



GRM6(XGN□)-12

全绝缘全封闭紧凑型开关设备

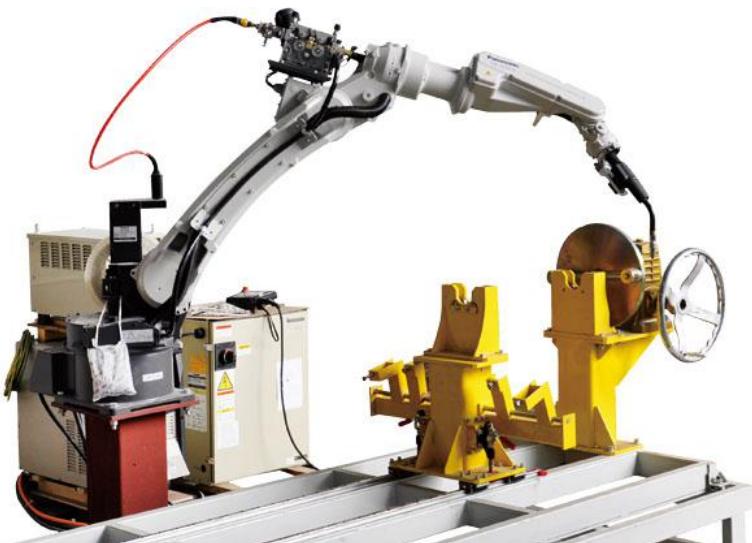
Fully Insulated Fully Enclosed Compact Switchgear



格立特电气有限公司

GHORIT ELECTRICAL CO., LTD.

◆ 生产设备 Production Equipment



Panasonic 焊接机器人
Panasonic welding robot



气箱装配流水线
Gas tank assembly line



气箱氦气检漏系统
Gas tank helium leak detection system

◆ 产品概述 Product Overview

GRM6(XGN□)-12 全绝缘全封闭紧凑型金属开关设备，可实现控制、保护、测量、监视、通讯等功能，特别适用于对配电设施场地小、可靠性要求高及地下、高原、沿海地区等自然环境和条件相对恶劣的场合。主要使用在对可靠性要求高的地区、工矿企业和变电站、地铁、轻轨铁路等用地紧张、空间狭窄受限制的地方。

它集微处理机技术、现代网络通讯技术和新型开关制造技术于一体，可有效分、合负荷电流和短路电流。设备内部所配置的测量保护控制和通讯功能可充分满足配电自动化系统要求。

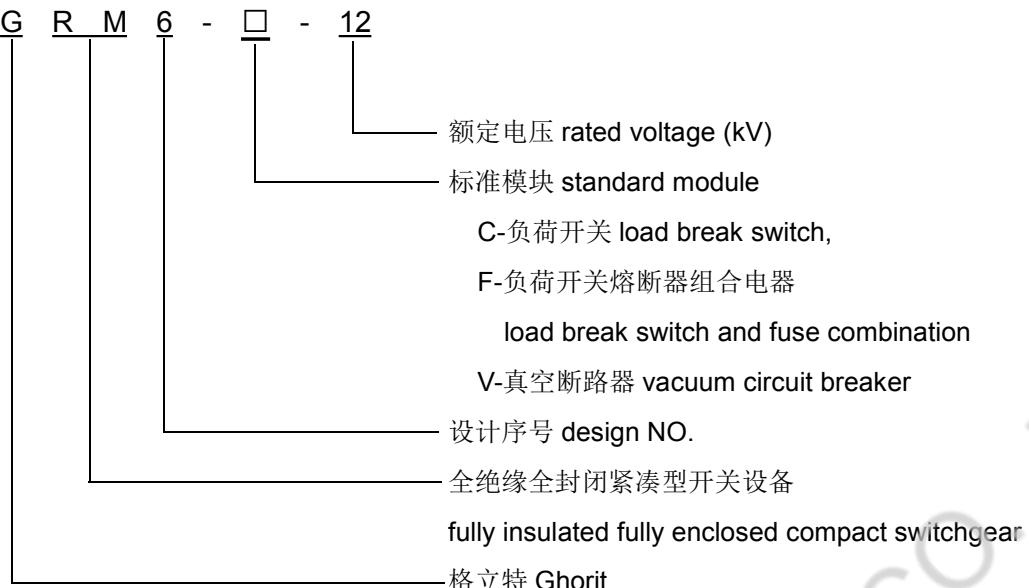
其主回路中的断路器、三工位开关、负荷开关等高压元件的导电部分集中安装在密封的柜式不锈钢外壳内，其最大的特点是不受外界环境影响，可靠性高，在环境恶劣的场所可使设备长期安全运行；其次是高压元件尺寸得到缩小，使设备小型化，另外密封壳体内的零部件无腐蚀、生锈现象，消除了由此造成的影响。加之配用性能稳定、电寿命长的高压元件，可实现免维护或少维护的使用要求。

GRM6(XGN□)-12 fully insulated fully enclosed compact switchgear, which can realize functions of control, protection, measurement, monitoring, communication, etc. is especially suitable for places with small distribution facility site and high reliability requirements, and places with a relatively harsh natural environment and conditions, such as underground, highland and coastal areas. It is mainly used in areas where land is tight and space is limited, high reliability is required, like industrial and mining enterprises and substations, subways, light rail railways, etc.

It combines microprocessor technology, modern network communication technology and new switch manufacturing technology to effectively separate and combine load current and short circuit current. The measurement protection control and communication functions configured inside the device can fully meet the requirements of the distribution automation system.

The conductive parts of the high voltage components such as circuit breakers, three working position switches and load break switches in the main circuit are installed in a sealed cabinet-type stainless steel casing. The biggest feature is that it is not affected by the external environment, and has high reliability and can make the equipment run safely for a long time in places with poor environment; secondly, the size of the high voltage component is reduced, the device is miniaturized, and the parts inside the sealed casing are free from corrosion and rust, thereby eliminating the influence. In addition, with high voltage components with stable performance and long electrical life, maintenance-free or less maintenance requirements can be achieved.

◆ 型号说明 Type Description



◆ 使用环境 Use Conditions

- 环境温度：上限+40℃，下限-40℃；
Ambient air temperature: -40℃~+40℃;
- 相对空气湿度：日平均不大于 95%，月平均不大于 90%；
Relative air humidity: daily average ≤95%, monthly average ≤90%;
- 海拔高度不超过 1500 米（标准充气压力下）；
Altitude ≤1500m (under standard inflation pressure);
- 地震烈度不超过 9 级；
Seismic intensity ≤9 class;
- 无火灾、爆炸、严重污秽、化学腐蚀及剧烈震动的场所。
Places free from fire, explosion, serious contamination, chemical corrosion and severe vibration.

◆ 特殊条件 Special Conditions

- 对于有别于正常操作的条件下的特殊运行条件，制造商和最终用户必须取得一致；
Manufacturers and end users must agree on special operating conditions that are different from normal operating conditions;
- 如果涉及特殊恶劣的运行环境，则必须向制造商和供应商咨询；
If a particularly harsh operating environment is involved, the manufacturer and supplier must be consulted;
- 当电气设备安装在海拔高度为 1500 米以上时，需特别注明，以便制造时对压力进行调整。该压力调整时，开关柜本身的寿命无显著影响。
When electrical equipment is installed at an altitude of 1500 meters or more, special instructions are required to adjust the pressure during manufacturing. When the pressure is adjusted, the life of the switchgear itself has no significant effect.

◆ 产品的技术特点 Product Technical Characteristics

• 模块化设计 Modular design

开关分为固定模块和可扩展模块组，在同一个 SF6 绝缘气室中，最多可以配置 6 个模块；配置模块数多于 6 个的开关柜要采用扩展母线将开关柜连接起来，实现半模块化结构；也可以通过在所有的模块之间使用扩展母线的方式以实现全模块配置。通过不同的功能模块组合可以形成由简单到复杂的配电方案，满足二次变电站和开闭所中的各种配置要求。

The switch is divided into fixed module and expandable module group. In the same SF6 insulated air chamber, up to 6 modules can be configured. Switching cabinets with more than 6 modules must be connected with the expansion busbar to realize the semi-module structure; full module configuration can also be achieved by using an extended bus between all modules. Through the combination of different functional modules, a simple to complex power distribution scheme can be formed to meet various configuration requirements in the secondary substation and the opening and closing.

• 结构紧凑 Compact structure

除了空气绝缘的计量柜外，所有的模块都只有 325mm 宽，计量柜宽度是 695mm；所有单元的电缆联接套管对地高度一致，方便了现场施工。

Except for the air-insulated metering cabinet, all modules are only 325mm wide and the metering cabinet width is 695mm; the cable joints of all units are the same height to the ground, which is convenient for on-site construction.

• 不受环境影响 Unaffected by the environment

所有高压带电部分安装在密封的不锈钢箱体内，箱壳采用不锈钢板焊接，充入工作压力为 1.4bar 的 SF6 气体，防护等级为 IP67。可用于安装于潮湿、多沙多尘、盐雾、矿山、箱式变电站和空气污染易引发表面污闪的场所。即使是熔断器小室也具有 IP67 的防护等级。扩展母线是完全绝缘和屏蔽的，以保证不受外部环境变化的影响。

All high-voltage live parts are installed in a sealed stainless steel case. The case is welded with a stainless steel plate and filled with SF6 gas at a working pressure of 1.4 bar. The degree of protection is IP67. It can be used in places where it is installed in damp, dusty, salt spray, mine, box-type substation and air pollution. Even the fuse compartment has an IP67 rating. The extension busbars are completely insulated and shielded to ensure that they are not affected by changes in the external environment.

• 高可靠的人身安全 Highly reliable personal safety

所有带电部分封闭在 SF6 气室内；开关具有可靠的泄压通道，负荷和接地开关为三位置开关，简化了相互之间的联锁；电缆室盖板与负荷开关之间具有可靠的机械联锁。

All live parts are enclosed in the SF6 air chamber; the switch has a reliable pressure relief channel, the load and grounding switches are three-position switches, simplifying the interlocking between each other; reliable mechanical interlock between the cable compartment cover and the load switch .

