KYN28A–12交流金属封闭开关设备
KYN28A–12 AC metal–enclosed switchgear

常熟开关　持续超越

- 国家创新型试点企业
- 国家重点高新技术企业
- 全国企事业知识产权示范单位
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国家科学技术进步奖证书
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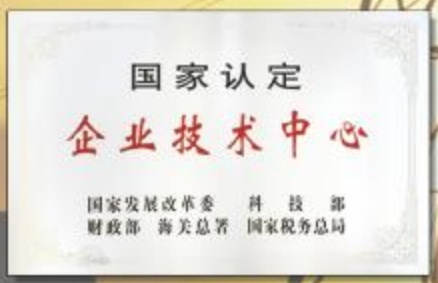


国家认定企业技术中心
National Enterprise Technology Center

博士后技术创新中心
Postdoctoral Technical Innovation Centre

博士后科研工作站
Postdoctoral Programme

公司简介
Introduction

常熟开关制造有限公司是国有资产参股的电器制造企业、“国家重点高新技术企业”，占地约300亩，员工1700人。主要生产中低压电器元件、工控产品、太阳能光伏逆变器、成套装置等，可以为您提供“智能配电系统三位一体完整的解决方案”。

公司建有博士后科研工作站、国家认定企业技术中心和江苏省电器控制工程中心，具有一支以博士、硕士、本科生为主的多层次研发队伍，工程技术人员占企业员工总数的50%左右。公司拥有先进的模具制造、零部件自动化生产、断路器装配自动检测流水线等一大批先进的制造和试验检测设备；实施以ERP管理为重点的信息化、网络化管理；完善质量／环境／职业健康安全体系，确保为用户提供优质、安全、可靠的产品。CM系列塑料外壳式断路器、CW系列智能型万能式断路器曾双双被评为中国名牌产品。

Changshu Switchgear Mfg. Co., Ltd. (Former Changshu Switchgear Plant), an enterprise with state-owned equity, covered an area of 200,000 m^2, with 1700 staffs, is a "National Key New High-tech Enterprise" and mainly produces HV and LV electrical components, industry control products, solar photovoltaic inverters and complete sets of equipment etc, all of which could provide trinity and complete solutions for intelligent power distribution system.

Post - doctoral scientific research station, Province Enterprise Technique Center and Jiangsu Province Electrical Apparatus Control Engineering Research Center have been established and a multi-level professional technique team has been formed consisting of PHD candidates, postgraduates and university graduates. Engineers and technicians have covered 50% of all staffs.

Advanced mould manufacturing equipments, automation producing equipments for spare parts, assembling and inspecting lines for breakers and test equipments have been brought in. Meanwhile, information and network management, taking ERP management as the focal point, has been applied and quality environmental systems (ISO9001/ISO14001/OHSMS18001) have also been established and perfected to ensure reliability and safety for customers.

CM Series Moulded Case Circuit Breaker and CW Series Intelligent Air Circuit Breaker are both China Top Brand products.

常熟开关制造有限公司
为您提供电气系统完整的解决方案

高压真空断路器


CV1-12/CVR1-12系列
高压真空断路器


CV2-12系列
高压真空断路器


CV1-24/CV2-24系列
高压真空断路器


CV1-40.5/CV2-40.5系列
高压真空断路器

智能型万能式断路器


CW1系列
智能型万能式断路器


CW2系列
智能型万能式断路器


CW3系列
智能型万能式断路器


CW3X-1600系列
智能型万能式断路器


CW3R系列
智能型万能式断路器


CW3F-2500系列
智能型万能式断路器


CW3V系列
智能型真空万能式断路器

塑料外壳式断路器


CM3系列
塑料外壳式断路器


CM3E系列
电子式塑壳断路器


CM3L系列
带剩余电流保护塑壳断路器


CM3Z系列
智能型塑壳断路器


CM3ZL系列
带剩余电流保护塑壳断路器


CM3ZL/ZH自动重合闸
带剩余电流保护塑壳断路器


CM5系列
塑料外壳式断路器


CM5Z系列
智能型塑壳断路器


CM5Z-1600
智能型塑壳断路器


CM5L系列
带剩余电流保护塑壳断路器


CM5ZL系列
带剩余电流保护智能型塑壳断路器


CM5X-125塑料外壳式断路器
CM5XL-125带剩余电流保护塑壳断路器

常熟开关制造有限公司
为您提供电气系统完整的解决方案

自动转换开关


CA1/CA1B系列自动转换开关(CB级)


CAP1系列自动转换开关(PC级)



CAP2系列自动转换开关(PC级)

接触器和过载继电器


CK3/CK3B系列接触器


CJR3/CJR3B系列热过载继电器


CJD3系列电子过载继电器

剩余电流动作继电器


CLJ3 剩余电流动作继电器

电动机软起动器


CR1系列电动机软起动器


CR2系列智能型电动机软起动器

电动机保护器


CD3系列电动机控制保护器

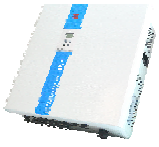

CD4系列电动机控制保护器

控制和保护电器



CB1系列控制和保护开关电器(CPS)

光伏发电用产品


CS1G系列组串式并网型光伏发电逆变器


CW3G系列隔离开关（AC，DC）


CW3DC系列直流万能式断路器


CM3DC系列直流塑壳断路器

小型断路器


CH系列小型断路器

电力质量和系统自动化器件


AD128系列信号灯
LA168系列按钮


CI1系列远程智能I/O模块


CN1DP-MP
CN1DP-MD
CN1DP-MC
通信适配器
CN1EG以太网适配器


FDM3
短消息通知模块


FWB1温度报警模块

智能化通信低压配电网络监控系列


Riyear-PowerNet配电监控系统


CEPA3智能配电一体机

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计算机中心 CAD Center

模具加工中心 CAM Center

贴片中心 SMT Center

概 述 OVERVIEW

KYN28A-12交流金属封闭开关设备(以下简称开关柜)系三相交流50Hz、额定电压至12kV单母线及单母线分段系统的户内成套配电装置。适用于各电厂、变电站及机场、码头、厂矿企事业、宾馆金融高层和民用建筑等户内供电系统，作为接受、分配电能和监测保护电网之用。

开关柜内主要元器件选用本公司生产的CV1-12及CV2-12型真空断路器，也可选用常州森源的VS1、厦门华电的VEP、通用GE公司的VB2、ABB公司的VD4及施耐德公司的EV12等型号的真空断路器。

注：本公司企业型号为KZN1-12，与KYN28A-12为同一产品。

KYN28A-12 AC metal-enclosed switchgear (hereinafter referred to as switchgear) is an indoor power distribution unit with three-phase AC 50Hz, rated voltage to 12kV single bus and single busbar segmentation system. It is applicable to indoor power supply systems such as power plants, substations and airports, terminals, factories and mines, hotel financial high-rises and civil buildings, as a means of receiving, distributing and monitoring power grids.

The main components in the switchgear are CV1-12 and CV2-12 vacuum circuit breakers produced by our company. We can also use VS1 of Changzhou Senyuan, VEP of Xiamen Huadian, VB2 of General GE, VD4 of ABB and Schneider’s Vacuum circuit breakers of the EV12 and other models.

Note: Our company model is KZN1-12, which is the same product as KYN28A-12.

● 开关柜符合下列标准

GB/T1984《高压交流断路器》

GB/T1985《交流高压隔离开关与接地开关》

GB/T3906《3.6kV～40.5kV交流金属封闭开关设备和控制设备》

GB/T11022《高压开关设备和控制设备的共用技术要求》

DL/T404《3.6kV～40.5kV交流金属封闭开关设备和控制设备》

IEC62271-200《额定电压1kV以上52kV及以下交流金属封闭开关设备和控制设备》

开关柜通过了国家高压电器质量监督检测中心全部型式试验、通过了防内部故障电弧试验和严酷气候条件下的试验（凝露试验和人工污秽试验）以及通过了国家电网的IAC级型式试验。

● The switchgear complys with the following standards

a) GB/T1984 "High-voltage alternating-current circuit breakers"

b) GB/T1985 " High-voltage alternating-current disconnectors and earthing switches"

c) GB/T3906 " alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6kV and up to and including 40.5kV "

d) GB/T11022 "Common specifications for high-voltage switchgear and controlgear standards"

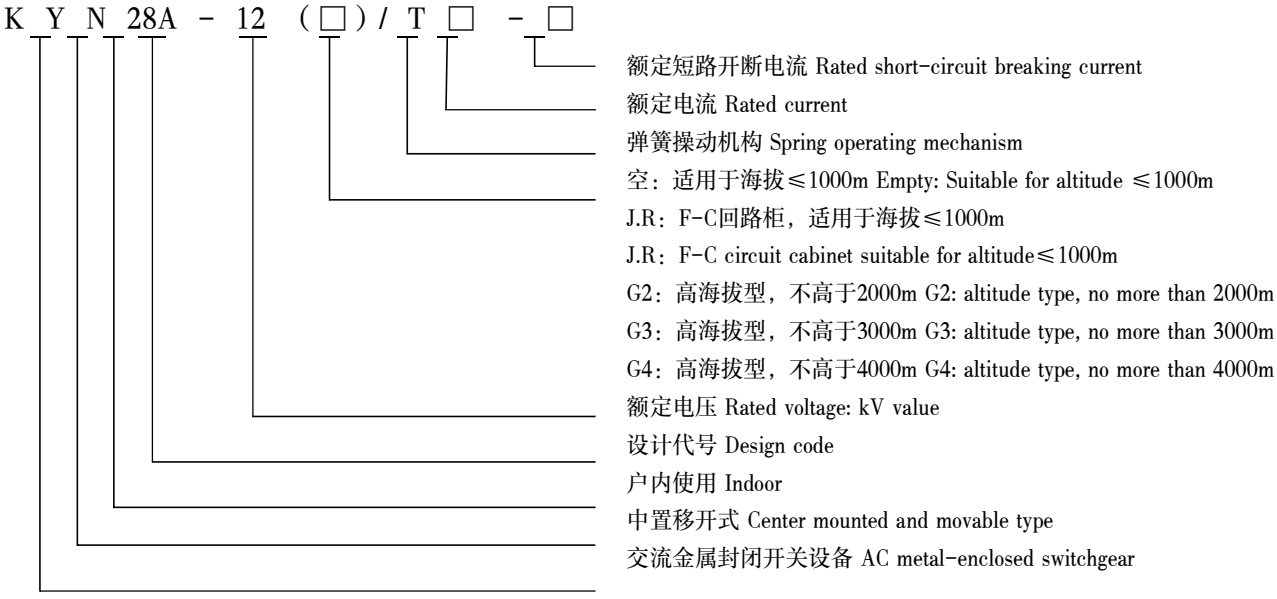
e) DL/T404 " alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6kV and up to and including 40.5kV "

f) IEC62271-200 " alternating-current metal-enclosed switchgear and controlgear for rated voltages above 1kV and up to and including 52kV"

The switchgear has passed all type tests of the National High Voltage Electrical Apparatus Quality Supervision and Inspection Center, passed the internal fault arc test and the test under severe climatic conditions (condensation test and artificial pollution test) and passed the IAC level type test of the State Grid.

概　述 OVERVIEW

● 型号及含义 Type and meaning



正常使用条件 NORMAL SERVICE CONDITIONS

● 环境温度：最高温度＋40℃，最低温度-15℃，日平均温度不大于＋35℃ 。

● 海拔：不超过1000m；
　　不超过2000m（G2型）；
　　不超过3000m（G3型）；
　　不超过4000m（G4型）。

● 相对环境湿度：日平均相对湿度不大于95%；
　　月平均相对湿度不大于90%；
　　日平均水蒸气压力不超过2.2kPa；
　　月平均水蒸气压力不超过1.8kPa。

● 地震烈度：不超过8度。

● 周围空气：没有明显地受到尘埃、烟、腐蚀性和/或可燃性气体、蒸气或盐雾的污染。

● 在二次系统中感应的电磁干扰的幅值不超过1.6kV。

开关柜内使用的某些元器件及附件不符合上述条件以及使用条件与正常条件不符时，由制造厂和用户协商解决。

● Ambient temperature: maximum temperature +40℃, minimum temperature −15℃, daily average temperature is not greater than +35℃.

● Altitude: No more than 1000m;
No more than 2000m (G2 type);
No more than 3000m (G3 type);
No more than 4000m (G4 type).

● Relative ambient humidity: Daily average relative humidity is not more than 95%;
Monthly average relative humidity is not more than 90%;
Daily average water vapor pressure does not exceed 2.2 kPa;
Monthly average water vapor pressure does not exceed 1.8 kPa.

● Earthquake intensity: No more than 8 degrees.

● Ambient air: Not significantly contaminated by dust, smoke, corrosive and/or flammable gases, vapors or salt sprays.

● The magnitude of electromagnetic interference induced in the secondary system does not exceed 1.6kV.

If some components and accessories used in the switchgear do not meet the above conditions and the conditions of use do not match the normal conditions, the manufacturer and the user shall negotiate to solve the problem.

