

People Electric

Complete Sets of Equipment Selection Manual

成套设备选型手册



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成套电气设备选型手册

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8PT

Low-voltage switch cabinet



面对全球性挑战的解决方案： SIVACON

SIVACON 8PT是一种由人民电器集团引进的新型的低压开关柜，它具有断路器技术、固定安装式技术、抽出式技术及插入式设计技术。

人民电器通过与本地优秀的、高水准的低压开关柜生产厂合作，使他们成为生产SIVACON 8PT的“技术合作伙伴”，使得多用途的、通过型式试验的SIVACON低压开关柜完全全地来到了您的身边。

THE Solution for global challenges:

SIVACON

SIVACON 8PT is a new type of low-voltage switch cabinet that has been introduced by Renmin Group lately; it encompasses the circuit breaker technology, fixed installation technology, draw-out technology and plug-in technology.

By working together with excellent and top-class local manufacturers of low-voltage switch cabinets and making them the technical partners for SIVACON 8PT, Renmin Group is glad to present the multi-purpose SIVACON low-voltage switch cabinet, which has passed type experiment.

通过型式试验的低压开关柜

SIVACON低压开关柜具有用于建筑行业 and 工业技术领域的标准型结构。

SIVACON是根据世界市场需要而开发的低压开关柜，也就是说，它一方面要考虑到所谓一手包办的标准型解决方案的各项要求，另一方面，它又兼顾到当地生产以及由此给财务和生产运行带来的利益。

SIVACON是向世界各地推广的开关柜，它可应用在最最大额定电流至7400A5的各种容量等级的层面上，它既可采用固定安装式设计，插入式设计，也可采用抽出式设计。

The low-voltage switch cabinet which has passed type experiment

SIVACON low-voltage switch cabinet features a standard structure suitable for the construction industry and industrial technologies.

SIVACON is a low-voltage switch cabinet that has been developed specifically for the world market, which means that it both takes into consideration all the relevant requirements for standard turn-key solutions and focuses on financial benefits and production and operation benefits.

SIVACON switch cabinet targets the world market. It can be used for all levels of rated current up to 7400A5 and allows for fixed installation, plug-in design, and draw-out design.

模块化的设计

每台SIVACON都是完全用标准化和典型化的模块制成。所有模块在质量上均符合人民电器集团评定指标和设计指标。

模块具有多种组合可能性，从而能满足各式各样的要求。全部采用优质的人民电器集团开关电器就能保证做到使用寿命长和运行可靠性高。

Modularized design
Each SIVACON equipment is composed of standard and typical modules, all of which meet the quality indexes and design indexes of Renmin Group.
Modules have multiple combination portfolios and therefore can meet different requirements. The super-quality Renmin switch equipment features a long usage life and high operation reliability.

SIVACON特点

通过型式试验的低压开关柜(TTA)
水平母线统一布置在开关柜的上方
3极和4极水平母线系统其额定电流可至7400A
额定峰值耐受电流 I_{pk} 可至375kA
器件隔室的深度尺寸大，适用于各种安装
器件隔室可按模数结构分隔成不同的单元
开关柜可单面安装，也可以背靠背安装
进线可采用上进线或下进线

SIVACON Features
Low-voltage switch cabinet (TTA) has passed type experiment.
Horizontal busbar are all located above the switch cabinet.
The 3-pole and 4-pole horizontal busbar systems have a rated current up to 7400A.
Rated peak withstand current: I_{pk} up to 375kA.
The device compartment is sufficiently deep, suitable for all installations.
The device compartment can be divided into different units according to modular structure.
The switch cabinet can be installed on single side or back to back
Two types of inlet are available: upper inlet and lower inlet.
Electric cable outlet can be connected at the front or back of the cabinet.

SIVACON 的模块化技术能使开关柜最佳地适应各种要求

水平母线统一布置在开关柜的上方
器件可任意装入器件隔室，它与水平母线系统和开关柜的深度尺寸无关
可根据要求来分隔各功能室(符合IEC 60439-1规定的形式1至形式4)器件隔室的深度尺寸大

8PT

Low-voltage switch cabinet

Flexibility:

SIVACON always gives you what you need

The modular technologies of SIVACON enables the switch cabinet to best meet various requirements.

Horizontal busbars are all located at the top of switch cabinet.

Device can be conveniently installed into the device compartment, irrelevant to the horizontal busbar system and the depth of the switch cabinet.

Function rooms can be divided according to requirements (in compliance with Pattern 1 and Pattern 4 of IEC 60439-1).

The device compartment has a sufficient depth.

能最佳地适应开关设备安装现场的条件

可靠墙安装或自由落地安装

电缆可选用上进线或下进线

水平母线连接方便

电缆可柜前连接或柜后连接

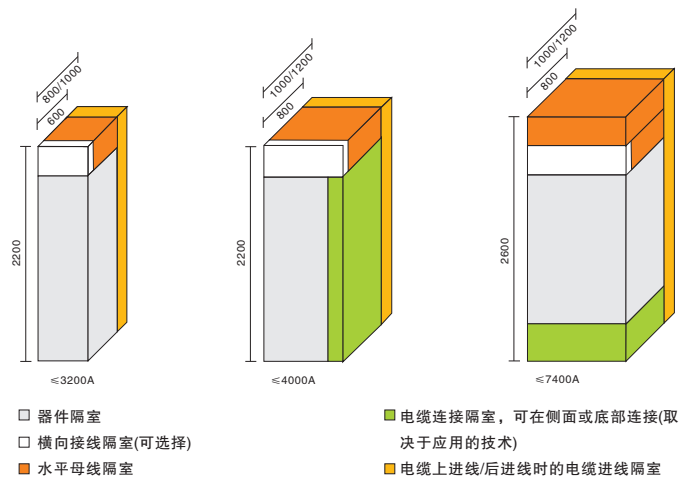
Best meet the conditions for the installation site for switch equipment

Can be mounted against the wall or on the floor.

Upper inlet and lower inlet for electric cables.

Convenient connection of horizontal busbars

Cables can be connected before or behind the cabinet.



8PT
低压开关柜

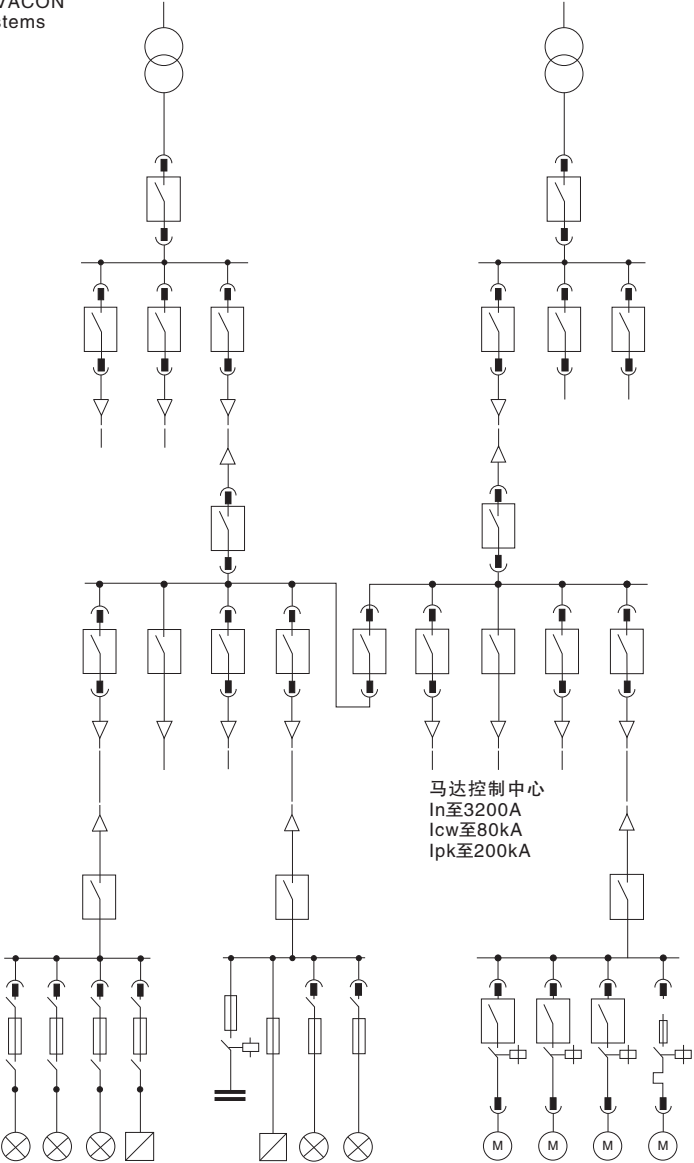
SIVACON在低压网络中的各种应用
Applications of SIVACON
in low-voltage systems

动力中心
In至7400A
Icw至150kA
Ipk至375kA

主配电柜
In至4000A
Icw至100kA
Ipk至250kA

分配电柜
In至3200A
Icw至80kA
Ipk至200kA

马达控制中心
In至3200A
Icw至80kA
Ipk至200kA



8PT
Low-voltage switch cabinet



骨架和外壳：
尺寸精准，结构牢固

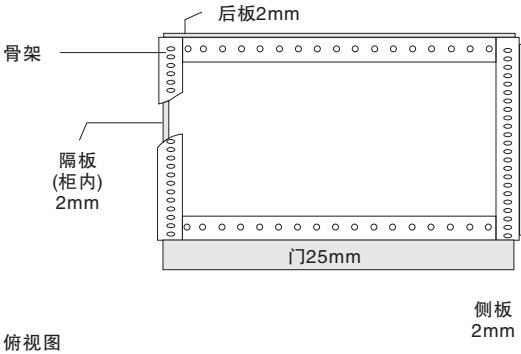
骨架是开关柜的承重结构，它是由牢固的钢板型材相互连接而构成。
SIVACON的骨架尺寸精准和稳固。它有二种结构型式，即螺钉连接式或焊接式。
骨架上带有模类为25mm的孔，可供各种用途的扩展。
门体机动灵活，能满足各种要求。
门的开启角度可至180°。
旋柄弹簧锁能可靠地防止由于疏忽或意外而使门弹开。
柜顶装有释压装置。

表面处理
可选用粉末喷涂、喷涂或镀锌。

材料
骨架和外壳均用钢板制成，其厚度为：
骨架：2.5mm
外壳：2.0mm

防护等级符合IEC 60529的规定
IP30，IP31，IP40，IP41，IP42自然通风型柜体
IP40，IP54非通风型柜体

开关柜的外型尺寸(不带外壳)



柜高(mm)	柜宽(mm)	柜深(mm)
2200	400,600,800,1000,1200	600,800,1000,1200
2600	400,600,800,1000,1200	800,1000,1200

8PT
低压开关柜

Framework and shell:
Precise size and secure structure

The framework is the load-bearing structure of the switch cabinet; it is made of secure steel plate profiles.
SIVACON framework features a precise size and a secure structure, of bolt connection or welding type.
The framework has 25-mm module jacks, suitable for various purposes.
The door mechanism is smooth and flexible and can meet different requirements.
The door opening angle can be up to 180° .
The spinner handle spring lock reliably prevents the door from springing open by accident or due to negligence of the operator.
On the top of the cabinet is the pressure relief device.

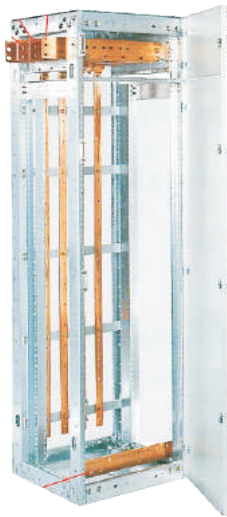
Surface processing
Galvanized/powder coat/spray-paint
Material

Both the framework and the shell are made of steel plate, the thickness of which is as follows:
Framework: 2.5mm
Shell: 2.0mm

Ingress Protection meets the requirements of IEC 60529.

IP30, IP31, IP40, IP41, IP42 natural ventilation-type cabinets
IP40, IP54 non-ventilation type cabinets

8PT
Low-voltage switch cabinet

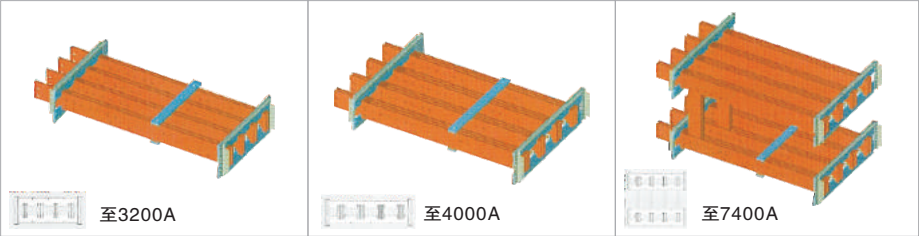


灵活多变的水平母线系统：
对不同的使用要求的回答

对水平母线系统提出的各种要求，需要用不同的实施可能性给予满足。
SIVACON提供的模块，即能做到结构经济性，又能实现运行的高度安全性。
水平母线布置在柜的上方。
水平母线系统的额定电流至7400A。
额定电流的等级划分面向实践。
额定峰值耐受电流IPK可至375KA。
母线隔室与器件隔室是相互隔开的。
从上方能方便地进行柜体母排间的连接。
具有电弧屏障，可对内部故障电弧进行限制。

The flexible horizontal busbar system:
Responds to different functional requests
Different requirements can be met by horizontal busbar systems using different implementation options.
The modules provided by SIVACON ensure both economical structure and high operation safety.
The horizontal busbar is located above the cabinet;
The rated current of the horizontal busbar system is up to 7400A;
The levels of rated currents are divided for practical and functional purposes;
The rated peak withstand current IPK is up to 375KA;
The bus barrier and device compartment are separated from each other. Busbars can be conveniently connected to each other from above the cabinets.
The cabinet is equipped with arc shield and the internal arc shield can be adjusted.

水平母线系统



额定电流In与周围温度的关系
母线系统至3200A

非通风型							通风型								相线截面		短路强度	
20° [A]	25° [A]	30° [A]	35° [A]	40° [A]	45° [A]	50° [A]	20° [A]	25° [A]	30° [A]	35° [A]	40° [A]	45° [A]	50° [A]	数量	尺寸 [mm]	I _{pk}	I _{ew} (1s)	
1075	1050	1025	1000	975	945	920	1315	1285	1250	1220	1185	1155	1120	1	40×10	163	65	
1615	1575	1540	1500	1460	1420	1375	2025	1975	1930	1880	1830	1780	1725	2	40×10	163	65	
1895	1850	1805	1760	1715	1665	1615	2420	2365	2310	2250	2190	2130	2065	2	60×10	200	80	
2260	2210	2155	2100	2045	1985	1925	2960	2890	2820	2750	2675	2600	2525	2	80×10	200	80	
2585	2525	2460	2400	2335	2270	2200	3445	3365	3285	3200	3115	3025	2935	2	100×10	200	80	

8PT
低压开关柜



母线系统至4000A

2205	2155	2105	2050	1995	1940	1880	2800	2735	2670	2600	2530	2460	2385	3	40 × 10	200	80
2530	2470	2410	2350	2285	2225	2155	3335	3260	3180	3100	3015	2930	2845	3	60 × 10	200	80
2850	2785	2720	2650	2580	2505	2430	3820	3730	3640	3550	3455	3360	3260	3	80 × 10	250	100
3175	3100	3025	2950	2870	2790	2705	4305	4205	4105	4000	3895	3785	3670	3	100 × 10	250	100

母线系统至7400A

4625	4520	4410	4300	4185	4065	3945	6240	6100	5950	5800	5645	5485	5320	3	80 × 10	200	80
														3	40 × 10		
5540	5415	5285	5150	5015	4870	4725	7480	7305	7130	6950	6765	6575	6380	3	80 × 10	375	150
														3	80 × 10		
5810	5675	5540	5400	5255	5110	4955	7965	7780	7590	7400	7205	7000	6790	3	100 × 10	250	100
														3	100 × 10		

断路器技术(FCB):
结构紧凑、安全可靠、用户欢迎

采用断路技术的进线柜，馈电柜和母联柜，不论是抽出式结构，还是固定安装式，均有3W，型断路器。

因为大多数用电设备是接在这类开关柜的后面，所以从开关设备的长期运行可靠性与人身安全性来看，它具有特殊的意义。

SIVACON应用断路器技术的元件来实现这些要求。

结构紧凑和安全可靠

由于采用通过型式试验的开关柜(TTA)而提高了安全性。

门关闭时具有试验和分离位置。

断路器是装入在各自相互隔开的隔室中，而每个隔室又都装有独立的门。

各额定电流范围均能与接线条件获得最佳配合。

电缆可从下方或上方连接。

应用3W，型 断路器深受用户欢迎

额定电流范围从630至6300A的人民电器集团3W断路器可用于固定安装式结构和抽出式结构，这就是说：

供电方向不受技术数据限制，可自由选择。

作为时间选择性短路保护的短时电流承载能力高达500MS，这样，在出现短路时，对于系统中未发生短路的部件就可保证安全运行。

在延时时间十分短促时(50ms)可采用ZSS型缩短时间的选择性控制装置作为短路保护。

控制面板上带LCD-工作电流显示器(不用电流表和电流互感器)。

在门关闭的情况下显示与操作。

8PT

Low-voltage switch cabinet

Circuit breaker technology (FCB):

Compact in structure, safe and reliable, popular among users

Whether of draw-out structure or fixed installation, the inlet cabinet, feeder cabinet and busbar cabinet which adopt the circuit breaker technology are all equipped with 3W circuit breakers. As most electric appliances are connected behind this type of switch cabinet, the circuit breaker technology is of special meaning for the long-term safe and reliable operation of the switch equipment and for human safety.

SIVACON uses components of the circuit breaker technology to meet these requirements.

Compact structure, safety and reliability

Safety is enhanced by using the switch cabinet (TTA) that has passed type experiment. When being closed, the door has the experimental position and the isolation position. Circuit breakers are installed in mutually separated rooms and each compartment room has its own door.

Each rated current scope can best meet the connection conditions.

Cables can be connected from above or below.

The 3W circuit breakers are extremely popular among customers.

Renmin 3W circuit breakers, with the rated current ranging from 630A to 6300A can be used for fixed installation structure and draw-out structure. This means that the power supply direction is not limited by technical data and can be selected freely.

The rated short-time withstand current for time selective short circuit protection is up to 500MS. At the time of short circuit, components in the system that are not in the short circuit can operate safely. When the delay is very short (50ms), the ZSS-type selective control device can be used for short circuit protection.

On the control panel is a LCD for displaying the working current (without using the ammeter and current mutual inductor).

The LCD shows and works when the door is closed.



当门关闭时，断路器可可靠的移动

When the door is being closed,
the circuit breaker can move reliably.

器件隔室

在门关闭时，断路器可安全地移动。

在维修位置，可在现场直接进行检查，而不需要取出断路器。

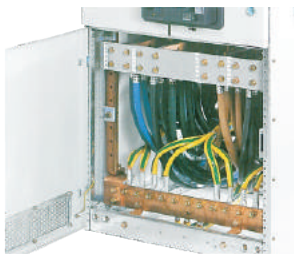
电缆或母线连接隔室

电缆或母线可从上方或下方连接。

电缆连接隔室与额定电流相匹配，它能最佳地配合电缆和母线的连接条件。

使用最佳连接隔室将显著缩短安装时间。

8PT
低压开关柜



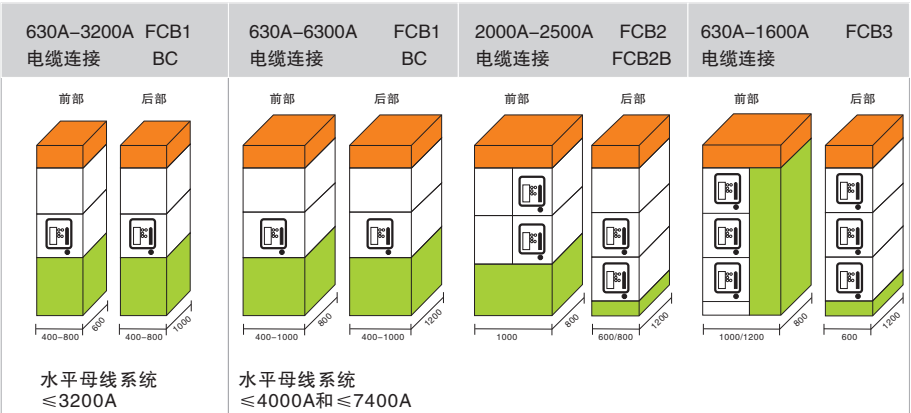
安全性高的最佳连接隔室
Optimal connection compartment
with high safety



Device compartment
When the door is being closed, the circuit breaker can move safely.
At the maintenance position, the system can be checked directly without having to take out the circuit breaker.
Cable or busbar connection compartment
Cables or busbars can be connected from above or below.
The cable connection compartment matches the rated current and can best meet the connection conditions between electric cables and busbars.
The optimal connection compartment will substantially shorten the installation time.

柜体尺寸/柜体结构
Cabinet size / structure

3W.断路器



固定安装式技术(OFF):
经济、安全和适应性好

电缆馈电回路用配电柜是采用固定安装式结构型式，根据用户要求，可装配断路器或熔断器式隔离开关。
这类配电柜主要应用在工作条件下不需要进行更换或允许短暂停电的场合。
在这种情况下，SIVACON固定装入式技术就显示出其很高的经济性，安全性和应变性。

采用通过型式试验的标准模声(TTA)提高了安全性。
采用模块式结构使电缆馈电回路配电柜能任意组合。
使用侧面的垂直配电母线，能迅速地进行改装。
在开关设备不带电且已断开的情况下，可毫无问题地更换电缆馈电回路。

8PT

Low-voltage switch cabinet



电缆馈电回路的断路器
固定在电器元件支架上

The circuit breaker in the feed circuit is secured on the support bracket of electric components.



电缆馈电回路的熔断式隔离开关
固定在电器元件支架上

The fuse isolating switch of feed circuit is secured on the support bracket of electric components.

电缆分支回路采用模块式结构

模块式的电缆分支回路使安装灵活方便。

它能简单地实现为适应工作条件而需进行改装和扩展。

可任意地装入的断路器或熔断器式隔离开关。

配电屏中的电缆馈电回路可自由组合。

电器元件支架可随意调节，以便获得统一的正面。

电缆馈电回路上可带或不带电流表。

柜体尺寸/柜体结构

3RV/3VF断路器

3NP熔断器式负荷隔离开关

电缆连接在右手侧

Fixed installation technology (OFF):

Economy, safety, adaptability

The power distribution cabinet for the feed circuit adopts the fixed installation structure. According to customer requirements, it can be equipped with circuit breaker or fuse switch.

Such power distribution cabinets are mainly used where replacement is not required under working conditions or transient power cut is allowed.

In these cases, the SIVACON fixed installation technology shows its favorable economical performance, safety, and adaptability.

The type-experiment-passing standard modules (TTA) ensure a high safety grade.

Modular structure makes random combination possible for the power distribution cabinet for the feed circuit.

The side vertical busbar can be quickly adapted and modified.

The feed circuit can be safely replaced when the switch equipment is switched off and has no power.

The cable branch circuit adopts the modular structure.

The modular cable branch circuit makes installation flexible and convenient; circuit breaker or fuse switch can be installed conveniently in the loop.

The feed circuits in the power switch panel allow for free and flexible combination.

The support bracket of the electric appliances can be adjusted freely.

The feed circuit can be equipped with or without ammeter.

Cabinet size/structure

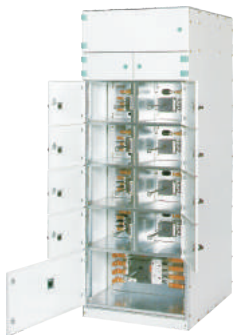
3RV/3VF circuit breaker

3NP fuse isolating switch

Cable connection is on the right hand side.



8PT
低压开关柜

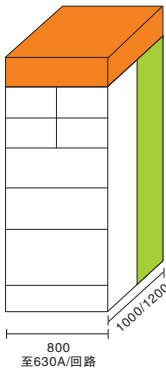


每一功能单元具有连接盒内部间隔形式最高可至BS60439的形式4类别7

Each function unit has the internal compartment up to Level 7 of Type 4, BS60439.

馈电回路的隔室化设计
每一断路器具有相应的门的隔室化设计提高了安装的及人身防护的安全性。
每一断路器具有相应的门及隔室
3VL断路器或插拔式3VL断路器
内部间隔形式最高可至BS604389的形式4类别7(每一功能单元具有连接盒)
位于后部的电缆连接隔室具有优化的连接条件

柜体尺寸/柜体结构
断路器3RV/3VL
电缆连接在后部



Fixed installation

Front-opening wiring

Back-opening wiring

Compartment grade

Compartment design of the feed circuit
The compartment design with each circuit breaker having its own door improves the safety protection during installation and operation.

Each circuit breaker has its own door and compartment.

3VL circuit breaker or plug-in 3VLcircuit breaker

The internal compartment is up to Level 7 of Type 4, BS604389 (Each function unit has a connection box).
The cable connection compartment in the back has optimized connection conditions.

Cabinet size/structure
Circuit breaker 3RV/3VL
Cable is connected at the back.

OFF1	固定安装	前开门接线	分隔等级4a
OFF2	固定安装	前开门接线	分隔等级4a
OFF3	固定安装	后开门接线	分隔等级4b
OFF4	固定安装	前开门接线	分隔等级4b

8PT

Low-voltage switch cabinet



3NJ4条型熔断器开关
3NJ4 bar-type fuse switch

固定安装式技术(OFF): 经济、安全和适应性好

可通断的条型熔断器式隔离开关

条形熔断器式隔离开关，其结构紧凑，并用模块组成。从可达到的装容密度来看，它具有最佳的装入条件。

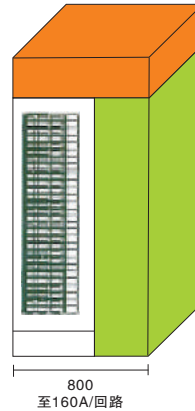
额定电流至630A的电缆馈电回路可带电流表或不带电流表

每柜可装入24版权法馈电回路

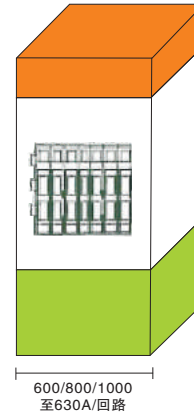
在不带电的情况下更换熔断器

柜体尺寸/柜体结构

3NJ4条型熔断器式隔离开关
电缆连接在右侧



电缆连接在底部



Fixed installation technology (OFF):
Economical, safe, and adaptable

make-break bar-type fuse switch

Compact in structure, the bar-type fuse switch is composed of modules. In terms of the achievable hosting density, it has the best hosting conditions.

Feed circuits with rated current of 630A can be equipped with or without ammeter.

Each cabinet can host 24 bar-type feed circuits

Fuse can be replaced when there is no current in the circuit.

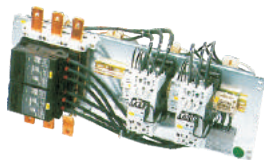
Cabinet size/structure

3NJ4 bar-type fuse switch

Cables are connected on the right side.

Cables are connected at the bottom.

8PT
低压开关柜



100kvar(非扼流型)电容器组
100 kvar (non-choke) capacitor bank



无功功率补偿(PFC):
低成本和高安全

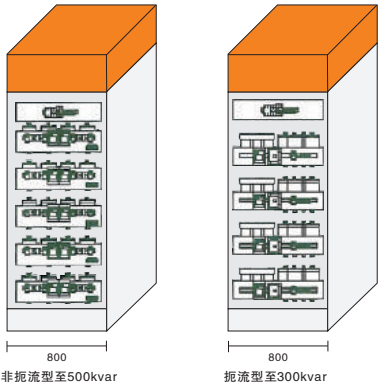
无功功率集中补偿用的控制柜能降低变压器和电缆的负载，减少传输捐赠耗，节约用电费用，根据不同的用电设备组成的结构，控制柜可装配非扼流型或扼流型电容器组件。

在门板上装有电子式无功功率控制器

多功能显示
C/k值自动整定
可调COS值，调节范围从0.8感性至0.98容性
手动/自动运行

电容器组件至100kvar
熔断器式隔离开关
控制电容器的接触器
MKK-电容器
放电装置
滤波电抗器(扼流时选用)

柜体尺寸/柜体结构
无功功率补偿装置



Reactive power compensation (PFC):
Low cost and high safety
The control cabinet used for intensive reaction power compensation can lower the load for the transformer and the cables, reduce the waste/consumption during power transmission, and thereby save power.
Based on the different structures/combination of electric appliances, the control cabinet can be equipped with choke or non-choke capacitor bank.
The door panel is equipped with electronic reactive power controller.
Multi-functional display
Automatic tuning of C/k value
Adjustable COS value, from 0.8 inductive to 0.98 capacitive
Manual/automatic operation
Cabinet size/structure
Reactive power compensation device
Capacitor bank up to 100kvar

Fuse switch
Contactor that controls the capacitor
MKK-capacitor
Discharge device
Filter reactor (for choke type)

8PT

Low-voltage switch cabinet

3NJ6条型插入式技术(OFPD): 快带插接, 永远安全

采用插接技术的电缆分支回路用配电柜, 如与抽出式技术相比较, 它显得更经济。它的结构紧凑, 并通过进线侧的插接触头, 能实现快速改装或在工作条件下进行更换, SIVACON条型结构型式具有更高的经济性, 安全性和灵活性。



采用通过型式试验的标准模块(TTA)提高了安全性
通过进线侧的插接触头可实现快速改装与互换
用于额定电流至630A的条型电缆馈电回路的器件有:

- 装有熔断器的熔断器模块
- 装有单断点熔断器式隔离开关
- 装有双断点熔断器式隔离开关
- 隔离开关

装容密度高, 每柜可装34条馈电回路
在不带电的情况下更换熔断器
插接式母线系统具有接触防护
电缆连接隔室宽为400mm
防护等级至IP40
配电装置不需要整柜断电就能更换馈电回路



柜体尺寸/柜体结构
3NJ6可插接的条型隔离开关侧面连接电缆

3NJ6 bar-type plug-in technology (OFPD):

Fast plug-in connection, lasting safety

The cable branch circuit power distribution cabinet that uses the plug-in technology is more economical than that which uses the draw-out technology. It features a compact structure and, through the plug on the inlet side, allows for fast modification or replacement under working conditions. The SIVACON bar-type structure is highly economical, safe, and flexible.

The standard module (TTA), which has passed type experiment, improves safety.

The plug-in contact on the inlet side facilitates fast modification and exchange.

The bar-type feed circuit with rated current up to 630A has the following components:

- Fuse module mounted with fuse
- Single-break fuse switch
- Double-break fuse switch
- Isolating switch
- High hosting density, with each cabinet capable of hosting 34 feed circuits
- Replacing of fuse when there is no power in the circuit



装有250A熔断器的3NJ6型
隔离开关, 其进线侧具有插接触头
The 3NJ6 isolating switch with 250A
fuse has plug-in contact on the inlet side.

8PT
低压开关柜

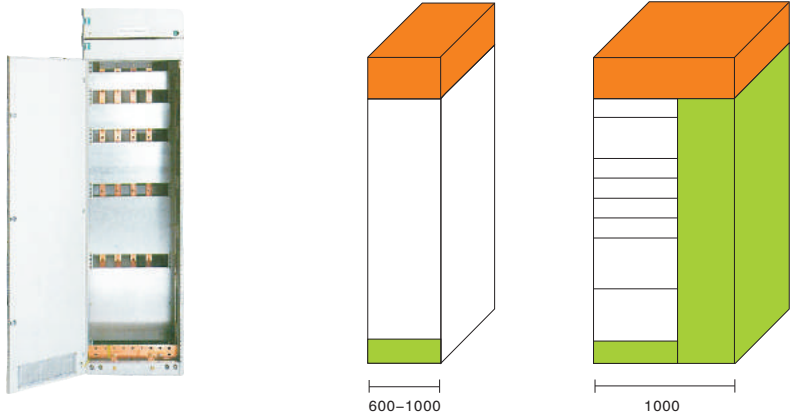
– Plug-in busbar system with contact protection
Cable connection compartment is 400mm wide.
Ingress Protection up to IP40
The power distribution equipment allows for replacing of feed circuits without requiring power cut for the entire cabinet.

Cabinet size/structure
The 3NJ6 plug-in bar-type isolation switch is connected by cables from the side.

用于自由设计的控制柜(CCS):
为机动灵活提供许多空

多种多样的扩展元件可供自由设计的控制和调节柜选用。
控制柜的母线系统可选3极和4极
额定电流至1200A
额定短时耐受电流ICW可至65kA
可带有与柜体等高的门或各隔室均带有独立的小门
柜体隔室化
各种各样的扩展元件

柜体尺寸/柜体结构
额定电流至1200A的用于自由设计的柜



8PT

Low-voltage switch cabinet



Control cabinet (CCS) for free and flexible design:

Flexible and convenient

A wide variety of extended and additional components are available for the free design of control and cabinet.

3-pole and 4-pole busbar systems in the control cabinet

Rated current up to 1200A

Rated short-time withstand current ICW up to 65kA

Doors of equal height to the cabinet or independent small doors for each compartment

Partitioning of the cabinet

A variety of extended components

Cabinet size/structure

Cabinet for free design, with rated current up to 1200A

插入式设计(OFFPM): 可迅速的插接, 永远安全



装有电动机回路及电缆馈电回路的插入式开关柜是抽出式设计的较经济的替代物。通过在进线侧的插头, 使得单元具有快速的可更换性, 并无需开柜整柜断电。

SIVACON插入式设计确保良好的经济性, 可靠性及通有性。

采用通过型式试验的标准模块(TTA)具有较高安全等级

在进线侧具有插接插头, 可快速更换单元

马达回路可至250kW

馈电回路可至630A

有熔断器或非熔断器保护

较高的装容密度(每柜可至22个回路)

插接母线系统具有防电击防护(可选择)

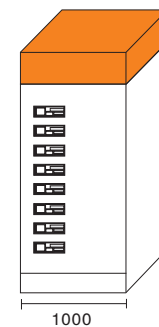
纵向导向确保充分的连接

400mm宽的电缆连接隔室

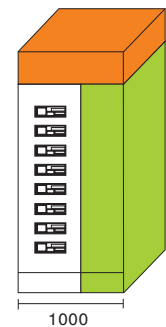
控制面板在门上(可选择)

安装板用于附加的控制器件

更换回路无需开关柜整柜断电



无独立的电缆连接隔室门



带独立的电缆连接隔室门

柜体尺寸/柜体结构

插入式模块可至630A/回路电缆右侧连接

8PT 低压开关柜

Plug-in design (OFFPM):

Fast connection, safety guarantee

The plug-in switch cabinet with motor circuit and feed circuit is a relatively economical substitute for the draw-out design. The plug on the inlet side facilitates fast replaceability of the units without requiring power cut for the entire cabinet.

The SIVACON plug-in design ensures favorable economic benefits, reliability and universality.

The type-experiment-passing standard modules (TTA) ensure a high safety grade.

On the inlet side is the plug, which allows for fast replacing of units.

Motor circuit up to 250kW

Feed circuit up to 630A

With fuse or non-fuse protection

High hosting density (with each cabinet capable of hosting up to 22 circuits)

The plug-in busbar system has protection against electric shock (optional).

Sufficient connection is ensured in the longitudinal direction.

400mm-wide cable connection compartment

Control panel on the door (optional)

Installation board for additional control components

Replacement of circuits does not require power cut for the whole switch cabinet.

Cabinet size/structure

The plug-in modules have a rated current of up to 630A/ cables are connected on the right

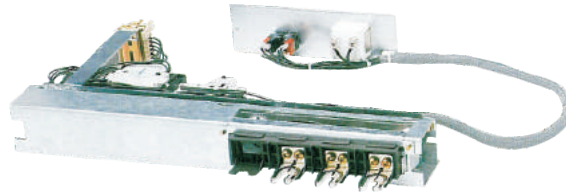


插入式单元模块高75mm, 11kW直接起动无熔断器

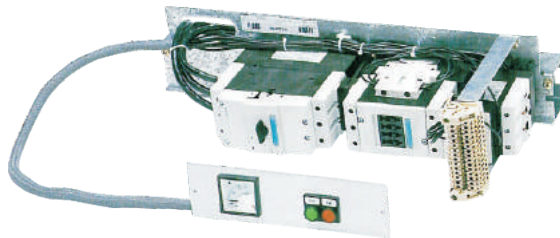
Plug-in units module height: 75 mm; direct startup at 11 kW, without fuse

8PT

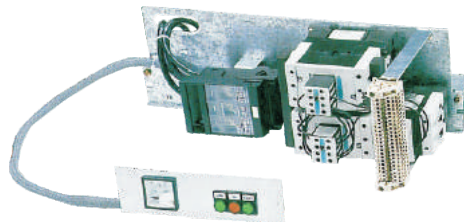
Low-voltage switch cabinet



插入式单元-后视图插接系统
Rear view of the plug-in connection system for plug-in units



插入式单元模块高125mm, 45kW直接启动无熔断器
Plug-in units module height: 125 mm; direct startup at 45 kW, without fuse

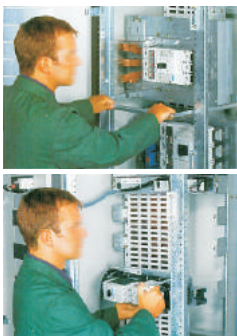


插入式单元模块高175mm, 45kW可逆带熔断器
Plug-in units module height: 175 mm; 45 kW reversible, with fuse

8PT
低压开关柜



电缆连接
Cable connection



插接母线系统
导轨(短或长)在柜体的右侧
Plugboard busbar system
slideway (short or long) is at the right
side of the cabinet body

垂直母线系统

垂直母线系统位于柜体的后部：其具有对带电体的接触防护，无需附加的活门。
具有防电击防护(可选)
3极或4极
接触防护(IP20B)
插接孔以25mm为模数

电缆连接
外部动力电缆直接连接在开关器件上
控制回路在端子上接线
400mm宽的电缆连接隔室

Vertical busbar system

The vertical busbar system is at the back of the cabinet. It has ingress protection and does not require an additional, flexible door for charged objects.
With protection against electric shock (optional)
3-pole or 4-pole
Ingress Protection (IP20B)
25-mm module jacks

Cable connection

The external power cable is directly connected to switch equipment.
The control circuit connects to terminals
400mm-wide cable connection compartment

8PT

Low-voltage switch cabinet



电缆连接在右侧
Cable connected to the right



电缆连接在后部
Cable connected at the back

抽出式设计(OFW): 适用性强，永远安全

装有电动机回路及电缆馈电回路的抽出式开关柜具有最佳的安全性及适用性，提供了较高的操作方便性。

利用导向的抽出式机构，可快速方便的进行更换及调整。因此每一模块能进行诸如增补或变换，即使隔室也可在操作期间进行变换。

SIVACON的抽出式设计提供了较高的适用性。

采用通过型式试验的标准模块具有较高的安全等级

出线回路可至250kW

可带有熔断器或非熔断器保护

试验位置和分离位置的防护等级为IP30

所有的抽出单元具有标准的操作界面

在供电侧及馈电侧具有隔离间隙

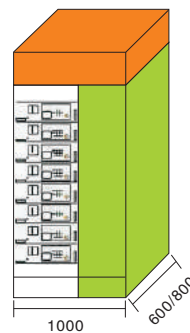
抽出式单元节省空间，最小高度为100mm

电缆连接隔室可在前部或后部

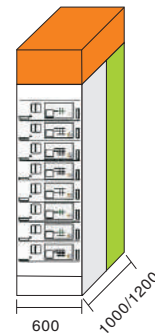
根据变化的条件可方便的进行变换，无需整柜断电

柜体尺寸/柜体结构
抽出式单元可至630A/回路

电缆连接在右侧



电缆连接在后部



Draw-out design (OFW):
Adaptable and safe

The draw-out switch cabinet with motor with motor circuit and feed circuit features the optimal safety and applicability and high operation convenience.

The orienting draw-out mechanism facilitates convenient replacing and adjustment. Each module can be easily added, modified, or replaced. Even the compartments can be changed during operation.

The SIVACON draw-out design offers favorable applicability.

8PT
低压开关柜

- The type-experiment-passing standard modules (TTA) ensure a high safety grade.
 - Outlet circuit up to 250kW
 - Can be equipped with fuse or non-fuse protection
 - IP at the experimental position and separation position is up to IP30
 - All draw-out units have a standard operation interface
 - Isolation clearance at the power supply side and the feeder side
 - The draw-out units is economical in space, with the min height of 100mm.
 - Cable connection compartment can be at the front or at the back.
 - Replacement is easy and convenient according to changing conditions, without requiring powercut for the entire cabinet.
- Cabinet size/structure
- Draw-out units up to 630A/circuit

SIVACON抽出式单元提供了操作使用的安全性

- 以8种模数高度的标准化设计
- (100、150、200、300、400、500、600、700mm)
- 抽出单元的位置清晰可见
- 所有的单元具有误操作防护
- 控制插头可到40针及可附加通讯总线插头(可选)
- 抽出式单元的铰链式前板可方便的用于单元调整(模数≥200mm)
- 抽出式单元大于250A时具有省力机构可方便插入
- 在后部有足够的空间用于安装辅助器件
- 分离位置可锁定使得在负载侧可安全操作



当主开关在“合”位置时，具有误操作的防护，可防止抽出式单元的移动

When the main switch is at "On" position, it prevents error operation and the movement of draw-out units.

8PT

Low-voltage switch cabinet

SIVACON draw-out units ensure safety during operation

Highly standardized design using 8 modules

(100、150、200、300、400、500、600、700mm)

Clear position of the draw-out unit

Prevention of error operation for all units

Up to 40-pin control plug and additional communication bus plug (optional)

The hinge front plate of the draw-out units facilitates unit adjustment (module ≥ 200 mm)

When the draw-out units have a current over 250A, an effort-saving mechanism is provided to facilitate plugging in.

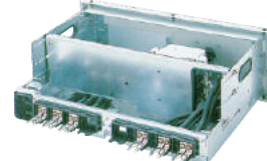
Sufficient space is provided in the back for installing supplementary devices.

The separation position can be locked to ensure safe operation at the load side.



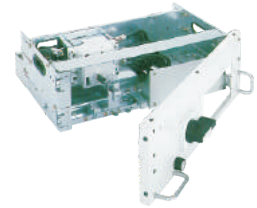
抽出式单元模数高度100mm,
11kW直接启动

Draw-out units module height:
100 mm; direct startup at 11 kW



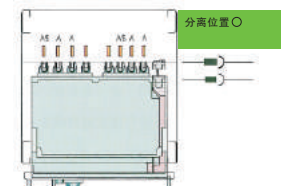
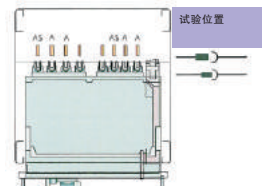
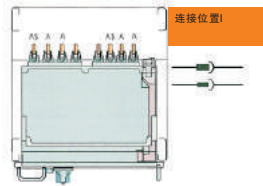
模数高度200mm的抽出式单元的后视图,
具有更多地安装器件的可能性

Rear view of the draw-out units with
module height of 200 mm, which brings
more options for device installation

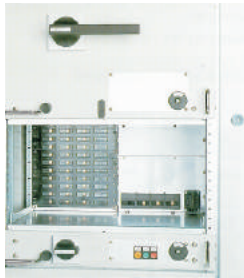


抽出式单元的铰链式前板

Hinge front plate of draw-out
units



8PT 低压开关柜



插接式母线带有安全防护
Plugboard busbar with a safeguard

根据变化的要求可进行灵活可靠的调整

无需整柜断电就可进单元隔室的简单变换
在单元隔室内无需任何接线工作
动力及控制电缆可分别在电缆连接隔室连接
电缆连接隔室可选400mm宽(前部)或600mm宽(后部)

垂直母线系统

垂直母线系统位于柜体的后部。它具有安全接触防护，
无需附加防护带电体的活门。

带有电击防护
3极或4极
安全防护(IP20B)
25mm模数的插孔

Can be adjusted flexibly and reliably according to changing requirements.

Simple and convenient replacing of units in the unit compartments without requiring power cut in the entire cabinet.

No connection is required in the unit compartments.

Power cables and control cables can be connected respectively in the cable connection compartment.

The cable connection compartment can be 400mm wide (in the front) or 600 mm wide (in the back).

Vertical busbar system

The vertical busbar system is at the back of the cabinet. It has ingress protection and does not require an additional, flexible door for charged objects.

With protection against electric shock

3-pole or 4-pole

Ingress Protection (IP20B)

25-mm module jacks



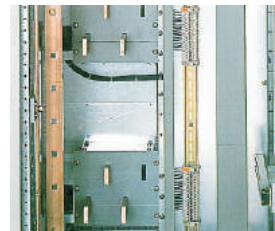
移动抽出式单元至分离位置
Move the draw-out units to the separation position



快速更换抽出式单元
Fast replacement of draw-out units



位于正面的电缆连接隔室
Cable connection compartment in the front



位于后面的电缆连接隔室
Cable connection compartment in the back

通过型式试验的成套开关设备(TTA): 用盖有印章的证书证明安全性

SIVACON是通过型式试验的成套开关设备(TTA)，在试验站中对它在运行情况和故障情况下的物理性能进行了试验验证。通过型式试验，这意味着在运行可靠性和人身安全性两方面具有最高的保障。

SIVACON已经根据IEC60439-1、DIN EN60439-1(VDE0660第500部分)进行了下述验证：

型式试验

通过试验验证温升

通过试验验证绝缘强度

通过试验验证短路强度

通过检查或电阻测量，验证成套开关设备的机壳和保护导线之间的接地连续性

通过试验验证保护导体的短路强度

机械动作的验证

IP—防护等级的验证

每台SIVACON开关设备在出厂之前都进行出厂试验：

外观检查开关电器组合装置，包括接线，必要时也进行电气动作试验

绝缘试验

检查保护措施并外观检查直通的保护导线的连接

这些安全要求是通SIVACON内部的一系列具体措施来实现的，举例来说：

在采用抽出式断路器时，通过精密设计加工的机械导轨和联锁机构来防止误操作

应用少量的高级优质绝缘材料(例如用母线支撑架、增强刚性的横梁等)

应用可靠的西门子开关电器，减少故障提前出现的危险

通过3W断路器上的ZSS(缩短时间的选择性控制装置)，即使延时时间相当长，也能在70至100ms范围内可靠地分断

数据处理辅助设计保证了电气设备选用与到位的万无一失

严格执行DIN EN ISO 9001规定的质量管理

Complete set switch equipment that passes the type experiment (TTA):

The stamped certificate testifies its safety.

SIVACON is a complete set switch equipment that passes the type experiment (TTA); Its physical performance during operation and malfunction is tested and verified in the type experiment. The successful passing of type experiment means that the product provides the highest guarantee for operation reliability and human body safety.

SIVACON has been tested according to IEC60439-1 and DIN EN60439-1 (article 500 of VDE0660)

8PT
低压开关柜

as follows:

Type experiment

Verify temperature rise through experiment

Verify insulation strength through experiment

Verify short circuit withstand through experiment

Check or measure resistance to verify the ground continuity between the shell of complete set switch equipment and protection wires.

Verify the short circuit withstand of the protection conductors through experiment

Verify mechanical action

Verify IP -- Ingress Protection

Out-of-factory experiments are done before each SIVACON switch equipment goes out of factory:

Appearance check: combination device of switch equipment, including connection; when necessary, do electric action experiments

Insulation experiment

Check protective measures and visually check the direct connection of protection wires

All these safety requirements are met by a series of specific internal measures of SIVACON. For instance:

Where draw-out circuit breakers are used, mechanical rail and interlock mechanism of high-precision design and processing are applied to prevent error operation.

A small amount of high-class super-quality insulation material is used (, for example, for busbar support bracket and the beam for increasing rigidity.)

Reliable Siemens switch equipment is used to reduce the risk and danger of premature errors and malfunctions.

ZSS (time-shortening selective control device) on the 3W circuit breaker ensures reliable isolation within 70–100ms even if the delay is very long.

Data processing assisted design ensures reliable and trustworthy selection and operation of electric equipment.

Strictly abiding by the quality management of DIN EN ISO 9001

技术数据一览表

标准和规范	通过型式试验的低压成套开关设备(TTA)内部故障条件的电弧试验	IEC60439-1,DINEN60439-1(VDE0660第500部分)IEC61640, VDE0660第500部分
空气间隙与爬电距离	额定冲击耐受电压(Uimp)	8kV
	过电压类型	III
	污染等级	3
额定绝缘电压(Ui)		1000V
额定工作电压(Ue)		至690V

8PT

Low-voltage switch cabinet

标准和规范	通过型式试验的低压成套开关设备(TTA)内部故障条件的电弧试验	IEC60439-1,DINEN60439-1(VDE0660第500部分)IEC61640, VDE0660第500部分	
额定电流(In) 水平母线(3极和4极)	主母线	额定电流	至 7400A
		额定峰值耐受电流(Ipk)	至 375kA
		额定短时耐受电流(Icw)	至 150kA,1s
			至 120kA,3s
	用于断路器技术的垂直母线	额定电流	至 6300A
		额定峰值耐受电流(Ipk)	至 250 kA
		额定短时耐受电流(Icw)	至 100kA,1s
			至 80kA,3s
	用于固定安装式设计的垂直母线	额定电流	至 1400A
		额定峰值耐受电流(Ipk)	至 163kA
		额定短时耐受电流(Icw)	至 65kA* ,1s
			至 50kA,3s
	用于条型技术(插接式)的垂直母线(3NJ6)	额定电流	至 2100A
		额定峰值耐受电流(Ipk)	至 110kA
		额定短时耐受电流(Icw)	至 50kA* ,1s
	用于插入式设计及抽出式设计的垂直母线	额定电流	至 1200A
		额定峰值耐受电流(Ipk)	至 163kA
		额定短时耐受电流(Icw)	至 65kA
			至 50kA,3s
电器—额定电流		断路器	至 6300A
		电缆馈电回路	至 630A
柜的内部分隔	形式1至形式4	IEC60439-1,7.7节,DINEN60439-1	
表面处理	骨架部件	镀锌/粉末喷涂/喷漆	
	外壳	镀锌/粉末喷涂/喷漆	
	门	粉末喷涂/喷漆	
防护等级	符合IEC60529,EN60529	IP30至IP54	
外形尺寸		高：2200,2600mm(包括屏顶单元)	
		宽：600,800,1000,1200mm	
		深：600,800,1000,1200mm	

*额定限制短路电流Icc可至100kA

ZBW

系列组合变电站



适用范围 Scope of application:

ZBW 系列组合式变电站，俗称欧式箱变，是将高压电器设备、变压器、低压电器设备等组合成紧凑型成套配电装置，用于城市高层建筑、城乡建筑、居民小区、高新技术开发区、中小型工厂、矿山油田以及临时施工用电等场所，作配电系统中接受和分配电能之用。

ZBW 系列组合式变电站，具有成套性强、体积小、结构紧凑、运行安全可靠、维护方便、以及可移动等特点，与常规土建式变电站相比，同容量的组合式变电站占地面积通常仅为常规变电站的 1/10~1/5，大大减少了设计工作量及施工量，减少了建设费用。在配电系列中，可用于环网配电系统，也可用于双电源或放射终端配电系统，是目前城乡变电站建设和改造的新型成套设备。

ZBW 系列组合式变电站符合 SD320-1992《箱式变电站技术条件》和 GB/T17467-1997《高压 / 低压预装式变电站》的标准。

ZBW series combined transformer substation, commonly named as European box-type transformer, is a kind of compact power distribution device that integrates high voltage electrical devices, transformer, low voltage electrical devices together. It can be used in high-rise buildings, buildings in urban and rural areas, residential communities, high-tech development areas, small & medium size factories, mining areas, oil fields, temporary construction sites, and other premises, and can also be used for acceptance and distribution of power in power distribution system.

ZBW series combined transformer substation is characterized with features including high integrity, small size, compact structure, safe and reliable operation, convenient maintenance, portable, etc. Compared to conventional transformer requiring civil work, the combined transformer with same capacity needs only one-tenth to one-fifth of the floor area for conventional transformer so that the design work, construction work and construction expense is reduced significantly. It also can be used in ring net power distribution system and double power supply or terminal power distribution system. This new complete set of product is an ideal choice for construction and modification of transformer in urban and rural areas.

ZBW series combined transformer substation complies with standards of SD320-1992 "Technical specifications for box-type transformer" and GB/T17467-1997 "High voltage/low voltage prefabricated substations" .

工作条件 Operating conditions

海拔高度不超过1000m；

环境温度最高不超过+40℃，最低不低于-25℃，24小时周期内平均温度不超过+35℃。

户外风速不超过35m/s；

空气相结温度不超过90% (+25℃) ；

地震水平加速度不大于0.4m/s²，垂直加速度不大于0.2m/s²；

无火灾、爆炸危险、严重污秽、化学腐蚀及剧烈震动的场所。

特殊使用条件，订货时与我公司协商解决。

Attitude above sea level: no more than 1,000 m

Ambient temperature: highest temperature +40℃, lowest temperature -25℃, average temperature in 24 hours no more than +35℃

ZBW

Series combined transformer substation

Outdoor wind speed no more than 35m/s
Air relative humidity no more than 90% (+25℃)
Shock resistance: horizontal acceleration no more than 0.4m/s², vertical acceleration no more than 0.2m/s²
Installation conditions: no risk of fire and explosion, free of serious contamination, chemical corrosion and severe vibration and shock
For special operating conditions, please inform the Company in ordering and solve it through negotiation.