◆ 性能指标 Performance Index

- SF6 气体压力: 20℃下为 1.4bar (绝对压力)

SF6 gas pressure: 1.4bar under 20°C (absolute pressure)

- 年泄漏率: 0.25%/年

Annual leakage rate: 0.25%/year

- 防护等级 Protection grade

SF6 气室: IP67

SF6 gas room: IP67

熔断器筒: IP67

Fuse tube: IP67

开关柜外壳: IP3X

Switchgear enclosure: IP3X

- 母线 Busbar

开关柜内母线: 400mm²Cu

Switchgear internal busbar: 400mm²Cu

开关柜接地母线: 150mm²Cu

Switchgear earthing busbar: 150mm²Cu

气室不锈钢壳厚度: 3.0mm

Thickness of gas room stainless steel enclosure: 3.0mm

- 开关柜前面板、侧板和电缆室前盖板, 公司标准色为: 玉色 7783; 用户有特殊需要, 订货时提出。

The front panel and the side panel of the switchgear, and the front cover of the cable room, the company's standard color is: jade color 7783; if users have special requirements, please put forward when ordering.

◆ 满足主要标准 Meet Main Standards

- GB 1984 高压交流断路器 (IEC 62271-100: 2001, MOD)

GB 1984 High-voltage alternating-current circuit-breakers (IEC 62271-100: 2001, MOD)

- GB 1985 高压交流隔离开关和接地开关 (IEC 62271-102: 2002, MOD)

GB 1985 High-voltage alternating-current disconnectors and earthing switches (IEC 62271-102: 2002, MOD)

- GB/T 11022 高压开关设备和控制设备标准的共用技术要求

GB/T 11022 Common specifications for high-voltage switchgear and controlgear standards

- GB 3804 3.6kV~40.5kV 高压交流负荷开关 (IEC 60265-1-1998, MOD)

GB 3804 High-voltage alternating-current switches for rated voltage above 3.6kV and less than 40.5kV (IEC 60265-1-1998, MOD)

- GB 3906 3.6kV~40.5kV 交流金属封闭开关设备和控制设备 (IEC 62271-200-2003, MOD)

GB 3906 Alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6kV and up to and including 40.5kV (IEC 62271-200-2003, MOD)

- GB 4208 外壳防护等级 (IP代码) (IEC 60529-2001, IDT)

GB 4208 Degrees of protection provided by enclosure (IP code) (IEC 60529-2001, IDT)

- GB 16926 高压交流负荷开关熔断器组合电器 (IEC 6227-105-2002, MOD)
GB 16926 High-voltage alternating current switch-fuse combinations (IEC 6227-105-2002, MOD)
- DL/T 402 高压交流断路器订货技术条件 (IEC 62271-100-2001, MOD)
DL/T 402 Specification of high-voltage alternating-current circuit-breakers (IEC 62271-100-2001, MOD)
- DL/T 403 12-40.5kV 高压真空断路器订货技术条件
DL/T 403 HV vacuum circuit-breaker for rated voltage 12kv to 40.5kv
- DL/T 404 3.6kV~40.5kV 交流金属封闭开关设备和控制设备
DL/T 404 Alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6kV and up to and including 40.5kV
- DL/T 486 高压交流隔离开关和接地开关 (IEC 62271-102-2002, MOD)
DL/T 486 HV AC disconnectors and earthing switches (IEC 62271-102-2002, MOD)
- DL/T 593 高压开关设备和控制设备标准的共用技术要求(IEC 60694-2002, MOD)
DL/T 593 Common specifications for high-voltage switchgear and controlgear standards IEC 60694-2002, MOD)
- DL/T 728 气体绝缘金属封闭开关设备订货技术导则 (IEC 815-1986, IEC 859-1986)
DL/T 728 Technical guide for the order of gas-insulated metal-enclosed switchgear (IEC 815-1986, IEC 859-1986)
- DL/T 791 户内交流充气式开关柜选用导则
DL/T 791 Specification of indoor AC HV gas-filled switchgear panel

◆ 主要技术参数 Main Technical Parameters

序号 NO.	项目 Items	单位 Unit	数据 Value			
			负荷开关 Load break switch	组合电器 Combination	真空断路器 Vacuum circuit breaker	隔离/接地开关 Disconnect/ earth switch
1	额定电压 Rated voltage	kV			12	
2	额定频率 Rated frequency	Hz			50	
3	工频耐压 (相间/断口) Power frequency withstand voltage (phase-to-phase/across open contacts)	kV			42/48	
4	雷电冲击耐压 (相间/断口) Lightning impulse withstand voltage (phase-to-phase/across open contacts)	kV			75/85	
5	额定电流 Rated current	A	630	See note 1	630	630
6	额定闭环开断电流 Rated closed-loop breaking current	A	630			
7	额定电缆充电开断电流 Rated cable charging breaking current	A	10			
8	额定短路关合电流 (峰值) Rated short circuit making current (peak)	kA	50	80	50	
9	额定峰值耐受电流 Rated peak withstand current	kA	50			

10	额定短时耐受电流 Rated short time withstand current	kA/4s	20			
11	额定短路开断电流 Rated short circuit current	kA		31.5	20	
12	额定转移电流 Rated transfer current	A		1700		
13	配用熔断器最大电流 Max. current of equipped fuse	A		125		
14	回路电阻 Circuit resistance	$\mu\Omega$	≤ 300	≤ 600	≤ 300	
15	机械寿命 Mechanical life	times	5000	3000	5000	2000

注 1：取决于熔断器的电流额定值 Note 1: depends on the rated current of fuse.

◆ 订货须知 Ordering Instructions

用户订货时须提供以下技术资料:

When ordering, the following technical information must be provided

- 主回路图、排列图、平面布置图; Main circuit diagram, arrangement diagram, and layout diagram;
- 开关柜二次线路原理图; Switchgear secondary circuit schematic diagram;
- 开关柜使用在特殊环境条件时应说明。

If the switchgear is used under special environmental conditions, it should be proposed.

◆ 标准模块 Standard Modules

GRM6(XGN□)-12 型开关设备的每个模块具有下列配置

Each module of the GRM6(XGN□)-12 type switchgear has the following configurations

- D 柜-提升模块 D cabinet - lifting module

见“不带接地刀的电缆连接模块”中标准配置与特性

See standard configuration and features in "cable connection module without grounding knife"

- C 柜-负荷开关模块 C cabinet - load switch module

见“负荷开关模块”中标准配置与特性

See standard configuration and features in "load switch module"

- F 柜-负荷开关熔断器组合电器模块 F cabinet-load switch and fuse combination module

见“负荷开关熔断器组合电器模块”中标准配置与特性

See standard configuration and characteristics in "load switch and fuse combination module"

- V 柜-真空开关模块 V cabinet - vacuum switch module

见“真空开关模块”中标准配置与特性

See standard configuration and features in "vacuum switch module"

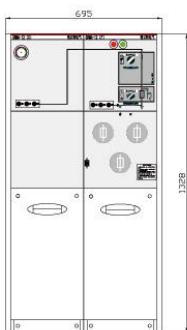
- 进线套管的电容性电压指示器 Capacitive voltage indicator for the incoming bushing
- 每个气室安装一个监测 SF6 密度的压力表计 Install a pressure gauge that monitors SF6 density in each chamber
- 吊装用的吊耳 Lifting lug
- 操作手柄 Operating handle

◆ 选配 Optional Configurations

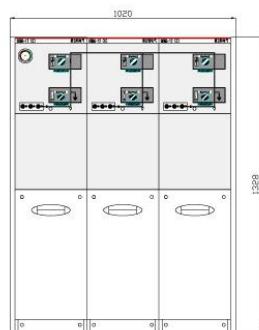
电动操作机构/电缆短路及接地故障指示器/电流互感器及表计

Electric operating mechanism/cable short circuit and ground fault indicator/current transformer and meter

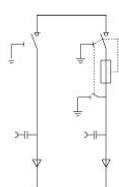
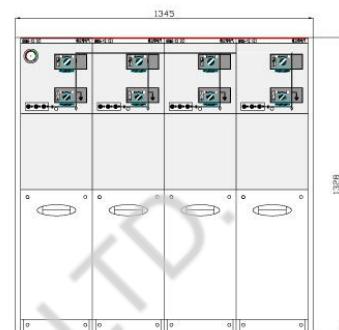
DF



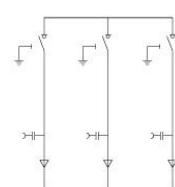
CCC



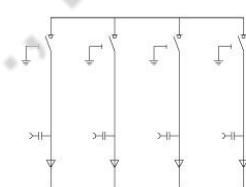
CCCC



标准 2 路 DF (260kg)



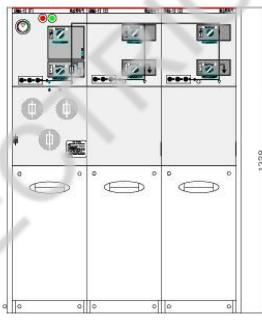
标准 3 路 CCC(3000kg)



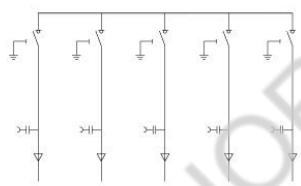
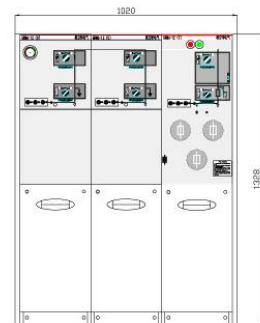
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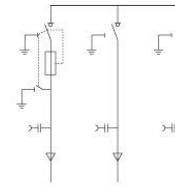
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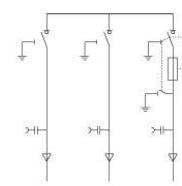
CCF



标准 5 路 CCCCC (480kg)

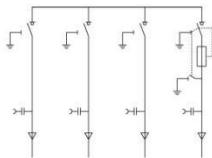
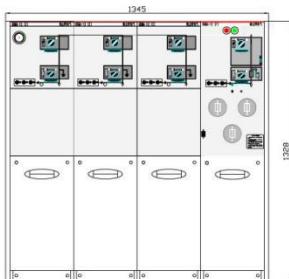


标准 3 路 FCC (320kg)



