

## XGN2-12 箱型固定式金属封闭开关设备

Box fixed type metal-enclosed switchgear



### 概述 General

XGN2-12 箱型固定式金属开关设备（简称开关柜），用于 3.6、7.2、12KV 三相交流 50Hz 系统中作为接受与分配电能之用，特别适合于频繁操作的场合，其母线系统为单母线（并可派生出单母线带旁路和双母线结构）。本开关柜符合国家标准 GB3906《3-35KV 交流金属封闭开关设备》及国际标准 IEC298 的要求，并达到“五防”闭锁功能。本开关柜的主开关采用 ZN28A-12 或 ZN22-12 系列真空断路器配用 CD17A 电磁操作机构和 CT19B 弹簧操作机构，隔离开关采用 GN30-12 旋转式隔离开关、GN22-10 大电流隔离开关系列产品。



XGN2-12 box fixed type metal-enclosed switchgear (switch cabinet for short) is used to receive and distribute electrical energy in 3.6, 7.2, 12KV three phase AC 50Hz system, specially in the frequent operation occasion. Its bus bar system is single bus bar and it can derive single bus bar with branch and double bus bar structure. This switch cabinet conforms to the requirement of national standard GB3906-91 "3-35KV AC Metal Seal Switch equipment" and the international standard IEC298, and has the function of "five prevention". This switch cabinet's main switch is composed of ZN28A-12 Yu or the ZN22-12 series vacuum circuit-breaker, the CD17A spring operating mechanism and the CT19B spring operating mechanism, the GN30-12 rotary isolator and the GN22-10 big electric current isolator series product.

### 使用环境条件 Environmental condition

- 1、环境温度：上限 +40℃，下限 -25℃；
- 2、海拔高度不超过 1000m；
- 3、相对湿度：日平均值不大于 95%；  
月平均值不大于 90%；
- 4、地震烈度不超过 8 度；
- 5、没有火灾、爆炸危险和污染等级不超过 3 级、化学腐蚀性及剧烈震动的场所。

1. Ambient temperature: -25℃ ~ +40℃ ;
2. Altitude is not higher than 1000M;
3. Relative environment humidity:  
The daily relative humidity average is not higher than 95%;  
The monthly relative humidity average is not than higher 90%;
4. The earthquake's intensity does not exceed 8 degree.
5. Without fire, the danger of explosion, chemical corrosion and fierce vibration place and the pollution grade not beyond 3 level.

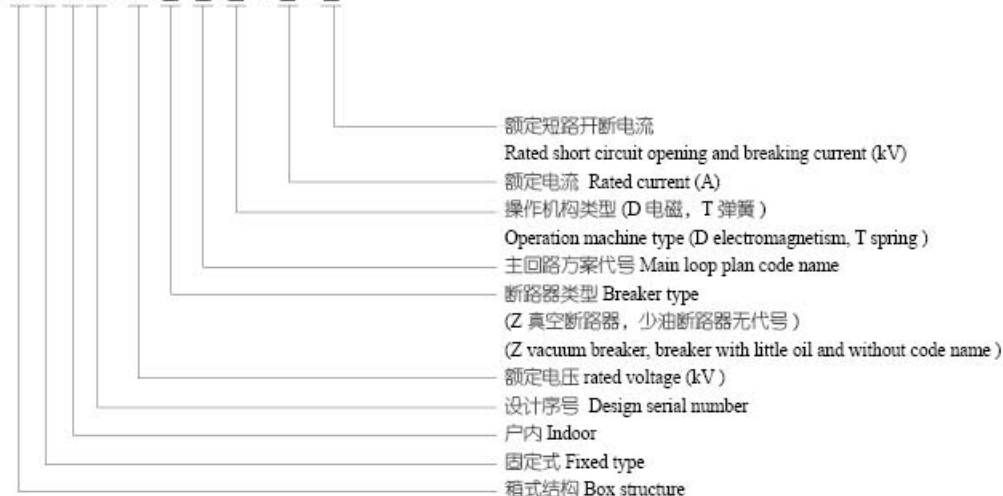
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### 产品型号及含义 Product type and meaning

