is needed for the long distance delivery by the transportation car, the delivery procedure shall be treated with extra attention to avoid accident.

d 断路器在柜内的分、合闸状态确认：断路器的分合闸状态可由断路器的手车面板上分、合闸指示牌及仪表室面板上分合闸指示灯两方判定。

The confirmation of circuit breaker switch-on and off inside the cabinet: the switch-on and off of the circuit breaker shall be decided by the switch-on and off indicators on the panel of the handcart and meter room.

若透过柜体中面板观察玻璃窗看到手车面板上绿色的分闸指示牌则判定断路器处于分闸状态，此时如果辅助回路插头接通电，则仪表室面板上合闸指示灯亮。

Judging from green switch-off indicator in the handcart panel we see through the window of the cabinet body, the circuit breaker is in the switch-off state. At this time, if the supplementary loop is powered on, the switch-on indicator in the panel of the meter room shall light up.

▶ 有接地开关的断路器柜的操作 Operate the circuit breaker with grounding switch

将断路器手车推入柜内如从柜内取出手车的程序，与无接地开关的断路器柜的操作程序完全相同。仅当手车在柜内操作过程中和操作接地开关过程中要注意的地方叙述如下：

The operation of pushing the circuit breaker handcart inside the cabinet and pull it out is exactly same to the operation of circuit breaker cabinet with no grounding switch. The following notes shall be paid attention with during the handcart operation inside the cabinet and grounding switch operation.

a 手车柜内操作

当准备将手车推入工作位置时，除了要遵守 1.1.1 中的 b 的各项要求外，还应确认接地开关处于分闸状态，否则下一步操作无法完成。

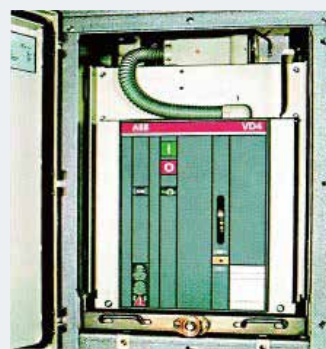
Operation inside the handcart cabinet
In preparing to put the handcart in working position, the grounding switch shall be confirmed to be open, apart from observing all kinds of requirements in the 1.1.1; otherwise, the next step shall not be fulfilled.

b 合、分接地开关操作

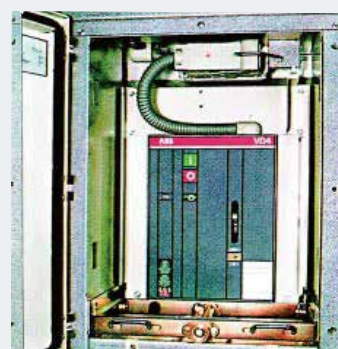
若要合接地开关，首先应确定手车已退到试验/断开位置，并取下推进摇把。然后按下接地开关操作孔处联锁弯板，插入接地开关操作手柄。顺时针转动 90 度。接地开关处于合闸状态。若再逆时针转动 90 度，便将接地开关分闸。

Close and open the grounding switch

In case of closing the grounding switch, we shall first confirm the handcart is in the test or disconnection position, and remove the handle. Then press the interlocking curved plated in the operation hole of the grounding switch, insert the operation handle, turn 90 degree clockwise in order to close the grounding switch. If turn 90 degree counterclockwise, the grounding switch shall be separated.



断路器抽出式部件在试验/隔离位置
The drawn-out part of the circuit breaker is in the test / isolation position



断路器隔室（门打开）断路器抽出式部件在运行位置
The drawn-out part of the circuit breaker room (with an open door) is in the operating position

► 隔离手车的操作 Operate the isolation handcart

隔离手车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推拉手车。在进行隔离手车柜内操作时，必须保证首先将与之相配合的断路器 [见7.1.1.1-d]，同时断路器分闸后其辅助触点转换解除与配合的隔离手车上的电气连锁，此时才能操作隔离车。具体操作程序同操作断路器手车相同。

The isolation handcart is not equipped with the capabilities of connecting and disconnecting the load current. Thus, it is forbidden to pull the handcart under the loaded circumstance. During the operations inside the cabinet of the isolation handcart, it is guaranteed to use the matched circuit breaker (see 7.1.1.1-d) and its supplementary contacts are switched off to remove the electrical interlocking with the matched isolation handcart. The detailed operation procedure is similar to the operation of a circuit breaker.

► 使用连锁的注意事项 Cautions for interlocking

本产品的连锁功能是以机械连锁为主，辅之以电气连锁实现其功能的，功能上能实现开关“五防”闭锁的要求，但是操作人员不应因此而忽视操作规程的要求，只有规程制度与技术手段相结合才能有效发挥连锁装置的保障作用，防止误操作事故的发生。

The interlocking function of this product mainly refers to the mechanical interlocking, supplemented by the electric interlocking. The interlocking function meets the requirements of the Five Protections. Nevertheless, the operator shall not ignore the requirements of standard procedure. Only the combination of rules and technical means can give the protection of interlocker to full play and prevent the operational accident.