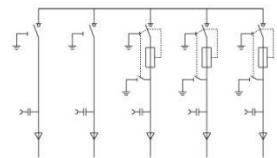
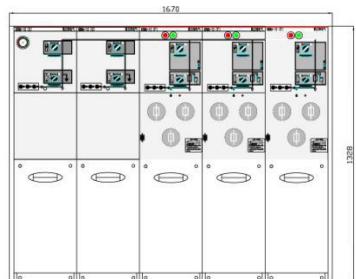
标准 3 路 CCF (320kg)

CCCF



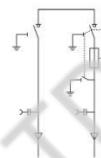
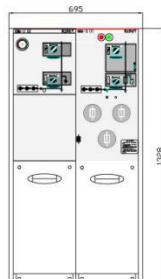
标准 4 路 CCCF (410kg)

CCFFF



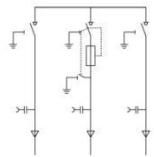
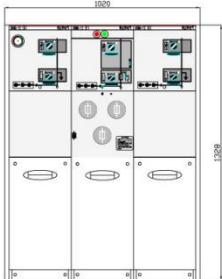
标准 5 路 CCFFF (540kg)

CF



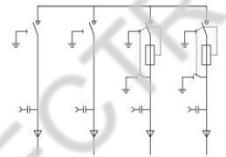
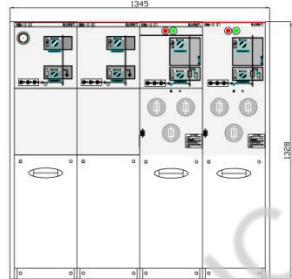
标准 2 路 CF (270kg)

CFC



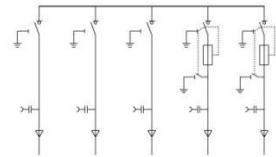
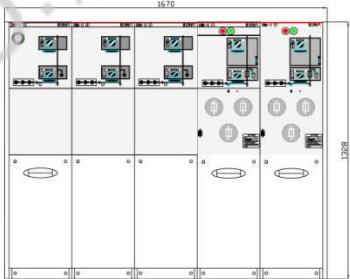
标准 3 路 CFC (320kg)

CCFF



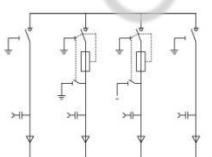
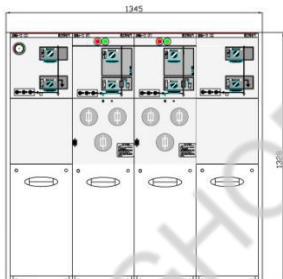
标准 4 路 CCFF (430kg)

CCCFF



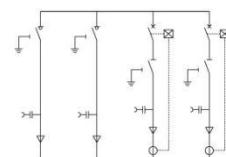
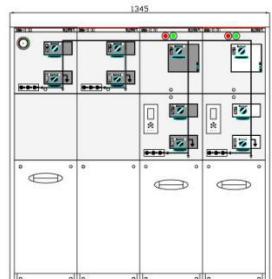
标准 5 路 CCCFF (520kg)

CFFC



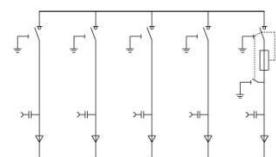
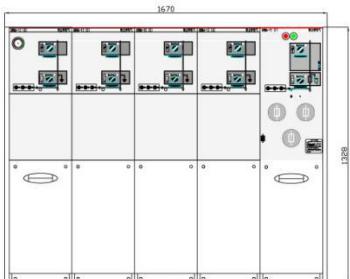
标准 4 路 CFFC (430kg)

CCVV



标准 4 路 CCVV (411kg)

CCCCF



标准 5 路 CCCCCF (500kg)

◆ 标准扩展模块 Standard Expansion Modules

可用的模块 Available modules

C	负荷开关模块 Load switch module 不带接地刀的电缆连接模块	Width=325mm
D	Cable connection module without grounding knife	Width=325mm
F	负荷开关熔断器组合电器模块 Load switch fuse combination electrical module	Width=325mm
V	真空断路器模块 Vacuum circuit breaker module	Width=325mm
S _L	母线分段开关模块 (负荷开关) Busbar segmentation switch module (load switch)	Width=325mm
S _{vBr}	母线分段开关模块 (真空断路器) Busbar segmentation switch module (vacuum circuit breaker)	
S _v	S _v 总是跟母线提升模块在一起 S _v is always with the bus lifting module	Width=650mm
M	表计模块 12kV Meter module 12kV	Width=695mm
PT	模块 Module	Width=370 or 695mm

注：单个模块必须加扩展头后才能使用。

Note: A single module must add extension before it can be used.



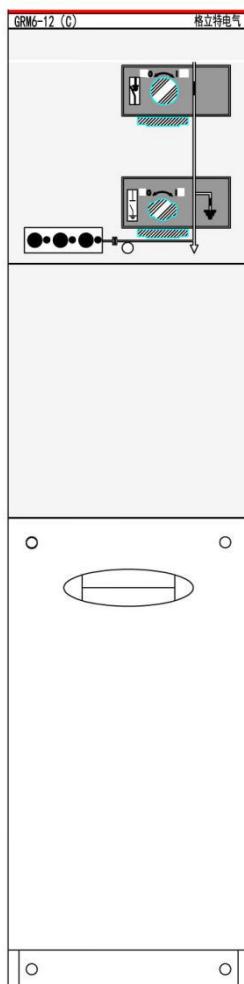
◆ 扩展模块-负荷开关模块 C Expansion Module-Load Switch Module C

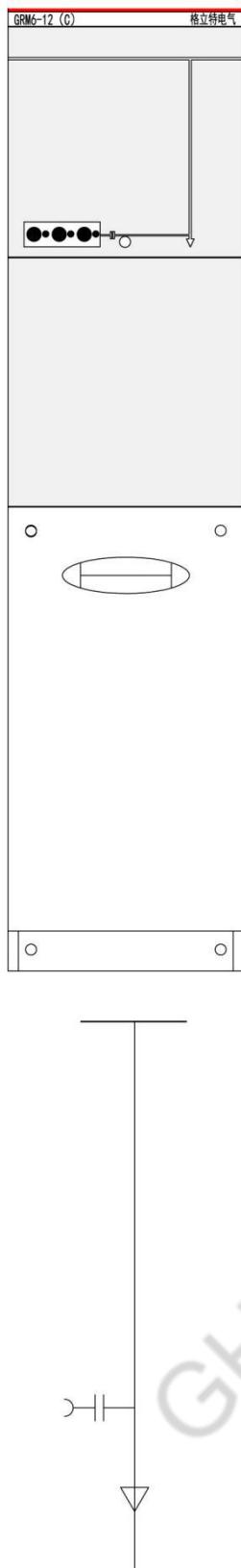
标准配置与特性 Standard Configuration and Characteristics

- 630A 内部母线 630A internal bus
- 三工位负荷/接地开关 Three working-position load/earth switch
- 三工位单弹簧操作机构, 有两个独立的负荷开关和接地开关操作轴
Three working-position single-spring operating mechanism, with two independent load switch and earth switch operating shafts
- 负荷开关和接地开关位置指示 Load switch and earth switch position indication
- 位于前部水平布置的出线套管, 630A 的 400 系列螺栓式套管
Outgoing bushing in front horizontal arrangement, 630A 400 series bolted bushing
- 指示套管带电的容性电压指示器 Capacitive voltage indicator indicating that the bushing is live
- 对于所有的开关功能, 都在面板上有方便的加装挂锁装置
For all switch functions, there is a convenient add-on padlock on the panel
- SF6 气体压力表 (每个 SF6 气箱中仅有一处)
SF6 gas pressure gauge (only one in each SF6 gas box)
- 接地母排 Ground busbar
- 接地开关与电缆室前面板的联锁
Interlocking of the earth switch to the front panel of the cable compartment

可选配置与特性 Optional Configuration and Characteristics

- 预留外部母线扩展 Reserved bus extension
- 外部母线 External bus
- 负荷开关操作用电动机 110V/220V DC/AC
Load switch operation motor 110V/220V DC/AC
 - 短路及接地故障指示器 Short circuit and ground fault indicator
 - 测量环形电流互感器及电流表 Measure toroidal current transformer and ammeter
 - 计量环形电流互感器及电度表 Meter toroidal current transformer and watt-hour meter
 - 在电缆进线套管处可加装氧化锌型避雷器或双电缆头
A lightning arrester or double cable head can be installed at the cable incoming bushing
 - 钥匙互锁 Key interlocking
 - 进线带电接地闭锁 (当套管带电时闭锁接地开关) 110V/220V DC/AC
Incoming live grounding lock (lock the earth switch when the bushing is energized)
110V/220VAC
 - 辅助触点 Auxiliary contacts
 - 负荷开关位置 2NO+2NC Load switch position 2NO+2NC
 - 接地开关位置 2NO+2NC Earth switch position 2NO+2NC
 - 带信号的压力表 1 NO Pressure gauge with signal 1 NO
 - 带信号触点的灭弧器 1 NO Arc extinguisher with signal contact 1 NO
 - 二次装置可装设于 Secondary device can be installed in
 - 开关柜顶部的二次线小室 Secondary line chamber at the top of the switchgear
 - 开关柜顶部的低压箱 Low voltage box at the top of the switchgear





◆ 扩展模块-不带地刀电缆连接模块 D

Expansion Module-Without Grounding Knife Module D

标准配置与特性 Standard Configuration and Characteristics

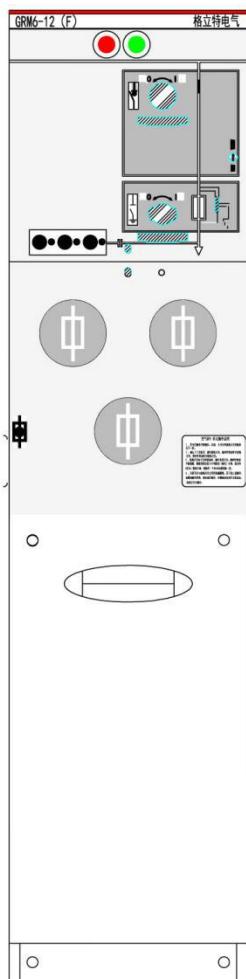
- 630A 内部母线 630A internal bus
- 位于前部水平布置的出线套管, 630A 的 400 系列螺栓式套管
Outgoing bushing in front horizontal arrangement, 630A 400 series bolted bushing
- 指示套管带电的容性电压指示器 Capacitive voltage indicator indicating that the bushing is live
- SF6 气体压力表 (每个 SF6 气箱中仅有一处)
SF6 gas pressure gauge (only one in each SF6 gas box)
- 接地母排 Ground busbar