X G N 2 - 12 □ □ □ / □ - □



### 主要技术参数 Main technical parameters

开关柜主要技术参数见表 1 Switch cabinet's main technical parameters

项目 Item	单位 Unit	VS1
额定电压 Rated voltage	kV	3.6, 7.2, 12
额定电流 Rated current	A	630,1250,1600,2000,3150
额定短路开断电流 Rated short circuit opening current	kA	16,20,31.5,40
额定短路关合电流 (峰值) Rated short circuit breaking current (peak value)	kA	40,50,80,100
额定短路动稳定电流 (峰值) Rated short circuit stable moving current (peak value)	kA	40,50,80,100
额定热稳定电流 Rated heat stable heating current	kA	16,20,31.5,40
额定热稳定时间 Rated heat stable heating time	s	4
防护等级 Protection grade		IP2X
结构型式 Structure type		单母线分断及单母线带旁路 Single bus bar disjunction and single bus bar with branches
操作方式 Operation mode		电磁式, 弹簧储能式 electromagnetic, spring and energy storage type
外形尺寸宽 × 深 × 高 The external dimension width × deep × is high	mm	1100 × 1200 × 2650(一般型)(common type)
重量 Weight	kg	1000

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### 结构特点 Structural features

XGN2-12 开关柜为金属封闭箱式结构，柜体骨架由角钢焊接而成，柜内分为断路器室、母线室、电缆室、继电器室等，室与室之间用钢板隔开。

1 断路器的转动由拉杆与操动机构连接，断路器上接线端子与上隔离开关连接，断路器下接线端子与电流互感器连接，电流互感器与下隔离开关接线端子连接，断路器室还设有压力释放通道，若内部电弧发生时，气体可通过排气通道将压力释放。

2 母线室在柜体后上部，为了减小柜体高度，母线呈品字形排列，以 7350N 抗弯强度的瓷质绝缘子支持，母线与上隔离开关接线端子相连接，相邻两柜母线室之间可隔离。

3 电缆室在柜体下部的后方，电缆室内支持绝缘子可设有电压监视装置，电缆固定在支架上，对于主结线为联络方案时，本室则为联络电缆室，继电器室在柜体上部前方，室内安装板可安装各安装各种继电器等，室内有端子排支架，门上可安装指示仪表、信号元件等二次元件，顶部还可布置二次小母线。

4 断路器的操动机构装在正面左边位置，其上方为隔离开关的操作及联锁机构，开关柜为双面维护，前面检修继电器室的二次元件，维护操动机构，机械联锁及传动部分，检修断路器，后面维修主母线和电缆终端，在断路器室装有照明灯，前门的下方设有与柜宽方向平行的接地铜母线，其截面为  $4 \times 40\text{mm}$ 。

5 机械联锁：为了防止带负荷分合隔离开关，防止误分误合断路器，防止误入带电间隔；防止带电合接地开关；防止带接地刀合闸，开关柜采用相应的机械联锁，机械联锁的动作原理如下：

#### (1) 停电操作（运行 - 检修）

开关柜处于工作位置，即上下隔离开关、断路器处于合闸状态，前后门已锁好，并处于带电运行之中，这时的小手柄处于工作位置，先将断路器分闸后，再将小手柄插入下隔离的操作孔内从上往下拉，拉到下隔离分闸位置，将手柄拿下，再插入上隔离操作孔内，从上往下拉，拉到上隔离分闸位置，再将操作手柄拿下，插入接地开关操作孔内，从下往上推，使接地开关处于合闸位置，这时可将小手柄扳至“检修”位置，可先打开前门，取出后门后边钥匙打开后门，停电操作完毕，检修人员对断路器室及电缆室进行维护和检修。

#### (2) 送电操作（检修 - 运行）

若已检修完毕，需要送电，其操作程序如下：将后门关闭，钥匙取出后关前门，将小手柄从“检修”位置扳到“分断闭锁”位置，这时前门被锁死，断路器不能合闸，用操作手柄插入接地开关操作孔内，从上往下拉，使接地开关处于分闸位置，将操作手柄拿下，再插入上隔离的操作孔内，从下往上推，使上隔离处于合闸位置，将操作手柄拿下，插入下隔离的操作孔内，从下往上推，使下隔离处于合闸位置，取出操作手柄，将小手柄扳至工作位置，这时可将断路器合闸。

#### 6 产品外形尺寸及结构图（见图 1、图 2、图 3）

XGN2-12 switch cabinet is the metal-enclosed box structure, its cabinet frame is welded together by the angle iron, the cabinet inside is divided into breaker room, bus bar room, cable room, relays room and so on. Rooms are separated by armor plate.

