奥凯电气
AOKER ELECTRIC

高压开关柜系列

High voltage switch cabinet series

江苏奥凯电气有限公司

JIANGSU OKEY ELECTRIC CO.,LTD.

奥凯电气
AOKER ELECTRIC

企业简介 company introduce

江苏奥凯电气有限公司是一家外商独资企业，位于风景秀丽的中国江苏省镇江新区港南大道88号，周边环境优雅，交通便捷。公司注册资本1600万美元，现拥有5.6万平方米的研发、制造基地和标准化厂房。公司引进现代化生产设备，先进的检测仪器，研制、开发、制造、销售输配电设备成套高新技术产品。公司管理规范，资质齐全，技术力量雄厚，已通过国家质量管理体系、职业健康管理体系以及环境安全管理体系的认证和验收。

本公司主要产品有高低压系列开关柜、配电箱，高低压母线槽、照明母线，铝合金、不锈钢、玻璃钢、防火、节能等系列电缆桥架，产品严格按国家标准生产并已通过国家强制性3C认证，且达到国际先进水平，产品广泛用于发电厂、输配电、化工、冶金、石油、房产及标准化工厂等重要建设工程项目，品种规格齐全，完全满足不同用户，不同场合与不同环境的客户需求，且得到用户一致好评。

公司于2012年正式引进现代化生产设备、先进的检测仪器，研制开发预警系统成套高新技术产品，产品达到国际先进水平，得到用户一致好评。2012年11月，爆炸物危险实时监控安全预警系统荣获军队科技进步一等奖。

奥凯电气正以“科技先行，质量为本，客户至上，服务至佳”为原则，既往开来，不断进取，团结奋进，走向更加辉煌的明天！


测试中心透视图


研发楼透视图

奥凯电气
AOKER ELECTRIC

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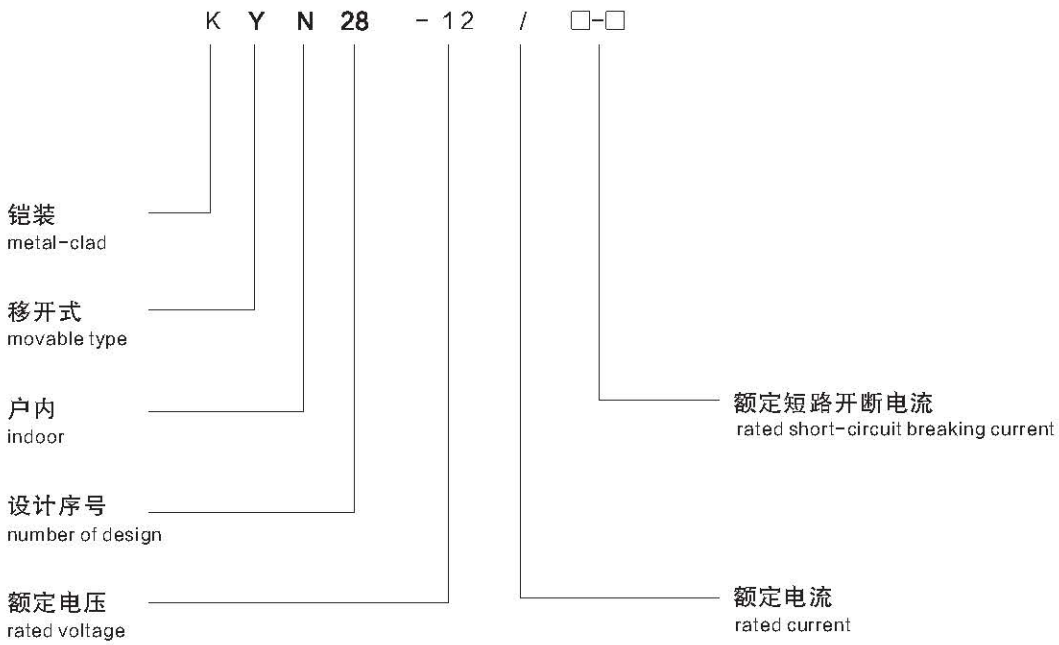
KYN28-12户内交流金属铠装移开式开关设备

一、概述
general

我公司生产的KYN28-12户内交流金属铠装移开式开关设备(以下简称开关柜)，系三相交流50HZ单母线及双母线分段系统的户内成套配电装置，适用于发电厂、变电站以及工矿企业的额定电压3.6～12kV电网中，作为接受和分配电能之用，并对电路实行控制、保护和监测。开关柜既可选用国内知名品牌真空断路器(例如VS1系列)，又可选用国际知名品牌真空断路器(例如ABB公司VD4系列、西门子公司3AE系列、施耐德公司HVX系列)，还可装设隔离设备或12kV以下的真空接触器，成套设备可满足电网对高压开关柜要求，并适合“五防”和全工况、全封闭、全绝缘条件，实为一种性能优越的配电装置。

Our company produces the KYN28-12 indoor communication metal armoured open type switchgear (hereinafter referred to as the switchgear), department of three-phase ac 50 hz single busbar and double bus section system of indoor complete sets of power distribution equipment, applicable to power plants, substations, and industrial and mining enterprises of rated voltage 3.6 ~ 12 kv power grid, as acceptance and distribution of electrical energy, and the circuit implementation of control, protection and monitoring. Switch cabinet can be used both domestic well-known brand vacuum circuit breaker (VS1 series, for example), and can choose the international well-known brand vacuum circuit breaker (such as ABB VD4 series, the series of Siemens 3 ae, schneider company HVX series), can also be installed isolation devices or below 12 kv vacuum contactor, complete sets of equipment can meet the requirements of power grid for high voltage switchgear, and is suitable for "five prevention" and the full process, fully enclosed, the insulation condition, it is a kind of superior performance of the power distribution device.

二、型号说明
type description



三、产品使用条件
use conditions

3.1环境温度：上限+40℃，下限-25℃；

3.2海拔高度：不超过1000m；

3.3相对湿度：日平均值不大于95%，月平均值不大于90%；

3.4地震强度不超过8级；

3.5周围空气应补受腐蚀性或可燃气体、水蒸气等明显污染。。

3.1Ambient temperature: upper limit + 40℃, lower limit -25℃;

3.2Altitude: not higher than 1000m;

3.3Relative humidity: daily average relative humidity not over 95%, monthly average relative humidity not over 90 %;

3.4Earthquake strength: not surpass 8 degree;

3.5Locations where no obvious fire or explosive danger, not heavily polluted, no corrosion.

四、外形尺寸
outer dimension

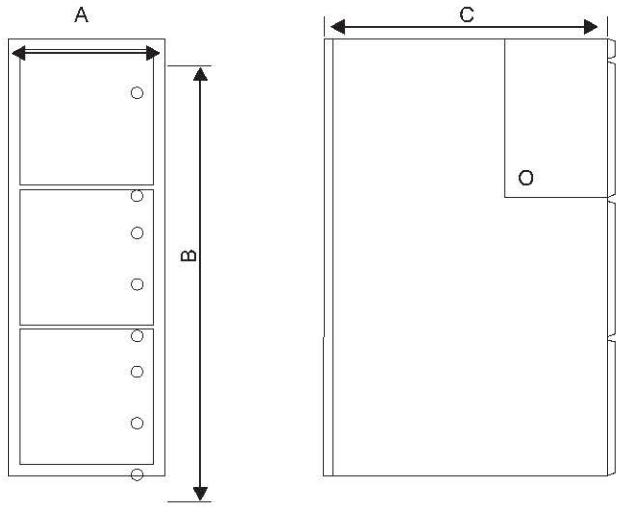


图1 开关柜外形尺寸
diagram 1 outer dimension of switchgear

4.1 外形尺寸 outer dimension

高度height B(mm)		2300
宽度width A(mm)	分支小母线额定电流达至1250A 热稳定电流40KA rated current of small branch bus is up to 1250A, thermal stable current 40KA	800
	分支小母线额定电流达至1600A及以上 the rated current of small branch bus is over 1600A	1000
深度depth C(mm)	电缆进出线 cable incoming and out going	1500
	架空进出线 Overhead incoming and out going	1660
重量wt.(kg)		700～1200

4.2 柜型分类kinds of cabinets

柜型 cabinet	特征描述 description of characteristics	尺寸(宽×深×高)mm Size (width ×depth×height)mm
Ⅰ型柜 Ⅰcabinet	电缆进出线、主开关额定电流为≤1250A cable incoming and out going, rated current of main switch≤1250A	800×1500×2300
Ⅱ型柜 Ⅱcabinet	电缆进出线、主开关额定电流为1600A～3150A cable incoming and out going, rated current of main switch 1600A～3150A	1000×1500×2300
Ⅲ型柜 Ⅲcabinet	架空进出线、主开关额定电流≤1250A Overhead incoming and out going, rated current of main switch ≤1250A	800×1660×2300
Ⅳ型柜 Ⅳcabinet	架空进出线、主开关额定电流为1600A～3150A Overhead incoming and out going , rated current of main switch 1600A～3150A	1000×1660×2300

五、技术参数
technical parameters

5.1 开关柜设备技术参数technical parameters of switchgear

项目 Item		单位 Unit	数据 Data
额定电压 Rated voltage		KV	3，6，10
最高工作电压 Max. working voltage		KV	3，6，7，2，12
额定绝缘水平 Rated insulation level	1min工频耐受电压 Power-frequency withstand voltage 1min	KV	42
	雷电冲击耐受电压 lightning impulse voltage	KV	75
额定频率 Rated frequency		Hz	50
主母线额定电流 Rated current of main bus		A	630 1250，1600，2000，2500，3150，4000
分支母线额定电流 Rated current of branch bus		A	630，1250,1600，2000，2500，3150，4000
3s热稳定电流（有效值） thermal Stable Current 3s (effective Value)		KA	16，20，25，31.5，40，50
额定动稳定电流（峰值） Rated dynamic stable current (peak)		KA	40，50，63，80，100，125
防护等级 Degree Of Protection		外壳为IP4X，隔室间、断路器室门打开时为IP2X Enclosure is IP 4X, when the door is open, the inter-compartment and the circuit breaker compartment are IP 2X .	

注：电流互感器的短路容量应单独考虑
Note: short circuit capacity of the current transformer shall be considered alone.

5.2、真空断路器技术数据 The technical parameter of the circuit breaker

5.2.1 真空断路器技术数据表1 table 1 the technical parameter of the circuit breaker

项目 item		单位 Unit	数据 Data
额定电压 Rated voltage		kV	3，6，10
最高工作电压 Max. working voltage		kV	3，6，7，2，12
额定绝缘水平 Rated insulation level	1min工频耐受电压 Power-frequency withstand voltage 1min	kV	42
	雷电冲击耐受电压 lightning impulse voltage (full-wave)	kV	75

额定频率 Rated frequency	Hz	50
主母线额定电流 Rated current of main bus	A	630，1250，1600，2000，2500，3150
分支母线额定电流 Rated current of branch bus	kA	630，125，1600，2000，2500，3150
3S热稳定电流（有效值） thermal stable current 3s (effective value)	kA	16，20，25，31.5，40，50
额定动稳定电流（峰值） Rated dynamic stable current (peak)	kA	40，50，63，80，100，125

当断路器用于控制3～12KV电动机时，若起动电流小于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%.