可选配置与特性 Optional Configuration and Characteristics

- 预留母线扩展 Reserved bus extension
- 外部母线 External bus
- 短路及接地故障指示器 Short circuit and ground fault indicator
- 测量环形电流互感器及电流表
Measure toroidal current transformer and ammeter
- 计量环形电流互感器及电度表
Meter toroidal current transformer and watt-hour meter
- 在电缆进线套管处可加装氧化锌型避雷器或双电缆头
A lightning arrester or double cable head can be installed at the cable incoming bushing
- 二次装置可装设于 Secondary device can be installed in
 - 开关柜顶部的二次线小室 Secondary line chamber at the top of the switchgear
 - 开关柜顶部的低压箱 Low voltage box at the top of the switchgear

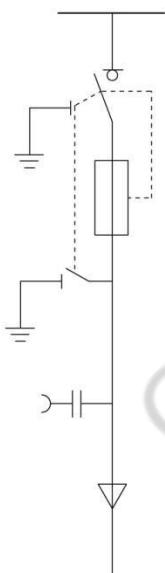
◆ 扩展模块-负荷开关熔断器组合电器模块 F

Expansion Module-Load Switch and Fuse Combination Module F



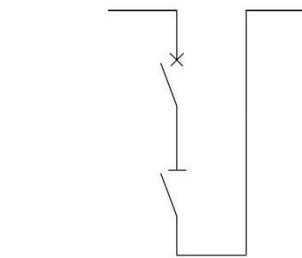
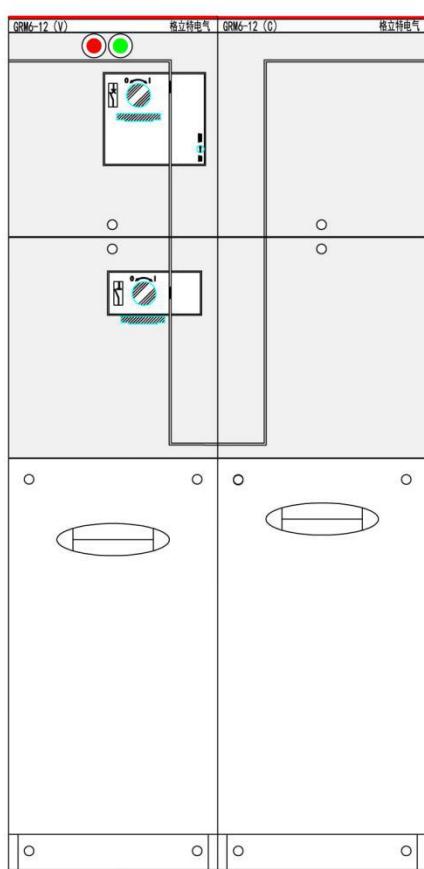
标准配置与特性 Standard Configuration and Characteristics

- 630A 内部母线 630A internal bus
- 三工位的负荷开关, 熔断器首端与熔断器末端接地开关为机械联动
Three working-position load switch, the fuse head end is mechanically linked with the fuse tail end earth switch
- 三工位双弹簧操作机构, 有两个独立的负荷开关和接地开关操作轴
Three working-position double-spring operating mechanism, with two independent load switch and earth switch operating shafts
- 负荷开关和接地开关位置指示 Load switch and earth switch position indication
- 熔断器筒 Fuse tube
- 熔断器水平放置 Fuse placed horizontally
- 熔断器跳闸指示 Fuse tripping indication
- 位于前部水平布置的出线套管, 200A 的 200 系列插入式套管
Outgoing bushing in front horizontal arrangement, 200A 200 series plug-in bushing
- 指示套管带电的容性电压指示器 Capacitive voltage indicator indicating that the bushing is live
- 对于所有的开关功能, 都在面板上有方便的加装挂锁装置
For all switch functions, there is a convenient add-on padlock on the panel
- SF6 气体压力表(每个 SF6 气箱中仅有一处)
SF6 gas pressure gauge (only one in each SF6 gas box)
- 接地母排 Ground busbar
- 用于变压器保护的熔断器参数 Fuses for transformer protection parameter
12kV 最大 125A 熔断器 12kV max. 125A fuse
- 接地开关与电缆室前面板的联锁
Interlocking of the earth switch to the front panel of the cable compartment



可选配置与特性 Optional Configuration and Characteristics

- 预留母线扩展 Reserved bus extension
- 外部母线 External bus
- 负荷开关操作用电动机 110/220V DC/AC Load switch operation motor 110/220V DC/AC
- 并联跳闸线圈 110/220V DC/AC Paralleling tripping coil 110/220V DC/AC
- 并联合闸线圈 110/220V DC/AC Paralleling closing coil 110/220V DC/AC
- 测量环形电流互感器及电流表 Measure toroidal current transformer and ammeter
- 计量环形电流互感器及电度表 Meter toroidal current transformer and watt-hour meter
- 进线带电接地闭锁 (当套管带电时闭锁接地开关) 110V/220VAC
Incoming live grounding lock (lock the earth switch when the bushing is energized)
110V/220VAC
- 辅助触点 Auxiliary contacts
 - 负荷开关位置 2NO+2NC Load switch position 2NO+2NC
 - 接地开关位置 2NO+2NC Earth switch position 2NO+2NC
 - 带信号的压力表 1 NO Pressure gauge with signal 1 NO
 - 熔断器熔断 1 NO Fuse blown 1 NO
- 二次装置可装设于 Secondary device can be installed in
 - 开关柜顶部的二次线小室 Secondary line chamber at the top of the switchgear
 - 开关柜顶部的低压箱 Low voltage box at the top of the switchgear



◆ 扩展模块-母线分段开关模块（断路器）S_vB_r

Expansion Module-Busbar Sectional Switch Module (Circuit Breaker) S_vB_r

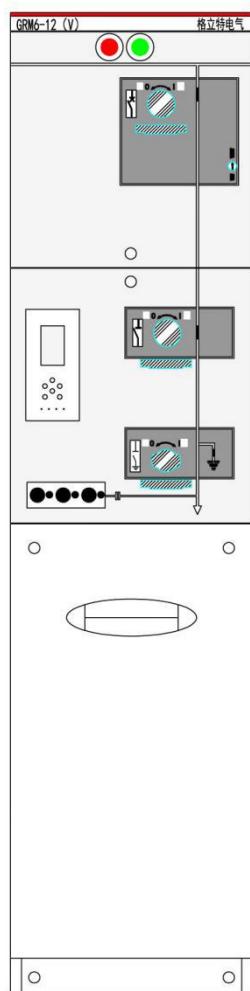
标准配置与特性 Standard Configuration and Characteristics

- 630A内部母线 630A internal bus
- 630A的真空断路器 630A vacuum circuit breaker
- 真空断路器用两工位双弹簧操作机构 Two working-position double-spring operating mechanism for vacuum circuit breaker
- 真空断路器下部隔离开关 Vacuum circuit breaker lower disconnect switch
- 隔离开关单弹簧操作机构 Disconnect switch single-spring operating mechanism
- 真空断路器和隔离开关机械联锁 Mechanical interlocking of vacuum circuit breaker and disconnect switch
- 真空断路器和隔离开关位置指示 Vacuum circuit breaker and disconnect switch position indication
- 对于所有的开关功能，都在面板上有方便的加装挂锁装置 For all switch functions, there is a convenient add-on padlock on the panel
- SF6 气体压力表 (每个SF6 气箱中仅有一处) SF6 gas pressure gauge (only one in each SF6 gas box)
- SV总是与母线提升柜相连，共同占用两个模块宽度 SV is always connected to the busbar lifting switchgear, occupying two module widths together

可选配置与特性 Optional Configuration and Characteristics

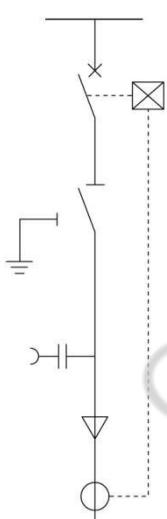
- 预留外部母线扩展 Reserved bus extension
- 外部母线 External bus
- 真空断路器操作用电动机 110V/220V DC/AC Vacuum circuit breaker operation motor 110V/220V DC/AC
- 并联跳闸线圈 110/220V DC/AC Paralleling tripping coil 110/220V DC/AC
- 并联合闸线圈 110/220V DC/AC Paralleling closing coil 110/220V DC/AC
- 钥匙互锁 Key interlocking
- 辅助触点 Auxiliary contacts
- 断路器位置 2NO+2NC Circuit breaker position 2NO+2NC
- 隔离开关位置 2NO+2NC Disconnect switch position 2NO+2NC
- 二次装置可装设于 Secondary device can be installed in
开关柜顶部的二次线小室 Secondary line chamber at the top of the switchgear
开关柜顶部的低压箱 Low voltage box at the top of the switchgear

◆ 扩展模块-真空断路器模块 V Expansion Module - Vacuum Circuit Breaker Module V



标准配置与特性 Standard Configuration and Characteristics

- 630A 内部母线 630A internal bus
- 630A 的变压器/线路保护用真空断路器 630A transformer/line protection vacuum circuit breaker
- 真空断路器用两工位双弹簧操作机构 Two working-position double-spring operating mechanism for vacuum circuit breaker
- 真空断路器下部三工位隔离/接地开关 Vacuum circuit breaker lower three working-position disconnect/earth switch
- 三工位隔离/接地开关单弹簧操作机构 Three working-position disconnect/earth switch single-spring operating mechanism
- 真空断路器和三工位开关机械联锁 Mechanical interlocking of vacuum circuit breaker and three working-position switch
- 真空断路器和三工位开关位置指示 Vacuum circuit breaker and three working-position switch position indication
- 电子式保护继电器 Electronic protection relay
- 跳闸线圈（用于继电器动作）Trip coil (for relay action)
- 位于前部水平布置的出线套管, 630A 的 400 系列螺栓式套管 Outgoing bushing in front horizontal arrangement, 630A 400 series bolted bushing
- 指示套管带电的容性电压指示器 Capacitive voltage indicator indicating that the bushing is live
- 对于所有的开关功能, 都在面板上有方便的加装挂锁装置 For all switch functions, there is a convenient add-on padlock on the panel
- SF6 气体压力表 (每个 SF6 气箱中仅有一处) SF6 gas pressure gauge (only one in each SF6 gas box)
- 接地母排 Ground busbar
- 接地开关与电缆室前面板的联锁 Interlocking of the earth switch to the front panel of the cable compartment



