

XGN15-12(SF6)

箱式固定式交流金属封闭开关设备

Box Irremovable-type AC Metal-enclosed Switchgear



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概述 General

XGN15-12(SF6) 型单元式交流金属封闭环网开关设备（以下简称环网柜）是我们在引进国外先进技术并按照国内农电及城网改造之要求而自行设计、研制成功的新一代高压电器产品。各项技术性能指标全 IEC62271-200:2003 和 GB3906 标准。

环网柜的主开关、操作机构及元器件采用 ABB 公司原装件或采用进口部件国内组装生产的 SFL-12 型开关设备，也可根据用户需要配装 ABB 公司原装 SFL 型 SF6 断路器或 VD4-S 型真空断路器。其操作方式分为动、电动两种。

柜体经数控机床加工后铆接而成，防护等级达到 IP3X，并有可靠的机械联锁和防误操作功能。本产品具有体积小、重量轻、外型美观、操作简便、长寿命、高参数、无污染、少维护等极具显著的特点。

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

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

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

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

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

型号含义 Type Designation

X G N 15 -12 (SF6)



正常使用条件 Working Conditions

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

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结构特点 Structure Features

◆ 柜体结构

环网柜体采用 2mm 厚敷铝锌板 (或冷轧板喷塑后) 铆接成型, 柜后设有二处压力释放孔, 其一是针对电缆室, 另一个针对负荷开关 / 母线室。此结构能够最大限度地保障人身安全和运行设备的可靠。

◆ Cabinet Structure

Ring network switchgear is made by 2mm thick coated aluminium zinc plate (or cold-rolled sheet after powder coating). The cabinet is equipped with two pressure relief holes at the back of it---one is for the cable compartment, and another is for load switch/busbar compartment.

This structure is the best one to guarantee personal safety and reliable operation of the equipment.

◆ 母线室

母线室位于柜的顶部并连接相邻开关柜。

负荷开关是独立单元, 内部充以 SF6 气体。

◆ Busbar Compartment

Busbar compartment is at the top of the cabinet and connects the adjacent cabinets. Load switch is an independent unit filled with SF6 gas.

◆ 电缆室

大约 75% 空间是用于电缆连接、熔断器、接地开关和 CT、PT 安装。

◆ Cable Compartment

About 75% of the cable compartment is used to connect cables and install fuses, grounding switches and CT and PT.

◆ 机构小室与联锁

小室包含操作机构和机构联锁以及位置指示、辅助接点、脱扣线圈、带电显示器和联锁。

◆ Small Compartment of Operating Mechanism and Interlocking

Small compartment includes operating mechanism, mechanical interlocking, indicator of positions, auxiliary contacts, release coils, charged display and its interlocking.

◆ 继电器箱

继电器箱在柜的顶部, 是可选的。小室用来安装特殊的装置诸如仪表、继电器和马达单元。

◆ Relay Instruments Compartment

Relay instruments compartment is at the top of the cabinet. It is optional. There is a small compartment to install special devices such as instruments, relay and motor unit.

◆ 断路器室

一个断路器 (SF6 或真空) 能置于负荷开关之下方。

◆ Circuit Breaker Compartment

The circuit breaker (SF6 or VCB) can be installed below the load switch.

◆ 压力释放

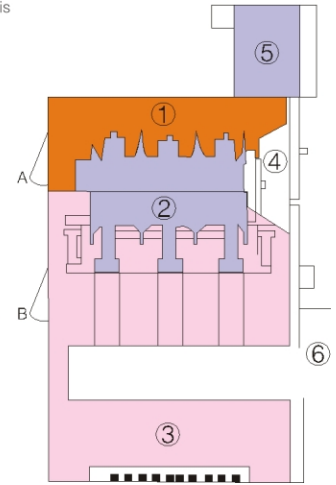
上面的压力释放是用于释放母线和负荷开关室内部电弧事故时产生的气体压力。

下面的压力释放是用于释放电缆小室内部电弧事故时产生的气体压力。

◆ Pressure Release

The upper pressure release device releases the pressure from the arc accident of busbar and load switch compartment.