KYN28A–12开关柜主要技术参数 Main technical parameters of KYN28A–12 switchgear

项目 Item		单位 Unit	数据 Data	
额定电压 Rated voltage Ur		kV	7.2	12
1min工频耐受电压 Rated 1min power-frequency withstand voltage Ud	对地、相间 To the ground/ interphase	kV	32	42
	隔离断口 Isolating distance	kV	36	48
雷电冲击耐受电压 Rated lightning impulse withstand voltage Up	对地、相间 To the ground/ interphase	kV	60	75
	隔离断口 Isolating distance	kV	70	85
主母线额定电流 Main busbar rated current Ir		A	630,1250,1600,2000,2500,3150,4000（注1）（note1）	
4s额定短时耐受电流 Rated short-time withstand current 4s Ik		kA	25,31.5,40,50（注2）（note2）	
额定峰值耐受电流 Rated peak withstand current Ip		kA	63,80,100,125（注3）（note3）	
防护等级 Degree of protection		外壳为IP4X，隔室间和断路器室门打开时为IP2X The enclosure is IP4X, IP2X when compartment and circuit breaker compartment door open		

注1：海拔高度1000～2000m时，主母线额定电流为630A,1250A,1600A,2000A,2500A,3150A；
海拔高度2000～4000m时，主母线额定电流为630A,1250A；
注2：海拔高度1000～2000m时，4s额定短时耐受电流为25kA,31.5kA,40kA；
海拔高度2000～4000m时，4s额定短时耐受电流为25kA,31.5kA；
注3：海拔高度1000～2000m时，额定峰值耐受电流为63kA,80kA,100kA；
海拔高度2000～4000m时，额定峰值耐受电流为63kA,80kA；

Note 1: When the altitude is 1000～2000m, the rated current of the main busbar is 630A, 1250A, 1600A, 2000A, 2500A, 3150A;
When the altitude is 2000～4000m, the rated current of the main busbar is 630A, 1250A;
Note 2: When the altitude is 1000～2000m, the rated short-time withstand current of 4s is 25kA,31.5kA,40kA;
When the altitude is 2000～4000m, the rated short-time withstand current of 4s is 25 kA,31.5kA;
Note 3: When the altitude is 1000～2000m, the rated peak withstand current is 63kA,80kA,100kA;
When the altitude is 2000～4000m, the rated peak withstand current is 63kA,80kA.

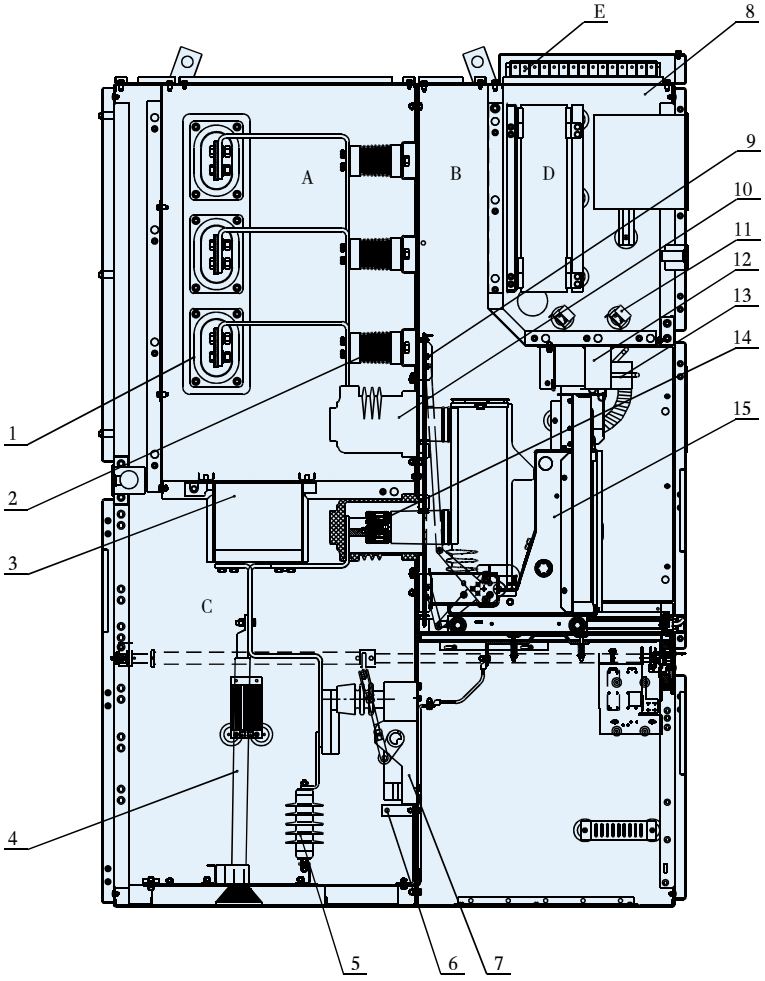
KYN28A–12(J.R)(简称F–C回路柜)主要技术参数
KYN28A–12 (J.R) (referred to as F–C circuit cabinet) main technical parameters

项目 Item		单位 Unit	数据 Data	
额定电压 Rated voltage Ur		kV	7.2	12
1min工频耐受电压 Rated 1min power-frequency withstand voltage Ud	对地、相间 To the ground/ interphase	kV	32	42
	隔离断口 Isolating distance	kV	36	48
雷电冲击耐受电压 Rated lightning impulse withstand voltage Up	对地、相间 To the ground/ interphase	kV	60	75
	隔离断口 Isolating distance	kV	70	85
F-C小车额定电流Ir(取决于熔断器) F-C trolley rated current Ir (depending on the fuse)		A	250	200
主母线额定电流 Main busbar rated current Ir		A	630,1250,1600,2000,2500,3150,4000	
4s额定短时耐受电流 Rated short-time withstand current 4s Ik		kA	25,31.5,40,50	
额定峰值耐受电流 Rated peak withstand current Ip		kA	63,80,100,125	
防护等级 Degree of protection		外壳为IP4X，隔室间和断路器室门打开时为IP2X The enclosure is IP4X, IP2X when compartment and circuit breaker compartment door open		

开关柜外形尺寸和结构图 Switchgear dimensions and structure

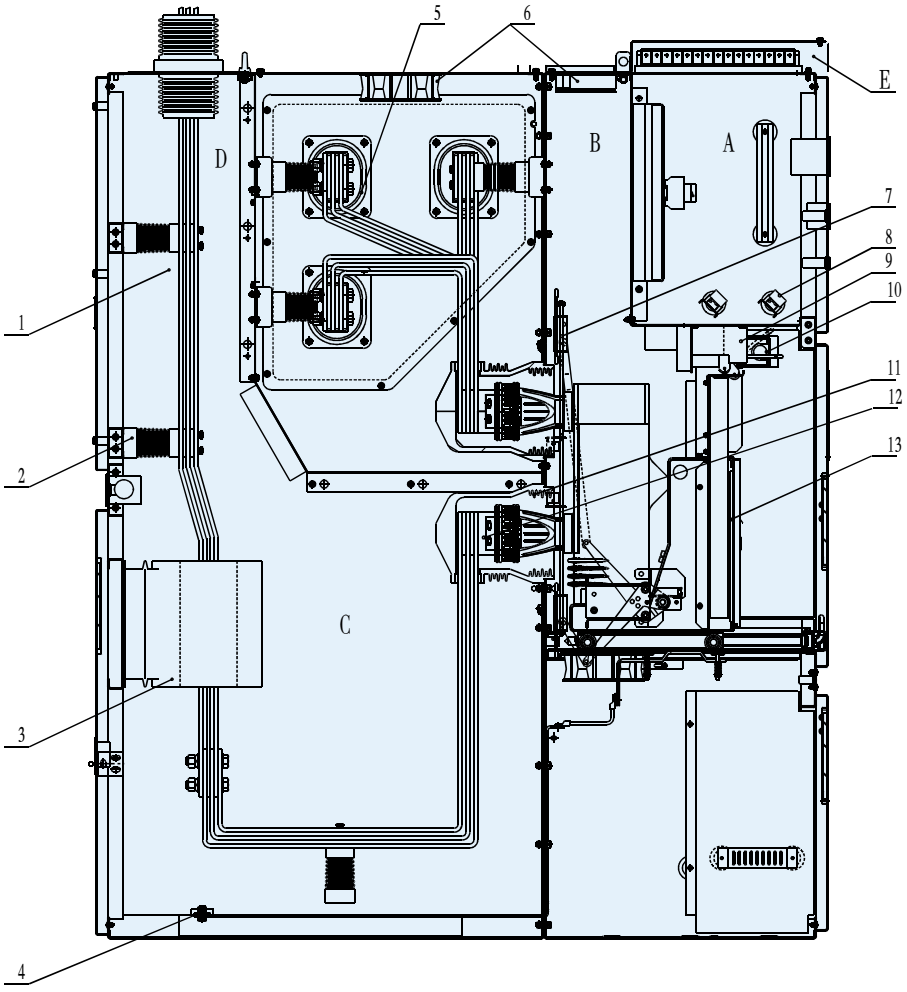
<table>
<tr><td rowspan="6">宽度 Width (mm)</td><td colspan="3">额定电流至1250A Rated current up to 1250A</td><td colspan="2">800</td></tr>
<tr><td colspan="3">额定电流1600A及以上 Rated current 1600A and above</td><td colspan="2">1000</td></tr>
<tr><td rowspan="4">所用变
electric substation transformer</td><td rowspan="2">熔断器手车方案
Fuse trolley scheme</td><td>变压器50kVA及以下
Transformer 50kVA and below</td><td>800</td></tr>
<tr><td>变压器50kVA以上
Transformer 50kVA and above</td><td>1000</td></tr>
<tr><td rowspan="2">负荷开关方案
Load switch scheme</td><td>变压器50kVA及以下
Transformer 50kVA and below</td><td>1200</td></tr>
<tr><td>变压器100kVA
Transformer 100kVA</td><td>800+1000</td></tr>
<tr><td rowspan="4">深度 Depth (mm)</td><td colspan="2" rowspan="2">电缆下进下出
Cable incoming and outgoing at the bottom</td><td>普通柜 Ordinary cabinet</td><td colspan="2">1500</td></tr>
<tr><td>IAC级柜 cabinet</td><td colspan="2">1600</td></tr>
<tr><td colspan="3">电缆架空进出线 Incoming and outgoing with cable overhead</td><td colspan="2">1660</td></tr>
<tr><td colspan="3">铜排架空进出线 Incoming and outgoing with copper bus overhead</td><td colspan="2">1800</td></tr>
<tr><td>高度 height (mm)</td><td colspan="3"></td><td colspan="2">2200</td></tr>
</table>

注：海拔高度1000～2000m时，柜外形尺寸采用800(1000)x1600(1800)x2200；
海拔高度2000～4000m时，柜外形尺寸采用1000x1850(2150)x2300。
Note: When the altitude is 1000m ~ 2000m, the cabinet dimensions are 800(1000)x1600(1800)x2200;
When the altitude is 2000m ~ 4000m, the cabinet dimensions are 1000x1850(2150)x2300.



A：母线室 bus room
B：断路器室 circuit breaker room
C：电缆室 cable room
D：低压室 low voltage room
E：柜顶小母线隔室 cabinet top small bus compartment
1. 穿墙套管 wall bushing
2. 支柱绝缘子 post insulator
3. 电流互感器 current transformer
4. 电缆密封终端 cable sealing terminal
5. 避雷器 lightning arrester
6. 接地主母线 grounded main bus
7. 接地开关 grounding switch
8. 框架 frame
9. 活门机构 valve mechanism
10. 静触头盒 static contact box
11. 二次控制端子 secondary control terminal
12. 二次插件联锁机构
secondary plug-in interlocking mechanism
13. 航空插头 aviation connector
14. 一次静触头 primary static contacts
15. 断路器小车 circuit breaker trolley

典型方案内部结构示意图(630A~2000A)
Schematic diagram of internal structure of typical scheme (630A~2000A)



A：母线室 bus room
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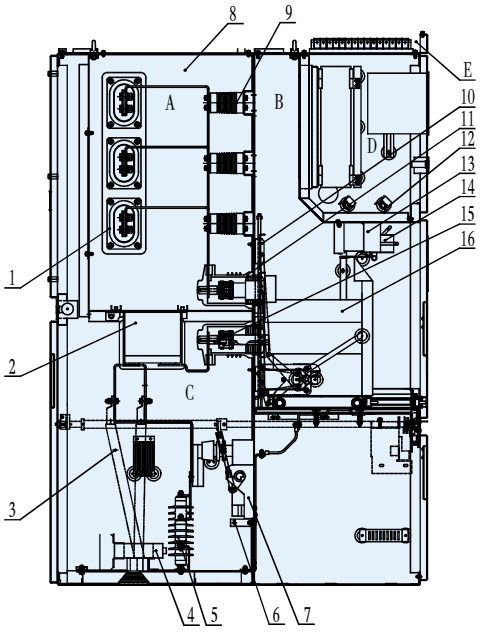
1. 框架 frame
2. 支柱绝缘子 post insulator
3. 电流互感器 current transformer
4. 接地主母线 grounded main bus
5. 穿墙套管 wall bushing
6. 风机 fan
7. 活门机构 valve mechanism
8. 二次控制端子
secondary control terminal
9. 二次插件联锁机构
secondary plug-in interlocking mechanism
10. 航空插头 aviation connector
11. 静触头盒 static contact box
12. 一次静触头 primary static contacts
13. 断路器小车 circuit breaker trolley

典型方案内部结构示意图(2500A~4000A)
Schematic diagram of internal structure of typical scheme (2500A~4000A)

F–C回路柜 F–C Circuit cabinet

宽度 Width(mm)		650,800
深度 Depth(mm)	电缆下进下出 Cable incoming and outgoing at the bottom	1500
	铜排架空进出线、电缆架空进出线 Incoming and outgoing with copper bus overhead、 Incoming and outgoing with cable overhead	1660
高度 Height(mm)		2200



A：母线室 bus room
B：断路器室 circuit breaker room
C：电缆室 cable room
D：低压室 low voltage room
E：柜顶小母线隔室 cabinet top small bus compartment
1. 穿墙套管 wall bushing
2. 电流互感器 current transformer
3. 电缆密封终端 cable sealing terminal
4. 电流互感器 current transformer
5. 避雷器 lightning arrester
6. 接地主母线 grounded main bus
7. 接地开关 grounding switch
8. 框架 frame
9. 支柱绝缘子 post insulator
10. 活门机构 valve mechanism
11. 静触头盒 static contact box
12. 二次控制端子 secondary control terminals
13. 二次插件联锁机构 secondary plug-in interlocking mechanism
14. 航空插头 aviation connector
15. 一次静触头 primary static contacts
16. 交流高压真空接触器-熔断器组合电器
AC high voltage vacuum contactor-fuse combination

典型方案内部结构示意图(F-C回路)
Schematic diagram of the internal structure of a typical scheme (F-C loop)