可选配置与特性 Optional Configuration and Characteristics

- 预留外部母线扩展 Reserved bus extension
- 外部母线 External bus
- 真空断路器操作用电动机 110V/220V DC/AC Vacuum circuit breaker operation motor 110V/220V DC/AC
- 并联跳闸线圈 110/220V DC/AC Parallel tripping coil 110/220V DC/AC
- 并联合闸线圈 110/220V DC/AC Parallel closing coil 110/220V DC/AC
- 测量环形电流互感器及电流表 Measure toroidal current transformer and ammeter
- 计量环形电流互感器及电度表 Meter toroidal current transformer and watt-hour meter
- 进线带电接地闭锁 (当套管带电时闭锁接地开关) 110V/220VAC Incoming live grounding lock (lock the earth switch when the bushing is energized) 110V/220V AC
- 钥匙互锁 Key interlocking
- 辅助触点 Auxiliary contacts
 - 真空开关位置 2NO+2NC Vacuum switch position 2NO+2NC
 - 隔离开关位置 2NO+2NC Disconnect switch position 2NO+2NC
 - 接地开关位置 2NO+2NC Earth switch position 2NO+2NC
 - 真空开关跳闸信号 1 NO Vacuum switch trip signal 1 NO
 - 带信号的压力表 1 NO Pressure gauge with signal 1 NO
- 二次装置可装设于 Secondary device can be installed in
 - 开关柜顶部的二次线小室 Secondary line chamber at the top of the switchgear
 - 开关柜顶部的低压箱 Low voltage box at the top of the switchgear
- 其它继电器如 SPAJ140C Other relays such as SPAJ140C

◆ 扩展模块-母线分段模块（负荷开关）S_L

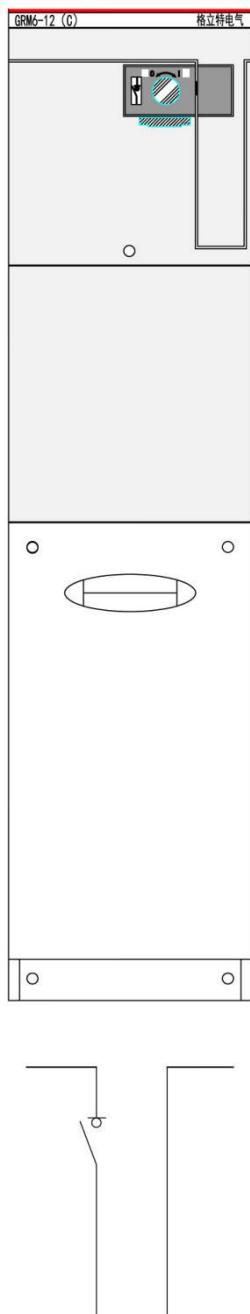
Expansion Module-Busbar Sectional Switch Module (Load Switch) S_L

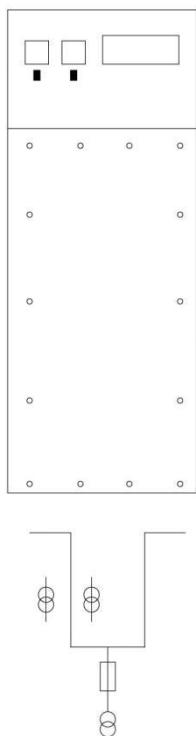
标准配置与特性 Standard Configuration and Characteristics

- 630A 内部母线 630A internal bus
- 隔离开关 Disconnect switch
- 单弹簧操作机构 Single-spring operating mechanism
- 开关位置指示 Switch position indication
- 对于所有的开关功能，都在面板上有方便的加装挂锁装置
For all switch functions, there is a convenient add-on padlock on the panel
- SF6 气体压力表（每个SF6 气箱中仅有一处）
SF6 gas pressure gauge (only one in each SF6 gas box)

可选配置与特性 Optional Configuration and Characteristics

- 预留外部母线扩展 Reserved bus extension
- 外部母线 External bus
- 负荷开关操作用电动机 110V/220V DC/AC
Load switch operation motor 110V/220V DC/AC
- 钥匙互锁 Key interlocking
- 辅助触点 Auxiliary contacts
负荷开关位置 2NO+2NC Load switch position 2NO+2NC
- 二次装置可装设于 Secondary device can be installed in
开关柜顶部的二次线小室 Secondary line chamber at the top of the switchgear
开关柜顶部的低压箱 Low voltage box at the top of the switchgear





◆ 扩展模块-12kV计量柜

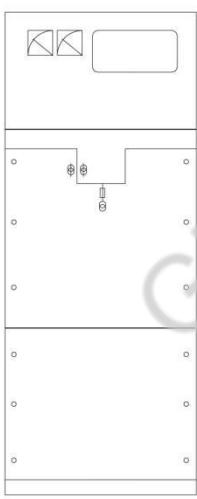
Expansion Module-12kV Metering Cabinet

标准配置与特性 Standard Configuration and Characteristics

- 2 只电流互感器 2pcs current transformers
- 2 只电压互感器 2pcs voltage transformers
- 保护 PT 的熔断器 Fuse for PT protection
- 低压组成部分 Low voltage components
 - 电压表 Voltmeter
 - 电流表 Ammeter
- 宽x高x深=695x1334x820mm WxD=695x1334x820mm
- 宽x高x深=695x1680x820mm (带仪表箱)
- WxD=695x1680x820mm (with instrument box)

可选配置与特性 Optional Configuration and Characteristics

- 氧化锌避雷器 Zinc oxide arrester
- 指示开关柜带电的容性电压指示器 Capacitive voltage indicator indicating the switchgear is electrified
- 低压组成部分 Low voltage components
 - 1 只有功电度表 1pc active watt-hour meter
 - 1 只无功电度表 1pc reactive watt-hour meter

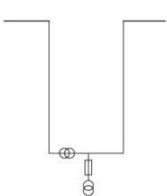


◆ 扩展模块-12kV电压互感器柜

Expansion Module-12kV Voltage Transformer Cabinet

标准配置与特性 Standard Configuration and Characteristics

- 1 只或 2 只电压互感器 1pc or 2pcs voltage transformer
- 保护 PT 的熔断器 Fuse for PT protection
- 电压表 Voltmeter
 - 宽x高x深=695(370)x1334x820mm WxD=695x1334x820mm
 - 宽x高x深=695(370)x1680x820mm (带仪表箱)
 - WxD=695x1680x820mm (with instrument box)



可选配置与特性 Optional Configuration and Characteristics

- 氧化锌避雷器 (695 宽) Zinc oxide arrester (695 width)
- 指示开关柜带电的容性电压指示器 Capacitive voltage indicator indicating the switchgear is electrified

◆ 进/出线保护 Incoming / Outgoing Line Protection

使用真空开关/真空断路器模块

Use vacuum switch / vacuum circuit breaker module

变压器或线路保护为真空开关/真空断路器，带有保护继电器和电流互感器。当故障电流达到保护继电器所设定的整定电流时，由保护继电器发出命令通过脱扣器使开关跳闸。

The transformer or line protection is a vacuum switch/vacuum circuit breaker, with protective relays and current transformers. When the fault current reaches the setting current set by the protection relay, the protection relay issues a command to trip the switch through the trip unit.

◆ 变压器/线路保护 Transformer / Line Protection

GRM6-12 型充气柜提供了两种变压器保护方式：负荷开关熔断器组合电器和具有继电器保护的断路器。

The GRM6-12 C-GIS provides two types of transformer protection: load switch fuse combination and circuit breaker with relay protection.

◆ 使用负荷开关熔断器组合电器模块 Use Load Switch Fuse Combination Module

变压器保护为限流高压熔断器与负荷开关的组合。熔断器室将安装在一个位于单元前部独立的有闭锁的外壳后面。负荷开关使用弹簧储能机构，该机构可由熔断器撞针所触发。为了便于熔断器的更换，可以使用操作手柄来拆卸熔断器室的端盖。熔断器的跳闸机构前置，保证了整个系统的防水性能。负荷开关熔断器组合电器使用弹簧撞针式的后备保护式限流熔断器，安装时撞针侧朝向开关柜前部。

Transformer protection is a combination of current limiting high voltage fuse and load switch. The fuse compartment will be mounted behind a separate, latched enclosure at the front of the unit. The load switch uses a spring charging mechanism that can be triggered by a fuse striker. To facilitate the replacement of the fuse, an operating handle can be used to remove the end cap of the fuse compartment. The trip mechanism of the fuse is placed in front to ensure the waterproof performance of the entire system. The load switch fuse combination uses a spring-loaded type of backup-protection type current limiting fuse, and the striker side faces the front of the switchgear during installation.