型号及其含义 Description and model of product



主要技术参数 External dimensions of product

表 1

序号	项目	单位	高压电器	变压器	低压电器
1	额定电压 Ue	kV	7.2、12	6/0.4、10/0.4	0.4
2	额定容量 Se	kVA		目型：200~1250	
3	额定电流 Le	kA	200~630		100~3000
4	额定开断电流	A kA	负荷开关 400~630A 组合电器取决于熔断器		15~63
5	额定短时 耐受电流	kA	20 (2S) 12.5 (4S)	200~400kVA 400kVA	15 (1S) 30 (1S)
6	额定峰值 耐受电流	kA	31.5、50	200~400kVA 400kVA	30 63
7	额定关合电流	kA	31.5、50		
8	工频耐受 电压 1min	kV	相对地及相间 42、30 隔离断口 48、34	油变：35/5min 干变：28/5 min	≤ 300V 时 2kV 300，660V 时 2.5kV
9	雷电冲击	kV	相对地及相间 75.60 隔离断口 85、75	75	
10	噪声水平	dB		油变：< 55 干变：< 65	
11	防护等级		IP33	IP23	IP33
12	外形尺寸		根据所选变压器容量和形式，选定不同的外形尺寸。		

产品结构特点 Structural features of product

1、本产品由高压配电装置、变压器及低压配电装置联接而成，分成三个功能隔室，即高压室、变压器室和低压室。高、低压室功能齐全，高压侧一次供电系统，可布置成环网供电、终端供电、双电源供电等多种供电方式，还可装设高压计量装置，满足高压计量的要求。变压器室可选择 S9、S11 系列低损耗油浸式变压器和 SC (B) 9、SCR9、SC (B) 10、SCR10 系列干式变压器；变压器室设有自启动强迫风冷系统及照明系统，低压室根据用户要求可采用面板或柜装式结构组成用户所需供电方案，有动力配电、照明配电、无功功率补偿、电能计量和电量测量等多种功能，满足用户的不同要求，并方便用户的供电管理和提高供电质量。

2、高压室结构紧凑合理、并具有全面防误操作的“五防”联锁功能。变压器在用户有要求时，可设有轨道能方便地从变压器室两侧大门进出。各室均有自动照明装置，另外高、低压室所选用全部元件性能可靠、操作方便、使产品运行安全可靠、操作维护方便。

3、采用自然通风和强迫通风两种方式、使通风冷却良好。变压器室和低压室均有通风道，排风扇有温控装置，按整定温度能自动启动和关闭，保证变压器满负荷运行。

4、箱体结构能防止雨水和污物进入采用特种钢板或铝合金板制作，经防腐处理，具备长期户外使用的条件。确保防腐、防水、防尘性能，使用寿命长，同时外形美观。

This product consists of high voltage power distribution device, transformer and low voltage power distribution device. It is divided into three function compartments, high voltage compartment, transformer compartment and low voltage compartment. Both high voltage and low voltage compartments are provided with all functions, the primary power supply system on high voltage side can be configured in various power supply methods, such as ring net power supply, terminal power supply, power supply with double supply. High voltage metering instrument can also be installed on high voltage side to satisfy the requirements for high voltage measurement. For transformer compartment, S9, S11 series low loss oil immersed transformer, and SC (B) 9、SCR9、SC (B) 10、SCR10 series dry transformer are available, and the transformer compartment is equipped with self-start forced air cooling system and lighting system. The low voltage compartment can be equipped with panel or cabinet type structure based on customer's requirements, and has various functions including distribution for drive power, power distribution for lighting, compensation of reactive power, metering of electricity energy, and measurement of electricity consumption to meet various demands of customers and provide customers with convenient management and high quality in terms of power supply.

High voltage compartment is designed with compact structure and interlock function of “Five preventions” to completely protect from mis-operation. Upon customer's request, the transformer can be equipped with guide rail for convenient access through the gates on both sides of the transformer. All compartments are provided with auto lighting system, furthermore, both high voltage and low voltage compartments are made of reliable and easy to operate elements so that the product can be operated safely and stably, maintained conveniently.

The product has good cooling and ventilation effect due to application of both natural ventilation and forced ventilation. Both transformer compartment and low voltage compartment are equipped with ventilation ducts, the exhaust fan is provided with temperature regulating device and can start or stop automatically according to the preset temperature to ensure the transformer to be operated under full load.

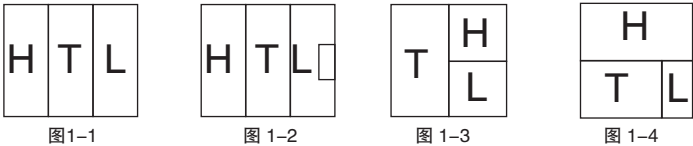
The box structure is designed with special steel sheet or aluminum alloy sheet to prevent entry of rain water and dirty. The box is treated with anti-corrosion measures and is suitable for outdoor use for long time. The box is provided with features including resistance to corrosion, water proof, dust proof, long useful life and good external appearance.

ZBW

Series combined transformer
substation

平面布置形式及外形尺寸 Plane layout and external dimensions

- 1、ZBW 系列箱式变电站，根据排列方式分：
“目”字型排列（图 1-1、图 1-2）；
“品”字型排列（图 1-3、图 1-4）；
- ZBW series box-type transformer substation, based on its configuration, can be classified as follows
“B” type configuration (see figure 1-1 and figure 1-2)
“D” elta configuration (see figure 1-3 and figure 1-4)



图为 ZBW 系列箱式变电站平面布置形式图 H- 高压室 T- 变压器室 L- 低压室
Configuration diagram of ZBW series box-type transformer substation is shown in the figure.
H -high voltage compartment, T -transformer compartment, L -low voltage compartment

- 2、外形尺寸见图 2、图 3、表 2 For external dimensions see figure 2, 3 and table 2

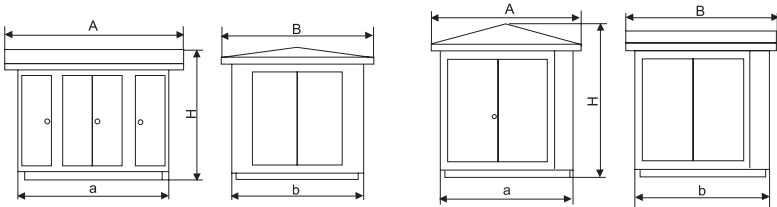


图 2 ZBW 系列箱式变电站外形图（“目”字型排列）
Figure 2: External drawing of ZBW series box-type transformer substation (“B” type configuration)

图 3 ZBW 系列箱式变电站外形图（“品”字型排列）
Figure 3: External drawing of ZBW series box-type transformer substation (“Delta” configuration)

类别			A	a	B	b	H	最佳适用场所
三相	目字型	100–630kVA	4140	3750	2590	2290	2320	工矿、油田、建筑施工等
		800–1250kVA	5184	4880	2500	2290	2626	
	品字型	50–400kVA	2500	2300	2400	2200	2320	生活小区
单相	目字型	≤ 50kVA	2500	2300	1260	1060	2215	路灯供电
		80–100kVA	2500	2300	1840	1640	2215	

注：以上外形尺寸仅供设计时参考，订货时以实物尺寸为准。
Note: The above mentioned external dimensions are for reference only, and the order should be performed based on real size.

ZBW

系列组合变电站

订货须知Notes to order

订货时请提供以下资料：
箱式变电站型式；
变压器型号和容量；
高、低压回路主接线方案图；
有特殊要求的电气元件型号和参数；
外壳颜色；
备品、备件的名称、数量以及其它要求。

The following information shall be provided for order:
Type of box-type transformer substation
Model and capacity of transformer
Connecting diagram of high and low voltage circuits
Models and parameters of electrical elements with
special requirements Color of housing
Description, quantity and other requirements for spare
parts and elements

10KV

Assembled type Voltage Transformer

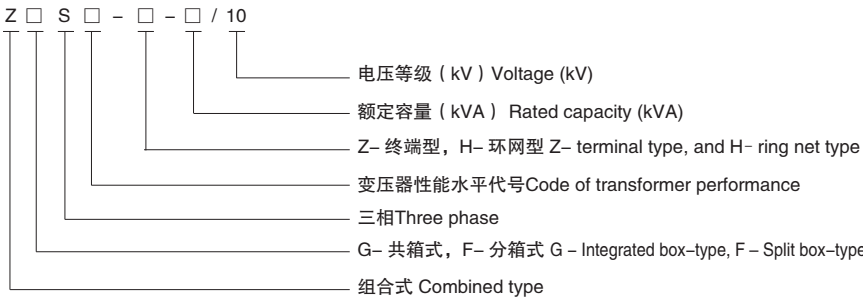


产品概述 Introduction of product

组合变压器，俗称美式箱变，具有供电可靠、结构合理、安装迅速、灵活、操作方便、体积小等卓越性能，广泛用于工业园区、居民小区、商业中心、城市道路以及高层建筑等各种场所。该类产品与目前国内生产的欧式箱变不同在于：美式箱变是将变压器铁心、高压负荷开关、保护用熔断等设备一体化设计、放置于同一油箱中，因而体积较小。

Combined transformer, commonly named as American box-type transformer, has outstanding features including reliable power supply, compact structure, fast and flexible installation, convenient operation, small size, etc. It can be widely used in industrial areas, residential communities, commercial centers, urban roads, high-rise buildings and other premises. The difference between this kind of product and European box-type transformer domestically manufactured is: American box-type transformer is designed with integration of transformer core, high-voltage load switch, protective fuse and other devices, and placed in an oil tank for relatively comparably smaller size.

产品型号及含义 Description and model of product



使用环境

环境温度：最高气温 +40℃，最低气温 -30℃
 海拔：≤ 1000m
 风速：相当 34m/s (不大于 700Pa)
 湿度：日相对湿度平均值不大于 95%
 月相对湿度平均值不大于 95%
 防震：水平加速不大于 0.4m/s²，垂直加速度不大于 0.15m/s²
 安装地点倾斜度：不大于 3°
 安装环境：无爆炸性、腐蚀性气体，安装场所无剧烈震动冲击
 订购本产品超出上述条件的规定时，可与本公司协商。

Operating conditions

Ambient temperature: Highest temperature: +40℃, lowest temperature: -30℃
 Altitude above sea level: no more than 1,000 m
 Wind speed: 34 m/s (no more than 700Pa)
 Humidity: daily average of relative humidity no more than 95%
 Monthly average of relative humidity no more than 95%
 Shock resistance: horizontal acceleration no more than 0.4m/s², vertical acceleration no more than 0.15m/s²
 Slope of installation site: no more than 3°
 Installation conditions: free of explosive and corrosive gas, no severe vibration and shock
 When the product is ordered for operating conditions out of the scope specified above, please inform the Company in advance.

10kV

级组合式变压器 (美式箱变)

产品特点 Features of product

体积小，结构紧凑，仅为同容量欧式箱变的三分之一左右。
全密封，全绝缘结构，无需绝缘距离，可确保人身安全。
既可用于环网，又可用于终端，转换十分方便，提高了供电的可靠性。
变压器性能卓越：低损耗、低噪音、低温升、过载能力强、抗短路、耐冲击能力强。
电缆接头可操作200A负荷电流，在紧急情况下可作为负荷开关操作，并具有隔离开关的特点。
采用双熔丝保护，降低了运行成本，插入式熔断器熔丝为双敏熔丝（温度、电流）。
选用高燃点油（R-TEMP油，燃点高达312℃），可置于建筑内消除火灾隐患。
采用Dyn11接法及三相五柱式结构，优点是电压质量高，中性点不飘移、噪音低、防雷性好。

Small size, compact structure, only one third of the size of European box-type transformer with same capacity
The product is fully enclosed and equipped with complete insulation structure without requiring insulation clearance to ensure personal safety.
It is suitable for both ring net and terminal and can be changed conveniently for an enhanced reliability of power supply.
Outstanding performances of transformer: low noise, low loss, low temperature rise, strong overload capacity, and resistance to short circuit and impact.
The cable connector can be operated at load current of 200A and operated as load switch under emergency circumstances. It also has features similar to isolating switch.
Adopt double fuse protection to reduce operating cost, and the plug fuse is fuse of double sensitivity (temperature and current).
Due to use of oil with high ignition point (R-TEMP oil, the ignition point is up to 312℃), it can be used in buildings and eliminate risk of fire.
Adopt Dyn11 connection and three-phases five-poles structure with advantages such as high quality of voltage, no displacement of neutral point, low noise and good lightning protection.

主要技术参数 External dimensions of product

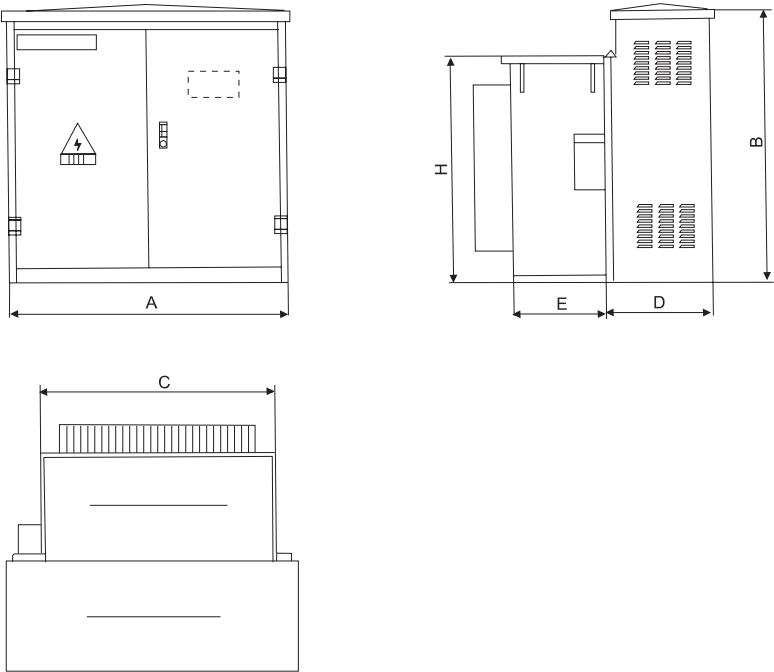
序号	项目		单位	技术参数
1	额定电压	一次侧	kV	6~10
		二次侧	kV	0.4
2	额定工作电压		kV	12
3	额定频率		Hz	50
4	额定容量		kVA	100~1250
5	1 分钟工频耐受电压		kV	35
6	雷电冲击耐受电压		kV	95
7	2 秒短时耐受电流		kV	12
8	高压后备限流熔断器遮断容量		kV	50
9	无载调压			(6~10) ± 2 × 2.5%
10	环境温度		℃	-20~+40
11	允许温升		K	55

10KV

Assembled type Voltage Transformer

产品外形尺寸 External dimensions of product

1、标准型外形尺寸图 1、 External dimensions of standard product

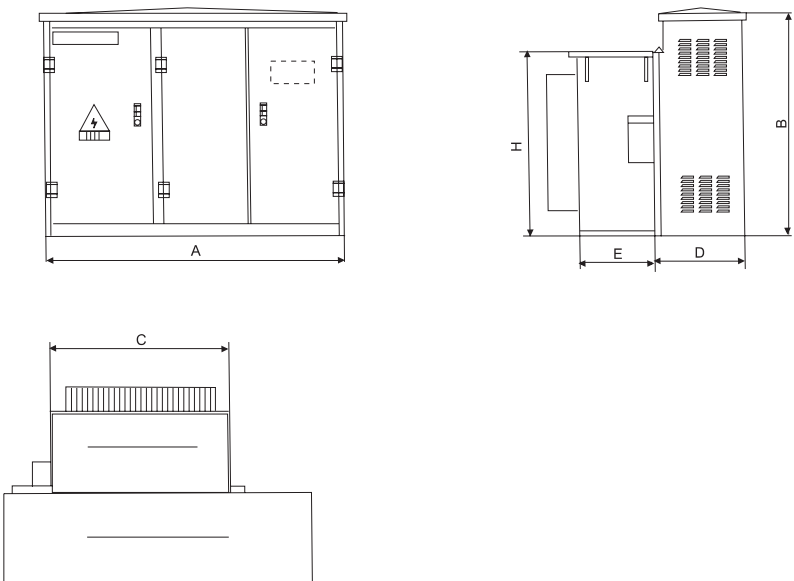


标准型外形尺寸					
容量 KVA	100-250	315-400	500-630	800-1000	1250
A	1840	1840	1840	2000	2200
B	1780	1780	1780	1780	1780
C	1250	1450	1550	1700	2000
D	800	800	800	800	800
E	555	555	625	725	855
H	1400	1500	1500	1500	1550

10kV

级组合式变压器 (美式箱变)

加强型外形尺寸 External dimensions of enforced product



标准型外形尺寸					
容量 kVA	100-250	315-400	500-630	800-1000	1250
A	2200/2400	2200/2400	2200/2400	2200/2400	2200/2400
B	1820	1820	1820	1820	1820
C	1250	1450	1550	1700	2000
D	800	800	800	800	800
E	555	555	625	725	855
H	1400	1500	1500	1500	1550

注：以上外形尺寸仅供设计时参考，订货时以实物尺寸为准。
Note: The above external dimensions are for reference only and the order should be performed based on the real size.

GCS

Type low-voltage switchboards of the draw-out version



概 述

GCS型低压抽出式开关柜（以下简称装置）是两部联合设计组根据行业主管部门、广大电力用户及设计单位的要求设计研制出的符合国情、具有较高技术性能指标、能够适应电力市场发展需要并可与现有引进产品竞争的低压抽出式开关柜。该装置目前已被电力用户广泛选用。

装置适用于发电厂、石油、化工、冶金、纺织、高层建筑等行业的配电系统。在大型发电厂、石化系统等自动化程度高，要求与计算机接口的场所，作为三相交流频率为 50(60)Hz、额定工作电压为 380V(400)、(660)，额定电流为 4000A 及以下的发、供电系统中的配电、电动机集中控制、无功功率补偿使用的低压成套配电装置。装置的基本组织形式见附图 1。

装置的设计符合下列标准

IEC439-1《低压成套开关和控制设备》

GB7251《低压成套开关设备》

JB/T9661《低压抽出式成套开关设备》

Brief Introduction

GCS Type low-voltage switchboards of the draw-out version (abbreviated as device in the following parts) is studied and produced by two joint designing groups according to the requirements of the professional administration, the common electricity users, and the designing unit. It meets the conditions of our country, has high technical performance index, can apply to the developing need of the electricity market and can compete with the currently introduced products. This device is now widely used by the electricity users. This device applies to the electricity distribution system for the professions of power plants, oil, and chemical industry, metallurgy, textile and high-rise construction etc. In the places such as huge power plants, petrochemical industry system etc. which are highly automatic and should be interfaced to computers, it functions as the electricity distribution, the collective control of the motor and the low-voltage complete set of electricity distribution device, which is used for reactive-load compensation, in the electricity generation and supply systems whose triphase AC frequency is 50(60)Hz, whose rated working voltage is 380V(400),(600) and whose rated current is less equal to 4000A. The basic organizing pattern of the device is showed in the attached picture. The design of the device meets the following criteria. IEC439-1 low-voltage complete set of switch and controlling equipment

GB7251《low-voltage complete set of switch equipment》

JB/T9661《low-voltage draw-out complete set of switch equipment》

使用条件

2.1 周围空气温度不高于 +40 ℃，不低于 -5 ℃。2.4 小时内平均温度不得高于 +35 ℃。超过时，需根据实际情况降容运行。

2.2 户内使用，使用地点的海拔高度不得超过 2000m。

2.3 周围空气相对湿度在最高温度为 +40 ℃时不超过 50%，在低温时允许有较大的相对湿度：如 +20 ℃时为 90%，应考虑到由于温度的变化可能会偶然产生凝露的影响。

2.4 装置安装时与垂直面的倾斜度不超过 5°，且整组柜列相对平整（符合 GBJ232-82 标准）。

2.5 装置应安装在无剧烈震动和冲击以及不足以使电器元件受到不应有腐蚀的场所。

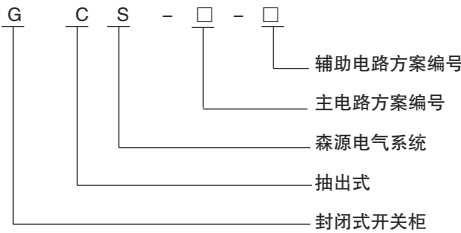
2.6 用户有特殊要求时，可以与制造厂协商解决。

GCS
型低压抽出式开关柜

Using conditions

- 2.1 The surrounding temperature must be less equal to +40℃ and over equal to -5℃ . The average temperature within 24hours must be less equal to +35℃ . If so, capacity should be dropped according to the practical situations.
- 2.2 Used indoors. The altitude of the using location should be less equal to 2000m.
- 2.3 When the highest temperature is40℃, the relative humidity of the temperature of the surrounding air must be less equal to 50%。 At the lowest temperature, a higher relative humidity is allowed: for example, 90% when it is + 20℃ . The influence of the occasional appearance of the moist because of the variety of the temperature should be taken into consideration.
- 2.4 The verticality of the installing device should be less equal to 5° and the whole group of boards should be relatively level.(meet the GBJ232-82 criteria)
- 2.5 The device should be installed in places without strenuous vibration and thrashing and not enough to corrode the electric components.
- 2.6 If the users have special requirements, they can contact the producer and solve them together.

产品型号及含义



主要技术参数 Main Technical Parameters

4.1 基本技术参数见表
the basic technical parameters are showed in table 表 table1

主电路额定电压（V）		交流 380(400)、(660)
辅助电路额定电压（V）		交流 220、380(400) 直流 10、220
额定频率（Hz）		50(60)
额定绝缘电压（V）		660(1000)
额定电流（A）	水平接线	≤ 4000
	垂直母线 (MCC)	1000

GCS

Type low-voltage switchboards of the draw-out version

表 table2

母线额定短时耐受电流 (kA/1s)		50, 80
母线额定峰值耐受电流 (kA/0.1s)		105, 176
工频试验电压 (V/1min)	主电路	2500
	辅助电路	1760
母线	三相四线制	A. B. C. PEN
	三相五线制	A. B. C. PE.N
防护等级		IP3L0. IP4L0

4.2主电路方案

装置主电路方案共 32 组 118 个规格，不包括由于辅助电路的控制与保护的变化而派生的方案和规格。包括了发电、供用电和其它电力用户的需要，额定工作电流 4000A，适合 2500kVA 及以下的配电变压器选用。

此外，为适应供用电提高功率因数的需要而设计了电容器补偿柜；考虑综合投资的需要而设计了电抗器柜。

4.2The Main Circuit Scheme

There are altogether 32 groups and 118 specifications of schemes for installing main circuit, not including the schemes and specifications derived from the change of the controlling and the protection of the auxiliary circuit. And it includes the need of the electricity generation and supply as well as that of other electricity users. Its rated working current is 4000A, which applies to the electricity distribution transformer which is less equal to 2500kVA.

In addition, the electric capacitor compensation board is designed for the need of raising the frequency factor of the using electricity. The reactance board is designed allowing for the need for comprehensive investment.

备注：

- DW914是主选断路器，也可选用其它性能更先进或RDSW6(RDW1)、F、M系列断路器。
- 01、02、04方案如PE+N线需进入电源柜时柜宽用括号内尺寸。
- SDL、SDH是GCS柜专用电源互感器。

Noting:

- DW914 is the mainly chosen circuit breaker. Other circuit breakers with more advanced performance or the RDSW6(RDW1).F.M series can also be chosen.
- 01,02,04 scheme: if the PE+N line needs to enter the source board, the width of the board should use the size put in the brackets.
- SDL, SDH are the special source transformers of GCS Board.

4.3 辅助电路方案

GCS辅助电路图册共有辅助电路方案120个，分上下两册。上册《交流操作部分》共分63个方案，下册《直流操作部分》共有 57 个方案。

直流操作部分的辅助电路方案，主要用于发电厂变电站的低压厂（所）用系统。适用于 200MW 及以下和 300MW 及以上容量机组低压厂用系统，工作（备用）电源进线，电源馈线和电动机馈线的一般控制方式。

交流操作部分的辅助方案主要用于厂矿企业及高层建筑的变电所的低压系统。有 6 种适用于双电源操作控制的组合方案。并设有操作电气连锁备用自投、自复等控制电路，工程设计中可以直接采用。

直流控制电源为直流 220V 或 110V，交流控制电源为交流 380V 或 220V，由抽屉单元组成的成套柜。220V 控制电源引自本柜内专设控制变压器供电的公用控制电源，公用控制电源采用不接地方式控制变压器，留有 24V 电源供需要使用弱电信号灯时采用。电度表的安装地点和电压的引入方法及其它安装使用要求详见辅助电路图的《编制说明》。

4.4 母线（主母线的组合形式见 52 页附图 4、59 页附图 15）为提高母线动热稳定能力和改善接触面的温升，装置全部采用 TMY-T2 系列硬铜排，铜排的连接部分必须搪锡，推荐采用全长搪锡，也可选用全长镀银铜母线。

a. 水平母线

水平母线于柜后部母线隔室内，3150A 及以上为上下双层布置，2 500A 及以下为单层布置，每相由 4 条或 2 条母排组成，大大提高了母线的短路强度。

装置水平母铜排选用见表 3。表 table3

额定电流 A	铜排规范
630 1250	2 (50×5)
1600	2 (60×6)
2000	2 (60×10)
2500	2 (80×10)
3150	2×2 (60×6)
4000	2×2 (60×10)

b. 垂直母线

用于抽屉柜的垂直线采用“L”形硬铜搪锡母线。L 形母线规格(mm): (高 × 厚) + (底 × 厚)(50× 5)+(30×5)额定电流100A

c.中性接地母线

采用硬铜排。贯通水平中性接地线（PEN）或接地+中性线（PE+N）规格见表 4。

表 table4

相导线截面各 mm ²	选用 PE（N）线截面 mm ²
500-720	40×5
1200	60×6
>1200	60×10

* 装置内垂直 PEN 线或 PE+N 线的规格全部选用 40×5

4.5 电器元件选择

装置主要选用技术性能指标先进，采用引进技术国内已能批量生产的电器元件。

a. 主开关

630A 及以上的电源进线及馈线开关，主选 DW914 系列，也可以用 RDSW6(RDW1)、DW40、DW48 系列、AE 系列、3 WE 或 RDW17 系列，认为有必要时，也可选用进口的 M 系列或 F 系列。

b. 630A 以下的馈线和电动机控制用开关，主要选用 RDM949 系列、RDM1 系列、塑壳开关也可以选用 NZM 系列、TM30 系列塑壳断路器。

c. 交流接触器，主要选用 CJX8 系列、CJX2(RDC6) 系列、CJX1 系列的接触器以及与之配套的热继电器、联锁机构。

d. 电流互感器全部采用森源电气有限公司监制的 SDH 系列、SDL 系列、SDL1 系列。(见 61 页附图 19)

e. 熔断器选用高分断能力的 HH15 系列刀熔和 NT00 系列。

f. 为提高主电路的动稳定能力，设计了 RGCS 系列专用的 CMJ 型组合式母线夹和绝缘支件，采用高强度、阻燃型的合成材料热塑成型，绝缘强度高，自熄性能好，结构独特，只需调正积木式间块即可适用不同规格的母线。

(见 53 页附图 5、60 页附图 16 ~ 17)

g. 为降低功能单元的间隔板、接插件、电缆头的温升，设计了 RGCS 柜专用的转接件，与同类产品产比较转接件热容量增大，温升降低。(见 54-55 页附图 6 ~ 8)

h. 如设计部门根据用户需要，选用性能更优良、技术更先进的新型电器元件时，因 GCS 系列柜具有良好的通用性，不会因更新电器元件，造成制造和安装方面的困难。

4.3 The Auxiliary Circuit Scheme

The atlas of RGCS Auxiliary Circuit includes 120 auxiliary circuit schemes and it is divided into two volumes. The first volume AC manipulation part has altogether 63 schemes while the second volume direct current manipulation part has altogether 57 schemes.

The auxiliary circuit schemes in the direct current manipulation part are mainly used in the systems of the low-voltage factories of the transformer houses of power plants. They apply to the systems of the low-voltage factories whose capacity units are less equal to 200MW or over equal to 300MW. They also apply to the common controlling modes of the working (spared) source in cable, source feeder and feeders of the electric motor.

The auxiliary schemes in the AC manipulation part are mainly used the low-voltage systems of the mineral companies and high-rise constructions for altering electricity. There are 6 combination schemes for controlling the binary source manipulation. Controlling circuits for manipulating electric interlocking spared self-throwing, self-reset etc. are installed and can be directly adopted in project designing.

The direct current controlling source is 220V or 110V direct current. AC controlling source is 380V or 220V AC. The complete set of boards is made up of drawer units. 220V controlling source is introduced from the public controlling source which is especially installed for the controlling of the electricity supply of the pressure transformer inside the board. The public controlling source controls the pressure transformer without earthing. And 24V source is left for using when the weak signal light is needed.

The installing location of the energy meter, the way of introducing the pressure and other requirements of installing and using are explained in detail in the Instructions of the Programming of the auxiliary circuit diagram.

4.4 Bus bars (the combination patterns of the main bus bars are showed on page52 Attached Picture4 and page 59 Attached Picture 15)

In order to improve the dynamic heat-stable ability of the bus bars and better the temperature rise of the contact surface, the device completely adopts TMY-T2 Series hard copper blocks. The connection between

the copper blocks should be tin-patched. Thorough-length tin-patching and thorough-length silver-plating copper bus bars are recommended.

a. Level Bus Bars

Level bus bars are in the bus bar isolation house at the rear of the board. Those, which are over equal to 3150A, are laid out with upper and lower layers. Those, which are less equal to 2500V, are laid out with single layer. Each phase consists of 4 or 2 bus blocks, thus well improving the short-cut intensity of bus bars.

What to choose for installing level copper bus blocks is showed in the table3:

b. Vertical Bus Bars

The vertical block of the drawer board adopts “L” shaped hard copper tin-patching bus bars.

The specifications of the shaped bus bars: (height × thickness)+(bottom × thickness)

The rated current is 1000A.

c. Neutral Earthing Bus Bars

They adopt hard copper blocks. The specifications of the piercing level neutral earthing wires (PEN) or the earthing + neutral wires (PE+N) are showed in table4:

* The specifications of the vertical PEN wires or PE+N wires inside the device should all choose 40 × 5.

4.5 Choice for Electric Components

This device mainly adopts the electric components that have advanced technical performance criteria and which using has produced in batch at home introduced technique.

a. The Main Switch

The source in cable switches and the feeder switches, which are over equal to 630A mainly, choose DW914 series. RDSW6(RDW1), DW40, DW48 series and AE series, 3WE or RDW17 series can also be chosen. When it is necessary, M series or F series, which are introduced, can be chosen.

b. The feeder and electric motor controlling switches, which are less equal to 630A mainly, choose RDM949 series, RDM1series. Plastic-cover switches can also choose NZM series and TM30 series plastic-cover circuit breaker.

c. AC contactors mainly choose the contactors of CJX8 series, CJX2(RDC6)series, and CJX1 series and heat relays and interlocking mechanism which assort with the those contactors.

d. Current transformers all adopt SDH series, SDL series and SDL1 series, which are supervised and manufactured by Senyuan Electricity Co, Ltd. (consult the attached picture19 on page 61)

e. Fuses choose HH15 series knif switch and NT00 series with high breaking capacity.

f. In order to raise the main circuit's dynamic-stable ability, CMJ type combining bus bar folders and insulation branching items are designed especially for RGCS series. High-intensity and burning-protection combining materials are used to heat the plastics and mold them. They have high insulation intensity, high self-extinguishing performance, unique structure and can apply to different specifications of bus bars after the modular blocks are adjusted. (Consult the attached picture 5 on page 53 and the attached picture 16-17 on page 60)

g. In order to decrease the temperature rise of the interblocks, joint bars and cable heads of the function units, commutators especially for RGCS boards are designed. Compared with the same kinds of products, the commutators have larger heat capacity and the temperature rise will be decreased. (consult the attached picture 6-8 on page 54-55)

h. When the designing department chooses new type electric components with better performance and more advanced technique according to the need of the customers, because of the commonality of the RGCS series boards, there won't be any difficulty in producing or installing them, which are resulted from refreshing electric components.

结构特点（见 51 页附图 2）

5.1 装置的主构架采用 8MF 型钢，构架采用拼装和部分焊接两种结构形式。主构架上均有安装模数孔 $E=20\text{mm}$ 。

5.2 装置各功能室严格分开，其隔室主要分为功能单元室、母线室、电缆室，各单元的功能相对独立。

5.3 装置柜体的尺寸系列如表

高	2200								
宽深	400		600		800			1000	
	800	1000	800	1000	600	800	1000	600	800 1000

5.4 功能单元

a. 抽屉层高的模数为 160mm（见 55-56 页附图 9 ~ 10）。分为 $\frac{1}{2}$ 单元、1 单元、 $1\frac{1}{2}$ 单元、2 单元、3 单元五个尺寸系列。

单元回路额定电流 400A 及以下。

b. 抽屉改变仅在高度尺寸上变化，其宽度、深度尺寸不变。相同功能单元的抽屉具有良好的互换性。

c. 每台 MCC 柜最多能安装 11 个一单元的抽屉或 22 个 $\frac{1}{2}$ 单元的抽屉。其中一单元以上抽屉采用多功能后板（见 61 页附图 18）

d. 抽屉进出线根据电流大小采用不同片数的同一规格片式结构的接插件。（见 54-55 页附图 6 ~ 8）

e. $\frac{1}{2}$ 单元抽屉与电缆室的转接采用背板式结构 ZJ-2 型转接件。转接件的外形见 54 页附图 7。

f. 单元抽屉与电缆室的转接按电流分档采用相同尺寸棒式或管式结构 ZJ-1 型转接件。转接外形见 54 页附图 6。

g. 抽屉面板具有分、合、试验、抽出等位置的明显标志。（见 57 页附图 11 ~ 12）。

h. 抽屉单元设有机械联锁装置。（见 58-59 页附图 13 ~ 14）。

5.5 馈线柜和电动机控制柜设有专用的电缆隔室，功能单元室与电缆室内电缆的连接通过转接件或转接铜排实现，既提高了电缆的使用可靠性，又极大地方便了用户对电缆的安装与维修。

电缆隔室有二个宽度尺寸（240mm 和 440mm）可供选用，视电缆数量、截面和用户对安装维修方便的要求而定。（见 52 页附图 3）

5.6 装置的功能单元辅助接点对数一单元及以上的为 32 对， $\frac{1}{2}$ 单元的为 20 对，能满足自动化用户与计算机接口的需要。

5.7 考虑到干式变压器使用的普通性安全性和油浸变压器的经济性，装置既可以方便地与干式变压器组成一个组列，也可以与油浸变压器低压母线方便连接。

5.8 以抽屉为主体，同时具有抽出式和固定式，可以混合组合，任意选用。

5.9 装置按三相五线制和三相四线制设计，设计部门和用户可以方便地选用 PE+N 或 PEN 方式。

5.10 柜体的防护等级为 IP3LO、IP4LO，也可以按用户需要选用。

Structural Features (consult the attached picture2 on page 51)

5.1 The main framework of the device adopts 8MF type steel. Its construction has two forms-consolidation and partial welding. All the main frameworks have installing modular holes $E=20\text{mm}$.

5.2 The individual function houses of the device are divided strictly. Its isolation house mainly includes function unit house, bus bars house and cable house. Each unit functions relatively independently.

5.3 The size series of the device board is showed in the following table (left)

5.4 Function Unit

- a. The module of the height of the drawer layer is 1600mm (consult the attached picture 9–10 on page55–56). There are five size series—1/2unit, 1unit, 1(1/2) units, 2units and 3 units. The rated current of the unit loop must be less equal to 400A.
 - b. varies its height size instead of width or depth sizes. Drawers belonging to the same function unit are of good interchangeability.
 - c. At most 11 one unit drawers or 22 one half unit drawers can be installed on each MCC board. Drawers whose units are more than one use multifunctional rear boards. (Consult the attached picture 18 on page61)
 - d. According to the amount of the current, the in–and–out cables of the drawers adopt the same type of with different pieces (Consult the attached picture6–8 on page 54–55)
 - e. The resetting between the unit drawers and the cable house adopts the backboard structure ZJ–2 type–resetting piece. Its appearance is shown on page54, attached picture 7
 - f. According to electricity grading, the resetting between the unit drawers and the cable house adopts the same size bar–type or the pipe–type structure ZJ–1 type resetting piece. (The resetting appearance is shown on page 61, attached picture 6.)
 - g. There are obvious marks of locations of switch–on, switch–off, trial and drawing–out on the drawer face. (Consult the attached picture11~12 on page 57)
 - h. The mechanical interlocking equipment is installed in the drawer unit. (consult attached picture 13~14 on page 58–59)
- 5.5 The special cable isolation house is installed in the feeder board and the electric motor controlling board. The current connection between the function unit house and the cable house is realized by resetting piece of the resetting copper block. This not only increases the use reliability of the cables but also makes it convenient for the users to install, maintain and repair the cable.
- Two width sizes (240mm and 440mm) can be chosen according to the number of the cables, the cross–section and the users– requirements for convenient installation, maintenance and fixing. (Consult attached picture 3 on page52)
- 5.6 The function unit auxiliary connection point of the device has 32 pairs when the unit is over equal to one, 20 pairs when the unit is 1/2. It can satisfy the need of automatic users and the port of the computer.
- 5.7 Considering the commonality and safety of using the dry–type pressure transformer and the economy of the oil–immersed pressure transformer, can easily form a group with the dry–type pressure transformer as well as be easily connected to the low–voltage bus bars of the oil–immersed pressure transformer.
- 5.8 The drawer is considered the main body. The draw–out version and the fixed–mounted version co–exist. They can be combined and chosen at random.
- 5.9 The device is designed according to triphase five–wire system and triphase four–wire system. The designing department and the users can conveniently choose PE+N or PEN mode.
- 5.10. The protection grade of the board is IP3LO, IP4LO. It can also decided by the needs of the users.

装置特点

- 6.1 提高转接件的热容量，较大幅度的降低由于转接件的温升给接插件、电缆头、间隔板带来的附加温升。
- 6.2 功能单元之间、隔室之间的分隔清晰、可靠，不因某一单元的故障而影响其它单元工作，使故障局限在最小范围。

6.3 母线平置式排列使装置的动、热稳定性好，能承受 80/176kA 短路电流的冲击。

6.4 MCC 柜单柜的回路数量多到 22 回，充分考虑大单机容量发电，石化系统等行业自动化电动门(机)群的需要。

6.5 装置与外部电缆的连接在电缆隔室中完成，电缆可以上下进出。零序电流互感器置电缆隔室内，使安装维修方便。

6.6 同一电源配电系统，可以通过限流电抗器匹配限制短路电流，稳定母线电压在一定的数值，还可部分降低对元器件短路强度的要求。

6.7 抽屉单元有足够数量的二次接插件（1 单元及以上为 32 对， $\frac{1}{2}$ 单元为 20 对。），可满足计算机接口和自控回路对接点数量的要求。

Features of the device

6.1 It improves the heat capacity of the resetting piece, obviously decreases the additional temperature rise, which is brought to the patching piece, the cable head and the interval board because of the temperature rise of the resetting piece.

6.2 The isolation between one function unit and another as well as that between one isolation house and another is clear and trustworthy. The working of other units isn't influenced by the accident of a particular unit. Confine the accidents in the smallest range.

6.3 The level arraying of the bus bars betters the dynamic heat-stable ability. It can tolerate the attack of 80/176kA cutting-out current.

6.4 The loop quantity of MCC single board is so large that it reaches 22 loops. This fully allows for the need of profession automaticity electricity-driven door (machine) groups of single device capacity generation and petrification system etc.

6.5 The connection between the device and the outside cables is finished in the cable isolation house. Cables can be in and out from above or below. The zero order current transformers is installed inside the cable isolation house, thus making the installation and maintenance convenient.

6.6 Electricity distribution systems belonging to the same source can limit the cutting-out current, make the pressure of the bus bars stable at a certain number and can also partially decrease the requirements of the cutting-out intensity of the component pieces through the current-limiting reactance equipment match.

6.7 There are enough quadratic patching pieces (there are 32 couples when it is more equal to 1 unit and 20 couples when it is $\frac{1}{2}$ unit) in the drawer unit. They can meet what the computer port and the self-controlling loop require of the quantity of the connecting points.

安装与使用

产品到达收货地点后，首先应当检查包装是否完整无损，发现问题应及时通知合同有关部门做好商务记录，共同分析原因，作好鉴证和善后处理。

对于不立即安装的产品，应根据正常使用条件和电气设备暂时保管规程要求置于适当的场所，妥善保管。

7.1 产品的安装应按示意图进行（见图 1 ~ 图 3，表 7 ~ 表 9）。基础槽钢和采用螺栓固定方式时的螺栓由用户自备。主母线连接时，如表面因运输、保管等原因有不平整时需平整后再连接紧固。

7.2 装置单独或成列安装时，其垂直度以及柜面不平整和柜间缝隙的偏差应符合表 6 规定。

表 table 6

项次	项 目		允差 (mm)
1	垂直度		3.3
2	水平度	相邻两柜顶部成列柜顶部	2
		相邻两柜边	5
3	不平度	成列柜边	1
			5
4	柜间接缝		2

7.3 产品安装后投运前的检查与试验

- a. 检查柜面漆或其它复盖材料（如喷塑）有否损坏，柜内是否干燥清洁。
- b. 电器元件的操作机构是否灵活，不应有卡涩或操作力过大现象。
- c. 主要电器的主辅触头的通断是否可靠、准确。
- d. 抽屉或抽出式机构抽拉应灵活、轻便、无卡阻和碰撞现象。
- e. 抽屉或抽出式结构的动、静触头的中心线应一致，触头接触应紧。主、辅触头的插入深度应符合要求。机械联锁或电气联锁装置应动作正确，闭锁或解除均应可靠。
- f. 相同尺寸的抽屉应能方便的互换，无卡阻和碰撞现象。
- g. 抽屉与柜体间的接地触头应接触紧密，抽屉当推入时，抽屉的接地触头经主触头先接触，拉出时接地触头比主触头后断开。
- h. 仪表的刻度整定、互感器的变比及极性应正确无误。
- i. 熔断器的熔芯规格应符合工程设计的要求。
- j. 保护的额定值及整定应正确，动作可靠。
- k. 用 1000 兆欧表测量绝缘电阻值不得低于 1mΩ。
- l. 各母线的连接应良好，绝缘支撑件、安装件及其它附件安装应牢固可靠。

7.4 使用注意事项

- a. 装置为不靠墙安装，正面操作，双面维修的低压配电柜。柜的维修通道及柜门，必须是考核合格的专业人方可进入或开启进行操作、检查和维修。
- b. 空气断路器、塑壳断路器经过多次分、合，特别是经过短路分、合后，会使触头局部烧伤和产生碳类物质，使接触电阻增大，应按断路器使用说明书进行维护和检修。
- c. 经过安装和维修后，必须严格检查各隔室之间、功能单元之间的隔离状况，以确保本装置良好的功能分隔性，防止出现故障扩大。

Installation and Using

When the products arrive at the receiving location, first, examine whether the package is complete without destruction. If problems are found, notice the contractual concerned departments to make business record, analyze the cause together, give signatures and make funeral arrangements.

As for those products which won’ t be installed immediately, they should be safely kept in proper places according to the requirements of the normal using conditions and the temporary regulations for electric equipment.

7.1 Products should be installed according to the diagrammatic sketch (consult Illustration1–3,Table7–9). The basic box iron and the bolts when the fixing ways for bolts are adopted should be prepared by the users themselves. When the bus bars are connected, if their faces are made uneven because of transportation or custody, they should be made even and then connected tightly.

7.2 When the device is installed singly or in array, its verticality, the unevenness of the board surface and the deviation between the intervals insides boards should meet the regulations in table6.

7.3 The Examination and Trial before Committing the Installed Products

- a. Examine whether the surface paint or the other covering materials (such as the spraying plastic) are destroyed and whether it is clean inside the board.
- b. Whether the manipulation mechanism of the electric components is flexible. There should be no tensivity or over force manipulation.
- c. Whether the opening and closing of the main and auxiliary ports of the main electric equipment are trustworthy and accurate.
- d. The drawers and the mechanism of draw-out version should be pulled flexibly, conveniently without prevention or crashing.
- e. The central lines of the dynamic and static ports of the drawers and the mechanism of draw-out version should be in agreement with each other. The connection of the ports should be tight. The interposing depth of the main and the auxiliary ports should meet the requirement. The mechanical interlocking or the electric interlocking mechanism should act correctly. Both the blocking and its release should be trustworthy.
- f. Drawers of the same size should be able to be interchanged conveniently without prevention or crashing.
- g. The connection of the earthing contactor between the drawer and the board should be tight. When the drawer is pushed in, the earthing contactor is firstly connected through the main contactor. When the drawer is pulled out, the earthing contactor is dropped out after the main contactor.
- h. The scale of the meter should be adjusted. The transformation ratio and the polarity of the transformer should be accurate.
- i. The specification of the fuse core should meet the requirements of the project designing.
- j. The rated quantity and the adjustment of protection should be accurate and the act should be trustworthy.
- k. The insulation electric resistance quantity measured by the 1000 me ohm meter should be over equal to 1 me ohm.
- l. The connection of each bus bar should be good. The installation of the insulation strutting piece, the installing piece and other additional pieces should be strong and trustworthy.

7.4 Matters which need attention while the device is used:

- a. The device is a low-voltage electricity distribution board which can't be installed along the wall and it is manipulated in the front face. It can be maintained from both faces. Only the professional workers who have passed the examination can enter, open, manipulate and maintain the maintenance gangway and the door of the board .
- b. After several times of opening and closing, especially after the cutting-out closing and opening, the contactors of the air circuit breaker and the plastic covering circuit breaker will be partially burned and produce carbonic matters, thus enlarging the connecting electric resistance. The circuit breakers should be maintained and inspected according to the instructions for using.
- c. After the installation and maintenance, the isolation status between one isolation house and another as well as that between one function unit and another should be inspected strictly in order to guarantee the good functional isolation of the device, preventing the accident from being enlarged.

GCS
型低压抽出式开关柜

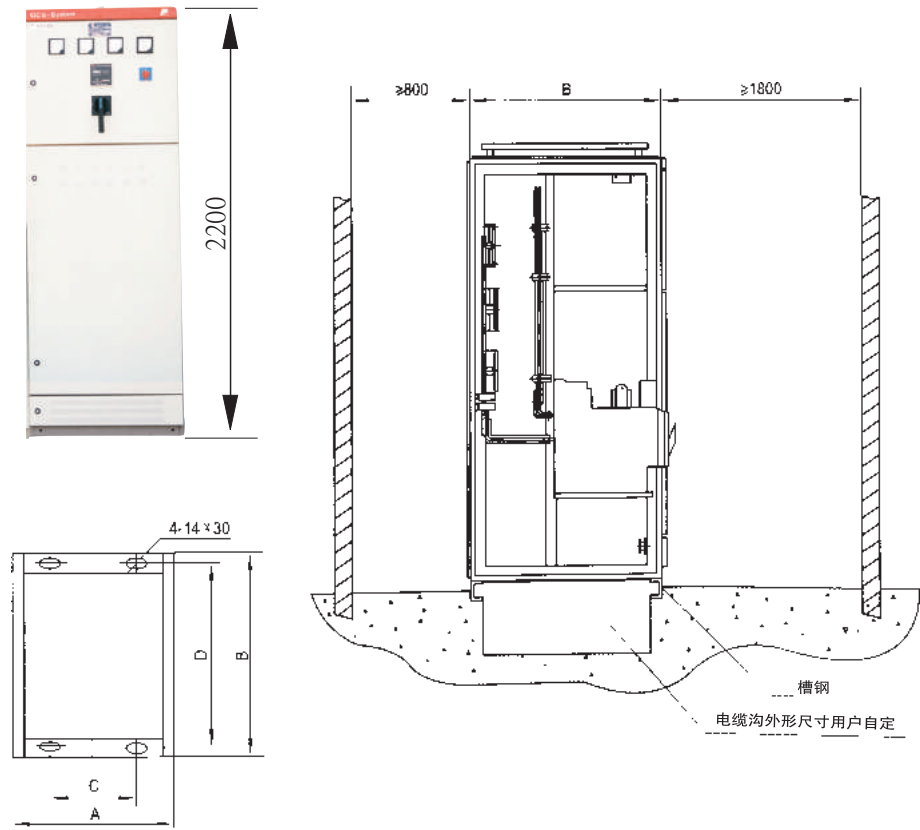


表 table7

通用柜代号	A	B	C	D	备注
GCS-TG1010-4	1000	1000	850	956	联络柜
GCS-TG0810-4	800	1000	650	956	受电柜
GCS-TG0808-4	800	800	650	756	受电柜
GCS-TG0608-4	600	800	450	756	受电柜

图 1 受电、联络柜安装示意图
Illustration I the diagrammatic sketch of installing the incoming and connecting board

GCS

Type low-voltage switchboards of the draw-out version

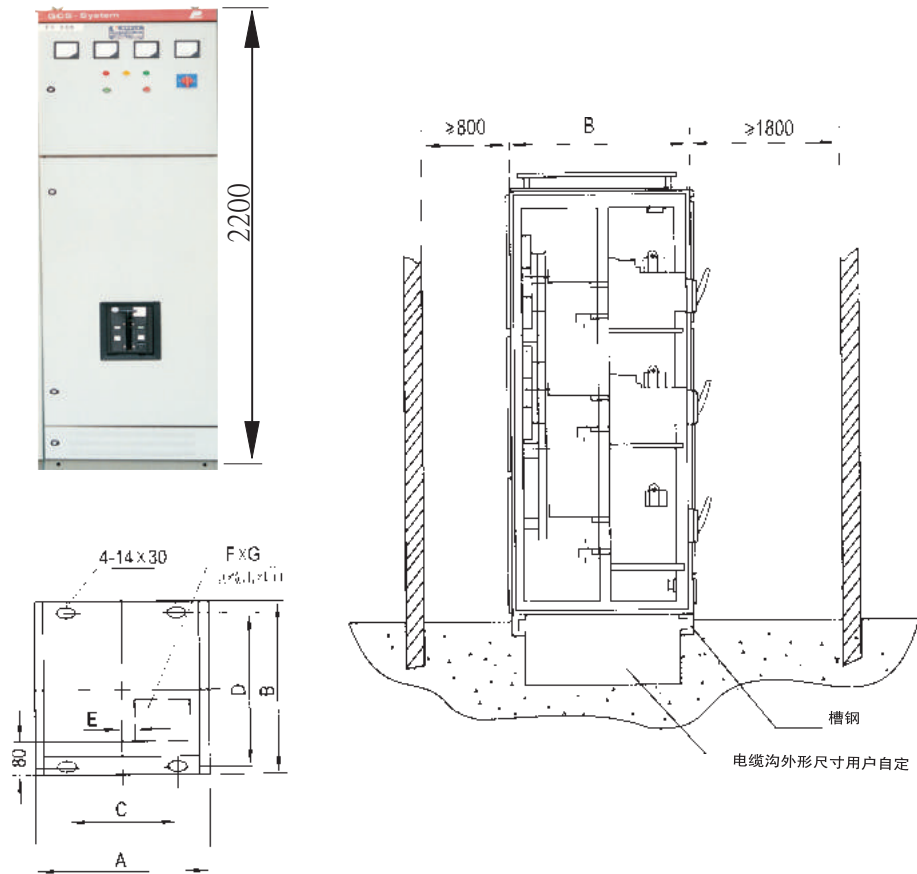


表 table8

通用柜代号	A	B	C	D	E	F×G
GCS-TG1010-2	1000	1000	850	956	60	400×400
GCS-TG0810-2	800	1000	650	956	160	200×400
GCS-TG1008-2	1000	800	850	756	60	400×400
GCS-TG0808-2	800	800	650	756	160	200×400

图 2 PC 柜安装示意图

Illustration II the diagrammatical sketch of installing the PC board

GCS
型低压抽出式开关柜

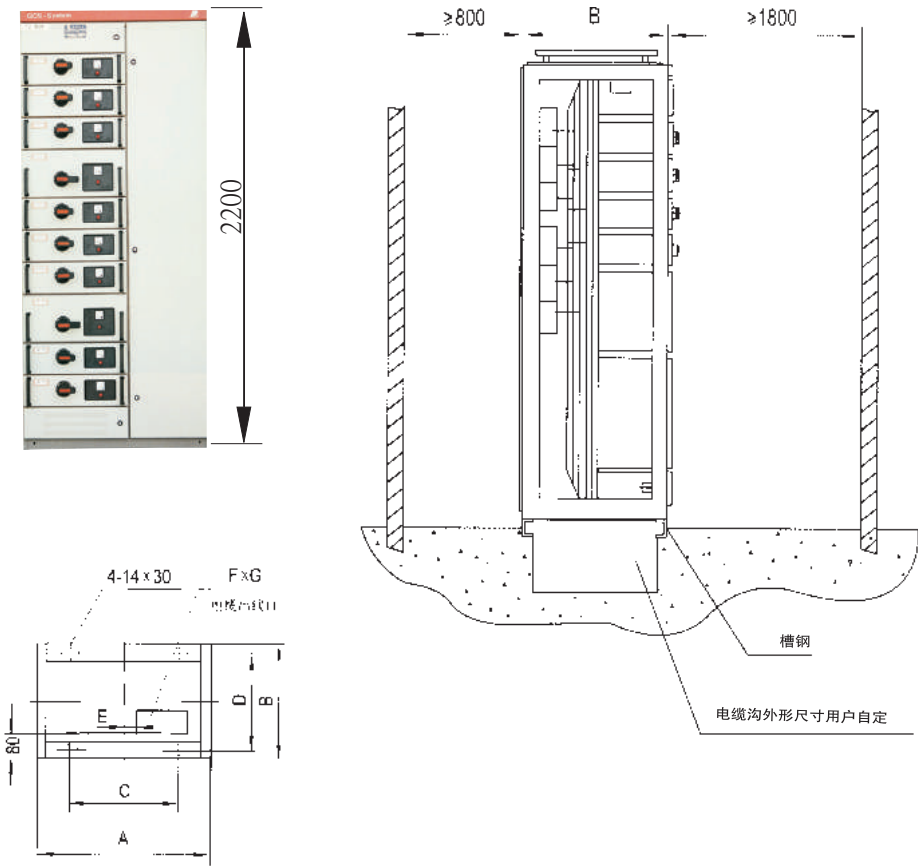


表 table9

通用柜代号	A	B	C	D	E	F x G
GCS-G1006-1	1000	600	850	556	60	400 x 350
GCS-G0806-1	800	600	650	556	160	200 x 350

图 3 MCC 柜安装示意图
Illustration III the diagrammatical sketch of installing the MCC board

附录GCS基本系统构成及专用配套件

8.1 装置

装置的受电柜、动力馈电柜（PC）和电动机控制柜（MCC）全系列的母线短路强度均达到 80kA（有效值）/ 176kA（峰值）的水平。填补了我国高短路强度抽出式开关柜的空白，具有国内领先水平。

PC 柜由三个单元馈线组成，每单元馈线最大电流 1600A。

PC 柜、MCC 柜的母线室，功能单元室和电缆室相互分隔。MCC 柜最多可由 22 个 1/2 功能单元组合。也可以按照 160mm 模数由 1/2 或以上功能单元混合组成。

可按需要实现抽出式单元和固定分隔式单元混合组装。

8.2 MCC 通用柜构架

装置的框架由 8MF 型钢及专用连接件组装而成。型钢截面积大、有足够的刚度、组合原理简单、工艺性强、稳固性好。

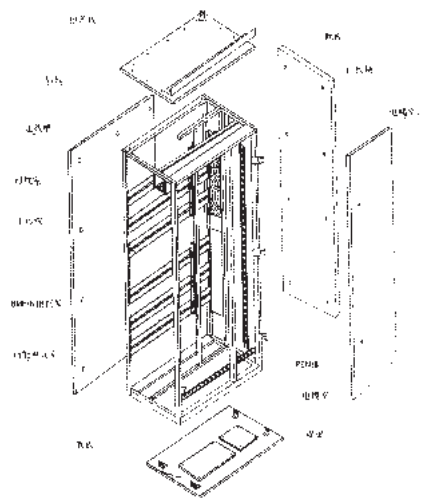
8.3 MCC 柜电气结构形式

MCC 柜的垂直母线为 L 型，额定电流为 1000A，额定短路强度达 80kA（有效值）/ 176kA（峰值）。L 型垂直母线固定夹持在隔离板内，通过专用的母线过渡连接头与主母线相连接，功能单元的出线与 ZJ 型转接中，插接隔离板中的 L 型垂直母线与功能单元的进线插头相插接，功能单元的出线与 ZJ 型转接中插接。由转接件实现功能室和电缆室之间的电气转接。电缆室可根据设计需要选择 240mm 或 440mm 的室宽。

8.4 主母线

主母线的额定电流 $\leq 4000A$ 。平置于柜后，用专用母线夹具固定在型钢框架上，安装方便，稳固性好，能承受 80kA（有效值）/ 176kA（峰值）短路电流的冲击。

装置工作电流 $\leq 2500A$ 主母线为单组双列平置（如图示）。装置工作电流 $> 2500A$ 主母线为双组双列平置。一次母线推荐采用全长镀锡或镀银的工艺。水平母线和垂直母线之间的电气连接采用专用过渡连接头，可降低母线过渡搭接温升。



附图 2 MCC 通用柜构架
Figure II The Framework of the Universal MCC Board

GCS

型低压抽出式开关柜

8.1 The DeviceThe cutting-out intensity of the bus bars of the incoming board, power feeder board (PC) and the whole series of the electric motor controlling board of the device has reached the level of 80kA (effective value) / 176kA (peak). It is of national advanced level and fills in the blank of the national high cutting-out intensity switchboards of the draw-out version.PC board consists of three unit feeders. The highest current for each unit feeder is 1600A.The bus bar house, function unit house and cable house of the PC board and the MCC board are separated from each other. MCC board can be made up of at most 22 one half function units. It can also be combined by function units which are over equal to one half unit according to 160mm modular. The combination between the draw-out unit and the fixing isolation unit can be realized according to needs.