When the circuit breaker is used to control 3-12KV motor, if the starting current is smaller than 600A , the metal oxide surge arrester shall be used. As to the detail requirements, the user shall consult the manufacturer. When the circuit breaker is used to break the capacitor bank, the rated current of the capacitor shall not be 80% larger than that of the circuit breaker.

5.2.2 真空断路器技术数据表2 Table 2 the technical parameter of the circuit breaker

项目 item	单位 Unit	数据 Data
瞬态恢复电压上升率 Transient Recovery Voltage Rise Rate	kV/ms	0.345，0.145
瞬态恢复电压峰值 Transient Recovery Voltage Peak	kV	20.6，30
额定操作顺序 Rated Operating Sequence		分-3min-合分-3min-合分 Open- 3min-close-open- 3min-close-open
自动重合闸操作顺序 auto-reclosing Operating Sequence		分-0.3s-合分-3min-合分 Open-0.3s-close-open-0.3min-close-open
多次重合闸操作顺序 multiple Reclosing Operating Sequence		分-0.3s-合分-15s-合分-15s-合分 Open-0.3s- Close-open-15s- Close-open-15s- Close-open
合闸时间 closing Time	ms	约70 About 70
分闸时间 breaking Time	ms	≤45
燃弧时间 Arcing Time	ms	≤15
开断时间 brcaking Time	ms	≤60

5.2.3 真空断路器技术数据表3 Table 3 the technical parameter of the circuit breaker

额定电压V Rated current V		消耗功率VA/W[1] Consumed power VA/W[1])	储能时间（秒）（最大）S[2] Stored energy (max.)S[2]
交流 AC	110	150	15
	120	150	15
直流 DC	24	130	15
	30	130	15
	48	130	15
	60	130	15
	110	140	15
	220	140	15

六、结构特点
structure characteristics

我公司生产的开关柜按GB3906-06中的铠装式金属封闭开关设备而设计，整体式有柜体和中置式可抽出部件(即手车)两大部分组成，见图2；柜体分四个单独的隔室，外壳防护等级为IP4X，各小室和断路器室门打开时防护等级为IP2X，具有架空进出线，电缆进出线及其他功能方案，经排列、组合后能成为各种方案形式的配电装置。

The switchgear produced by our company is designed based on the metal-clad enclosed switchgear of GB3906-06. The switchgear comprises of such two parts as the cubicle and the withdrawable unit of intermediate type (handcart). See diagram 2;The enclosure of the cubicle is divided into 4 compartments, the degree of protection for the enclosure of the cubicle is IP4X, and the degree of protection for the circuit breaker compartment and other compartments is IP2X when the door is open. The switchgear has such functions as overhead incoming and outgoing feeder, incoming and outgoing cable, which can be used as power distribution device when arranging these cubicles based on each solution according to usages.

6.1 外壳及其它 enclosure and others

开关柜的外壳选用敷铝锌薄钢板，经CNC机床加工，并采取多重折边工艺，这样使整个柜体不仅具有精度高、很强的抗腐蚀与抗氧化作用，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、便于组装生产。

The enclosure, assembled with steel plates which are coated with zinc & aluminum, is processed by CNC machines with multi edging technology, has such advantages as high precision, strong mechanical strength, beautiful appearance, light weight, anti-corrosion and anti-oxidization. The assembling configuration connected by riveting nuts and high-strength screws makes production cycle short, versatility strong and occupying area small.

6.2 手车

手车骨架也采用薄钢板经CNC机床加工后组装而成，手车与柜体绝缘配合，机械联锁安全、可靠、灵活，根据用途不同手车分断路器手车、电压互感器手车、计量手车、隔离手车等。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。

The framework of the handcart is assembled with steel sheets which are processed by CNC machines. The handcart is cooperated with enclosure insulation. The mechanical interlock is safe, reliable and flexible. The handcart can be divided into breaker handcart, voltage transformer handcart, measurement handcart, isolation handcart and etc. based on their uses. The handcart is changed based on modulus and building blocks , the handcarts of the same specification are interchangeable. The handcart has such positions as breaking , testing and working. Each position is equipped with a positioning device respectively , which ensures interlocking reliable.

6.3 隔室 compartment

开关柜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到IP2X；除继电器室外，其他三隔室都分别有其泄压通道，由于采用了中置式形式，电缆室位置大大增加，因此设备可接多路电缆。

The main electrical components in the switchgear have their own compartments, that is: breaker compartment, bus compartment, cable compartment and relay instrument compartment. The degree of each compartment reaches IP2X. All compartments , except the relay compartment, have their own pressure-relief passages . Because of the intermediate type , the cable compartment is large enough to connect multiple cables.

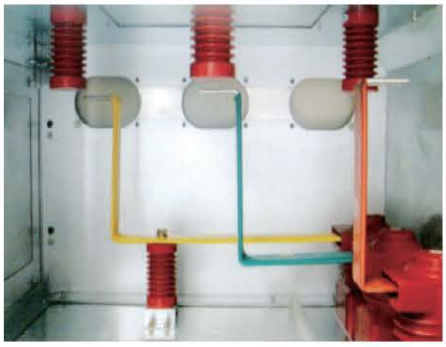
6.3.1断路器隔室B Circuit breaker's compartment B

隔离两侧安装了轨道，供手车15在柜内由隔离位置/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，同时由于上、下活门不联动，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，通过上门观察窗，可以观察隔室内手车所在位置，合、分闸显示，储能状况。

The rails are installed in the circuit breaker's compartment for the handcart sliding from isolating position /testing position to working position. The partition 13 (shutter) of the stationary contact block 6 is installed behind the rear wall of the handcart compartment. In the process when the handcart moves from the breaking position/testing position to working position, the shutter of the upper and lower stationary contact blocks will co-ordinate with the handcart , and automatically it will simultaneously open , vice versa , it will automatically close until the handcart completely covers the stationary contact block , which will form effective isolation . When overhauling, the shutter of the live side will be locked, because the upper and lower shutter will not co-operate, which can ensure the maintenance staff will not contact live component. When the door of the circuit breaker compartment is closed, the handcart can also be operated. Through observation window, the position of the handcart, breaking and closing, stored energy can be observed.

6.3.2母线隔室A bus compartment A

主母线4是单台拼接相互贯穿联接，通过分支母线2和静触头固定，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。分支母线通过螺栓联接于静触头盒6和主母线，不需要其它支撑，对应特殊需要，母线可用热缩套和联接螺栓绝缘套和端帽覆盖，相临柜母线用套管3固定，这样联接母线阀所保留的空气缓冲，在如果出现内部故障电弧时，能防止其贯穿熔化，套管3能有效把事故限制在隔室内而不向其他柜蔓延。



Main bus 4 is connected by single splicing through penetration (see table 6), and is fixed by branch bus 2 and stationary contact. The main bus and link bus are of copper-bar with rectangular section. When used for large current, the main bus will be connected by double bus-bars splicing. The branch bus is connected with stationary contact block 6 and main bus by screws without any supports. As to special use, the bus may be covered by heat shrinkable sleeves, screw insulating sleeve and end caps. The bus in adjacent cubicle is fixed by bushings, in this way, if arc fault occurs, the gas buffering will prevent the bus from being penetrated and melt down. Bushing 3 can effectively prevent the fault spreading to other compartment.

6.3.3电缆隔室C Cable compartment C

开关柜采用中置式，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安装于隔室后门下部；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，每相可并1～3根单芯电缆，联接电缆的柜底配置开缝的可卸式非金属封板或不导磁金属封板，确保施工方便。

The cable compartment is large enough to install current transformer 7, grounding switch 8 (mounted on the rear wall of the compartment), and surge arrester 10 (mounted in the lower part of the rear door of the compartment). After the handcart 15 and the horizontal withdrawable partition is moved away, a construction worker can enter the cubicle from front for installing and maintaining. The cables in the cable compartment will connect conductors; each phase can connect 1-3 single-core cables. The cubicle is equipped with a detachable non-metal or non-magnetic metal closure plate with a slot to ensure easy construction.

6.3.4继电器仪表室D Relay instrument compartment D

继电器仪表室内科安装继电器保护元件、仪表、带电监察指示器，以及特殊要求的二次设备。控制线路放设在足够空间的线槽内，并有金属盖板，使二次线与高压室隔离，其左侧线槽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放设在右侧，在继电器仪表室的顶板上海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，便于小母线的安装。

Relays, instruments, charged monitoring indicators and secondary equipment can be mounted in the relay instrument compartment. The control lines are laid in the duck with enough space. There is a metal covering plate, which will separate the secondary lines from the high voltage compartment. The duck on the left is reserved for incoming and outgoing of control small lines. The small lines of the switchgear are laid on the right. There is a penetration hole for small cables in the top plate of the relay instrument compartment. The top cover can rotate for the convenience of mounting small cables.

6.4防止误操作联锁装置 Interlocking device preventing error operation

开关柜内装有安全可靠的联锁装置，完全满足五防的要求。

○仪表室门上装有提示性的按钮或者转换开关，以防止误合、误分断路器。

○断路器手车在试验位置或工作位置时，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。

○仅当接地开关处于分闸时，断路器手车才能从试验/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(接地开关可带带电显示装置)，这样实现了防止带电误合接地开关及防止了接地开关处于闭合位置时关合断路器。

○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。

○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。

○断路器手车在工作位置时，二次插头被锁定不能拔除。

○各柜体可装电气联锁。

本开关柜还可以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，其订货按用户的需求选择。

There is a reliable interlocking device in the cubicle, which completely meets fail-safe requirements.

○there installed an obvious push-button or a change-over switch in the door of the relay instrument compartment to prevent the circuit breaker from error closing or breaking.

○only when the circuit breaker handcart is on the testing position, or on working position, can the circuit breaker be conducted with operation, besides, the circuit breaker can no t move when it is switched on, which prevents the on-load closing or breaking.

○only when the ground switch is opening, can the circuit breaker handcart be moved from testing / off position to working position; only when the circuit breaker handcart is on testing / off position, can the ground switch be operated with closing (the ground switch can be with a live displaying device), which can prevent closing the ground switch by error with current carrying and prevent close the circuit breaker when the ground switch is on the off position.

○when the ground switch is on opening position, the lower door and the rear door can not be opened, which prevents entering the alive bay.

○when the circuit breaker handcart is on testing or working position without control voltage can only manually opening be operated, closing can not be conducted.