CV1/CV2/VS1真空断路器技术参数 vacuum circuit breaker technical parameters

项　目 Item		单位 Unit	数　据 Data
额定电压 Rated voltageUr		kV	12
额定绝缘水平 Rated insulation level	1min工频耐受电压 1min power-frequency withstand voltage Ud	kV	42
	雷电冲击耐受电压(峰值) Lightning impulse withstand voltage Up (peak)	kV	75
额定频率 Rated frequency fr		Hz	50
额定电流 Rated current Ir		A	630,1250,1600,2000,2500,3150,4000
额定短路开断电流(有效值) Rated short-circuit breaking current Isc (r.m.s)		A	25，31.5,40,50
额定短路关合电流 Rated short circuit making current		kA	63,80,100,125
4s额定短时耐受电流(有效值) Rated short-time withstand current 4s Ik (r.m.s)		kA	25，31.5,40,50
额定峰值耐受电流 Rated peak withstand current Ip		kA	63,80,100,125
额定背对背电容器组开断电流(有效值) Rated back-to-back capacitor bank breaking current Ibb (r.m.s)		A	400
额定背对背电容器组关合涌流(峰值) Rated back-to-back capacitor bank making inrush current Ibi (peak)		kA	20(频率4250Hz)
额定操作顺序 Rated operation sequence		自动重合闸 Automatic reclosing：O-0.3s-CO-180s-CO	
		非自动重合闸 Non-automatic reclosing：O-180s-CO-180s-CO	
合闸和分闸装置额定电源电压 Rated supply voltage of closing and opening device Uop		V	AC:110、220；DC：110、220
辅助回路额定电源电压 Auxiliary circuit rated supply voltage Ua		V	AC:110、220；DC：110、220
机械寿命 Mechanical durability	相间距210mm断路器 Circuit breaker with interphase spacing 210mm	次	20000
	相间距150mm及275mm断路器 Circuit breaker with interphase spacing 150mm and 275mm		10000

技术参数 TECHNICAL PARAMETERS

● VD4真空断路器技术参数 VD4 vacuum circuit breaker technical parameters

项　目 Item		单位 Unit	数　据 data
额定电压 Rated voltage Ur		kV	12
额定绝缘水平 Rated insulation level	1min工频耐受电压 1min power-frequency withstand voltage Ud	kV	42
	雷电冲击耐受电压(峰值) Lightning impulse withstand voltage Up (peak)	kV	75
额定频率 Rated frequency fr		Hz	50
额定电流 Rated current Ir		A	630,1250,1600,2000,2500,3150,4000
额定短路开断电流(有效值) Rated short-circuit breaking current Isc (r.m.s)		A	25，31.5,40,50
4s额定短时耐受电流(有效值) Rated short-time withstand current 4s Ik (r.m.s)		kA	25，31.5,40,50
额定峰值耐受电流 Rated peak withstand current Ip		kA	63,80,100,125
额定操作顺序 Rated operation sequence		自动重合闸 Automatic reclosing：O-0.3s-CO-180s-CO	
		非自动重合闸 Non-automatic reclosing：O-180s-CO-180s-CO	
合闸时间 Closing time		ms	55～66
分闸时间 opening time		ms	33～45
燃弧时间 Arcing time		ms	≤15
开断时间 Break time		ms	48～60

结　构 STRUCTURE

开关柜由固定的柜体和可抽出式部件(简称小车)两大部分组成。柜的外壳和各小室间的隔板选用敷铝锌钢板，经多重折边工艺加工装配组合而成。

开关柜由接地的钢板分隔成断路器室、母线室、电缆室、继电器仪表室。各高压小室均设有独立的通向柜顶的排气通道,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，顶部的压力释放金属板将被自动打开，排出气体并释放压力，确保开关柜不被破坏及保护操作人员的安全。

断路器手车

● 抽出式小车

小车骨架用冷轧钢板经数控机床加工后组装而成。根据用途，小车可分为断路器小车、电压互感器小车、计量小车、隔离小车、熔断器小车、避雷器小车、F-C小车等，同种规格的小车可以任意互换。

小车在柜内有“隔离/试验”和“工作”位置，每一位置均设有定位装置，以保证小车联锁可靠，在移动小车时，首先解除联锁，且确保断路器在小车移动之前处于分闸状态。

小车设有手动操作机构。带有弹簧触头系统的一次动触头装在断路器的极柱上，当小车刚进入开关柜时的锁定位置即是“隔离/试验”位置，此时小车通过底盘车底部的接地铜排已可靠地连接到开关柜的接地系统。透过门上的观察窗能看到小车在柜内的位置。断路器的弹簧机构的控制和其分合闸等指示器均设在小车的面板上，以方便操作。其它类型的小车也具有类似性能。

The switchgear consists of two parts: a fixed cabinet and a withdrawable component (referred to as a trolley). The outer shell of the cabinet and the partition between the small chambers are made of aluminum-zinc-plated steel sheets, which are processed and assembled by multiple hemming processes.

The switchgear is separated by a grounded steel plate into a circuit breaker room, a bus room, a cable room, and a relay meter room. Each high-voltage chamber has an independent exhaust passage leading to the top of the cabinet. When an internal fault arc occurs in the circuit breaker or the bus, the air pressure inside the switchgear rises with the appearance of the arc, and the pressure release metal plate at the top is automatically opened. Exhaust gas and release pressure to ensure that the switchgear is not damaged and protects the operator's safety.

- Draw-out trolley

The skeleton of the car is assembled by cold-rolled steel sheets processed by a CNC machine tool. According to the application, the trolley can be divided into a circuit breaker trolley, a voltage transformer trolley, a metering trolley, an isolation trolley, a fuse trolley, a lightning arrester trolley, an F-C trolley, etc., and the same type of trolley can be interchanged at will.

The trolley has “isolation/test” and “working” positions in the cabinet. Each position is equipped with positioning devices to ensure reliable interlocking of the trolley. When moving the trolley, the interlock should be released first and ensure that the breaker is at open position before moving the trolley.

The trolley has a manual operating mechanism. The primary moving contact with the spring contact system is mounted on the pole of the circuit breaker. When the trolley enters the switchgear, the locked position is the “isolation/test” position. At this time, the trolley can connect to the grounding system of the switchgear through the grounding copper bar at the bottom of the chassis. through the observation window on the door, you can see the position of the car in the cabinet. The control of the spring mechanism and its opening and closing indicators of circuit breaker are all placed on the panel of the trolley for easy operation. Other types of trolleys also have similar performance.

断路器室或F–C回路室 Circuit breaker room or F–C circuit room

活门关闭
Valve closed

活门打开
Valve open

断路器室内安装了特定的导轨，供小车在“工作”位置和“隔离/试验”位置之间移动。活门由金属板制成，安装在断路器室的后壁上。断路器室与主母线室和电缆室间的隔板上安装有主回路静触头盒，当小车在“隔离/试验”位置时，活门自动关闭，主回路静触头与动触头被活门隔离；当小车进入“工作”位置时，活门自动打开，使动、静触头顺利接通。

开关柜能在柜门关闭的情况下通过摇把操作小车，通过观察窗可以看到小车在柜内所处的位置。若是断路器小车，能看到断路器的合分状态以及储能/释能状态。

Specific rails are installed in the circuit breaker compartment for the trolley to move between the "working" position and the "isolated/tested" position. The shutter is made of sheet metal and is mounted on the rear wall of the circuit breaker compartment. A main circuit static contact box is installed on the partition between the circuit breaker chamber and the main bus room and the cable room. When the trolley is in the "isolation/test" position, the valve is automatically closed, and the main circuit static contact and the movable contact are isolated by the valve; when the trolley enters the "working" position, the valve automatically opens, allowing the moving and stationary contacts to be successfully connected.

The switch cabinet can operate the trolley through the rocker with the cabinet door closed, and the position of the trolley in the cabinet can be seen through the observation window. If it is a circuit breaker trolley, you can see the closing/opening state of the circuit breaker and charging/discharged state.

母线室 Bus room

母线室(“I”字型布置)
Bus room ("I" layout)

母线室(“品”字型布置)
Bus room ("品" layout)

母线室内安装有与系统额定电流匹配的主母线。

额定电流2000A及以下，主母线采用“I”字型布置；额定电流2500A至4000A时，主母线采用“品”字型布置。相邻母线室间用套管和不锈钢板隔离，防止事故蔓延。

The main bus is installed in the bus room to match the rated current of the system.

If the rated current is 2000A or below, the main bus is arranged in "I" shape; when the rated current is 2500A to 4000A, the main bus is arranged in the "品" type. The adjacent bus compartment is separated by a casing and a stainless steel plate to prevent accidents from spreading.

● 继电器仪表室 Relay and meter room

继电器仪表室及其门板可根据不同的功能要求安装各种二次元件。小母线安装在继电器仪表室顶部，并用金属隔板盖住，现场安装简单方便。

The relay meter room and its door panel can be installed with various secondary components according to different functional requirements. The small bus is installed on the top of the relay meter room and covered with a metal partition. The installation on site is simple and convenient.

继电器仪表室
Relay meter room

● 电缆室 Cable room

电缆室主要用于连接用户的电力电缆，可根据用户电力电缆的规格及数量制作不同的连接接口，方便现场操作。电缆室内可选择安装电流互感器、电压互感器、接地开关、避雷器、零序电流互感器、避雷器等。电缆室门与柜体装有可靠的联锁装置。

The cable room is mainly used to connect the user's power cable. Different connection interfaces can be made according to the specifications and quantity of the user's power cable, which is convenient for on-site operation. The transformer room can be equipped with current transformers, voltage transformers, grounding switches, lightning arresters, zero-sequence current transformers, and lightning arresters. The cable compartment door and the cabinet are equipped with reliable interlocking devices.

电缆室
Cable room

防止误操作联锁装置 Anti-misoperation interlocking device

开关柜具有可靠的联锁装置，为操作人员与设备提供可靠的安全保障，其功能如下：

a) 当接地开关处于分闸位置时，小车才能从“隔离/试验”位置移至“工作”位置；

b) 当小车处于“隔离/试验”位置时，接地开关才能进行分合闸操作；

c) 断路器小车只有在“试验”或“工作”位置时，才能分合断路器；

d) 断路器在合闸状态下，断路器小车不能从“隔离/试验”位置移动到“工作”位置或从“工作”位置移动到“隔离/试验”位置；

e) 小车在“工作”位置时，二次插件被锁定不能拔下；

f) 通过机械联锁使电缆室后门在接地开关关合时才能打开；反过来电缆室后门关好后才能分接地开关，且只有当电缆室后门关好，接地开关分闸后，断路器才能合闸。

The switchgear has a reliable interlocking device to provide reliable safety for operators and equipment. Its functions are as follows:

a) Only when the grounding switch is in the open position, the trolley can be moved from the “Isolation/Test” position to the “Working” position;

b) Only when the trolley is in the “Isolation/Test” position, the grounding switch can perform the opening and closing operation;

c) The circuit breaker trolley can only be used to open/close the circuit breakers when in the “test” or “working” position;

d) When the circuit breaker is closed, the circuit breaker trolley cannot be transfer from the “Isolation/Test” position to the “Working” position or from the “Working” position to the “Isolation/Test” position;

e) When the trolley is in the “working” position, the secondary plug is locked and cannot be unplugged;

f) The mechanical interlock make the cable room can be opened only when the grounding switch is closed; in turn, the grounding switch can be divided only when the cable room rear door is closed, and only when the cable room rear door is closed and the grounding switch is opened, the circuit breaker can be Closed.

紧急分闸装置（选装） Emergency opening device (optional)

紧急分闸装置安装于断路器室门，用于在极端情况下，线路运行时不打开断路器室门就能紧急分断所在线路上的断路器。

The emergency breaking device is installed on the circuit breaker door for emergency breaking of the circuit breaker on the line without opening the circuit breaker door when the line is running.

紧急分闸机构
Emergency opening device

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操作，仍应严格按操作程序和技术文件的要求进行，不应随意变更操作流程，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，甚至引起安全事故。

Although the switchgear cabinet is designed to ensure the correct interlocking of the operating procedures of the various parts of the switchgear, the operation of the various parts of the switchgear by the operator should be strictly in accordance with the requirements of the operating procedures and technical documents. The operation procedure should not be arbitrarily changed, nor should be forced to operate without analysis when the operation is blocked, otherwise it will easily cause equipment damage and even cause safety accidents.