8.2 The Framework of the Universal MCC BoardThe framework of the device is combined by 8MFprofiled bar and special connecting pieces. The cross-section of the profiled bar is very large. The profiled bar has enough rigidity, simple combination principles, good technological characters and good stability.

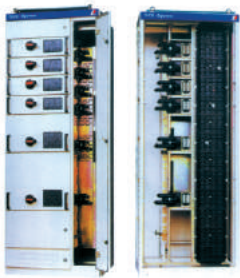
8.3 The electrical construction pattern of the MCC board

The vertical bus bar of the MCC board is shaped like an “L” . Its rated current is 1000A. Its rated cutting-out intensity reaches 80kA (effective value) /176kA (peak). “L” shaped vertical bus bar is fixed and retained inside the isolation boards and is connected to the main bus bar through the special bus bar transitional connecting head. As for the out cable of the function unit and the ZJ type relay center, the “L” shaped vertical bus bar in the plugging isolation board is plugged to the in cable plug of the function unit while the out cable of the function unit is plugged to the ZJ type relay center. The electric patch between the function house and the cable house is realized by the patching piece. The width of the cable house can be either 240mm or 440mm according to the designing needs.

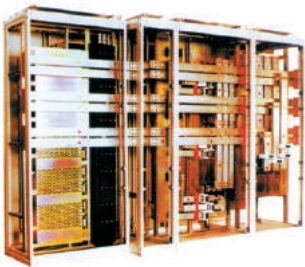
8.4 The Main Bus Bar

The rated current of the main bus bar must be less equal to 4000A.It is placed levelly at the rear of the board and is fixed on the framework of the profiled bar by special bus bar clamp. It is easy to install. It is of good stability and can tolerate the attack of the 80kA (effective value)/176kA (peak) cutting-out current.

When the working current of the device is less equal to 2500A, its bus bars are laid levelly in single group double array (as is showed in the picture). When the working current of the device is over 2500A, the bus bars are laid levelly in double groups double array. The technique of whole-length tin-plating or silver-plating is recommended to once bus bars. The special transitional connecting head is used to connect the electricity between the level and the vertical bus bars. This can decrease the lap joint temperature rise produced by the transition of bus bars.



附图 Attached picture3 MCC 柜电气结构形式



附图 Attached picture 4 主母线

GCS

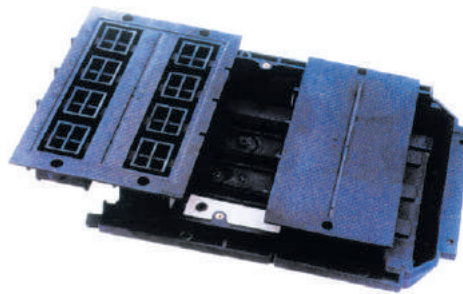
Type low-voltage switchboards of the draw-out version

8.5 隔离板

隔离板是为 MCC 柜设计的组合式多功能母线间隔器具。整套隔离板由隔离板上端板、隔离板下端板、盖板、盖板上端板、盖板下端板、卡脚组成。它拼装简单、坚实、绝缘好、高阻燃、起到夹持 L 型垂直母线、隔离母线区和功能区的作用，还能为功能单元的主回路插接提供接口。

8.5 The Isolation Board

The isolation board is compound multi-functional bus bar isolation equipment designed for MCC board. The whole set of the isolation boards consists of upper header of the isolation board, the lower header of the isolation board, the cover board, the upper header of the cover board, the lower header of the cover board and the jamming foot. It is simply and solidly combined. It has good insulation, high prevention from burning. It functions to hold the "L" shaped vertical bus bar, the isolation bus bar area and the function area. It can also provide the contactor for the plugging of the main loop of the function units.



附图 Attached picture5

8.6 ZJ-1 转接件

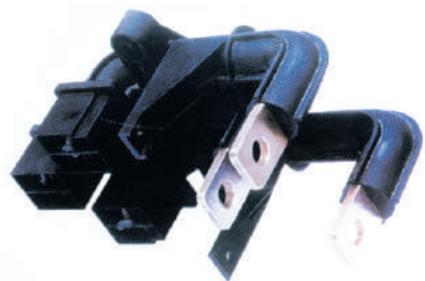
该转接件用圆铜棒（400A）或圆铜管（250A）弯曲成型，外表面包有增强尼龙塑料绝缘层和十二道加强筋。它能完成抽屉单元最大电流的转接。热容量大、强度好、结构型式新颖、呈品字形排列、占用空间小、电缆连接方便。

8.6 ZJ-I Resetting Piece

This resetting piece is melded from the round copper bar (400A) or the round copper pipe (250A). The enhancing nylon plastic insulation layer and 12 intensifying ribs cover its surface. It can finish the reset of the highest current in the drawer units. It has large heat capacity, good intensity, new structure pattern and it is arrayed like the word "ping" It occupies little space and the cables can be easily connected.

GCS

型低压抽出式开关柜



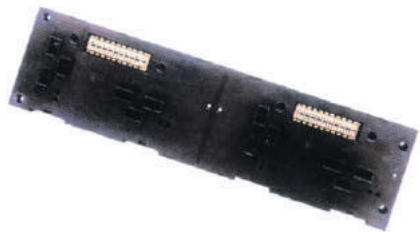
附图 Attached picture6

8.7 ZJ-2 转接件

该转接件由后板、左盖板、右盖板、小型母线、出线插头、出线压板组面。用于 抽屉单元的电路转接。进线采用铜母线接插头加装 U 型弹片，增大触头的压力。主辅电路出线直接从右侧转入电缆室。其结构合理、体积小、转接方便。

8.7 ZJ-2 Resetting Piece

The surface of this resetting piece consists of the rear board, the left cover board, the right cover board, the minitype bus bas, the out cable plug and the out cable pressure board. It is used to reset the current of 1/2 drawer unit. The in cables adopt copper bus bars. U type bullet is added to the patching head, enlarging the pressure of the contactor. The out cables of the main and auxiliary circuits are introduced directly into the cable house from the right side. With reasonable construction and small volume, it can be resetted easily.



附图 Attached picture7

8.8 ZJ-3 转接件

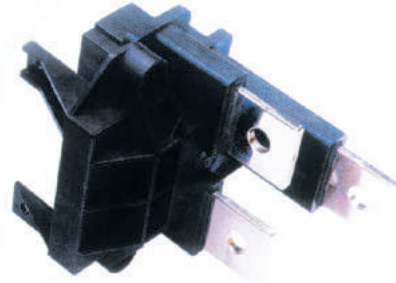
该转接件用于 PC 柜功能单元与电缆室之间的转接。它由 10×60 与 6×60 两种不同规格的三相铜排热塑而成。其转接方式简单，牢固，可靠。

8.8 ZJ-3 Resetting Piece

This resetting piece is used to reset the function unit and the cable house of the PC board. It is heated and molded from triphase copper blocks with two different specifications 10×60 and 6×60. Its resetting mode is simple, solid and trustworthy.

GCS

Type low-voltage switchboards of the draw-out version



附图 Attached picture8

8.9 $\frac{1}{2}$ 单元抽屉

该单元抽屉是由全塑组件装配而成，高阻燃、强绝缘、轻巧、牢固。它由前框、后框、侧盖板、导轨及拉手组成。在前框的左上方设有操作机构手柄安装座和手柄，在后框的上方有 20 对辅助电路插头。左右侧板带有能通风槽和加强筋。主要件不采用螺钉连接，由零件各自的槽口卡接完成。抽屉与 ZJ-2 型转件接插后，实现电路的转接。

8.9 1/2 Unit Drawer

This unit drawer consists of all plastic pieces. It is of high prevention from burning and sufficient insulation. It is solid, light and handy. It is made up of the front framework, the rear framework, the side cover board, the track and the handle. On the left upper part of the front board, the hand grip and the manipulation mechanism hand grip pedestal are installed. On the upper part of the rear board, there are 20 pairs of auxiliary current plugs. The left and right side boards have ventilating slot and dabber. The main pieces are connected by the daps of these pieces instead of by the screws. The resetting of the current is realized after the drawer is patched with the ZJ-2 type resetting piece.



附图 Attached picture9

GCS

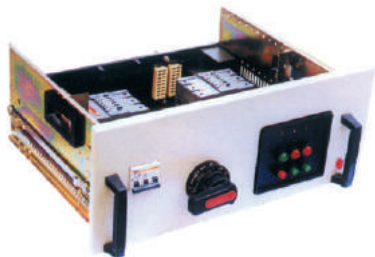
型低压抽出式开关柜

8.10 I 单元抽屉

该单元抽屉由抽屉面板、左右侧板、固定锁钩、前上支架、前下支架、后端板、测控板、抽屉底板、导轨、导杆等主要零部件组成。它抽屉灵活，定位准确。加上装有旋转操作机构，功能完备。

8.10 Unit Drawer

This unit drawer is made up of the main components such as the left and right side boards, the fixed latch hook, the front upper holder, the front lower holder, the rear terminal board, the measuring and controlling board, the bottom board of the drawer, the track and the guiding bar. It is flexible and located correctly. Its function is perfect with the spinning manipulation mechanism.



附图Attached picture 10

8.11 操作手柄 ($\frac{1}{2}$ 单元抽屉用)

I 工作位置：主开关合闸，功能单元锁定。

O 主开关分闸：主回路断开，功能单元锁定。

↘↑ 试验位置：主开关分闸，控制回路接通，功能单元锁定。

↘↑ 隔离位置：抽屉抽出 30mm。主、辅回路均隔离断开，抽屉锁定。

↑↓ 抽出位置：主回路和控制回路均断开，抽屉任意抽出。

操作手柄压下 6mm 后，方能从 O 位置转向 I 位置，如有必要，操作手柄上可在主开关分闸、试验、隔离三位置加挂锁，作为安全保护。

8.11 The Manipulation Hand Grip (used by 1/2 unit drawers)

I The working location: the main switch is closed and the function unit is locked.

O The main switch opened: the main loop is cut and the function unit is locked.

↘↑ The trial location: the main switch is opened, the controlling loop is connected and the function unit is locked.

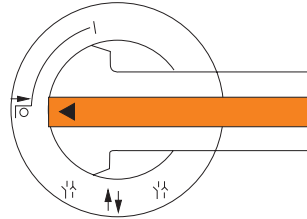
↘↑ The isolation location: The drawer is drawn off 30mm. Both the main loop and the auxiliary loop are cut and the drawer is locked.

↑↓ The drawn-off location: Both the main loop and the auxiliary loop are cut and the drawer can be drawn off at random.

Only after the manipulation hand grip is pressed down 6mm, can it be changed from location O to location 1. If necessary, the padlock can be added to the manipulation hand grip in places of the opening of the main switch, the trial and the isolation for safety protection.

GCS

Type low-voltage switchboards of the draw-out version



附图 Attached picture 11

8.12 操作手柄 (1 单元及以上抽屉用)

I 工作位置：主开关合闸，功能单元锁定。

O 主 开关分闸：主回路断开，功能单元锁定。

III 试验位置：主开关分闸，控制回路接通，功能单元锁定。

III 隔离位置：旋出 30mm 距离，主回路及控制回路均隔离断开，功能单元锁定。

III 抽出位置：主回路和控制回路均断开，抽屉任意抽出。

操作手柄压下 9mm 后，方能从 O 位置转向 I 位置，如有必要，操作手柄上可在主开关分闸、试验、隔离三位置加挂锁，作为安全保护。

8.12 The Manipulation Hand Grip (used by drawers with units over equal to 1)

I The working location: the main switch is closed and the function unit is locked.

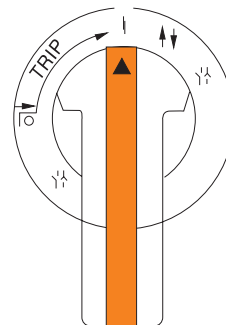
O The main switch opened: the main loop is cut and the function unit is locked.

III The trial location: the main switch is opened, the controlling loop is connected and the function unit is locked.

III The isolation location: The drawer is drawn off 30mm. Both the main loop and the manipulation loop are cut and the function unit is locked.

III The drawn-off location: Both the main loop and the auxiliary loop are cut and the drawer can be drawn off at random.

Only after the manipulation hand grip is pressed down 9mm, can it be changed from location 0 to location 1. If necessary, the padlock can be added to the manipulation hand grip in places of the opening of the main switch, the trial and the isolation for safety protection.



附图 Attached picture 12

GCS
型低压抽出式开关柜

8.13 CJG-1 操作机构（1单元及以上抽屉用）

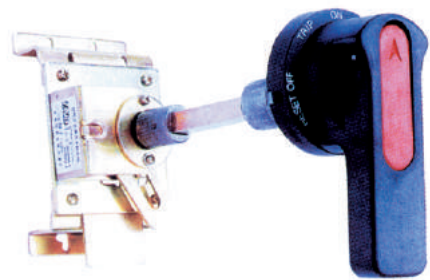
该操作机构由转轴、圆柱形凸轮、离合齿片、轴销压簧、拨叉等组成。通过操作手柄转动圆柱形凸轮可插拔抽屉并同时具备开关的分、合、试验、隔离及锁定功能。

工作过程：在抽出位置（↑↑）时，抽屉方能旋进或旋出，操作手柄顺时针转动 30° 后，到达隔离位置（↘↑），再顺时针转动 180°，到达试验位置（↘↑）。继续顺时针转动 30° 后，到达开关分断位置（O），将手柄压下 9 mm 顺时针转动 90° 后，主开关合闸，如需退出，则依次相反操作。

8.13 CJG-1 Manipulation Mechanism (used by drawers with units over equal to 1)

This manipulation mechanism is made up of the rotor, the cylindrical jaw, the on-off bits, the dowel setting bolt spring and the pull-out fork etc. Through the turning of the manipulation hand grip, the cylindrical jaw can insert and pull out the drawer and meanwhile it possesses the ability of the opening and closing of the switch, trial, isolation and locking.

The working process: Only in the drawing-off location, can the drawer be spun in and out. The manipulation hand grip reaches the isolation location after it is clockwise spun 30°. Another clockwise 180° it reaches the trial location. Another clockwise 30° it reaches the location of opening the switch. When the hand grip is pressed down 9mm and spun clockwise 90° the main switch is closed. If you want to withdraw, take the reverse procedures in turn.



附图 Attached picture 13

8.14 CJG-2 操作机构（ $\frac{1}{2}$ 单元用）

该操作机构由传动部分、转轴、锁扣等组成，具有开关的分合、试验、隔离及锁定功能。

工作过程：在抽出位置（↑↑）时，抽屉方能推进或拉出；逆时针转动 45° 后，拉出抽屉时可自动到达隔离位置（↘↑）。顺时针转动 45°，到达试验位置（↘↑）。再顺时针转动 45°，到达开关分断位置（O）。将手柄压下 6mm 顺时针转动 60° 后，开关合闸。如需退出，则依次相反操作。

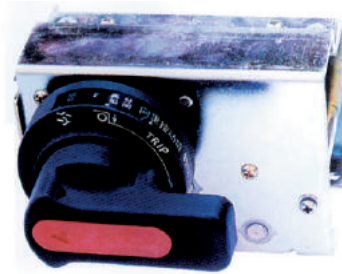
8.14 CJG-2 Manipulation Mechanism (used by 1/2 unit)

This manipulation mechanism is made up of the driving part, the rotor and the lock catch etc. It possesses the ability of the opening and closing of the switch, trial, isolation and locking.

The working process: Only in the drawing-off location, can the drawer be pushed in and pulled out. The drawn-off drawer automatically reaches the isolation location after it is anti-clockwisely spun 45°. After it is clockwise spun 45°, it reaches the trial location. Another clockwise 45°, it reaches the location of opening the switch. When the hand grip is pressed down 6mm and spun clockwise 60°, the switch is closed. If you want to withdraw, take the reverse procedures in turn.

GCS

Type low-voltage switchboards of the draw-out version



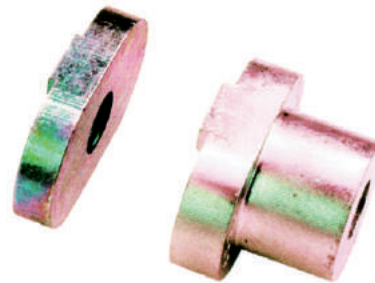
附图 Attached picture 14

8.15 母线过渡接头

主要功能是完成水平母线和垂直母线之间的电气连接。它由 T 形铜套、专用固定块和螺栓组成。接触压力大，能保证相应的接触面积和接触质量，使用方便。连接头整体镀银，长期工作电流为 1000 A。

8.15 The Bus Bar Transitional Contactor

Its main function is to connect the electricity between the level bus bars and the vertical bus bars. It is made up of the “T” shaped copper jacketing, the special fixing block and the bolt. The big contact pressure can guarantee the corresponding contact area and contact quality. It can be used conveniently. The whole connecting head is silver-plating. The long-term working current is 1000A.



附图 Attached picture 15

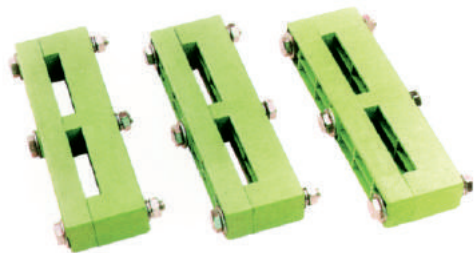
8.16 母线夹

平置式水平母线夹具由母线夹座、盖板、绝缘垫座、不锈钢螺栓组成。安装方便、阻燃、强度好、使用安全可靠。

8.16 The Bus-bar Clamp

The flat level bus-bar clamp composed of the bus bar folder pedestal, the cover board, the insulation backer and the non-rust steel bolt. It can be easily installed and be used safely and trustworthily. It has good intensity and prevention from burning.

GCS
型低压抽出式开关柜



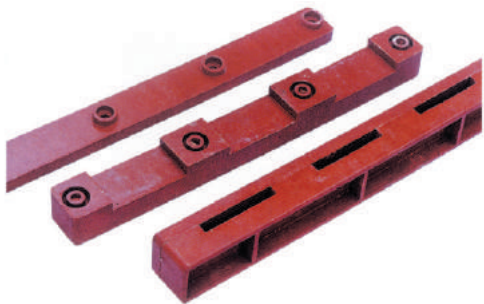
附图 Attached picture 16

8.17 SJZ 型绝缘支撑夹

绝缘支撑夹由支撑夹座、支撑盖板组装而成。分单排单层、单排双层、双排单层、双排双层四种型式。在电源柜、PC 柜中用于夹持垂直分支母线，其结构简单，夹座与盖板之间的套筒式组合加大了电气间隙和爬电距离。能达到高绝缘、高强度的性能要求。

8.17 SJZ Type Insulation Supporting Clamp

The insulation supporting clamp is composed of the supporting clamp pedestal and the supporting cover board. It includes four types single block single layer, single block double layers, double blocks single layer and double blocks double layers. It is used to hold the vertical branching bus bars in the source board, It possesses simple structure. The sleeve-type combination between the clamp pedestal and the cover board enlarge the electric intervals and the creepage current space. It meets the performance requirement of high insulation and intensity.



附图 Attached picture 17

8.18 多功能抽屉后板

(1 单元及以下抽屉用)

由增强尼龙注塑成型，呈 U 型板状结构。上侧方有走线槽。左下侧方有进线电缆插座，右侧布有品字形电缆出线座还布有二排辅助插头的安装槽孔，同时具备抽屉的导向定位功能。

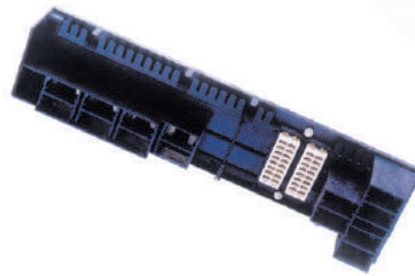
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Type low-voltage switchboards of the draw-out version

8.18 The Multi-functional Rear Board of the Drawer

(used by the drawers with units less equal to 1)

It is melded from the intensified nylon and plastic. It has “U” shaped board structure. On the upper side, there is a cable ditch. The in cable plug is installed on the lower left side. The “Ping” shaped leading-out cable plug and the two blocks of auxiliary plug installing slotted hole are installed on the right side. Meanwhile, it possessed the drawers ability of steering location.



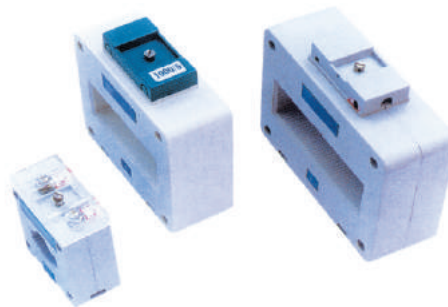
附图 Attached picture 18

8.19 SDH、SDL 系列电流互感器

用于装置的测量和零序检测。具有温升低、导磁率高、损耗低、漏磁小、补偿调节精细、体积小、固定容易的特点。外壳为高分子塑料注塑成型，性能指标高、阻燃性好、重量轻、强度大、外形美观。

8.19 Current Transformers of the Series SDH,SDL

It is used for the measuring and zero order inspection of the device. It has these features: low temperature rise, high magnetic inductive capacity, low deterioration, low leakance, delicate compensation adjustment, small volume and easy fixing. Its cover is melded from high molecular plastic. It has high performance criteria, good prevention from burning, light weight, high intensity and beautiful appearance.



附图 Attached picture19

GCS

型低压抽出式开关柜

订货需知

订货合同包含以下内容：

- 9.1 产品的全型号包括主电路方案号和辅助电路方案号；
- 9.2 主电路系统组合顺序图；
- 9.3 辅助电路电气原理图；
- 9.4 柜内元器件清单；
- 9.5 电路中电压、电流、时间等整定参数；
- 9.6 与产品正常使用不符的其它特殊要求。

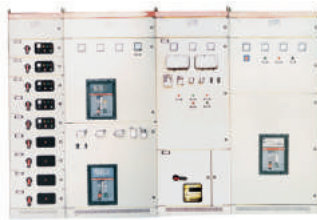
Ordering Instructions

The ordering contract includes the following contents:

- 9.1 The whole model numbers of the product includes the scheme number of the main circuit and the auxiliary circuit.
- 9.2 The combination precedence diagram of the main circuit system.
- 9.3 The electric principle diagram of the auxiliary circuit.
- 9.4 The list of the components inside the boards.
- 9.5 The setting parameters of the voltage, current and time etc in the circuit.
- 9.6 Other special requirements which don't apply to the normal using of the product.

GCK、GCL

Low-voltage Switch Boards of the Draw-out Version



概 述

GCK、GCL系列低压抽出式开关柜是我公司根据广大用户的需求而设计的，具有结构先进，外形美观，电气性能高，防护等级高，安全可靠，维护方便等特点，是冶金、石油、化工、电力、机械，轻纺等行业低压供电系统理想的配电装置。

被国家列为两网改造推荐产品和第九批节能产品。

Brief Introduction

The GCK,GCL series low-voltage switch boards of the draw-out version are produced by our company according to the need of the common users. It has the following features: advanced structure, beautiful appearance, high electric performance, high grade of protection, high safety and convenient maintenance etc. It is the ideal electricity distribution device for the low-voltage electricity supply system of the professions such as metallurgy, oil, chemical industry, electricity, mechanism and light textile etc. It is graded as the recommended product for reforming the two nets and the ninth batch of energy-saving product by our nation.

使用环境条件

- 2.1 海拔高度不超过 2000 米。
- 2.2 周围空气温度不高于 + 40℃，并且 24h 内其平均温度不高于 + 35℃，周围空气温度不低于 - 5℃。
- 2.3 大气条件：空气清洁，相对湿度在温度为 + 40℃时不超过 50%，在温度较低时允许有较高的相对湿度，例如 + 20℃时为 90%。
- 2.4 没有火灾、爆炸危险、严重污染、化学腐蚀及剧烈震动的场所。
- 2.5 与垂直面倾斜不超过 5°。
- 2.6 控制中心适应于以下温度的运输和储存过程，- 25℃ ~ + 55℃，在短时间内（不超过 24h）不超过 + 70℃。
- 2.7 如上述使用条件不能满足时，应由用户在订货时向我公司提出，协商解决。

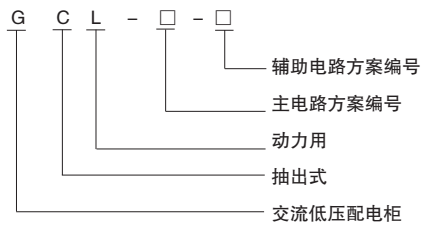
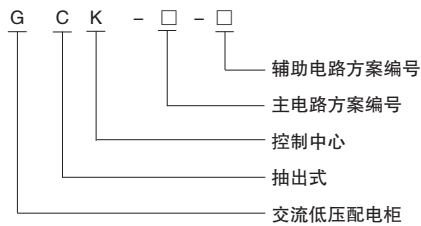
Conditions for using ambient

- 2.1 The altitude must be less equal to 2000meters.
- 2.2 The temperature of the surrounding air must be less equal to +40℃. Its average temperature must be less equal to +35℃ and the temperature of the surrounding air must be over equal to -5℃ within 24 hours.
- 2.3 The Atmospheric Conditions: The air should be clear. The relative humidity must be less equal to 50% when it is +40℃. When temperature is low, a higher relative humidity is allowed. For example, 90% when it is +20℃.
- 2.4 Place without the danger of fire and explosion, severe pollution, chemical corrosion or strenuous vibration.
- 2.5 The verticality must be less equal to 5°.
- 2.6 During transportation or storage, the controlling center must be apply to the following temperature:-25℃ ~ + 55℃, but within short time (less equal to 24 hours), the temperature must be less equal to 70℃.
- 2.7 If the above conditions can't be satisfied, the users should mention it to our company while ordering and solve it together.

GCK、GCL

系列低压抽出式开关柜

产品型号及含义



主要技术参数

- 3.1 额定绝缘电压：6 60v
- 3.2 额定工作电压：380V 660V
- 3.3 辅助电路额定电压：AC 220v 、380v、DC 110v 、220v
- 3.4 使用频率：50 ~ 6(0)Hz
- 3.5 额定电流：水平母线≤ 3150A
垂直母线 630A、800A
- 3.6 额定短时耐受电流：105kA/1S
中性母线 30kA/1S
- 3.7 额定峰值电流：105kA/0.1S, 50kA/0.1S
- 3.8 功能单元（抽屉）分断能力：50kA(有效值)
- 3.9 外壳防护等级：IP30、IP40
- 3.10 母线设置：三相四线制、三相五线制
- 3.11 符合标准：
IEC-439 BS5486 VDE0660、GB7251、
NEMAIC2-322,JJB/T9661
- 3.12 操作方式：就地、远方、自动

GCK, GCL

Low-voltage Switch Boards of the
Draw-out Version

Main Technical Parameters

- 3.1 Rated insulation voltage: 660v.
- 3.2 rated working voltage: 380v 660v.
- 3.3 rated voltage of the auxiliary circuit: AC 220V 380V DC 110 V 220V.
- 3.4 using frequency: 50~(60) Hz.
- 3.5 rated current: the level bus bar must be less equal to 3150A, The vertical bus bar 630A, 800A.
- 3.6 rated short-time tolerant current: 105kA/1s, Neutral bus bar 30kA/1s.
- 3.7 rated peak current: 105kA/0.1s, 50kA/0.1s.
- 3.8 the breaking capacity of the function unit (drawer): 50kA (effective value).
- 3.9 the protection grade of the cover board: IP30, IP40.
- 3.10 the installation of the bus bars: triphase four wires system, triphase five wires system.
- 3.11 meeting the criteria:
IEC-439 BS5486 VDE0660, GB7251,
NEMAIC2-322.JJB/T9661.
- 3.12 the manipulation method: local, remote, and automatic.

结构特征

GCK、GCL的基本框架为组合装配式结构，框架的全部结构件都经过镀锌，喷塑处理，通过螺钉紧固互相连接成基本框架，再按需要加上门，挡板、隔板、抽屉、安装支架以及母线和电器组件等零件，组装成一台完整的控制中心柜，本柜结构有下列特点。

4.1 柜架

柜架采用异型钢材，利用角板定位，螺栓连接的无焊接结构。

- a. 零部件的成型尺寸，开孔尺寸，设备间隔实行模数化。（模数 E=20mm, 下同）。
- b. 内部结构件采用镀锌处理。
- c. 外部经磷化处理；然后采用静电环氧粉末喷涂。
- d. 柜架分成母线室、功能单元、电缆室三个相互隔离的区间，可防止事故扩散和便于带电维修。

Features of the Structure

The basic framework of the GCK, GCL is joint-installed structure. All the pieces of the framework are zinc plating and processed by spraying plastic. Screws to form the framework tightly connect them. After the components including the upper door, the back plate, the isolation board, the drawer, the installing supporter, the bus bars and the electric units etc. are added according to the need, a complete controlling center board is finished. The structural features of this board are listed as follows.

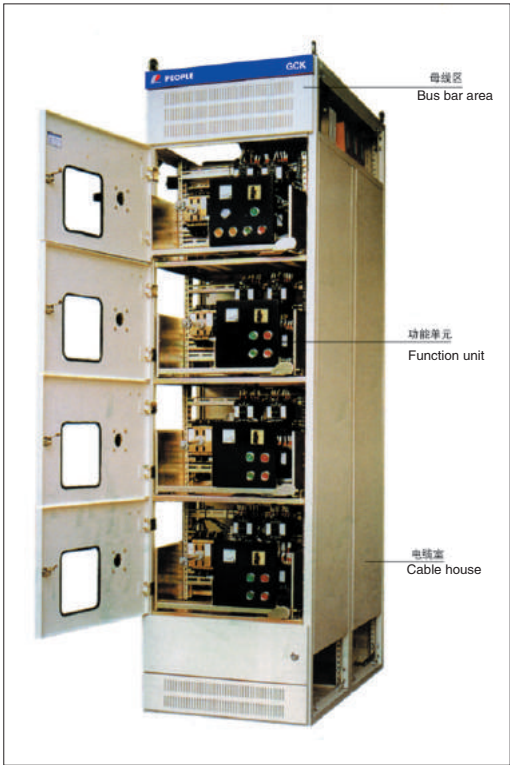
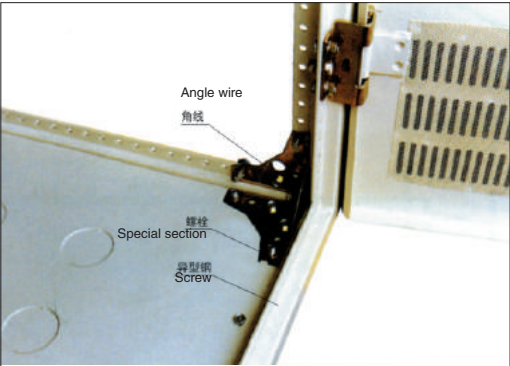
4.1 Shelves of the Board

The shelves of the board adopt special section. They are located by using the angle plate and are connected by screws without welding structure.

- a. Modularization is carried out on the molding size and aperture size of the components and the intervals between the devices. (The module E is equal to 20mm, which is also available in the following part.)
- b. The inside structural components are zinc plating.
- c. The surface receives phosphate treatment and electrostatic epoxy powder coating.
- d. The framework of the board is divided into three isolated areas bus bar house, function unit and cable house. This prevents the accident from being enlarged and brings convenient fixing with electricity.

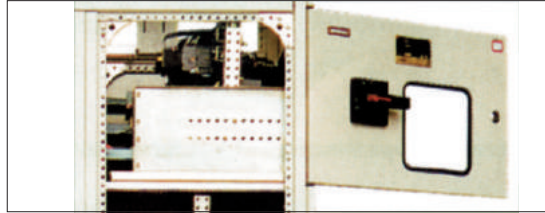
GCK、GCL

系列低压抽出式开关柜



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Low-voltage Switch Boards of the Draw-out Version



5.4 功能单元（抽屉部分）Function Unit (the drawers section)

- a. 功能单元：馈电单元、Function Unit: Feeding Unit.
电动机单元、Electric Motor Unit.
公用电源单元。Public Source Unit.



- b. 抽屉层高度模数为200mm，分为 $\frac{1}{2}$ 单元、1单元、 $1\frac{1}{2}$ 单元、2单元、 $2\frac{1}{2}$ 单元、3单元六个尺寸系列。单元回路额定电流 630A 及以下。
- c. 每台 MCC 柜最多能安装 9 个一单元的抽屉或 18 个 $\frac{1}{2}$ 单元的抽屉。
- d. 隔室的门板由主开关的操作机构与抽屉进行机械连锁，主开关在合闸位置时，门板打不开。
- e. 主开关的操作机构可用一把撬锁锁定在合闸或分闸位置，可安全地进行电器设备的维修。

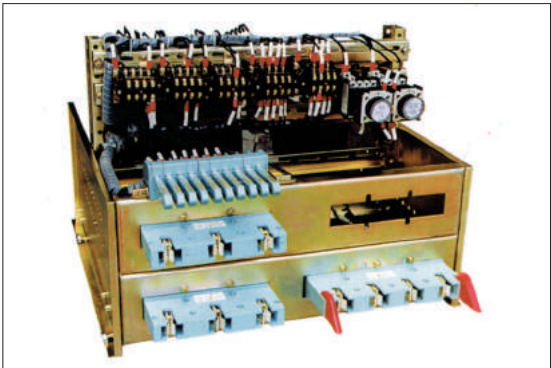
- b. The height module of the drawer layers is 200mm and it has 6 size series: $\frac{1}{2}$ unit, 1 unit, 1 (1/2) units, 2units, 2(1/2) units and 3 units. The rated current of the unit circuit is less equal to 630A.
- c. At most 9 one- unit or 18 one half unit drawers can be installed to the MCC board.
- d. The door board of the isolation house is mechanically interlocked by the manipulation mechanism of the main switch and the drawer. The door board cann' t be opened when the main switch is in the closing location.
- e. The manipulation mechanism of the main switch can be locked in the closing or opening location by a prying lock. The electric equipment can be maintained and fixed safely.

GCK、GCL

系列低压抽出式开关柜



- f. 功能单元隔室采用金属隔板隔开。
- g. 隔室中的活门，随着抽屉的推进和拉出自动打开和封闭，使之在隔室中不能触及垂直母线。
- f. The function unit isolation houses are isolated by metal partitions.
- g. With the pushing and the pulling the drawer, the valve in the isolation house can open and close automatically. Then it won't touch the vertical bus bar in the isolation house.



- h. 功能单元背面具有主电路进出线插头、辅助电路二次插头及接地插头。
- i. 接地插头使抽屉在分离试验连接位置时，保证了保护电路的连续性。
- h. The main circuit in-and-out cable plug, the auxiliary circuit quadratic plug and the earthing plug are installed on the back of the function unit.
- i. The earthin plug guarantee the continuity of the protective circuit when the drawer is in the isolation trial connection location.

GCK, GCL

Low-voltage Switch Boards of the Draw-out Version

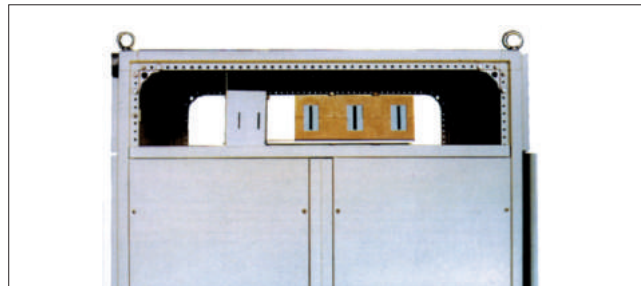


4.3 母线系统

- a. GCK、GCL 母线系统采用三相四线制、三相五线制，水平母线装于柜顶，N 线、PE 线既可以装于柜顶，也可以装于柜下部。
- b. 三相水平母线采用铜母线，机械强度高、散热性好。

4.3 The Bus Bar System

- a. GCK, GCL Bus Bar System adopts triphase four-wire system and triphase five-wire system. The level bus bar is installed on the top of the board. Wire N and wire PE can be installed both on the top and the lower part of the board.
- b. The triphase level bus bars adopt copper ones. They have high mechanical intensity and elimination of heat.

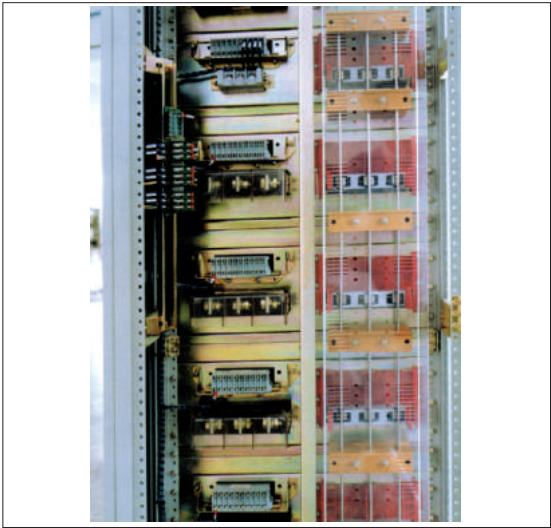


- c. 垂直母线采用碳酸酯工程塑料外壳封闭。

The vertical bus bars adopt the carbonic eater engineering plastics' cover.

GCK、GCL

系列低压抽出式开关柜



外形及安装尺寸

- 有效率安装高度 1800。

5.1 受电柜及母线联络柜

柜宽根据开关电流等级及进出线方式分为

600；800；1000；1200；(800+400)mm；

柜深为 800；1000mm (推荐用 1000mm；

上进上出线柜深必须用 1000mm)

5.2 馈电柜

柜宽：600，800mm

柜深：800，1000mm (推荐用 1000mm；
- 上出线柜深必须用 1000mm)

5.3 电动机控制柜 (MCC)

柜宽：600，600+200mm

柜深：800，1000mm (推荐用 1000mm；

上出线柜深必须用 1000mm)

5.4 功率因数补偿柜

柜宽：600(4、6 路)，800(8 路)，1000(10 路)

柜深：800，1000mm

The Outside Size and the Installing Size

The efficient installing height is 1800.

5.1 The incoming board and the bus bar connection board The width of the board is divided according to the grade of the switch current and the way of in-and-out cable into:600;800;1000;1200; (800+400)mm.

The depth of the board is 800; 1000mm (1000mm is recommended; the depth of the upper in-and-out cable board must be 1000mm.).

5.2 The feeder board

width of the board: 600, 800mm.

depth of the board: 800, 1000mm (1000mm is recommended; the depth of the upper out cable board must be 1000mm).

5.3 The electric motor controlling board (MCC)

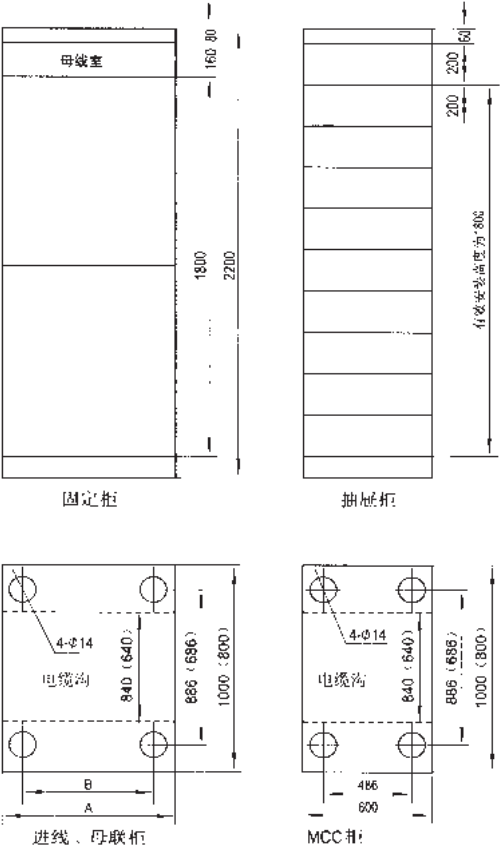
width of the board: 600, 600+200mm.

depth of the board: 800, 1000mm (1000mm is recommended; the depth of the upper out cable board must be 1000mm).

GCK、GCL

Low-voltage Switch Boards of the Draw-out Version

<div> <div>名称</div> <div>尺寸</div> </div>	A	B
受电或馈电	600	486
受电或母联	800	686
受电或母联	1000	886



注：出线柜可组合功能单元的 H 高度为 1600。若不用电源时，可达 1800。

Noting: The H height of the function units which can be combined of the out cable board is 1600. It can reach 1800 when electricity is not used.

GCK、GCL

系列低压抽出式开关柜

订货须知

用户订货时应提供下列资料：

- 6.1 主电路方案编号，单元容量及辅助电路控制方式。（即：就地、远方、自动控制）。
- 6.2 开关柜的排列图和配电室平面布置图。
- 6.3 进出线方式。
- 6.4 开关柜柜体的表面颜色。
- 6.5 上述第 2、3 条如用户不注明，则按我厂标准柜供货。
- 6.6 若用户要求漏电保护时，应在订货时提出。
其它特殊方案可与我厂协商解决。

Ordering Instructions

The following materials should be provided when the products are ordered:

- 6.1 the scheme number of the main circuit; unit capacity and the controlling mode of the auxiliary circuit (that is: local, remote and automatic control).
- 6.2 the pareto diagram of the switch board and the lay out chart of the electricity distribution house.
- 6.3 the mode of the in-and-out cable.
- 6.4 the surface color of the switch board.
- 6.5 If the above princible2 and principle 3 are not mentioned clearly, our factory will supply the standard board.
- 6.6 If the users want to ask for electricity leaking protection, this should be pointed out before the order. As for those special schemes, please negotiate with our factory and solve it together.

MNS

Integrated Low Voltage Switch
Equipment



概述

MNS型低压成套开关设备（以下简称低压开关柜）是我公司结合我国低压成套开关设备的发展趋势，在其电器元件的选用与柜体结构方面进行改进，并重新注册的产品。该产品的电气性能和机械性能完全满足原MNS产品技术要求。

本低压开关柜适用于交流 50 ~ 60Hz, 额定工作电压 660V 及以下的电力系统，作为发电、输电、配电、电能转换和电能消耗的设备控制。

本低压开关柜除一般陆地使用外，经过特殊处理后还可用于海上石油钻采平台和核电站中。

本低压开关柜符合 IEC439、VDE0660 第 5 部分，GB7251-87《低压成套开关设备》标准和 JB/T9661《低压抽出式成套开关设备》行业标准。

General

MNS Integrated Low Voltage Switch Equipment(Named as Low Voltage Switchboard for Short in the following text) is a registered product of our company. RMNS low voltage switchboard is improved both in electric part choosing and in structure designing according to the trend of integrated low voltage switch equipment. The electric and mechanical performance of this product can meet the technical level of the original MNS product.

This low voltage Switchboard can serve as control equipment for generating, transmitting, distributing electricity and transducing or consuming power in AC 50-60Hz electric systems which rated operating voltage should not above 660V.

This low voltage Switchboard can operating in general overland cases and can operating in maritime petroleum mining platform and nuclear power plant after special treatment.

This low voltage Switchboard is compliant with IEC439 , the 5th section of VDE0660, the GB7251 integrated low voltage switch equipment standard and JB/T9661 integrated low voltage draw-out switch equipment standard.

使用环境条件

2.1 周围环境温度不高于+40℃，并在24h内平均温度不高于+35℃，最低环境温度不低于-5℃。

2.2 相对湿度在最高温度为 + 40℃时不超过50%,在较低温度时，允许有较高的相对湿度（例：+20℃时为90%）；

2.3 海拔高度不超过2000m；

2.4 允许在-25℃ ~ +50℃温度条件下运输和储存，并允许在24h内温度不超过+70℃；

2.5 地震烈度低于9度。

Service Environmental Condition

2.1 The ambient temperature is between -5℃ and +40℃, and the mean temperature of 24 hours is not above +35℃.

2.2 Relative humidity is not above 50% when the ambient temperature is not above +40℃. when the temperature is relatively low, higher relative humidity is allowed (For example, the allowed relative humidity is 90% when the ambient temperature is +20℃).

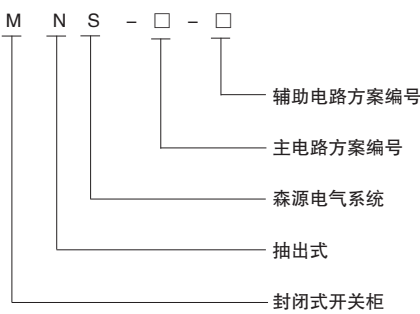
2.3 Altitude is not above 2000m.

2.4 The temperature for transportation and storage is between-25℃ and +50℃, and a temperature below +70℃ is allowed within 24 hours.

2.5 Seismic intensity is below 9 degree.

MNS
型低压成套开关设备

产品型号及含义



技术参数 Technical Parameters

3.1 MNS 型低压开关柜的主要技术参数见表

额定工作电压 (V)		380、660
额定绝缘电压 (V)		660
额定工作电流 (A)	水平母线	630 ~ 5000
	垂直母线	800 ~ 2000*
额定短时耐受电流 有效值 (1s)/ 峰值 (kA)	水平母线	50 ~ 100/105 ~ 250
	垂直母线	60/130 ~ 150
外壳防护等级		IP30、IP40、IP54**
外形尺寸 (宽 × 深 × 高, mm)		600 × 800、1000 × 600、(1000) × 2200

* 垂直母线额定工作电流：单面或双面操作的抽出式 MCC 为 800A，可移式为 1000A；柜深 1000mm 单面操作的 MCC 为 800 ~ 2000A。

** 防护等级 IP54 由于降容情况严重，故不推荐使用。

*The rated operational current of the vertical bus bars:

The rated operational current of the single-sided or dual-sided draw-out MCC is 800A, and that of movable type MCC is1000A. The rated operational current of the single-sided 1000mm MCC is 800-2000A.