本产品的连锁功能的投入与拆除。大部分是在正常操作过程中同时实现的，不要增加额外的操作步骤。如发现操作受阻{如操作阻力增大}应首先检查是否有误操作的可能，而不应强行操作以至损坏设备，甚至导致因误操作事故的发生。

The plug-in and removal of the product interlocking are realized simultaneously during the normal operation with no extra operations. In case of any obstructions, for example increases in the operation differences, we should check whether there are any possibilities of misconducts before conducting any forced operation, which might cause damage to the equipment, even the operation accident.

有些连锁因特殊需要允许紧急锁 [如柜体下面板和接地开关的连锁]。紧急解锁的使用须谨慎，不宜经常使用，使用时也要采取必要的防护措施，一经处理完毕。应立即恢复连锁原状。

Emergency lock is needed in special occasions, for example the interconnecting between the lower plate of the cabinet body and the grounding switch. The unlocking in emergency shall be treated with caution and conducted once in a while with needed protections. Once finished, the original state of interlocking shall be immediately recovered.

► 开关柜的检修应按有关规程要求进行，建议用户特别注意以下几点：

The check and maintenance of the switch cabinet shall be handled according to specific regulations. The user is suggested to pay attention to following notes:

1. 按真空断路器的安装使用说明书的要求，检查断路器的情况，并进行要的调整。

Check the condition of the circuit breaker according the installation manual, and make related adjustment when necessary.

2 检查手车推进机构及其连锁的情况，使其满足本说明书的有关要求。

Check the conditions of the handcart propulsion institution to make sure they are in compliance with the requirements in the manual.

3 检查主回路触头的情况。擦除动、静触头上陈旧油脂，察看触头的磨伤，弹簧力有无距显变化，有无因温度过高引起镀层异常氧化现象，如有以上情况，应及时处理。

Check the contact of the main loop, degrease the static contact. Observe the contact for its fraying and any obvious changes in spring force, any abnormal oxidation phenomenon in the galvanized layer due to the over-temperature. In case of above situations, timely treatment shall be conducted.

4 检查辅助回路触头有无异常情况，并进行必要的修整。

Check the contact in the auxiliary loop, and make adjustment when necessary.

5 检查接地回路各部分的情况，如接地地头，主接地线及过门接地线等，保证其导电连续性。

Check the grounding loop in all parts, such as the grounding contact, main grounding line, etc, to make sure their continuity of conduction.

6 检查各部分紧固件，如有松动，应及时紧。

Check the fastener in all parts, if any unbolts, tighten their up in time.

► 接线方案 Wiring scheme

表 Table 9

方案编号 Scheme No.	01	02	03	04	05	06	07
一次主接线图 Primary Wiring Diagram							
用途 Usage	受电 馈电 Receive Feed	馈电 Feed	馈电 Feed	受电 馈电 Receive Feed	馈电 Feed	馈电 Feed	右联络 Right connection
柜体尺寸：宽×深×高(mm) Cabinet Size:W×D×H (mm)	800(1000)×1500×2300						
额定电流(A) Rated Current (A)	630~4000						
一次主要元器件 Primary Components	真空断路器：VS1或VD4 Vacuum Breaker:VS1 or VD4	1	1	1	1	1	1
	电流互感器：LZZBJ9-12 Current Transformer	2	2	2	3	3	2
	电压互感器：JDZX11-10 Voltage Transformer						
	高压熔断器：XRNP-10 HV Fuse						
	接地开关：JN15-12 Grounding Switch		1	1		1	1
	避雷器：HY5WS-17/45kV Arrester			1			1
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

方案编号 Scheme No.	08	09	10	11	12	13	14
一次主接线图 Primary Wiring Diagram							
用途 Usage	右联络 Right connection	左联络 Left connection	左联络 Left connection	右联络 Right connection	右联络 Right connection	左联络 Left connection	左联络 Left connection
柜体尺寸：宽×深×高(mm) Cabinet Size:W×D×H (mm)	800(1000)×1500×2300						
额定电流(A) Rated Current (A)	630~4000						
一次主要元器件 Primary Components	真空断路器：VS1或VD4 Vacuum Breaker:VS1 or VD4	1	1	1	1	1	1
	电流互感器：LZZBJ9-12 Current Transformer	2	2	2	3	3	3
	电压互感器：JDZX11-10 Voltage Transformer						
	高压熔断器：XRNP-10 HV Fuse						
	接地开关：JN15-12 Grounding Switch	1		1		1	1
	避雷器：HY5WS-17/45kV Arrester						
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