- **无接地开关的断路器柜的操作**

a.将断路器小车推入柜体

运载小车在转运断路器之前，应调整到合适的高度位置。

断路器小车准备由柜外推入柜内前，应先检查断路器规格是否符合要求,有无杂物放在断路器小车内，确认无问题后将断路器小车装在运载车上并锁定。认真检查断路器室内的活门及其机构动作是否灵活、可靠，有无卡滞现象等。

将载有断路器的运载车移至柜前，将运载车前部定位锁板插入柜体上隔板的孔内，待运载车与柜体锁定后，将断路器小车上的把手向内侧拉动，解除断路器小车与运载车的锁定，平稳地将断路器小车推入柜体，到位后将断路器小车的把手向两侧拉动，使断路器小车的锁杆进入柜体并锁定，解除运载车与柜体的锁定，并移开运载车。

抽出（插入）断路器小车

Pull out (insert) circuit breaker trolley

b.断路器小车在柜内的操作

断路器小车进入柜体并锁定后，断路器小车即处于“隔离/试验”位置。若将小车投入试运行，应将二次接插件插好，通电后，继电器仪表室面板上的试验位置指示灯亮，此时可对断路器进行电气操作试验。

若将断路器小车移到“工作”位置，首先应确认断路器处于分闸状态，确认断路器处于联锁允许摇进的状态，关上柜门，然后将专用摇把插入断路器室门板上的操作孔内，顺时针方向转动摇把，约转动20圈后，摇把明显受阻并有清脆的辅助开关转换声，同时继电器仪表室面板上工作位置指示灯亮，表明断路器处于“工作”位置，此时主回路已接通。取下摇把，然后可通过控制面板上的主令元件进行合、分闸等操作。

若准备将断路器小车从“工作”位置退出：首先应确认断路器处于分闸状态，确认断路器处于联锁允许摇出的状态，插入小车专用摇把，逆时针方向转动约20圈后，摇把受阻并听到清脆的辅助开关转换声，继电器仪表室面板上的试验位置指示灯亮，表明断路器小车回到“隔离/试验”位置，此时主回路已完全断开，金属活门已关闭，取下摇把，打开柜门。

c.从柜中取出断路器小车

若准备从柜中取出断路器小车：首先应确认断路器小车已处于“隔离/试验”位置，然后打开柜门，拔下二次插件，并将动插件扣锁在断路器小车架上，此时将运载车移至柜前与柜体锁定。将断路器小车上的把手向内侧拉动，使断路器小车上锁杆退出柜体，解除断路器小车与柜体的锁定，将断路器小车移入运载车并锁定，打开运载车与柜体的联锁，把运载车向后拉出适当的距离。

- **带接地开关的断路器柜的操作**

带接地开关的断路器柜若将断路器小车装入或从柜内取出，其程序与无接地开关的断路器柜的操作程序基本相同，仅当断路器小车在柜内操作过程中和操作接地开关过程中需要注意以下两方面：

a.小车在柜内的操作

除了遵守无接地开关的断路器柜小车在柜内操作的程序以外，在将断路器小车从“隔离/试验”位置进

入“工作”位置前，还应确认接地开关处于分闸状态，否则操作将无法进行。

b.合、分接地开关的操作

合、分接地开关，首先应确认断路器小车已处于“隔离/试验”位置，然后按下接地开关操作孔处的联锁弯板，插入接地开关操作手柄，按指示牌的标志方向进行合、分闸操作，合、分接地开关必须到位。

- 隔离柜的操作

若将隔离小车装入柜内或从柜内取出，其程序与无接地开关的断路器柜的操作程序完全相同。隔离小车在柜内的操作，除了遵守无接地开关的断路器柜小车在柜内操作的程序以外，当准备将隔离小车从“隔离/试验”位置向“工作”位置移动，或从“工作”位置向“隔离/试验”位置移动，必须先解除电磁闭锁装置的锁定。

- 计量柜与PT柜的操作

计量柜和PT柜的操作程序与无接地开关的断路器柜的操作程序完全相同。当计量柜装有电磁闭锁装置时，操作移动小车前，必须先解除电磁闭锁装置的锁定。

- F-C回路柜的操作

操作步骤与带接地开关的断路器柜的操作相同。

- Operation of circuit breaker cabinet without grounding switch

a. Push the circuit breaker trolley into the cabinet

The trolley should be adjusted to the appropriate height position before carrying the breaker。

Before the circuit breaker trolley is ready to be pushed into the cabinet from the outside, check whether the circuit breaker specifications meet the requirements, whether there is any debris in the circuit breaker trolley, and confirm that there is no problem, then put the circuit breaker trolley on the carrier and lock it. Carefully check whether the valve in the circuit breaker and its mechanism are flexible and reliable, and there is no stuck phenomenon.

Move the carrier that carrying the circuit breaker to the front of the cabinet, insert the front positioning lock plate of the truck into the hole in the upper partition of the cabinet. After the carrier and the cabinet are locked, pull the handle on the circuit breaker trolley to the inside. Release the lock of the circuit breaker trolley and the carrier, and the circuit breaker trolley is smoothly pushed into the cabinet. After the position is reached, pull the handle of the circuit breaker trolley to both sides, so that the lock lever of the circuit breaker trolley enters the cabinet and is locked. Unlock the carrier and the cabinet then remove the carrier.

b. Operation of the circuit breaker trolley in the cabinet

After the circuit breaker trolley enters the cabinet and is locked, the circuit breaker trolley is in the “Isolation/Test” position. If the trolley is put into trial operation, the secondary connector should be inserted. After the power is turned on, the test position indicator on the panel of the relay meter room is illuminated. At this time, the circuit breaker can be electrically tested.

If the circuit breaker trolley is moved to the "working" position, first confirm that the circuit breaker is in the open position, and confirm that the circuit breaker is in the position where the interlock is allowed to rack-in. Close the door, then insert the special rocker into the operation hole on the door panel of the circuit breaker, turn the handle clockwise, after about 20 turns, the handle is obviously blocked and there is a clear auxiliary switch conversion sound. At the same time, the working position indicator on the panel of the relay meter room is illuminated, indicating that the circuit breaker is in the “working” position, and the main circuit is already connected. Remove the handle and then perform the closing and opening operations through the main components on the control panel.

If it is ready to withdraw the circuit breaker trolley from the "working" position: first confirm that the circuit breaker is in the open position, confirm that the circuit breaker is in the position where the interlock is allowed to be rack-out. Insert the special handle of the trolley, turn it counterclockwise for about 20 turns, the handle will be blocked and there is a clear auxiliary switch conversion sound. The test position indicator on the panel of the relay instrument room is illuminated, indicating that the circuit breaker car has returned to the "Isolation/Test" position. At this time, the main circuit has been completely disconnected, the metal shutter has been closed, remove the handle, and open the door.

c. Take the circuit breaker trolley out from the cabinet

If you are going to remove the circuit breaker trolley from the cabinet: first make sure that the circuit breaker trolley is in the "Isolation/Test" position, then open the cabinet door, unplug the secondary insert, and lock the movable insert on the circuit breaker frame. Then move the trolley to the front of the cabinet and lock it with the cabinet. Pull the handle on the circuit breaker trolley to the inner side, so that the lock lever of the circuit breaker trolley is removed from the cabinet, and the lock of the circuit breaker trolley and the cabinet is released. Move the circuit breaker trolley into the carrier and lock it, open the interlock between the carrier and the cabinet, and pull the carrier backwards at an appropriate distance.

- Operation of circuit breaker cabinet with grounding switch

If the circuit breaker cabinet with the grounding switch is installing in or removing from the cabinet, the procedure is basically the same as that of the circuit breaker cabinet without the grounding switch. Only when the circuit breaker trolley is operating in the cabinet and during the operation of the grounding switch, the following two aspects should be noted:

a. In addition to the procedures for operating the circuit breaker cabinet car without a grounding switch in the cabinet, Before turning the circuit breaker trolley from the "Isolation/Test" position to the "Working" position, make sure that the grounding switch is in the open position, otherwise the operation will not be possible.

b. Closing/opening operation of the grounding switch

To close and open the grounding switch, first confirm that the circuit breaker trolley is in the "Isolation/Test" position, Then press the interlocking bending plate at the operating hole of the grounding switch, insert the grounding switch operating handle, and perform the closing and opening operations according to the direction of the indication label. The closing and opening operation must be in place.

- Isolation cabinet operation

If the isolation trolley is loaded into or removed from the cabinet, the procedure is identical to that of the circuit breaker cabinet without a grounding switch. The operation of the isolation trolley in the cabinet, in addition to the procedures for operating the circuit breaker cabinet car without a grounding switch in the cabinet, when it is ready to transfer the isolation trolley from the "isolation/test" position to the "working" position, or from the "working" position to the "isolation/test" position, the electromagnetic locking device must be unlocked first.

- Metering cabinet and PT cabinet operation

The operating procedures for the metering cabinet and the PT cabinet are identical to those for the circuit breaker cabinet without a grounding switch. When the metering cabinet is equipped with an electromagnetic locking device, the locking of the electromagnetic locking device must be released before operating the trolley.

- Operation of F-C circuit cabinet

The operation steps are the same as those of the circuit breaker cabinet with the grounding switch.

● 开关柜的安装基础除了符合《电力建设施工及验收技术规范》中的有关条款规定外还应参考本公司的安装基础图。

● 开关柜的安装基础一般要分二次浇灌混凝土。第一次为安装开关柜的基础框架。第二次浇灌混凝土是地面的抹平层，一般厚度为60mm，在浇注混凝土抹平层时混凝土高度应低于构件平面3～5mm。

● 基础框架预埋时应进行水平校准，要求水平误差及平直度不超过1mm，总长度误差不超过3mm。

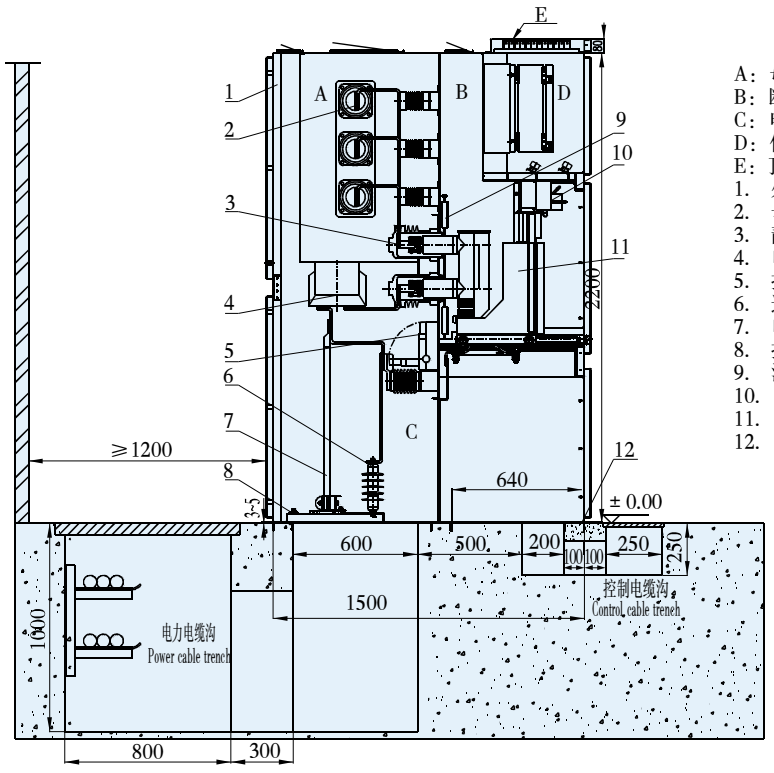
● 基础框架应有可靠的接地。接地线用截面积不小于40×4的镀锌钢带连接。当一组开关柜排列较长时，基础框架应有两端接地。

● In addition to complying with the relevant provisions of the "Technical Specifications for Construction and Acceptance of Electric Power Construction" , the installation base of the switchgear should also refer to the installation base map of our company.

● The installation base of the switchgear is generally divided into two times to pour concrete. The first time was the basic frame for installing the switchgear. The second watering concrete is the smoothing layer of the ground, generally 60mm thick. When pouring the concrete smoothing layer, the concrete height should be lower than the component plane by 3~5mm.

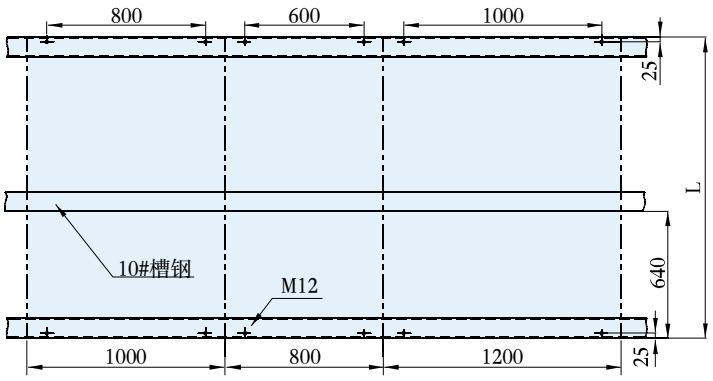
● Horizontal calibration should be carried out before the basic frame is embedded, and the horizontal error and straightness should not exceed 1mm, the total length error should not exceed 3mm.

● The base frame should have a reliable grounding. The grounding wire is connected by a galvanized steel strip with a cross-sectional area of not less than 40×4. When a group of switchgear cabinets are arranged long, the base frame should be grounded at both ends.



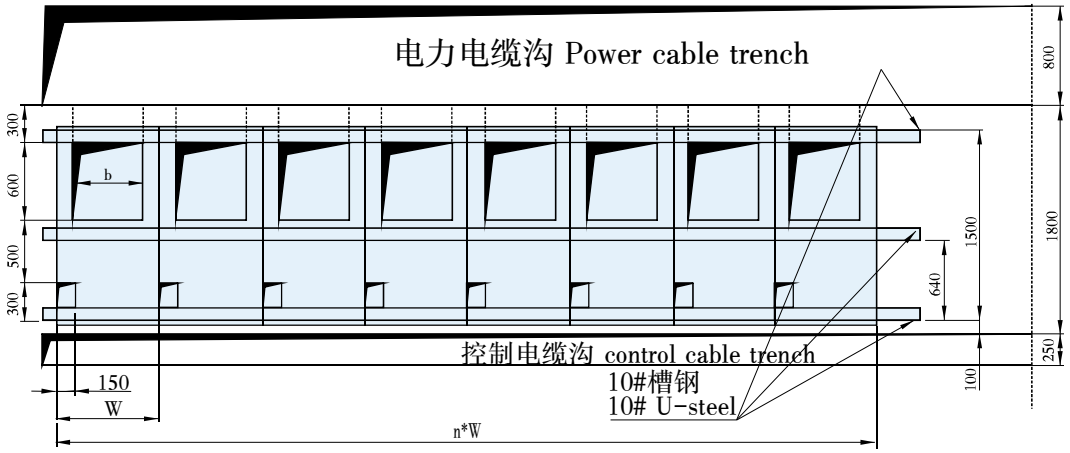
A：母线隔室 Bus compartment
B：断路器隔室 Circuit breaker compartment
C：电缆隔室 cable compartment
D：低压隔室 low voltage compartment
E：顶部控制母线隔室 top control bus compartment
1. 外壳 Enclosure
2. 母线 Bus
3. 静触头装置 Static contact device
4. 电流互感器 Current transformer
5. 接地闸刀 Grounding knife
6. 避雷器 Lightning arrester
7. 电缆密封终端 Cable sealing terminal
8. 接地主母线 Grounding main bus
9. 活门机构 Valve mechanism
10. 二次插件 Secondary plug-in
11. 断路器小车 Breaker trolley
12. 10#槽钢 10# U-steel

典型开关柜的内部结构及安装基础示意图
Schematic diagram of the internal structure and installation foundation of a typical switchgear



注：L为柜深。
Note: L is the depth of the cabinet

基础框架典型加工图
Typical processing diagram of basic frame



柜宽 cabinet width W	b
800	550
1000	750
1200	950

电缆沟道典型布置图
Typical layout of cable trench

安装

开关柜安装前，首先检查安装基础是否符合开关柜的基础要求。

拆箱后，应首先保管好随箱文件，并根据装箱单检查随柜附件、备品备件是否齐全。

检查柜体、绝缘件及断路器等元件有无损坏。如发现损坏应速与厂家联络。

清除柜内有无灰尘、杂物，尤其绝缘件表面，应清扫干净。

按以下步骤安装开关柜：

为减小积累误差，开关柜应从中间位置开始按排列顺序拼装。拼柜过程中应穿插安装水平母线，否则柜体全部就位后，可能无法安装水平母线。

并列好开关柜，调整好位置，相邻柜靠紧，用M10x 25螺栓进行柜间连接，高度方向的连结点不得少于3点。

用M12地脚螺栓或采取电焊(塞焊)方法将柜体与底脚槽钢固定。

打开母线室背部隔板安装水平母线，连接母线时接触面要平整、无污物，并涂上导电膏。通电前将隔板封闭。

安装一次电缆：电缆头制作完后，将电缆头固定在支架上，电缆与母线接触面应平直，电缆施工完后应将电缆室与电缆沟用橡皮泥封隔；电缆沟的尺寸示意见图三。

按小母线布置图安装好柜顶小母线；按照二次接线图连接好柜与柜之间电气联锁线。

沿开关柜排列方向连接柜间接地母线，接地回路连接应导通，接地电阻应满足规定要求。

安装二次回路电缆：电缆由柜左侧底部穿入，顺侧壁进入继电器仪表室，分别接到相应的端子排上，施工时应注意电缆号、端子号不要漏穿或穿错。二次电缆施工完后，用橡皮泥封堵电缆孔。

用纯酒精、干净软布将绝缘子、穿墙套管、触头盒等绝缘件擦拭干净。

Installation

Before installing the switchgear, first check whether the installation base meets the basic requirements of the switchgear.