**Due to the severe reduction of capacity, the IP54 protection degree is not recommended.

3.2 本产品柜内主要电器技术数据见表

名 称	型 号	主要技术数据	名 称	型 号	主要技术数据
低压断路器	DW914(AH)	600 ~ 4000A	熔断器式隔离器	DCHR1	125 ~ 630A
低压断路器	RDW17	600 ~ 3900A	熔断器式隔离开关	HH15	125 ~ 800A
低压断路器	RDM1系列 RDM2 系列	15 ~ 630A	交流接触器	CJX2-F(RDC6) 系列 CJX2(RDC6) 系列 CJX8 系列	4.7 ~ 630A
低压断路器	DZ47-63 S503	10 ~ 63A	熔断器	NGT 系列 RT20/NT	4 ~ 630A
低压断路器	RDM8 系列 LNA	6 ~ 100A	热过载继电器	JRS2 系列 JRS8/NT	16 ~ 370A
熔断器式 负荷开关	SMP	125 ~ 630A	电流互感器	LMK1 LN LMZ2	15 ~ 5000/5A
熔断器式 负荷开关	OESA	63A	电容器	BSMJ CLMB	~ 400v(内部△)
低压断路器	RDSW6(RDW1)	600 ~ 3200A	低压断路器	M	600 ~ 6300A

结构简介

低压开关柜的基本柜架为组合装配式结构，柜架的全部结构件都经过镀锌处理，通过自攻锁紧螺钉或 8.8 级六角螺钉坚固互相连接成基本柜架，再按方案变化需要，加上相应的门、封板、隔板、安装支架以及母线、功能单元等零部件，组装成一台完整的低压开关柜，开关柜内零部件尺寸、隔室尺寸实行模数化（模数单位 E=25mm，下同）。

4.1 动力配电中心（以下简称 PC）

4.1.1 PC 柜内划分成四个隔室，即水平母线隔室，在柜的后部；功能单元隔室，在柜前上部或柜前左边；电缆隔室，在柜前下部或柜前右边；控制回路隔室，在柜前上部。其分隔措施：水平母线隔室与功能单元隔室、电缆隔室之间用三聚氰胺酚醛夹心板或钢板分隔。控制回路隔室与功能单元隔室之间用阻燃型聚胺脂发泡塑料模制罩壳分隔。左边的功能单元隔室与右边的电缆隔室之间用钢板分隔。

4.1.2 柜内安装的框架式断路器均能在关门状态下实现柜外手动操作，视察断路器的分合闸状态和根据操作机构与门的位置关系，判断出断路器在试验位置还是在工作位置。

4.1.3 主电路与辅助电路之间设计成分隔结构，仪表、信号灯和按钮等组成的辅助电路单元，均安装于塑料板上，板后有一个用阻燃型聚胺脂发泡塑料做成的罩壳与主电路分离。

4.2 抽出式电动机控制中心和小电流的动力配电中心（以下简称为抽出式 MCC）

4.2.1 抽出式 MCC 柜内分成三个隔离室，即柜后部的水平母线隔室，柜前部左边的功能单元隔室，柜前部右边的电缆隔室。水平母线隔室与功能单元隔室之间用阻燃发泡塑料制成的功能壁分隔。电缆隔室与水平母线隔室、功能单元隔室之间用钢板分隔。

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4.2.2 抽出式 MCC 有单面操作和双面操作两种结构。

4.2.3 抽出式 MCC 有五种标准尺寸的抽屉，它们分别是 8E/4、8E/2、8E、16E 和 24E。其中 8E/4 和 8E/2 两种抽屉的结构是用模制的阻燃型塑料件和铝合金型材组成（4 个 8E/4 或 2 个 8E/2 组成一个 8E 高度的间隔）。功能单元隔室的总高度为 72E。

4.2.4 五种标准尺寸的抽屉，一般有 16 个二次隔离触头引出。如果需要，除 8E/4 抽屉外，其它四种抽屉可增加到 32 个。每个静触头的接线端同时可接 3 根导线。上述端头由制造厂随产品提供适量的附件和冷轧钳。

4.2.5 通过机械连锁装置的操作程序，只有当主回路和辅助回路全部断开的状态下才能移动抽屉，机械连锁装置使抽屉具有移动位置、分断位置和分离位置，并用相应的符号标志出来。

机械连锁装置上的操作手柄和主断路器的操作手柄能同时被三把挂锁锁住。

4.3 可移式电动机控制中心和小电流动力配电中心（以下简称可移式 MCC）

4.3.1 可移式 MCC 的柜体结构特征同 4.2 条款中 (a) 和 (b)。

4.3.2 功能单元设计成可移式结构，功能单元与垂直母线的连接采用一次隔离触头，即使与其连接的电路是带电的，也可以从设备中完整地取出和放回该功能单元。另一端为固定式结构。

4.3.3 可移式 MCC 的功能单元分为 3E、6E、8E、16E、24E、32E 和 40E 功能单元隔室，总高度也是 72E。

4.4 母线系统

4.4.1 水平母线（L 1、L 2、L 3）。水平母线安装于柜后独立的母线隔室中，它有两个可选择的安装位置，即柜高 1/3 或 2/3 处。母线可按需要装于上部或下部，也可以上下两组同时安装，两组母线可以单独使用，也可以并联使用。

每相母线由 2 根、4 根或 8 根母排并联，母排截面有 $10 \times 30 \times 2$ ， $10 \times 60 \times 2$ ， $10 \times 80 \times 2$ ， $10 \times 60 \times 4$ ， $10 \times 80 \times 2 \times 2$ 和 $10 \times 60 \times 4 \times 2$ 六种。

4.4.2 垂直母线为 $50 \times 30 \times 5$ 的 L 型铜母线，它被嵌装于用阻燃型塑料制造的功能壁中，带电部分的防护等级达 IP20。

4.4.3 中性线（N 线）和保护接地线（PE 线）。中性线母线和保护接地线母线平行地安装在功能单元隔室的下部和垂直安装在电缆室中。N 线和 PE 线之间如用绝缘子相隔，则 N 线与 PE 线分别使用，两者之间如用导体短接，即成 PEN 线。

4.5 保护接地系统

本开关柜的保护电路由单独装设的并贯穿于整个排列长度的 PE 线（或 PEN 线）和可导电的金属结构件两部分组成。金属结构件除外表的门和封板外，其余都经过镀锌处理。在结构的连处都经过精心设计，使其能通过一定的短路电流。

4.6 辅助电路电缆槽

在功能单元隔室的顶部装有辅助电路电缆槽，槽内可安放柜间连接线和公用电源线。

4.7 辅助电路的隔离措施

在抽出式 MCC 方案的每一回路中，按系统需要可装设一只隔离变压器，变压器容量较交流接触器，规格确定。

Structural introduction

The base frame of the low voltage switchboard is assembled structure. All the parts of the base frame are zincified and assembled by self-locking bolts or 8.8 grade bolts. Then according to the requirement of scheme, other corresponding parts such as door, cover board, clapboard, installation support and bus bars, function units are added to the frame to form a complete LOW VOLTAGE switchboard. The dimension of the parts in the switchboard and the room is modular (modular unit=25mm, the same below)

4.1 Power distribution center (PC for short) a. PC board is divided into 4 rooms. The horizontal busbars room is at the back of the PC board; the function unit room at the front-top or on the front-left; the cable room at the front-bottom or on the front-right; the control circuit room at the front-top. Isolating measures are as follows: the horizontal bus bars room, the function unit room and the

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Integrated Low Voltage Switch Equipment

cable room are isolated by melamine phenolic board or steel board. The control circuit room and function unit room are isolated by flame retardant melamine expanded plastic molding case. The left function unit room and the right cable room are isolated by steel board.

b. The frame type breaker in the board can be manually operated without opening the door. Operators can determine whether the breaker is in the testing position or in the operating position by observing the state of the breaker.

c. The main circuit and the auxiliary circuit are separated. The meters, signal lights and buttons of the auxiliary circuit are installed on a plastic board. There is a flame retardant melamine expanded plastic case behind the board to separating the auxiliary circuit from the main circuit.

4.2 Draw-out motor control center and small current power distribution center (Draw-out MCC for short below)

a. Draw-out MCC cabinet is divided into 3 room i.e. the horizontal bus bars room at the back, the function unit room on the front-left, and the cable room on the front-right. The horizontal bus bars room and function unit room are isolated by flame retardant expanded plastic board. The cable room and the horizontal bus bars room or the function unit room are isolated by steel board.

b. Draw-out MCC has single operating side version and dual operating side version.

c. Draw-out MCC has 5 types of standard drawers. They are 8E/4, 8E/2, 8E, 16E and 24E. The 8E/4 and 8E/2 drawers are made up of molding flame retardant plastic and aluminium alloy (4 8E/4 drawers or 2 8E/2 drawers make a space of 8E height). The total height of the function unit room is 72E.

d. The 5 types of drawers usually have 16 quadric isolating contacts. The contacts of all types of drawers except for 8E/4 can be added up to 32. The terminal of each contact can be connected with 3 wires. Accessories and cold rolling grips for the terminals are applied by the manufacturer.

e. According to the operating procedure of the mechanical interlocking device, the drawers can only be moved when the main circuit and the auxiliary are both disconnected. The draws have 3 positions: moving position, switching position and isolating position. They are denoted by corresponding denotations.

The handle of the mechanical interlocking device and the handle of the main breaker can be locked by three locks.

4.3 Movable motor control center and small current power distribution center (Movable MCC for short below)

a. The structural features of the Movable MCC board are the same as the items of a. and b. in section 4.2.

b. The function unit is movable, and it is connected with the vertical bus bars by primary isolating contacts. Even though the corresponding circuit is not disconnected, the function unit can be fetched out and in. The other side of the function unit is fixable.

c. The types of the function unit room of Movable MCC are 3E, 6E, 8E, 16E, 24E, 32E and 40E. The total height of the function unit is 72E.

4.4 Bus bars system

a. Horizontal bus bars (L1, L2, L3): The horizontal bus bars are installed in the isolating bus bars room at the back of the board. They have 2 options of installing positions i.e. the first third of the board height and the second third of the board height. The bus bars can be installed at either top or bottom in the board or in both positions. The 2 bus bars can operate individually or parallelly.

Each bus bars is composed of 2 or 4 or parallel buses. The sizes of the bus sections are $10 \times 30 \times 2$, $10 \times 60 \times 2$, $10 \times 80 \times 2$, $10 \times 60 \times 4$, $10 \times 80 \times 2 \times 2$ or $10 \times 60 \times 4 \times 2$.

b. The vertical bus bars are L type copper bus bars which size are $50 \times 30 \times 5$. They are embedded in the flame retardant plastic function walls, and the protection degree of the electriferous part of them is IP20.

c. The neutral bus bar (N bus bar) and the protecting earth bus bar (PE bus bar): The N bus bar and the PE bus bar are parallelly installed at the bottom of the function unit cabinet and vertically installed in the cable cabinet. The N bus bar and the PE bus bar operate individually if they are insulated, and they form PEN bus bars if they are connected.

4.5 Protecting earth system The protecting circuit of the switchboard is composed of PE bus bar (or PEN bus bar) and conductive metal component. The PE bus bar (or PEN bus bar) is individually installed and runs through all the length of the bus bars. All parts of the metal component except for the door and cover board are zincified. The elaborate designed connections of the component can endure a short-circuit current of certain value.

4.6 Cable groove of the auxiliary circuit The cable groove of the auxiliary circuit is installed at the top of the function unit room. Inter-board cable and common power cable can be installed in the groove.

4.7 Isolating measures of the auxiliary circuit In each circuit of the draw-out MCC scheme, an isolating transformer can be installed according to the requirement of the system. The capacity of the transformer is in accordance with the AC contactor and the specification.

一次方案的排列组合

5.1 功能单元隔的总高度为 72E。

5.2 在同一台开关柜中，功能单元的一般排列规律是小功能单元在上，大功能单元在下。

5.3 8E/4 抽屉为 4 个组成一个 8 E 安装单元，8 E/2 抽屉为 2 个组成一个 8E 安装单元。

5.4 方案中所画的电流互感器为本方案中最多安装数量（方案 03-06、12 ~ 17 中可增加一只电流互感器，用于无功功率补偿回路）。在实际使用中可按系统需要而减少或不装。

5.5 本开关柜的深度有 600mm（MCC 单面操作柜）和 1000mm（PC 和 MCC 双面操作柜）两种，推荐 PC 和 MCC 柜分开排列使用。

5.6 当 PC 和 MCC 二种柜并排排列时，则将单面操作的 MCC 柜加深到 1000mm，或把与 PC 相邻的双面操作柜改为单面操作柜。

5.7 母线桥选用时应注意母线桥宽度与开关柜一样宽，所以母线桥只能架，设于两边相同宽度的开关柜上；在标准的 MCC 柜上不能架设母线桥，如要架设应按 6.6 条处理；在 600mm 宽的柜体上架设母线桥，其最大额定电流不大于 1500A。

5.8 DCHR1 型熔断器式隔离器与其它 MCC 方案组合时，最小应留有 1E 的空隙。

5.9 在每台 MCC 柜中需留有适当的备用功能单元，不能为长期运行的功能单元或不装功能单元的空格。

The arrangement of the primary scheme

5.1 The total height of the function unit room is 72E.

5.2 The general arrangement principle of the function unit is that the small units is above the big ones in the same switchboard.

5.3 The 8E assembled unit is composed of 4 8E/4 drawers or 2 8E/2 drawers.

5.4 The number of the current transformers in the scheme is the maximum value (In scheme 03-06, 12-17, a current transformer can be added to serve in the reactive power compensation circuit). In actual application, you can install no or fewer current transformer according to the requirement of the system.

5.5 The depth of the switchboard can be 600mm (for mono-side MCC) or 1000mm(PC or dual-side MCC). Arranging PC boards and MCC boards respectively are recommendable.

5.6 When arranging PC and MCC together, the depth of the mono-side MCC should be added up to 1000mm, or the dual-side MCC near the PC should be changed into mono-side operating mode.

5.7 When choosing the bus bars bridge, the width of the bus bars bridge should be equal to that of the switchboard. Therefore, the bus bars bridge should be spanned on switchboards of the same width. The bus bars bridge should not be spanned on the standard MCC. If necessary, spans it according to paragraph 6.6. If the bus bars bridge is spanned on switchboard of a 600mm width, the maximum rated current should not be above 1500A.

5.8 When combining the DCHR1 fuse type isolator with other MCC scheme, a 1E space should be kept.

5.9 Between each MCC, spare function unit should be installed. Long-term running function unit or space without function unit is not allowed.

外形及安装尺寸

本开关柜架的外形尺寸见图 1。MNS 型抽出式 MCC、（ PC 柜 ）的外形尺寸见图 2 ~ 图 5，安装尺寸图见图 6。

The figure and installation dimension

The general dimension of the cabinet is showed in fig.1. The general dimension of MNS draw-out MCC(or PC) is showed in fig.2~5. The installation dimension is showed in fig.6.

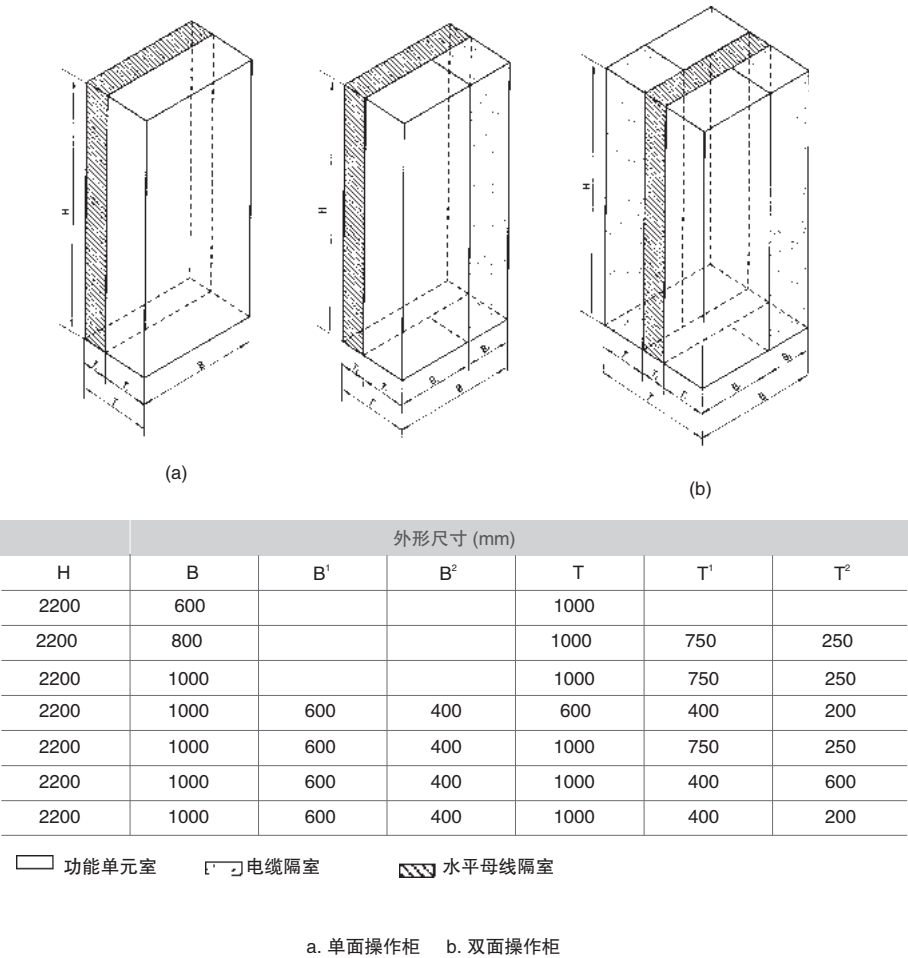


图 1 MNS 型低压开关柜柜架的外形尺寸

fig.1 The general dimension of MNS low voltage switchboard s frame

MNS
型低压成套开关设备

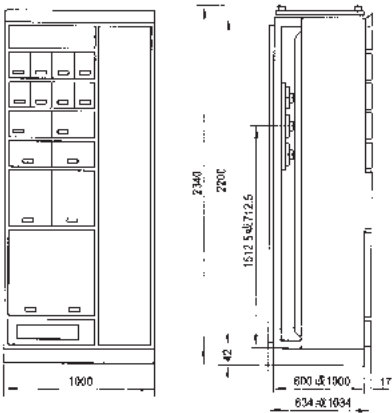


图2 抽出式MCC柜 (单面操作)

fig.2 Draw-out MCC
(Cabinet operated on mono-side)

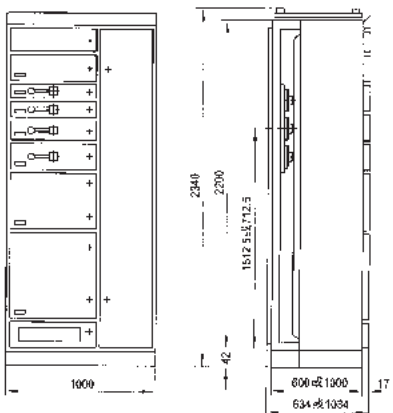


图3 可移式 MCC (单面操作)

fig.3 Movable MCC
(Cabinet operated on mono-side)

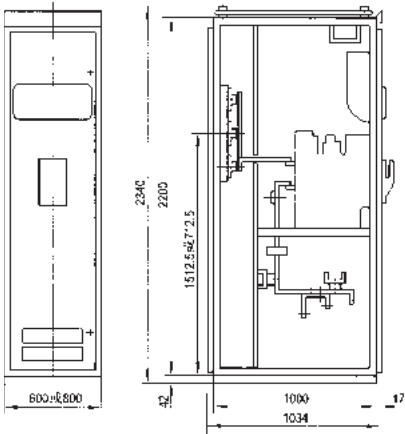


图4 PC 柜 (DW914)

fig.4 PC (DW914)

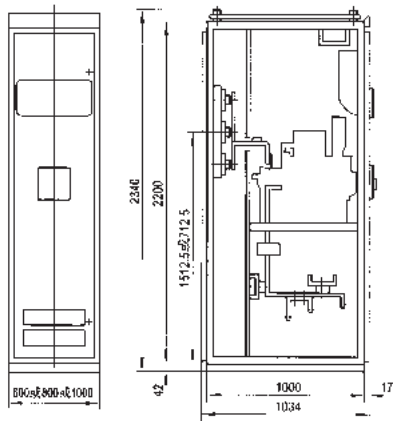
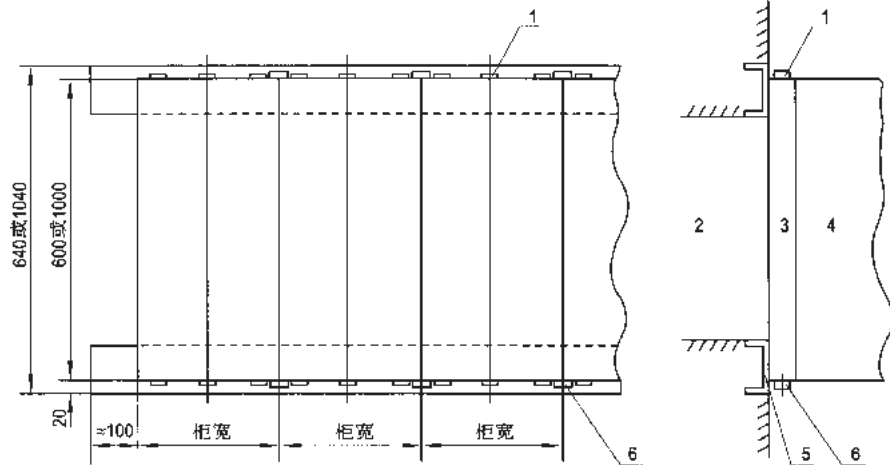


图5 PC 柜 (RDW17-630 ~ 3205)

fig.5 PC (RDW17-630-3205)

MNS

Integrated Low Voltage Switch
Equipment



1、电焊处 2、电缆沟 3、开关柜底 4、开关柜 5、10# 槽钢 6、连接板

1.Welding position 2. Cable groove 3. The bottom of the cabinet 4.Switchboard

5.10# channel steel 6.Connection board

图 6 MNS 型低压开关柜安装尺寸图

fig.6 The installation dimension of MNS low voltage switchboard.

抽屉式 MCC 柜操作须知

7.1 抽屉底部应正确插入导向件后，才能向柜内推动，否则将会发生损坏抽屉或拉不出等不良现象。

7.2 8E/4 和 8E/2 抽屉面板上的符号标志和作用（见图 7）。图中从分断位置“O”到工作位置“Ⅰ”的箭头表示为，先将操作手柄向里推进后将手柄从“O”旋转到“Ⅰ”即可，返回时不须推动，只要将手柄“Ⅰ”旋向“O”，放手后，手柄将自动弹出。

7.3 8E ~ 24E 抽屉面板上的符号标志和作用（见图 8）。当手柄到达工作位置时，机构对开关解除机械闭锁，这时主开关方可进行合闸和分闸操作。但是，当主开关合闸后，联锁机构的手柄就不能操作。

7.4 在符号标志的右下角门上有一塑料小盖，这是门的解锁机构，操作过程如下：当抽屉在工作位置时，如要开门，则先将小盖拔出。然后用螺丝刀插入孔内向下移动锁扣即可开门，关闭后务必将塑料小盖盖上，否则将破坏原有的防护等级。

MNS
型低压成套开关设备

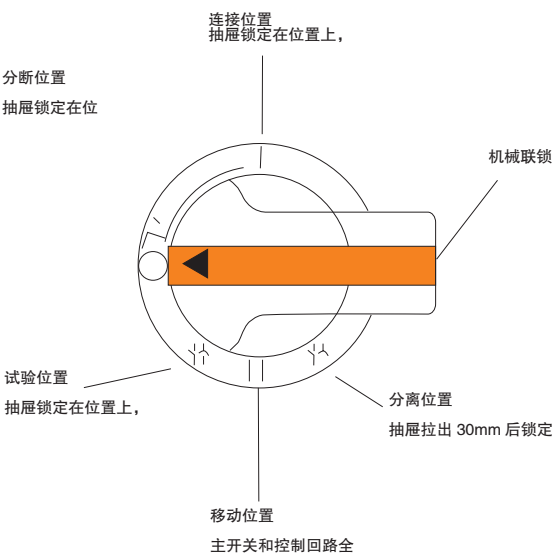


图7 8E/4和8E/2抽屉操作手柄位置图
-fig.7 The position of 8E-24E drawers'handle

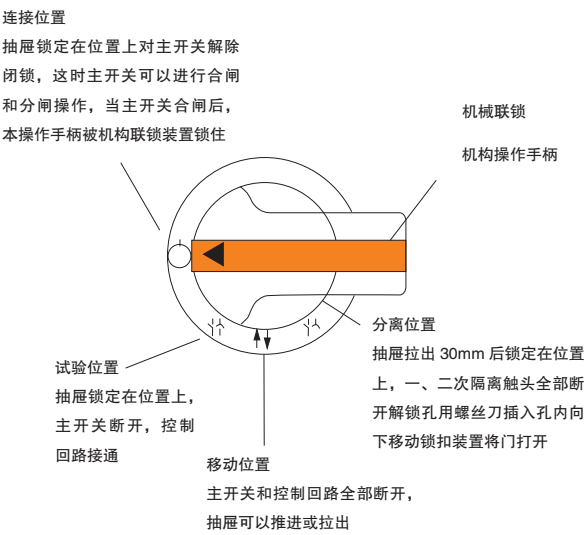


图 7 8E ~ 24E 抽屉操作手柄位置图
-fig.7 The position of 8E-24E drawers'handle

Operating specification of draw-out MCC

7.1 The drawers should be pushed into the switchboard after inserting oriented part below its bottom. Or the drawers will be damaged or cannot be pulled out.

7.2 The signature on the panel of 8E/4 and 8E/2 drawers and its function is showed in fig.7. The arrow from the switching position “O” to the operating position “I” in the diagram represents that: Push the handle and rotate it from the position “O” to “I”. The reverse procedure need not to push the handle and only need to rotate it from the position “I” to “O”. When the handle reach the position “O”, release it and it will rebound.

7.3 The signature on the panel of 8E-24E drawers and its function is showed in fig.8. When the handle reaching the operating position, the machine relieve the lock of the switch and the main switch can be switched on or switched off. However, if the main switch is switched on, the handle of the interlock machine is disabled.

7.4 At the right-bottom corner of the signature there is a small plastic cover. It is the unlocking machine of the door. The unlocking procedure is as follows: when the drawer is in the operating position, pull out the cover, insert a screwdriver into the hole and move the lock down. Thus the door is unlocked. Make sure to cover the small plastic cover after closing the door, or the original protecting degree will be damaged.

订货须知

订货时，用户应提供下列资料数据：

8.1 一次回路方案及单线系统图。

8.2 二次回路原理图或接线图。

8.3 柜的排列图和配电室的平面布置图。

8.4 每台开关柜所装各种电器设备的平面布置图。

8.5 提供水平母线的工作电流和短路电流，并按工厂标准选取母线规格，工厂标准母线规格是 10×30×2、10×60×2、10×80×2、10×60×4、10×80×2×2、10×60×4×2，如不注明母线规格，则由工厂选定。

8.6 提供每个回路的使用名称，字数限制在 10 个字以内，如不提供，制造厂仅提供空白符号牌。

8.7 如需对辅助电路中的控制开关或转换开关、按钮等标志功能名称，则需提供内容。

8.8 抽屉的试验位置是用位置开关来实现的，如需要此试验位置，则需在系统中串入该触点。

Information for order

Please offer the following information when ordering the equipment:

8.1 The primary circuit scheme and the mono-wiring diagram of the system.

8.2 The secondary circuit scheme or the wiring diagram.

8.3 The arrangement diagram of the switchboard and the planar arrangement diagram of the distribution room

8.4 The planar arrangement diagram of the electrical equipment in each switchboard

8.5 Offer the operating current and the short-time current of the horizontal bus bars and choose the size of the bus bars. The sizes of the standard bus bars of the manufacturer are 10×30×2, 10×60×2, 10×80×2, 10×60×4, 10×80×2×2, 10×60×2×4. If not specified, the size of the bus bars is chose by the manufacturer.

8.6 Offer the name of each circuit, and the names of the circuits are limited to 10 letters. If the names are not given, the manufacturer will offer blank plate.

8.7 If you want to give name to the control switches, transfer switches and buttons of the auxiliary circuit, you should offer the corresponding information.

8.8 The testing position of the drawers is formed by position switch. If you want to posses the testing position, please add this contact to the system.

GGD

型交流低压配电柜



概述

GGD型交流低压配电柜适用于发电厂、变电所、工业企业等电力用户作为交流50Hz，额定工作电压380V，额定电流至3150A的配电系统中作为动力，照明及配电设备的电能转换、分配与控制之用。该产品分断能力高，额定短时耐受电流达50kA。线路方案灵活、组合方便、实用性强、结构新颖等特点。该产品是我国组装式、固定面板开关柜的代表产品之一。

该产品符合IEC439《低压成套开关设备和控制设备》，GB7251《低压成套开关设备中》等标准。

General

GGD AC low voltage distribution board is applicable to power plants, transformer substations and industrial corporations. It serves as power source, power transformation, distribution and control equipment of illumination and distribution equipment in AC 50Hz distribution systems which rated voltage is 380V and rated current is not above 3150A. The product has high breaking capacity, and its rated prospective short-circuit withstand current can reach 50kA. Because of its flexible wiring scheme, it provides convenient arrangement, favorable practicability and novel structure. The product is representative product of national assembled and fixable switchboard.

The product is compliant with Low Voltage Unit Switch Equipment and Control Equipment standard IEC439 and Low Voltage Unit Switch Equipment standard GB7251.

使用条件

- 2.1 周围空气温度不高于 + 40℃，不低于 - 5℃。24h 内的平均温度不得高于 + 35℃。
- 2.2 户内安装使用，使用地点的海拔不得超过 2000M。
- 2.3 周围空气相对湿度在最高温度为 + 40℃时不超过 50%，在较低温度时允许有较大的相对湿度：（例如 + 20℃时为 90%）应考虑到由于温度的变化可能会偶然产生凝露的影响。
- 2.4 设备安装时与垂直面的倾斜度不超过 5%。
- 2.5 设备应安装在无剧烈震动和冲击的地方，以及不足使电器元件受到腐蚀的场所。
- 2.6 用户有特殊要求时可与本公司协商解决。

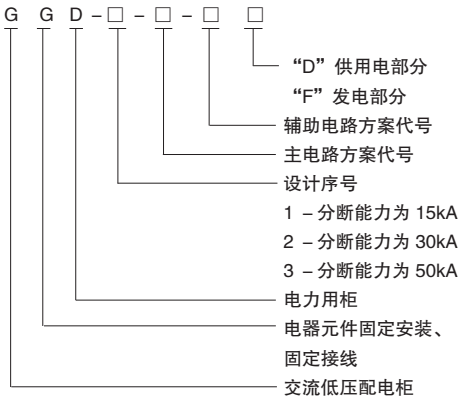
Service condition

- 2.1 The ambient temperature is between -5℃ and +40℃, and the mean temperature of 24 hours is not above +35℃.
- 2.2 It has outdoor installation. The altitude is not above 2000m.
- 2.3 Relative humidity is not above 50% when the ambient temperature is not above +40℃. when the temperature is relatively low, higher relative humidity is allowed (For example, the allowed relative humidity is 90% when the ambient temperature is +20℃). Condensation may occur occasionally due to temperature alternation.
- 2.4 The lean between equipment and vertical plane should not exceed 5% during installation.
- 2.5 In order to protect the electric components, the equipment should be mounted in a concussion and corrosion proof site.
- 2.6 Please consult our company if you have special requirement.

GGD

AC (alternating current) Low
Voltage Distribution Board

产品型号及含义



主要技术参数 Main technical parameters

4.1 基本电气参数见表 The basic electric technical parameters are showed in table 1

型 号	额定电压 (V)	额定电流 (A)		额定短路开关电流 (kA)	额定短时耐受电流(I _S) (kA)	额定峰值耐受电流(kA)
GGD1	380	A	1000	15	15	30
		B	600(630)			
		C	400			
GGD2	380	A	1500(1600)	30	30	63
		B	1000			
		C	600			
GGD3	380	A	3150	50	50	105
		B	2500			
		C	2000			

4.2 辅助电路方案

辅助电路的设计分供电方案和发电厂方案两部分。

4.3 主母线

额定电流在1500A及以下时采用单铜排母线。额定电流大于1500A时采用双铜排母线。母线的搭接面均采用搪锡工艺处理。

4.4 电器元件选择

a. GGD 柜主要采用国内已能批量生产的较先进的电器元件。

GGD

型交流低压配电柜

如RDW17、DZ20、DW15等。

b. HD13BX和HS13BX型旋转操作式刀开关是NLS为满足GGD柜独特结构的需要而设计的专用元件，它改变了机构的操作方式，保留了老产品的优点，是一种实用新型的电器元件。

c. 如设计部门根据用户需要，选用性能更优良，技术更先进的新型电器元件时，因GGD柜具有良好的安装灵活性，一般不会因更新电器元件造成制造和安装方面的困难。

d. 为进一步提高电路的动稳定能力，GGD柜的母线支撑采用专用的ZMJ型组合式母线夹和绝缘支撑件。母线夹由高强度、高阻燃型PPO复合材料热塑成型，绝缘强度高、自熄性能好，结构独特，只需调整积木式间块即可方便地组合成单母线或双母线夹。绝缘支撑是套筒式模压结构，成本低、强度高、解决了老产品爬电距离不够的缺陷。

4.2 Scheme of the auxiliary circuit

The scheme of the auxiliary circuit is composed of power supply scheme and power generation scheme.

4.3 Main busbars

The main busbars is mono-row copper busbars when the rated current is not above 1500A and is dual-row copper busbars when the rated current is above 1500A. The lap joints of the busbars are tin-coated.

4.4 Electric components choosing

a. The electric components of GGD board are mainly advanced batch component such as RDW17, DZ20, DW15 etc.

b. HD13BX and HS13BX rotary operating knife switches are special components meeting the requirement of the unique structure of GGD board which are designed by NLS. They are novel practical components, and they both change the operating pattern of the machine and reserve the advantages of the old product.

c. Because of the flexible installation of the GGD board, updating electric component causes no difficulties of manufacture and installation when the designer choose components of more excellent performance and more advanced technique according to the requirement of the client.

d. In order to improve the homeostasis of the circuit, the busbars support of the GGD board introduces special ZMJ combined busbars gripper and insulated support. The grippers are made up of thermo-molding PPO composite which has high intension and high flame retardance. The grippers have good self-quenching performance and unique structure. They can compose mono-gripper and dual-grippers only by adjusting the building blocks. The insulated support is press mold sleeve. It has low cost and high intension and overcome the insufficiency of power delivery distance of the old product.

结构特点

5.1 GGD 型交流低压配电柜的柜体采用通用柜的形式，框架用 8MF 冷弯型钢局部焊接或组装而成，框架零件及专用配套零件由本公司生产配套供货，以保证柜体的精度和质量。通用柜的零部件按模块原理设计，并有 20 模的安装孔，通用系数高。可以使工厂实现予生产。既缩短了生产制造周期，也提高了工作效率。

5.2 GGD 柜设计时充分考虑到柜体运行中的散热问题。在柜体上下两端均有不同数量的散热槽孔，当柜内电器元件发热时，热量上升，通过上端槽孔排出，而冷风不断地由下端槽孔补充进柜，使密封的柜体自下而上形成一个自然通风道，达到散热的目的。

5.3 GGD 柜按照现代工业产品造型设计的要求，采用黄金分割比的方法设计柜体外形和各部分的分割尺寸，使整柜美观大方。

5.4 柜门用转轴式活动铰链与构架相连、安装、拆卸方便。门的折边处均嵌有一根山型橡塑条，关门时门与构架之间的嵌条有一定的压缩行程，能防止门与柜体直接碰撞，也提高了门的防护等级。

5.5 装有电器元件的仪表门用多股软铜线与构架相连。柜内的安装件与框架间用滚花垫圈连接，整柜构成完整的接地保护系统。

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AC (alternating current) Low
Voltage Distribution Board

- 5.6 柜体面漆可选用聚脂桔形烘漆, 亦可选用喷塑粉工艺处理。均具有附着力强、质感好的特点。整柜呈亚光色调, 避免了眩光效应, 给值班人员创造了较舒适的视觉环境。
- 5.7 柜体的顶盖在需要时可拆除, 便于现场母线线的装配和调整, 柜顶的四角装有吊环, 用于起吊和装运。
- 5.8 柜体的防护等级为 IP30, 用户也可根据使用环境的要求在 IP20 ~ IP40 之间选择。

Structural features

5.1 The cabinet of GGD AC low voltage distribution board is of general form. The frame of it is composed of 8MF cold bending steel through welding and assembling. The parts of the frame and the special fittings should be supplied by our company in order to ensure the precision and the quality of the cabinet.

The parts of the general form cabinet are designed according to modularization principle. Furthermore, the cabinet has 20 modulus mounting holes. This improves the compatible coefficient of the cabinet and enables the factory to realize beforehand production. Therefore, the period of manufacture is reduced and the productivity is improved.

5.2 The heat dispersion problem is fully considered when designing the cabinet. There are various numbers of holes for heat dispersion at both the top and the bottom of the cabinet. When the electric components emit heat, the heat rises and disperses from the holes at the top. Simultaneously, cold air comes into the cabinet from the holes at the bottom. Thus a natural venting path is formed from bottom to top in the closed cabinet and the heat can be dispersed.

5.3 The GGD board is designed according to the requirement of modern formal designing of industrial product. The figure of the cabinet and the size each parts of the cabinet are compliant with golden section, so the whole cabinet is graceful.

5.4 The door is connected with the frame by rotatory active gemels. It can be assembled and disassembled conveniently. Each edge of the door has hill-shape elastomer strip. The strip can be compressed when the door is opened and closed. Therefore, the collision between the door and the cabinet is avoided and the protecting degree of the door is improved.

5.5 The instrument door on which the electric components installed is connected with the frame by multi soft copper strings. The fittings in the cabinet are connected with the frame by gridding washers. The whole cabinet forms complete protecting earth system.

5.6 The surface of the cabinet is painted with orange polyester baking paint or is processed with spray-plastic procedure. The features of this painting procedure are high adherence, fine texture etc. The whole cabinet is in a subdued hue. It avoids the dizzy hue effect and creates a comfortable visual environment for the operators.

5.7 The cover of the cabinet can be disassembled if necessary, so that the main busbars assembly and adjustment can be executed on the spot. There are hoisting rings at each top corner of the cabinet in order to hoist and handle the equipment.

5.8 The protecting degree of the cabinet is IP30. Other protecting degrees between IP20 and IP40 are available according to the service condition.

安装及使用

产品到达收货地点后，首先应当检查包装是否完整无损，发现问题应及时通知有关部门查找原因。对于不立即安装的产品，应根据正常使用条件的规定，置于适当的场所。

6.1 外型及安装

a. 外型结构（见图 1）

b. 产品的安装应按安装示意图进行（见图 2），基础槽钢和螺栓由用户自备，主母线安装时应将搭接面修理平整，处理干净，然后用螺栓紧固。

6.2 产品在安装完毕后，投入运行前需进行如下项目的检查与试验。

a. 检查柜体面漆有无脱落，柜内是否干燥、清洁。

b. 电器元件的操作机构是否灵活，不应有卡滞或操作力过大现象。

c. 主要电器的通断是否可靠、准确。辅助接点的通断是否可靠准确。

d. 仪表指示与互感器的变比及极性是否正确。

e. 母线连接是否良好，绝缘支撑件、安装件及附件是否安装牢固可靠。

f. 辅助接点是否符合要求，熔断器的熔芯规格是否正确，继电器的整定值是否符合设计要求。动作是否正确。

g. 电路的接点是否符合电器原理图要求。

h. 保护电路系统是否符合要求。

i. 用 500 伏兆欧表测量绝缘电阻值不得低于 1 兆欧。

6.3 使用注意事项

a. 本产品为不靠墙安装，单面（正面）操作，双面开门维修的低压配电柜。产品的维修通道及柜门，必须经考核合格的专业人员方可进入或开启进行操作、检查和维修。

b. 空气断路器经过多次合、分后，会使主触点局部烧伤和产生碳类物质，使接触电阻增大，应定期对空气断路器按其使用说明书进行维护和检修。

Installation and Operation

On receiving the product, examine the packing immediately to check that no signs of damage are apparent. If the product is visibly damaged, inform the corresponding department to determine the cause. If the product is not installed immediately, it should be sited in proper place according to the proper operating regulations.

6.1 Figure and installation

a. Structure of the figure (see fig. 1)

b. The product installation should be held according to the installation sketch map (see fig.2). You should prepare the basis channel steel and bolts, then smooth and clean the joint surface for the main busbars installation and tighten the assembly by bolts.

6.2 After installation, you should carry commissioning and check the following before operation:

a. Whether the paint of the cabinet surface has flaked and whether it is dry and clean in the cabinet.

b. Whether the operating machine of the electric components is flexible and whether blockage or excessive operating force occurs.

c. Whether mainly electric components work reliably and perfectly and the auxiliary contacts switch reliably and perfectly.

d. Whether the instruments indicate correctly and the transformers transform properly.

e. Whether the busbars connection is perfect and the assembly of the insulated support, fittings and accessories is tightened.

f. Whether the auxiliary contacts are in accordance with requirement, the specifications of the fuses are proper and the relays are tuned according to the designing parameters and work properly.

GGD

AC (alternating current) Low
Voltage Distribution Board

- g. Whether the connections of the circuit is compliant with the circuit diagram.
- h. Whether the protecting system of the circuit meets the requirement.
- i. Whether the insulated resistance measured by 500VA multimeter is not below 1 million ohm.

6.3 Operating precaution

- a. The product should not be installed near the wall. It has one side (front side) for operating and dual doors for maintaining. All maintenance of the cabinet should be carried by trained and qualified personnel through opening the maintaining door.
- b. Air breaker may create partial burns of the main contact and generate carbonic matter after many times of switching. This causes the increase of the contact resistance. You should carry periodic inspection and maintenance of the air breaker according to its manual.

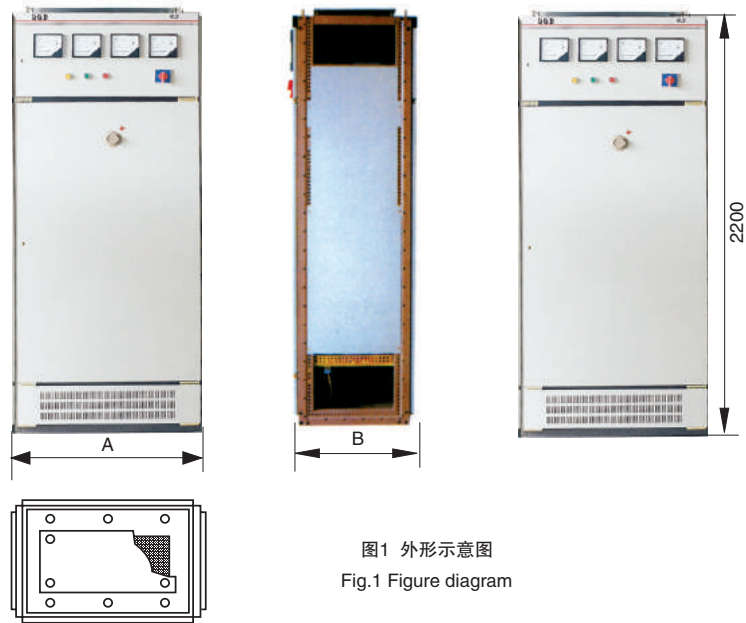


图1 外形示意图
Fig.1 Figure diagram

产品代号	A	B
GGD 06	600	600
GGD 06A	600	800
GGD 08	800	600
GGD 08A	800	800
GGD 10	1000	600
GGD 10A	1000	800
GGD 12	1200	800

GGD

型交流低压配电柜

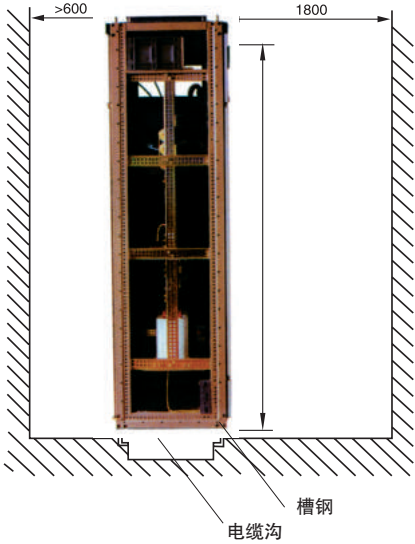
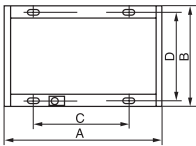


图 2 安装示意图
Fig.2 Installation diagram

产品代号	A	B	C	D
GGD 06	600	600	450	556
GGD 06A	600	800	450	756
GGD 08	800	600	650	556
GGD 08A	800	800	650	756
GGD 10	1000	600	850	556
GGD 10A	1000	800	850	756
GGD 12	1200	800	1050	756

订货须知

- a. 产品的全型号（包括主电路方案号和辅助电路方案号）。
- b. 主电路系统组合顺序图。
- c. 辅助电路电气原理图。
- d. 柜内元器件清单。
- e. 其它与产品正常使用条件不符的特殊要求。

Ordering notice

- a:The whole model of the product(including the scheme number of the lead circuit and the assistant circuit).
- b:The compose photo in turn of the lead circuit system.
- c:The electricity principle photo for the assistant circuit.
- d:The detailed list of the component in the case.
- e:Other special request that is unsuitable for normal using condition of the product.

RMJ

series product of low-voltage
distributing cabinet



适用范围

我公司根据国家电力部有关精神及农村电网无功补偿的若干文件，面向农网低压配电地区的发展方向，研制开发了RMJ型低压无功自动补偿配电柜系列产品。

RMJ型低压无功补偿配电装置适用于交流50Hz，额定电压0.4kV以下的输配电系统。该系列产品融自动补偿和配电为一体，集漏电保护，电能计量、过流、过压、缺相保护等多功能为一体的新型户内外低压配电柜，该产品具有体积小、易安装、防窃电、成本低、适应强、耐老化、投运准确，无补偿误差等特点。具有防护等级高，保护性能完善，自动化程序高等优点，是理想的电网改造适选产品。

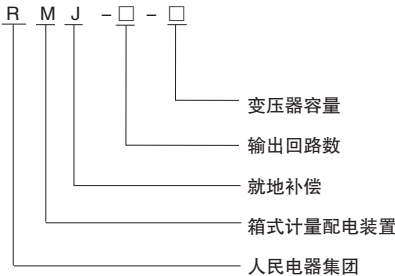
该产品符合IEC439《低压成套开关设备和控制设备》、GB7251.1-97《低压成套开关设备》等标准。

Scope of application

Our company researched and developed the RMJ series product of low-voltage distributing cabinet with powerless automatic compensation depending on the development direction facing the low-voltage distribution area of rural electrical power according to the related spirit and several documents about the powerless compensation of country electrical net issued by the national power ministry.

RMJ low-voltage distributing cabinet with powerless automatic compensation is applicable to the transmission and distribution system which is AC 50Hz and the rated current is below 0.4kV. This series of product is a new indoor and outdoor lower-voltage distributing cabinet integrating the automatic compensation and distribution as well as integrating multi functions such as the leakage protection, calculation of electrical energy, overcurrent, overvoltage and open-phase protection and so on. This product has the features such as small volume, easy installation, electric larceny protection, low cost, high adaptation, weathering proof accurate operation and no compensation error area and so on. It has the advantages such as high degree of protection, perfect protection performance and high automation degree and so on. It is a ideal product available for reconstruction of electrical network.

型号及其含义



工作原理

装置的计量用 DD862 型单相电度表或 DT862 型三相四线电度表及 0.5 级电流互感器；CJ20 型交流接触器作为电源总控制；分路配电采用 RDM1 型塑料外壳式断路器；由新型 RDJD2 型鉴相鉴幅无声运行漏电继电器控制 CJ20 型交流接触器有效地进行漏电和触电保护；JKL5C 型无功功率控制器监控并自动投切 BSMJ 型自愈式低压并联电容器进行无功补偿。

RMJ

型低压无功补偿配电装置

Operating principle

The metering of device is by means of the DD862 3-phase/ 4 wires wathour meter and class 0.5 current transformer. The CJ20 AC contactor is used as the total control for power supply. For the shunt distribution, the RDM1 plastic housing circuit breaker is used. The new RDJD2 phase demodulation & amplitude discrimination leakage relay with no noise operation controls the CJ20 AC contactor for effective leakage and electric shock protection. JKL5C powerless power controller monitors and switches on and off BSMJ self-recovery low-voltage parallel capacitor for powerless compensation.

工作条件

- 3.1周围空气温度：不高于 + 40℃，并且24h内其平均温度不高于+35℃，不低于 - 25℃。
- 3.2 海拔高度：≤ 2000M；
- 3.3 安装倾斜度不超过 ± 5° 。
- 3.4 周围无剧烈振动，无腐蚀性气体和导电尘埃。
- 外壳防护等级：IP55
- 3.1 Ambient air temperature: ≤+40℃ and the average temperature is not higher than +35℃ and not less than -25℃ .
- 3.2 Altitude: ≤ 2000M.
- 3.3 Installation inclination does not excess to ± 5° .
- 3.4 there is no severe vibration and corrosive gas as well as the conductive dust around the switch cabinet.
- Protection degree of housing: IP55.

产品性能

- 额定电压：AC400V 50Hz
- 额定容量：20 ~ 250Kva
- 无功补偿容量：4 ~ 60Kvar
- 漏电动作电流：≤ 300mA
- 触电动作电流：≤ 50mA
- 动作时间：≤ 0.2S

Performance of product

- Rated voltage: AC400V 50Hz.
- Rated capacity: 20–250kVA.
- Capacity of powerless compensation: 4–60KVAR.
- Leakage action current: ≤ 300mA.
- Electrical shock action current: ≤ 50mA.
- Action time: ≤ 0.2S.

4.1 一次方案图 (见图 1) Primary schematic diagram (see the figure 1)

4.2 主电路方案及主要电器元件 Main circuit scheme & main electrical element

名 称	型号规格	20kVA	30kVA	50kVA	80kVA	100kVA	150kVA	200kVA
进线总控制	CJ20	1/63A	1/100A	1/150A	1/225A	1/265A	1/400	1/500
出线开关	RDM1(DZ20,DZ47)	3/25A	3/40A	3/50A	3/80A	3/100A	3/150	3/200
交流接触器	CJ19	4	4	4	4	4	4	4
补偿容量	BSMJ(Kvar)	4	6	10	15	20	30	40
补偿器	JKL5C	—	—	1	1	1	1	1
避雷器	FYS-0.22	3	3	3	3	3	3	3
鉴相鉴幅漏电器	RDJD2	1	1	1	1	1	1	1

注：进线总控制、分路开关型号、补偿回路数、输出回路数均可由客户自定。手动时用 42L6-COS ϕ 替代 JKL5C。

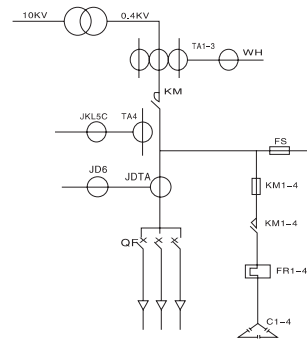
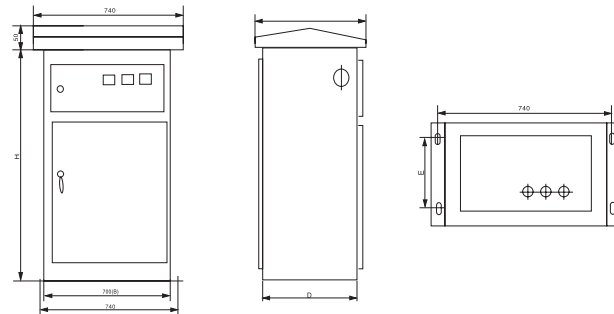


图 figure1

4.3 外形尺寸及安装尺寸 Physical dimension & installation dimension



RMJ

型低压无功补偿配电装置

容量 名称	外形尺寸(mm)			安装尺寸(mm)	
	H	d	B	E	F
20、30	1000	400	700	300	740
50、80	1100	450	700	350	740
100	1200	500	700	400	740
150	1250	550	700	450	740
200	1300	600	700	500	740

注：户内户外H,d相同，户内仪表孔开在面板上，括号内为户外安装尺寸。Note: the H and d is same for indoor and outdoor type. The instrument hole is drilled in the panel for indoor type. The number in the parentheses outdoor installation dimension.

产品的安装，调试及维修

- 5.1 产品为冷轧钢板折弯焊接而成，前后为开启式可供操作与维修，内部采用模数 20mm 立梁，安装时，客户可根据电器元件大小自在内部上、下移动，直至达到满意的效果。
- 5.2 安装前应检查箱内元件是否有损坏，断线，掉头并作下列检查与试验，
- 5.2.1 检查箱体喷涂层是否有剥落，箱内是否清洁；
- 5.2.2 各开关元件操作是否灵活；
- 5.2.3 检查电压表，控制器是否良好与正确；
- 5.2.4 检查母线连接接触是否良好，接地装置是否可靠；
- 5.2.5 测量其绝缘电阻，应大于 50 兆欧。
- 5.3 调试
- 5.3.1 鉴相鉴幅无声运行漏电继电器的调试见使用说明书。
- 5.3.2 无功功率控制器的调试见其使用说明书。
- 5.4 维修：维修时要先断开漏电断路器，5 分钟后，使补偿电容器放电后方可检修。

Installation, debugging and maintenance of product

- 5.1 The product is welded by bending the cool-rolled sheet steel. The front and rear is open for operation and maintenance. The module 20mm vertical beam is used in the internal part. When installing, the client can move up and down depending on the size of electrical element until the satisfactory result is reached.
- 5.2 shall check the element in the box for damage, wire breakage and falling before installation and take the following inspection and test:
- 5.2.1 Check if the coating for box body is peeled off and the box is clean.
- 5.2.2 Whether each switch element is flexible.
- 5.2.3 Check if the voltmeter and controller is good and correct.
- 5.2.4 Check if the bus connection and contact is good and the earthing device is reliable.
- 5.2.5 Measure the insulating resistance and the insulating resistance shall be more than 50 megohms
- 5.3 Debugging
- 5.3.1 See the operating instructions for phase demodulation & amplitude discrimination leakage relay with no noise operation
- 5.3.2 see the operating instructions for powerless power controller.
- 5.4 Maintenance: the leakage circuit breaker is disconnected at first when servicing. After 5 minutes, it can be repaired after discharging the compensating capacitor.

RMJ

series product of low-voltage
distributing cabinet

随机文件

- 6.1 合格证。
- 6.2 使用说明书（包括鉴相鉴幅漏继电器和无功功率自动补偿控制器）。
- 6.3 电气原理图。

Attached document

- 6.1 Certificate of quality.
- 6.2 Operating instruction (including the phase demodulation & amplitude discrimination leakage relay and automatic powerless power compensating controller).
- 6.3 Electrical schematic diagram.

订货须知

- 7.1 台数；
- 7.2 型号、输出回路数；
- 7.3 注明配电变压器容量；
- 7.4 注明补偿电容量容量、回路数；
- 7.5 户内、户外式；
- 7.6 手动或自动。

例：RMJ-2-100(20Kvar,4 路)

表示：变压器容量为 100kVA，二组分路开关，补偿容量为 20Kvar，四路电容。

注：客户没有注明补偿容量的，我公司均按总容量 20% 配置。30kVA 以下（包括 30kVA）选手动式，30kVA 以上可选自动式。

Ordering specifications

- 7.1 Number of unit.
- 7.2 Model & number of output circuit.
- 7.3 Note the capacity of distributing transformer.
- 7.4 Note the capacity of compensating capacitor and circuit number.
- 7.5 Indoor and outdoor type.
- 7.6 Manual or automatic.

For example: RMJ-2-100 (20kVAR, 4 lines)

Implies: the capacity of transformer is 100kVA, two groups of branch switches, compensating capacity is 20 kVAR and four capacities.

Note: if the customer does not note the compensating capacity, our company will configure according to 20% of total capacity. The manual mode is selected for below 30kVA(including 30kVA). The automatic mode can be selected for above 30kVA.