方案编号 Scheme No.	15	16	17	18	19	20	
一次主接线图 Primary Wiring Diagram							
用途 Usage	架空进线+左联 Overhead incoming line+Left connection	架空进线+左联 Overhead incoming line+Left connection	架空进线+右联 Overhead incoming line+Right connection	架空进线+右联 Overhead incoming line+Right connection	架空进线+左联 Overhead incoming line+Left connection	架空进线+左联 Overhead incoming line+Left connection	
柜体尺寸:宽×深×高(mm) Cabinet Size:W×D×H (mm)	800(1000)×1660×2300						
额定电流(A) Rated Current (A)	630~4000						
一次主要元器件 Primary Components	真空断路器:VS1或VD4 Vacuum Breaker:VS1 or VD4	1	1	1	1	1	1
	电流互感器:LZZBJ9-12 Current Transformer	2	2	2	2	3	3
	电压互感器:JDZX11-10 Voltage Transformer						
	高压熔断器:XRNP-10 HV Fuse						
	接地开关:JN15-12 Grounding Switch		1		1		1
	避雷器:HY5WS-17/45kV Arrester						
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

方案编号 Scheme No.	21	22	23	24	25	26	
一次主接线图 Primary Wiring Diagram							
用途 Usage	架空进线+右联 Overhead incoming line+Right connection	架空进线+右联 Overhead incoming line+Right connection	架空进出线 Overhead incoming and outgoing lines	架空进出线 Overhead incoming and outgoing lines	架空进出线 Overhead incoming and outgoing lines	架空进出线 Overhead incoming and outgoing lines	
柜体尺寸:宽×深×高(mm) Cabinet Size:W×D×H (mm)	800(1000)×1660×2300						
额定电流(A) Rated Current (A)	630~4000						
一次主要元器件 Primary Components	真空断路器:VS1或VD4 Vacuum Breaker:VS1 or VD4	1	1	1	1	1	1
	电流互感器:LZZBJ9-12 Current Transformer	3	3	2	2	2	3
	电压互感器:JDZX11-10 Voltage Transformer						
	高压熔断器:XRNP-10 HV Fuse						
	接地开关:JN15-12 Grounding Switch		1		1	1	
	避雷器:HY5WS-17/45kV Arrester					1	
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

方案编号 Scheme No.	27	28	29	30	31	32	33
一次主接线图 Primary Wiring Diagram							
用途 Usage	架空进出线 Overhead incoming and outgoing lines	架空进出线 Overhead incoming and outgoing lines	受电 馈电 Receive Feed	馈电 Feed	受电 馈电 Receive Feed	受电 馈电 Receive Feed	馈电 Feed
柜体尺寸：宽×深×高(mm) Cabinet Size:W×D×H (mm)	800(1000)×1660×2300						
额定电流(A) Rated Current (A)	630~4000						
一次主要元器件 Primary Components	真空断路器：VS1或VD4 Vacuum Breaker:VS1 or VD4	1	1	1	1	1	1
	电流互感器：LZZBJ9-12 Current Transformer	3	3	2	2	3	3
	电压互感器：JDZX11-10 Voltage Transformer			2	2	2	2
	高压熔断器：XRNP-10 HV Fuse			3	3	3	3
	接地开关：JN15-12 Grounding Switch	1	1		1		1
	避雷器：HY5WS-17/45kV Arrester		1			1	
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

方案编号 Scheme No.	34	35	36	37	38	39	40	
一次主接线图 Primary Wiring Diagram								
用途 Usage	受电 馈电 Receive Feed	受电 馈电 Receive Feed	馈电 Feed	电压测量 Voltage measurement	电压测量 Voltage measurement	电压测量+ 避雷器 Voltage measurement + Arrester	电压测量+ 避雷器 Voltage measurement + Arrester	
柜体尺寸：宽×深×高(mm) Cabinet Size:W×D×H (mm)	800(1000)×1500×2300							
额定电流(A) Rated Current (A)	630~4000							
一次主要元器件 Primary Components	真空断路器：VS1或VD4 Vacuum Breaker:VS1 or VD4	1	1	1				
	电流互感器：LZZBJ9-12 Current Transformer	3	2	2				
	电压互感器：JDZX11-10 Voltage Transformer	2	3	3	2	3	2	3
	高压熔断器：XRNP-10 HV Fuse	3	3	3	3	3	3	3
	接地开关：JN15-12 Grounding Switch			1				
	避雷器：HY5WS-17/45kV Arrester	1					1	1
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above							