After unpacking, you should first keep the file with the box and check whether the accessories and spare parts are complete according to the packing list.

Check components such as cabinets, insulation, and circuit breakers for damage. If there is any damage, please contact the manufacturer.

Remove dust and debris from the cabinet, especially the surface of the insulation.

Install the switchgear according to the following steps:

In order to reduce the accumulation error, the switchgear cabinet should be assembled in the order of arrangement from the middle position. The horizontal busb should be inserted during the consolidation process. Otherwise, the horizontal bus may not be installed after the cabinets are fully seated.

Check the switch cabinets, adjust the position, the adjacent cabinets should be close, and connect the cabinets with M10x 25 bolts. The joint point in the height direction must be no less than 3.

Fix the cabinet to the foot U-steel with M12 anchor bolts or by electric welding (plug welding).

Open the bus back partition to install the horizontal bus. When connecting the bus, the contact surface should be flat, free from dirt and coated with conductive paste. Close the partition before powering up.

Install the primary cable: After the cable head is finished, fix the cable head to the bracket, and the cable

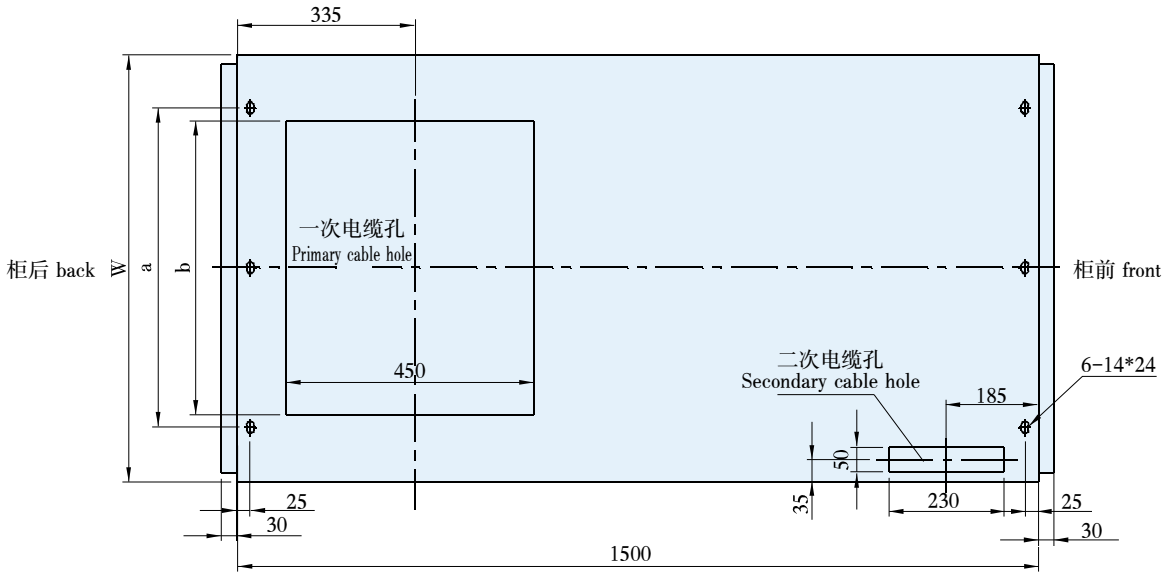
and bus contact surface should be straight. After the cable is finished, the cable compartment and the cable trench should be sealed with plasticine; the size of the cable trench is shown in Figure 3.

Install the small top bus according to the small bus layout; connect the electrical interlocking cable between the cabinets according to the secondary wiring diagram.

Connect the grounding bus between cabinets along the direction of the switchgear cabinets. The grounding loop connection should be conducted. The grounding resistance should meet the specified requirements.

Install the secondary circuit cable: the cable enters from the bottom left side of the cabinet, enters the relay meter room along the side wall, and is respectively connected to the corresponding terminal blocks. When constructing, pay attention to the cable numbers and terminal numbers. After the secondary cable is finished, seal the cable holes with plasticine.

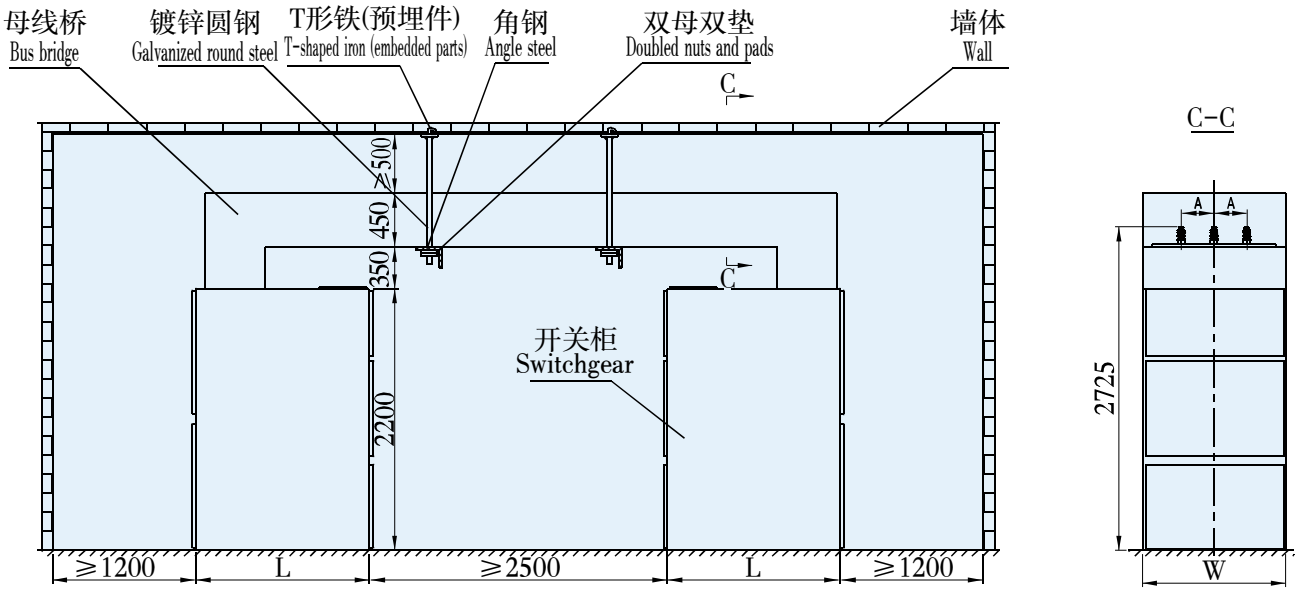
Wipe the insulation, insulators, wall bushings, contact boxes, etc. with pure alcohol and a clean soft cloth.



柜宽 width W	a	b
800	600	530
1000	800	730
1200	1000	930

底部安装与开孔示意图

Bottom mounting and cut-out schematic



母线桥示意图

Bus bridge schematic

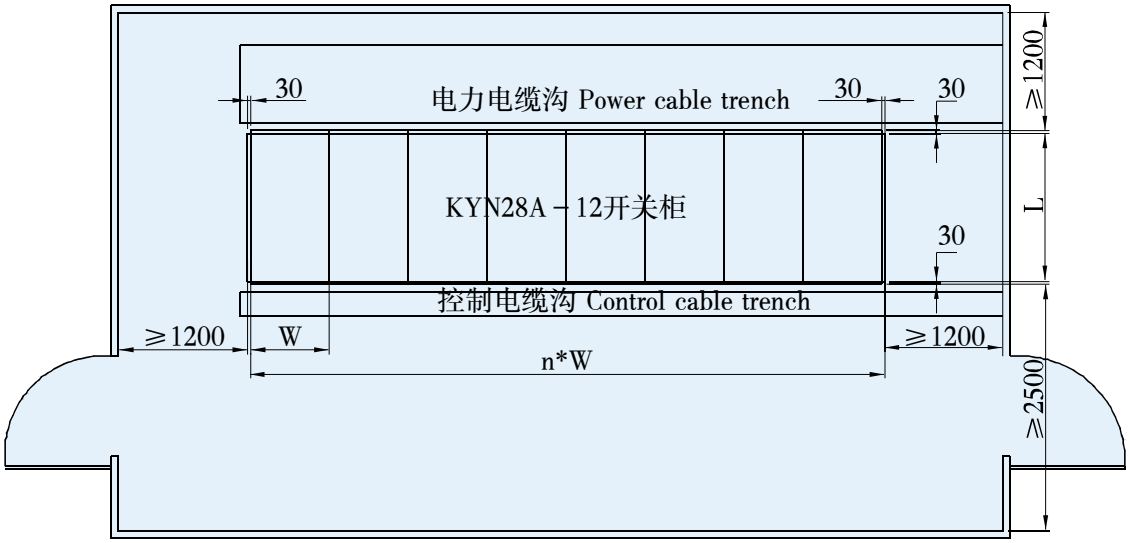
1:50

注：1.L、W为开关柜的柜深和柜宽。

2.A为相间距，分为210mm和275mm两种。

Note: 1 L/W are depth and width of the cabinet

2 A is interphase distance and is divided into 210mm and 275mm.



配电室典型平面布置图

Typical layout of power distribution room

注：1.W、L分别为开关柜的宽度和深度。

2.开关柜面对面双列布置时，柜间距大于2500mm。

Note: 1 L/W are depth and width of the cabinet

2 When the switchgear is arranged in a double row face to face, the cabinet spacing should be more than 2500mm

安装与调试 INSTALLATION AND COMMISSIONING

调试

开关柜安装好后，在投入运行前，需进行下列各种检查和试验：

a)检查开关柜内安装的电器设备和控制接线是否符合工厂的图纸要求；

b)手车推拉应灵活轻便，无卡阻、碰撞现象，同类型手车互换性是否良好；

c)检查活门动作是否灵活、可靠，无卡滞现象；

d)检查所安装的电器设备接触是否良好，是否符合本身的技术条件；

e)检查机械联锁机构，电气联锁装置的动作是否正确可靠，应符合系统的要求；

f)检查主回路的绝缘电阻是否符合要求；手车与柜体间的接地是否接触紧密；

g)检查开关柜内部有无异物及各部件的安装螺钉是否有松动现象；

h)检查主回路和辅助回路的1min工频绝缘电压试验，应无击穿闪络现象。

Commissioning

After the switchgear is installed, the following inspections and tests are required before putting into operation:

a) Check whether the electrical equipment and control wiring installed in the switch cabinet meet the requirements of the factory drawings;

b) The push-pull of the trolley should be flexible and light, without jamming and collision, and the interchangeability of the same type of trolley is good;

c) Check whether the movement of the valve is flexible, reliable, and free from sticking;

d) Check whether the installed electrical equipment is in good contact and meets its own technical conditions;

e) Check the mechanical interlocking mechanism, whether the action of the electrical interlocking device is correct and reliable, and it should meet the requirements of the system;

f) Check whether the insulation resistance of the main circuit meets the requirements; whether the grounding between the trolley and the cabinet is in close contact;

g) Check if there is any foreign matter inside the switchgear and whether the mounting screws of each component are loose;

h) Check the 1min power frequency insulation voltage test of the main circuit and the auxiliary circuit, and it should be not breakdown and there is no flashover.

维护与检修 MAINTENANCE AND REPAIR

维护

开关柜的维护应由专业人员实施，应如实记录开关柜的运行情况，并按断路器、操作机构的使用说明书要求做好定期的维护保养工作。

检修

开关柜分为故障检修和定期检修两种。

故障检修是为防止故障运行和防止事故扩大，在发现事故出现或断定事故即将出现时，立即对故障部位进行检修，及时排除故障，如发现绝缘件表面凝露或局部放电，柜内温度明显升高或有强烈异常气味等情况。

定期检修，检修内容如下：

a)对开关柜内外进行清扫，特别是绝缘件表面；

b)检查导电体联接部位紧固是否良好；

c)按各类断路器的检修项目进行检修、调试(包括操作机构)；

d)检测接地回路的连续性；

e)对断路器断口进行工频耐压试验。

维护与检修 MAINTENANCE AND REPAIR

Maintenance

The maintenance of the switchgear should be carried out by professionals. The operation of the switchgear should be recorded truthfully, and the regular maintenance work should be done according to the instructions of the circuit breaker and the operating mechanism.