○when the circuit breaker is on working position, the secondary plug is locked and won't be pulled out.

○the cubicle can be equipped with electric interlocking.

An electromagnet locking device can be equipped on the grounding operating mechanism so as to raise reliability. The user may choose when ordering.

6.5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，装设在门上的特殊密封圈把柜前门封板起来，顶部装置的泄压金属板将被自动打开，释放压力和排泄气体，以确保操作人员和开关柜的安全。

Above such compartments as of circuit breaker handcart, bus-bar and cable, there is a pressure-relief device . As a fault occurs on the circuit breaker or bus-bar , which will produce an arc, the air pressure in the cubicle will rise , the special sealing ring mounted on the door will enclose the front door , the pressure-relief metal plate on the top will open automatically and relieve pressure and discharge gases, which will ensure safety of operators and switchgears.

6.6二次插头与手车的位置联锁 Interlocking of secondary plug with handcart position

在开关柜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，二次静触头座装设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被电磁锁锁定，断路器手车在二次插头未接通之前仅能进行分闸，所以无法使其合闸。

The link between the secondary line of the switchgear and that of circuit breaker's handcart is realized by manual secondary plug. The moving contact of the secondary plug is connected with the circuit breaker's handcart by a nylon corrugated tube.The secondary stationary contact block is mounted on the upper right of the handcart compartment. Only when the circuit breaker's handcart is on testing / breaking position can the secondary plug be plugged or unplugged ; when the circuit breaker's handcart is on working position, the secondary plug is locked it can not be unplugged because of mechanical interlocking . Because the closing mechanism is locked by an electromagnetic lock,only switching-off can be operated for breaker's handcart before the secondary plug is switched-on.

6.7带电显示装置 live displaying device

如果用户有所需求时，开关柜内可设有监测一次回路运行的可选件带电显示装置，改装置有高压传感器和可携带式显示器两单元组成，经用户外接电线连接为一体，该装置不但可以提示高压回路带电状况，而且还可以与电磁锁配合，实现强制闭锁开关手柄、阀门，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。

A live displaying device can be equipped for monitoring primary circuit . The device is composed of a HV sensor and a portable displayer. The device not only can display charged state of the HV circuit, but also can cooperate with the electromagnetic lock, which can prevent error operation and entering the live bay.

6.8防止凝露和腐蚀 anti-condensation and anti-corrosion

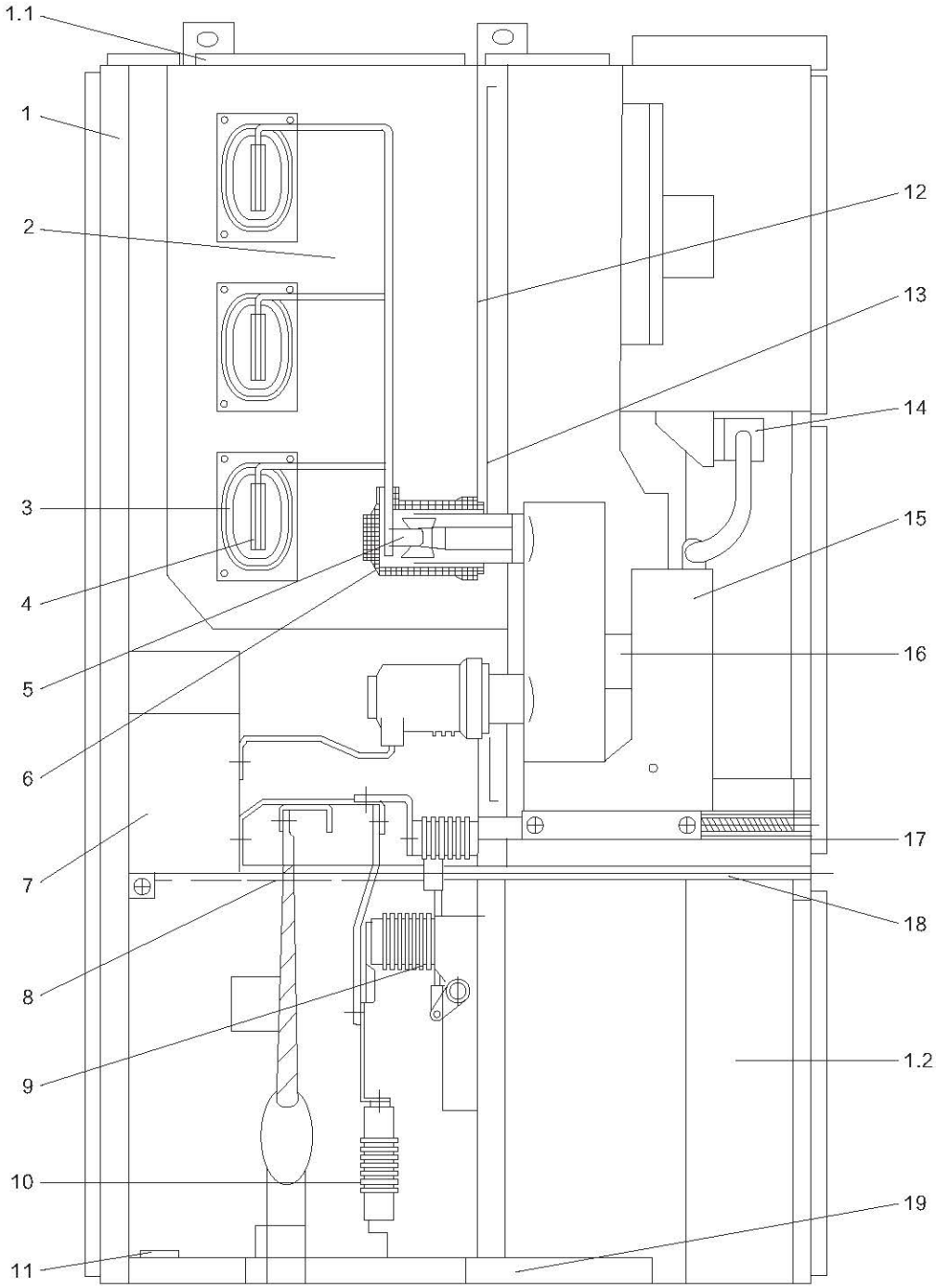
为了防止在高湿度或温度变化较大的气候环境中产生凝露带来之危险，在断路器室和电缆室内分别装设加热器，以便在上述环境之中使用和防止腐蚀发生。

A heater is installed in the breaker's and cable's compartments so as to prevent condensation and corrosion.

6.9接地装置 grounding device

在电缆室内单独设立有10×40mm²的接地铜排，此排能贯穿相邻各柜，并与柜体良好接触，此接地排供接地之元器件使用，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，确保运行操作人员及柜体安全。

There installed a 10×40mm²grounding copper bar in the cable compartment, which connects adjacent cubicles by penetrating and contacts cubicles well, in this way, all cubicles are in good state of grounding, which makes operators and cubicles safe.



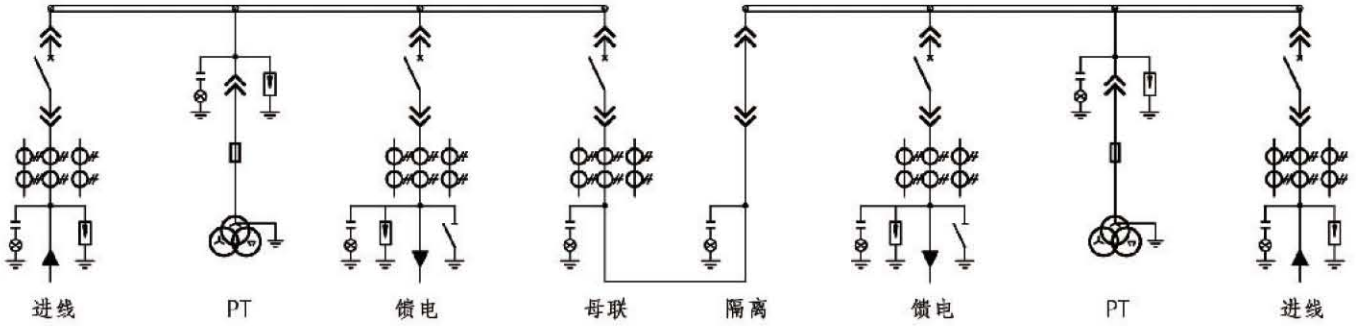
A.母线室
B.断路器室
C.电缆室
D.继电器仪表室
1.1泄压盖板
1.2二次通道盖板
1.柜板
2.支母排
3.母线套管
4.主母排
5.静触头
6.触头盒
7.电流互感器
8.接地开关
9.电缆
10.氧化锌避雷器
11.接地母排
12.隔板
13.活门
14.二次触头座
15.断路器手车
16.加热器
17.手车操作孔
18.接地开关操作轴
19.底板

A bus compartment
B circuit breaker compartment
C cable compartment
D relay instrument compartment
1.1, pressure-releaf cover
1.2, secondary passage cover
3, bus bushing
4, main bus-bar
5, stationary contact
6, contact's box
7, CT
8, grounding switch
9, cable
10, zinc-oxide surge arrester
11, grounding bus-bar
12, partition
13, shutter
14, secondary contact block
15, handcart of circuit breaker
16, heater
17, operating hole of handcart
18, operating shaft of grounding switch
19, bottom plate

图2 开关柜机构示意图

diagram 2 schematic diagram of switchgear mechanism

七、主接线方案
Main connection solution



八、安装和调试
Installation and commissioning

8.1 基础形式 foundation

8.1.1开关柜的安装基础的施工应符合《电力建设施工及验收技术规范》中的有关条款规定。

8.1.2开关柜的安装基础一般分二次浇灌混凝土，第一次为开关柜安装构件即角钢或方钢，槽钢构件安装基础，第二次浇灌混凝土是地面的的补充层，一般厚度为60mm，在浇筑混凝土补充层时，混凝土高度应低于构件平面1～3mm。

8.1.3开关柜地基安装图(详见图3)

8.1.4在基础构件安装时要保证安装质量，框架安装的技术标准为1平方米公差1mm。

8.1.1 The construction of foundation installation for switchgears shall conform to the stipulations of "Sechnical Specification For Construction and Acceptance of Electric Power Construction".

8.1.2 The foundation installation of switchgears shall be carried out with casting concrete for two times. The first time is for such component parts as L steel , square steel and U-steel, the second time for replenishing layer , its thickness is 60mm, the replenishing layer shall be 1～3mm lower than component parts plane.

8.1.3 Foundation installation diagram of switchgears (see diagram 3).

8.1.4 It is important to ensure the quality of foundation component parts when installing . The tolerance for frame installation is 1 mm/ $1m^2$.