方案编号 Scheme No.	41	42	43	44	45	46	
一次主接线图 Primary Wiring Diagram							
用途 Usage	电压测量+避雷器 Voltage measurement +Arrester	电压测量+避雷器 Voltage measurement +Arrester	电压测量+左联 Voltage measurement +Left connection	电压测量+右联 Voltage measurement +Right connection	电压测量+左联 Voltage measurement +Left connection	电压测量+右联 Voltage measurement +Right connection	
柜体尺寸:宽×深×高(mm) Cabinet Size:W×D×H(mm)							
额定电流(A) Rated Current (A)							
一次主要元器件 Primary Components	真空断路器:VS1或VD4 Vacuum Breaker:VS1 or VD4						
	电流互感器:LZZBJ9-12 Current Transformer						
	电压互感器:JDZX11-10 Voltage Transformer	2	3	2	2	3	3
	高压熔断器:XRNP-10 HV Fuse	3	3	3	3	3	3
	接地开关:JN15-12 Grounding Switch						
	避雷器:HY5WS-17/45kV Arrester	1	1				
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

方案编号 Scheme No.	47	48	49	50	51	52	
一次主接线图 Primary Wiring Diagram							
用途 Usage	电压测量+ 避雷器+左联 Voltage measurement+ Arrester+Left connection	电压测量+ 避雷器+右联 Voltage measurement+ Arrester+Right connection	电压测量+ 避雷器+左联 Voltage measurement+ Arrester+Left connection	电压测量+ 避雷器+右联 Voltage measurement+ Arrester+Right connection	右联络 Right connection	左联络 Left connection	
柜体尺寸:宽×深×高(mm) Cabinet Size:W×D×H(mm)							
额定电流(A) Rated Current (A)							
一次主要元器件 Primary Components	真空断路器:VS1或VD4 Vacuum Breaker:VS1 or VD4						
	电流互感器:LZZBJ9-12 Current Transformer						
	电压互感器:JDZX11-10 Voltage Transformer	2	2	3	3		
	高压熔断器:XRNP-10 HV Fuse	3	3	3	3		
	接地开关:JN15-12 Grounding Switch						
	避雷器:HY5WS-17/45kV Arrester	1	1	1	1		
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

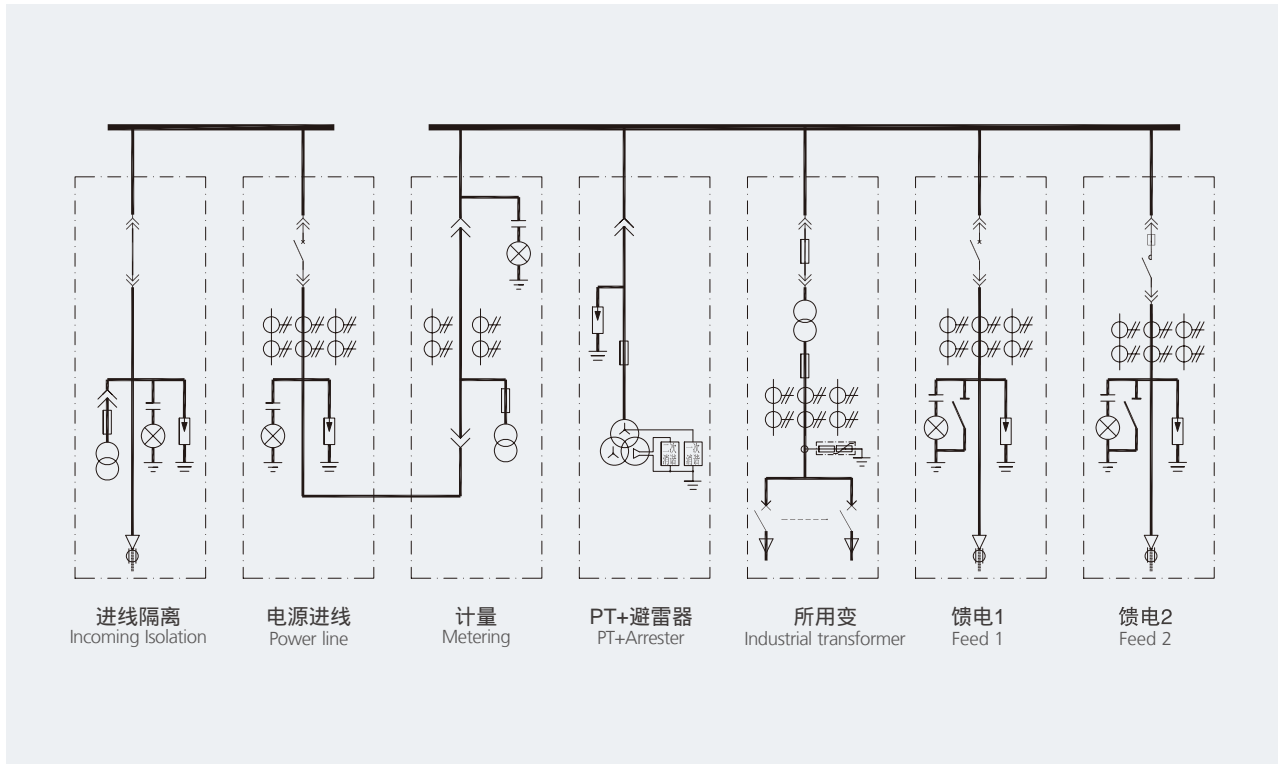
方案编号 Scheme No.	53	54	55	56	57	58	
一次主接线图 Primary Wiring Diagram							
用途 Usage	隔离 Isolation	隔离+左联+计量 Isolation+left connection+Voltage metering	隔离+右联+计量 Isolation+Right connection+metering	隔离+左联+电压测量 Isolation+left connection+Voltage metering	隔离+左联+电压测量 Isolation+left connection+Voltage metering	隔离+右(左)联 Isolation+(Right/left) connection	
柜体尺寸：宽×深×高(mm) Cabinet Size:W×D×H (mm)	800(1000)×1500×2300						
额定电流(A) Rated Current (A)	630~4000						
一次主要元器件 Primary Components	真空断路器：VS1或VD4 Vacuum Breaker:VS1 or VD4	隔离车 Isolation car	隔离车 Isolation car	隔离车 Isolation car	隔离车 Isolation car	隔离车 Isolation car	隔离车 Isolation car
	电流互感器：LZZBJ9-12 Current Transformer		2	2			
	电压互感器：JDZX11-10 Voltage Transformer		2	2	2	2	
	高压熔断器：XRNP-10 HV Fuse		3	3	3	3	
	接地开关：JN15-12 Grounding Switch						
	避雷器：HY5WS-17/45kV Arrester		1				
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