Repair

The switchgear is divided into two types: troubleshooting and regular maintenance.

Trouble-shooting is to prevent malfunctions and prevent accidents from expanding. When an accident is discovered or it is determined that an accident is about to occur, the faulty part is immediately repaired and the fault is removed. For example, the surface of the insulating element is found to be condensation or partial discharge, the temperature inside the cabinet is obviously increased or there is a strong abnormal smell.

Regular maintenance, repairs are as follows:

a) Cleaning the inside and outside of the switchgear, especially the surface of the insulation;

b) Check if the joints of the electrical conductor is fastened;

c) Inspection and commissioning (including operating mechanism) according to the maintenance items of various circuit breakers;

d) Detecting the continuity of the ground loop;

e) Power frequency withstand test for breaker fracture

产品成套性 PRODUCT SET

供货时提供下列文件及附件：

a)产品装箱清单；

b)产品合格证；

c)产品出厂试验报告；

d)产品样本；

e)有关电气图纸；

f)柜门钥匙、操作手柄及合同规定的备品备件；

g)主要元器件的使用说明书。

The following documents and accessories are available at the time of delivery:

a) Product packing list;

b) Product certification;

c) Product factory test report;

d) Product samples;

e) Relevant electrical drawings;

f) Cabinet door key, the operating handle and the spare parts specified in the contract;

g) Instructions for main components.

a)主结线方案图编号、用途和单线系统图；额定电压、额定电流、额定短路开断电流；配电室平面布置图及开关柜的排列图；

b)标明进/出线电缆的规格和进/出线方式；

c)开关柜控制、测量及保护功能的要求以及其他闭锁和自动装置的要求；

d)柜内主要元器件的型号、规格和数量；

e)需要母线桥时提供跨距和高度尺寸；

f)开关柜使用在特殊环境条件下时，应在订货时详细说明；

g)其他特殊要求。

a) Main junction scheme diagram number, use and single-line system diagram; rated voltage, rated current, rated short-circuit breaking current; layout of power distribution room and arrangement diagram of switchgear;

b) Indicate the specifications of the incoming/outgoing cable and the way of incoming/outgoing;

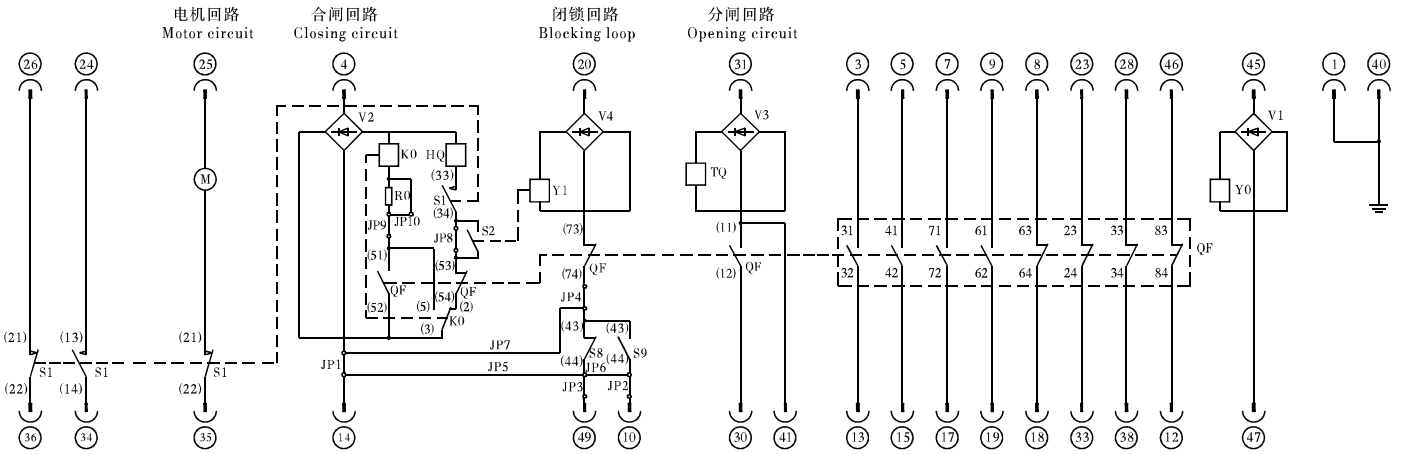
c) Requirements for control, measurement and protection functions of the switchgear and other requirements for latching and automatic devices;

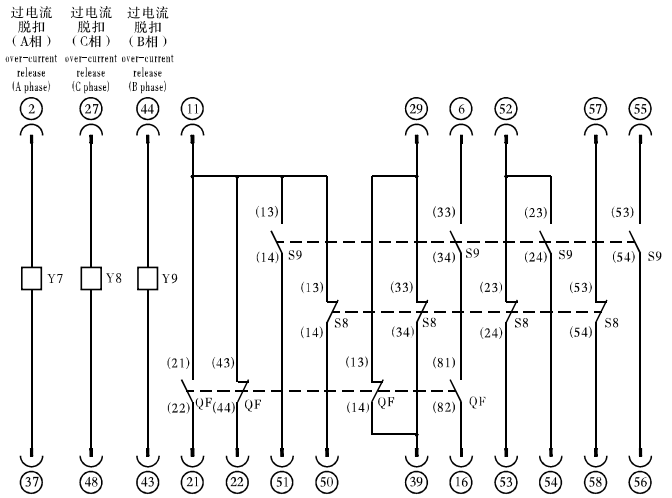
d) The type, specification and quantity of the main components in the cabinet;

e) Provide span and height dimensions when bus bridges are required;

f) When the switchgear is used under special environmental conditions, it should be specified when ordering;

g) Other special requirements.





可选件接线设置 Optional wiring settings

跳线状态 Jumper status / 跳线 Jumper / 配置 Configuration		JP1	JP2	JP3	JP4	JP5	JP6	JP7	JP8	JP9
带防跳 With anti-jump	带闭锁 With lock	√	√	√	√	/	/	/	/	√
	无闭锁 No lockout	/	/	/	/	√	√	√	√	√
无防跳 No anti-jump	带闭锁 With lock	√	√	√	√	/	/	/	/	/
	无闭锁 No lockout	/	/	/	/	√	√	√	√	/

操作电源选择
Operating power supply selection

操作电源 Operating power supply / 跳线 Jumper	JP10
AC/DC 220V	/
AC/DC 110V	√

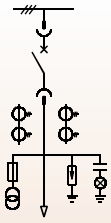
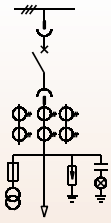
Y0：底盘车闭锁电磁铁（可选）
Y0: chassis car lock solenoid (optional)
Y1：闭锁线圈（可选）
Y1: latching coil (optional)
V1～V4：整流桥（控制电压为直流时无）
V1-V4: rectifier bridge (no control voltage when DC)
R0：电阻
R0: resistor
JP1～JP10：跳线
JP1-JP10: jumper

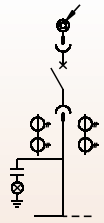
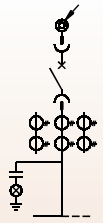
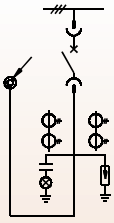
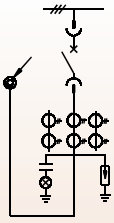
QF：辅助开关（分合操作时切换）
QF auxiliary switch (switching during opening and closing operation)
S9：微动开关（当在工作位置时切换）
S9 micro switch (switch in the working position)
S8：微动开关（当在试验位置时切换）
S8 micro switch (switch in test position)
S1：微动开关（合闸弹簧储能后切换）
S1 micro switch (switch after closing spring energy storage)
S2：微动开关
S2 micro switch
HQ：合闸脱扣器
HQ closing release
TQ：分闸脱扣器
TQ trip release
M：储能电机
M energy storage motor
Y7～Y9：间接式过电流脱扣器（可选）
Y7-Y9 indirect over-current release (optional)
K0：防跳继电器（可选）
K0 anti-jump relay (optional)

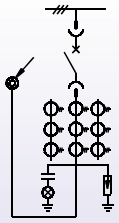
注：“/”表示断开；“√”表示连接
Note: “/” means disconnected “√” means connected

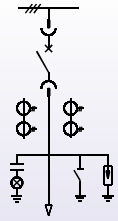
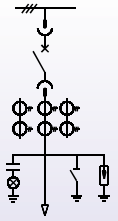
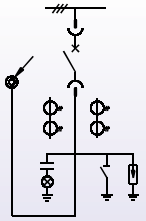
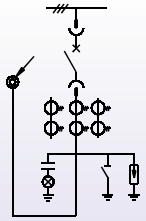
说明：图示位置为CV2-12/T（V）断路器处于试验位置，未储能，分闸状态
Instruction: The position shown is that the CV2-12/T(V) circuit breaker is in the test position, not charged, and at open position

主结线方案 MAIN JUNCTION SCHEME

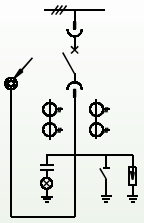
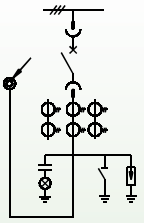
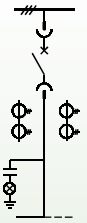
方案编号 Scheme number		01	02	03	04
主结线方案 Main junction scheme					
额定电流 Rated current		630~1250A	630~1250A	630~1250A	630~1250A
主要元器件 Main components	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker	1	1	1	1
	电流互感器 LZZBJ9-10 Current Transformer	2	3	2	3
	电压互感器 JDZ10-10 Voltage transformer			2	2
	高压熔断器 XRNP1-10 High voltage fuse			3	3
	接地开关 JN15-10 Grounding switch				
	避雷器 YH5W lightning arrester	3	3	3	3
	带电显示器 DXN1 Live display	1	1	1	1
用 途 Use		电缆下进线 Cable Incoming at the bottom	电缆下进线 Cable Incoming at the bottom	电缆下进线 Cable Incoming at the bottom	电缆下进线 Cable Incoming at the bottom
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800×1500×2200	800×1500×2200	800×1500×2200	800×1500×2200
	高海拔G2型 High altitude G2	800×1600×2200	800×1600×2200	800×1600×2200	800×1600×2200
	高海拔G3,G4型 High altitude G3、G4	800×1850×2300	800×1850×2300	800×1850×2300	800×1850×2300
备 注 Note				PT手车式时柜高为2300mm Cabinet height 2300mm for PT trolley type	PT手车式时柜高为2300mm Cabinet height 2300mm for PT trolley type

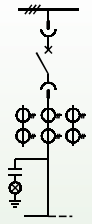
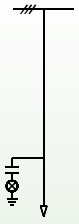
方案编号 Scheme number		05	06	07	08
主结线方案 Main junction scheme					
额定电流 Rated current		630~1250A	630~1250A	630~1250A	630~1250A
主要元器件 Main components	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker	1	1	1	1
	电流互感器 LZZBJ9-10 Current Transformer	2	3	2	3
	电压互感器 JDZ10-10 Voltage transformer				
	高压熔断器 XRNP1-10 High voltage fuse				
	接地开关 JN15-10 Grounding switch				
	避雷器 YH5W lightning arrester			3	3
	带电显示器 DXN1 Live display	1	1	1	1
用 途 Use		电缆架空上进线+左(右)联 Incoming on top with cable overhead+ left(right) junction	电缆架空上进线+左(右)联 Incoming on top with cable overhead+ left(right) junction	电缆架空上进线 Incoming on top with cable overhead	电缆架空上进线 Incoming on top with cable overhead
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800×1500×2200	800×1500×2200	800×1660×2200	800×1660×2200
	高海拔G2型 High altitude G2	800×1600×2200	800×1600×2200	800×1800×2200	800×1800×2200
	高海拔G3,G4型 High altitude G3、G4	800×1850×2300	800×1850×2300	800×2150×2300	800×2150×2300
备 注 Note					

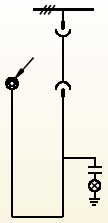
方案编号 Scheme number		09			
主结线方案 Main junction scheme					
额定电流 Rated current		630~1250A	1600~2000A	2500~3150A	4000A
Main components 主要元器件	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker	1	1	1	1
	电流互感器 LZZBJ9-10 Current Transformer	3	3	3	LMZBJ9-10H *3
	电压互感器 JDZ10-10 Voltage transformer				
	高压熔断器 XRNP1-10 High voltage fuse				
	接地开关 JN15-10 Grounding switch				
	避雷器 YH5W lightning arrester	3	3	3	1
	带电显示器 DXN1 Live display	1	1	1	1
用 途 Use		铜排架空上进线 Incoming on top with copper busbar overhead	铜排架空上进线 Incoming on top with copper busbar overhead	铜排架空上进线 Incoming on top with copper busbar overhead	铜排架空上进线 Incoming on top with copper busbar overhead
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800 × 1800(1660) × 2200	1000 × 1800 × 2200	1000 × 1800 × 2200	1000 × 1800 × 2200
	高海拔G2型 High altitude G2	800 × 1800 × 2200	1000 × 1800 × 2200	1000 × 1800 × 2200	——
	高海拔G3,G4型 High altitude G3、G4	1000 × 2150 × 2300	——	——	——
备 注 Note		主电路带计量方案时,柜深须为1800 When the main circuit is equipped with metering equipment, the cabinet depth must be 1800			