8.2 开关柜的安装 Installation of switchgears

8.2.1开关柜的安装基础尺寸与安装尺寸详见图4、图5。

8.2.2柜体单列时，柜前走廊以2.5米为宜，双列布置时，柜间操作走廊以3米为宜。

8.2.3按工程需要和图纸标明，将开关柜运至他们特定的位置，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。

8.2.4开关柜设备在运输过程中，宜使用特定的运输工具如吊车或叉车，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再推入相应小室。

8.2.5松开母线室顶盖螺栓，卸去顶盖。

8.2.6在母线室前面松开固定螺栓，卸下装卸式隔板12。

8.2.7松开断路器手车下面得可抽出式隔板17的固定螺栓，并将水平隔板卸下。

8.2.8松开和移去电缆盖板19。

8.2.9从开关柜左侧控制小母线槽移去盖板，右前方控制线槽盖板亦同时卸下。

8.2.10卸下吊装板及紧固件。

8.2.11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。

8.2.12当开关柜已完全组合(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。

8.2.1 As to foundation installation dimension, please see diagram 4 and 5.

8.2.2 If the cubicles are arranged in single row, the operating corridor is 2.5m, if in double rows, 3 m.

8.2.3 It is better to begin from the middle when arranging longer row of switchgears （more than 10）.

8.2.4 During transportation, it is better to use a crane or a forklift. It is forbidden to transport the switchgear with the breaker's handcart in the cubicle. Only after the cubicle is installed can the breaker's handcart (or other handcarts) be pushed into related

compartments.

8.2.5 Loosen the screws on the top cover of the bus compartment, remove the top cover.

8.2.6 Loosen the screws before the bus compartment, remove the detachable partition 12.

8.2.7 Loosen the screws of the withdrawable partition under the breaker's handcart, remove the horizontal partition.

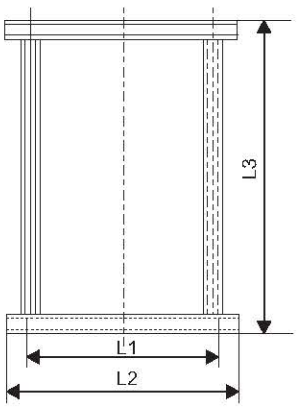
8.2.8 Loosen and remove covering plate 19 of cables.

8.2.9 Remove the covering plate from the small bus channel on the left of the switchgear , and remove the covering plate of the control line channel on right front at the same time.

8.2.10 Remove lifting plates and fasteners.

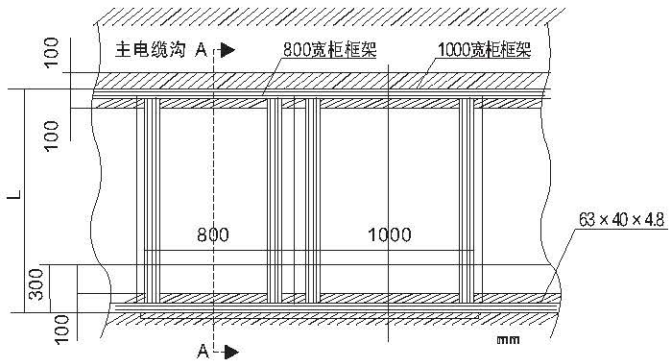
8.2.11 Install the switchgear one after another. Pay attention to horizontal degree and verticality, roughness shall be within 2mm.

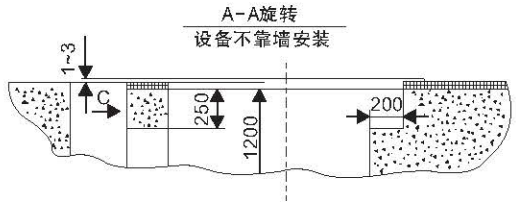
8.2.12 After switchgears are constituted, connect them by M12 anchor bolts with foundation frames or weld.

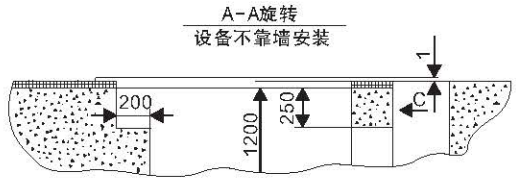


柜宽A Cubicle width A	柜深B Cubicle depth B	L1	L2	L3
800	1500电缆 1500 cable	630	800	1450
	1660架空 1660 overhead			1610
1000	1500电缆 1500 cable	830	1000	1450
	1660架空 1660 overhead			1610

图3 开关设备地基安装图
Diagram 3 foundation installation diagram of switchgears







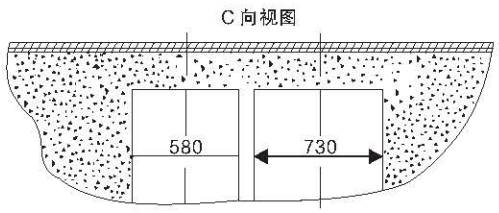
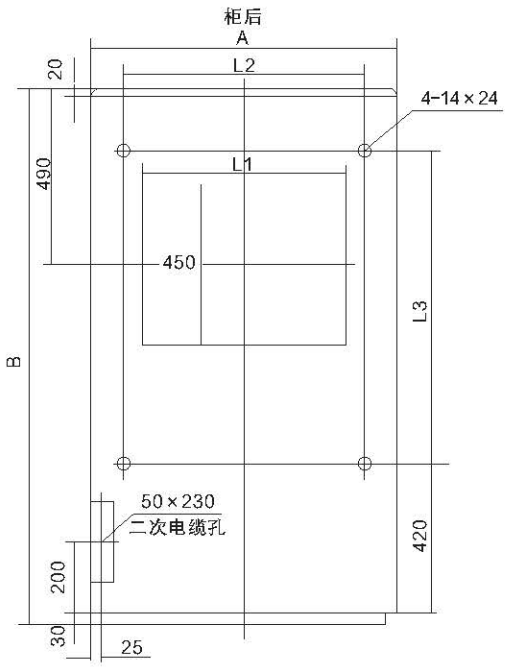


图4 开关设备安装基础示意图 注:A-A剖视图
见下页 Diagram 4 schematic diagram of foundation installation for switchgears

柜深	L
1500	1450
1660	1610



mm

柜宽A Cubicle width A	柜深B Cubicle depth B	L1	L2	L3
800	1500电缆 1500 cable	530	630	880
	1660架空 1660 overhead			1040
1000	1500电缆 1500 cable	730	830	880
	1660架空 1660 overhead			1040

图5 开关设备安装尺寸示意图
Diagram 5 schematic diagram of switchgears dimensions

8.3母线的安装 installations of buses

开关柜设备中的母线均采用矩形母线，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，因而在安装时必须遵照下列步骤：

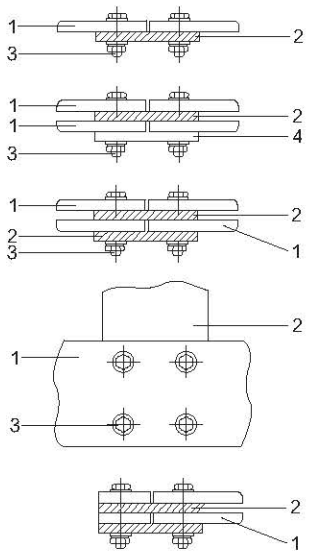
8.3.1用清洁干燥的软布擦揩母线，检查绝缘套管是否有损伤，在连接部位涂上导电膏或者中性凡士林。

8.3.2一个柜接一个柜地安装母线，将母线段和对应分支小母线接在一起，拴接时直插入合适的垫块，用螺栓拧紧。主母线和分支母线的联接形式见图6。

The buses in the switchgears are rectangular and sectional . The buses of different specifications shall be chosen based on different currents. Following procedures shall be observed during installing:

8.3.1 Clean buses with dry and soft cloth; examine weather the insulating bushings are damaged, coat the connecting parts with conductive paste or neutral Vaseline.

8.3.2 Install buses for the switchgear one after another, connect bus sections with corresponding small buses. Insert suitable blocks when bolted, tighten screws. As to the connecting method, please see diagram 6.



1.主母线 2.分支小母线 3.螺栓 4.垫块
图6 母线与支母线的联接型式

8.4开关柜的接地装置 grounding device of switchgears

8.4.1用预设的连接板将各柜的接地母线一一连接在一起。

8.4.2在开关柜内部联接所有需要接地的引线。

8.4.3将基础框架与接地线相连，如果柜子排列超过10台以上，必须由两个以上的接地排。

8.4.4将接地开关的接地线与开关柜接地主母线联接。

8.4.1 Connect the grounding bus of each switchgear with the preset connection board.

8.4.2 Connect leads in the switchgear which need grounding.

8.4.3 Connect the foundation frame with the grounding wire. If a row consists of more than 10 switchgears, more than 2 grounding bars are needed.

8.4.4 Connect the grounding wire of the earth switch with the main grounding bus of the switchgear.

8.5 开关柜安装后的检查

当开关柜安装就位后，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，将断路器在柜中推进、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。

After switchgears are installed, clean dust and sundries, then examine whether the screws are tightened, whether connections are reliable. Observe whether there is abnormal condition when the circuit breaker is "ON" and "OFF". Adjust pointers of all indicating instruments to "zero", examine whether the secondary connection is right according to the circuit diagram , adjust the relay, examine whether the interlock is effective.

8.6开关柜安装完毕或投运前建议进行下述电气性能测试，测试项目及试验标准见下表

It is suggested that following electrical tests be carried out after switchgears are installed and before putting into service

额定电压 rated voltage		KV	3.6	7.2	12
主回路工耐压(1min) power frequency withstand voltage of main circuit		KV	25	32	42
辅助控制回路 auxiliary control circuit	工频耐压(1min) power frequency withstand voltage	KV	2	2	2
	绝缘电阻测试(1000V兆欧表) metering of insulating resistance (1000V megger)	MW	≥1	≥1	≥1

主回路电阻(上、下静触头盒之间) resistance of main circuit (between upper and lower stationary contact block)	额定电流(A) rated current	630	1000	1250	1600	2000	2500	3150	4000
	回路电阻(uΩ) circuit resistance	100	80	80	45	40	35	30	30
断路器回路电阻(uΩ) circuit		50	40	40	25	20	20	15	15

▶ 九、使用与维护

Use and maintenance

9.1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：

during switchgear operation, the operators shall pay attention to following besides by related regulations:

9.1.1操作程序

虽然开关柜设计有保证开关柜各部分操作程序正确的联锁，但是操作人员对开关柜各部分的投入和提出，仍应严格按操作规程和本说明书的要求进行，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。

9.1.1.1无接地开关的断路器柜的操作

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嵌，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，将转运车推至柜首，把小车升到合适位置，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之后，打开断路器小车的锁定鈎，将小车平稳推入柜体同时锁定，当确认已将小车与柜体锁定好之后，解除转运车与柜体的锁定，将转运车推开。

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，此时可在主回路未接通的情况下对小车进行电气操作试验，若想继续进行操作，首先必须把所有柜门关好，用钥匙插入门锁孔，把门锁好，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，然后取下摇把，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)，插入手车操作摇把，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。

c.从柜中取出小车：若准备从柜内取出小车，首先，应确认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，此时将转运车推至柜前(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定，解除转运车与柜体的锁定，把转运车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，在推动转运车工程中要格外小心，以避免运输过程中发生意外事故。

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。

若通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，此时如果辅助回路触头接通电，则仪表面板上分闸指示灯亮。若通过柜体中面板观察玻璃窗看到手车面板上红色的合闸指示牌则判定断路器处于合闸状态，此时如果辅助回路触头接通电，则仪表面板上合闸指示灯亮。

9.1.1.2有接地开关的断路器的操作

将断路器手车推入柜内和从柜内取出手车的程序，与无接地开关的断路器柜的操作完全相同，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对方叙述如下：

a.手车在柜内的操作

当准备将手车推入工作位置时，除了要遵守9.1.1.1b中提到注意的诸项要求外，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。

b.合、分接地开关操作

若要合接地开关，首先应确认手车已退到试验/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。

9.1.1.3一般隔离柜的操作

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分闸(见9.1.1.1 d)，同时断路器分闸后期分闸触点转换解除与配合隔离手车上的电气联锁，只有这时才能操作隔离车，具体操作程序同操作断路器手车相同。

9.1.1operating procedures

Although there is an interlock which ensures correct operating procedures. The operators shall be strict in accordance with operating regulations and this manual, otherwise, the equipment will be damaged or an accident will occur.