方案编号 Scheme No.	59	60	61	62	63	64	65
一次主接线图 Primary Wiring Diagram							
用途 Usage	计量+左联 Metering+left connection	计量+右联 Metering+Right connection	计量+左联 Metering+left connection	计量+右联 Metering+Right connection	计量+左联 Metering+left connection	计量+右联 Metering+Right connection	计量+左联 Metering+left connection
柜体尺寸：宽×深×高(mm) Cabinet Size:W×D×H (mm)	800(1000)×1500×2300						
额定电流(A) Rated Current (A)	630~4000						
一次主要元器件 Primary Components	真空断路器：VS1或VD4 Vacuum Breaker:VS1 or VD4						
	电流互感器：LZZBJ9-12 Current Transformer	2	2	3	3	2	2
	电压互感器：JDZX11-10 Voltage Transformer	2	2	2	2	3	3
	高压熔断器：XRNP-10 HV Fuse	3	3	3	3	3	3
	接地开关：JN15-12 Grounding Switch						
	避雷器：HY5WS-17/45kV Arrester						
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

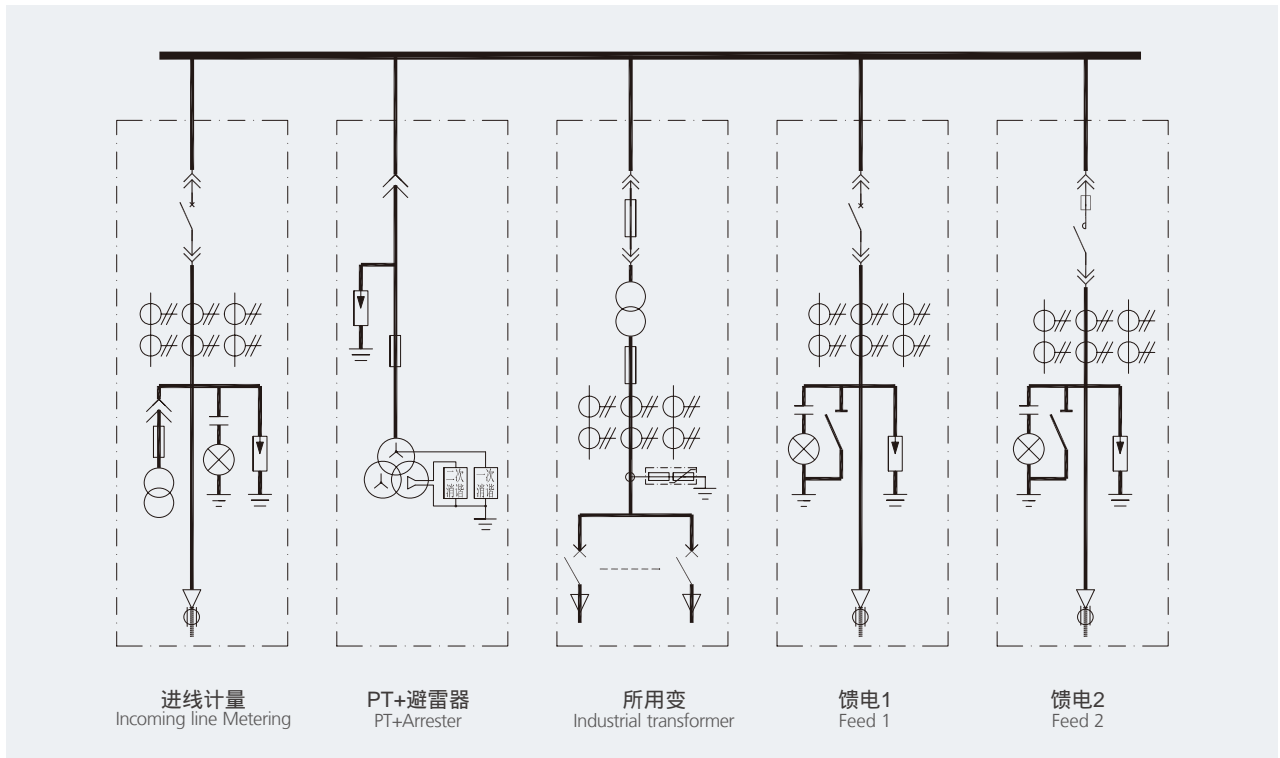
方案编号 Scheme No.	66	67	68	69	70	71	72
一次主接线图 Primary Wiring Diagram							
用途 Usage	计量+右联 Metering+Right connection	进线+计量 Incoming+Metering	进线+计量 Incoming+Metering	进线+计量 Incoming+Metering	进线+计量 Incoming+Metering	进线+计量 Incoming+Metering	进线+计量 Incoming+Metering
柜体尺寸:宽×深×高(mm) Cabinet Size:W×D×H (mm)	800(1000)×1500×2300						
额定电流(A) Rated Current (A)	630~4000						
一次主要元器件 Primary Components	真空断路器: VS1或VD4 Vacuum Breaker:VS1 or VD4	1	1	1	1	1	1