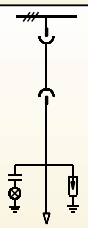
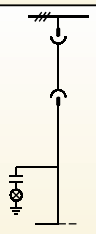
方案编号 Scheme number		10	11	12	13
主结线方案 Main junction scheme					
额定电流 Rated current		630~1250A	630~1250A	630~1250A	630~1250A
Main components 主要元器件	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker	1	1	1	1
	电流互感器 LZZBJ9-10 Current Transformer	2	3	2	3
	电压互感器 JDZ10-10 Voltage transformer				
	高压熔断器 XRNP1-10 High voltage fuse				
	接地开关 JN15-10 Grounding switch	1	1	1	1
	避雷器 YH5W lightning arrester	3	3	3	3
	带电显示器 DXN1 Live display	1	1	1	1
用 途 Use		电缆下出线 Cable outgoing at the bottom	电缆下出线 Cable outgoing at the bottom	电缆架空上出线 Outgoing on top with cable overhead	电缆架空上出线 Outgoing on top with cable overhead
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800 × 1800(1660) × 2200	800 × 1800(1660) × 2200	800 × 1800(1660) × 2200	800 × 1800(1660) × 2200
	高海拔G2型 High altitude G2	800 × 1800 × 2200	800 × 1800 × 2200	800 × 1800 × 2200	800 × 1800 × 2200
	高海拔G3,G4型 High altitude G3、G4	1000 × 2150 × 2300	1000 × 2150 × 2300	1000 × 2150 × 2300	1000 × 2150 × 2300
备 注 Note		主母线额定电流2500A及以上时,柜深为1660。 When the main busbar rated current is 2500A and above, the cabinet depth should be 1660		主母线额定电流2500A及以上时,柜深为1800。 When the main busbar rated current is 2500A and above, the cabinet depth should be 1800	

主结线方案 MAIN JUNCTION SCHEME

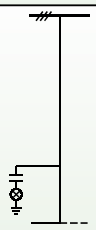
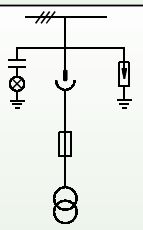
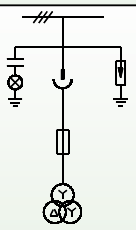
方案编号 Scheme number		14	15	16		
主结线方案 Main junction scheme						
额定电流 Rated current		630~1250A	630~1250A	630~1250A	1600~2000A	2500~3150A
主要元器件 Main components	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker	1	1	1	1	1
	电流互感器 LZZBJ9-10 Current Transformer	2	3	2	2	2
	电压互感器 JDZ10-10 Voltage transformer					
	高压熔断器 XRNP1-10 High voltage fuse					
	接地开关 JN15-10 Grounding switch	1	1			
	避雷器 YH5W lightning arrester	3	3			
	带电显示器 DXN1 Live display	1	1	1	1	1
用 途 Use		铜排架空上出线 Outgoing on top with copper busbar overhead	铜排架空上出线 Outgoing on top with copper busbar overhead	左(右)联络 left(right) junction	左(右)联络 left(right) junction	左(右)联络 left(right) junction
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800×1800(1660)×2200	800×1800(1660)×2200	800×1500×2200	800×1500×2200	1000×1660×2200
	高海拔G2型 High altitude G2	800×1800×2200	800×1800×2200	800×1600×2200	800×1600×2200	1000×1600×2200
	高海拔G3,G4型 High altitude G3、G4	1000×2150×2300	1000×2150×2300	1000×1850×2300	1000×1850×2300	——
备 注 Note		主电路带计量方案时，柜深为1800。 主母线额定电流2500A及以上时,柜深为1800。 When the main circuit is equipped with metering equipment, the cabinet depth must be 1800 When the main busbar rated current is 2500A and above, the cabinet depth should be 1800				

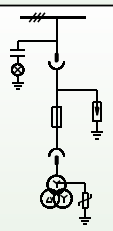
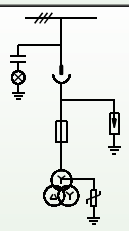
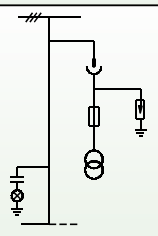
方案编号 Scheme number		17			18
主结线方案 Main junction scheme					
额定电流 Rated current		630~1250A	1600~2000A	2500~3150A	630~1250A
主要元器件 Main components	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker	1	1	1	
	电流互感器 LZZBJ9-10 Current Transformer	3	3	3	
	电压互感器 JDZ10-10 Voltage transformer				
	高压熔断器 XRNP1-10 High voltage fuse				
	接地开关 JN15-10 Grounding switch				
	避雷器 YH5W lightning arrester				
	带电显示器 DXN1 Live display	1	1	1	1
用 途 Use		左(右)联络 left(right) junction	左(右)联络 left(right) junction	左(右)联络 left(right) junction	母线提升 Busbar rise
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800×1500×2200	1000×1500×2200	1000×1660×2200	800×1500×2200
	高海拔G2型 High altitude G2	800×1600×2200	1000×1600×2200	1000×1600×2200	800×1600×2200
	高海拔G3,G4型 High altitude G3、G4	1000×1850×2300	——	——	1000×1850×2300
备 注 Note					

方案编号 Scheme number		19			
主结线方案 Main junction scheme					
额定电流 Rated current		630~1250A	1600~2000A	2500~3150A	4000A
Main components 主要元器件	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker				
	电流互感器 LZZBJ9-10 Current Transformer				
	电压互感器 JDZ10-10 Voltage transformer				
	高压熔断器 XRNP1-10 High voltage fuse				
	接地开关 JN15-10 Grounding switch				
	避雷器 YH5W lightning arrester				
	带电显示器 DXN1 Live display	1	1	1	1
用 途 Use		隔离上进线 Isolated Incoming on top	隔离上进线 Isolated Incoming on top	隔离上进线 Isolated Incoming on top	隔离上进线 Isolated Incoming on top
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800×1800(1660)×2200	1000×1800(1660)×2200	1000×1800×2200	1000×1800×2200
	高海拔G2型 High altitude G2	800×1800×2200	1000×1800×2200	1000×1800×2200	——
	高海拔G3,G4型 High altitude G3、G4	1000×2150×2300	——	——	——
备 注 Note		主电路带计量方案时，柜深为1800。其他电路推荐柜深为1800。 When the main circuit is equipped with metering equipment, the cabinet depth must be 1800. The recommended depth of other circuits is 1800.			

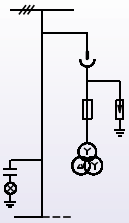
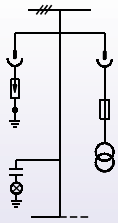
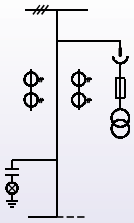
方案编号 Scheme number		20	21			
主结线方案 Main junction scheme						
额定电流 Rated current		630~1250A	630~1600A	1600~3150A	1600~3150A	1600~3150A
Main components 主要元器件	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker					
	电流互感器 LZZBJ9-10 Current Transformer					
	电压互感器 JDZ10-10 Voltage transformer					
	高压熔断器 XRNP1-10 High voltage fuse					
	接地开关 JN15-10 Grounding switch					
	避雷器 YH5W lightning arrester					
	带电显示器 DXN1 Live display	1	1	1	1	1
用 途 Use		隔离下进线 Isolated Incoming at the bottom	母线提升+左(右)联络 Busbar rise+ left(right) junction	母线提升+左(右)联络 Busbar rise+ left(right) junction	母线提升+左(右)联络 Busbar rise+ left(right) junction	母线提升+左(右)联络 Busbar rise+ left(right) junction
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800×1500×2200	800×1500×2200	1000×1500×2200	1000×1600×2200	1000×1500×2200
	高海拔G2型 High altitude G2	800×1600×2200	800×1600×2200	1000×1600×2200	1000×1600×2200	——
	高海拔G3,G4型 High altitude G3、G4	1000×1850×2300	1000×1850×2300	——	——	——
备 注 Note						

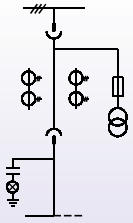
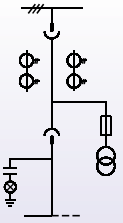
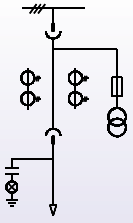
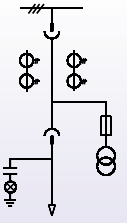
主结线方案 MAIN JUNCTION SCHEME

方案编号 Scheme number		22			23	24
主结线方案 Main junction scheme						
额定电流 Rated current		630~1250A	1600~2000A	2500~3150A		
主要元器件 Main components	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker					
	电流互感器 LZZBJ9-10 Current Transformer					
	电压互感器 JDZ10-10 Voltage transformer				2	JDZX10-10 *3
	高压熔断器 XRNP1-10 High voltage fuse				3	3
	接地开关 JN15-10 Grounding switch					
	避雷器 YH5W lightning arrester				3	3
	带电显示器 DXN1 Live display	1	1	1	1	1
用 途 Use		母线提升+左(右)联络 Busbar rise+ left(right) junction	母线提升+左(右)联络 Busbar rise+ left(right) junction	母线提升+左(右)联络 Busbar rise+ left(right) junction	PT	PT
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800 × 1500 × 2200	1000 × 1500 × 2200	1000 × 1500 × 2200	800 × 1500(1660) × 2200	800 × 1500(1660) × 2200
	高海拔G2型 High altitude G2	800 × 1600 × 2200	1000 × 1600 × 2200	1000 × 1600 × 2200	800 × 1600 × 2200	800 × 1600 × 2200
	高海拔G3,G4型 High altitude G3、G4	1000 × 1850 × 2300	——	——	1000 × 1850 × 2300	1000 × 1850 × 2300
备 注 Note					主母线额定电流2500A及以上时,柜深为1660。 When the main busbar rated current is 2500A and above, the cabinet depth should be 1660	

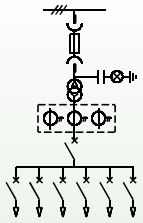
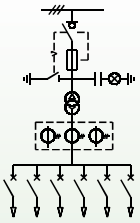
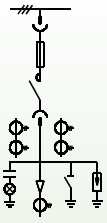
方案编号 Scheme number		25	26	27	
主结线方案 Main junction scheme					
额定电流 Rated current					
主要元器件 Main components	负荷开关 ISARC load switch				
	电流互感器 LZZBJ9-10 Current Transformer				
	电压互感器 JDZ10-10 Voltage transformer	JDZX9-10G *3	JDZX9-10G *3	2	2
	高压熔断器 XRNP1-10 High voltage fuse	3	3	3	3
	塑壳断路器 CM1/CM2 Molded case circuit breaker				
	变压器 SC9-□ 10/0.4kV transformer	3	3	3	3
	带电显示器 DXN1 Live display	1	1	1	1
用 途 Use		PT	PT	PT+左(右)联 PT+left(right) junction	PT+左(右)联 PT+left(right) junction
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800 × 1500(1660) × 2200	800 × 1500(1660) × 2200	800 × 1500 × 2200	1000 × 1500 × 2200
	高海拔G2型 High altitude G2	800 × 1600 × 2200	800 × 1600 × 2200	800 × 1600 × 2200	1000 × 1600 × 2200
	高海拔G3,G4型 High altitude G3、G4	1000 × 1850 × 2300	1000 × 1850 × 2300	1000 × 1850 × 2300	——
备 注 Note		1.一次消谐器LXQ-10 2.主母线额定电流2500A及以上时,柜深为1660。 1. primary harmonic elimination device LXQ-10 2. When the main busbar rated current is 2500A and above, the cabinet depth should be 1660			用于主母线额定电流2500A及以上方案。 For the main bus rated current 2500A and above.

主结线方案 MAIN JUNCTION SCHEME

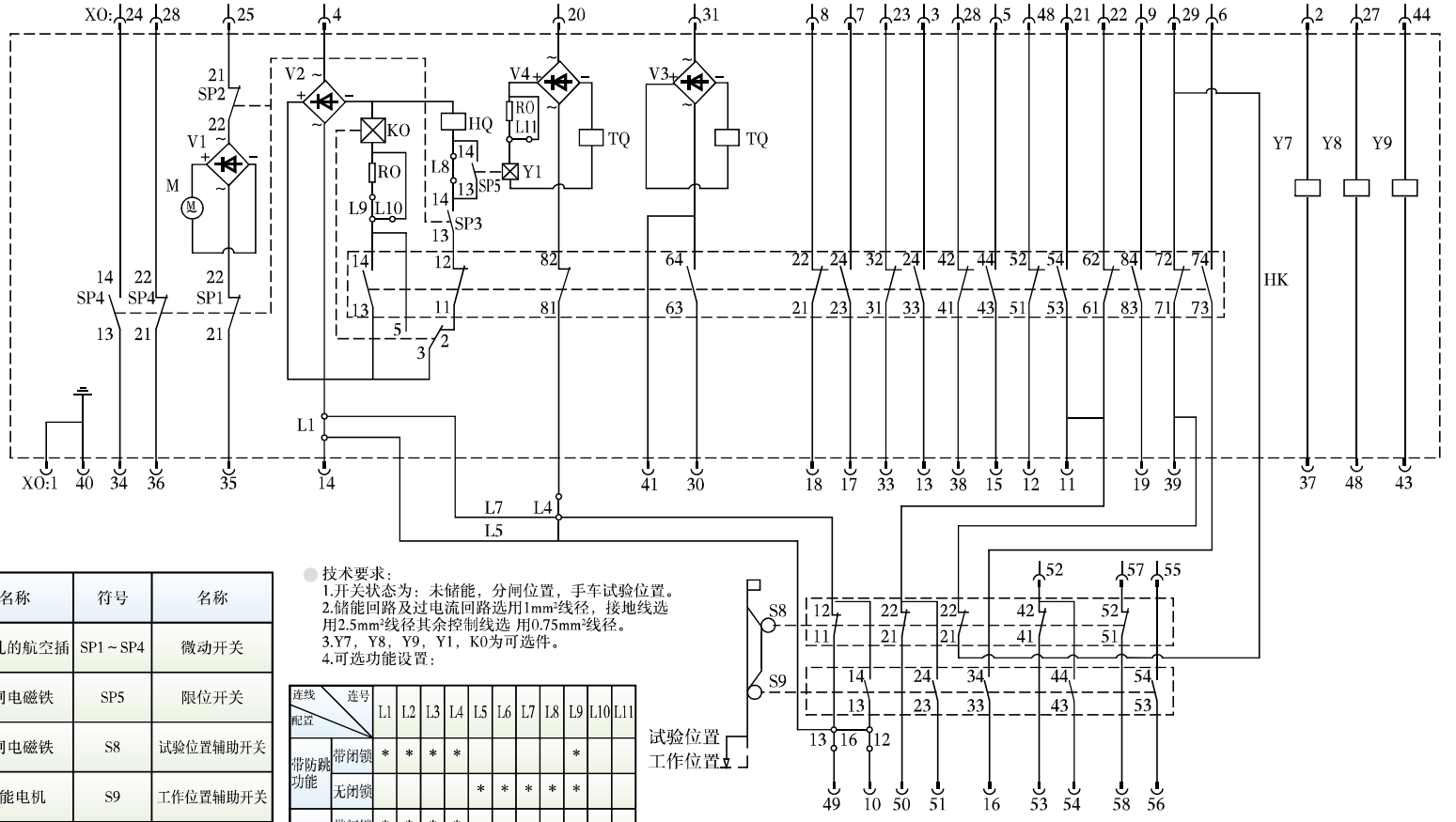
方案编号 Scheme number		28		29	30
主结线方案 Main junction scheme					
额定电流 Rated current					630~1250A
主要元器件 Main components	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker				
	电流互感器 LZZBJ9-10 Current Transformer				2
	电压互感器 JDZ10-10 Voltage transformer	JDZX10-10 *3	JDZX10-10 *3	2	2
	高压熔断器 XRNP1-10 High voltage fuse	3	3	3	3
	接地开关 JN15-10 Grounding switch				
	避雷器 YH5W lightning arrester	3	3		
	带电显示器 DXN1 Live display	1	1	1	1
用 途 Use		PT+左(右)联 PT+left(right) junction	PT+左(右)联 PT+left(right) junction	PT+计数器车 PT+ counter car	计量+左（右）联 Meter+ left(right) junction
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800×1500×2200	1000×1660×2200	800×1500×2200	800×1500×2200
	高海拔G2型 High altitude G2	800×1600×2200	1000×1600×2200	800×1600×2200	800×1600×2200
	高海拔G3,G4型 High altitude G3、G4	1000×1850×2300	——	——	1000×1850×2300
备 注 Note			用于主母线额定电流2500A及以上方案。 For the main bus rated current 2500A and above.	避雷器附计数器 Lightning arrester with counter	