9.1.1.1 operations for breaker cubicle without a grounding switch.

a.Put the movable part of the circuit breaker into the cubicle: before pushing the breaker handcart into the cubicle, the circuit breaker shall be examined whether it is all right, whether there is a part not mounted, if it is all right, put the handcart onto the transfer-cart and lock it, then push the transfer-cart in front of the cubicle, lift the handcart to suitable position, insert the positioning locking plate in front of the transfer-cart into the partition socket in the cubicle, lock the transfer-cart and cubicle, open the locking hook of the breaker's handcart, push the handcart into the cubicle and lock it . After confirming the handcart and cubicle are locked, unlock the transfer-cart and cubicle, move away the transfer-cart.

b.Handcart's operation in the cubicle: after the handcart is pushed into the cubicle from the transfer-cart , it is on off position . If the handcart will be put into service, first move the handcart to testing position, plug the auxiliary circuit into the socket, if Power is on, the indicating lamps on testing position of the panel of the instrument compartment will be lit, at this time, the electrical operation test can be carried out with the handcart when the main circuit is not electrified , if go on operations , all doors shall be closed, lock the doors with keys, confirm the breaker is on opening position (see d),at this time, insert the handle of the handcart into the operating hole of the panel, rotate the handle clockwise, until it is obviously blocked and a clear sound sends out, meanwhile, the indicating lamps on testing position of the panel of the instrument compartment is lit , then take down the handle , at this time ,the main circuit is power on, the breaker is on working position, onn or off can be operated by control circuit.

If the handcart will withdraw from working position , first, confirm the breaker is in opening state (seed) , insert the handle of the handcart , rotate the handle anticlockwise, until it is obviously blocked and a clear sound sends out, the handcart returns to testing position. At this time the main circuit is off, the metal shutter is closed.

c.Take the handcart out of cubicle : first confirm that the handcart is on testing position , and then unplug the auxiliary circuit out of the socket, push the transfer-cart in front of the cubicle, unlock the handcart and pull it out. When the handcart comes into the transfer-cart, confirm it is locked, unlock the transfer-cart with the cubicle, pull the transfer-cart backward for some distance, and then stop it. Pull the transfer-cart with care to avoid accident.

d.Confirmation of off or on state of the breaker in the cubicle: the off or on state of the breaker is determined based on breaking-closing indicator on the panel of the handcart and the indicating lamp on the panel of the instrument compartment.

When the green breaking indicator board on the handcart panel is seen through the glass observation window in the panel of the cubicle, the breaker is determined to be in off state, if, at this time , the auxiliary circuit contact is powered on , the breaking indicating lamp on the instrument panel is lit . When the red closing indicator board on the handcart panel is seen through the glass observation window in the panel of the cubicle, the breaker is determined to be in on state, if, at this time , the auxiliary circuit contact is powered on, the closing indicating lamp on the instrument panel is lit.

9.1.1.2 operations for breaker cubicle with a grounding switch

The procedures are the same with those of operations for breaker cubicle without a grounding switch when pushing the handcart in or pulling it out. Matters needing attention for operations of handcart in the cubicle and operations on grounding switch:

a .operations of handcart in the cubicle

It shall be confirmed that the grounding switch is in off state besides the requirements in 9.1.1.1b when getting ready to push the handcart into working position.

b.closing and breaking operations of the grounding switch

If the grounding switch is to be closed, it shall be confirmed that the handcart has returned to testing/breaking position, and that the handle has been taken down, then, press the interlocking bending plate in the operating hole of the grounding switch, insert the operating handle, rotate it 90° clockwise, the grounding switch is in on state, if rotate the operating handle 90° anticlockwise, the grounding switch is in off state.

9.1.1.3 operations of isolating cubicle

The isolating handcart has no making or breaking capacity, so, it is not allowed to push or pull handcart with load. Before operating isolating handcart, it shall be confirmed that the breaker which is cooperated with the handcart is in off state (see9.1.1.1 d). the operating procedures are the same with those of the breaker handcart.

9.2使用联锁的注意事项 matters need attention when using the interlock

9.2.1本开关柜的联锁柜内以机械联锁为主，辅之以电气联锁实现其功能的，功能上能实现开关柜“五

防”闭锁的要求，但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联锁装置的保障作用，防止误操作事故的发生。

9.2.2本开关柜的联锁功能的投入与解除，大部分是在正常操作过程中同时实现的，不需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，甚至导致误操作事故的发生。

9.2.3有些联锁因特殊需要允许紧急解锁(如柜体下面板和接地开关的联锁)。紧急联锁的使用必须慎重，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，应立即恢复联锁原状。

9.2.1 The interlocking in this switchgear is mainly of mechanical interlocking, supported by electrical interlocking. The operators shall observe operating regulations to avoid accidents.

9.2.2 The lock and unlock of the interlocking needs no extra operating procedures, if operations are blocked, first examine whether error operations have happened. Do not carry on forced operations.

9.2.3 Some interlocking needs emergency unlocking (for example, the interlocking of the bottom panel with the grounding switch). Emergency unlocking can not be often used, during emergency unlocking; necessary protective measures shall be taken.

9.3开关柜的检修除有关规程要求进行外，建议用户特别注意以下几点：

9.3.1按真空断路器的安装使用说明书的要求，检查断路器的状况，并进行必要的调整。

9.3.2检查手车推进机构及联锁的情况，使其满足本说明书的有关要求。

9.3.3检查主回路触头的情况，擦除动静触头上陈旧油脂，擦看触头有无损伤，弹簧力有无明显变化，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。

9.3.4检查辅助回路触头有无异常情况，并进行必要的休整。

9.3.5检查接地回路各部分的情况，如接地触头，主接地线及过门接地线等，保证其导电连续性。

9.3.6检查各部分紧固件，如有松动，应及时紧固。

9.3 As to overhauling of the switchgears, it is suggested that the user pay attention to the following besides related regulations:

9.3.1 Examine the conditions of vacuum circuit breakers in accordance with instructions.

9.3.2 Examine the conditions of pushing mechanism of the handcart and interlocking.

9.3.3 Examine main circuit contacts, erase grease on the moving and stationary contacts, examine whether contacts are damaged, whether spring force has changed, whether the coating layer is oxidized, if any, deal with them.

9.3.4 Examine whether the auxiliary circuit contacts are all right.

9.3.5 Examine grounding circuits such as grounding contacts, main grounding wires and so on.

9.3.6 Examine all fasteners, if loose, fix them.

▶ 十、运输与存放

Storage and transportation

开关柜在运输与存放过程中应注意以下几点：

a.不许倾翻，倒置和遭受剧烈震动，防止靠近火源。

b.应防止淋雨，以免产品受潮。

c.不得随意拆卸电器产品及零部件。

Pay attention to the following when switchgears are transported:

a.No upside down, or violent vibrations, do not approach fire.

b.prevent them from rains or being damped.

c.Do not randomly dismantle the parts or the products.

十一、产品成套提供下列文件
The following shall be provided

a.产品合格证；
b.产品装箱单；
c.产品出厂试验报告；
d.产品使用说明书；
e.设备清单；
f.二次接线图；
g.出图产品提供图目录及设备表供应；
h.中置手车操作摇把，接地开关操作手柄及中置手车转运车(合同台数10台以下每5台配一套；超过10台，每增加10台，加一套)。

a. Compliance certificates of products
b. Packing list
c. Shop test reports
d. User's manual
e. Equipment list
f. Secondary connection diagram
g. Provide drawing contents and equipment lists
h. Operating handles of the handcart, operating handles of the grounding switch and transfer-carts (one set for 5, if more than 10, an additional set for 10).

十二、订货须知
Order information

8.1 基础形式

订货时应提供下列资料：
a.主接线方案编号及单线系统图，排列图及平面布置图。
b.二次功能图，端子排列图，若无端子排列图时按制造厂家端子排编排。
c.开关柜的电器元件的型号、规格、数量。
d.电气设备汇总表。
e.需要母线桥(两列柜间母线桥和墙面间母线桥)时，需提供跨距和高度尺寸。
f.开关柜使用在特别环境条件时，应在订货时提出。
g.需要其他或超出附件供件时，应提出种类和数量。

The following information shall be provided when ordering:
a. Numbers of main connection solutions, single-line system diagram, layout drawings, plane layout diagram.
b. Secondary schematic diagrams, terminal layout drawings; if there is no terminal layout drawings, the terminals will be arranged by the manufacturer.
c.
d. Aggregated list of electric equipment.
e. The skip distance and height sizes shall be provided if the user needs bus bridges (the bus bridges between two rows of cubicles, the bus bridges between cubicle and wall).
f. The user shall inform the manufacturer that the switchgears are used in special environments when ordering
g. The kinds and quantities of extra accessories and spare parts needed.

XBW-12系列箱式变电站

XBW—12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装置，用于城市高层建筑、城乡建筑、豪华别墅、广场公园、居民小区、高新技术开发区、中小型电厂、矿山油田以及临时施工用电等场所，作为接受和分配电能并向用户提供电能之用。

XBW—12系列箱式变电站，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，与常规土建式变电站相比，同容量的箱式变电站占地面积通常仅为常规变电站的1/10~1/5，大大减少了设计工作量及施工量，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新型成套设备。

本产品符合国标GB/T17467《高压/低压预装式变电站》和SD320《箱式变电站技术条件》。

XBW - 12 series box-type substation, high voltage electrical equipment, transformers, low voltage electrical equipment, such as combined into compact complete sets of equipment, for urban high-rise building, square, park, urban and rural construction, the luxurious villa, residential area, high and new technology development zone, small and medium-sized power plants, mines, oil field and temporary construction etc, as acceptance and distribution of electric energy and provide electricity to the user.