1 The circuit breaker room is located below in front of the cabinet body. It is connected by the tension bar and the drive mechanism. Line terminal above the breaker connects with isolated switch. Line terminal below the breaker connects with the current mutual inductance which connects isolated switch's line terminal. The circuit breaker room also is equipped with the pressure release channel, if internal electric arc it occurs, the gas passable exhaust channel released the pressure through exhaust channel.

2 Bus bar room is behind, upside cabinet body. In order to reduce the cabinet body altitude, bus bar room shows itself like the word “品” supported by the 7350N anti-curved intensity porcelain insulator. Bus bar connects with upside insulated switch's line terminal. Bus bar room in neighboring two cabinets can be isolable.

3 The cable room is behind and below the cabinet body. The supporting insulator inside the cable room may be equipped with the voltage monitor device. The electric cable fixes on the support. When the main line is used to connect, this room is connecting cable room. The relay room is upside and in front of the cabinet body. The installing panel inside the cable room can install each kind of the relay. There are terminal supporters inside. The door of the cable room can be installed indication instrument, the signal part and other twice parts. The top can be installed twice small bus bar.

4 Circuit breaker's drive mechanism is installed face and left side of the breaker. Above it is isolated switch's operation and the interlocking mechanism. The switch cabinet is the two-sided maintenance. The front is twice component checking and repairing relay room and breaker, maintaining the drive mechanism, interlocking mechanism and transmission parts; the back is repairing the main bus bar and cable terminal. There is head lamp inside the breaker. The downside of front door is equipped with bus bar connected by copper paralleling with cabinet. The section is  $4 \times 40\text{mm}$ .

5 Mechanical interlocking: In order to prevent the load from turning on and off the isolated switch and the circuit breaker by mistake, prevent from isolating with charge and earthed switch with charge and turning on the knife switch. The switch cabinet uses the corresponding mechanical interlocking. The mechanical interlocking movement principle as follows:

#### (1) power-cut operation (operation - examination)

The switch cabinet is in the working position, namely the upside and downside isolated switch, the circuit breaker are at turn-on condition, the front and back door has been locked and at electriferous condition, at this time, the small handle was in the working position. First, turn the breaker off, insert the small handle into downside isolated operation hole, then pull to the isolated turn-off position from down to up. Then take the handle down, insert the handle into upside isolated operation hole, pull to the isolated turn-off position from up to down. Then take the handle down and insert it into switch hole, push from down to up to make the switch turn off. At this time, pull the small handle to the “examination and repair condition. Then open the front door first, then open the back door, the power cut operation finish, the examiner maintain and repair the breaker and the cable room.

#### (2) Power transmission operation (examination repair - movement)

If examination repair operation has finished, the power transmission is needed, its operation procedure as follows: Close the back door, after the key is taken out, close the front door, pull the small handle from “the examination repair” position to disjunction and closedown” position, at this time the front door is locked, the circuit breaker cannot be turned on. Insert the operation handle to the earthed switch operational hole, push the upside isolator to the turn on position from down to up, take the operation handle out and insert into the downside isolating operational hole, pull the downside isolator to the turn-on operation from down to up and take the operational handle out, pull the small handle to the operation position, at this time, turn the breaker on.

#### 6 Product's external dimensions and the structure chart (see chart 1, chart 2, chart 3)

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图 1 XGN2-12 外形尺寸及结构图 Diagram 1 Outline size and structure of XGN2-12 type

1. 本体结构 Main body structure
2. 门接地线 door's earthed line
3. 二次电缆安装 Secondary electric cable installment
4. 后门解锁装配 Back door interconnection assembly
5. 照明灯 Head lamp
6. 支持绝缘子 Support insulator
7. 架空出线装配 Aerial wire assembly
8. 母线室装配 Bus bar room assembly
9. 继电器室装配 Relay room assembly
10. 前门元件装配 Front door's component assembly
11. 带接地刀上隔离开关传动装配  
The isolated switch drive assembly with earth knife
12. 操作联锁机构 Operation interlocking mechanism
13. 下隔离开关传动装配 Downside isolated switch drive assembly
14. 电流互感器装配 Current mutual inductance assembly
15. 真空断路器传动装配 (电操)  
The vacuum circuit-breaker drive assembly
16. 接地母线装配 Earthed bus bar assembly