	电流互感器: LZJB9-12 Current Transformer	3	2	2	3	3	2
	电压互感器: JDZX11-10 Voltage Transformer	3	2	2	2	2	3
	高压熔断器: XRNP-10 HV Fuse	3	3	3	3	3	3
	接地开关: JN15-12 Grounding Switch						
	避雷器: HY5WS-17/45kV Arrester						
备注 Remark	1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above						

方案编号 Scheme No.	73	74	75	76	77	78	
一次主接线图 Primary Wiring Diagram							
用途 Usage	进线+计量 Incoming+Metering	进线+计量 Incoming+Metering	电压测量+避雷器 Voltage measurement +Arrester	所用变 Industrial transformer	就地补偿 On-size compensation	F-C 馈电 F-C Feed	
柜体尺寸:宽×深×高(mm) Cabinet Size:WxDxH (mm)	800(1000)×1500×2300						
额定电流(A) Rated Current (A)	630~4000						
一次主要元器件 Primary Components	真空断路器: VS1或VD4 Vacuum Breaker:VS1 or VD4	1	1	隔离车 Isolation car	隔离车 Isolation car	接触器 Contactor	隔离车+接触器 Isolation car+Contactor
	电流互感器: LZJB9-12 Current Transformer	2	3	3	3	2	2
	电压互感器: JDZX11-10 Voltage Transformer						
	高压熔断器: XRNP-10 HV Fuse	3	3	3	6	3	3
	接地开关: JN15-12 Grounding Switch						1
避雷器: HY5WS-17/45kV Arrester			1		1	1	
备注 Remark	备注 1.可按用户指定元器件型号 2.额定电流1600A及以上则柜宽为1000mm 3.所用变、就地补偿根据实际容量确定柜宽尺寸 1.The user can choose the component type.2.The cabinet width is 1000mm for the one with rated current of 1600A and above.3.The cabinet size shall be subject to the fact.						