XBW - 12 series box-type substation, with complete sets of strong, small size, compact structure, safe and reliable running, convenient maintenance, as well as the characteristics of mobile, compared with the conventional civil type transformer substation, with the capacity of the box-type substation area usually only 1/10 - 1/5 for conventional substation, greatly reducing the workload of design and construction, reduce the construction cost. In the power distribution system, distribution system can be used in the ring network, and also can be used for double power supply or radiation terminal power distribution system, is the urban and rural substation construction and reconstruction of new type of complete sets of equipment.

This product conforms to the national standard GB/T17467 preinstalled high/low pressure type transformer substation and SD320 "box-type substation technical conditions".

二、产品使用环境
Products using the environment

2.1 环境温度：上限+40℃，下限－15℃。
2.2 相对湿度不大于90%(+25℃时)。
2.3 海拔不超过2000m。
2.4 风压：不超过700Pa(相当于风速34m/s)。
2.5 覆冰不超过10mm。
2.6 风速不超过34m/s(相应于圆柱表面上的700Pa) 。
2.7 地震烈度不超过8度。
2.8 安装倾斜度不超过5度。
2.9 在二次系统中感应的电磁干扰的幅值不超过1.6kV。若超出上述使用环境条件，订货时请与本公司协商。

2.1 Ambient temperature: 2.1 cap + 40 ℃, the lower limit - 15 ℃.
2.2 relative humidity is not more than 90% (+ 25℃).
2.3 altitude does not exceed 2000 m.
2.4 wind pressure: no more than 700 pa (equivalent to 34 m/s wind speed).
2.5 ice no more than 10 mm. 34 m/s wind speed is less than
2.6 (corresponding to the cylindrical surface of 700 pa).
2.7 earthquake intensity is not more than 8 degrees.
2.8 installation to no more than 5 degrees.
2.9 in the secondary system of induction electromagnetic interference amplitude is less than 1.6 kV. If more than the use of environmental conditions, when ordering, please negotiate with our company.

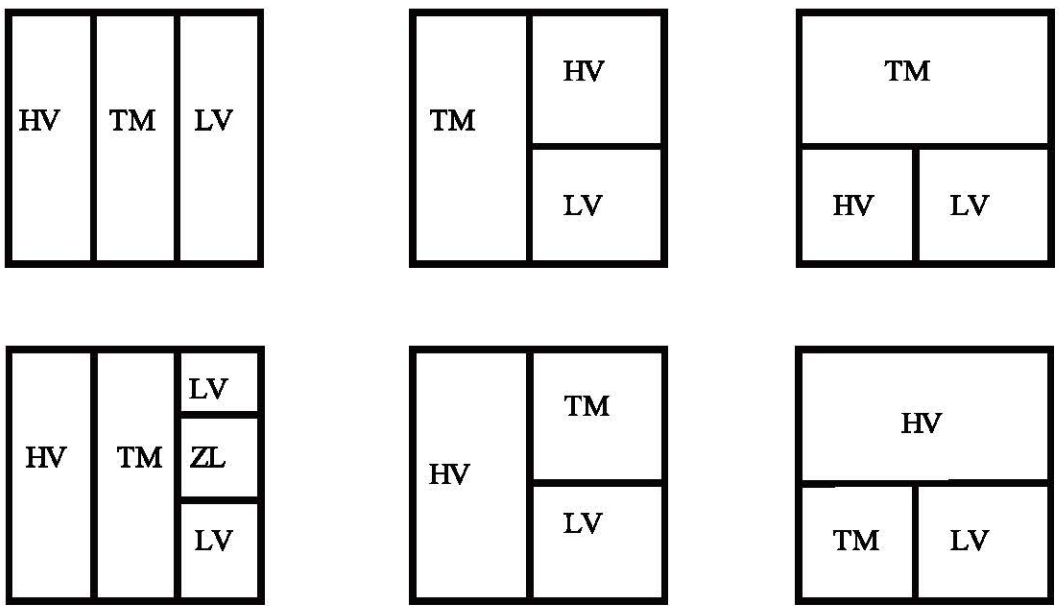
三、主要技术参数
The main technical parameters

内容 Content			单位 unit	高压开关 High voltage switch	电力变压器 Power transformer		低压开关 Low voltage switch
额定电压 The rated voltage			kV	3.6	3/0.4		0.4/0.22
				7.2	6/0.4		
				12	10/0.4		
额定电流 Rated current			A	≤630			≤4000
额定频率 Rated frequency			Hz	50(60)			
额定容量 Nominal capacity			kVA		50～2500		
额定短时耐受电流(3s) Rated short-time resistance current (3s)			kA	20			
额定峰值耐受电流 Rated current peak tolerance			kA	50			
额定短路关合电流 Close the current of rated short circuit			kA	50			
10KV额定绝缘水平 10kv rated insulation level	工频耐受电压值 Power frequency withstand voltage value	通用值 Universal values	kV	42	干式28 Dry type 28	油浸35 Oil-immersed 35	2.5
		隔离断口 The isolation of fracture	kV	48			
	冲击耐受电压(峰值) Impulse withstand voltage (peak value)	通用值 Universal values	kV	75	75		8
		隔离断口 The isolation of fracture	kV	85			
防护等级 Protection grade			IP43				
噪音 The noise			dB		干式≤55，油浸≤65 Dry 55 or less, in oil 65 or less		

四、主要结构特征
Major structural features

XBW—12系列箱式变电站的总体结构包括三个主要部分：高压开关柜、变压器及低压配套装置，其总体结构主要有两种形式：一种为组合式；另一种为一体式。组合式布置是高压开关设备、变压器和低压配电装置三部分个为一室，即由高压室、变压器室和低压室三个隔室组成，可按"目字型"或"品字型"布置，如图所示。"目字型"布置与"品字型"布置相比，"目字型"接线较为方便，故大多采用"目字型"布置。但"品字型"布置结构较为紧凑，特别是当变压器室排布多台变压器时，"品字型"布置较为有利。

XBW - 12 series box-type substation general structure includes three main parts: high voltage switchgear, transformer and low voltage auxiliary device, its overall structure mainly has two forms: one is combined; Another for one-piece. Modular arrangement is high voltage switch equipment, transformers and low voltage power distribution equipment for one room, which is composed of high voltage room, transformer room and low pressure chamber of three compartment, can press "item type" or "article type" decorate, as shown. "Item type" decorate compared with "product type" decorate, "item type" connection is more convenient, so "item type" USES mostly arranged. But the "product type" structure is more compact, especially when the room arrangement more transformer, favourable "product type".



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HV—高压室；LV—低压室；TM—变压器室；ZL—操作走廊
HV - high pressure chamber; Louis vuitton - low pressure chamber; TM - transformer room; ZL - operation corridor

4.1 变电站小型化

XBW—12系列箱式变电站基建工程规模小，占地面积小，综合成本低，与土建变电站相比，节省投资30~50%；施工周期短，全站施工周期仅半个月左右即可并网运行。

4.1 substation miniaturization

XBW - 12 series box-type substation construction project is small, cover an area of an area small, low comprehensive cost, compared with the civil substation, investment saving 30-50%; Short construction period, the total construction period is only about half a month can be parallel operation.

4.2 变电站建设工厂化

XBW—12系列箱式变电站是将10kV及以下一、二次系统，在工厂内组装到一密封箱体内。而该成套设备的装配、试验、调试工作都在工厂内完成。现场工作只需做好设备相应的基础及进、出线联接，即可很快实现送电营运。实现了变电站无室内控制室，无室内开关室，无室内架构，不仅降低了基建成本，而且使建站及安装工作简便快捷。

4.2 factory substation construction

XBW - 12 series box-type substation is a 10 kv and below, secondary system, assembled into a sealed enclosure in the factory. Complete sets of equipment and the assembly, testing and commissioning work is done in the factory. The basis of field work just have equipment corresponding and the inlet and outlet connections, can quickly send operations. Implements the substation without interior control room, indoor switch room, interior architecture, not only to reduce the construction cost, and make the work site and installation is simple and quick.

4.3 变电站运行安全可靠

XBW—12系列箱式变电站采用密封隔热型式，为电器设备的可靠运行提供良好环境。箱体结构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，50年不褪色，同时外型有普通型、景观型等各种造型设计，以满足不同场合使用。

本产品由高压配电装置、变压器、低压配电装置联接而成，并用隔板分成三个功能隔室：高压室、变压器室和低压室，高低压室功能齐全。高压设备推荐选用XGN15—12型或XGN21—12型环网柜，配FLN36—12D六氟化硫负荷开关或VS1—12真空断路器，而与之相配套的各类控制保护器可以装在相应的单元柜上，相对独立。变压器室可选择S9、S9—M以及其他低损耗油浸式变压器或SCB9干式变压器；变压器室在用户有要求时，可设轨道方便变压器从变压器室两侧大门进出，可装设自起动强迫风冷系统、重瓦斯保护系统等。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、电能计量和电量测量等多种功能，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。各室均有自动照明装置，高低元件性能可靠、操作维护方便。

变电站可配套稳定可靠的直流开关电源及免维护的电池直流系统，为系统提供连续、不间断的服务。根据用户要求可取消直流电源，所有的控制和保护电源均使用AC220V。为维持自动化设备在事故状态下能够工作30分钟，增设UPS电源，应急备用。

变电站采用自然和机械强迫通风两种方式排气散热，使得在炎热的夏季站内温度不会超过35℃，不影响站内设备的安全运行。为防止凝露发生，危及电器绝缘，可应用户要求在站内加装凝露控制器。

4.3 safety and reliability of the operation of the transformer substation

XBW - 12 series box-type substation adopts sealing and heat insulation type, good environment for the reliable operation of electrical equipment. Outdoor enclosure structure with long-term use of conditions, to ensure that the anticorrosive, waterproof, dustproof performance, service life is long, 50 years do not fade, and appearance are ordinary type, landscape and so on all sorts of modelling design, to meet different situations.