GZD(W)

系列 (微机控制) 直流电源柜



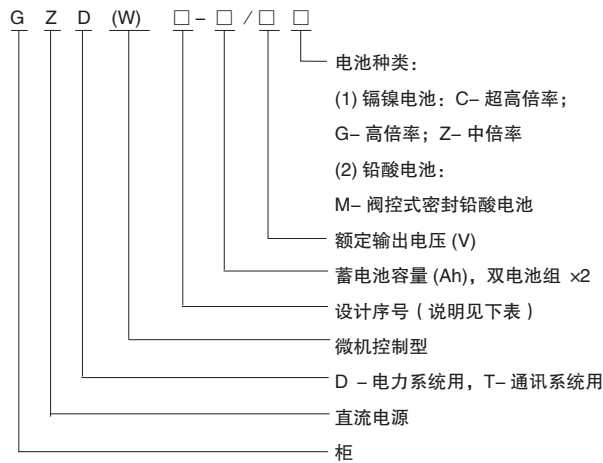
概 述

GZD(W) 系列 (微机控制) 直流电源柜应用于中小型发电厂和变电站, 作为正常运行和事故状态下的高压开关分合闸、继电保护、自动控制、事故照明、灯光和音响信号等所需的直流电源; 也可应用于冶金、铁道、矿山、石化、邮电、通讯、医疗卫生、银行、宾馆、高层建筑和计算机网络等行业所需的直流电源; 微机控制直流电源柜可用于无人值守、远程集中监控的发电厂、变电站和其他行业的直流电源。

summarization

GZD(W)series(microcomputer control)direct current power supply board is used in middle and small size power plants and transformer substations as a direct current power required in switch cutting on and off in the high pressure, relay protection, automatic control, accident lighting, light and sound signal in normal operation and fault condition. It is also used as power in fields of metallurgy, railroad, mine, landification, post, communication, medical sanitation, bank, hotel, highbuilding and computer network. Computer controlled direct current power supply board can be used in the power plants which are watched by no one and monitored remotely and concentratedly, in transformer substations and other fields.

型号及其含义



GZD(W)

series(microcomputer control)
direct current power supply box

产品型号	序号说明	规格(种)	适用范围
GZD(W)30-□/□	单母线分段、单组电池、二台双线输出充电浮充电装置、无降压回路	10	发电厂或大型变电站
GZD(W)31-□/□	单母线、单组电池、二台双线输出充电浮充电装置、无降压回路	10	发电厂或大型变电站
GZD(W)32-□/□	双母线分段、单组电池、二台双线输出充电浮充电装置	20	10~220kV 变电站和中小型电厂
GZD(W)33-□/□	双母线、单组电池、二台双线输出充电浮充电装置	20	10~220kV 变电站和中小型电厂
GZD(W)34-□/□	双母线分段、单组电池、二台双线输出充电浮充电装置	20	10~220kV 变电站和中小型电厂
GZD(W)35-□/□	双母线、单组电池、二台三线输出充电浮充电装置	20	10~220kV 变电站和中小型电厂
GZD(W)40-□/□	单母线分段、双组电池、二台双线输出充电浮充电装置、无降压回路	10	重要发电厂或大型变电站
GZD(W)41-□/□	双母线、双组电池、二台双线输出充电浮充电装置	12	10~220kV 变电站和中小型电厂
GZD(W)42-□/□	双母线分段、单组电池、三台双线输出充电浮充电装置	10	重要发电厂或大型变电站
GZD(W)43-□/□	双母线、双组电池、二台三线输出充电浮充电装置	12	10~220kV 变电站和中小型电厂

主要功能

- 3.1 规格齐全：该系列产品共有十种型号几百种规格，能完全满足大中小型发电厂、变电站和各行业对直流电源的需求。
- 3.2 运行可靠：交流双路输入自动切换。该产品设有二台充电浮充电装置互为备用，系统切换方便。
- 3.3 运行稳定：该产品抗干扰性能好，稳流、稳压精度高，纹波系数小。
- 3.4 电池使用寿命长：该产品能严格按照蓄电池充电曲线对蓄电池进行充电、浮充电，避免过充或欠充现象。微机控制型具有电池巡检功能。
- 3.5 控制方式多：该产品设有自动和手动或微机控制互为备份，运行连续性强。
- 3.6 多重保护：该产品能对各工作点跟踪检测，软件与硬件保护相结合。绝缘检测装置随时监测母线或馈线对地绝缘状况。
- 3.7 远动通讯：微机控制直流电源柜能与上位微机通讯，能实现集中监控和无人值守。

Main functions

- 3.1 full specifications: This serial products include ten types and several hundreds of specifications. They can meet with the needs of DC power supply for middle and small size power plants, transformer substations and all kinds of fields
- 3.2 run reliably: AC two channels input can be switched automatically. This product has two float charging devices and can be switched conveniently.
- 3.3 run stably: This product has a good anti-noise ability, a high precision of stable current and voltage, a small ripple coefficient.
- 3.4 long lifetime of battery: This product charges batteries according to the charging curve of storage battery and can avoid over charging and lack charging. The microcomputer controlled type has a function testing battery itinerantly.
- 3.5 many ways to control: This product can be hand controlled, automatically controlled or computer controlled. The running continuity is good.
- 3.6 multriple protections: This product can test every operational points. The software protection and hardware protection are integrated. Insulation testing device tests insulation condition of busbars and feeder lines to the ground momentarily.
- 3.7 romote dynamic communication: Computer controlled DC power board can communicate with epigynous computers. Concentrated monitoring and no one watch can be achieved.

GZD(W)
系列 (微机控制) 直流电源柜

使用环境

- 4.1 海拔高度不超过2000米。
- 4.2 环境温度为 - 5℃至 + 40℃。
- 4.3 环境湿度不大于90%。(20 ± 5℃时)。

application ambient

- 4.1 Altitude is not higher than 2000 m.
- 4.2 Ambient temperature is -5℃+40.
- 4.3 Ambient humidity is not bigger than 90%.

主要技术指标

- 5.1 输入电源电压：三相交流380V ± 10%，50Hz ± 5 %。
- 5.2 输出直流额定电压：24V；48V；60V；115、130V；230、260V。
- 5.3 输出直流额定电流：
6，10，12，20，30，40，50，60，70，80，100，130，150，180，200，260，300，400A。
- 5.4 蓄电池额定容量：10，20，38，40，50，60，65，80，100，150，200，250，300，400，500，600，800，1000，1200，1500，1600Ah
- 5.5 浮充调节范围：21–28V，43–57V，54–71V，99–130V，198–260V。
- 5.6 均充调节范围：27–31V，54–62V，68–78V，125–140V，250–286V。
- 5.7 主充调节范围：21–36V，43–70V，54–88V，99–162V，198–324V。
- 5.8 输出直流电流调节范围：额定值的0–100%。
- 5.9 稳压精度：< ± 1%。
- 5.10 稳流精度：< ± 1%。
- 5.11 纹波系数：<1%。
- 5.12 整机噪声：<55dB。
- 5.13 主变压器温升：<70℃。
- 5.14 工作方式：连续工作。
- 5.15 防护等级：IP20 ~ 30。

main technical index

- 5.1 input power supply voltage: triphase AC.
- 5.2 output DC rated voltage.
- 5.3 output DC rated current.
- 5.4 storage battery rated capacity.
- 5.5 float charging range.
- 5.6 even charging range.
- 5.7 main charging range.
- 5.8 output DC current range:the 0–100% of rated value.
- 5.9 precision of stable voltage.
- 5.10 precision of stable current.
- 5.11 ripple coefficient.
- 5.12 noise of whole device.
- 5.13 temperature increase of main transformer.
- 5.14 operational style: continuous operation.
- 5.15 degree of protection.

GZD(W)
series(microcomputer control)
direct current power supply box

110V 直流电源柜选型规格参数表

项 目 型号规格	交流输入		控制母线				合闸母线		
	电 压 (V)	容 量 (kV.A)	最大 经常性负 荷电流 (A)	事故时负荷		馈出 路数	合闸冲击负荷		馈出 路数
				时间 (h)	电 流 (A)		时间 (s)	电 流 (A)	
GZD、GZDW-10/110	380 ± 10%	2	8	1	<7.5	4 ~ 6	0.3	<120	4 ~ 6
GZD、GZDW-20/110	380 ± 10%	3	10	1	<15	4 ~ 6	0.3	<240	4 ~ 6
GZD、GZDW-40/110	380 ± 10%	4.5	15	1	<30	4 ~ 6	0.3 ~ 0.5	<480	4 ~ 6
GZD、GZDW-60/110	380 ± 10%	7	20	1	<45	4 ~ 6	0.3 ~ 0.5	200 ~ 500	5 ~ 6
GZD、GZDW-80/110	380 ± 10%	8	25	1	<60	4 ~ 6	0.3 ~ 0.5	200 ~ 500	5 ~ 6
GZD、GZDW-100/110	380 ± 10%	10	30	1	<70	4 ~ 6	0.3 ~ 0.5	200 ~ 500	5 ~ 6
GZD、GZDW-120/110	380 ± 10%	11	35	1	<85	4 ~ 6	0.3 ~ 0.5	200 ~ 500	5 ~ 6
GZD、GZDW-150/110	380 ± 10%	13	40	1	<110	4 ~ 6	0.3 ~ 0.5	200 ~ 500	5 ~ 6
GZD、GZDW-200/110	380 ± 10%	15	45	1	<150	4 ~ 6	0.3 ~ 0.5	200 ~ 500	5 ~ 6
GZD、GZDW-250/110	380 ± 10%	17	50	1	<180	4 ~ 6	0.3 ~ 0.5	200 ~ 500	5 ~ 6
GZD、GZDW-300/110	380 ± 10%	22	60	1	<220	4 ~ 6	0.3 ~ 0.5	200 ~ 500	5 ~ 6
GZD、GZDW-350/110	380 ± 10%	25	70	1	<260	6 ~ 40	0.3 ~ 0.5	200 ~ 500	6 ~ 40
GZD、GZDW-400/110	380 ± 10%	30	80	1	<300	6 ~ 40	0.3 ~ 0.5	200 ~ 500	6 ~ 40
GZD、GZDW-500/110	380 ± 10%	37	100	1	<370	6 ~ 40	0.3 ~ 0.5	200 ~ 500	6 ~ 40
GZD、GZDW-600/110	380 ± 10%	42	120	1	<450	6 ~ 40	0.3 ~ 0.5	200 ~ 500	6 ~ 40
GZD、GZDW-800/110	380 ± 10%	55	150	1	<600	6 ~ 40	0.3 ~ 0.5	200 ~ 500	6 ~ 40
GZD、GZDW-1000/110	380 ± 10%	70	200	1	<800	6 ~ 40	0.3 ~ 0.5	200 ~ 500	6 ~ 40

GZD(W)
系列 (微机控制) 直流电源柜

110V 直流电源柜选型规格参数表

项 目 型号规格	直流电动机 起动脉冲负荷		选用不同蓄电池所需柜（屏）数					
			高倍率 镉镍电池		中倍率 镉镍电池		阀控式密封 铅酸电池	
	时间 (s)	电流 (A)	单电 池组	双电 池组	单电 池组	双电 池组	单电 池组	双电 池组
GZD、GZDW-10/110	1 ~ 30	50	2	2			2	2
GZD、GZDW-20/110	1 ~ 30	200	2	2			2	2
GZD、GZDW-40/110	1 ~ 30	100 ~ 400	2	3			2	2
GZD、GZDW-60/110	1 ~ 30	100 ~ 400	2	3			2	3
GZD、GZDW-80/110	1 ~ 30	100 ~ 400	2	4			2	3
GZD、GZDW-100/110	1 ~ 30	100 ~ 400	3	4	5		3	3
GZD、GZDW-120/110	1 ~ 30	200 ~ 700	4	4	5		3	4
GZD、GZDW-150/110	1 ~ 30	200 ~ 700	4	5	5		3	4
GZD、GZDW-200/110	1 ~ 30	200 ~ 700	5		6		4	4
GZD、GZDW-250/110	1 ~ 30	200 ~ 700	5		6		4	5
GZD、GZDW-300/110	1 ~ 30	200 ~ 700	5		6		4	5
GZD、GZDW-350/110	1 ~ 30	400-1000	5		7		4	
GZD、GZDW-400/110	1 ~ 30	400-1000	5		7		5	
GZD、GZDW-500/110	1 ~ 30	400-1000			7		5	
GZD、GZDW-600/110	1 ~ 30	400-1000			10		5	
GZD、GZDW-800/110	1 ~ 30	400-1000			12		6	
GZD、GZDW-1000/110	1 ~ 30	800-3000			12		6	

GZD(W)

series(microcomputer control)
direct current power supply box

220V 直流电源柜选型规格参数表

项 目 型号规格	交流输入		控制母线				合闸母线		
	电 压 (V)	容量 (kV.A)	最大 经常 性负 荷电 流 (A)	事故时负荷		馈出 路数	合闸冲击负荷		馈出 路数
				时间 (h)	电 流 (A)		时间 (s)	电 流 (A)	
GZD、GZDW-10/220	380±10%	3	8	1	<7.5	4～8	0.3～0.5	<120	
GZD、GZDW-20/220	380±10%	5	10	1	<15	4～8	0.3～0.5	<240	
GZD、GZDW-40/220	380±10%	8	15	1	<30	4～8	0.3～0.5	<480	
GZD、GZDW-60/220	380±10%	12	20	1	<45	4～8	0.3～0.5	200～500	4～8
GZD、GZDW-80/220	380±10%	14	25	1	<60	4～8	0.3～0.5	200～500	4～8
GZD、GZDW-100/220	380±10%	18	30	1	<70	4～8	0.3～0.5	200～500	4～8
GZD、GZDW-120/220	380±10%	20	35	1	<85	4～8	0.3～0.5	200～500	4～8
GZD、GZDW-150/220	380±10%	23	40	1	<110	4～8	0.3～0.5	200～500	4～8
GZD、GZDW-200/220	380±10%	28	45	1	<150	4～8	0.3～0.5	200～500	4～8
GZD、GZDW-250/220	380±10%	33	50	1	<180	4～8	0.3～0.5	200～500	4～8
GZD、GZDW-300/220	380±10%	40	60	1	<220	4～8	0.3～0.5	200～500	4～8
GZD、GZDW-350/220	380±10%	46	70	1	<260	4～8	0.3～0.5	200～500	4～8
GZD、GZDW-400/220	380±10%	54	80	1	<300	8～50	0.3～0.5	200～500	8～50
GZD、GZDW-500/220	380±10%	68	100	1	<370	8～50	0.3～0.5	200～500	8～50
GZD、GZDW-600/220	380±10%	82	120	1	<450	8～50	0.3～0.5	200～500	8～50
GZD、GZDW-800/220	380±10%	105	150	1	<600	8～50	0.3～0.5	200～500	8～50
GZD、GZDW-1000/220	380±10%	130	200	1	<800	8～50	0.3～0.5	200～500	8～50

注：其它电压等级的直流电源柜，根据用户需要做相应改变。m 表示相应增加的屏数。

GZD(W)
系列 (微机控制) 直流电源柜

220V 直流电源柜选型规格参数表

项 目 型号规格	直流电动机 起动脉冲负荷		选用不同蓄电池所需柜 (屏) 数					
			高倍率 镉镍电池		中倍率 镉镍电池		阀控式密封 铅酸电池	
	时间 (s)	电流 (A)	单电 池组	双电 池组	单电 池组	双电 池组	单电 池组	双电 池组
GZD、GZDW-10/220	1 ~ 30	50	2	3			2	3
GZD、GZDW-20/220	1 ~ 30	200	2	3			2	3
GZD、GZDW-40/220	1 ~ 30	100 ~ 400	3	4			2	3
GZD、GZDW-60/220	1 ~ 30	100 ~ 400	3	4			3	4
GZD、GZDW-80/220	1 ~ 30	100 ~ 400	3	6			3	4
GZD、GZDW-100/220	1 ~ 30	100 ~ 400	4	6	7		3	4
GZD、GZDW-120/220	1 ~ 30	200 ~ 700	5		7		3	4
GZD、GZDW-150/220	1 ~ 30	200 ~ 700	5		7		4	6
GZD、GZDW-200/220	1 ~ 30	200 ~ 700	8		10		4	6
GZD、GZDW-250/220	1 ~ 30	200 ~ 700	8		10		5	8
GZD、GZDW-300/220	1 ~ 30	200 ~ 700	8		10		5	8
GZD、GZDW-350/220	1 ~ 30	400 ~ 1000	8		12		5	
GZD、GZDW-400/220	1 ~ 30	400 ~ 1000	8		12		6	
GZD、GZDW-500/220	1 ~ 30	400 ~ 1000			12		6	
GZD、GZDW-600/220	1 ~ 30	400 ~ 1000			12+n		6	
GZD、GZDW-800/220	1 ~ 30	400 ~ 1000			12+n		8	
GZD、GZDW-1000/220	1 ~ 30	800 ~ 3000			12+n		12	

注：其它电压等级的直流电源柜，根据用户需要做相应改变。m 表示相应增加的屏数。

GZD(W)

series(microcomputer control)
direct current power supply box

直流系统图 (图 1 ~ 图 10)

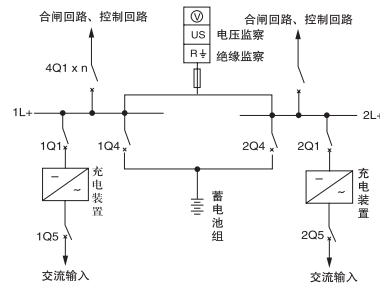


图 1 GZD(W)30 系列直流系统简图
figure1 GZD(W)30 series DC system

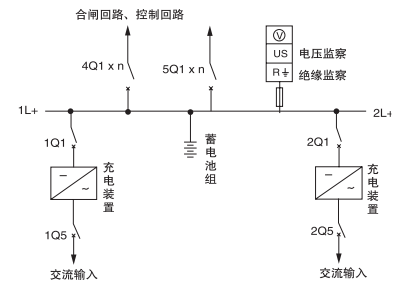


图 2 GZD(W)31 系列直流系统简图
figure2 GZD(W)31 series DC system

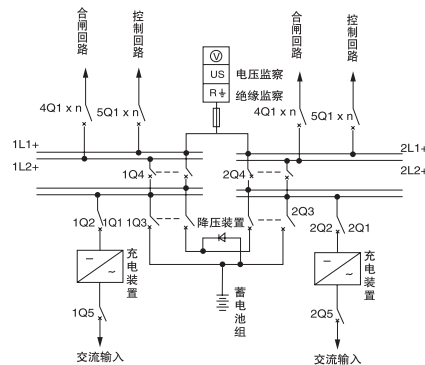


图 3 GZD(W)32 系列直流系统简图
figure3 GZD(W)32series DC system

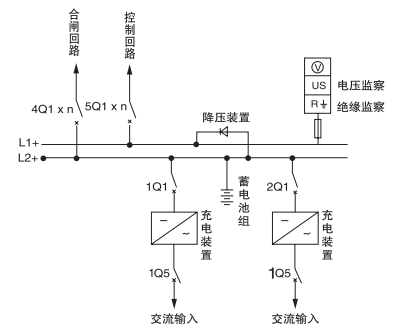


图 4 GZD(W)33 系列直流系统简图
figure4 GZD(W)33 series DC system

GZD(W)
系列 (微机控制) 直流电源柜

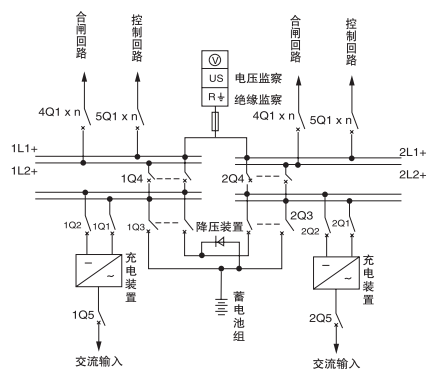


图 5 GZD(W)34 系列直流系统简图
figure5 GZD(W)34 series DC system

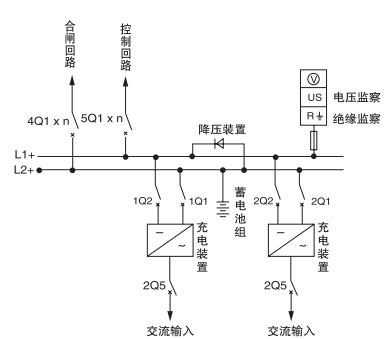


图 6 GZD(W)35 系列直流系统简图
figure6 GZD(W)35 series DC system

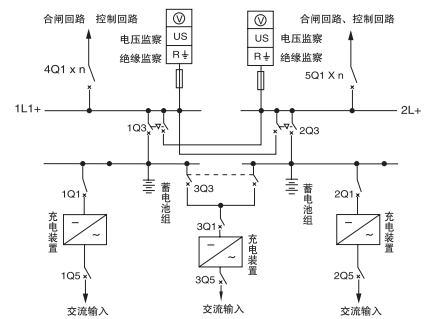


图 7 GZD(W)40 系列直流系统简图
figure7 GZD(W)40 series DC system

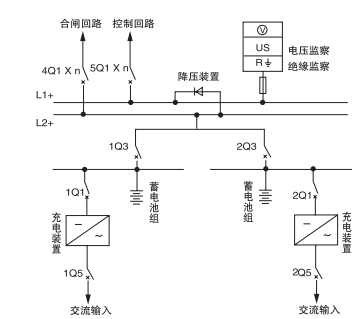


图 8 GZD(W)41 系列直流系统简图
figure8 GZD(W)41 series DC system

GZD(W)

series(microcomputer control)
direct current power supply box

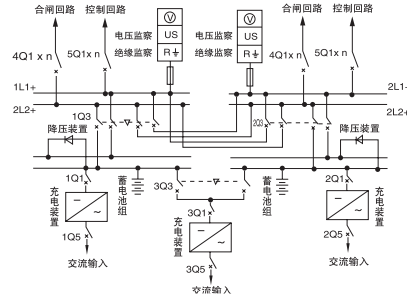


图 9 GZD(W)42 系列直流系统简图
figure9 GZD(W)42 series DC system

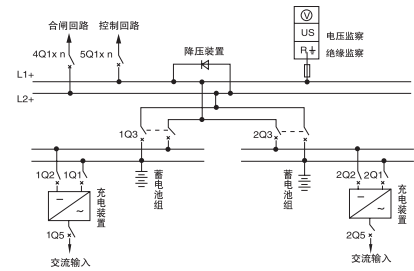


图 10 GZD(W)43 系列直流系统简图
figure10 GZD(W)43 series DC system

电源柜平面及安装 (图 11) power board plane and installation

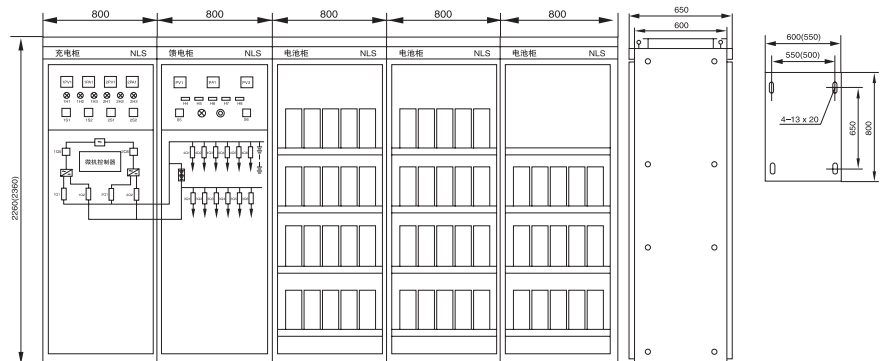
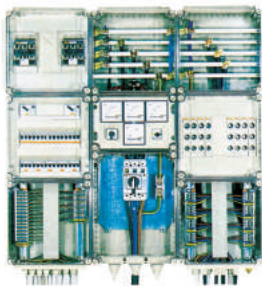


图 11 GZD(W)35-200/230.260M 直流电源柜屏面布置及安装图
figure 11 DC power board plane arrangement and installation

CI

全绝缘全密封低压开关柜



概述

随着对电力需求的日益增长，对能够满足各种应用的配电系统的需求也同步增长。公司以市场为导向，开发了具有国际一流水平的低压配电设备—CI 全绝缘全密封低压开关柜，以其卓越的性能，非凡的品质，为各类用户的不同需求提供最佳的解决方案。

Brief introduction

With the increasing demands of electric power in order to satisfy the increasing varied applied distribution systems requirements. Our company takes the market as guide Which have developed the low-voltage distribution equipment with the first class international level. CI Insulated and Sealed Distributing fully insulated and air proof low pressure switch board. It provides the best choices for different customers of varied requirements with its excellent function and unique quality.

电气参数 Electricity parameter

额定工作电压 Ue	Va、c 400 (690)
额定绝缘电压 Ui	Va、c 690, Vd、c 800
额定电流 Iu 主母线系统 A	160、250、400、630、1000、1600
额定预期短时耐受电流 Ika rms	20、25、35、40、80、80
母线支撑间距 mm	≥ 375
额定短时耐受电流 Icw kA rms	4、7、14、28、50、56
额定峰值耐受电流 Ipk kA	40、52.5、73.5、84、176、176

工作和环境条件 Operational and environmental conditions

3.1 环境温度	
24小时平均值 °C	≥ +35
极限值 °C	-5 - 40
3.2 相对湿度	
% (40°C时)	≥ 50
% (20°C时)	≥ 90
3.3 海拔高度 m	≥ 2000

结构参数 Structure parameter






4.1 防护等级		
CI…外壳		IP65
KST 电缆下方进线		IP65
KST 电缆上方进线		IP64
4.2 金属表面防护		镀铬
4.3 绝缘性		
表面绝缘强度 Ω		10 ¹³
介质绝缘强度 kV/mm		30
4.4 抗腐蚀能力		
+ 完全 ○ 部分 – 不能		
酸	< 10% > 10%	+/0
碱		–
矿物油		+
酒精		+
动物油 植物油		+
水		+
石蜡		+

CI 全绝缘全密封低压开关柜为全拼装结构。柜体由独立的 CI，模块拼装而成，能根据配电方案在高 750 到 2875mm，宽 375mm 到无限的范围内任意排列，不同规格的 CI 模块的外形尺寸如下：

The CI is an totally assembled structure.It is assembled with the independent CI..modular units.It can be freely arranged in the dimensions of height from 750mm and width from 375mm to the indefinite according to the distribution scheme.Different CI..units dimensions follows.

CI

全绝缘全密封低压开关柜

	型号	宽度 × 高度 × 厚度 (安装深度) mm
	CI23-125	187.5 × 250 × 150 (125)
	-150	187.5 × 250 × 175 (150)
	CI43-125	375 × 250 × 150 (125)
	-150	375 × 250 × 175 (150)
	-200	375 × 250 × 225 (200)
	CI44-125	375 × 375 × 150 (125)
	-150	375 × 375 × 175 (150)
	-200	375 × 375 × 225 (200)
	-250	375 × 375 × 275 (250)
	CI45-200	375 × 500 × 225 (200)
	CI48-200	375 × 750 × 225 (200)
	-250	375 × 750 × 275 (250)

可信赖的质量

性能可靠

所有元器件均为人民电器集团有限公司出品，产品使用寿命长。

安全系数高

CI 外壳配有专门的压力释放机械装置，一旦出现短路故障，壳盖可自行打开几毫米将内部压力释放然后自动关闭，不良后果将被控制在最小范围内而不会危及工作人员人身安全。

Trusty quality

- Reliable function:allthe parts are produced in people ele.appliance group Co..Ltd.and durable use and life time maintenance free.
- High safety factor:The CI..unit is installed special perssure releasing mechanical devices.its case can automatically open a few millimeter to release the internal pressure then close when short-current.So that it controls the harm to the minimum scope.and not endanger the staff.

CI

Insulated and sealed distributing fully insulated and air proof low pressure switch board

无与伦比的适候性

高性能材质

CI 外壳采用高质量的工程塑料聚碳酸酯制成，机械强度高，绝缘性能好，耐腐蚀、抗老化、防尘、防潮、阻燃。能极好抵抗大多数化学和热影响。

高防护等级

CI 外壳防护等级高达 IP65，能在粉尘、湿气、腐蚀性的烟雾和水溅、温度波动等十分恶劣的条件下确保内部电气元件的使用性能不受影响，特别适用于海洋、沙漠、油田、化工厂、水泥厂、建筑、粮食、轻纺等环境恶劣的场所，在最大程度上突破了环境条件对电气设备使用的限制。

Unique adaptability

- High quality material:The case is made of high quality engineering plastic-polycarbonate.with high mechanical intensity.excellent insulation.anti-ageing.dust proof.moisture proof and buning.proof.It can resist the most of impacts of chemicals and heat.
- High protection grade:The CI..units have an IP65 degree of protection.The internal parts operate well under the arduous emironment conditions of dusty.humidity.smoky.corrosive.smoke,water splashing and temperature wave.It is especially adaptable in the place of ocean,desert,oil fields and chemical factories.It breaks the environment restriction to the using of electric equipments to the maximum.

友好的操作界面

装置工作状态在透明的外罩一目了然，操作人员可方便快捷的进行监控、记录，在出现故障或发生停电之前及时准确的了解系统工作状态。

Operation table

- The machin working status can be observed through the transparent case.the operator can rapidly and easily moniter.reeord and learn the system working status thoroughly before happening obstacles of electricity failures.

灵活、方便的排列安装方式

完美体现您的设计思想

全模数化结构，完全摒弃了现有电气设备只能在固定框架内组合的传统模式。CI…外壳可以单独使用，可以组成壁挂式或嵌挂式小型配电盘、动力箱、照明箱，也可以组合成落地的大型配电屏。

最有效的利用安装空间

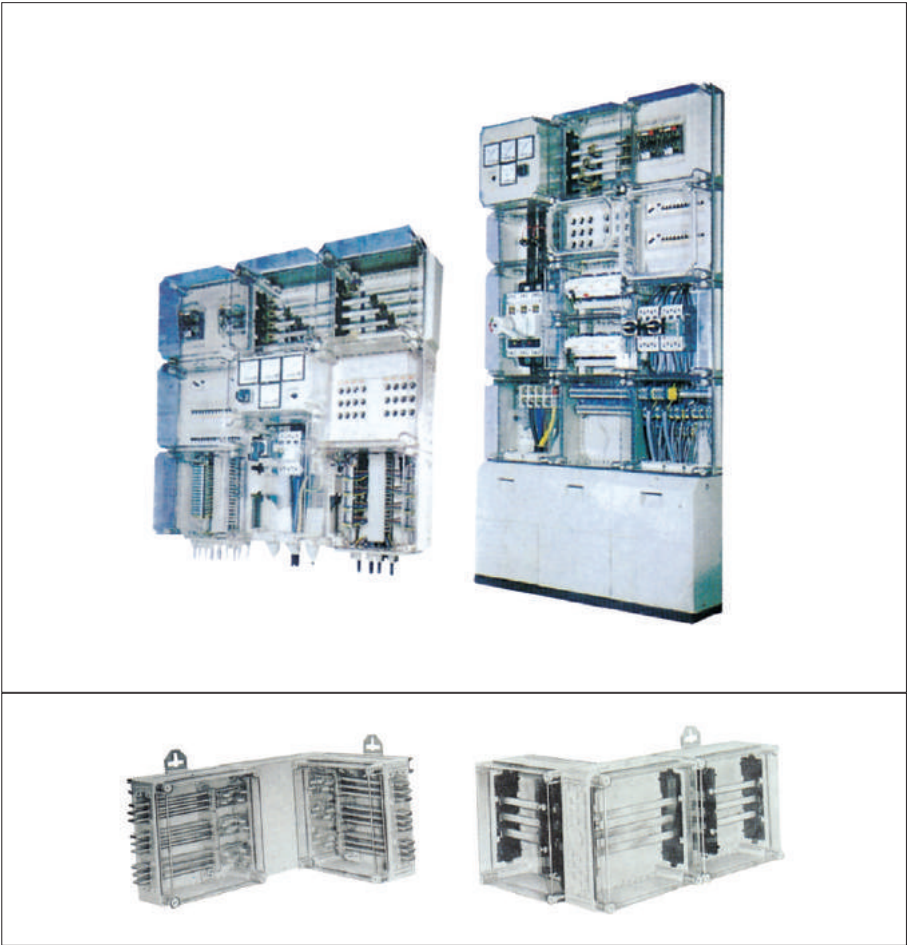
视现场具体布局确定安装形式，不仅可以壁挂式安装和靠墙安装，甚至左右叠装，拐弯和背靠安装也不存在任何困难，这种特点使得该产品在安装空间狭小有限的场所（如轮船等），具有无可比拟的优越性。

Flexible and convenient arrangement and installation

- perfectly embody you design It adopts modular structure,casting away the traditional pattern that compose the electrical devices in the fixed frame.the CI..units can be used alone or can be slotly put on the wall,or fixed in hanging type distributor power cases,light cases and also can be assembled into standard switchboards.
- Effectirely use the installing room According to the inatallation-site layout to decide how to mount.It can be mounted on the wall or against it even left and right overlaping fix.It can be easy fix i n the corner and back to back.These characteristics make the product fix in a narrow place with limited fixing room(such as ships etc.) with the uncomparable superiority.

CI

全绝缘全密封低压开关柜



智能化控制

该产品能够方便的采用可编程控制器等智能化模块，简单、快捷的对配电系统进行全自动监控，实现远程控制，同时大大缩小了安装空间。

Inteligem control

The product can adopted intelligent.modules such as PLC.which rapidly and automatically monitor the distribution system and realized the remote control,meanwhile largely reduces the installation room.

CI

Insulated and sealed distributing fully insulated and air proof low pressure switch board



断路器技术参数

型 号	额定电流 A	额定分断能力 KA			整定值	
		N	S	H	过载 A	短路 A
RDM6-125/25	25	22	65	100	16-25	160-320
RDM6-125/40	40				25-40	260-500
RDM6-125/63	63				40-63	400-800
RDM6-125/80	80				63-80	600-800
RDM6-125/100	100				80-100	600-1000
RDM6-250/125	125	25	65	100	80-125	750-1500
RDM6-250/160	160				100-160	1000-1900
RDM6-250/200	200				140-200	1000-1900
RDM6-250/250	250	35	65	100	200-250	1600-2400
RDM6-250/315	315				240-300	2000-4000
RDM6-400/250	250	45	65	100	125-250	250-3000
RDM6-400/400	400				200-400	400-4800
RDM6-630/630	630				300-630	600-7560
RDM6-630/630	630	100	100	100	315-630	1260-12600
RDM6-800/800	800				400-800	1600-16000
RDM6-1000/1000	1000				500-1000	2000-20000
RDM6-1000/1250	1250				625-1250	2500-25000
RDM6-1000/1600	1600				800-1600	3200-32000

注：额定分断能力中，N 为标准分断型系列，S 为中分断型系列，H 为高分断型系列。

过载继电器技术参数

型 号	整定值范围 A	最大极 限电流 A	型 号	整定值范围 A	最大极 限电流 A
JRS2(RDR6)–0.16	0.1–0.16	0.5	JRS2(RDR6)–10	6–10	25
JRS2(RDR6)–0.24	0.16–0.24	1	JRS2(RDR6)–16	10–16	35
JRS2(RDR6)–0.4	0.24–0.4	2	JRS2(RDR6)–24	16–24	50
JRS2(RDR6)–0.6	0.4–0.6	2	JRS2(RDR6)–40	24–40	80
JRS2(RDR6)–1.0	0.6–1.0	4	JRS2(RDR6)–57	40–57	100
JRS2(RDR6)–1.6	1.0–1.6	6	JRS2(RDR6)–80	50–63	100
JRS2(RDR6)–2.4	1.6–2.4	6	JRS2(RDR6)–35	25–35	100
JRS2(RDR6)–4	2.4–4	10	JRS2(RDR6)–50	35–50	125
JRS2(RDR6)–6	4–6	10	JRS2(RDR6)–70	50–70	160
JRS2(RDR6)–9	6–9	10	JRS2(RDR6)–100	70–100	160
JRS2(RDR6)–0.16	0.1–0.16	0.5			
JRS2(RDR6)–0.24	0.16–0.24	1	JRS2(RDR6)–50	35–50	125
JRS2(RDR6)–0.4	0.24–0.4	2	JRS2(RDR6)–70	50–70	160
JRS2(RDR6)–0.6	0.4–0.6	4	JRS2(RDR6)–100	70–100	200
JRS2(RDR6)–1.0	0.6–1.0	4	JRS2(RDR6)–125	95–125	250
JRS2(RDR6)–1.6	1.0–1.6	6	JRS2(RDR6)–150	120–142	250
JRS2(RDR6)–2.4	1.6–2.4	10			
JRS2(RDR6)–4	2.4–4	16	JRS2(RDR6)–70	50–70	160
JRS2(RDR6)–6	4–6	20	JRS2(RDR6)–100	70–100	200
JRS2(RDR6)–10	6–10	25	JRS2(RDR6)–125	95–125	250
JRS2(RDR6)–16	10–16	35	JRS2(RDR6)–160	120–160	250
JRS2(RDR6)–24	16–24	50	JRS2(RDR6)–220	160–220	250

接触器技术参数

型号	常温电流 AC-I(A)	三相交流电动机额定 值 380V-AC-3		装配的辅助触 头类型数量		可与接触器插接的 热继电器	独立安装热继 电器
		(kW)	Ie(A)	(常开)	(常闭)		
CJX2(RDC6)-9/11	20	4	8.5	1	1	JRS2(RDR6)- □	
CJX2(RDC6)-9/22	20	4	8.5	2	2		
CJX2(RDC6)-12/11	20	5.5	11.5	1	1	JRS2(RDR6)- □	
CJX2(RDC6)-12/22	20	5.5	11.5	2	2		
CJX2(RDC6)-16/11	35	7.5	15.5	1	1		
CJX2(RDC6)-16/22	35	7.5	15.5	2	2		
CJX2(RDC6)-25/11	35	11	22.5	1	1		
CJX2(RDC6)-25/22	35	11	22.5	2	2		
CJX2(RDC6)-32/11	55	15	30	1	1	JRS2(RDR6)- □	
CJX2(RDC6)-32/22	55	15	30	2	2		
CJX2(RDC6)-40/11	55	18.5	36	1	1		
CJX2(RDC6)-40/22	55	18.5	36	2	2		
CJX2(RDC6)-50/11	90	22	43	1	1		
CJX2(RDC6)-50/22	90	22	43	2	2		
CJX2(RDC6)-63/11	90	30	56	1	1		
CJX2(RDC6)-63/22	90	30	56	2	2		
CJX2(RDC6)-80/11	100	37	72	1	1	JRS2(RDR6)- □	
CJX2(RDC6)-80/22	100	37	72	2	2		
CJX2(RDC6)-95/22	140	45	85	2	2	JRS2(RDR6)- □	
CJX2(RDC6)-115/22	160	55	104	2	2		
CJX2(RDC6)-150/22	160	75	142	2	2	JRS2(RDR6)- □	
CJX2(RDC6)-185/22	210	90	170	2	2		
CJX2(RDC6)-225/22	220	110	205	2	2	JRS2(RDR6)- □	
CJX2(RDC6)-265/22	300	132	250	2	2		
CJX2(RDC6)-330/22	300	160	300	2	2	JRS2(RDR6)- □	
CJX2(RDC6)-500/22	400	200	400	2	2		
CJX2(RDC6)-500/22	550	250	475	2	2		
CJX2(RDC6)-630/22	630	335	630	2	2		
CJ40-1000	850		820	2			

MCD- II
型组合式低压开关柜



概述

MCD- II 型组合式低压开关柜（以下简称装置），是我公司在自行设计的 MCD-AB 型组合式低压开关柜的基础上设计出的一种新型低压开关柜。

本装置适用于交流 50-60Hz，额定工作电压 660V 及以下的系统，用于发电、供电系统、负荷中心、马达控制中心，无功自动补偿等。

本装置适用于各种工矿企业的供电，特别适用于石油化工，纺织及高层建筑的供电，经过特殊处理后还可用于海上石油钻采平台和核电站中。

本装置符合 IEC439 和 GB7251-87《低压成套开关设备》、ZBK36001-89《低压抽出式成套开关设备》。

Summary

MCD- II combination low-voltage switch cabinet (which is called device there in after), is a new type low-voltage switch cabinet designed based on self-designed MCD-AB combination low-voltage switch cabinet.

Our device is used to these system of 50-60Hz AC, 660V rated operational voltage or lower, and used of generating electricity systems, distributing electricity systems, charge centers, motor control centers, automatic compensatings and so on.

Our device is used of the distributing electricity in all kinds of enterprises, especially used of petrochemistries, weavings, and high buildings, and if it is dealt specially, it can be used of oil wells on the sea and nuclear power stations.

Our device is built in accordance with the specifications of IEC439, GB7251-87《Low-Voltage Switchgear Assemblies》, and ZBK36001-89《Low-Voltage Eliciting Switchgear Assemblies》.

工作和环境条件

2.1 周围空气温度不高于+40℃，不低于-5℃，且24小时内日平均温度不大于+35℃。

2.2 大气条件：空气清洁，相对湿度在最高温度为+40℃时不超过50%，在较低温度时允许有较高的相对湿度。例如 +20℃时为 90%，但考虑到由于温度变化，有可能会偶然地产生湿度的凝露。

2.3 海拔高度不超过 2000m。

2.4 本装置适应于以下温度的运输和储存过程：-25℃至+55℃的范围之间，在短时间内（不超过24小时）可达+70℃，在这些极限温度下装置不应遭到任何不可恢复的损伤，而且在正常的条件下面能正常工作。

2.5 如果上述使用条件不能满足时，应由用户与制造厂协商解决。

2.6 当本装置适用于海上石油钻采平台、核电站和火电站时，应另行签订技术协议。

The work condition

2.1 The ambient temperature of the air is not higher than +40℃, not lower than -5℃, and the mean level over 24 hours is not higher than +35℃.

2.2 Atmosphere condition: the air is clean, relative humidity does not exceed 50% when the highest temperature is +40℃, at the same time, it is no problem to have comparatively high relative humidity when it is in the comparatively low temperature. For example, when the temperature is +20℃, it is 90%, but if the temperature change, maybe there will be producing beads sometimes.

2.3 The altitude is not higher than the 2000 metre.

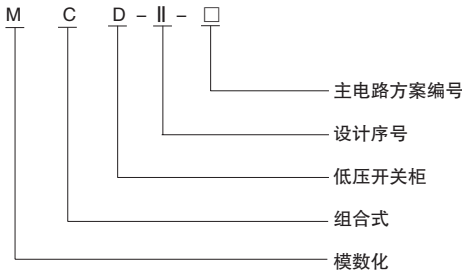
MCD- II
combination low-voltage switch
cabinet

2.4 The device is transported and deposited in these temperature scope: -25℃to +55℃, and it can be 70℃ in a short time (not exceed 24 hours).At these limit temperature, the device is working well, and in the natural work condition,it is working well too.

2.5 If these conditions are not met, the consumer should negotiate with the manufacturer.

2.6 When the device is used for oil well on the sea, nuclear power station, and power plant, it should sign the technology agreement.

型号及其含义



结构特征

装置的基本柜架为组合装配式结构，柜架的全部结构件都经过镀锌处理，通过自攻锁紧螺钉或 8.8 级内六角螺钉紧固互连接成基本柜架，再按方案变化需要，加上相应的门、封板、隔板、安装支架以及母线、功能单元部件，组装成一台完整的装置，隔室实行模数化（模数单位 1M=100mm，下同），间隔布置，每一电气单元独占一个隔室。根据用户的需要电气单元可以制成抽出式或固定间隔式两种形式。一台馈电柜可以制成全抽出式单元或全固定间隔式单元，也可制成抽出式单元和固定间隔式单元混装，设计选择灵活方便。

- 4.1 动力配电中心（以下简称 PC）
 - 4.1.1 PC 柜内划分成四个隔室：水平母线隔室、功能单元隔室、电缆隔室、仪表室。各隔室之间间接地的镀锌钢板分隔。
 - 4.1.2 柜内安装的框架式断路器，均能在关门状态下实现柜外手动操作，视察断路器状态或根据机构与门的位置关系，可判断出断路器在实验位置还是在工作位置。
- 4.2 抽出式电动机控制中心和小电流的电力配电中心（以下简称为抽出式 MCC）
 - 4.2.1 抽出式 MCC 柜内分成四个隔室，即柜顶部的水平母线室，柜前的功能单元区，柜后左边的垂直母线室，柜后右边的电缆隔室。各隔室之间间接地的镀锌钢板分隔。
 - 4.2.2 抽出式 MCC 有三种标准尺寸的抽屉，他们分别是 2M、4M 和 6M。功能单元区的总高度为 18M，可以安装 9 个 2M 抽出式单元。
 - 4.2.3 抽出式单元，联锁可靠，互换性好，安装，使用，维修安全方便。
- 4.3 固定间隔式电动机控制中心和小电流动力配电中心（以下简称为固定间隔式 MCC）
 - 4.3.1 固定间隔式 MCC 的柜体结构同 2.1。
 - 4.3.2 固定间隔式 MCC 的功能单元分为 2M、4M、6M 和 8M。功能单元区总高度也是 18M。
- 4.4 母线系统
 - 4.4.1 水平母线安装于柜顶独立的母线隔室中，每相母线由 2 根母排并联，母排截面有 10×30×2、

MCD- II

型组合式低压开关柜

10×60×2、10×80×2、10×100×2 四种，母线额定电流达 3200A，也可根据用户要求做至 4000A。

4.4.2 垂直母线

垂直母线为 50×30×5 的 L 型铜母线，它用阻燃型垂直排夹固定在垂直母线室中，额定电流 1000A。

4.4.3 中性母线（N 线）和保护母线（PE 线）。

中性母线和保护母线平行的安装在柜架后下部和垂直安装在柜架后右部，N 线与 PE 线之间如用绝缘子相隔，则 N 线与 PE 线分别使用，二者之间如用导体短接，即成 PEN 线。

4.5 保护接地系统

装置的保护电路由单独装设的并贯穿于整个排列长度的 PE 线（或 PEN 线）和镀锌结构框架与各功能单元形成可靠的接地保护系统。

装置中金属结构件，除外表的门和封板外，其余都经过镀锌处理，在结构件的连接处，都经过精心设计，使其能通过一定的短路电流，使得该装置接地保护安全可靠。

The specialty of structure

The base frame of the device is an assembled combination structure. All of frame parts are dealt with plating the zinc, and are connecting each other to be the base cabinet with tapping screws or 8.8 rank hexagon socket set screws. And according to the project's change, adding corresponding doors, close boards, insulating boards, fixing brackets, busbars, and function cell parts, all the frame parts can be made up of a finishing device. The room is used of modulus pattern (modulus unit 1M=100mm, same there in after), interval laying, every electric cell has a room. According to the user need's, the electric cell can be made of eliciting pattern or fixed interval pattern. An electric cabinet can be made of full eliciting pattern cell or full fixed interval pattern cell, and it can also be made of eliciting and fixed interval pattern cell assembledly, the designing choice is convenient.

4.1 The power distributing center (which is called as PC thereafter)

4.1.1 The PC cabinet is divided into four rooms: the level busbar room, the function cell room, the cable room, the instrument room. Each room is divided with the steel plate of plating zinc and earthing.

4.1.2 The switch setting in the cabinet, can be operated outside the cabinet at the state of closing doors, and inspection to the switch or according to the relation of the door's and framework's location, we can make sure that the switch is at the work position or at the experiment position.

4.2 The eliciting electromotor control center and the small electricity power distributed center (which is called as eliciting MCC thereafter)

4.2.1 The eliciting MCC's divided into four rooms, it is including of the level busbar room at the top of the cabinet, the function cell room in the front of the cabinet, the vertical busbar room at the left behind of the cabinet, the cable room at the right behind of the cabinet. Each room is divided with the earthing steel plate of plating zinc.

4.2.2 The eliciting MCC has three kinds of standard size drawer, they are 2M, 4M, 6M, separately. The function cell's overall height is 18M, which can be installed 9 eliciting cells of 2M.

4.2.3 The eliciting cell is connecting stabile, the reciprocating is well, installation, using, maintaining is safe and convenient.

4.3 The fixed interval electromotor control center and the small electricity power distributed center (which is called as fixed interval MCC thereafter)

4.3.1 The fixed interval MCC's cabinet structure is the same as 2.1.

MCD- II
combination low-voltage switch
cabinet

4.3.2 The fixed interval MCC’ s function cell is 2M, 4M, 6M, and 8M. The function cell’ s overall height is 18M too.

4.4 The busbar system

4.4.1 The level busbar is fixed in the independent busbar room at the top of the cabinet, the busbar is made of two busbar rows parallel connection, the section of busbar row is 10×30×2, 10×60×2, 10×80×2, 10×100×2 specification. The busbar rated current is 3200A, and it also can be 4000A if the consumer asked.

4.4.2 The vertical busbar The vertical busbar is the type of L, cross-section 50×30×5. It is fixed in the vertical busbar room with the vertical row of obstruct burning, the rated current is 1000A.

4.4.3 The neutral busbar (N line) and the protective busbar (PE line)

The neutral busbar and the protective busbar is mounted in parallel at the cabinet back bottom, and mounted vertically at the cabinet back right, if the N line and PE line are separated by insulated stuff, then the N line and PE line can be used separately, and if they are connected with the conductor, they are PEN line.

4.5 The earthing protection system The device’ s protective electrocircuit is made up of the cabinet framework plating zinc, PE line (or PEN line), which is fixed alone and run through all the row extent, and each function cell to be the safe earthing protection system.

The device’ s metal structure parts are all dealt with plating zinc except the surface of the door and the sealed board. At the junction of the structure parts, we designed elaborately to make it pass the number of the short circuit, so that the device’ s earthing protection system is safe and reliable.