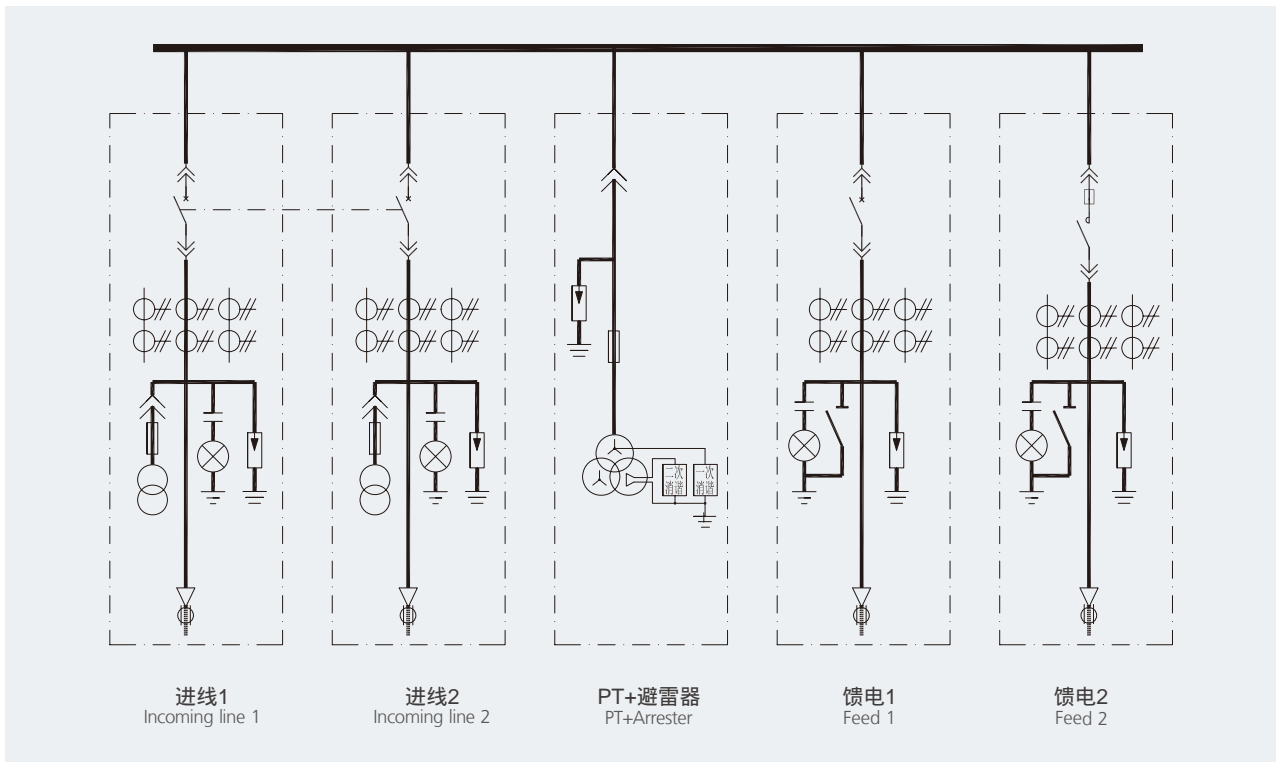
▶ 方案实例一 Example 1



▶ 方案实例二 Example 2



► 方案实例三 Example 3



► 订货须知 Order Instruction

订货时应提供下列技术资料：

a 主接线方案编号、用途和单线系统图、额定电压、额定电流、额定短路开断电流、配电室平面布置图及开关柜的排列配置等。

b 开关柜控制、测量及保护功能的要求以及其它闭锁和自动装置的要求及原理。

c 开关柜内主要电气元件的型号、规格及数量。

d 如开关柜之间或进线柜需要的母线桥连接，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。

e 开关柜使用在特殊环境条件时，应在订货时详细说明。

f 其它特殊要求，在订货前详细书面说明、协商。

如订货合中有所用变柜，地基制作请按照提供的基础图施工。

The following technical document shall be provided at ordering:

The number and use of main wiring scheme, single line systematic diagram, rated voltage, rated current, rated short-circuit breaking current, layout of the distribution room and configuration of the switch cabinet, etc.

Requirements of controlling, measuring and protecting the switch cabinet as well as principles in its interlocking function and automatic device;

The type, specification and quantity of the main electric components inside the switch cabinet;

In case the bus bridge connection is needed between the switch cabinets or incoming cabinets, the rated load, width and height of the bus bridge, and other detailed data shall be provided.

Special statement shall be made at ordering for the use of switch cabinet in harsh environment.

Written statement and negotiation shall be made before ordering for other special needs.

If there is any switch cabinet in the order contract, the foundation construction shall be fulfilled according to the map provided.



雷诺尔

Shanghai RENLE
Science&Technology Co., Ltd.