This product is composed of high voltage switchgears, transformers, low voltage power distribution unit connection, and baffle plate is divided into three functional across the room: high voltage room, transformer room and low pressure chamber, high and low pressure chamber fully functional. High voltage equipment recommended to choose XGN15-12 type or XGN21-12 type ring network cabinet, with FLN36-12 d sulfur hexafluoride load switch or 12 VS1 vacuum circuit breaker, the protector can be installed with matching all kinds of control in the corresponding unit on ark, relatively independent. Transformer room is available in the integrated, the integrated -m and other low loss oil-immersed transformer or SCB9 dry type transformer; Transformer room in the user requirements, can be set for transformer from the transformer room on both sides of the gate in orbit, can furnish self-starting forced air cooling system, the heavy gas protection system, etc. Low pressure chamber or cabinet according to user requirements can be used panel mounted structure required power supply scheme, users have power distribution, lighting distribution, reactive power compensation, power measurement and energy measurement and other functions, meet different requirements of users, and convenient user power supply management and improve the quality of power supply. Each room has automatic lighting device, components and reliable performance, convenient operation and maintenance.

Substation can form a complete set of reliable dc switching power supply and maintenance-free battery dc system, for the system to provide continuous, uninterrupted service. According to user requirements can cancel all dc power supply, control and protection power supply are using AC220V. In order to maintain automation equipment in the accident situation to work 30 minutes, add UPS power supply, emergency.

Substation adopts two methods of natural and mechanical forced ventilation exhaust heat, makes the internal temperature in hot summer can't more than 35℃, will not affect the safe operation of the equipment within the station. To prevent condensation, endanger electric insulation, at the request of the user within the station equipped with condensation controller.

4.4 变电站智能化

XBW—12系列箱式变电站适用于12kV及以下无人值守开闭所或变电站，其二次系统采用由微机监控、保护装置构成的变电站综合自动化系统，完成对主变、线路、电容器、高压电机等电器设备的控制、保护、测量和信息远传功能。微机型保护及监控装置功能强大，稳定可靠的"四遥"功能，辅之以仿真、提示及防误操作程序，使得操作得心应手。

4.4 intelligent substation

XBW - 12 series box-type substation is applicable to 12 kv and below unattended or substation by opening and closing, the second time system by microcomputer monitoring and protection device is adopted to form the integrated substation automation system, complete the main transformer, line, and capacitor, high-voltage motor electrical equipment control, protection, measurement and information remote transmission function. Type microcomputer protection and monitoring device powerful, stable and reliable "four control" function, supplemented by simulation, tips and prevent wrong operation procedures, making operation with ease.

五、 运输、吊装
Transportation and hoisting

5.1 运输

5.1.1 箱变在运输途中不需要外包装。

5.1.2 箱变以汽车运输最佳，注意选择合适的吨位及长度，行驶速度不超过40公里/小时，并且要求行驶平稳，注意避开空中障碍物。

5.1.3 长途运输时，为防止箱变在运输途中损坏，用尼龙绳索或尼龙网对箱变和运输载体进行固定。

5.2 吊装

吊装时使用本公司配备的专用吊装工装，吊索上方的横杆长度应大于箱变外壳的宽度，以防止钢丝吊索损坏箱体及开关柜；吊索下方的吊环挂在箱变底座标明的吊装位置。吊装时要平放，勿将箱体碰划，防止表面漆层受损。落地时应缓慢，勿猛烈撞击，以防箱内元件受到震动而损坏。

吊装时使用本公司配备的专用吊装工装，吊索上方的横杆长度应大于箱变外壳的宽度，以防止钢丝吊索损坏箱体及开关柜；吊索下方的吊环挂在箱变底座标明的吊装位置。吊装时要平放，勿将箱体碰划，防止表面漆层受损。落地时应缓慢，勿猛烈撞击，以防箱内元件受到震动而损坏。起吊钢丝绳之间的夹角不得大于60度。

5.1 transportation

5.1.1 change in transit don't need to outer packing box.

5.1.2 change in motor transport box best, pay attention to choose the right tonnage and length, speed is not more than 40 km/h, and smooth driving, pay attention to avoid the air barrier.

5.1.3 long-distance transportation, in order to prevent the case become damaged during transit, nylon rope or nylon net fixed on change and transport carrier box.

5.2 the lifting

Lifting is used when the company is equipped with special lifting equipment, at the top of the rail sling length should be greater than the width of the box change shell, in order to prevent damage of sling wire casing and switchgear; Sling rings to hang in the box below bottom mark of hoisting position. Should flat when lifting, not body touch, will prevent surface lacquer layer is damaged. Landing should be slow, don't hit so hard to prevent vibration and damage of the components in the.

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六、订货须知
Ordering instructions

订货时须提供下列资料：

a）一次线路方案及单母线系统图

b）二次控制原理图或接线图

c）预装式变电站的平面布置图

d）每个柜内所装各种电器详细的型号、规格及数量

e）提供的母线规格或按我公司标准供给

f）柜体表面颜色（除用户特殊要求）按我公司标准颜色制造。（RAL7032）

注：用户有特殊的要求，可以在订货时提出。

When placing order, please provide the following information:

A) a line scheme and single busbar system diagram

B) the secondary control principle diagram or wiring diagram

C) preinstalled type substation layout

D) in each cabinet on the various electrical detail type, specification and quantity

E) provide bus specification or standard supply according to my company

F) the cabinet put oneself in another's surface color (in addition to the user's special requirement) according to our company standard color. (RAL7032)

Note: users have special requirements, can be in when ordering.

HXGN15-12(F·R)箱式固定交流金属封闭环网开关设备

1.1简述

HXGN15—12(F·R)箱式固定交流金属封闭环网开关设备(简称"环网柜"),是为城市电网改造和建设需要而设计的新型开关设备。在供电系统中亦作为开断负荷电流和短路电流以及关合短路电流之用,适用于交流3—10kV、50Hz的配电系统中。广泛地用于城市电网建设和改造工程、工矿企业、高层建筑和公共设施等,作为环网供电单元和终端设备,起着电能的弹簧操动机构,该机构既可手动操作,也可电动操作。接地开关和隔离开关配用手力操动机构,本环网柜成套性强、体积小、无燃烧和爆炸危险,具有可靠的"五防"功能。

1.1 a brief introduction

HXGN15-12 (F, R) box fixed ac metal-enclosed switchgear ring network (hereinafter referred to as "ring network cabinet"), is designed for urban power grid renovation and construction needs new type of switch devices. In the power supply system as well as the breaking load current and short circuit current and close short circuit current, suitable for 3 to 10 kv, 50 hz power distribution system. Widely used in urban power grid construction and renovation project, industrial and mining enterprises, high-rise buildings and public facilities, etc., as a ring net power supply unit and terminal equipment, play the power of the spring operating mechanism, the institution can be manually operation, can also be electric operation. Grounding switch and isolating switch with hand operating mechanism, this ring network cabinet complete sex strong, small volume, no combustion and explosion danger, has reliable "five prevention" function.

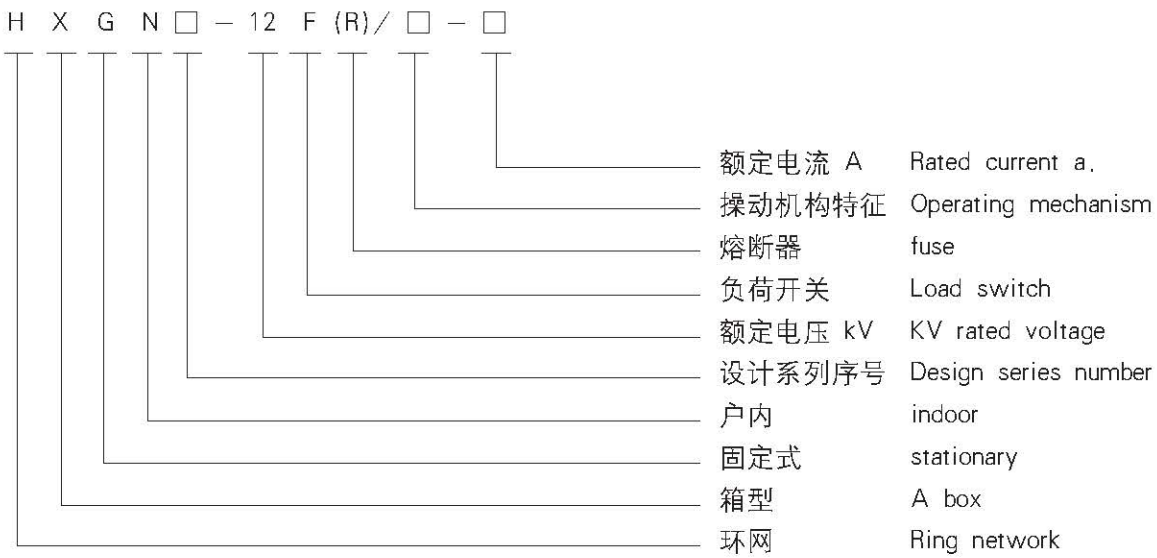
1.2 标准

本环网柜符合GB3906、IEC60420等标准的有关规定。

1.2 standard

The ring network cabinet in accordance with the relevant provisions of the standard GB3906, IEC60420 etc.

二、型号及其含义
Model and its meaning



三、正常使用条件
Normal conditions of use

3.1 周围空气温度：–15℃～+40℃；

3.2 海拔高度：1000m及以下；

3.3 湿度条件：日平均值不大于95%，水蒸气压力日平均值不超过2.2kPa；
月平均值不大于90%，水蒸气压力月平均值不超过1.8kPa。

3.4 地震烈度：不超过8度；

3.5 没有腐蚀性或可燃性气体等明显污染的场所。

注：超出上述正常使用条件时，用户可与本公司协商。

3.1 ambient air temperature: 15 ℃ ~ + 40℃; Height:

3.2 1000 m and below; Humidity conditions:

3.3 day average no greater than 95%, water vapor pressure, average no more than 2.2 kPa;
Monthly average no greater than 90%, the water vapor pressure on the average no more than 1.8 kPa.

3.4 earthquake intensity: no more than 8 degrees;

3.5 no corrosive or flammable gases such as obvious pollution places.

Note: beyond the normal conditions of use, the user can negotiate with our company.