主要技术参数 The main technology parameter

5.1 装置的主要技术参数

项 目		单 位	参 数
主电路额定电压		V	交流 380、660
辅助电路额定电压		V	交流 220、380
			直流 110、220
额定频率		Hz	50(60)
额定绝缘电压		V	660 (1000)
额定电流母线	水平母线		3200
	垂直母线		1000
母线额定短时耐受电流		A	30、50、80
母线额定峰值耐受电流			63、105、176
母线	三相四线制	kA/1s	A、B、C、PEN
	三相五线制	kA/0.1s	A、B、C、PE、N
防护等级			IP22、IP30、IP40
外形尺寸	高 X 宽 X 深	mm	2200X600 (800，1000) X800 (1000)

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型组合式低压开关柜

5.2 本装置内一次回路电器设备技术参数 The device once return circuit electric setting technology parameter

5.2.1 RDW1 系列低压空气断路器

型号	极数	标识号	额定持续电流 (A)	额定绝缘电 压 (V)	额定分断容量 (kA)		额定接通容量 (kA)
					380V	660V	
RDW1- 2000	3-4	1250	1250	1000	40	35	85
		1600	1600		50	35	105
		2000	2000		55	45	120
		1250	1250 1600		85	55	265
		1600			130	85	440
		1600			130	85	440
RDW1- 3200		2000	2000 2500		85	55	265
		2500			130	85	440
		2500			130	85	440
		3200	2500、3000		65	55	143
RDW1- 3200		3200	2000、2500、 3000		75	65	165
RDW1- 4000		3200	3200		75	65	165
		4000	3600		80	65	176
		4000	3200、4000、 5000		100	75	220
6300		120			85	260	
RDW1- 6300	3	6300		6300	100	75	220
		6300	120		85	260	

5.2.2 M 系列低压空气断路器

型 号	断路器型式	额定绝缘电压 (V)	额定开断短路电流 (KA)		额定关合短路电流 (KA)	
			380V	660V	380V	660V
M08-800(3-4 极)	N1	1000	40	40	84	84
	H1		65	65	143	143
	H2		100	85	220	187
	L1		130	65	286	143
M08-1000(3-4 极)	N1		40	40	84	84
	H1		65	65	143	143
	H2		100	85	220	187
	L1		130	65	286	143

MCD- II

combination low-voltage switch cabinet

续上表

型 号	断路器型式	额定绝缘电压 (V)	额定开断短路电流 (KA)		额定关合短路电流 (KA)	
			380V	660V	380V	660V
M12-1250(3-4 极)	N1	1000	40	40	84	84
	H1		65	65	143	143
	H2		100	85	220	187
	L1		130	65	286	143
M16-1600(3-4 极)	N1		40	40	84	84
	H1		65	65	143	143
	H2		100	85	220	187
	L1		130	65	286	143
M20-2000(3-4 极)	N1		55	55	121	121
	H1		75	75	165	165
	H2	1000	100	85	220	187
	L1		130	65	286	143
M25-2500 (3-4 极)	N1		55	55	121	121
	H1		75	75	165	165
	H2		100	85	220	187
	L1		130	65	286	143
M32-3200 (3-4 极)	H1		75	75	165	165
	H2		100	85	220	187
M40-4000 (3-4 极)	H1		75	75	165	165
	H2		100	85	220	187

5.2.3 DW914 (AH) 系列万能式空气断路器

型 号	额定 电流 A	过电流脱扣器 额定电流(A)	额定绝 缘电压 (V)	额定分断能力 (KA)		额定接通能力 (KA)		短时耐受电 流(IS)(KA)
				瞬时		短延时 0.42s		
				660V	380V	660V	380V	
DW914—600 (AH—6B)	600	250、400、630	660		42、88.2		22、46.2	30
DW914—1000 (AH—10B)	1000	250、400、 630、1000	660		50、105	30、63		40
DW914—1600 (AH—16B)	1600	250、1000、400、 1250、630、1600	660	30、63	65、143	22、46.2	30/40 63/84	50
DW914—2000 (AH—20C)	2000	500、1250、 800、2000	660	30、63	65、143	30、63	35、80.5	50
DW914—2000G (AH—20CH)	2000	500、1250、 800、2000	660	30、63	70、154	30、63	35、80.5	70

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续上表

型号	额定 电流 A	过电流脱扣器 额定电流(A)	额定绝 缘电压 (V)	额定分断能力 (KA)		额定接通能力 (KA)		短时耐受电 流(IS)(KA)
				瞬时		短延时 0.42s		
				660V	380V	660V	380V	
DW914-3200 (AH-32C)	3200	2000、3200	660	50、105	65、143	42、88.2	42、88.2	65
DW914-3200G (AH-32CH)	3200	2000、3200	660	50、105	85、187	42、88.2	42、88.2	85
DW914-4000 (AH-40C)	4000	4000	660	50、105	120、264	42、88.2	42、88.2	100

5.2.4 RDM6 系列低压塑壳断路器

型号	额定持续电 流 (A)	极数	额定工作电 压 (V)	性能水平	额定极限短路分断容量 (KA)		额定短路合闸容量 (KA)	
					380V	660V	380V	660V
RDM6	125	3	500	B	16	—	32	—
				N	25	—	52.5	—
RDM6	160	3-4	690	B	16	6	32	10
				N	35	8	74	13.5
				S	50	10	105	17
RDM6	160、250	3-4	690	N	35	14	74	28
				H	65	18	143	36
				L	85	20	187	40
RDM6	160、250	3-4	690	N	35	18	74	36
				H	65	22	143	46
RDM6	160、250	3-4	690	L	100	30	220	63
RDM6	400	3-4	690	N	35	20	74	40
				H	65	25	143	52.5
				L	100	35	220	74
RDM6	630、800	3-4	690	N	35	20	74	40
				S	50	22	105	46
				H	65	25	143	52.5
				L	100	35	220	74
RDM6	1250、1600	3-4	690	S	50	20	105	42
				H	65	25	143	52.5
				L	100	35	220	74

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5.2.5 RDM11 系列、RDM6 系列低压塑壳断路器

型号	额定绝缘电压 (V)	过流保护整定电流 (A)	断路器型式	极限断路容量 (kA)		断路容量 (kA)	
				380V	660V	480V	660V
RDM11-100 (3、4 极)	750	12.5-100	N	25	8	25	10
			H	70	10	65	35
			L	150	20	130	50
RDM11-160 (3、4 极)	750	12.5-160	N	36	8	35	20
			H	70	10	65	35
			L	150	20	130	50
RDM11-250 (3、4 极)	750	12.5-250	N	36	8	35	20
			H	70	10	65	35
			L	150	20	130	50
RDM11-400 (3、4 极)	750	160-400	N	45	10	42	20
			H	70	20	65	35
			L	150	35	130	50
RDM11-630 (3、4 极)	750	250-630	N	45	10	42	20
			H	70	20	65	35
			L	150	35	130	50
RDM6-800 (3、4 极)	750	320-800	N	50	25	42	30
			H	70	40	65	42
			L	150	60	100	65
RDM6-1000 (3、4 极)	750	400-1000	N	50	25	42	30
			H	70	40	65	42
			L	150	60	100	65
RDM6-1250 (3、4 极)	750	500-1250	N	50	25	42	30
			H	70	40	65	42

5.2.6 RDM949 系列塑料外壳式断路器

型号	RDM949-30		RDM949-100BA RDM949-100B RDM949-100BD RDM949-100B	RDM949-400BA RDM949-225 RDM949-225BD RDM949-225B	RDM949-400BA RDM949-400B RDM949-400BD	RDM949-600BA RDM949-600B RDM949-600BD	RDM949-800
额定电压 (V)	AC660V 及以下						
额定电流 (A)	30	100	225	400	600	800	
极数	2.3						
脱扣电流 (A)	15 20 30	15 20 30 40 50 60 75 100	125 150 175 200 225	250 300 350 400	450 500 600	700 800	

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5.2.7 OESA 型开关熔断器组

型号	开关规格	额定绝缘电压 (V)	额定工作电压 AC-20 (V)	额定工作电流 AC-21A (A)	额定工作电流 AC-22A (A)	额定工作电流 AC-23A (A)	额定开断容量 AC-23 类 (A)	额定电容器容量 (KVAR)	
				690V	690V	690V	690V	400V	690V
OESA Mini	20	1000	1000	20	20	20	256	10	15
	25			25	25	25	256	12	20
	32			32	32	32	256	15	25
OESA	32	750	750					15	
	63			63	63	40	320	30	50
	125			125	125	50	405	50	90
	160			160	135	50	405	57	100
OESA -PL	200	1000	1000	200	200	200	2000	90	160
	250			250	250	250	2000	105	190
	315			315	315	315	3200	145	250
	400			400	400	400	3200	180	325
	630			630	630	630	5760	250	450
	800			800	800	720	5760	310	550

5.2.8 HH15 系列隔离开关熔断器组

规格		63A	125A	160A	250A	400A	630A
额定绝缘电压 V		660					
额定工作电压 V		380 500 660					
额定熔断短路	380V	100					
	500V						
电流 KA	660V	50					
最大熔断体 A		160			400		630
熔断体尺码		00			1-2		3

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5.2.9 CJX2(RDC6) 系列交流接触器

型号	三相感应电动机的 最大功率 kW		额定工 作电流 A	型号	三相感应电动机的 最大功率 kW		额定工 作电流 A
	380V	660V			380V	660V	
CJX2(RDC6)-9	4.0		9	CJX2(RDC6)-80	40	45	80
CJX2(RDC6)-12	5.5		12	CJX2(RDC6)-115	45	59	96
CJX2(RDC6)-9	4.0	4.0	9	CJX2(RDC6)-150	55	110	120
CJX2(RDC6)-12	5.5	5.5	12	CJX2(RDC6)-150	75	110	145
CJX2(RDC6)-16	7.5	5.5	16	CJX2(RDC6)-185	90	132	185
CJX2(RDC6)-25	11	11	25	CJX2(RDC6)-225	110	160	210
CJX2(RDC6)-32	15	15	30	CJX2(RDC6)-265	140	200	260
CJX2(RDC6)-40	18.5	22	37	CJX2(RDC6)-330	160	250	305
CJX2(RDC6)-50	22	30	50	CJX2(RDC6)-400	200	355	400
CJX2(RDC6)-63	30	37	65	CJX2(RDC6)-630	280	500	550
CJX2(RDC6)-80	37	40	75	CJ40-800	370	600	700
				CJ40-800	400	650	750

5.2.10 CJX8 系列交流接触器

型号	额定绝缘电 压最高工作 电压 (V)	在 AC3、AC4 时				在 380V 时	
		额定工作电流 A		控制功率 KW		额定开断能力 A	
		380V	660V	380V	660V	合	分
CJX8-16	660	15.5	6.7	7.5	5.5	190	155
CJX8-25		22	13	11	11	270	220
CJX8-40		37	21	18.5	18.5	445	370
CJX8-50		44	25	22	22	540	450
CJX8-80		65	45	33	40	780	650
CJX8-95		85	55	45	50	1020	850
CJX8-115		105	82	55	75	1260	1050
CJX8-185		170	118	90	110	2040	1700
CJX8-265		245	170	132	160	3000	2500
CJX8-400		370	268	200	250	4450	3700
CJX8-500		475	337	250	315	5700	4750

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5.2.11 JRS8 系列热过载继电器

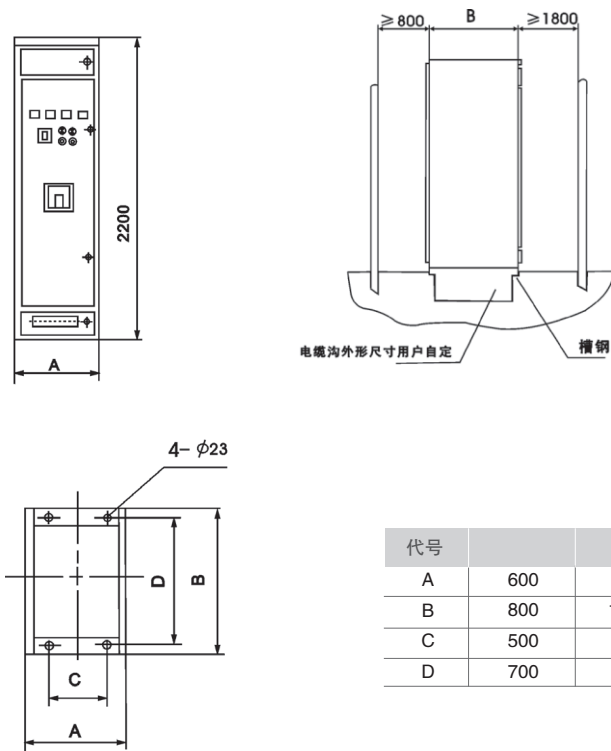
型号	热元件额定电流范围（A）	配套接触器
JRS8-25	0.11-0.17 0.17-0.26 0.26-0.43 0.43-0.65 0.65-1.00 0.85-1.30 1.10-1.60 1.35-2.00 1.7-2.4 2.2-3.2 3.0-4.7 4.0-6.3 5.5-8.0 7.5-10.5 10.0-14.0	CJX2(RDC6)-9-12
JRS8-32	0.1-0.16 0.16-0.25 0.25-0.40 0.63-1.0 1.0-1.4 1.3-1.8 1.7-2.4 2.2-3.1 2.8-4.0 3.5-5.0 4.5-6.5 6.0-8.5 7.5-11.0 10-14 13-19 18-25 24-32	CJX2(RDC6)-32
JRS8-85	18-25 22-32 29-42 36-52 45-63 60-80	CJX2(RDC6)-40-80
JRS8-85	29-42 36-52 45-63 60-80	CJX2(RDC6)-95
JRS8-105	80-100	CJX2(RDC6)-115
JRS8-170	65-90 80-110 100-135	CJX2(RDC6)-115
JRS8-250	100-135 110-150 130-175 150-200	CJX2(RDC6)-265
JRS8-170(带互感器)	130-185 165-235 220-310 285-400	CJX2(RDC6)-400
JRS8-250(带互感器)	265-375 355-500 465-650 610-850	CJ40-800

5.2.12 JRS8 系列热过载继电器

型号	额定电流 A	热元件额定电流范围（A）	配套接触器
JRS8-16	16 25	0.11-0.16 0.14-0.21 0.19-0.29 0.27-0.40 0.35-0.52 0.42-0.63 0.55-0.83 0.70-1.0 0.90-1.3 1.1-1.5 1.3-1.8 1.5-2.1 1.7-2.4 2.1-3.0 2.7-4.0 3.4-4.5 4.0-6.0 5.2-7.5 6.3-9.0 7.5-11 9.0-13 12-17.6	CJX8-16
JRS8-25		0.17-0.25 0.22-0.32 0.28-0.42 0.37-0.55 0.5-0.7 0.6-0.9 0.7-1.1 1.0-1.5 1.3-1.9 1.6-2.4 2.1-3.2 2.8-4.1 3.7-5.5 5.0-7.5 6.7-10 8.5-13 11-14 13-17 15-20 18-23 21-27 26-32	CJX8-25
JRS8-45	45	0.28-0.40 0.35-0.52 0.45-0.63 0.55-0.83 0.7-1.0 0.86-1.3 1.1-1.6 1.4-2.1 1.8-2.5 2.2-3.3 2.8-4.0 3.5-5.2 4.5-6.3 5.5-8.3 7-10 8.6-13 11-16 14-21 18-27 25-35 30-45	CJX8-37 CJX8-45
JRS8-105	105	27-42 36-52 45-63 57-82 70-105 80-115	CJX8-65、85、105
JRS8-170	170	90-130 110-160 140-200	CJX8-170
JRS8-250	250	100-160 160-250 250-400	CJX8-250
JRS8-370	370	100-160 160-250 250-400 315-500	CJX8-370、460

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安装尺寸 Fixing size



代号			
A	600	800	1000
B	800	1000	
C	500	700	900
D	700	900	

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订货须知

- 6.1 一次回路方案及单线系统图；
- 6.2 二次回路原理图或接线图；
- 6.3 装置的排列图和配电室的平面布置图；
- 6.4 每个装置内所装各种电器设备的详细规格和数量；
- 6.5 提供水平母线的工作电流和短路电流，并按标准选取母线规格（ $10 \times 30 \times 2$ 、 $10 \times 60 \times 2$ 、 $10 \times 80 \times 2$ ）如不标明母线规格，则由制造厂选定；
- 6.6 母线系统 A、B、C、N、PE 或 A、B、C、PEN，如不标明，由制造厂选定；
- 6.7 提供每个回路的使用名称（限制在 10 字以内），如不提供，制造厂供空白符号牌；
- 6.8 装置外壳的防护等级（IP30、IP40）柜底是否封闭，如不标明，则为 IP30 柜底不封闭；
- 6.9 装置表面漆膜颜色，如不标明，则为标准色。

Order notice

- 6.1. once circuit project and mongline system map;
- 6.2. secondary circuit principle map or wiring map;
- 6.3. device' s array map and outfit electricity room ' s floor plan;
- 6.4. all kinds of the electricity setting' s detailed spec and amount in the device;
- 6.5. Providing level busbar' s work current and short current, and choose busbar spec according to the standard ($10 \times 30 \times 2$, $10 \times 60 \times 2$, $10 \times 80 \times 2$). If not notice the busbar spec, then the manufacturer will make a choice.
- 6.6. the busbar system A, B, C, N, PE, or A, B, C, PEN. If not notice, then the manufacturer will make a choice.
- 6.7. Providing each circuit' s using name (limited in 10 words), if not providing, the manufacturer will provide blank sign cards.
- 6.8. Whether the device shell' s bottom of the cabinet whose protection rate is IP30, IP40 is blocked out or not , if not noticed, then the IP30 bottom of the cabinet is not blocked out.
- 6.9. The surface of the device's color, if not noticed, then it is the standard color.



MCD-4000

低压开关柜

主母线额定电流

额定电流 (A)	L1, L2, L3	PEN	N	PE
800	1 × Cu	1 × Cu	1 × Cu	1 × Cu
1000	1 × Cu			
2000	2 × Cu			
3000	4 × Cu	2 × Cu	2 × Cu	
3200				
4000				

注：铜母线截面为60 × 10mm²倍数

额定短路分断能

额定电流 A	额定预期短路耐受电 流 cos ϕ ≥ 0.2kA	额定短时耐受电 流 kA	额定峰值耐受电流 kA
800	50	42 / 1	110
1000、2000	80	66 / 1	176
3000、3200、4000	100	80 / 1	220

进线断路器的选择 Choice of circuit-breaker

断路器的分断能力必须大于等于变压器的短路电流。标准变压器的额定电流及短路电流见下表；

The breaking capacity of breaker must be over equal to the short circuit current of transformer.rated current and short circuit current of standard transformer see the list below;

额定电压 Ue	400 / 231V			525V			690 / 400V		
阻抗电压 百分比Usc	4%	6%		4%	6%		4%	6%	
额定容量 S _N KVA	额定电流 In(A)	短路电流 Isc' ' (A)		额定电流 In(A)	短路电流 Isc' ' (A)		额定电流 In(A)	短路电流 Isc' ' (A)	
400	578	14450	9630	440	11000	7333	336	8336	5568
500	722	18050	12030	550	13750	9166	420	10440	7120
630	910	22750	15166	693	17320	11550	526	13300	8760
800	1156	28900	19260	880	22000	14666	672	16672	11136
1000	1444	36100	24060	1100	27500	18333	840	20840	13920
1250	1805	45125	30080	1365	34375	22916	1050	26060	17480
1600	2312	57800	38530	1760	44000	29333	1330	33300	22300
2000	2888	72200	48120	2200	55000	36666	1684	41680	27840
2500	3612	90300	60200	2752	68800	45866	2094	52350	34900

粗略估算:变压器额定电流：In(A)=S_N/(kVA) 380V:k=1.5 415V:k=1.4 500V:k=1.1 600V:k=0.9,变压器短路电流：1sc'' =100 x In/Usc

MCD-4000

low-voltage switch board

结构特征

柜体

柜体基本结构是框架结构，采用“威图”公司进口PS4000箱体为基础：门上安装有高机械强度、高绝缘性的工程材料聚碳酸酯制成的透明门板，即使系统在运行时也可检查其运行状态，确保了操作者的人身安全；

• Switchboard

The basic structure of the switchboard is frame mode and applies the PS4000 as basis imported from RITTAL company: The transparent door is made of high mechanical intensity and high insulating engineering polycarbonate. even of system is in operation that can be observed enabling to ensure the operators safety:

系统

以安装模块为安装单元，当所需要的电器元件确定后，安装模块的高度根据元件型号确定，不同宽度的柜体内所能安装的模块数量是固定值；柜体分为三个安装区：母线安装区、元器件安装区、电缆安装区；元件的安装形式有固定式和抽出式两种，均为面板操作；主母线由专用母线框固定，按“品”安结构排布，增大了相间距，提高了系统的稳定性；

• System

To take the fixing unit. while the electrical elements determined. The height of fixing chips will be set according to the types of elements. The number of chips is a certain value in different switchboards: The switchboards is divided into three areas: main busbars area, element area and cable area. The element fixing form divides as two type; fixed-mounted and draw-out version, both belong to the panel operation: The main busbars fixed with the special frame like triangle. It widens the gap among the three phase conductors and increases the system's stability.

所有裸露母线前均装有阻燃、绝缘透明罩，使柜体内部防护等级达到 IP20，能有效避免触电危险；

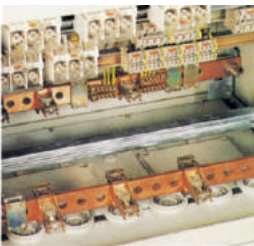
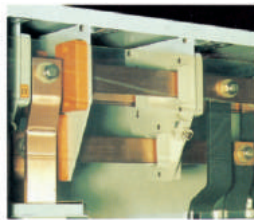
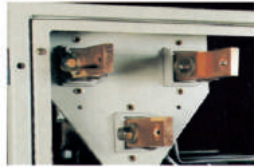
All the bare main busbars are fixed with the burning proof and Insulating transparent cover and reach the protection degree of IP20 in the switch board. So that it can effectively avoid the danger of electricity.

为方便用户引出电缆，各出线回路出线端都采用连接端子。每组端子可加装透明绝缘的防护罩，同时，特制的电缆护套可满足不同规格电缆进出而不降低柜体的防护等级。

In order to be convenient for the customers to get the cable out. Both ends are fixed to connectors with transparent protective covers. Mean while special cable protective cover can satisfy Dissimilar cable in and out but not decrease the protection degree of switch board.

该产品能够方便的采用可编程控制器等智能化模块，简单、快捷的对配电系统进行全自动监控，实现远程控制，同时大大缩小了安装空间。

The product can easily apply programmed controller, it takes rapid and easy way to automatically monitor the distribution system, and has realized the long distance control, mean while compressed the installation room.



MCD-4000
低压开关柜

断路器技术参数

型 号	额定分断能力 (kA)			整定值		额定电流A
	N	S	H	过载 (A)	短路 (A)	
RDM6-125/25	22	65	100	16-25	160-320	25
RDM6-125/40				25-40	260-500	40
RDM6-125/63				40-63	400-800	63
RDM6-125/80				63-80	600-800	80
RDM6-125/100				80-100	600-1000	100
RDM6-250/125	25	65	100	80-125	750-1500	125
RDM6-250/160				100-160	1000-1900	160
RDM6-250/200				140-200	1000-1900	200
RDM6-400/250	35	65	100	200-250	1600-2400	250
RDM6-400/300				240-300	2000-4000	315
RDM6-630/250	45	65	100	125-250	250-3000	250
RDM6-630/400				200-400	400-4800	400
RDM6-630/630				300-630	600-7560	630
RDM6-800/630	100	100	100	315-630	1260-12600	630
RDM6-800/800				400-800	1600-16000	800
RDM6-1600/1000				500-1000	2000-20000	1000
RDM6-1600/1250				625-1250	2500-25000	1250
RDM6-1600/1600				800-1600	3200-32000	1600
RDW1-3200/2000	55	75	100	800-2000	1200-20000	2000
RDW1-3200/2500				1000-2500	1500-25000	2500
RDW1-3200/3200		75	100	1280-3200	1920-32000	3200
RDW1-4000/4000				1600-4000	2400-40000	4000

注：额定分断能力中，N 为标准分断型系列，S 为中分断型系列，H 为高分断型系列。

MCD-4000

low-voltage switch board

接触器技术参数

型 号	常温 电流 AC-I(A)	三相交流电动 机额定值 380V-AC- 3 P(kW) Ie(A)	装配的辅助触 头源型数量 (常开) (常闭)		可与接触器插 接的热继电器	独立安装热 继电器
CJX2(RDC6)-9/11	20	4 8.5	1	1	RDR6(JRS2)-25/10	
CJX2(RDC6)-9/12	20	4 8.5	2	2		
CJX2(RDC6)-12/11	20	5.5 11.5	1	1	RDR6(JRS2)-25/13	
CJX2(RDC6)-12/22	20	5.5 11.5	2	2		
CJX2(RDC6)-16/11	35	7.5 15.5	1	1		
CJX2(RDC6)-16/22	35	7.5 15.5	2	2		
CJX2(RDC6)-25/11	35	11 22.5	1	1		
CJX2(RDC6)-25/22	35	11 22.5	2	2		
CJX2(RDC6)-32/11	55	15 30	1	1	RDR6(JRS2)-36/30	
CJX2(RDC6)-32/22	55	15 30	2	2	RDR6(JRS2)-36/36	
CJX2(RDC6)-40/11	55	18.5 36	1	1	RDR6(JRS2)-36/36	
CJX2(RDC6)-40/22	55	18.5 36	2	2	RDR6(JRS2)-36/36	
CJX2(RDC6)-50/11	90	22 43	1	1	RDR6(JRS2)-93/50	
CJX2(RDC6)-50/22	90	22 43	2	2	RDR6(JRS2)-93/50	
CJX2(RDC6)-63/11	90	30 56	1	1	RDR6(JRS2)-93/65	
CJX2(RDC6)-63/22	90	30 56	2	2	RDR6(JRS2)-93/65	
CJX2(RDC6)-80/11	100	37 72	1	1	RDR6(JRS2)-93/80	RDR6(JRS2)-93/80
CJX2(RDC6)-95/22	100	37 72	2	2	RDR6(JRS2)-93/80	RDR6(JRS2)-93/80
CJX2(RDC6)-95/22	140	45 85	2	2	RDR6(JRS2)-93/93	RDR6(JRS2)-93/93
CJX2(RDC6)-115/22	160	55 104	2	2	RDR6(JRS2)-200/125	RDR6(JRS2)-200/125
CJX2(RDC6)-150/22	160	75 142	2	2	RDR6(JRS2)-200/160	RDR6(JRS2)-200/160带互感器
CJX2(RDC6)-185/22	210	90 170	2	2	RDR6(JRS2)-200/170	RDR6(JRS2)-200/170带互感器
CJX2(RDC6)-225/22	220	110 205	2	2	RDR6(JRS2)-200/200	RDR6(JRS2)-200/200带互感器
CJX2(RDC6)-265/22	300	132 250	2	2	RDR6(JRS2)-400/250	RDR6(JRS2)-400/250带互感器
CJX2(RDC6)-330/22	300	160 300	2	2	RDR6(JRS2)-400/300	RDR6(JRS2)-400/300带互感器
CJX2(RDC6)-400/22	400	200 400	2	2	RDR6(JRS2)-400/400	RDR6(JRS2)-400/400带互感器
CJX2(RDC6)-500/11	550	250 475	2	2	RDR6(JRS2)-630/500	RDR6(JRS2)-630/500带互感器
CJX2(RDC6)-630/22	630	335 630	2	2	RDR6(JRS2)-630/630	RDR6(JRS2)-630/630带互感器
CJ40-1000	850	450 820	2	2	RDR6(JRS2)-400/250	RDR6(JRS2)-400/250带互感器

MCD-4000
低压开关柜

过载继电器技术参数

型号	整定值范围 A	最大极限电流 A	型号	整定值范围 A	最大极限电流 A
JRS2(RDR6)-0.16	0.1-0.16	0.5	JRS2(RDR6)-10	6 - 10	25
JRS2(RDR6)-0.24	0.16-0.24	1	JRS2(RDR6)-16	10 - 16	35
JRS2(RDR6)-0.4	0.24-0.4	2	JRS2(RDR6)-24	16 - 24	50
JRS2(RDR6)-0.6	0.4-0.6	2	JRS2(RDR6)-40	24 - 40	80
JRS2(RDR6)-1.0	0.6-1.0	4	JRS2(RDR6)-57	40 - 57	100
JRS2(RDR6)-1.6	1.0-1.6	6	JRS2(RDR6)-80	50 - 63	100
JRS2(RDR6)-2.4	1.6-2.4	6	JRS2(RDR6)-35	25 - 35	100
JRS2(RDR6)-4	2.4-4	10	JRS2(RDR6)-50	35 - 50	125
JRS2(RDR6)-6	4-6	10	JRS2(RDR6)-70	50 - 70	160
JRS2(RDR6)-9	6-9	10	JRS2(RDR6)-100	70 - 100	160
JRS2(RDR6)-0.16	0.1-0.16	0.5			
JRS2(RDR6)-0.24	0.16-0.24	1	JRS2(RDR6)-50	35 - 50	125
JRS2(RDR6)-0.4	0.24-0.4	2	JRS2(RDR6)-70	50 - 70	160
JRS2(RDR6)-0.6	0.4-0.6	4	JRS2(RDR6)-100	70 - 100	200
JRS2(RDR6)-1.0	0.6-1.0	4	JRS2(RDR6)-125	95 - 125	250
JRS2(RDR6)-1.6	1.0-1.6	6	JRS2(RDR6)-150	120 - 142	250
JRS2(RDR6)-2.4	1.6-2.4	10			
JRS2(RDR6)-4	2.4-4	16	JRS2(RDR6)-70	50 - 70	160
JRS2(RDR6)-6	4-6	20	JRS2(RDR6)-100	70 - 100	200
JRS2(RDR6)-10	6-10	25	JRS2(RDR6)-125	95 - 125	250
JRS2(RDR6)-16	10-16	35	JRS2(RDR6)-160	120 - 160	250
JRS2(RDR6)-24	16-24	50	JRS2(RDR6)-220	160 - 220	250

熔断器与刀熔开关技术参数

型号	额定电压 V	额定电流 A	备注
HR3-100/31	380	100	熔断器可单独安装
HR3-200/31		160	
HR3-400/31		250	
HR3-400/31		400	
HR3-600/31		600	

MCD-4000

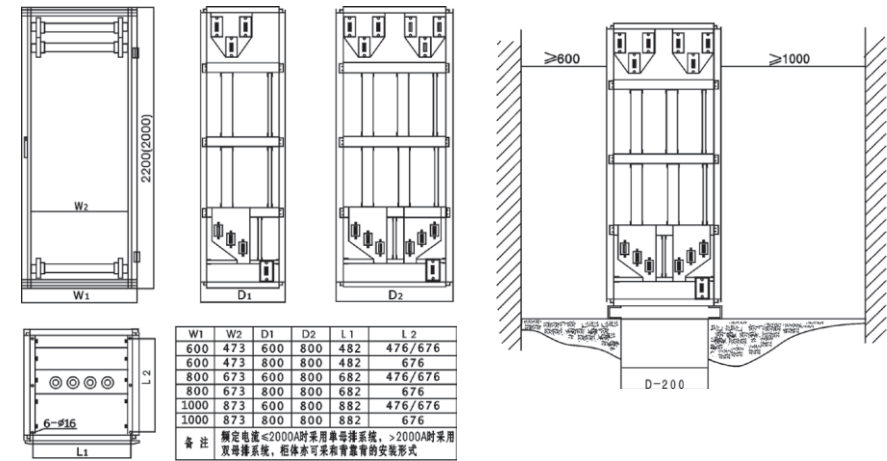
low-voltage switch board

环形电流互感器技术参数

型号 (准确级 3 / 5A)	形式	额定容量 VA(标准级 3)	额定一次电流 A
LMZ1 - □ / 5	单相	1.25, 2.5, 5 5, 7.5, 15 15, 15 15, 15 15, 30	50, 100, 200 250, 400, 600 800, 1000 1250, 1600 2000, 2500 3200, 4000
LMZ1 - □ / 5	单相		
LMZ1 - □ / 5	单相		
LMZ1 - □ / 1	差相		50, 100, 200 250, 400, 600

隔离开关技术参数

型号	额定电流 A	额定电压 V	额定短时耐受电流 KA
HD17-200	40~200	400	3
HD17-400	100~315	400	7
HD17-630	250、400、630	400	10
HD17-1600	630~1600	400	20
HD18-4000	800~3200	400	50



KYN28A-12(Z)

铠装移开式交流金属封闭
开关设备



概述

KYN28A-12(Z) 铠装移开式交流金属封闭开关设备（又称 GZS1 开关设备）系由西安森源公司开发和提供技术转让的先进中压开关设备。它适用于三相交流 50Hz 电力系统，用于接受和分配电能并对电路实行控制、保护及监测。

符合标准：

- GB3906-91 《3 ~ 35kV 交流金属封闭开关设备》
- GB11022-89 《高压开关设备通用技术条件》
- IEC298(1990)《额定电压 1kV 以上 50kV 及以下交流金属封闭开关设备和控制设备》
- DL404-91 《户内交流高压开关柜订货技术条件》

Brief introduction

KYN28A-12(Z) steel-clad movable-type AC metallic packing switch equipment(or named GZS1) is an advanced MV switch equipment developed by XIAN SenYuan Company and technical transfer is supplied. It is suitable for triphase AC 50Hz electric power system for receiving and distributing electric energy and controlling, protecting and monitoring electric circuit.

Accordant criterion:

- 《3-35kv AC metallic packing switch equipment》
- 《General Technical Specifications for High-voltage Switch Equipment 》
- 《AC Metallic Packing Switch Equipment Which Rated Voltage Between 1kV And 50kV》
- 《Ordering Specification of Indoor AC High-voltage Switch Box》

使用环境条件

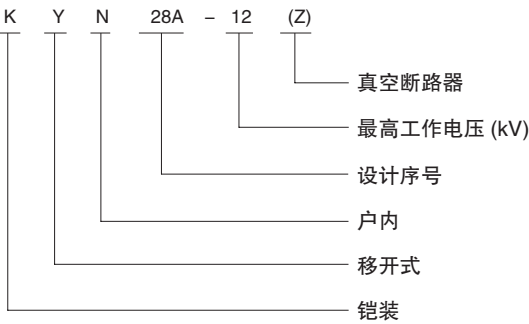
- 2.1 环境温度：最高温度+40℃，最低温度-10℃。
- 2.2 环境湿度： 日平均相对湿度≤ 95%，
月平均相对湿度≤ 90%。
- 2.3 海拔高度：1 000m 以下。
- 2.4 抗地震度：地震烈度不超过 8 度。
- 2.5 周围空气应不受腐蚀性或可燃气体、水蒸汽等明显污染。
- 2.6 无经常性的剧烈震动场所。
- 2.7 在超过 GB3906 规定的正常的环境条件下使用时，由用户和我公司协商。

Operation environment conditions

- 2.1 ambient temperature: max +40℃，min-10℃
- 2.2 ambient humidity: daily average relative humidity ≤ 95%monthly average relative humidity ≤ 90%
- 2.3 absolute altitude: less then 1000m
- 2.4 earthquake-resistance: earthquake intensity less then 8
- 2.5 ambient air is not apparent polluted by corrosive or flammable gas and water vapor.
- 2.6 place without frequent severe shock.
- 2.7 consumers must consult us when the operation environment conditions exceed the normal condition specified by GB3906.

KYN28A-12(Z)
steel-clad movable-type AC
metallic packing switch equipment

型号及其含义 Type and its meaning



技术参数 Technical data

4.1 开关设备技术参数见表 1 technical data of switch equipment (table 1) 表 1

项 目		单 位	参 数			
额定电压		kV	3、6、10			
最高工作电压		kV	3.6、7.2、12			
额定频率		Hz	50			
断路器额定电流		A	630、1250、1600、2000、2500、3150			
开关柜额定电流		A				
额定热稳定电流 (4s)		kA	630、1250、1600、2000、2500、3150			
额定动稳定电流 (峰值)		kA				
额定短路开断电流		kA	16、20、25、31.5、40、50			
额定短路关合电流 (峰值)		kA	40、50、63、80、100、125			
额定绝缘水平	1min 工频耐受电压	kV	16、20、25、31.5、40、50			
			40、50、63、80、100、125			
	雷电冲击耐受电压	kV	24	32	42	
			40	60	75	
防护等级		外壳为 IP4X，隔室间、断路器室门打开时为 IP2X。				

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4.2 操作机构技术参数见表 2 technical data of operating mechanism (see table 2) 表 2

名 称		单 位	数 值
额定操作电压	合闸线圈	V	DC220, 110
	分闸线圈	V	AC220, 110
线圈功率	合闸线圈	W	245
	分闸线圈	W	245
储能电机功率		W	50
储能电机额定电压		V	AC、DC220
储能时间		s	110

4.3 ZN73、VD4 真空断路器技术参数 technical data of VD4 Vacuum circuit breaker
4.3.1ZN73、VD4 真空断路器技术参数 表 3 technical data of VD4 Vacuum circuit breaker (see table 3)

项 目		单位	参 数		
额定电压		kV	3、6、10		
最高工作电压		kV	3.6、7.2、12		
额定频率		Hz	50		
额定电流		A	630、1250、1600、2000、2500、3150		
额定热稳定电流 (4s)		kA	16、20、25、31.5、40、50		
额定动稳定电流（ 峰值 ）		kA	40、50、63、80、100、125		
额定短路开断电流		kA	16、20、25、31.5、40、50		
额定短路关合电流（ 峰值 ）		kA	40、50、63、80、100、125		
额 定 绝 缘水平	1min 工频耐受电压	kV	24	32	42
	雷电冲击耐受电压	kV	40	60	75
额定操作顺序			分-0.3s-合分-180s-合分		
额定短路开断电流开断次数		次	50		
机械寿命			20000		

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steel-clad movable-type AC
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4.3.2 ZN73、VD4 真空断路器机械特性表 4 Mechanical characters of VD4 Vacuum circuit breaker Table 4

名 称		单 位	数 值
触头开距		mm	11 ± 1
超行程			4 ± 0.5
相间中心距离			210、275
合闸触头弹跳时间		ms	≤ 2
三相分闸不同期性			≤ 2
分闸时间，当操作电压为	最高		≤ 50
	额定		≤ 50
	最低		≤ 60
合闸时间			≤ 100
平均分闸速度		m/s	0.9 ~ 1.2
平均合闸速度			0.6 ~ 0.8

当断路器用于控制 3 ~ 10kV 电动机时，若起动电流小于 600A，必须加金属氧化物避雷器，其具体要求由用户与制造厂联系协商；当断路器用于开断电容器组时，电容器组的额定电流不应大于断路器额定电流的 80%。

Metal oxide lightning arrester must be added if the initial current is less then 600mA When the breaker is used to control the 3~10 voltage motors. The details must be negotiated by customer and manufacturer. The rated current of capacitor group should be no more then 80% of the circuit breakers rated current when the circuit breaker is used to break capacitor group.

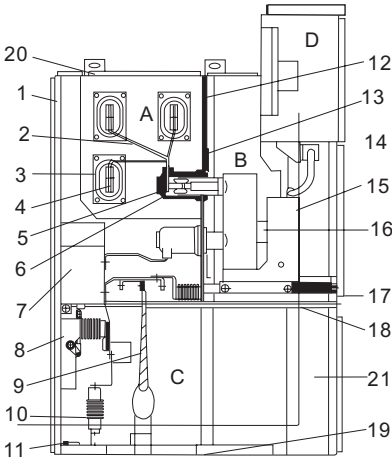


图 1 开关设备结构示意图
Figure 1 abridged general view of switch equipment

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铠装移开式交流金属封闭
开关设备

A. 母线室	B. 断路器手车室	C. 电缆室	D. 继电器仪表室
A.busbar room	B.handcart room of circuit break	C.cable room	D.instrument room of relay
1. 外壳	1-shell	12. 装卸式隔板	12-loadable dummy plate
2. 分支母线	2-branch busbar	13. 隔板（活门）	13-dummy plate (valve)
3. 母线套管	3-busbar spigot	14. 二次插头	14-seconderay-plug
4. 主母线	4-main busbar	15. 断路器手车	15-circuit breaker handcart
5. 静触头装置	5-static contactor device	16. 加热装置	16-heating unit
6. 静触头盒	6-static contactor box	17. 可抽出式水平隔板	17-extractable horizontal
7. 电流互感器	7-current mutual-inductor	18. 接地开关操作机构	dummy plat
8. 接地开关	8-grounding switch	19. 底板	18-operation mechanism of
9. 电缆	9-cable	20. 泄压装置	grounding switch
10. 避雷器	10-lightning arrester	21. 控制小线槽	19-motherboard
11. 接地主母线	11-grounding main busbar		20-pressure-releasing device
			21-mini-control slot

结构特点

开关设备按 GB3906-91 中的铠装式金属封闭开关设备而设计。整体是由柜体和中置式可抽出部件（即手车）两大部分组成（见图 1）。柜体分四个单独的隔室，外壳防护等级为 IP4X，各小室间和断路器室门打开时防护等级为 IP2X。具有架空进出线、电缆进出线及其它功能方案，经排列、组合后能成为各种方案形式的配电装置。本开关设备可以从正面进行安装调试和维护，因此它可以背靠背组成双重排列和靠墙安装，提高了开关设备的安全性、灵活性，减少了占地面积。

5.1 外壳及其它

开关设备的外壳是选用进口敷铝锌薄钢板，经 CNC 机床加工，并采取多重折边工艺。这样使整个柜体不仅具有精度高、很强的抗腐蚀与抗氧化作用，而且由于采用多重折边工艺，使柜体比其它同类设备柜体整体重量轻、机械强度高、外形美观。柜体采用组装式结构，用拉铆螺母和高强度的螺栓联接而成。这样使加工生产周期短、零部件通用性强、占地面积少，便于组织生产。

Structure characters

The switch equipment is designed according to the design criterion of shield metallic sealed switch equipment of GB3906-91. The entirety is constituted by the cabinet and midship draw-out part (handcart). The cabinet is divided into four compartments. Their shells have IP4X protection level. The protection level is IP2X when the doors of the compartments or the rooms of circuit breaker are opened. We can afford various power distribution devices through arraying and assembling various system alternatives of overhead wires and electric cables and other function projects. The switch equipment can be installed, debugged and maintained form the front side. Therefore, they can double array back-to-back and installed against wall. This increases reliability and flexibility of the switch equipment and reduces the floor space.

5.1 Shell and other parts

The shell of the switch equipment is made by inward aluminum-and-zinc-coat sheet steel. The sheet steel is elaborated CNC lathe and passes multi-flanging processes. Therefore, the box has the features of high accuracy, powerful corrosion-resistant inoxidizable ability. Moreover, it has lighter heavy, higher strength and more beautiful appearance comparing to like products. The box adopts modular structure and the modules are connected through nuts and powerful screws. Consequently, it has shorter processing cycle, more general parts, less floor space and easier produce management.

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5.2 手车

手车骨架也采用薄钢板经 CNC 机床加工后组装而成。机械联锁安全、可靠、灵活。根据用途不同，手车分断路器手车、电压互感器手车、计量手车，隔离手车。各类手车按模数，积木式变化同规格手车可以百分之百自由互换。手车在柜体内有退出（隔离）位置和工作位置，每一位置都分别有定位装置，以保证联锁可靠，必须按联锁防误操作程序进行操作。各种手车均采用蜗轮、蜗杆摇动推进、退出，其操作轻便、灵活，适合于各种值班人员操作。手车当需要移开柜体时，用一只专用转运车，就可以方便取出，进行各种检查、维护；而且采用中置式，整个小车体积小，检查、维护都极方便。

5.2 Handcart

The skeleton of handcart is also made by inward sheet steel and the sheet steel is also elaborated by CNC lathe. The mechanical interlock is safe, reliable and flexible. According to different purposes, the handcart is divided circuit break handcart, voltage transformer handcart, measurement handcart and isolation handcart. All handcarts vary according to modularization modules and the same specs handcarts can replace each other freely. The handcart has isolation position and working position in the box. All positions have location device in order to reliable interlock. It must be operated according anti-mishandling processes. All handcarts are propelled by turbines and worms rotating. The operation is easy, flexible and suitable for different operators. When the handcart needs to move out the box, it can be easily took out through a special delivery for different check-up and maintenance. For its midship installation, the whole handcarts volume is small and the check-up and maintenance is easy.

5.3 隔室

开关设备主要电气元件都有其独立的隔室，即：断路器手车室、母线室、电缆室、继电器仪表室。各隔室间防护等级都达到 IP2X；除继电器室外，其它三隔室都分别有其泄压通道。由于采用了中置式形式，电缆室位置大大增加，因此设备可接多路电缆。

5.3 Isolation room

The main electric elements of the switch equipment have their own independent isolation rooms. They are circuit breaker handcart room, busbar room, cable room and relay instrument room. All isolation rooms have reached IP2X protection level. Except for the relay room, all rooms have pressure-leaking channel. For its midship installation, the capacity of cable room is enlarged enormously. Hence, the equipment can connect

5.3.1 断路器隔室

隔室两侧安装了轨道，供手车 15 在柜内由隔离位置移动至工作位置。静触头盒 6 的隔板 13(活门)安装在手车室的后壁上。当手车从断开位置移动到工作位置过程中，上、下静触头盒上的活门与手车联动，同时自动打开；当反方向移动时活门则自动闭合，直至手车退至一定位置完全覆盖住静触头盒，形成有效隔离，同时由于上、下活门不联动，在检修时，可锁定带电侧的活门，从而保证检修维护人员不触及带电体。在断路器室门关闭时，手车同样能操作，通过上门观察窗，可以观察隔室内手车所处位置，合、分闸显示，储能状况。

5.3.1 Circuit breaker isolation room

There are rails at the both side of the isolation room in order the handcart 15 shift to operation position from isolation position. The dummy plate 13 (valve) of the static contactor box 6 installs on the back wall of the handcart room. During the handcart moving from break position to operation position, the upper and nether static contactor boxes are open at the same time. When it moves to the opposite direction, the valve closes automatically until the handcart arrives a certain position, covers up the static contactor box completely and forms an effective isolation. Because the upper and nether valves are not linked, the valve in the electriferous side can be locked during maintenance time in order protect the maintenance man not contacting electriferous body. When the room of circuit breaker closed, the handcart can operate likewise. The position, switch-status and energy-status of the handcart can be viewed from the observation window in the upper door.

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5.3.2 母线隔室

主母线 4 是单台拼接相互贯穿联接（见图 2）。通过支母线 2 和静触头盒固定。主母线和联络母线为矩形截面的铜排；用于大电流负荷时采用双根母排并联。支母线通过螺栓联接于静触头盒 6 和主母线上，不需要其它支撑。对于特殊需要，母线可用热缩套和联接螺栓绝缘套和端帽覆盖，相邻柜母线用套管 3 固定。这样联接母线间所保留的空气缓冲，在如果出现内部故障电弧时，能防止其贯穿熔化，套管 3 能有效把事故限制在隔离室内而不向其它柜蔓延。

5.3.2 Busbar isolation room

The main busbar is single-joint breakthrough-connected and fixed by branch busbar and static contactor box. The main busbar and connecting busbar is made of rectangle copper bar and installed in parallel in occasion of high-current load. The branch busbar is connected to static contactor box 6 and the main busbar through bolts and needs no other sustainer. For special needs,the main busbar can be covered by heat-shrinkable cover, attachment-bolt insulation covering and end-hat. The main busbar in the adjacent boxes can be fixed by busbar spigot 3. Using this way connecting the buffer-air between busbars can protect it to be melted and breakthrough when inner accident electric emerges. The busbar spigot 3 can control the accident within isolation room effectively and not spread to other boxes.

5.3.3 电缆隔室

开关设备采用中置式，因而电缆室空间较大。电流互感器 7、接地开关 8 装在隔室后壁上，壁雷器 10 安装于隔室后下部。将手车 15 和可抽出式水平隔板 17 移开后，施工人员就能从正面进入柜内安装和维护。电缆室内的电缆连接导体，每相可并 1 ~ 3 根单芯电缆。必要时每相可并接 6 根单芯电缆，联接电缆的柜底配制开缝的可卸式非金属封板或不导磁金属封板，确保了施工方便。

5.3.3 Cable isolation room

The switch equipment adopts midship-installation and its capacity is large. Current mutual-inductor 7 and grounded switch 8 are installed on the back wall of the isolation room. The lightning arrester 10 is installed back-below wall of the isolation room. When the circuit breaker 15 and extractable horizontal dummy 17 are moved away, the constructor can enter the box to install and maintain from the facade. The conductor cables in the cable room can parallel connect 1~3 single-core cables each phase. If necessary, each phase can connect 6 single-core cables. The box floor of the connection cable prepared detachable nonmetallic sealing board non- magnetic-conduct metal to assure the convenience of construction.

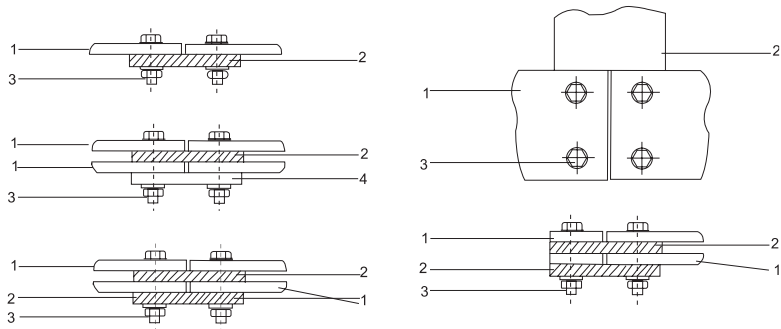


图2 主母线与支母线的联接型式1. 主母线 2. 分支小母线 3. 螺栓 4. 垫块

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5.3.4 继电器仪表室

继电器仪表室内可安装继电保护元件、仪表、带电监察指示器，以及特殊要求的二次设备。控制线路敷设在足够空间的线槽内，并有金属盖板，可使二次线与高压室隔离。其左侧线槽是为控制小线的引进和引出预留的，开关柜自身内部的小线敷设在右侧。在继电器仪表室的顶板上还留有便于施工的小母线穿越孔。接线时，仪表室顶盖板可供翻转，便于小母线的安装。

5.3.4 Relay instruction room

Relay protection elements, instructions, charge-monitoring indicators and secondary equipments with special requirements can be installed in the relay instruction room. Control circuit is laid out in the capacious slots with metallic capping plate to isolate secondary cables and high voltage room. The slot at the left side is prepared for the in-and-out of control cable. The switch box's own control cables are installed at the right side. In the roof of the relay instruction room remains little busbar through-hole for construction. The roof of the instruction room can be inverted for the installation of the little busbar during the construction.

5.4 防止误操作联锁装置

开关设备内装有安全可靠的联锁装置，完全满足五防的要求。

a. 仪表室门上装有提示性的按钮或者 KK 型转换开关，以防止误合、误分断路器。

b. 断路器手车在试验或工作位置时，断路器才能进行合分操作，而且在断路器合闸后，手车无法移动，防止了带负荷推拉断路器。

c. 仅当接地开关处在分闸位置时，断路器手车才能从断开位置移到工作位置。仅当断路器手车处于断开位置时，接地开关才能进行合闸操作（接地开关可带电压显示装置）。这样实现了防止带电误合接地开关及防止了接地开关处在闭合位置时合断路器。

d. 接地开关处于分闸位置时，下门及后门都无法打开，防止了误入带电间隔。

e. 断路器手车确实在试验或工作位置，而没有控制电压时，仅能手动分闸，不能合闸。

f. 断路器手车在工作位置时，二次插头被锁定不能拔除。

g. 各柜体可装电气联锁。

本开关设备还可以在接地开关操作机构上加装电磁铁锁定装置以提高可靠性，其订货按用户的需求选择。

5.4 anti-mishandling interlocking apparatus

There are safe and reliable interlocking apparatus in the switch equipment, wholly meet the five-protection requirement.

a. There are suggestive button or KK-type alternation switch in order to prevent falsely close or break circuit breaker.

b. The breaker can be operated close-and-break only when the breaker handcart is in the test or working position. Moreover, the handcart cannot be shifted if the breaker is closed. So the electriferous push-and-pull of circuit breaker is prevented.

c. The breaker handcart can be shifted from break position to working position only when the circuit breaker is in the break position. The grounded switch can be closed only when the breaker handcart in the break position (the grounded switch can be with voltage indication device). So, it is prevented that the grounded switch is falsely electriferously closed and the circuit breakers is falsely closed when grounded switch being closed.

d. The nether and back door cannot be open when the grounded switch is in break position, preventing falsely going into electriferous isolation room.

e. The breaker handcart can only be broken by hand and not be open when it is being tested or in the working position positively.

f. The secondary plug is locked and cannot be pull out when the breaker handcart is in the working position.

g. All boxes can be equipped with electric interlock.

For this switch equipment, the operation mechanism of grounded switch can be equipped with electromagnet

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lock mechanism in order to increase its reliability. The order is in term of consumers needs and choices.

5.5 泄压装置

在断路器手车室，母线室和电缆室的上方均设有泄压装置，当断路器或母线发生内部故障电弧时，伴随电弧的出现，开关柜内部气压升高，装设在门上的特殊密封圈把柜前面封闭起来 顶部装备的泄压金属板将被自动打开，释放压力和排泄气体，以确保操作人员和开关柜的安全。

5.5 Pressure-releasing device

There are pressure-releasing devices in the upper of the breaker handcart room, busbar room and cable room. The air pressure inner switch box is increasing accompanying with the emerging of electric arc when inner accident electric arc of the circuit breaker or busbar occurs. The special seal packing ring in the door sealing the front of the door, pressure-releasing metallic sheet equipped on the upper opening automatically and releasing pressure and gas, in order to protect the operator and switch box.

5.6 二次插头与手车的位置联锁

开关设备上的二次线与断路器手车的二次线的联络是通过手动二次插头来实现的。二次插头的动触头通过一个尼龙波纹伸缩管与断路器手车相联，二次静触头座装设在开关柜手车室的右上方。断路器手车只有在试验、断开位置时，才能插上和解除二次插头，断路器手车处于工作位置时由于机械联锁作用，二次插头被锁定，不能被解除。由于断路器手车的合闸机构被电磁铁锁定，断路器手车在二次插头未接通之前仅能进行分闸，所以无法使其合闸。

5.6 Position interlock of the secondary plug and the handcart

It is realized by manually secondary plug that the secondary cables of switch equipment contact with the secondary cables of the breaker handcart. The dynamic contactor of the secondary plug contacts with the breaker handcart through a nylon wavy collapsible tube. The secondary plug can be pulled or plugged only when the break handcart is in the test position or break position. The secondary plug is locked and cannot be released for mechanical interlock when the breaker handcart is in the working position. The breaker handcart can only be break for its close mechanism is locked by electromagnet before the secondary plug is closed.

5.7 带电显示装置

如果用户有需求时，开关柜内可设有检测一次回路运行的可选件即带电显示装置。该装置由高压传感器和显示器两单元组成。该装置不但可以提示高压回路带电状况，而且还可以与电磁锁配合，达到防止带电关合接地开关、防止误入带电间隔，从而提高配套产品的防误性能。

5.7 Electriferous indicator

The switch box can be equipped with option of electriferous indicator that can detect the circles running, if the consumer needs. The device has two components: high voltage sensor and indicator. The device not only can increase the electrification status of high voltage, but also can prevent the grounded switch being closed electriferously and falsely go into electriferous isolation room, so as to increase the ability of anti-mistake of the aligned products.

5.8 防止凝露和腐蚀

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

5.8 Moist and corrosion protection

In order to prevent the risk of moist in the high humidity and high temperature variation surrounding, the heater is installed in the circuit breaker room and cable room. Therefore, the usage in above surrounding is permitted and the corrosion is prevented.

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5.9 接地装置
在电缆室内单独设立有10×40mm²的接地铜排，此排能贯穿相邻各柜，并与柜体良好接触。此接地排供直接接地之元器件使用。同时由于整个柜体用敷铝锌板相拼联，这样使整个柜体都处在良好接地状态之中，确保运行操作人员触及柜体安全。

5.9 Grounded device
There is independent 10x40mm² grounded copper bar in the cable room. The bar can run through adjacent boxes and contact well with boxes. The grounded bar is for the components ground directly. At the same time, for the whole cabinet being jointed by aluminum-and-zinc-coat sheet steel, the whole box is in the status of well grounded and ensures the safety of the operator and box.