The lower pressure release device releases the pressure from the arc accident inside the cable small compartment.



主要技术参数 Specifications

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

基本组件 Basic Components

◆ SFL 型负荷开关 (ABB 原装件)

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

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

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

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

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

– 分励脱扣线圈供带 A 机构的 SFL。

◆ 选 K 机构的开关 SFL12/17.5 IVDP575305RI

SFL24K IVDP575304RI

◆ 选 A 机构的开关 SFL12/17.5 IVDP575303RI

SFL24A IVDP575302RI

◆ VD4-S 真空断路器 (ABB 原装件)

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

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

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

◆ SFL 型 SF6 断路器 (ABB 原装件)

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

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

基本组件 Basic Components

◆ SFL type load switch (ABB original unit)

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

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

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

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

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

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

◆ SFL24K IVDP575304RI

SFL switch with K mechanism: SFL12/17.5 IVDP575305RI

SFL24K IVDP575304RI

◆ SFL24A IVDP575302RI

SFL switch with A mechanism: SFL12/17.5 IVDP575303RI

SFL24A IVDP575302RI

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

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

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

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

◆ SFL type SF6 circuit breaker (ABB original unit)

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

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

外型尺寸 Dimension

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

SFL 技术数据 Specifications of SFL

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

VD4-S 技术数据 Specifications of VD4-S

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

本开关有许多优点 Advantages

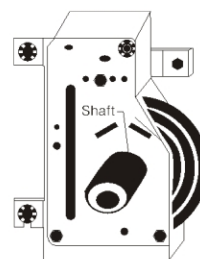
- a、燃弧持续时间短，灭弧室内的绝缘强度恢复迅速。
a, Short duration of arc and quick recovery of dielectric strength in arc chute;
- b、即使在最苛刻的环境中也保证安全可靠。
b, Safe and reliable even in harshest environment;
- c、可开断低值的感性、容性电流。
c, Capable breaking reactive current and capacitive current at low value;
- d、操作机构简单，能快速分合，机械寿命长。
d, Simple operating mechanism, quick breaking and closing, and long mechanical life;
- e、减少了触头和来弧室的耗损，也即延长了电寿命。
e, Less damage for contacts and arc chute; longer electrical life;
- f、允许操作次数多，但维护工作量很小。
f, More operation times; less maintenance work;
- g、轻型结构，紧凑，稳固。
g, Light, compacted and steady structure.

标准装备 Standard Equipments:

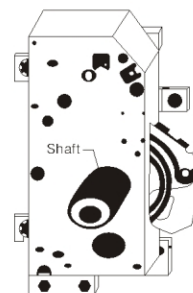
- 电动操作 Motor-drive operation
- 手动操作 Manual operation
- 辅助触点 (2 常开 2 常闭)
Auxiliary contacts (2 normally open and 2 normally close)
- 分励跳闸，带位置触点
Shunt trip with location contacts
- 分励合闸线圈
Shunt closing coil
- 信号触点的气体压力控制
Gas pressure control for signal contacts

可选装备 Operational Equipments:

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



k机构



A机构

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

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

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关合容量 Closing Capacity	kA	50	50	40
热稳定电流 Thermal Stability Current	kA/s	20/3	—	—
开断容量 Breaking Capacity	A	1700	—	—
最大熔断器 Maximum Fuse	A	125	—	—
极距 Polar Distance	mm	210	210	210

操作机构 Operating Mechanism

◆ 双功能机构：K 型 – 开关功能

利用操作杆或电机独立地进行分合闸操作

辅助触点：开关 (20 + 2C)/ 开关 (20 + 3C) 和接地开关 (10+1C) Double functional mechanism: function of K type switch

Use operating rod or motor to break or close independently.

Auxiliary contacts: switch (2 normally open + 2 normally close)/switch (2 normally open + 3 normally close) and grounding switch (1 normally open + 1 normally close)

◆ 接地开关功能

利用操作杆独立地进行分合闸操作操作能量由压缩弹簧提供，该弹簧释放后，使触头快速闭合或断开。

机械指示：组件中熔断器熔断时的机械显示器 / 电机选择 / AC220V / DC220V

◆ Function of grounding switch

Use operating rod or motor to break or close independently. The operating energy is provided by spring. When the spring releases, the contacts will close or break quickly.