方案编号 Scheme number		31	32	33	34
主结线方案 Main junction scheme					
额定电流 Rated current		630~1250A	630~1250A	630~1250A	630~1250A
主要元器件 Main components	真空断路器 CV1/VD4/VS1 Vacuum circuit breaker				
	电流互感器 LZZBJ9-10 Current Transformer	2	2	2	2
	电压互感器 JDZ10-10 Voltage transformer	2	2	2	2
	高压熔断器 XRNP1-10 High voltage fuse	3	3	3	3
	接地开关 JN15-10 Grounding switch				
	避雷器 YH5W lightning arrester				
	带电显示器 DXN1 Live display	1	1	1	1
用 途 Use		计量+左（右）联 Meter+ left(right) junction	计量+左（右）联 Meter+ left(right) junction	计量进线 Meter incoming	计量进线 Meter incoming
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800×1500×2200	800×1500×2200	800×1500×2200	800×1500×2200
	高海拔G2型 High altitude G2	800×1600×2200	800×1600×2200	800×1600×2200	800×1600×2200
	高海拔G3,G4型 High altitude G3、G4	——	1200×1850×2300	——	1200×1850×2300
备 注 Note					

主结线方案 MAIN JUNCTION SCHEME

方案编号 Scheme number		35	36		37
主结线方案 Main junction scheme					
额定电流 Rated current					
Main components 主要元器件	负荷开关 ISARC load switch		1	1	1
	真空接触器-熔断器组合电器 LHJCZR2系列 Vacuum contactor-fuse combination				
	电压互感器 JDZ10-10 Voltage transformer	BH-0.66 *3	BH-0.66 *3	BH-0.66 *3	2
	高压熔断器 XRNP1-10 High voltage fuse	3	3	3	
	塑壳断路器 CM1/CM2 Molded case circuit breaker	根据用户需要 According to the needs of users	根据用户需要 According to the needs of users	根据用户需要 According to the needs of users	
	变压器 SC9-□ 10/0.4kV transformer	1	1	1	
	带电显示器 DXN1 Live display	1	1	1	1
	接地开关 JN15-10 Grounding switch				1
	避雷器 YH5W lightning arrester				1
用 途 Use		所用变 electric substation transformer	所用变 electric substation transformer	所用变 electric substation transformer	F-C回路 F-C loop
外形尺寸（宽×深×高）Dimensions (W*D*H)	常规型 Normal type	800(1000)×1500(1660)×2200	(800+1000)×1600×2200	1200×1500×2200	650(800)×1500(1660)×2200
	高海拔G2型 High altitude G2	800(1000)×1600×2200	——	——	——
	高海拔G3,G4型 High altitude G3、G4	1000×1850×2300	——	——	——
备 注 Note			1.当变压器容量大于50kVA时,柜宽为1000。 2.主母线额定电流2500A及以上时,柜深为1660。 1. When the transformer capacity is greater than 50kVA, the cabinet width is 1000. 2. When the main busbar rated current is 2500A and above, the cabinet depth is 1660.	2.额定电流2500A及以上方案时,分成两面柜。 1.当变压器容量大于50Kvar时,推荐上述方案。 1. When the rated current is 2500A or above, it is divided into two sides. 2. When the transformer capacity is greater than 50Kvar, the above scheme is recommended.	主母线额定电流2500A及以上时,柜深为1660。 When the main busbar rated current is 2500A and above, the cabinet depth should be 1660

VS1手车式电气控制接线图



符号	名称	符号	名称
XO:	58针孔的航空插	SP1～SP4	微动开关
HQ	合闸电磁铁	SP5	限位开关
TQ	分闸电磁铁	S8	试验位置辅助开关
M	储能电机	S9	工作位置辅助开关
HK	辅助开关	Y1	闭锁电磁铁
V1～V4	整流元件	RO～R1	分压电阻
LX	接线端子	Y7～Y9	过电流保护脱扣器
KO	防跳继电器	L1～L11	连接线

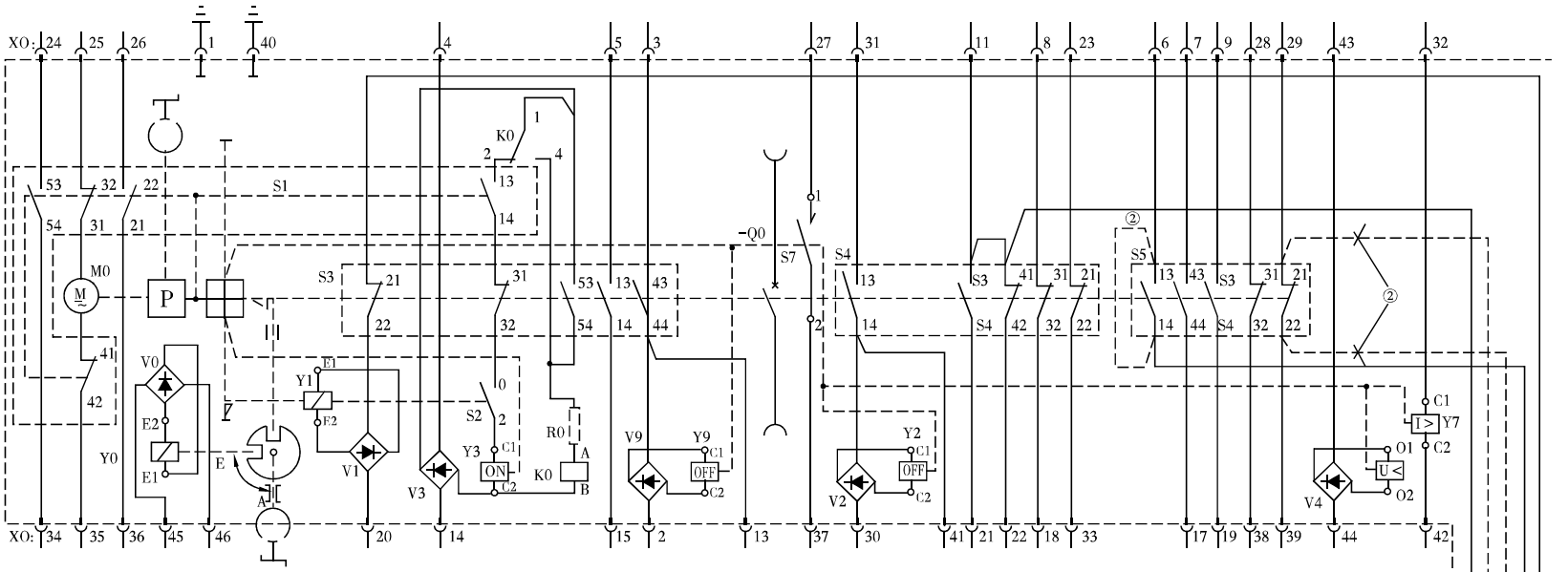
技术要求：
1.开关状态为：未储能，分闸位置，手车试验位置。
2.储能回路及过电流回路选用1mm²线径，接地线选用2.5mm²线径其余控制线选 用0.75mm²线径。
3.Y7，Y8，Y9，Y1，K0为可选件。
4.可选功能设置：

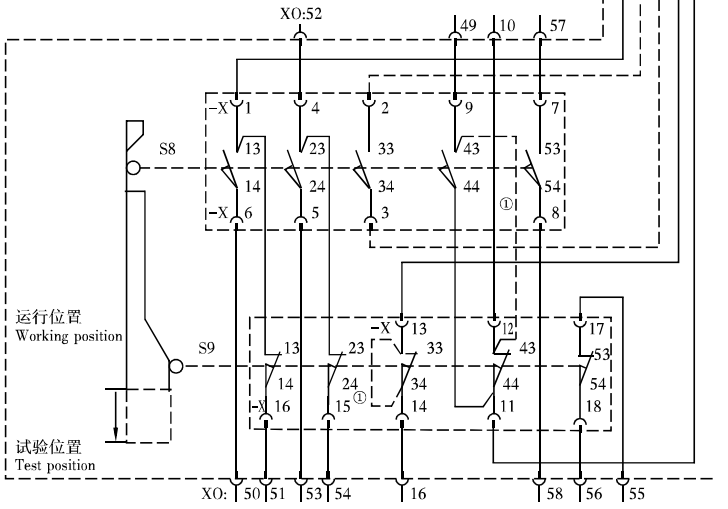
连线配置 \ 连号		L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
带防跳功能	带闭锁	*	*	*	*					*		
	无闭锁					*	*	*	*	*		
无防跳功能	带闭锁	*	*	*	*							
	无闭锁					*	*	*	*			
AC/DC110V											*	*
AC/DC220V												

注：“*”号表示连接，空格表示断开。

VD4手车式电气控制接线图

S1显示机构处于未储能状态





断路器二次元件
XO：58针孔的航空插 Y1　合闸闭锁电磁铁 Y2　第一分闸脱扣器 Y3　合闸脱扣器 Y4　欠压脱扣器 Y7　间接过流脱扣器 Y9　第二分闸脱扣器 S1　辅助开关 S2　辅助开关 S3、S4　辅助开关 S7　电气分闸信号的辅助开关（≥30ms） K0　防跳继电器 V1-V9　整流元件
手车上二次元件
-S8　限位开关（试验位置） -S9　限位开关（工作位置） Y0、V0　手车闭锁电磁铁 有S5时，　按虚线①接入。 无S5时，　按虚线②接入。

全国一级经销商明细表

北京

北京欣凯通机电有限公司 010-66162644
北京市北方森源电气有限责任公司 010-87581702
众业达电气(北京)有限公司 010-87365882

天津

天津市强强电器科技有限公司 022-83715527
天津众业达电气有限公司 022-86326002

上海

上海企开电器设备有限公司 021-56319844
上海森昊电气有限公司 021-54791857
上海泰耀机电设备有限公司 021-57428230
上海华启电气设备有限公司 021-56319844
上海斐格电气有限公司 021-24205696
上海众业达电器有限公司 021-56988198

重庆

重庆众业达电器有限公司 023-63056972

福建

泉州市恒源电力设备有限公司 0595-22587087
厦门亿合电器有限公司 0592-5223466
众业达电气（厦门）有限公司 0592-5976058
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杭州华森电器有限公司 0571-86947817
杭州天源机电设备有限公司 0571-87244850
杭州众业达电器有限公司 0571-88260931
乐清市新格电气有限公司 0577-62727313
宁波市江东腾辉电器有限公司 0574-87890910
宁波众业达电器有限公司 0574-87052331
众业达电气温州有限公司 0577-88919098

安徽

合肥皖为电气设备工程有限责任公司 0551-62884402
合肥环亚机电贸易有限责任公司 0551-62871030
众业达电气安徽有限公司 0551-65670231

江苏

南京扬力电器有限公司 025-84585297
南京兰珀电气工程有限公司 025-85283021
众业达电气南京有限公司 025-58833275
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镇江兆丰电器有限公司 0511-88320888
苏州苏新机电设备有限公司 0512-67571866
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苏州明大机电有限公司 0512-65833162
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常熟市润源电气设备销售有限公司 0512-52110269
常熟市创达电气物资有限责任公司 0512-52728292
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佛山市嘉合贸易有限公司 0757-83397660
东莞市运通泰电气科技有限公司 0769-22028877
深圳市华冠电器销售有限公司 0755-83928099
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唐山众业达电气设备有限公司 0315-5772701

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河南航天机电数字有限公司 0371-63329025
郑州众业达电器有限公司 0371-68069603
众业达电气洛阳有限公司 0379-60697679

四川

成都慧永电器成套设备有限公司 028-68003527
成都众业达电器有限责任公司 028-87560415

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陕西新力源电气有限公司 029-88348089
西安西菱电器机械设备有限公司 029-88320213
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昆明众业达自动化设备有限公司 0871-68065589

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内蒙古宇欣机电科技有限公司 0471-6512281

海南

海南华胜电气设备有限公司 0898-66226803

甘肃

甘肃众业达电器有限公司 0931-8406069