5.10 开关设备外形尺寸见图 3、表 5 5.10 Outline dimension of the switch equipment (see figure3,table 5)

高度 B(mm)		2300
宽度 A(mm)	分支小母线额定电流达到 1250A	800
	分支小母线额定电流 1600A 及以上	1000
深度 C(mm)	电缆进出线	1500
	架空进出线	1660

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6.1 开关设备地基尺寸见表 6、图 4 6.1 Dimension of the foundation Table 6 Figure 4 (mm) 表 6

柜宽 A	柜深 B	M	N	L
800	1500 电缆	630	800	1450
	1660 架空			1610
1000	1500 电缆	830	1000	1450
	1660 架空			1610

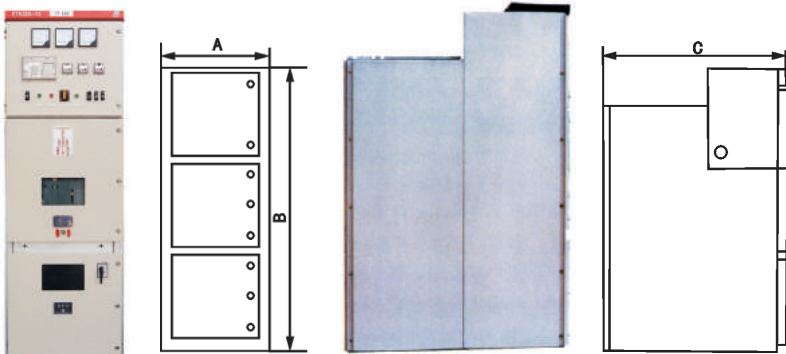


图 3 外形尺寸 Figure 3 Outline dimension

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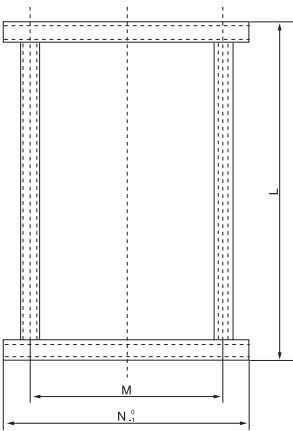


图 4 开关设备地基安装图

Figure 4 The groundwork installation diagram of switchgear

6.2 开关设备的安装 Installation of the switch equipment

- a. 开关设备的安装基础尺寸与安装尺寸 (见表 7、表 8、图 5、图 6)
a.Dimension of installation foundation and installation of the switch equipment (see table7, table8, figure 5, figure 6)

(mm) 表 table7

柜 深	L
1500	1450
1660	1610

(mm) 表 8

柜宽 A	柜深 C	L1	L2	L3
800	1500 电缆	530	630	880
	1660 架空			
1000	1500 电缆	730	830	1040
	1660 架空			

- b. 柜体单列时，柜前走廊以 2.5 米为宜，双列布置时，柜间操作走廊以 3 米为宜。
c. 按工程需要与图纸标明，将开关柜运至它们特定的位置，如果一排较长的开关柜排列（为 10 台以上），拼柜工作应从中间部位开始。
d. 开关设备在运输过程中，应使用特定的运输工具如吊车或叉车，严禁使用滚筒撬棍；且严禁将断路器手车 推入柜体一起搬运，断路器手车（以及其它手车）只有在柜体安装好以后再推入相应小室。

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- 松开母线室顶盖螺栓，卸去顶盖。
- 在母线室前面松开固定螺栓，卸下装卸式隔板 12。
- 松开断路器手车室下面的可抽出式水平隔板 17 的固定螺栓，并将水平隔板卸下。
- 松开和移去电缆盖板 19。
- 从开关设备左侧控制小线槽移去盖板。右前方控制线槽盖板亦同时卸下。
- 卸下吊装板及紧固件。
- 在此基础上，一个接一个地安装开关柜，包括水平和垂直两方面，开关柜安装不平度不得超过 2mm，
- 当开关设备已完全组合(拼接)好时，可用 M12 的地脚螺栓将其与基础框架相联或用电焊与基础框架焊牢。

b.2.5m wide is fit for gallery before box when the box is installed solely and 3m wide is fit for gallery before box when the boxes are installed doubly.

c.Carry the switch equipment to its certain position according to requirement of project and mark in drawing. Joint of boxes should start for the middle when there is a long array of boxes (more then 10).

d.Special transportation facilities such as crane or fork truck must be used when the switch equipment is being transported and the roller or crowbar is forbidden. The breaker handcart (or other handcars) can be pulled to corresponding room only after the box has installed and it is forbidden that transport box with the breaker handcart in it.

e.Loosen the roof bolt of busbar room and disassemble the roof.

f.Loosen the fixed bolt in front of the busbar room and disassemble the loadable dummy plate 12.

g.Loosen the fixed bolt of extractable horizontal dummy plat 17 under the breaker handcart room and disassemble the horizontal dummy.

h.Loosen and disassemble the cable motherboard 19.

i.Disassemble the cover plate from the control cable ditch at the left side of the switch equipment. So do the cover plate at the right front side.

j.Disassemble hoisting plate and fastener.

k.Based above, install the switch box one by one, including horizontal and vertical. The plainness of installation of the switch box is must not exceed 2mm.

l.The switch equipment can be connected to the foundation frame by foundation bolts or be welded hard to foundation frame when it has been assembled.

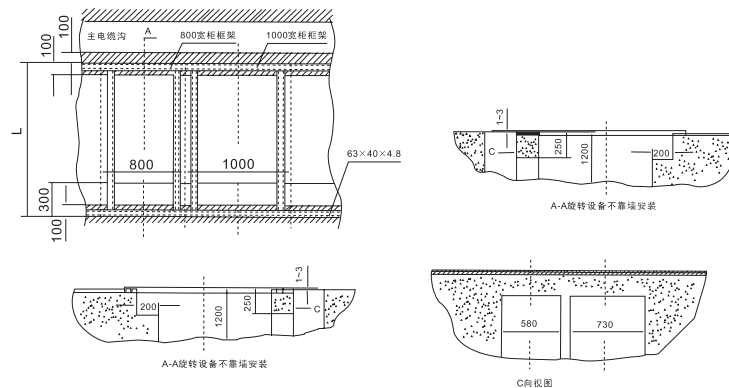


图 5 开关设备安装基础示意图

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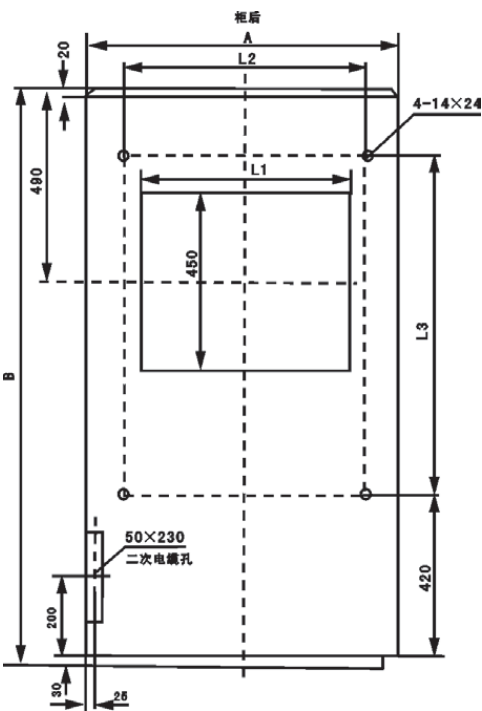


图 6 开关设备安装尺寸示意图

6.3 母线的安装

开关设备中的母线均采用矩形母线，且为分段形式，当选用不同电流时所选用的母线只是数量规格不一，因而在安装时必须遵照下列的步骤：

- a. 用清洁干燥的软布擦指母线，检查绝缘套管有否损伤，在连接部位涂上导电膏或者是中性凡士林。
- b. 一个柜接一个柜地安装母线，将母线段和对应的分支小母线接在一起，拴接时应插入合适的垫块，用螺栓拧紧。主母线与分支母线的联接形式见图 6。

6.4 开关设备的接地装置

- a. 用预设的连接板将各柜的接地母线 11 连接在一起。
- b. 在开关柜内部联接所有需要接地的引线。
- c. 将基础框架与接地排相连，如果柜子排列超过 10 台以上，必须有两个以上的接地排。
- d. 将接地开关的接地线与开关柜接地主母线联接。

6.5 开关设备安装后的检查

当开关设备安装就位后，清除柜内设备上的灰尘杂物，然后检查全部紧固螺栓有无松动，接线有无脱落。将断路器在柜中推进，推出，并进行分合闸动作，观察有无异常，将仪表的指针调整到零位，根据线路图检查二次接线是否正确。对继电器进行调整，检查联锁是否有效。

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6.3 Installation of busbar

All the busbar in the switch equipment is rectangle and is sectional type. The difference is number between different current. Therefore, the following procedures must be obeyed.

a. Use clean dry soft cloth to wipe the busbar. Check the insulation tubes if there is damage on it. Spread current-conducting cream or neutral Vaseline on the junction region.

b. Install the busbar one box by one box. Join the busbar section with branch busbar. Insert appropriate washer and fix them by bolts. The junction-type of main busbar and branch busbar see figure 6.

6.4 Grounded position of switch equipment

a. Connect the grounded busbar 11 all together with preinstall connection plate.

b. Connect all the leading wire in the box.

c. Connect the foundation frame and grounded bar. There must be more than two grounded bars if there are more than 10 boxes.

d. Connect the grounded cable of grounded switch and main busbar of switch box.

6.5 Check after the switch equipment installed

After the switch equipment has installed, please clean dust and sundries on the box. Then, check all the bolts if someone is unstuck or off. Push and pull the circuit breaker, close and break the breaker, observe it if it is abnormal. Set the pointer of instrument to zero, check the secondary wiring if it is wrong according to the line chart. Adjust the relay, check the interlock if it is effective.

使用与维护 Operation and maintenance

7.1 开关柜在运行中，运行人员除应遵守有关规程外，还应注意以下问题。

7.2 操作程序

虽然开关设备设计有保证开关设备各部分操作程序正确的联锁，但是操作人员对开关设备各部分的投入和退出，仍应严格按操作规程和本技术文件的要求进行，不应随意操作，更不应在操作受阻时，不加分析强行操作，否则，容易造成设备损坏，甚至引起事故。

7.1.1.1 无接地开关的断路器柜的操作

a. 将断路器可移开部件装入柜体: 断路器小车准备由柜外推入柜内前，应认真检查断路器是否完好，有无漏装部件，有无工具等杂物放在机构箱或开关内，确认无问题后将小车装在转运车上并锁定好。将转运车推到柜前，把小车升到合适位置，将转运车前部定位锁板插入柜体中隔板插口并将转运车与柜体锁定之后，打开断路器小车的锁定钩，将小车平稳推入柜体同时锁定。当确认已将小车与柜体锁定好之后，解除转运车与柜体的锁定，将转运车推开。

b. 小车在柜内操作: 小车在从转运车装入柜体后，即处于柜内断开位置，若想将小车投入运行，首先使小车处于试验位置，应将辅助回路插头插好，若通电则仪表室面板上试验位置指示灯亮，此时可在主回路未接通的情况下对小车进行电气操作试验，若想继续进行试验，首先必须把所有柜门关好，用钥匙插入门锁孔，把门锁好，并确认断路器处于分闸状态(见d条)。此时可将手车操作摇把插入中面板上操作孔内，顺时针转动摇把，直到摇把明显受阻并听到清脆的辅助开关切换声，同时仪表室面板上工作位置指示灯亮，然后取下摇把。此时，主回路接通，断路器处于工作位置。可通过控制回路对其进行合、分操作。

若准备将小车从工作位置退出，首先，应确认断路器已处于分闸状态(见d条)，插入手车操作摇把，逆时针转动直到摇把受阻并听到清脆的辅助开关切换声，小车便回到试验位置。此时，主回路已经完全断开，金属活门关闭。

c. 从柜中取出小车: 若准备从柜内取出小车，首先应确定小车已处于试验位置，然后解除辅助回路插头，并将动插头扣锁在手车架上，此时将转运车推到柜前(与把小车装入柜内时相同)，然后将手车解锁并向外拉出。当手车完全进入转运车并确认转运车锁定，解除转运车与柜体的锁定，把转运车向后拉出适当距离后，轻轻放下停稳。如小车要用转运车运输较长距离时，在推动转运小车过程中要格外小心，以避免运输过程中发生意外事故。

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d. 断路器在柜内的分、合闸状态确认：断路器的分合闸状态可由断路器的手车面板上分合闸指示牌及仪表室面板上分合闸指示灯两方判定。

若透过柜体中面板观察玻璃窗看到手车面板上绿色的分闸指示牌则判定断路器处于分闸状态，此时如果辅助回路插头接通电，则仪表板上分闸指示灯亮。

若透过柜体面板观察玻璃窗看到手车面板上红色合闸指示牌，则判定断路器处于合闸状态，此时如果辅助回路插头接通电，则仪表室面板上合闸指示灯亮。

7.1.1.2 有接地开关的断路器柜的操作

将断路器手车推入柜内和从柜内取出手车的程序，与无接地开关的断路器柜的操作程序完全相同。仅当手车在柜内操作过程中和操作接地开关过程中要注意的地方叙述如下：

a. 手车在柜内操作

当准备将手车推入工作位置时，除了要遵守 7.1.1.1b 中提请注意的诸项要求外，还应确认接地开关处于分闸状态，否则下一步操作无法完成。

b. 合、分接地开关操作

若要合接地开关，首先应确定手车已退到试验 / 断开位置，并取下推进摇把，然后按下接地开关操作孔处联锁弯板，插入接地开关操作手柄，顺时针转动 90 度，接地开关处于合闸状态。若再逆时针转动 90 度，便将接地开关分闸。

7.1 Besides obeying related rules, the operator should notice the following standards, when the switch box is running.

7.1.1 operating procedure

Although there is interlock in the switch equipment to ensure each part operating procedures is correct, the operator should strictly obey the instrument and requirement of the technical file, when push in and pull out the switch equipment. Random operations are not permitted. And the forced operations without analysis are forbidden when the operation is baffled. Otherwise, it is facile to damage the equipment and generate accident.

7.1.1.1 Operations of the circuit breaker box without grounded switch

a. Fit the portable components of the circuit breaker into the box. Before pull the breaker handcart into the box from outside, checking the circuit breaker if it is undamaged, if there is absent component, if there are sundries such as tools in the mechanical box or the switch, load the handcart in the transfer car and fix after ensuring no mistakes. Pull the transfer car before the box, raising the handcart to a appropriate position, inserting the location-plate on the fore part of the transfer car into the dummy plate socket in the box, after the transfer car has fixed with the box, loosen the lock hook of the breaker handcart and pull the handcart placidly into the box and fix it. After ensuring the handcart has fixed the handcart with the box, loosen the lock of transfer car and box and push aside the transfer car.

b. Operate the handcart in the box: after the handcart has load in the box from transfer car, it is in the break position in the box. If the handcart is wanted to run, firstly pull the handcart to test position and plug the auxiliary circuit. If the test-position-indicator on the instrument panel light when electrify, the electric operation test is permitted without electrifying the main circuit. If wanting more operation, firstly close all the box doors and plug the key and lock it, ensue the circuit breaker is break (see d.). By the time, it may insert the handcart operation dodder into the operation hole in the middle panel and rotate it clockwise until it is baffled obviously and auxiliary switch-shift sound is heard and the work-position-indicator on the instrument panel light. Then unload the dodder. By the time, the main circuit electrifies and the circuit break is in work position. It is can be operated it break or close through the control circuit.

If want to pull out the handcart from work position, firstly, ensure the circuit breaker is on the break position.

Then, insert the handcart operation dodder, and rotate it anti-clockwise until it is baffled obviously and auxiliary

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switch-shift sound is heard. The handcart go back to test position. By the time, the main circuit break and the metallic valve closed.

c.Pull out the handcart from box: If want to pull out the handcart from box, firstly, ensure the handcart in the test-position and release the auxiliary plug. Then, lock the dynamic plug with the handcart frame. By the time, push the transfer car before the box (the same as push the handcart in box). Then unlock the handcart and pull it out. After the handcart enter into the transfer car completely and ensue the transfer car be locked, unlock the transfer car and box. Draw back the transfer car a certain distance, lay it down lightly and stop stably. If the handcart is needed to transport a long distance, it must especially care when pull the transfer car in order to avoid accident during transport.

7.1.1.3 一般隔离柜的操作

隔离手车不具备接通和断开负荷电流的能力，因此在带负荷的情况下不允许推拉手车。在进行隔离手车柜内操作时，必须保证首先将与之相配合的断路器分闸（见 7.1.1.1 中 d），同时断路器分闸后其辅助触点转换解除与配合的隔离手车上的电气联锁，只有这时才能操作隔离车。具体操作程序同操作断路器手车相同。

7.1.2 使用联锁的注意事项

7.1.2.1 本产品的联锁功能是以机械联锁为主，辅之以电气联锁实现其功能的，功能上能实现开关“五防”闭锁的要求。但是操作人员不应因此而忽视操作规程的要求，只有规程制度与技术手段相结合才能有效发挥联锁装置的保障作用，防止误操作事故的发生。

7.1.2.2 本产品的联锁功能的投入与解除，大部分是在正常操作过程中同时实现的，不要增加额外的操作步骤。如发现操作受阻（如操作阻力增大）应首先检查是否有误操作的可能，而不应强行操作以至损坏设备，甚至导致误操作事故的发生。

7.1.2.3 有些联锁因特殊需要允许紧急解锁（如柜体下面板和接地开关的联锁）。紧急解锁的使用必须慎重，不宜经常使用，使用时也要采取必要的防护措施，一经处理完毕，应立即恢复联锁原状。

7.2 开关柜的检修除按有关规程要求进行，建议用户特别注意以下几点：

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

7.2.2 检查手车推进机构及其联锁的情况，使其满足本说明书的有关要求。

7.2.3 检查主回路触头的情况，擦除动静触头上陈旧油脂，察看触头有无损伤，弹簧力有无明显变化，有无因温度过高引起镀层异常氧化现象，如有以上情况，应及时处理。

7.2.4 检查辅助回路触头有无异常情况，并进行必要的修整。

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

7.2.6 检查各部分紧固件，如有松动，应及时紧固。

7.1.1.3 Operation of general isolation room

The isolation handcart hasn't the ability of breaking or closing the load current. Therefore, it is forbidden to pull or push the handcart on-load. It must be confirmed that the handcart has broken with the corresponding circuit breaker before operating it in the isolation handcart room (see 7.1.1.2 section d). Only when the auxiliary contactor has released the interlock with the copulate handcart after the circuit breaker is broken, the isolation handcart can be operated. The detailed operation procedures are the same as the breaker handcart.

7.1.2 Matters need attention of interlock

7.1.2.1 The productions interlock function gives priority to mechanical interlock and the electric interlock assistant it. The five-protection closing can be realized in function. But the operators should not ignore the

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requirement of operation criterion. Only when the rules and regulations combine with the technical facility, the interlock mechanism can exert its protection function effectively and avoid the mishandling accident.

7.1.2.2 The load and unload of the interlock function is realized during proper operating and it is unnecessary of additional procedures. If the operation is baffled (e.g. the resistance increase), the mishandling should be examined at first, but not take forced operation so as to damage the equipment, even result in mishandling accident.

7.1.2.3 Some interlocks permit emergent unlock for their special needs (e.g. the interlock of the floor of box and grounded switch) . The usage of emergent unlock function must be careful. It is unfit to use it frequently. It must adopt necessary measures of protection at the time and restore the interlock to the original state.

7.2 Besides obeying rules according to related criterion, the consumer should notice the following standards at the time of inspecting the switch box.

7.2.1 Check the circuit breaker status according to the vacuum breaker instruction book of installation and operation and adjust it if necessary.

订货须知

KYN28A-12(Z) 开关柜订货时应提供下列技术资料:

- a. 主接线方案图编号、用途和单线系统图、额定电压、额定电流、额定短路开断电流、配电室平面布置图及开关柜的排列配置图等。
- b. 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。
- c. 开关柜内主要电气元件的型号、规格及数量。
- d. 如开关柜之间或进线柜需要母线桥连接，应提供母线桥的额定载流量，母线桥的跨度，距地高度等具体要求数据。
- e. 开关柜使用在特殊环境条件时，应在订货时详细说明。
- f. 其它特殊要求。

Ordering criterion

Ordering KYN28A-12(Z) switch box should supply the following technical data.

- a.The serial number of the main wiring scheme drawing, purpose and single-cable system diagram, rated voltage, rated current, rated short-circuit current, rated broken circuit current, the layout chart of the electric distribution room, the array layout chart of the switch box.
- b.The requirement of the switch box control, measurement and protection, or other requirement of close-lock, requirement of automatic system.
- c.The type, specs and number of the main electric elements of the switch box.
- d.If the busbar-bridge connection between the switch boxes or in-cable boxes is needed, the detailed data such as rated current capacity of the busbar-bridge, the span and height, etc should be applied.
- e.If the switch box is used to special surrounding, it must be declared.
- f.Other special requirement.

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概述

KYN28C-12 系列户内金属铠装中置移开式开关设备系三相交流 50Hz 单母线分段系统或双母线分段系统的户内成套配电装置。用于接受和分配 3.6-12kV 的网络电能，并对电力电路实行控制保护、监视和测量。

KYN28C-12 系列开关柜包括额定稳定电流从 16kA 到 50kA，主母线、分支母线额定电流从 630A 到 3150A 的所有方案产品。其产品全部符合国家 GB3906、DL403、DL404 标准及国际 IEC298 等标准规定。

KYN28C-12 系列开关柜为全组装中置式结构，柜体采用 2mm 敷铝锌钢板，经 CNC 数控加工设备加工，通过高强度螺栓联接而成。柜内布局合理，功能齐全，具有防止误操作断路器，防止带负荷拉手车，防止带电合接地开关，防止带接地开关送电和防止误入带电间隔等“五防”功能。该开关柜能配置国产真空断路器和真空接触器，也能配置国外同类型产品。其结构紧凑，手车互换性高，电缆室空间充裕，检修方便，其整体性能达到国外同类产品先进水平。在此基础上开发生产的 F-C 回路开关柜，是一种将高压熔断器与真空接触器配合使用的新型配电装置，具有结构紧凑、体积小、噪音低、可靠性高、且可在中央控制室进行远距离遥控操作等优点。与使用真空断路器柜相比，可为用户节省资金 30% 以上。本产品可广泛应用于冶金、石化、电厂等部门，主要用于控制与保护电动机、变压器和电容器组等。

Product introduction

KYN28C-12 metal armor movable closedown switch devices is the indoor electric apparatus with three-phase 50Hz single main line subsection system or double main line subsection system. The device is for receiving and distributing 3.6V-12kV network electric power, and control, protect, monitor and measure the electro circuit.

KYN28C-12 switchboard includes all products with rated current ranging from 16kA to 50kA, with rated current of major main circuit and branch main circuit ranging from 630A to 3150A. The products are all accord with the GB3906, DL403, DL404, and IEC298, etc.

KYN28C-12 switchboard is of all assembled inner placed structure, and the cabinet is made by aluminum zinc coated steel board, machined by CNC numerical control apparatus, and combined by high strength bolt. The overall arrangement in the board is reasonable; the function of it is perfect, the board has so called “five prevention” function as to prevent operating the breaker by mistake, prevent drawing the handcart by mistake, prevent switching- on the grounded switch with electricity, prevent transferring the power with the grounded switch, and prevent entering the electriferous room by mistake. The switchboard can equip domestic made vacuum breakers and vacuum contactor, and can equip foreign made products of the same type. It has a compact structure, a high interconversion for handcart, an abundant space in cable room, convenient maintenance, the overall capability reached the advanced level of abroad products with the same type. The F-C loop switchboard, which is developed on the base mentioned above, is a new type switchboard combined with high-voltage fuse plug and vacuum contactor., have some advantages like compact structure, small size, low noise, high reliability, and remote control in central controlling room, etc. Compare with the vacuum breaker cabinet, it costs 30% less. The products can be widely used in metallurgy, petrification, power plant department, mainly used for controlling and protecting the electromotor, transformers and capacitor

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使用环境条件

2.1 正常使用环境条件：
海拔高度不超过：1000m。 地震烈度不超过：8 度。
最高温度：+40℃。 最低温度：-25℃。
日平均值：+35℃。 日平均相对湿度 95% 以下。
月平均相对湿度 90% 以下。
开关设备安装在户内没有火灾、爆炸危险，没有严重污秽、化学腐蚀及剧烈振动的场所。

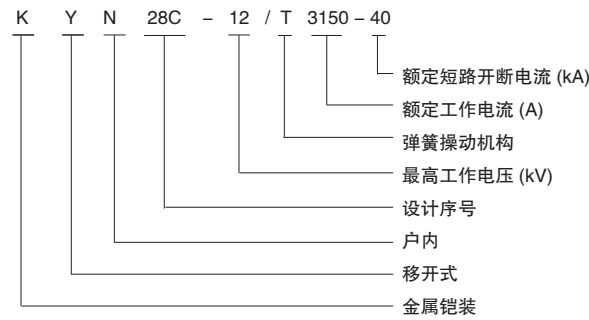
2.2 特殊使用环境条件：
当开关柜安装在海拔高度大于 1000m 的地区时，必须与厂家协商制造技术。当环境温度升高超过规定时，必须在柜内进行强迫通风，以提高母线的载流量。当开关柜运行于有严重凝露危险的环境中时，必须安装空间加热器。

Ambient condition for operation:

2.1 normal ambient conditions for operation:
Altitude under: 1000m.
Earthquake level under: 8 level.
Highest temperature: +40℃ .
Lowest temperature:-25℃ .
Daily average temperature: +35℃ .
Under the 95% of daily relative humidity .
Under the 90% of daily relative humidity.
The switches are installed indoors where no fire and explosion threatened, no severe dirt chemical erosion or acute vibration.

2.2 Special ambient conditions:
When the switchboard is installed in the place higher than 1000m in altitudes, it' s necessary to consult with manufacturers the production technology. When the temperature over the rated value, compelling ventilation is essential, so as to increase the flowing of the main line. When the switchboard runs in conditions with severe condensation threatened, special heaters should be installed.

型号及其含义 Type explanations



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名词解释

- 4.1 工作位置：是指可移部件在柜内的一种定位状态。在工作位置时，开关柜的主回路及辅助回路均接通。
- 4.2 试验位置：是指可移部件在柜内的一定位状态。在试验位置时，开关柜的辅助回路接通、但主回路断开，并且动、静触头被金属活门分隔。
- 4.3 储存位置：如果可移部件在柜内试验位置再切断辅助回路，可移开部件就处于储存位置。

Terms explanation

- 4.1 Working place: An orientation condition of movable parts in the cabinet. In working place, the main loop and the assistant loop of switchboard are switch-on.
- 4.2 Test place: An orientation condition of movable parts in the cabinet. In the test place, the assistant loop of switchboard is switch-on, but main loop switch-on, and the moving and still contactors are isolated by the metal valve.
- 4.3 Deposited place: If the movable parts cut the assistant loop in test place in cabinet once again, the movable parts is in the deposited place.

结构与特点 Structure and feature

KYN28C 系列开关柜由柜体和安装有不同电器元件的各功能单元隔室组成。见图 1

KYN28C switchboard is made up with cabinets and the isolated rooms with varied electric components. See figure 1.

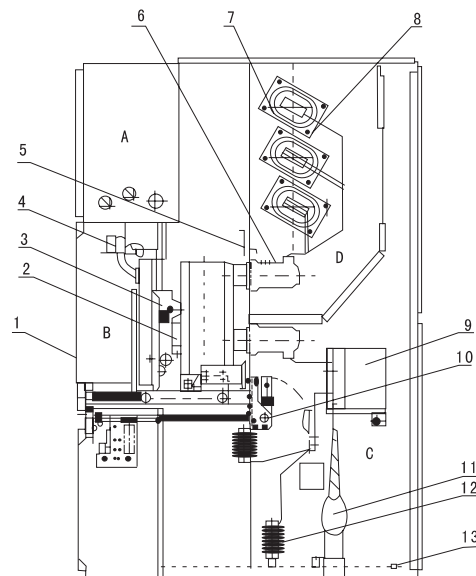


图 1

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A 仪表室	a.meter room	6 触头盒	6.contactor cabinet
B 手车室	b.handcart room	7 母线套管	7.bushing of main line
C 电缆室	c.cable room	8 主母线与支母线	8.major main line and branch main line
D 母线室	d.main line room	9 电流互感器	9.current mutual inductor
1 柜体	1.cabinet	10 接地开关	10.grounded switch
2 断路器手车	2.breaker handcart	11 一次电缆	11.once cable
3 加热器	3.heater	12 避雷器	12.thundering rod
4 二次插座及联锁	4.twice plug and interlock	13 接地母线	13.grounded main line
5 活门机构	5.valve machine		

5.1 柜体

KYN28C 系列开关柜柜体及各功能单元采用 2mm 敷铝锌钢板，经 CNC 数控加工设备加工，用高强度螺栓联接而成。(见图 2) 其产品非常适合于批量生产和装配，尺寸精度易于保证，互换性好，所有材料有很强的抗氧化与抗腐蚀能力，比焊接柜具有更高的强度和刚度。整体设计满足 IP4X 防护等级。

5.2 功能单元

KYN28C 系列开关柜有四个功能单元隔室，依次为手车室、母线室、电缆室及仪表室。相互之间被金属板分隔。见图 1

5.1 Cabinet

KYN28C switchboard and its part have 2mm aluminum-zinc coated steel board, machined by CNC numerical controlling apparatus, coupled by high strength bolt. (Figure 2) Its product is fit for batch production, and its precision of assembly, dimensions can be guaranteed, it has a good ability of interchanging, all materials has a strong anti-oxidation ability and anti-erosion ability, have a higher intension and toughness than the welding cabinet. Its overall design reached the IP4X protection level.

5.2 Functional Unit

The KYN28C switchboard has four functional unit isolated room, which are handcart room, main line room, cable room and meter room in sequence. The metal boards divide them. See the figure 1.

5.2.1 手车室

手车室内装有特定的导轨，使手车可在其中滑行与工作。手车具有工作位置和试验位置（隔离位置）。当手车由实验位置进入工作位置时，遮挡在静触头盒上的活门将被推开，使手车的动触头插入静触头。当手车抽出时，活门又会自动落下，可防止操作人员触及带电体。当手车抽出后，操作人员还可以将活门锁住，以防止活门被推开而发生意外。手车室可根据需要配断路器手车、电压互感器手车、隔离手车及计量手车。

手车可在开关柜门关闭的情况下被操作，并且通过门上的观察窗也可看见手车所处的位置和手车状态标志。即使打开手车室的门，其防护等级仍可达到 IP2X。

5.2.1 handcart room

Special guiding railways are installed in the handcart room, handcarts can slide and work in it. The handcarts have their working place and testing place (isolated place). When the handcarts enter the working place from the testing place. The moving valve on the still contactor cabinet will be pushed to let the moving contactor insert into the still contactor. When the handcarts pulled out, the moving valve will fall down automatically so as to prevent the operator from touching the electriferous body. After the handcart being pulled out, operators can lock the valve to prevent accidents happen. The handcart room can equip the breaker handcart, voltage mutual inductor handcart, isolated handcart and measure handcart if necessary.

The handcart can be operated while the doors of switchboard are closed, and the position and condition marks can be observed through the windows on the door. Even the door of handcart room is opened; the protection level can also reach IP2X.

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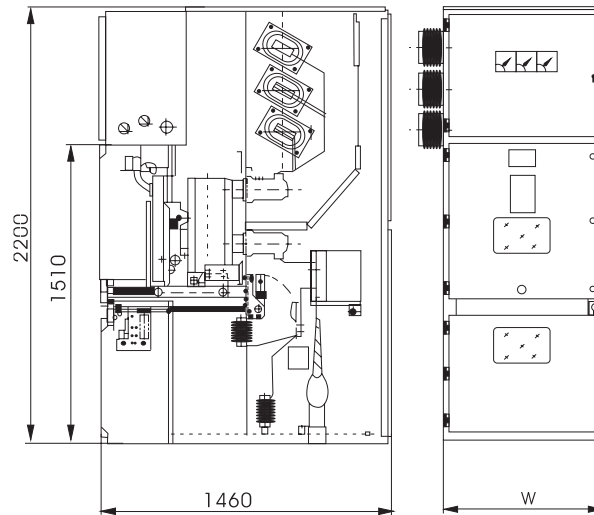


图 2 KYN28C 开关柜柜体结构

5.2.2 母线室

母线室的设计，充分考虑了用户安装施工时主母线的安装方式，使施工人员不需爬上柜顶，只要打开后隔板即可方便的安装母线。

分段母线穿越柜与柜之间的隔板，采用的是绝缘阻燃材料制成的穿墙套管，它既能起到对主母线的支撑作用，又可在出现内部故障时限制事态的蔓延。

5.2.3 电缆室

电缆室有充裕的空间安装检修电流互感器、接地开关、避雷器以及电缆。

电缆的使用量最多可达三至六组，在设计中，还考虑到用户特殊性要求，可使电缆的安装高度达 750mm 以上。见图 1

电缆室的底板结构也非常适合施工人员方便安装电缆。

5.2.4 仪表室

仪表室可装继电保护元件、仪表及其它二次设备，继电器屏板预开安装孔，可方便的安装继电元件，控制电缆敷设在有足够空间的走线槽内，并有金属盖板遮盖，左侧走线槽为控制线的引进、引出而预留，开关柜自身的控制线敷设在右侧，仪表室的侧板上开控制线穿越孔以便施工。

5.2.5 压力释放装置

在手车室、母线室和电缆室的上方均设有压力释放装置，当柜内发生内部故障而燃弧时，急剧升高的气压将迅速打开释放装置而使内部气体得以及时排泄，确保操作人员和开关柜的安全。

在开关柜正常工作时，压力释放装置的特殊结构又能帮助散热，使柜内一次回路各部分的温升始终保持在正常工作范围之内。

5.2.6 联锁装置

KYN28C 系列开关柜还设置有灵活可靠的五防联锁装置，为防止事故的发生和设备的安全运行提供了可靠保证。当接地开关在分闸位置时，手车才能从试验位置推进至工作位置，断路器手车分闸时，才可推进或抽出；当断路器手车处在试验位置或工作位置时，才能进行合分操作；当手车处于工作位置时，接地开关不能合闸，二次插头不能被拔除；接地开关合闸时，手车不能推进至工作位置。

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5.2.7 接地装置

用预设的连接板将各柜的主接地母线连接在一起。在开关柜内联接所有需接地的引线。
将基础架与接地排相连，如果柜子排列超过 10 台以上，须有二个以上的接地排。
将接地开关的接地线与开关柜主接地母线连接。

5.2.2 main line room

The design of the main line fully considered the installation way of major main line, so the operator have no necessity of climbing on the top of the cabinet, they can install the main line conveniently after opening the back isolated board.

The subsection main line through the cabinets is made up of inter-wall bushing with insulating fireproof materials. It can support the main line meanwhile curb the spreading of accidents while malfunction happens.

5.2.3 Cable room

The cable room has a plenty space to install and maintain the current mutual inductors, grounded switches, thundering rods, and cables.

Three to six cables can be used in maximum, In design, concerning the special demand of the customers, the installation height can over 750mm in altitude. See the figure 1

The base structure of cable room is very fit for convenient installation of the cable.

5.2.4 meter room

In meter room, protective relay units, meters and other twice apparatus can be equipped, the relay screen board opened the installation hole so as to install the relay units conveniently, the controlling cable is installed in the guiding slot with enough space, and with metal board covered, the left guiding slot obligated for in-out of the controlling cables, the controlling line of switchboard located in the right side, the side board of meter room opened the holes for convenient installation.

5.2.5 Pressure releasing device

Over the handcart room, main line room and the cable room installed the pressure releasing devices, when inner malfunction caused arcs, acute increasing pressure of air will open the releasing devices to release the inner air in time, to keep the safety of operators and switchboards.

5.2.6 Interlock devices

KYN28C switchboards are equipped with reliable and flexible “five prevention” interlock devices to prevent the accidents happen and keep a safe operation. When grounded switch is off, the handcart can move to working place from testing place, while the breaker handcart is switch-off, it can be pushed in or pulled out; when breaker handcart is located in testing place or working place, switch-on operation can be made; when handcart is in working place, the grounded switch should not switch-on, twice plug should not be pulled out; when grounded switch is switch-on, the handcart cannot push into the working place.

5.2.7 grounded devices

Combine the major grounded main line with the obligated connection board. Connect all lines with necessity of being grounded.

Connect the base frame with the grounded line, if cabinet number is over 10, two or more grounded line is in necessary.

Connect the grounded line of grounded switch with the major grounded main line of switchboard.

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主要技术参数 Technical parameter

6.1 KYN28C-12 开关设备主要技术参数 Main technical parameter of KYN28C-12 switchgear

表 1

序 号	项 目			技术参数	
1	额定电压 (kV)			6	10
2	最高工作电压 (kV)			7.2	12
3	绝缘水平	Imin 工频耐受电压 (有效值 kV)	对地及相间	32	42
			一次断口间	36	48
		雷电冲击耐受电压 (峰值 kV)	对地及相间	60	75
			一次断口间	70	85
4	额定频率 (Hz)			50	
5	主母线额定电流 (A)			1250, 1600, 2000, 2500, 3150	
6	额定短路开断电流 (kA)			16, 20, 25, 31.5, 40, 50	
7	额定短路关合电流 (kA)			40, 50, 63, 80, 100, 130	
8	动稳定电流 (kA)			40, 50, 63, 80, 100, 130	
9	热稳定电流 (kA)/ 持续时间 (s)			25/4,31.5/4,40/4,50/3	
10	柜间贯联接地母线 4s 热稳定电流 (kA)			31.5	
11	柜间贯联接地母线动稳定电流 (KA)			80	
12	机械寿命(次)	真空断路器		10000	
		接地开关		2000	
13	防护等级			IP4X	
14	外型尺寸 (宽 × 深 × 高)mm			14800 × 1460 × 2200(1600A以下选用) 1000 × 1460 × 2200(1600A 及以上选用)	

6.2 KYN28C-12(F-C) 开关设备主要技术参数 Main technical parameter of KYN28C-12(F-C) switchgear

表 2

序 号	项 目			技术参数		
1	额定电压 (kV)			3	6	10
2	最高工作电压 (kV)			3.6	7.2	12
3	绝缘水平	Imin 工频耐受电压 (有效值 kV)	对地及相间	24	32	42
			一次断口间	26	36	48
		雷电冲击耐受电压 (峰值 kV)	对地及相间	40	60	75
			一次断口间	46	70	85
4	额定频率 (Hz)			50		
5	主母线额定电流 (A)			1250, 1600, 2000, 2500, 3150		
6	F-C 回路额定电流 (A)			100, 160, 224		
7	预期短路开断电流 (kA)			40		
8	预期短路关合电流 (kA)			100, 130		
9	主母线热稳定电流 (kA)/ 持续时间 (s)			40/4		
10	主母线动稳定电流 (kA)			100, 130		

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序 号	项 目		技术参数
11	柜间贯联接地母线 4S 热稳定电流 (kA)		31.5
12	柜间贯联接地母线动稳定电流 (kA)		80
13	分支母线 4s 热稳定电流 (kA)		4
14	分支母线动稳定电流 (kA)		10
15	机械寿命(次)	真空接触器	按自身技术条件规定
		接地开关	2000
16	防护等级		IP4X
17	外型尺寸 (宽 × 深 × 高)mm		650 × 1460 × 2200

6.3ZN63C-12(VBI-12)系列真空断路器主要技术参数
Main technical parameter of ZN63C-12(VBI-12)

表 3

序 号	项 目			技术参数	
1	额定电压 (kV)			6	10
2	最高工作电压 (kV)			7.2	12
3	绝缘水平	1min 工频耐受电压 (有效值 kV)	对地、相间、断口	32	42
		雷电冲击耐受电压(峰值kV)	对地、相间、断口	60	75
4	额定频率 (Hz)			50	
5	额定电流 (A)			630,1250, 1600, 2000, 2500,	
6	额定短路开断电流 (kA)/ 开断次数			25/50,31.5/50(75),40/30	
7	额定短路关合电流 (kA)			63, 80, 100, 130	
8	动稳定电流 (kA)			63, 80, 100, 130	
9	热稳定电流 (kA)/ 持续时间 (s)			25/4,31.5/4,40/4	
10	额定操作操作顺序 (40kA 及以上)			分-0.3s(180s)-合分-180s-合分	
11	开断电容器组的额定值 (A)			630	
12	合闸时间 (ms)			≤ 75	
13	分闸时间 (ms)			≤ 50	
14	燃弧时间 (ms)			<15	
15	储能电动机功率 (W)			75	
16	(弹簧) 储能时间 (s)			≤ 10	
17	电动机的额定电压 (V)			交、直流：110、220	
18	合闸电磁铁功率 (W)/ 动作电流 (A)			367.4/1.67	
19	脱扣器功率 (W)/ 动作电流 (A)			367.4/1.67	
20	控制电压及信号引出方式			插头 / 插座或接线端子排	
21	机械寿命 (次)			10000	

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6.4 VD4 真空断路器主要参数 Main parameter of VD4 vacuum circuit

表 4

序 号	项 目	单 位	参 数
1	额定电压 (kV)	kV	12
2	绝缘水平	Imin 工频耐受电压 (有效值 kV)	42
		雷电冲击耐受电压 (全波)	75
3	额定频率	Hz	50
4	额定电流	A	630,1250, 1600, 2500, 3150
5	额定短路开断电流 (有效值)	kA	20、25、31.5、40、50
6	非对称短路开断电流 (有效值)	kA	21.8、27.3、34.3、43.6、55.8
7	动稳定电流 (峰值)	kA	40、50、63、80、100、125
8	3s 热稳定电流 (有效值)	kA	16、20、25、31.5、40、50
9	额定操作顺序		分-180s-合分-180s-合分
10	自动重合闸操作顺序		分-0.3s-合分-180s-合分
11	多次重合闸操作顺序		分-0.3s-合分-15s-合分-15s-合分
12	合闸时间	ms	约 70
13	分闸时间	ms	<45
14	开断时间	ms	<60

当断路器用于控制 3-10KV 电动机时，若起动电流小于 600A，必须加过电压吸收装置，其具体要求应由用户与制造厂联系协商；当断路器用于开断电容器组时，电容器组的额定电流不应大于断路器电流的 80%。

When the circuit breaker is used to control the 3-10kV motor, the voltage absorbing device must be added if the starting current is less than 600A. for the detailed requirements, the client shall discuss with the manufacturer. When the circuit breaker is used to switch on and off the capacitor bank, the rated current of capacitor bank shall not be more than 80% of current of circuit breaker.

6.5 JCZ5 型真空接触器主要技术参数 Main technical parameter of JCZ5 vacuum contactor

表 5

序号	类 型	3kV	6kV	10kV
1	额定电压 (kV)	3	6	10
2	最高电压 (kV)	3.6	7.2	12
3	额定电流 (A)	250	400	400
4	额定关合电流 (A)	2500	4000	4000
5	最大额定开断电流 (A)	2000	3200	3200
6	Imin 工频耐受电压 (kV)	23	32	42
7	雷电冲击耐受电压 (kV)	40	60	75
8	额定短路开断电流 (kA)	4	4	4
9	额定短路关合电流 (峰值 kA)	10	10	10
10	4s 热稳定电流 (kA)	4	4	4

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序号	类 型	3kV	6kV	10kV
11	额定峰值耐受电流 (kA)	4	10	10
12	额定操作电压 V	AC110/220	AC110/220	AC110/220
13	额定操作频率 (次 /h)	300	300	300
14	机械寿命 (次)	30×10^4	30×10^4	30×10^4
15	电寿命 (次)	AC-3	25×10^4	25×10^4
		AC-4	10×10^4	10×10^4
16	触头开距 (mm)	3.5 ± 0.5	$4^{+1}_{-0.5}$	$6^{+1}_{-0.5}$
17	超程 (mm)	1.5 ± 0.5	1.5 ± 0.5	1.5 ± 0.5
18	触头合闸弹跳时间 (ms)	≤ 5	≤ 5	≤ 5
19	平均合闸速度 (m/s)	0.15 ± 0.05	0.15 ± 0.05	0.2 ± 0.1
20	平均分闸速度 (m/s)	0.35 ± 0.05	0.45 ± 0.15	0.45 ± 0.15
21	合闸时间 (s)	≤ 0.1	≤ 150	≤ 0.15
22	固有分闸时间 (s)	≤ 50	≤ 50	≤ 0.05
23	外形尺寸 (mm)	$355 \times 353 \times 190$	$400 \times 240 \times 400$	$502 \times 300 \times 450$

6.6 高压限流熔断器主要技术参数

Main technical parameter of high-voltage current-limiting fuse

6.6.1 电动机保护用高压限流熔断器主要技术参数

Main technical parameter of high-voltage current-limiting fuse for motor protection

表 6

型 号	额定电压 (kV)	熔断器额定电流 (A)	熔体额定电流 (A)
XRNM1-3(WDFHO)	3.6	125	50, 63, 80, 100, 125
XRNM1-3(WFFHO)	3.6	200	125, 160, 200
XRNM1-3(WKFOH)	3.6	400	250, 315, 355, 400
XRNM1-6(WFNHO)	7.2	160	25,31.5,40,50,63,80,100,125,160
XRNM1-6(WFKNHO)	7.2	355	200, 224, 250, 315, 355

6.6.2 变压器保护用高压限流熔断器主要技术参数

Main technical parameter of high-voltage current-limiting fuse for transformer protection

表 7

型 号	额定电压 (KV)	熔断器额定电流 (A)	熔体额定电流 (A)
XRNT1-10(BDGHG)	12	50	6.3,10,16,20,22.4,25,31.5,35.5,40,45,50
XRNT1-10(BFGHD)	12	100	50, 63, 71, 80, 90, 100
XRNT1-10(AKGHD)	12	125	112, 125

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6.7 电流互感器主要技术参数 Main technical parameter of current transformer

a、额定绝缘水平：12/42/75kV b、负荷的功率因数： $\cos \phi = 0.8$ (滞后) c、额定二次电流：5A 或 1A

6.7.1 LZZBJ9-10/150、LZZBJ18-10/150 型动热稳定电流

表 8

额定一次电流 A	20~150	200	300	400~630	800~100	1200~1600	2000~2500
1s 热稳定电流 (kA)	$150I_n$	36	45	63	100	140	175
动稳定电流 (kA)	$375I_n$	90	100	150	250	350	425

6.7.2 LZZBJ9-10/150b/2、LZZBJ18-10/150b/2 型准确级次组合及相应的二次输出

表 9

准确级次组合 额定二次输出	20~500A				600~2500A			
	0.2	0.5	10P10	10P15	0.2	0.5	10P10	10P15
0.2/0.2;10P10/10P10 0.2/0.5;10P15/10P15	10	15	10		15	15	15	10
0.2/10P10;0.2/10P15 0.5/10P10;0.5/10P15	10	15	15	15	10	15	20	15
0.2/0.2/0.2;0.2/0.5/0.5 0.5/0.5/0.5;10P10/10P15	10	15	10	10	15	15	15	15
0.2/0.5/10P10 0.2/0.5/10P15	10	15	15		10	15	15	10

6.7.3 LZZBJ9-10/185、LZZBJ18-10/185 型动热稳定电流

表 10

额定一次电流 A	10~40	50~100	150~300	400~500	600~1000	1200~1600	2000~3150
1s 热稳定电流 (kA)	$200I_n$	$250I_n$	45	100	140	170	240
动稳定电流 (kA)	$500I_n$	$625I_n$	100	250	350	425	600

6.7.4 LZZBJ9-10/185h/2、LZZBJ18-10/185h/2 型准确级次组合及相应的二次输出

表 11

准确级次组合 额定二次输出	20~500(A)				600~2500(A)			
	0.2	0.5	10P10	10P15	0.2	0.5	10P10	10P15
0.2/0.2;10P10/10P10 0.2/0.5;10P15/10P15	15	20	15		15	20	20	15
0.2/10P10;0.2/10P15 0.5/10P10;0.5/10P15	10	15	20	15	15	20	30	20
0.2/0.2/0.2;0.2/0.5/0.5 0.5/0.5/0.5;10P10/10P15	10	15	15	10	15	15	20	15
0.2/0.5/10P10 0.2/0.5/10P15	10	15	15		10	15	20	15

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6.8 电压互感器主要技术参数 Main technical parameter of voltage transformer

6.8.1 JDZ8-10、JDZ18-10 系列电压互感器主要技术参数

表 12

额定电压比 (V/V)	额定输出 (VA)				极限输出 (VA)	额定绝缘水 平 (kV)	表面爬电距 离 (mm)
	0.2 级	0.5 级	1 级	3 级			
6000/100	15	30	60	150	200	7.2/32/60	210
10000/100					200	12/42/75	210

6.8.2 JDX8-10、JDZX18-10 系列电压互感器主要技术参数

表 13

额定电压比 (V/V)	额定输出 (VA)				极限输出 (VA)	额定绝缘水 平 (kV)	表面爬电距 离 (mm)
	0.2 级	0.5 级	1 级	3 级			
$\frac{6000}{\sqrt{3}}/\frac{100}{\sqrt{3}}/\frac{100}{\sqrt{3}}$	15	30	60	150	200	7.2/32/60	260
$\frac{10000}{\sqrt{3}}/\frac{100}{\sqrt{3}}/\frac{100}{\sqrt{3}}$					200	12/42/75	260

6.9 JN16-10 户内高压接地开关主要技术参数

MAIN TECHNICAL PARAMETERS OF JN16-10 INDOOR HIGH VOLTAGE EARTHING SWITCH

表 14

序号	项 目		技术参数	
1	额定电压 (kV)		10	
2	最高工作电压 (kV)		12	
3	热稳定电流 (kA)/ 持续时间 (s)		31.5/4	
4	额定短路关合电流 (kA)		65/80	
5	动稳定电流 (kA)		80	
6	极间中心距 (mm)		150;210;275	
7	额定绝缘 水平	1min 工频耐受电压 (q 有效值 kV)	极间及 极对地	42
		雷电冲击耐受电压 (峰值 kV)		75

6.10 ZR 型 LG 型阻容吸收器主要参数

MAIN TECHNICAL PARAMETERS OF ZR TYPE LG TPYE RESISTANCE- CAPACITANCE ABSORBER

6.10.1 ZR 型阻容吸收器主要技术参数

表 15

型 号	额定电压 (kV)	额定最高工 作电压 (kV)	额定电阻 (Ω)/ 电容 (μ F)	耐受电压 (kV-10s)	
				AC: 2.15Un	DC:4.3Un
ZR1-6-100/0.1	6	6.9	100/0.1	AC:12.9;DC:25.8	
ZR1-10-100/0.1	10	11.5	100/0.1	AC:21.5;DC:43	
ZR1-35-100/0.1	35	40.5	100/0.1	AC:75.2;DC:150.5	

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6.10.2 LG 型阻容吸收器主要技术参数

表 16

额定电压 (kV)	额定电容 (μ F)	额定电阻 (Ω)	工频电介质试验电压 (kV lmin)	备 注
3.6	0.05(0.1)	100	11	
7.2	0.05(0.1)	100	22	
12	0.05(0.1)	100	36	
	0.05(0.1)	100	42	Q 型 (加强型)
36	0.05(0.1)	100-400(100)	75	
	0.05(0.1)	100-400(100)	108	Q 型 (加强型)

使用须知：

- (1) 阻容吸收器应连接在真空断路器或真空接触器与电动机或变压器之间。
- (2) 阻容吸收器保护范围：保护电动机容量为 100-10000W，保护变压器容量为 100-31500KVA。
- (3) 阻容吸收器退出运行时应对阻容吸收器放电。

Working Directions:

- (1)Resistance-capacitance absorber should be connected between vacuum interrupter or vacuum contactor and motor or transformer.
- (2)The protection ranges of resistance-capacitance absorber are: 100-10000W for motor protection, 100-31500 kW for transformer protection.
- (3)When the resistance-capacitance absorber is retreated from operation, it should be discharged.

6.11 L XK- φ 120型零序电流互感器配用继电器主要技术参数

MAIN TECHNICAL PARAMETERS OF RALAY MATING WITH L XK-Φ120 TYPE NULL SEQUENCE
CURRENT TRANSFORMER

说明：电缆出线柜可根据用户需要配零序电流互感器。一般配用L XK- φ 120型零序电流互感器(最大穿过电缆直径 120mm)。

表 16

继电器型号	继电器线圈连接方式	继电器刻度值	一次零序电流值 (A)
DD-11/60	串联	15 × 1	2.4-4.5
		30 × 1	
	并联	15 × 1	3-5
		30 × 1	
DD-1/60	串联	15 × 1	3-5
		30 × 1	
	并联	15 × 1	3-6
		30 × 1	

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6.12 HY5WS1 型复合绝缘氧化锌避雷器主要技术参数
MAIN PARAMETERS OF HY5WS1 TYPE COMPLEX INSULATION ZINC OXIDE LIGHTNING ARRESTER
表 17

产品型号	额定电压 (kV)	持续运行 电压(kV)	直流1mA参 考电压(kV)	8/20us标称电 流下残压(kV)	2ms方波通 流容量(kA)	4/10us冲击 电流容量(kA)
HY5WS1-7.6/30	7.6	4.0	≥ 15.0	≤ 30	100	65
HY5WS1-12.7/50	12.7	6.6	≥ 25.0	≤ 50	100	65
HY5WZ1-7.6/27	7.6	4.0	≥ 14.5	≤ 27	150	65
HY5WZ1-12.7/45	12.7	6.6	≥ 24.0	≤ 45	150	65
HY5WR1-7.6/27	7.6	4.0	≥ 13.8	≤ 27	400	65
HY5WR1-12.7/45	12.7	6.6	≥ 23.0	≤ 45	400	65
HY2.5WD1-7.6-19	7.6	4.0	≥ 11.3	≤ 19	200	40
HY2.5WD1-12.7/31	12.7	6.6	≥ 18.9	≤ 31	200	40
HY5WS1-10/30	10	8.0	≥ 15.0	≤ 30	100	65
HY5WS1-17/50	17	13.6	≥ 25.0	≤ 50	100	65
HY5WZ1-10/27	10	8.0	≥ 14.5	≤ 27	150	65
HY5WZ1-17/45	17	13.6	≥ 24.0	≤ 45	150	65
HY5WR1-10/27	10	8.0	≥ 14.4	≤ 27	400	6
HY5WR1-17-45	17	13.6	≥ 24.0	≤ 45	400	65
HY5WS1-16.5/50	16.5	12.7	≥ 25.0	≤ 50	100	65
HY5WZ1-16.5/45	16.5	12.7	≥ 24.0	≤ 45	150	65
HY5WS1-3.8/17	3.8	2.0	≥ 7.5	≤ 17	100	65
HY5WZ1-3.8/13.5	3.8	2.0	≥ 7.2	≤ 13.5	150	65
HY5WR1-5/13.5	5	4.0	≥ 7.2	≤ 13.5	400	65

安装 Installation

8.1 开关柜安装 (见图3) installation switch cabinet (see the figure 3)

柜宽 A	柜深 B	L1	L2	L3
650	1460	330	430	880
800	1460 电缆 1610 架空	530	630	880
1000	1460 电缆 1610 架空	730	830	1040

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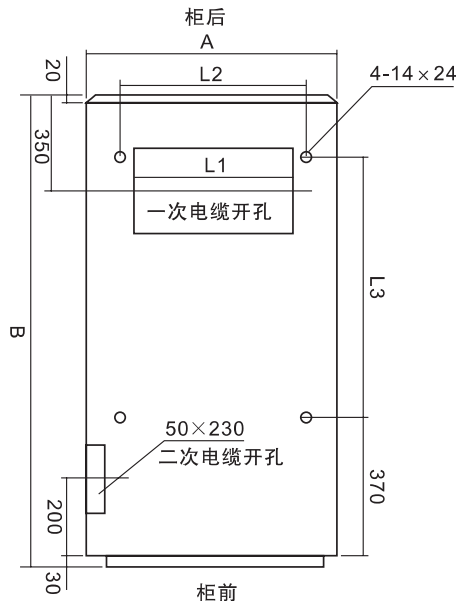


图3 开关柜安装尺寸示意图

7.1.1 按工程需要与图纸标明, 将开关柜运至其规定位置, 如果一排较长的开关柜排列 (为 10 台以上), 拼柜工作应从中间部位开始。

7.1.2 用特定的运输工具如吊车、铲车、严禁用滚筒、撬棍。

7.1.3 断路器手车可另放别处妥善保管。

7.1.4 松开母线室前面的固定螺栓，卸下垂直隔板。

7.1.5 松开断路器室下面水平隔板的固定螺栓，并将水平隔板卸下。

7.1.6 松开并移去电缆密封板。

7.1.7 拆下开关柜前侧左右两边的控制线槽板。

7.1.8 在基础上一个接一个安装开关柜，包括水平和垂直两方向，开关柜安装不平度不得超过 2mm.