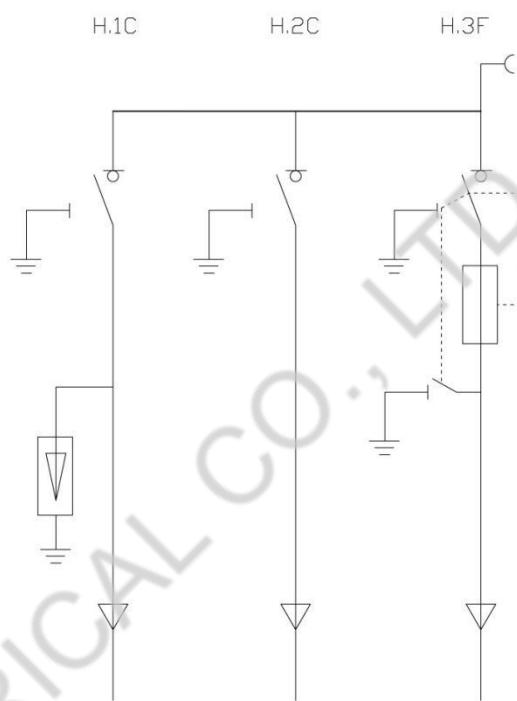
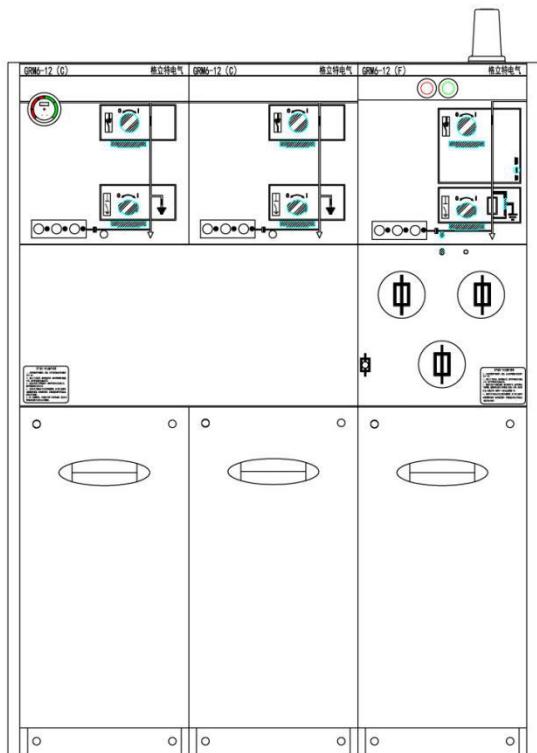
◆ 熔断器-变压器对照表 Fuse-Transformer Comparison Table

100%	变压器额定容量 (kVA) rated capacity of power transfromer (kVA)															
	Un (kV)	25	50	75	100	125	160	200	250	315	400	500	630	800	1000	1250
3	16	25	25	40	40	50	50	80	100	125	160	160	160			
3.3	16	25	25	40	40	50	50	63	80	100	125	160				
4.15	10	16	25	25	40	40	50	50	63	80	100	125	160			
5	10	16	25	25	25	40	40	50	50	63	80	100	160	160		
5.5	6	16	16	25	25	25	40	50	50	63	80	100	125	160		
6	6	16	16	25	25	25	40	40	50	50	80	100	125	160	160	
6.6	6	16	16	25	25	25	40	40	50	50	63	80	100	125	160	
10	6	10	10	16	16	25	25	25	40	40	50	50	80	80	125	125
11	6	6	10	16	16	25	25	25	40	50	50	63	80	100	125	
12	6	6	10	16	16	25	25	25	40	40	50	63	80	100	125	
13.8	6	6	10	10	16	16	25	25	25	40	50	50	63	80	100	
15	6	6	10	10	16	16	25	25	25	40	40	50	63	80	100	
17.5	6	6	6	10	10	16	16	16	25	25	25	40	50	50	63	80
20	6	6	6	10	10	16	16	16	25	25	25	40	40	50	63	63
22	6	6	6	6	10	10	16	16	16	25	25	25	40	50	50	63
24	6	6	6	6	10	10	16	16	16	25	25	25	40	40	50	63

◆ 方案说明 Plan Instructions

方案一 CCF+ Plan 1 CCF+

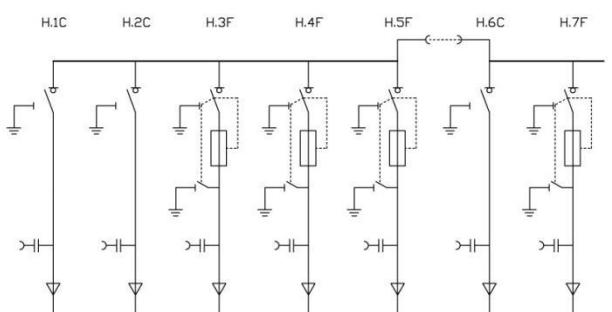
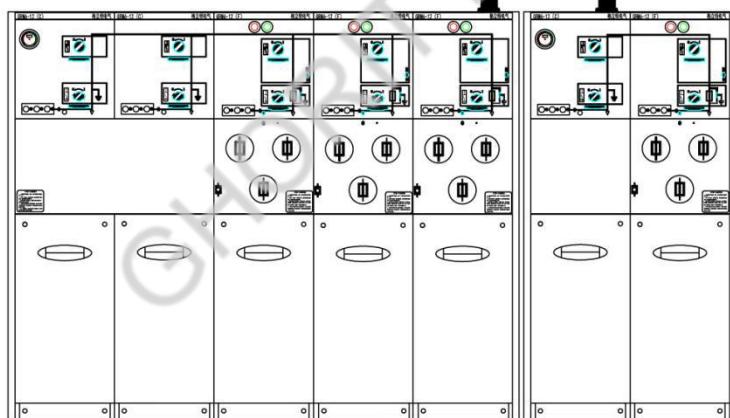
- 进线安装避雷器且预留扩展 Incoming line installed lightning arrester and with reserved extension



方案二 CCFFF=CF Plan 2 CCFFF=CF

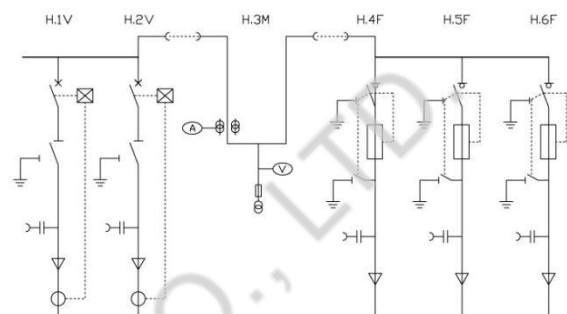
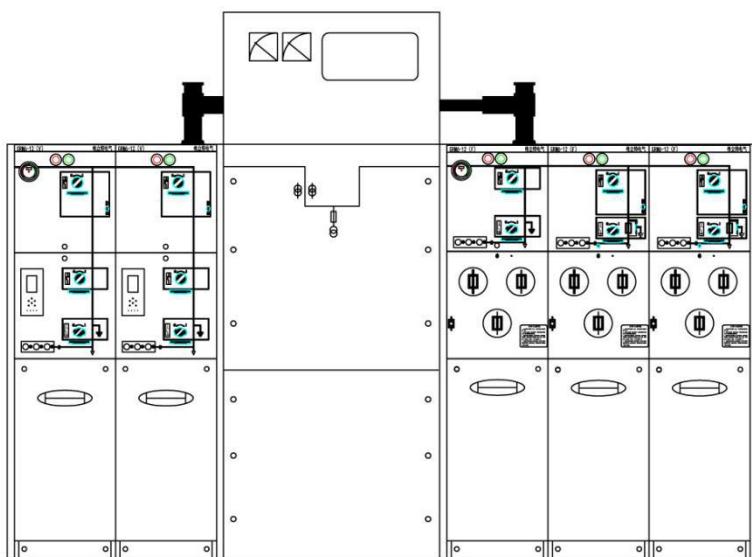
- 一组最多为 5 个单元，超过 5 个单元时需扩展母线连接

1 set at most 5 units, more than 5 units need to expand the bus connection



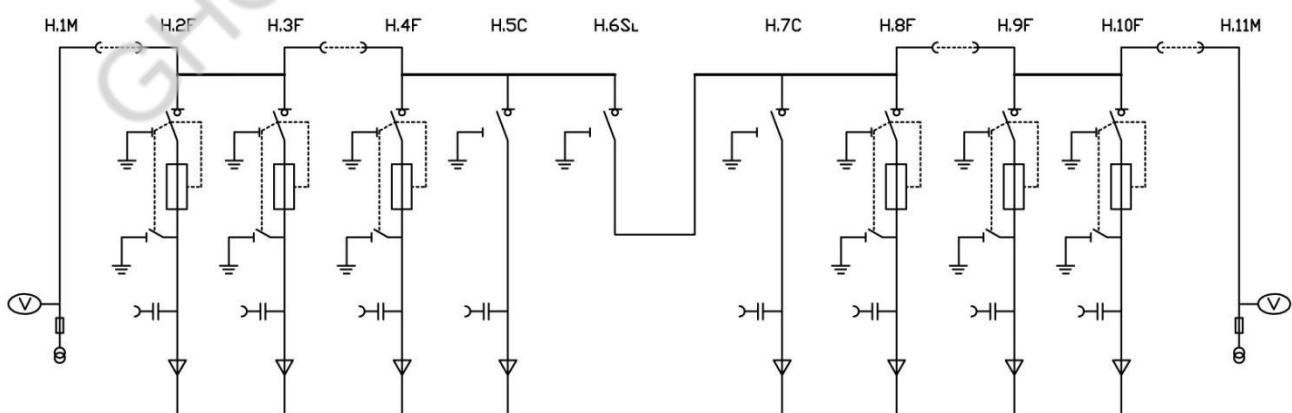
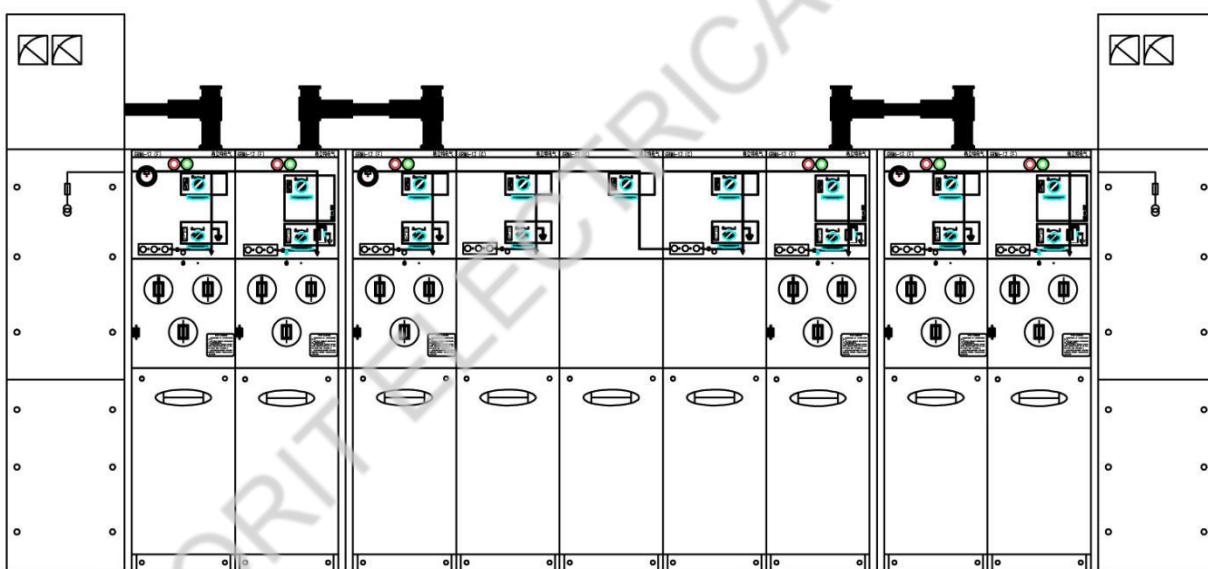
方案三 $VV=M=FFF$ Plan 3 $VV=M=FFF$

- 高压侧计量 High voltage side measurement



方案四 $PT=FF=FCSLCF=FF=PT$ Plan 4 $PT=FF=FCSLCF=FF=PT$

- 单母线分段带母线PT Single busbar section with busbar PT



◆ 附件 Annex

1. 辅助接点 Auxiliary contacts

在所有的负荷开关和断路器上都可配备 2 常开+2 常闭指示开关位置。1 个并联脱扣线圈(AC或DC)可以安装到变压器/开关断路器上。低压控制部件位于前面板后面。

2 NO + 2 NC indicator switch positions are available on all load switches and circuit breakers. A parallel trip coil (AC or DC) can be mounted to the transformer/switch breaker. The LV control unit is located behind the front panel.