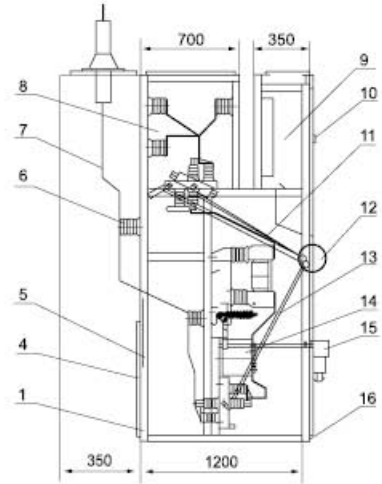


图 2 XGN2-12 大电流柜外形结构图 (配用 ZN28A 系列真空断路器)

Diagram 2 Outline structure of XGN2-12 heavy current cabinet (equipped with ZN28A series vacuum circuit breaker)

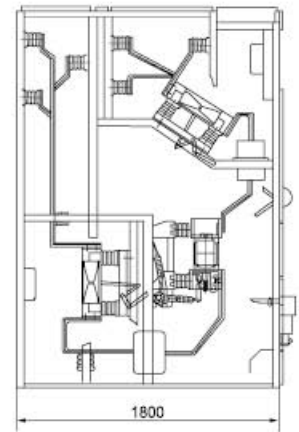
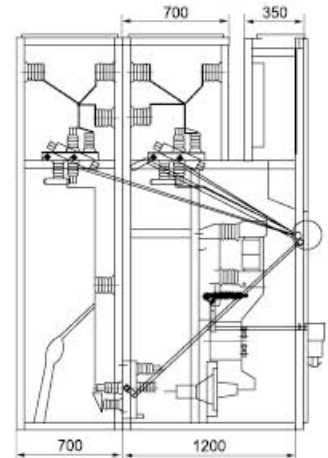
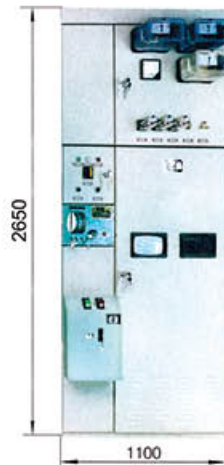


图 3 XGN2-12 旁路电缆出线柜外形结构图 Diagram 3 Outline structure of XGN2-12 bypass cable outgoing cabinet



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图 4 XGN2-12 型安装尺寸图 Diagram 4 Mounting size of XGN2-12 type

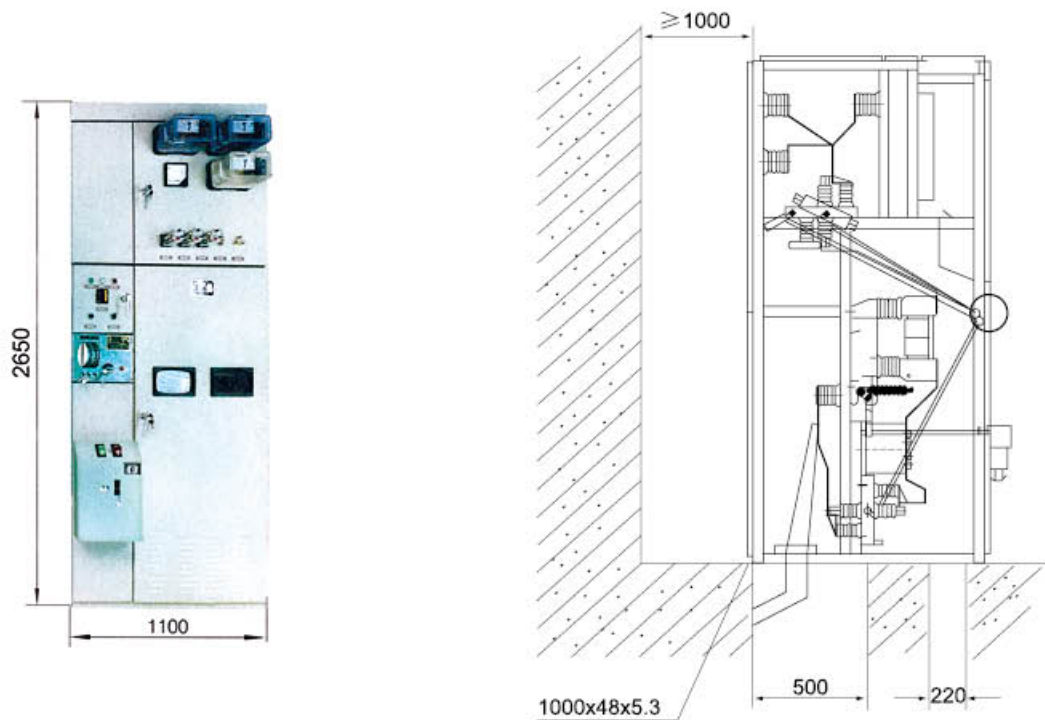
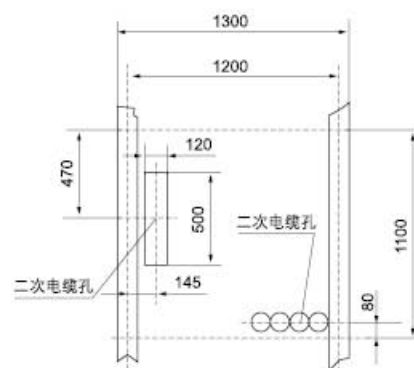