▶ 国家重点项目 National Key Projects



三峡工程
Three Gorges Project
北京奥林匹克水上公园
Beijing Olympic Rowing-Canoeing Park
北京奥运会配套项目
Supporting Projects for the Beijing Olympic Games
北京五棵松体育馆
Wukesong Indoor Stadium
国务院机关事务管理局
Bureau of Government Offices Administration of the State Council
中国中央电视台
CCTV (China Central Television)



首都国际机场
Beijing Capital International Airport
二炮导弹基地
China Second Artillery Corps Missile Base
中国空空导弹研究中心
China Air-to-air Missile Research Centre
中国人民解放军空军雷达基地
LA Air Force Radar Base



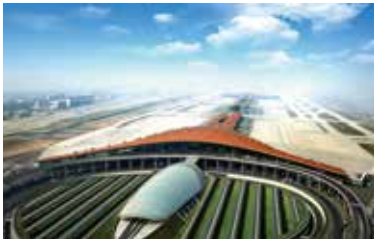
“南水北调”
South-to-North Water Diversion
黄衢南高速公路
Zhejiang Huangqunan Expressway
“西电东送”
Electricity Transmission from West to East China
“西气东输”
West-East Natural Gas Transmission



上海磁悬浮轨道交通车站
Shanghai Maglev Rail Transit Station
上海世博会配套项目
Supporting Projects for Shanghai Expo
上海浦东机场
Shanghai Pudong International Airport
上海国际汽车博物馆
Shanghai Auto Museum
上海虹桥机场扩建工程
Extension Project for Shanghai Hongqiao Airport
内蒙古呼和浩特白塔机场扩建工程航站楼
Terminal Expanded for Hohhot Baita International Airport
沈阳奥体中心
Shenyang Olympic Sports Center
北京南苑机场
Beijing Nanyuan Airport
云南2409空军机场
Yunnan 2409 Airforce Airport
青岛奥体中心
Qingdao Olympic Sports Center
济南奥体中心
Jinan Olympic Sports Center
双流国际机场扩建工程
Extension Projects for Chengdu Shuangliu International Airport



重庆袁家岗奥林匹克体育中心
Chongqing Olympic Sports Center
新白云国际机场
New Baiyun International Airport
武汉天河机场
Wuhan Tianhe Airport
上海地铁明珠三号线
Shanghai Metro Line 3
重庆国际会议中心
Chongqing International Conference Centre
山西万家寨引黄工程
Shanxi Wanjiashai Yellow River Diversion Project
青海小游山生态工程
Qinghai Xiaoyou Mountain Ecological Project



天津“八大片”供热工程
 Tianjin Badapian Heating Project
 山东菏泽市引黄供水工程
 Shandong Heze Yellow River Diversion & Water Supply Project
 上海国际航运中心洋山深水港工程
 Shanghai International Shipping Center Yangshan Deepwater Port
 四川西昌卫星发射中心
 Xichang Satellite Launch Center
 广西龙滩水电工程
 Guangxi Longtan Hydropower Project
 甘肃卫星发射中心
 Gansu Satellite Launch Center
 云南红河南沙水电站
 Yunnan Honghe Nansha Hydropower Station
 大唐国际发电股份有限公司
 Datang International Power Generation Co., Ltd.
 贵州开磷化工
 Guizhou Kailin Group Co., Ltd.
 内蒙古神华集团有限责任公司
 Inner Mongolia Shenhua Group
 金山石化
 Jinshan Petrochemical Company
 上海宝钢集团
 Shanghai Baosteel Group
 泰州石化
 Taizhou Petrochemical Company
 鞍山钢铁集团
 Anshan Iron and Steel Group
 吉林石化
 Jilin Petrochemical Company
 武汉钢铁公司
 Wuhan Iron and Steel Group
 广西柳化
 Guangxi Liuzhou Chemical Industry
 中国首钢集团
 Capital Iron and Steel Company
 广州石化
 Guangzhou Petrochemical Company
 中国长城铝业公司
 China Great Wall Aluminum Corporation
 洛阳石化
 Luoyang Petrochemical Company
 广西平果铝业
 Guangxi Pingguo Aluminum Company
 岳阳石化
 Yueyang Petrochemical Company
 广西柳钢
 Guangxi Liuzhou Iron and Steel Group
 南京石化
 Nanjing Petrochemical Company
 马鞍山钢铁
 Maanshan Iron and Steel
 北京燕山石化
 Beijing Yanshan Petrochemical Company
 山西中阳钢厂
 Shanxi Zhongyang Steel
 乌鲁木齐石化
 Urumqi Petrochemical Company
 大庆油田
 Daqing Oilfield
 锦西石化
 Jinxi Petrochemical Company
 胜利油田
 Shengli Oilfield
 独山子石化
 Dushanzi Petrochemical Company
 辽河油田
 Liaohe Oilfield
 北京金融街
 Beijing Financial Street
 塔里木油田
 Talimu Oilfield
 成都大熊猫生态园大熊猫博物馆
 Panda Museum in the Chengdu Ecological Park of Giant Panda
 克拉玛依油田
 Karamay Oilfield
 青岛北海船厂
 Qingdao Beihai Shipyard
 陕西长庆石油
 Shaanxi Changqing Oilfield