2. 电压指示 Voltage indication

电容性电压指示器显示套管是否带电，其上的插口可用于核相。

A capacitive voltage indicator indicates whether the bushing is energized and the socket on it can be used for the nuclear phase.

3. 短路/接地故障指示器 Short circuit / ground fault indicator

为了便于故障定位，电缆开关模块可以装备短路/接地故障指示器，进行简单的故障检测。

To facilitate fault location, the cable switch module can be equipped with a short circuit/ground fault indicator for simple fault detection.

4. 电动操作 Electric operation

对电缆开关单元与变压器单元手动操作机构是标准的方案。也可以选择安装电动操作机构。电缆开关、真空断路器和接地开关都是通过位于前面板后面的机构进行操作的。对于所有开关和断路器，都可以通过操作手柄操作（标准配置），或者可以配备马达操作机构（附件）。但是，接地开关只能手动操作，并且配置了具有关合故障电流能力的机构。电动操作机构很容易分期实现。

The manual operation of the cable switch unit and the transformer unit is a standard solution. It is also possible to install an electric operating mechanism. Cable switch, vacuum circuit breaker, and earth switch are operated by mechanism located behind the front panel. All switches and circuit breakers can be operated by operating the handle (standard configuration) or can be equipped with a motor operating mechanism (accessory). However, the earth switch can only be operated manually and is equipped with a mechanism that has the ability to close the fault current. Electric operating mechanisms are easy to implement in stages.

5. 电缆连接 Cable connection

GRM6(XGN□)-12 型开关设备安装了标准套管。所有套管的距离地面的高度都相同，并且外有电缆室盖板保护。此盖板可以与接地开关互锁，对于双电缆进线，还可以采用专用的双电缆室盖板。

The GRM6(XGN□)-12 switchgear is fitted with standard bushings. All bushings are the same height from the ground and are protected by a cable compartment cover. This cover can be interlocked with the earth switch. For dual cable

incoming, a dedicated dual cable compartment cover can also be used.

6. 压力指示器 Pressure indicator

通常配备压力指示器，该指示器为压力表形式。此外也可以配备电气触点来指示压力降低。

Usually equipped with a pressure indicator, this indicator is in the form of a pressure gauge. Electrical contacts can also be provided to indicate a pressure drop.

7. 外部母线 External busbar

GRM6(XGN□)-12 型开关设备可以配备外部母线，其额定电流为 1250A。

The GRM6(XGN□)-12 switchgear can be equipped with an external busbar with rated current 1250A.

8. 二次线小室/低压箱 Secondary line chamber / low voltage box

GRM6(XGN□)-12 型开关设备可以配备开关柜顶部的二次线小室或低压箱。二次线小室用于安装电流表（带或不带转换开关），带电闭锁控制单元。低压箱用于安装SPAJ140C, REF等继电器，并同时可安装电流表（带或不带转换开关），带电闭锁控制单元。

The GRM6 (XGN□)-12 switchgear can be equipped with a secondary line compartment or a low voltage box at the top of the switchgear. The secondary line compartment is used to install an ammeter (with or without a changeover switch) and a live blocking control unit. The low voltage box is used to install relays such as SPAJ140C, REF, and can also be equipped with an ammeter (with or without changeover switch) and a live blocking control unit.

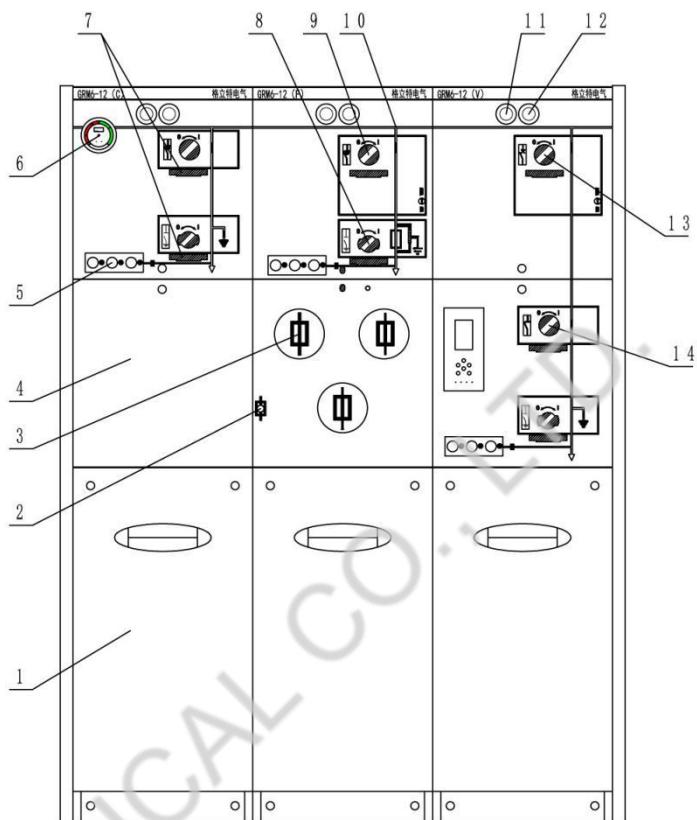
9. 避雷器 Lightning arrester

GRM6(XGN□)-12 型开关设备的电缆进/出线模块均可在电缆处安装氧化锌避雷器；也可以在母线上或M柜内安装氧化锌避雷器。

The cable incoming/outgoing module of the GRM6(XGN□)-12 type switchgear can be equipped with a zinc oxide lightning arrester at the cable; a zinc oxide lightning arrester can also be installed on the busbar or in the M cabinet.

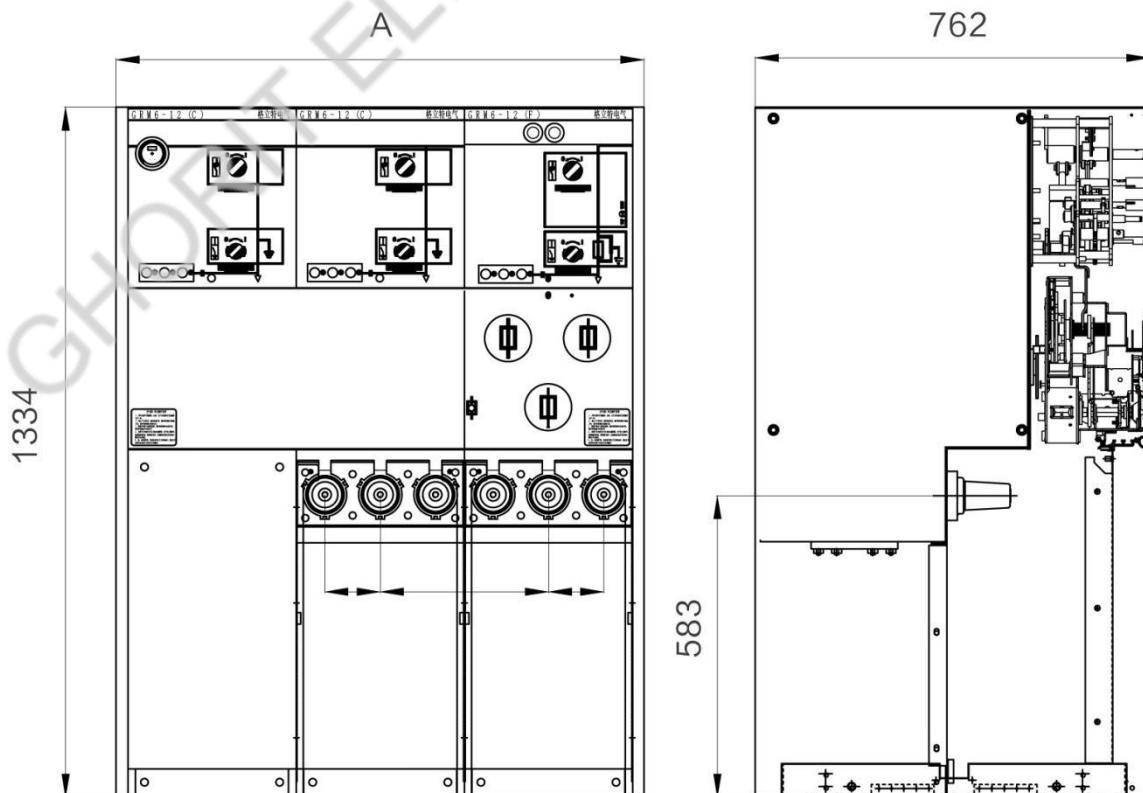
◆ GRM6(XGN□)-12 开关设备结构图 GRM6(XGN□)-12 Switchgear Structure Diagram