图 5 XGN2-12 型安装尺寸图 Diagram 5 Mounting size of XGN2-12 type



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### 一次线路图，方案组合示例 Primary circuit diagram, scheme combination example

38	44	50	29	52	29	29	53	46	30
630-1000A	630-1000A	630-1000A	630-1000A	630-1000A	630-1000A	630-1000A	630-1000A	630-1000A	630-1000A
架空进线、计量 Aerial incoming line, metering	架空进线、计量 Aerial incoming line, metering	架空进线、计量 Aerial incoming line, metering	架空进线、计量 Aerial incoming line, metering	架空进线、带避雷器 Aerial incoming line with arrester	架空进线、计量 Aerial incoming line, metering	架空进线、计量 Aerial incoming line, metering	电缆进线带 PT Cable incoming band	母线联络 Bus interconnection	母线联络 Bus interconnection

### 一次线路方案 Primary circuit scheme

主电路方案编号 Main circuit scheme number	01	02	03	04	05
主接线图 Main wire connection diagram					
主断路器 Main electrical appliance 旋转式隔离开关 GN □ -10 Rotary isolating switch 电流互感器 LZZJ-10 Current transformer 真空断路器 Vacuum circuit breaker 操作机构 CD <sup>10</sup> 或 CT <sup>8</sup> Operating mechanism 接地开关 JN □ -1 Grounding switch 带电显示装置 Charged displaying device	1	1	1	1	2
		1	2	3	
	1	1	1	1	1
	1	1	1	1	1
	1	1	1	1	1
最大工作电流 (A) Max. working current	600;3000				
备注 Remark	电缆出线 Cable outgoing				

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主电路方案编号 Main circuit scheme number	06	07	08	09	10
<b>主接线图</b> Main wire connection diagram					
主电路方案编号 Main circuit scheme number 主回路元件明细 Main electrical appliance	旋转式隔离开关 GN □ -10D Rotary isolating switch	1	1	1	
	电流互感器 LZZJ-10 Current transformer	1	2	3	
	真空断路器 Vacuum circuit breaker	1	1	1	1
	操作机构 CD <sub>17</sub> <sup>10</sup> 或 CT <sub>19</sub> <sup>8</sup> Operating mechanism	1	1	1	1
	旋转式隔离开关 GN □ -10 Rotary isolating switch	1	1	1	2
	接地开关 JN □ -1 Grounding switch	1	1	1	1
	带电显示装置 Charged displaying device	1	1	1	1
	最大工作电流 (A) Max. working current	600;3000			
备注 Remark	电缆进出线 Cable ingoing/outgoing				

主电路方案编号 Main circuit scheme number	11	12	13	14	15
<b>主接线图</b> Main wire connection diagram					
主电路方案编号 Main circuit scheme number 主回路元件明细 Main electrical appliance	旋转式隔离开关 GN □ -10D Rotary isolating switch				
	电流互感器 LZZJ-10 Current transformer	2	3		2
	真空断路器 Vacuum circuit breaker	1	1	1	1
	操作机构 CD <sub>17</sub> <sup>10</sup> 或 CT <sub>19</sub> <sup>8</sup> Operating mechanism	1	1	1	1
	旋转式隔离开关 GN □ -10 Rotary isolating switch	2	2	1	1
	接地开关 JN □ -1 Grounding switch			1	1
	带电显示装置 Charged displaying device	1	1	1	1
	最大工作电流 (A) Max. working current	630;3000			
备注 Remark	电缆进出线 Cable ingoing/outgoing		架空出线 Aerial outgoing line		