Mechanism Instruction: machinery monitors when the fuse burns out in components/ motor selection/ AC220V/ DC220V.

◆ 双功能操作机构：A 型 – 开关功能

利用操作杆或电机独立地进行分合闸操作，操作能量由压缩弹簧提供，该弹簧释放后，使触头闭合。

利用按钮 (O) 或脱扣单元独立地进行分合闸操作。

◆ Double functional mechanism: function of A type switch

Use operating rod or motor to break or close independently. The operating energy is provided by spring. When the spring releases, the contacts will close.

Use button (O) or release unit to operate closing and breaking independently.

◆ 接地开关功能

利用操作杆独立地进行分合闸操作，操作能量由压缩弹簧提供，该弹簧释放后，使触头快速闭合或断开。

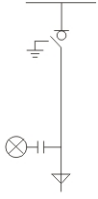
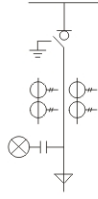


辅助触点：开关 (20+ 2C) 和接地开关 (10+1C) / 选电机时的开关 (1C) 和接地开关 /(10+1C)/ 熔断器烧断 (1C)/ 机械指示 / 脱分励脱扣 / 欠电压 / 电机选择

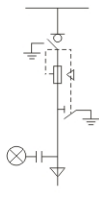
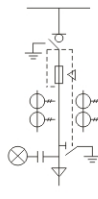
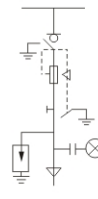
◆ Function of grounding switch

Use operating rod or motor to break or close independently. The operating energy is provided by spring. When the spring releases, the contacts will close or break quickly.

Auxiliary contacts: switch (2 normally open + 2 normally close) and grounding switch (1 normally open + 1 normally close)/switch for motor selection (1 normally close) and grounding switch/(1 normally open + 1 normally close)/fuse burnout (1 normally close)/mechanism instruction/shunt release/under voltage/motor selection

主电路方案图 Primary Wiring Scheme

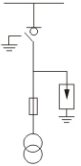

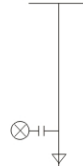

方案号 Scheme Number		1	1-1	1-2	1-3
主电路方案图 Primary Wiring Scheme					
主要 电器 元件 Main Electric Component	负荷开关 FLN36-12D Load Switch FLN36-12D	1		1	1
	熔断器 Fuse				
	电流互感器 LZZJ2-12 Current Transformer LZZJ2-12				
	高压带电显示装置 DXN6-T High Voltage Charged Display Device DXN6-T	1			1
	避雷器 HY5WZ 或 HY5WS Lightning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

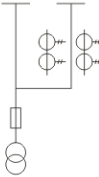
方案号 Scheme Number		2	2-1	2-2
主电路方案图 Primary Wiring Scheme				
主要 电器 元件 Main Electric Component	组合电器 FLN36-12D Primary Wiring Scheme	1		1
	熔断器 Fuse	S □ LAJ	S □ LAJ	S □ LAJ
	电流互感器 LZZJ2-12 Current Transformer LZZJ2-12		1-3	
	高压带电显示装置 DXN6-T High Voltage Charged Display Device DXN6-T	1	1	1
	避雷器 Lightning Arrester			HY5WZ
接地开关 Grounding Switch		1	1	1
宽 × 深 × 高 (mm) Width × Depth × Height (mm)		500 × 845 × 1600/1800	500 × 845 × 1600/1800	500 × 845 × 1600/1800
用途 Usage		保护变压器 Protect Transformer	保护变压器 Protect Transformer	保护变压器 Protect Transformer

XGN15-12(SF6)

箱型固定式交流金属封闭开关设备

主电路方案图 Primary Wiring Scheme

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

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

联锁 Interlocking

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

操作 Operation

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

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

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

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

订货须知 Ordering Information

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

外形及安装尺寸 Outline Overall and Installation Dimensions