1. 电缆室 Cable room
2. 熔断器熔断指示器 Fuse blow indicator
3. 熔断器室 Fuse room
4. 安装室 Installation room
5. 带电显示器 charged display
6. 压力指示器 Pressure indicator
7. 面板上的挂锁装置 Padlock device on the panel
8. 接地开关操作孔 Earth switch operating hole
9. 负荷开关操作孔 Load switch operation hole
10. 模拟线路图 Analog circuit diagram
11. 分闸按钮 Opening button
12. 合闸按钮 Closing button
13. 断路器操作孔 Circuit breaker operation hole
14. 隔离开关操作孔地基示意图 Disconnect switch operating hole foundation diagram



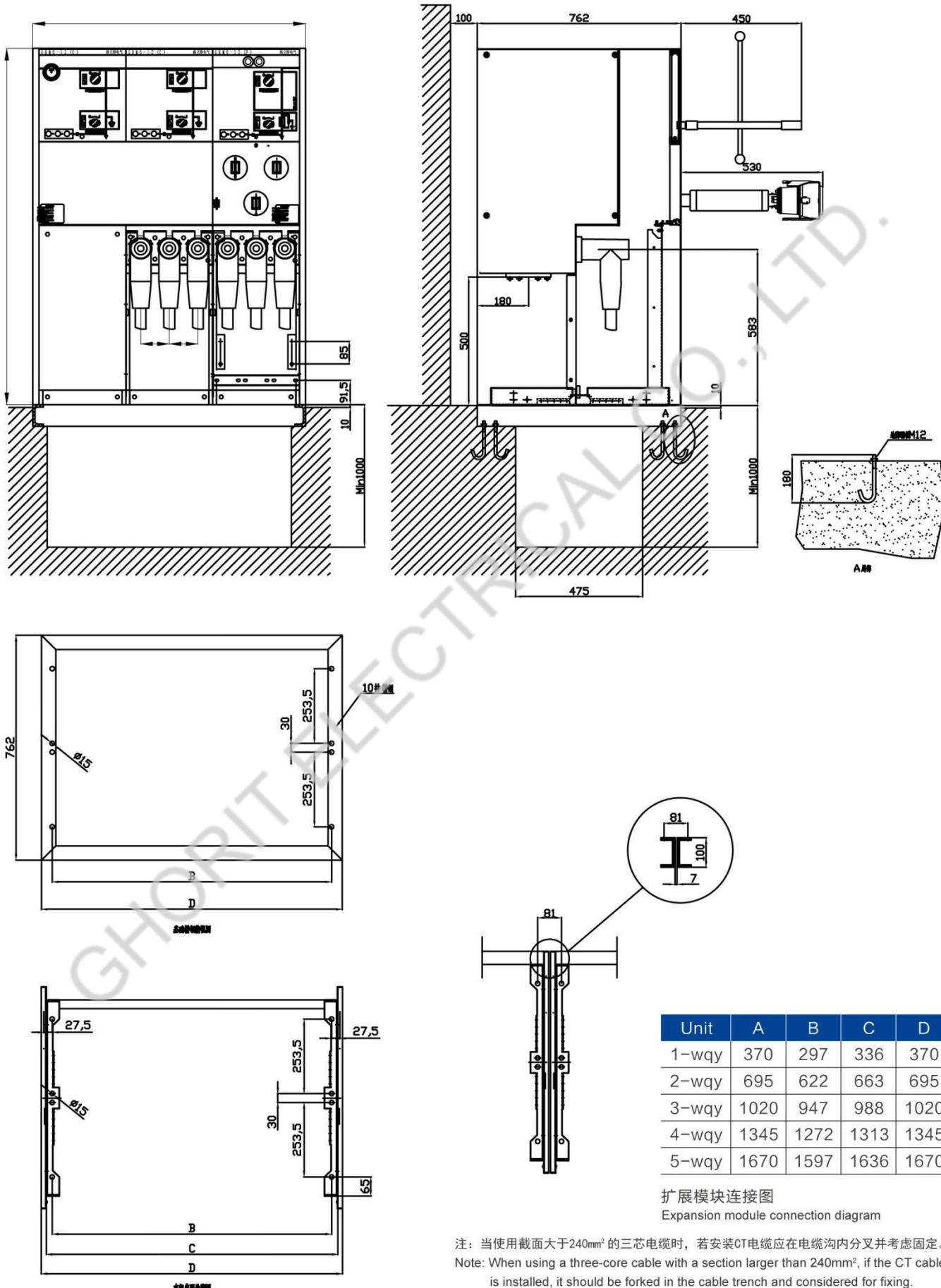
◆ GRM6(XGN□)-12 型开关设备结构及尺寸

GRM6(XGN□)-12 Switchgear Structure and Dimensions



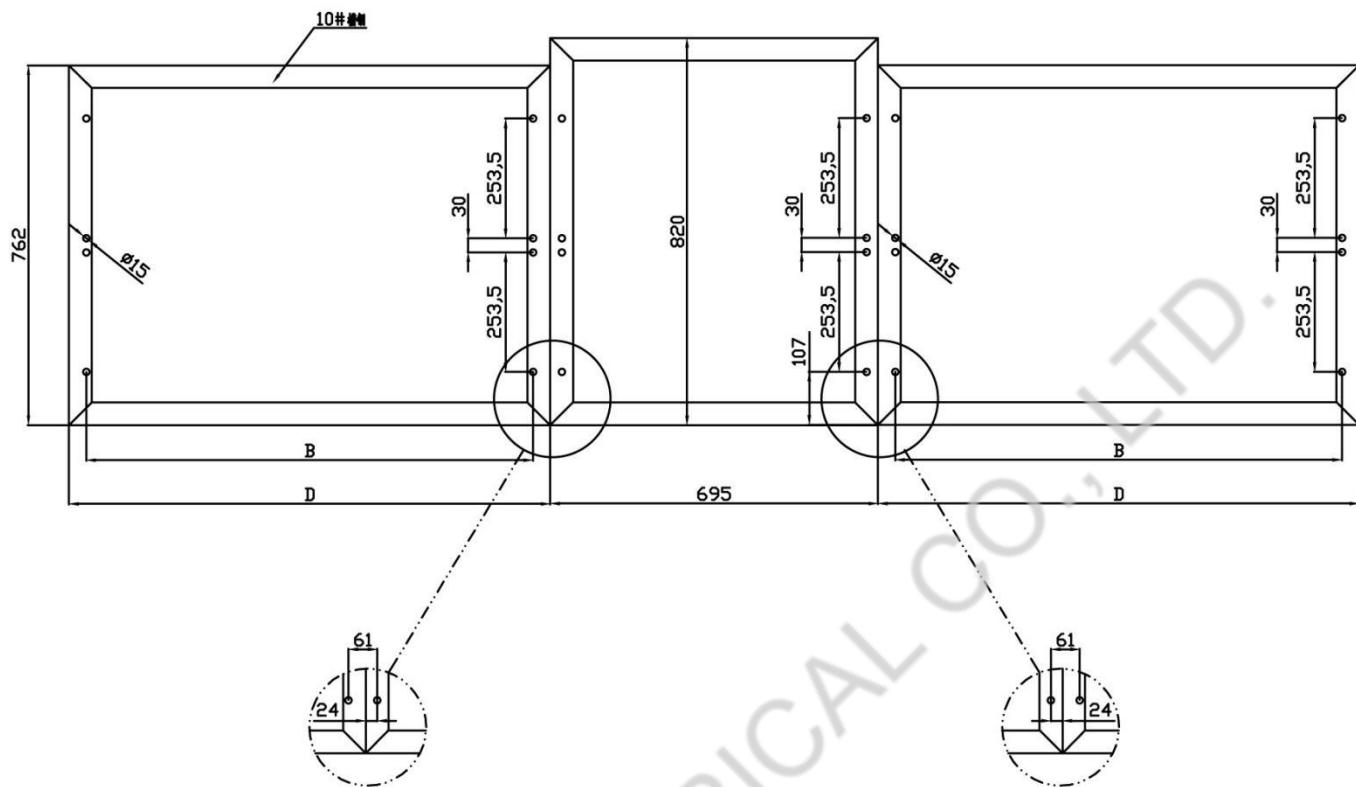
◆ 地基示意图 Foundation Diagram

1. 标准单元 Standard unit



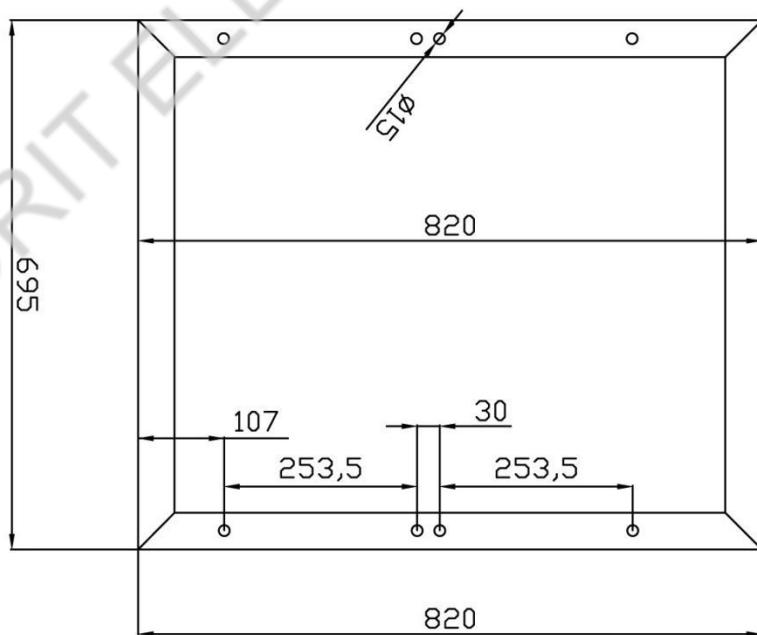
◆ 地基示意图 Foundation Diagram

2. 10kV 计量柜 10kV metering cabinet



GRM6(XGN□)-12 柜与 10kV M 柜或 PT 柜连接时基础槽钢俯视图

Top view of the base channel steel when the GRM6(XGN□)-12 cabinet is connected to the 10kV M cabinet or PT cabinet



10kV M 柜或 PT 柜底板安装图

GRM6(XGN□)-12 柜与 10kV M 柜或 PT 柜连接时地基图

Foundation diagram of GRM6(XGN□)-12 cabinet connected to 10kV M cabinet or PT cabinet