四、主要技术参数
The main technical parameters

序号 The serial number	名称The name of the		单位unit	参数值The parameter value
1	额定电压The rated voltage		kV	10
2	额定频率Rated frequency		HZ	50
3	主母线额定电流Rated current mistress line		A	630
4	额定短时耐受电流Rated short-time resistance current		KA	20
5	额定短时耐受电流持续时间Rated short-time resistance current duration		S	4
6	额定短路关合电流Close the current of rated short circuit		KA	50
7	额定峰值耐受电流Rated current peak tolerance		KA	50
8	额定有功负荷开断电流Active load open circuit current rating		A	630
9	额定闭环开断电流The nominal closed-loop open circuit current		A	630
10	熔断器额定电流Fuse rated current		A	20～125
11	额定转移电流Transfer current rating		A	3150
12	额定空载变压器开断电流No-load transformer open circuit current rating			1250KV变压器的空载电流 1250 kv transformer no-load current
13	Lmin短时工频耐压Lmin short-time power frequency withstand voltage		KV	42(隔离断口48)1250 kv 42 (48) isolation 1250 kv
14	额定雷电冲击耐压Lightning shock pressure rating		KV	75(隔离断口85)75 (85) isolation
15	开关操作力矩Switch operating torque		N.m	＜80
16	机械寿命 Mechanical life	真空负荷开关The vacuum load switch	次 time	10000
		隔离刀、接地刀Isolation, grounding cutter		2000

五、结构特点
Structural characteristics

5.1 结构性能特点

5.1.1 环网柜采用2mm厚敷铝锌板铆接成型，柜后板有二处压力释放孔，其一是针对电缆室，另外一个则针对负荷开关/母线室。此结构能够最大限度地保障人身安全和运行设备的可靠。

5.1.2 环网柜内配FZN21-12D型负荷开关或FZRN21-12D型熔断器组合电器，该型电器带有隔离开关、真空负荷开关、接地开半，且隔离开关及接地开关均有明显断口。

5.1.3 隔离开关、真空负荷开关、接地开关、柜门具有完善可靠的机械联动、联锁装置，能有效防止误操作，并确保安全维护。

5.1.4 可手动、电动操作。

5.1.5 计量柜的柜门、仪表门设有铝封销子。

5.1.6 熔断器组合电器柜、熔管带有撞针。短路情况下，撞针撞击跳闸机构，实现快速开断，能有效保护电器设备。

5.1.7 环网柜采用正面操作，可靠墙安装。

5.2 "五防"闭锁功能。

5.2.1 送电操作：只有当柜体门关闭并锁定，操作接地开关到"打开"位置，才能操作负荷开关至合闸位置。

5.2.2停电操作：当负荷开关处于隔离位置，才能关合接地开关，接地开关处于合闸位置时，插入绝缘隔板到位，才能打开柜门。

5.2.3真空灭弧室与隔离刀有可靠的联锁，而隔离刀与接地刀互为联动，并与柜门联锁，绝缘隔板与柜门也有联锁。

5.1 structure characteristics

5.1.1 ring network cabinet with 2 mm thick coated aluminium zinc plate riveting molding, cabinet has two plate after pressure relief hole, one is for the cable room, another is for load switch/busbar chamber. This structure can maximize guarantee personal safety and reliable operation equipment.

5.1.2 in ring network cabinet with FZN21-12 d type load switch or FZRN21-12 d type fuse combination electric appliance, the type of electric appliance with isolating switch, vacuum load switch, grounding and a half open, and isolating switch and earth switch has the obvious fracture.

5.1.3 isolating switch, vacuum load switch, grounding switch, cupboard door has perfect and reliable mechanical linkage, interlock device, can effectively prevent wrong operation, maintenance and ensure safety.

5.1.4 ensuring can be manual, electric operation.

5.1.5 measuring tank of cupboard door, the instrument door aluminum sealing pin.

5.1.6 fuse combination electrical cabinets, fusion tube with a firing pin. Short circuit conditions, firing pin impact tripping mechanism and realize the fast open circuit, can effectively protect the electrical equipment.

5.1.7 ring network cabinet USES positive operation, reliable wall installation.

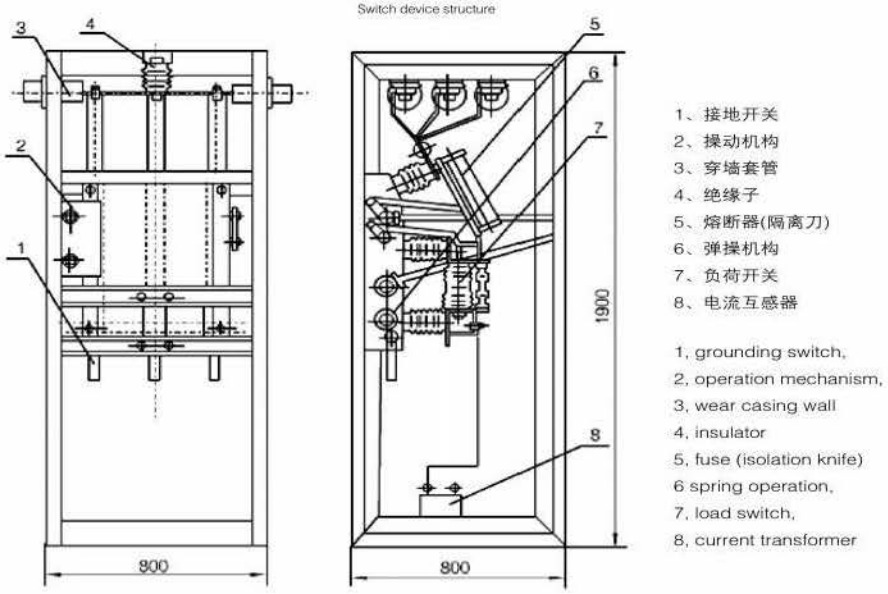
5.2 the "five prevention" locking function.

5.2.1 either operation: only when the cabinet door closed and locked, operate grounding switch to "on" position, to operate load switch to closing position.

5.2.2 outage operation: when the load switch in the isolated position, in order to close the grounding switch, grounding switch in the closing position, insert the insulation plate in place, can open cupboard door.

5.2.3 requires vacuum arcing chamber and the isolation knife have reliable interlocking, the isolation knife and, grounding knife and cupboard door interlock, insulating clapboard and cupboard door interlock.

开关设备结构图
Switch device structure



1、接地开关
2、操动机构
3、穿墙套管
4、绝缘子
5、熔断器(隔离刀)
6、弹操机构
7、负荷开关
8、电流互感器

1, grounding switch,
2, operation mechanism,
3, wear casing wall
4, insulator
5, fuse (isolation knife)
6 spring operation,
7, load switch,
8, current transformer

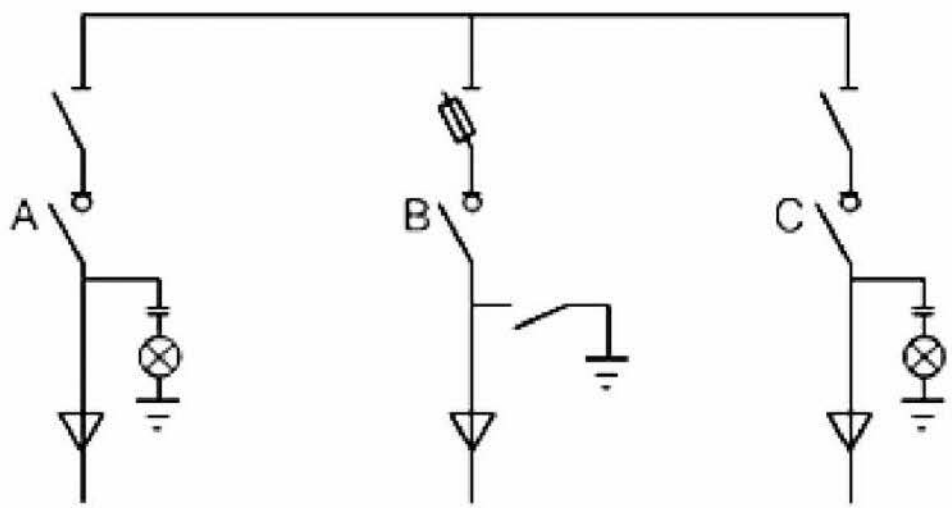
六、环网供电原理
Ring network power supply principle

环网供电一般由三个基本单元组成(见图)进出线柜作为环网单元,当任一线路出现故障时,能及时隔离,并由另一单元保证用户变压器支路连续供电。用户回路环网柜对变压器起着保护和隔离作用,便于维护检修。

环网柜可任意延展,并可根据用户要求由基本单元构成多种组合方案。

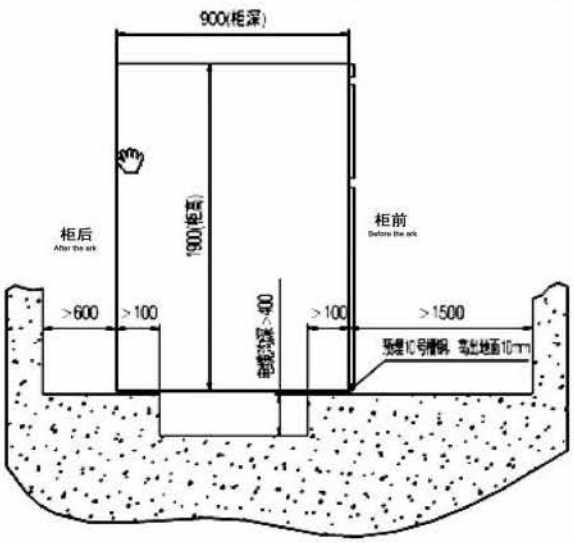
Ring network power supply generally consists of three basic unit (see photo) as ring network unit into the outlet ark, when any circuit malfunction, timely, and user transformer branch by another unit to ensure continuous power supply. Users back to the vessel network cabinet for transformer protection and isolation effect, ease of maintenance.

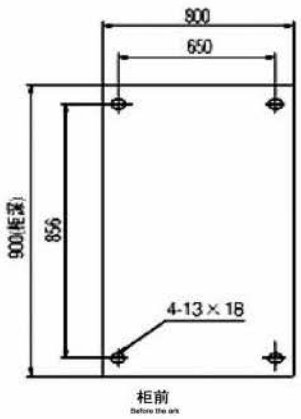
Ring network cabinet can be arbitrary extension, and can according to user requirements by basic unit constitute a variety of combination plan.



七、外形及安装尺寸
Appearance and installation dimensions

开关设备安装地基图
Switch equipment installation foundation drawing





说明：槽钢应可靠接地
Description: channel steel should be reliable grounding

八、订货须知
Ordering instructions

订货时应提供下列资料：

8.1 主接线方案图编号、用途和单线系统图、额定电压、额定电流、额定短路开断电流、配电室平面布置及开关柜的排列配置图等；

8.2 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图；

8.3 开关柜内主要电气元件的型号，规格及数量；

8.4 如开关柜之间或进线柜需要的母线桥连接，应提供母线桥断的额定载流量，母线桥的跨度，距地高度等具体要求数据；

8.5 开关柜使用的在特殊环境条件时，应在订货时详细说明；

When you order it should provide the following information:

8.1 the main wiring scheme figure number, purpose and single system diagram, rated voltage, rated current, rated short circuit breaking current, transformer room layout and the arrangement of switchgear configuration diagram, etc.;

8.2 switchgear control, measurement and protection function of demands, and other atresia and automatic device and schematic diagram;

8.3 switchgear main electric component model, specification and quantity;

Or into the line between 8.4 such as switchgear cabinets need bus bridge connection, should provide bus bar broken rated carrying capacity of the bridge, busbar bridge span, is apart from the highly specific requirements, such as data;

8.5 switch cabinets used in special environmental conditions, to be detailed in order;

地理位置 The geographical position

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