7.1.9 当开关柜栓紧在一起时，在带有纵向隔离母线的配电盘上插入并栓紧套管隔板。

7.1.10 当开关柜已完全组合（拼接）好时，可用地脚螺钉将其与基础构架相联或用电焊与基础构架焊牢。

7.2 母线的安装 installation of bus

开关柜的母线均为复合绝缘，安装时，须遵照下列步骤：

7.2.1 安装母线套管（开关柜具有纵向套管隔板）。

7.2.2 用清洁干燥软布擦揩母线，检查绝缘套管有无损伤，在连接部位上涂导电膏或中性凡士林。

7.2.3 柜与柜之间安装母线时，将母线和对应的扁平分支母线接在一起，用内六角螺栓拧紧。

7.2.4 套好连接处需要的绝缘套。

7.2.5 在母线端部，螺栓接头外侧插入需要的母线套。

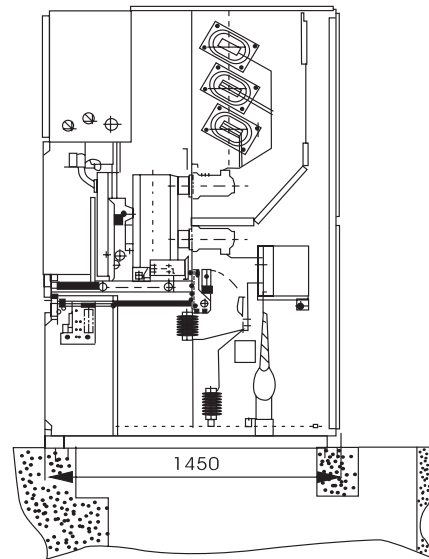
7.2.6 盖好母线终端帽。

7.2.7 保证母线相间及对地大于 125mm

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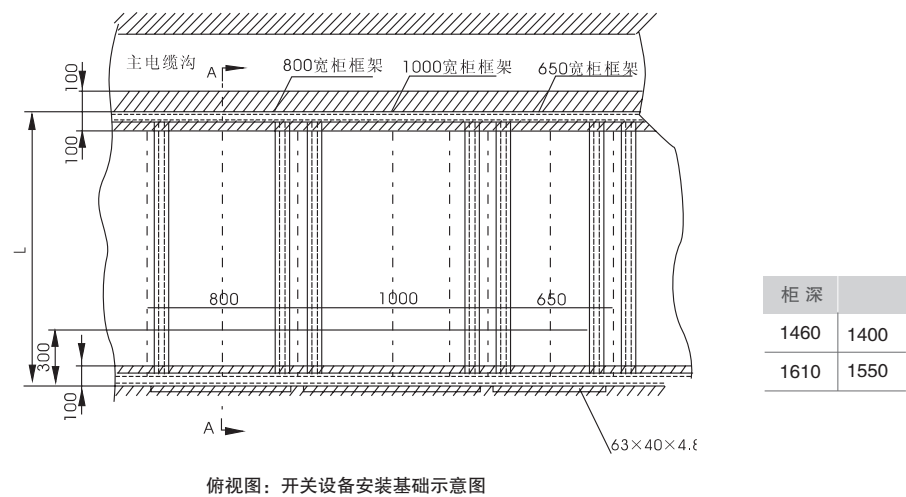
- 7.1.1 The switch cabinet is transported to the specified position according to the engineering demand and illustration on the drawing. If a long row of switch cabinet is arranged (over 10 cabinets), the assembly work of cabinet shall be started from the intermediate position.
- 7.1.2 The special transportation tool such as hoist, forklift is used. The roll and crowbar is prohibited to use.
- 7.1.3 The handcart of circuit breaker can be placed on the other place for safekeeping.
- 7.1.4 Loosen the fixing bolt in front of the bus room and remove the vertical partition.
- 7.1.5 Loosen the fixing bolt on the vertical partition at lower part of circuit breaker room and remove the vertical partition.
- 7.1.6 Loosen and remove the cable sealing plate.
- 7.1.7 Remove the slot plates of control line at both sides in front of switch cabinet.
- 7.1.8 The switch cabinet is installed on the foundation one by one including the vertical and horizontal directions. The installation levelness of switch cabinet is not allowed to be over 2mm.
- 7.1.9 When the switch cabinet is fastened together, the sleeve partition is inserted and fastened on the switchboard with longitudinal isolating bus.
- 7.1.10 When the switch cabinet is combined (assembled) together, the anchor screw is connected to the foundation frame or welded with the foundation frame by electric welding. The bus of switch cabinet is compound insulation. When installing, the following steps must be observed:
- 7.2.1 Install the bus sleeve (the switch cabinet has the longitudinal sleeve partition)
- 7.2.2 Clean the bus with the clean and soft cloth and check the insulating sleeve for damage. The conductive paste or neutral Vaseline is coated on the connection position.
- 7.2.3 When installing the bus between the cabinets, the bus is connected with the corresponding flat branch bus and tightened by the socket head bolt.
- 7.2.4 The required insulating sleeve is put at the connection place.
- 7.2.5 The required bus sleeve is inserted outside of screw connector at the end of bus.
- 7.2.6 Cover the bus with the terminal cap
- 7.2.7 Ensure that the interphase distance of bus and distance to ground is more than 125mm.



断面图

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订货须知 Ordering specifications

- 用户订货时应提供下列资料：
- 8.1 主接线方案及单线系统图、设备型号（容量）、排列图及平面布置图。
 - 8.2 二次回路功能图，端子排列图（如用户未提供要求，制造厂按标准提供）。
 - 8.3 开关柜内电器元件的型号、规格、数量。
 - 8.4 电气设备汇总表。
 - 8.5 需要母线桥（两列柜间母线桥和墙柜间母线桥）时，需提供跨距和高度尺寸。
 - 8.6 开关柜使用在特别环境条件时应在订货时提出。
 - 8.7 需要其它或超出附件、备件时应提出种类和数量。

- The client shall provide the following data when ordering
- 8.1 main wiring scheme and single-line system diagram, model of equipment (capacity), arrangement drawing and plan layout.
 - 8.2 secondary circuit function diagram, terminal arrangement diagram, (if the client does not provide the requirement, the manufacturer provides it according to the standard)
 - 8.3 Model, size and quantity of electrical element in the switch cabinet.
 - 8.4 Summary sheet of electrical equipment
 - 8.5 When the bus bridge (bus bridge between two cabinets and bus bridge between the wall cabinets) is required, it is required to provide the span and height dimension.
 - 8.6 It shall be put forward when ordering if the switch cabinet is used in the special environment.
 - 8.7 when requiring other or exceeding accessories and spare parts, the category and quantity shall be put forward.

KYN28-24
型铠装移开式金属封闭
开关设备



概 述 General

1.1 适用范围和主要用途

KYN28-24 铠装移开式交流金属封闭开关设备（以下简称开关设备），适用于户内三相 50/60Hz、额定电压 24KV 的电力系统中、主要应用于发电厂、变电所、工矿企业及高层建筑中，作为接受和分配电能并对电路实行控制、保护和监测。

KYN28-24 开关设备具有各种防止误操作的功能，包括防止带负荷移动手车，防止接地开关闭合位置合断路器、防止带电合接地开关和防止误入带电隔室等功能。KYN28-24 开关设备配置性能优良的 ZN73 系列中置式高压交流真空断路器及固封式真空开关。开关设备二次回路配置先进可靠的控制保护元件；母线采用热缩绝缘材料或环氧涂覆的绝缘手段，优化电极形状，柜体结构紧凑。KYN28-24 型开关设备是技术先进、性能稳定、结构合理、使用方便、安全可靠的配电设备。

1.1 Application Scope and Main Usage

KYN28-24 Metal-Clad Movable AC Metal-Enclosed Switchgear (hereinafter referred to as the switchgear) is suitable for the electric power system with indoor three-phase of 50/60Hz and rated voltage of 24KV, and mainly applies to electric power plants, substations, industrial and mining establishments, as well as high-rise buildings for receiving and distributing the electric energy and controlling, protecting, and monitoring the electric circuits.

KYN28-24 switchgear is provided with various functions preventing for misoperation, which comprises the functions on prevention of movement and isolation of handcarts with load, prevention of closure of circuit breaker at closed position by grounding switch, prevention of closing of grounding switch with electricity, and prevention of mistaken entrance into the electrified compartments etc. KYN28-24 switchgear is equipped with middle-placed high-voltage vacuum circuit breaker and fixed-sealing vacuum switch of ZN73 series with excellent configuration performance. The switchgear secondary circuit is equipped with advanced and reliable control and protection components; and the bus-bar adopts the insulation method with heat-shrinkable insulation materials or epoxy coating to optimize the electrode shape with compact structure of cabinet. KYN28-24 switchgear is the power distribution equipment with advanced technology, stable performance, reasonable structure, convenient use, as well as safety and reliability.

1.2 产品引用标准

- a) GB1984 高压交流断路器。
- b) GB3906 3~35KV 交流金属封闭开关设备。
- c) GB/T11022 高压开关设备和控制设备标准的共用技术要求。
- d) DL/T404 户内交流高压开关柜订货技术条件。
- e) DL/T593 高压开关设备的共用订货技术导则。

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Metal-Clad Movable AC Metal-Enclosed Switchgear

1.2 Product Quoted Standards

- a) GB1984 High-Voltage A.C. Circuit Breakers.
- b) GB3906 A.C. Metal-Enclosed Switchgear for Rated Voltages of 3-35KV.
- c) GB/T11022 Common Technical Requirements for High-Voltage Switchgear and Control Equipment Standards
- d) DL/T404 Technical Requirements for Indoor A.C. High-Voltage Switchgear Panel
- e) DL/T593 Common Specifications for High-Voltage Switchgear Enquiries and Orders.

1.3 使用环境条件

1.3.1 正常使用条件

- a) 环境温度：最高温度：+40℃，最低温度：-15℃，且在 24h 内测得的平均值不超过 35℃。
- b) 湿度条件如下：
 - 日相对湿度的平均值不超过 95%；
 - 日水蒸气压力的平均值不超过 2.2kpa；月水蒸气压力平均值不超过 1.8 kpa；
 在这样的条件下偶尔会出现凝露；
- c) 海拔不超过 1000m；
- d) 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；
- e) 来自开关设备和控制设备外部的振动或地动是可以忽略的；
- f) 在二次系统中感应的电磁干扰的幅值不超过 1.6KV。

1.3 Environmental Service Conditions

1.3.1 Regular Service Conditions

- a) Environmental Temperature: Maximum Temperature: +40℃ , Minimum Temperature: -15℃ , and the average value tested within 24h shall be less than 35℃.
- b) The humidity conditions are as follows:
 - The average value of daily relative humidity shall be less than 95%;
 - The average value of daily vapor pressure shall be less than 2.2kpa; the average value of monthly vapor pressure shall be less than 1.8 kpa;
 And the condensation will be occasionally appeared under these conditions;
- c) The elevation shall be less than 1000m;
- d) The ambient air shall not be obviously polluted by dust, smoke, corrosive and/or combustible gas, vapor or salt mist;
- e) The vibration or ground movement from the switchgear and control equipment can be neglected;
- f) The electromagnetic influence amplitude induced in the secondary system shall be less than 1.6KV.

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开关设备

1.3.2 特殊使用条件

在超过 GB/T11022 规定的正常环境条件下使用时，本公司和用户可就超出正常运行条件的特殊运行条件进行协商，并达成协议。为防止凝露现象，开关设备设有加热器，当开关设备处于备用状态时即应投入使用。开关设备正常运行时也应注意投运加热器。

1.3.2 Special Service Conditions

When it is used in excess of normal environmental conditions regulated by GB/T11022, the company and users can have negotiations on special service conditions exceeding the normal service conditions, and reach the agreements.

In order to prevent the condensation phenomenon, the switchgear is provided with a heater, which shall be put into use when the switchgear is in standby state. The commissioning heater shall be paid attention during normal operation of the switchgear.

技术参数Technical Parameters

2.1 开关设备主要技术参数 Main Technical Parameters of Switchgear

序号	名称		单位	参数			
1	额定电压		kV	24			
2	额定频率		Hz	50/60			
3	额定绝缘水平	1min 工频耐受电压（有效值）	kV	相间 相对地	60	隔离 断口	79
		雷电冲击耐受电压（峰值）	kV		125		145
		辅助控制回路工频耐受电压	V	2000			
4	额定电流		A	630、1250、1600、2000、2500			
5	额定短路开断电流		kA	20		25	
6	额定短时关合电流（峰值）		kA	50		63	
7	额定短时耐受电流（4s）		kA	20		25	
8	额定峰值耐受电流		kA	50		63	
9	辅助控制回路额定电压		V	直流或交流 110/220			
10	防护等级			IP4X（断路器门打开或隔室间为 IP2X）			
11	外形尺寸（宽 * 深 * 高）		mm	800x1810x2380		1000x1810x2380	
12	重量		kg	840~1440			

注：架空进出线柜深度为 2360mm。
Note: The depth of aerial cabinet for incoming and outgoing lines is 2360mm.

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2.2 ZN73-24 真空断路器主要技术参数

序号	名称		单位	参数	
1	额定电压		kV	24	
2	额定绝缘水平	1min 工频耐受电压（有效值）	kV	60	
		雷电冲击耐受电压（峰值）	kV	125	
3	额定频率		Hz	50/60	
4	额定电流		A	630、1250、1600、2000	630、1250、1600、2000、2500、3150
5	额定短路开断电流		A	20	25
6	额定短时关合电流（峰值）		kA	50	63
7	额定短时耐受电流（4s）		kA	20	25
8	额定峰值耐受电流		kA	50	63
9	额定单个电容器组开断电流		kA	630	
10	额定背对背电容器组开断电流		V	400	
11	额定短路开断电流开断次数			50	
12	机械寿命		mm	20000	
13	额定操作顺序		kg	0-0.3s-CO-180s-CO	

2.3 弹簧操动机构技术参数

序号	名称		单位	参数
1	额定操作电压	合闸脱扣线圈	V	AC220、AC110、DC220、DC110
		分闸脱扣线圈		
2	工作电流	合闸脱扣线圈	A	AC220 或 DC220 为 1.1
		分闸脱扣线圈		AC110 或 DC110 为 3.1
3	储能电机功率		W	80、110
4	储能电机功率		V	AC220、AC110、DC220、DC110
5	电机储能时间		S	≤ 10

结构和工作原理

3.1 结构简述

KYN28-24 开关设备由柜体和可移动部件（俗称手车）两大部分组成。柜体用金属隔板分成多个功能隔室，如母线室、断路器室、电缆室和继电器仪表室等。

开关设备的可移动开部件可配置真空断路器手车、电压互感器手车、避雷器手车、隔离手车和熔断器手车等。

3.2 主要结构特点

开关设备可以背靠背组成双重排列或靠墙安装，提高了开关设备的安全性和灵活性，减少占地面积。

3.2.1 外壳

开关设备的外壳选用进口敷铝锌钢板，经 CNC 机床加工，采取多重折边工艺制作而成。整个柜体具有精度

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型铠装移开式金属封闭 开关设备

高和很强的抗腐蚀与抗氧化性能，而且由于采用多重折边工艺，使柜体比其它同类设备柜体整体重量轻、机械强度高，外形美观。柜体采用组装式结构，用拉铆螺母和高强度的螺栓连接而成。使加工生产周期缩短，零部件通用性强，占地面积少，便于组织生产。

3.2.2 手车

手车骨架采用薄钢板经 CNC 机床加工后组装而成。手车与柜体配合精度高，机械联锁安全、可靠、灵活。手车根据用途不同分为断路器手车、电压互感器手车、计量手车、隔离手车等，同规格手车可以自由互换。手车在柜体内有断开 / 试验位置和工作位置，每一位置都分别有定位装置，以保证联锁可靠。各种手车均采用丝杆推进、退出，操作轻便、灵活，适合值班人员操作。当手车需要移开柜体时，用一台专用转运车，就可方便取出，以便进行各种检查和维护。

当手车用转运车运入柜体断路器室时，便能可靠锁定在断开 / 试验位置，并且柜体位置指示灯显示其所在位置。只有手车完全锁定后，才能摇动丝杆推进机构，将手车推向工作位置。手车到达工作位置时，推进手柄操作力突然加大并摇转不动，其对应位置指示灯便显示其所在位置。手车的机械联锁能可靠保证拖车只有在工作位置或试验位置，断路器才能进行合闸；而且断路器只有在分闸状态，手车才能移动。

3.2.3 隔室

开关设备主要电气元件都有其独立的隔室，即：断路器手车室、母线室、电缆室、断路器仪表室等。各隔室间防护等级都达到 IP2X。除断路器仪表室外，其它三个隔室都分别有泄压通道。由于采用了中置式形式，电缆室空间大为增加，因为设备可并接多路电缆。

a) 母线隔室 A：主母线是单台拼接相互贯穿联接，通过分支母线（静触头盒）及主母线绝缘套管固定。主母线和联络母线为矩形截面的铜排，用于大电流负荷时采用双母排。对于特殊需要，母线可用热缩套管和定制的绝缘罩盒覆盖。相邻柜母线间安装有绝缘套管，如果出现内部故障电弧时，套管能有效把事故限制在隔室内而不向其它柜蔓延。

b) 断路器隔室 B：隔室两侧安装了轨道，供手车在柜内由断开 / 试验位置移动至工作位置。静触头盒的隔板（活门）安装在手车室的后壁处，当手车从断开 / 试验位置移动到工作位置过程中，静触头盒口上的上、下活门与手车联动自动打开；当反向移动时，活门则自动闭合，直至手车退至一定位置而完全覆盖住静触头盒，形成有效隔离。由于上、下活门之间不联动，在检修时，可锁定带电侧的活门，从而保证检修维护人员不触及带电体。在断路器室门关闭时，手车同样能被操作。通过门上的观察窗，可以观察隔室内手车所处位置，合、分闸指示及储能状况。

c) 电缆隔室 C：开关设备采用中置式，因而电缆室空间较大。电流互感器、接地开关装在隔室后壁上（接地开关也可根据客户需要装在开关柜的中部），避雷器安装于隔室后下部。将手车和可抽出式水平隔板移开后，施工人员能从正面进入柜内安装和维护。电缆室内的电缆连接导体，每相可并接 1-3 根电缆，必要时每相可并接 6 根电缆，电缆隔室的柜底配制可卸式开缝的金属封板可不导磁金属封板，确保了施工方便。

d) 继电器仪表室 D：继电器仪表室内可安装继电保护元件、仪表、带电显示指示器以及特殊要求的二次设备。控制线路敷设在线槽内，线槽有金属盖板，可使二次线与高压元件隔离。左前侧线槽是为控制电缆的引进和引出预留的，底板相应部位开有二次电缆穿孔孔。在继电器仪表室的顶板上还留有便于施工的小母线穿孔孔，接线时仪表室顶盖板可翻开，便于小母线的安装。

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3.2.4 泄压装置

在手车室、母线室和电缆室的上方均设有泄压装置，当隔室内发生故障产生电弧时，开关柜内部气压升高，装设在前门上的特殊密封圈把柜门封闭起来，顶部装备的泄压金属板被自动打开，释放压力和高温气体，确保操作人员和开关设备的安全。

3.2.5 二次插头与手车的位置联锁

开关设备和手车的二次连线是通过二次插头的联络实现的，二次插头通过一根尼龙波纹伸缩管与手车相联，二次插座装设在开关柜手车室的右上方。手车只有在试验/断开位置时，才能插上或拔除二次插头。手车进入工作位置时二次插头被锁定。配装合闸闭锁电磁铁的断路器手车，在二次插头接通之前，手车的合闸机构被电磁铁锁定，仅能分闸，无法进行合闸操作。

3.2.6 带电显示装置

开关设备可装检测一次回路运行的带电显示装置，该装置由高压传感器和显示器两部分组成。该装置可以提示高压回路带电状况，还可以与电磁锁配合，对操作手柄、柜门和邻柜实现强制闭锁，达到防止带负荷移动隔离手车、防止带电关合接地开关、防止误入带电间隔的目的，提高配套产品的防误性能。

3.2.7 防止凝露

为了防止在高湿度或温度变化较大的环境中产生凝露，在断路器室和电缆室分别装设电加热器，以便在上述运行条件下防止绝缘事故的发生。

3.2.8 接地装置

在电缆室内单独设有 $50 \times 40\text{mm}^2$ 的接地铜排，且贯穿相邻各柜并与柜体良好连接，供直接接地之元器件使用。由于整个柜体用敷铝锌板相拼连，这样使整个柜体都处在良好的接地状态之中，确保运行操作人员触及柜体时的安全。

3.3 防止误操作联锁装置及工作原理

开关设备内装有安全可靠的联锁装置，完全满足“五防”的要求。

- a) 仪表室内上装有提示性的按钮或者KK型转换开关以防止误合、误分断路器；
- b) 断路器手车只有在试验或工作位置时，断路器才能进行合、分操作，而且在

合闸后，手车被锁住无法移动，防止带负荷时推、拉手车；

c) 仅当接地开关处在分闸位置时，断路器手车才能从试验/断开位置移至工作位置；仅当断路器手车处于试验/断开位置时，接地开关才能进行合闸操作（接地开关可带电压显示装置），这样实现了防止接地开关在闭合位置时关合断路器以及防止带电误合接地开关；

d) 接地开关处于分闸位置时，下门及后门被闭锁，防止误入带电间隔；

e) 按客户要求配装合闸闭锁电磁铁的断路器手车，在未使闭锁装置解锁的情况下，能阻止手动或电动合闸操作；

f) 断路器手车在工作位置时，二次插头被锁定不能拔除；

g) 各柜间可装电气联锁。本开关设备还可在接地开关操作机构上加装电磁铁锁定装置以提高可靠性，并按用户要求提供后柜门与接地开关操作的反向联锁装置，订货时按用户的需求选择。

3.4 开关设备电气控制接线原理

真空断路器的二次控制原理分别由储能回路、合闸回路、分闸回路、闭锁回路和辅助开关回路等部分组成，

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闭锁电磁铁Y1带电吸合，限位开关SP5接点13-14闭合，合闸线圈HQ可以正常进行电气合闸操作，并且闭锁电磁铁Y1吸合后合闸弯板被解锁，也可以手动合闸。因此，在二次控制电源未接通情况下，闭锁电磁铁能阻止手动或电动合闸操作。

Structure and Working Principle

3.1 Structure Description

KYN28-24 switchgear comprises two major parts of a cabinet and movable components (commonly referred to as handcars). The cabinet is divided into a variety of functional compartments with metal clapboards, such as a bus-bar compartment, a circuit breaker compartment, a cable compartment, as well as a relay instrument compartment etc.

The movable components of switchgear can be equipped with a vacuum circuit breaker handcart, a voltage transformer handcart, a lighting arrester handcart, an isolation handcart, as well as a fuse handcart etc.

3.2 Main Structure Characteristics

The switchgear can be composed of back-to-back double arrangement or wall installation, thereby improving the safety and flexibility of switchgear and reducing the floor area.

3.2.1 Enclosure

The switchgear enclosure is manufactured by imported zinc steel plate coated with aluminum, which is processed by CNC machine tool and multi-folding technology. The whole cabinet has high accuracy and strong anti-corrosion and anti-oxidation performance, and due to the adoption of multi-folding technology, the cabinet has lighter weight, higher mechanical strength, and more beautiful appearance comparing with other similar equipment cabinets. The cabinet adopts the assembled structure, and is connected by rivet nuts and high-strength bolts, thereby shortening the processing and production cycle with strong universality of spare parts and small floor area, and being convenient for organizing production.

3.2.2 Handcars

The handcart framework is assembled by thin steel plate, which is processed by CNC machine tool. The handcars and cabinet are provided with high cooperate precision and safe, reliable, as well as flexible mechanical interlocks. In accordance with different applications, the handcars can be divided into the circuit breaker handcart, the voltage transformer handcart, the measurement handcart, and the isolation handcart etc., in addition, the handcars with same size can be freely interchanged. The handcars are provided with off/test positions and working positions in the cabinet, and each position is respectively provided with a positioning device to ensure reliable interlocks. Various handcars adopt screw rods for propulsion and withdrawal with handy and flexible operation, which are suitable for operators on duty. A special transfer truck is used for convenient removal when the handcars need to be taken out from the cabinet, so as to conduct various inspections and maintenance.

When the handcars are transferred into the circuit breaker compartment of cabinet by transfer truck, they can be reliably locked at the off/test positions, and the indicator lamps of cabinet position will show their positions. Only when the handcars are completely locked, the screw rod feed mechanism can be shaken, which will push the handcars to the working positions. When the handcars reach the working positions, the operating force used for handle propulsion will be suddenly increased and be motionless under the rocking-turn, and the indicator lamps of corresponding positions will show their positions. The handcart mechanical interlocks can

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reliably ensure that the circuit breaker can be closed only when the trailer is in working position or test position; and the handcart can be moved only when the circuit breaker is in opening state.

3.2.3 Compartments

The main electric components of switchgear are provided with independent compartments, namely: circuit breaker handcart compartment, bus-bar compartment, cable compartment, and relay instrument compartment etc. The protection levels between the compartments all reach IP2X. In addition to the relay instrument compartment, other three compartments are respectively provided with pressure relief channels. Due to the adoption of central-positioned form, the cable compartment space is greatly increased, and the equipment can be connected with multi-path cable in parallel.

a) Bus-bar Compartment A: The main bus-bar is connected by mutual penetration of single splicing, which is fixed by branch bus-bar (static contact box) and main bus-bar insulating sleeve. The main bus-bar and contact bus-bar are copper bar with rectangular sections, and the pair bus-bar is adopted for large current load. For special needs, the bus-bar can be covered with heat-shrinkable sleeve and ordered insulation cover box. The insulation sleeves are equipped between the bus-bars of adjacent cabinets, and if the internal fault arc appears, the sleeves can effectively control the accident inside the compartment without spreading to other cabinets.

b) Circuit Breaker Compartment B: Two sides of the compartment are equipped with tracks, the handcart in the cabinet can be moved to the working positions from the off/test positions. The clapboards (valves) of static contact box are installed at rear wall of the handcart compartment, when the handcart moves from the off/test positions to the working positions, the upper valve and lower valve on the static contact box interlock with handcart to be automatically opened; when move in opposite direction, the valves can be automatically closed until the handcart moves back to certain positions to completely cover the static contact box, so as to form effective isolation. Because the upper valve and lower valve can't be interlocked, the valve at electrified side can be locked, thereby ensuring that the maintenance personnel doesn't touch the electrified bodies. When the door of circuit breaker compartment is closed, the handcart can be equally operated. The handcart position, closing and opening indications, and energy storage status in the compartment can be observed through the observation window on the door.

c) Cable Compartment C: The switchgear adopts the central-positioned type, therefore the cable compartment space is relatively large. The current transformer and grounding switch are installed on the compartment rear wall (the grounding switch can also be installed in the middle part of the switch cabinet in accordance with client's needs), and the lightning arrester is installed on the rear lower part of compartment. After removing the handcart and withdrawable horizontal clapboard, the construction personnel can enter into the cabinet from the front side for installation and maintenance. The cables in the cable compartment are connected with conductors, each phase can be connected with 1-3 cables in parallel, and each phase can be connected with 6 cables in parallel when necessary, and the cabinet bottom of cable compartment is equipped with metal seal plate with removable slots and metal seal plate without magnetic conduction, thereby ensuring construction convenience.

d) Relay Instrument Compartment D: The relay instrument compartment can be installed with relay protection components, instrument, electrified display indicator, and secondary equipment with particular requirements. The control circuit is laid in the wire duct, and the wire duct is provided with metal cover plate, which can isolate the secondary wires and high-voltage components. The left front wire duct is preserved for lead-in and

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lead-out of control cable, and the corresponding part of the bottom is opened with secondary cable threading hole. In addition, the top plate of relay instrument compartment is also preserved with small bus-bar crossing hole convenient for construction, and the top cover plate of instrument compartment can be opened during the wire connection, which is convenient for installation of small bus-bar.

3.2.4 Pressure Relief Devices

The upper sides of the handcart compartment, bus-bar compartment and cable compartment are equipped with pressure relief devices, when faults appear in the compartments to generate arcs, the internal air pressure of switch cabinets increases, the particular sealing ring equipped on the front door seal off the cabinet door, the pressure relief metal plate equipped on the top is automatically opened to release pressure and high-temperature air, so as to ensure safety of operators and switchgear.

3.2.5 Interlocks between Secondary Plug and Handcart Positions

The secondary connection of switchgear and handcarts are realized through connection of the secondary plug, the secondary plug is connected with handcarts via a nylon telescopic tube, and the secondary socket is equipped on the right upper side of handcart compartment of switch cabinet. Only when the handcarts are in test/off positions, the secondary plug can be plugged or removed. When the handcarts are in working positions, the secondary plug can be locked. The circuit breaker with closing blocked electromagnet is equipped, before the secondary plug is communicated, the closing mechanism on the handcart is locked by electromagnet, which can only be opened and can't conduct the closing operation.

3.2.6 Electrified Display Device

The switchgear can be equipped with electrified display device, which can detect the primary return circuit running, and the device comprises two parts of a high-voltage sensor and a display. The device can improve the electrified status of high-voltage return circuit, and can also be matched with electromagnetic lock to implement compulsive blocking to the operation handle, cabinet door and adjacent cabinets, thereby reaching the purpose on prevention of movement and isolation of handcarts with load, prevention of closing of grounding switch with electricity, and prevention of mistaken entrance into the electrified compartments, and improving the anti-misoperation performance of supported products.

3.2.7 Condensation Prevention

In order to prevent the generation of condensation in environment with high humidity or relatively large temperature change, the circuit breaker compartment and cable compartment are respectively equipped with electric heaters, so as to prevent insulation accidents under the above-mentioned operating conditions.

3.2.8 Grounding Device

The cable compartment is separately provided with grounding copper bar of $50 \times 40\text{mm}^2$, which runs through the adjacent cabinets and has good connection with cabinets, and is directly used by grounding components and parts. Because the whole cabinet is mutually connected with zinc plate coated with aluminum, therefore, the whole cabinet is in good grounding status, and ensures the safety of operators when touching the cabinet.

3.3 Interlocking Device for Anti-Misoperation and Working Principle

The switchgear is equipped with safety and reliable interlocking device, which completely satisfies the requirements of "Five Preventions".

a) The instrument compartment is equipped with a push button with indication or KK type changeover switch to prevent the circuit breaker from being mistakenly closed and mistakenly opened;

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b) Only when the circuit breaker handcart is in test or working position, the circuit breaker handcart can conduct the closing and opening operation, and after the closing, the handcart is locked without being moved, so as to prevent the handcart from being pushed and pulled with load;

c) Only when the grounding switch is in the opening position, the circuit breaker handcart can move to the working position from the test/off position; only when the circuit breaker handcart is in the test/off position, the grounding switch can conduct the closing operation (the grounding switch can be provided with voltage display device), thereby preventing the grounding switch from closing the circuit breaker at the make position and preventing the grounding switch from being mistakenly closed with electricity;

d) When the grounding switch is in opening position, the lower door and rear door are blocked for prevention of mistaken entrance into electrified compartment;

e) The circuit breaker handcart equipped with closing blocking electromagnet in accordance with customer requirements can prevent the manual or power–driven operation under the unblocking circumstance with blocking device.

f) When the circuit breaker handcart is in the working position, the secondary plug is locked without being removed;

g) Each cabinet can be equipped with electric interlocks. In addition, the reliability of switchgear can be improved by additionally installing the electromagnetic locking device on the grounding switch operating mechanism, and the reversal interlocking device of rear cabinet door and grounding switch operation can be provided in accordance with client requirements, which shall be selected in accordance with client demands when placing an order for goods.

3.4 Electric Control Wiring Principle of Switchgear

The secondary control principle of vacuum circuit breaker separately comprises the parts of an energy storage return circuit, a closing return circuit, an opening return circuit, a blocking return circuit and an auxiliary switch return circuit etc., the blocking electromagnet Y1 is pulled in with electricity, the connection points 13–14 of limit switch SP5 are closed, the closing coil HQ can normally conduct the electric closing operation, and the closing bending plate is unblocked after the blocking electromagnet Y1 is pulled in, and the closing can also be operated by hand. Therefore, the blocking electromagnet can prevent the manual or power–driven closing operation under the circumstance that the secondary control power source isn't connected.

4. Transportation, Installation, and Commissioning

4.1 Precautions for Transportation and Storage

a) The products are not allowed to be tilted, inverted, or subject to strenuous vibration during handling and transportation, and the hoist cable shall be placed on package container or designated parts of switchgear;

b) The products shall be prevented from the rain to avoid being affected with damp;

c) When the switchgear arrives at the scene, the consignee shall check whether the cargo outer package is complete, whether the cargo is damaged or short, and shall inform the supplier to conduct the collaborative inspection on the spot when necessary;

d) The product placement shall be smooth and steady, and electrical equipment components and spare parts shall not be randomly disassembled.

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运输、安装和调试

4.1 运输和存放注意事项

- a) 产品在装卸、运输时不准倾翻、倒置和遭受剧烈振动、吊绳应置于包装箱或开关设备指定的部位；
- b) 防止雨淋、以免产品受潮；
- c) 开关设备抵达现场时，收货人应检查货物外包装是否完整，货物有无受到损坏或短缺，必要时应通知供货方到现场共同检查；
- d) 产品的搁置应平稳，不得随意拆卸电器元件及零部件。

4.2 开关设备的安装

- a) 基础框架表面应平整且高出地坪 2-4mm，框架平整度和直线度允许公差为 1mm/m；
- b) 在基础框架上逐台调整开关柜的位置依次拼接，垂直度不超过 2mm。当开关柜数量多于 10 台时最好从中间开始拼装。开关柜与基础框架采用螺栓连接或焊接；
- c) 为方便主母线安装，开关设备的拼柜安装宜与主母线安装交替进行；
- d) 用预制的接地母排逐柜连接开关设备的主接地母线，将开关设备主接地母线与配电室的接地极相连；
- e) 一次电缆和二次电缆安装完成后，要封堵电缆穿孔周边的空隙，并装好封板和隔板。

4.3 开关设备的调试

- a) 检查隔离触头的插入深度和接触是否良好；
- b) 开关设备安装后要进行操作试验，手动操作断路器、手车和接地开关等部件，并检查机械联锁全部程序的操作，动作要准确，应灵活无卡滞现象；
- c) 检查断路器的机械的特性是否符合规定要求，并按规定的最高、最低操作电压进行操作试验，合分应正常；
- d) 对二次回路进行通电试验，检查保护、控制和信号回路动作的正确性；
- e) 主回路电阻测量，断路器的回路电阻应不超过标准规定值；
- f) 主回路相间和相对地间工频耐压试验，按交接验收规定进行；
- g) 二次回路绝缘强度试验 2000V1min。应无击穿闪络现象。二次回路的电子器件部分，试验电压由用户与制造厂商定。

Transportation, Installation, and Commissioning

4.1 Precautions for Transportation and Storage

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- c) When the switchgear arrives at the scene, the consignee shall check whether the cargo outer package is complete, whether the cargo is damaged or short, and shall inform the supplier to conduct the collaborative inspection on the spot when necessary;
- d) The product placement shall be smooth and steady, and electrical equipment components and spare parts shall not be randomly disassembled.

4.2 Switchgear Installation

- a) The surface of basic framework shall be smooth and shall be 2-4mm higher than grade level, and the per-

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missible tolerance of framework flatness and straightness is 1mm/m;

b) The positions of all switch cabinets shall be regulated on the basic framework to conduct successive matching, and the verticality shall be less than 2mm. When the number of switch cabinets is more than 10, it's better to start matching from the middle. The switch cabinets and basic framework adopt the bolt connection or welding;

c) In order to facilitate installation of main bus-bar, the cabinet matching installation of switchgear and installation of main bus-bar can be alternatively conducted;

d) The pre-made grounding bus-bar is connected with main grounding bus-bar of switchgear one by one, and the main grounding bus-bar of switchgear is connected with grounding pole of distribution chamber.

e) After the primary cable and secondary cable are installed, the peripheral gap of cable threading hold shall be sealed, and sealing plate and clapboard shall be equipped.

4.3 Switchgear Commissioning

a) Check whether the insert depth and contact of isolation contact finger are good;

b) The switchgear shall conduct the operation test after the installation, the components of circuit breakers, handcart, and grounding switch etc. shall be manually operated, and the operation of all procedures of mechanical interlocking shall be checked, which shall have precise action, and shall be flexible without the phenomenon of clamping stagnation;

c) Check whether the mechanical characteristics of circuit breakers comply with specified requirements, and conduct the operation test in accordance with regulated max. and min. operation voltage, the closing and opening shall be normal;

d) The secondary return circuit shall be conducted with the electricity test to check the accuracy of protection, control, and signal return circuit action.

e) The main return circuit resistance shall be measured, and the return circuit resistance of circuit breaker shall be less than specified value of the standard.

f) The power frequency withstand voltage test of main return circuit shall be alternatively and relatively conducted, which shall be conducted in accordance with reception and acceptance regulations;

g) The insulation strength test of secondary return circuit shall be 2000V 1min. And for the electric components of secondary return circuit, the test voltage shall be agreed by users and manufacturer.

开关设备的操作程序

虽然开关设备设计有保证各部分操作程序正确的联锁装置，但是操作人员对开关设备仍应严格按操作规程和本技术文件的要求进行操作，不应随意操作，更不应在操作受阻时不加分析强行操作，否则，容易造成设备损坏，甚至引起事故。

5.1 无接地开关的断路器柜操作

a) 将断路器可移开部件装入柜体；把断路器手车装在转运车上并锁定好，将转运车推到柜前，把小车升到合适位置后，将转运车前部定位锁板插入柜体中隔板插口并将转运车与柜体锁定，打开断路器小车的锁定钩，将断路器手车平稳推入柜体同时锁定，当确认已将手车与柜体锁定后，解除转运与柜体的锁定，将转运车拉开。

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b) 手车在柜内操作：断路器手车装入柜体后即处于断开位置，将辅助回路二次插头插好后手车处于试验位置。若通电则仪表室面板上试验位置指示灯亮，此时可在主回路未接通的情况下对手车进行电气操作试验。若想继续进行操作，必须先把所有柜门关好并把门锁好。

确认断路器处于分闸状态，此时可将手车操作摇把插入面板操作孔内，顺时针转动摇把、直到摇把明显受阻并听到清脆的辅助开关切换声，同时仪表室面板上工作位置指示灯亮，然后取下摇把。此时，主回路接通，断路器处于工作位置，可通过控制回路对其进行合、分操作。

若准备小车从工作位置退出，首先应确认断路器已处于分闸状态，插入手车操作摇把，逆时针转动直到摇把明显受阻并听到清脆的辅助开关切换，小车便回到试验位置。此时，主回路已经完全断开，金属活门关闭。

c) 从柜中取出手车：从柜内取出手车时要确定断路器已处于分闸状态，然后解除辅助回路二次插头并将插头扣锁在手车架上，此时将转运车推至柜前（与把手车装入内时相同）并锁定，然后将手车解锁并向外拉出。当手车完全进到转运车上并确认与转运车锁定后，解除转运车与柜体的锁定，把转运车向后拉出。如手车要用转运车运输较长距离时，在推动转运小车过程中要格外小心，以避免运输过程中发生倾翻等意外事故。

d) 断路器手车在柜内的分、合闸状态确认：分、合闸状态可由断路器手车面板上的分、合指示牌及仪表室面板上分、合闸指示灯来判定。若透过柜体中面板观察窗看到手车面板上绿色的分闸指示牌则判定断路器处于分闸状态，此时如果辅助回路二次插头接通操作电源，则仪表室面板上分闸指示灯亮。

5.2 有接地开关的断路器柜操作

将断路器手车推入柜内和从柜内取出手车的程序，与无接地开关的断路器柜的操作程序完全相同。仅将手车在柜内操作和接地开关操作过程中要注意的地方叙述如下：

a) 手车在柜内操作：当准备将手车推入工作位置时，除了要遵守 5.1b 中提请注意的诸项要求外，还应确认接地开关要处于分闸状态，否则下一步操作无法完成。

b) 合、分接地开关操作：若要合接地开关，首先应确定手车已退到试验 / 断开位置，并取下推进摇把，然后按下接地开关操作孔的联锁弯板，插入接地开关操作手柄，顺时针转动 90°，便将接地开关分闸。

5.3 一般隔离柜的操作

隔离插头不具备接通和断开负荷电流的能力，因此在带负荷的情况下不允许移动手车。在进行隔离手车操作时，必须保证先将与之相配合的断路器分闸（见 5.1 中 d），断路器分闸后其辅助触点转换解除与之配合的隔离手车上的电气联锁，只有这时才能操作隔离手车。具体操作程序与断路器手车操作程序相同。

KYN28-24 开关设备是以机械联锁为主，辅之以电气联锁实现其“防误”功能。联锁操作过程中如发现操作阻力增大，应在排除有误操作可能的前提下，及时检查联锁装置。

Operation Procedures of Switchgear

Although the switchgear is designed to have interlocking device that ensures accurate operation procedures for each part, however, the operators shall still operate the switchgear by strictly following the operating instructions and this technical document, who shall not operation in random, and shall not conduct the forced

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operation without analysis when operation is interrupted, otherwise, the equipment will be easily damaged and will even cause the accident.

5.1 Operation of Circuit Breaker Cabinet without Grounding Switch

a) The removable components of circuit breaker shall be equipped in the cabinet; the circuit breaker handcart shall be equipped on the transfer truck and shall be locked, the transfer truck shall be pushed to the front of cabinet, the truck shall be hoisted to a suitable position, the positioning lock plate at front part of transfer truck shall be inserted into the cabinet clapboard faucet and the transfer truck and cabinet shall be locked, the locking hook of circuit breaker handcart shall be opened, the circuit breaker handcart shall be steadily pushed into the cabinet and locked, when you confirm that the handcart is locked with the cabinet, the transfer truck and cabinet shall be unlocked to withdraw the transfer truck.

b) Operation of handcart in the cabinet: after being equipped in the cabinet, the circuit breaker handcart shall be in off position, and after the secondary plug of auxiliary return circuit is inserted, the handcart shall be in test position. If the electricity is put through, the test position indicator lamp on the instrument compartment panel shall be light, and the handcart can be conducted with electric operation test under the circumstance that the main return circuit is not connected. If the operation needs to be continued, all the cabinet doors shall be closed and locked.

You shall confirm that the circuit breaker is in the opening state, insert the handcart operation crank into the panel operation hole, rotate the crank in clockwise direction until it is obviously blocked and a ringing auxiliary switch changeover sound is heard, meanwhile the working position indicator lamp on the instrument compartment panel shall be light, then the crank shall be taken off. By this time, the main return circuit shall be connected, the circuit breaker shall be in working position, which can be conducted with closing and opening operations through the control return circuit.

If the handcart is prepared to be withdrawn from working position, you shall firstly confirm that the circuit breaker has been in opening state, and then insert the handcart operation crank, rotate the crank in counterclockwise direction until the crank is obviously blocked and the ringing auxiliary switch changeover sound is heard, the handcart shall be back to the test position. By this moment, the main return circuit has been completely cut off, and the metal valve shall be closed.

c) Take out the handcart from the cabinet: when taking out the handcart from the cabinet, you shall confirm that the circuit breaker has been in opening state, and relieve the secondary plug of auxiliary return circuit, and buckle and lock the plug on the handcart frame, push the transfer truck to the front of cabinet (same as loading of handcart) and lock, and then unlock the handcart and outwardly draw out. When the handcart is completely on the transfer truck and is confirmed to be locked with transfer truck, you shall relieve the locking between the transfer truck and cabinet, and backwardly draw out the transfer truck. If the handcart is transported by transfer truck for a longer distance, you shall take special care in the process of pushing the transfer truck, so as to avoid unexpected accident such as tilting in transportation process.

d) Confirmation on opening and closing states of circuit breaker handcart in the cabinet: the opening and closing states can be determined by opening and closing indicators on the circuit breaker

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handcart panel, and opening and closing indicator lamps on the instrument compartment panel. If the green opening indicator on handcart panel is seen from the observation window on middle panel of cabinet, the circuit breaker shall be determined to be in opening state, and if the secondary plug of auxiliary return circuit is connected with operating power supply, the opening indicator lamp on the instrument panel shall be light.

5.2 Operation of Circuit Breaker Cabinet with Grounding Switch

The procedure that the circuit breaker handcart is pushed into the cabinet and the handcart is taken off from the cabinet is completely same with the operation procedure of circuit breaker cabinet without grounding switch. The places that shall be paid attentions in the process of handcart operation in the cabinet and grounding switch operation are as follows:

- a) Operation of handcart in the cabinet: when the handcart is prepared to be pushed in the working position, in addition to complying with various requirement in 5.1b, you shall also confirm that the grounding switch shall be in the opening state, otherwise the next operation won't be completed.
- b) Closing and opening operations of grounding switch: if you close the grounding switch, you shall firstly confirm that the handcart has been moved back to the test/off position, and the crank has been taken off, then push down the interlocking bending plate of grounding switch operation hole, insert with operation crank of grounding switch, rotate 90° in clockwise direction, so as to open the grounding switch.

5.3 Operation of General Isolation Cabinet

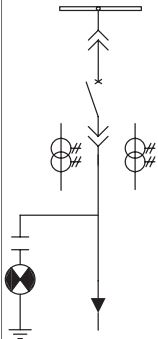
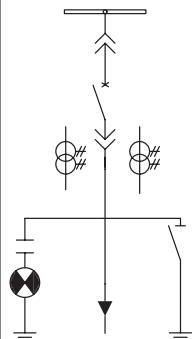
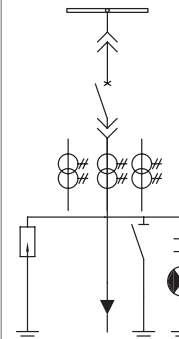
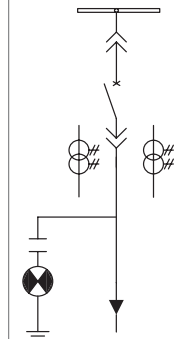
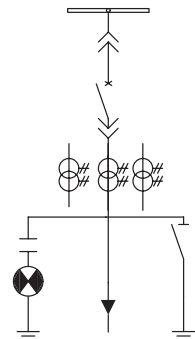
The isolation plug is not provided with capacity on connecting and cutting the load current, therefore, the handcart shall not be moved under the circumstance with load. When the handcart isolation operation is conducted, you shall firstly ensure the opening of matched circuit breaker (see d of 5.1), after being opened, the auxiliary contact of circuit breaker shall convert to relieve the electric interlocking on matched isolation handcart, only then can operate the isolation handcart. The specific operation procedure is the same as the operation procedure of circuit breaker handcart.

KYN28-24 switchgear gives priority to mechanical interlocking, assisting with electric interlocking to realize “anti-misoperation” functions. If the operation resistance increases in the process of interlocking operation, the interlocking device shall be timely checked in the premise of clearing possibility of misoperation.

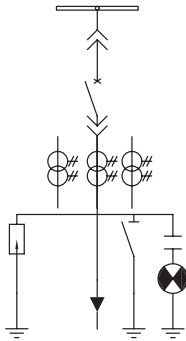
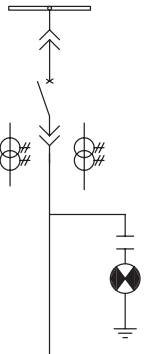
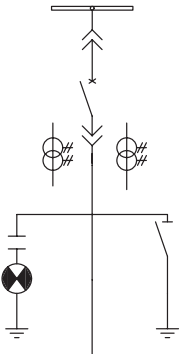
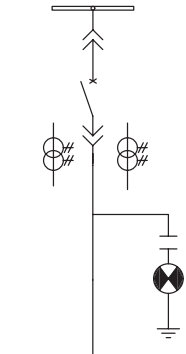
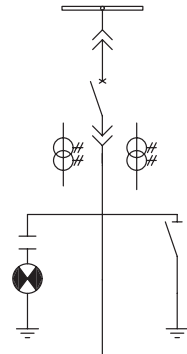
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KYN28-24 开关柜一次单线图

方案编号	001	002	003	004	005
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
— 真空断路器 ZN73-24	1	1	1	1	1
次 电 流 互 感 器 LZZB9-24	2	2	2	3	3
主 电 压 互 感 器 JDZ11-20/JDZX11-20					
器 高 压 熔 断 器 XRNP-24 0.5A					
元 接 地 开 关 JN15-24		1	1		1
件 避 雷 器 HY5WZ-32/84			1		
用途	受电、馈电	馈电	馈电	受电、馈电	馈电

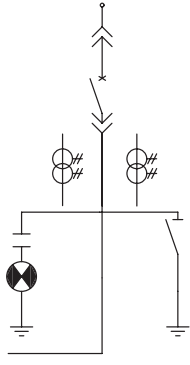
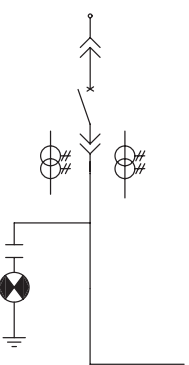
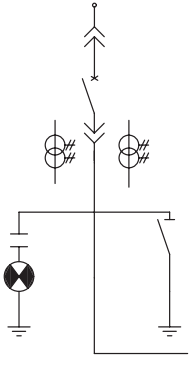
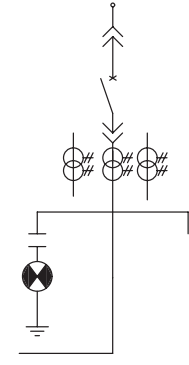
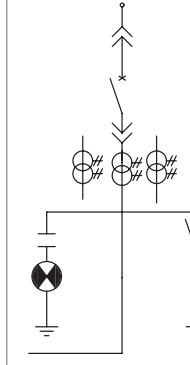
KYN28-24
型铠装移开式金属封闭
开关设备

方案编号	006	007	008	009	010
一次方案					
额定电流（A）	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24	1	1	1	1	1
电流互感器 LZB9-24	3	2	2	2	2
电压互感器					
JDZ11-20/JDZX11-20					
高压熔断器 XRNP-24 0.5A					
接地开关 JN15-24	1		1		1
避雷器 HY5WZ-32/84	3				
用途	馈电	联络（右）	联络（右）	联络（左）	联络（左）

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方案编号	011	012	013	014	015
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24	1	1	1	1	1
电流互感器 LZZB9-24	3	3	3	3	2
电压互感器					
JDZ11-20/JDZX11-20					
高压熔断器 XRNP-24 0.5A					
接地开关 JN15-24		1		1	
避雷器 HY5WZ-32/84					
用途	联络 (右)	联络 (右)	联络 (左)	联络 (左)	架空进线 (左联络)

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型铠装移开式金属封闭
开关设备

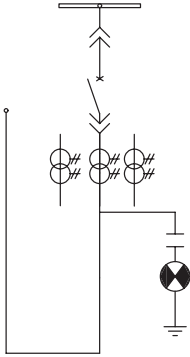
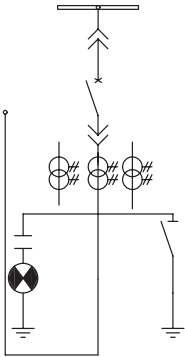
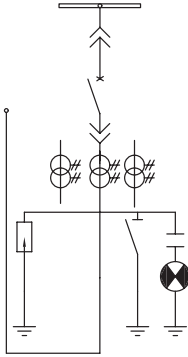
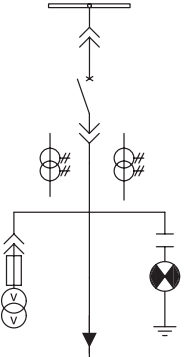
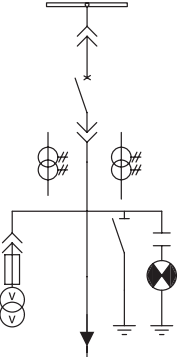
方案编号	016	017	018	019	020
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24	1	1	1	1	1
电流互感器 LZSB9-24	2	2	2	3	3
电压互感器 JDZ11-20/JDZX11-20					
高压熔断器 XRNP-24 0.5A					
接地开关 JN15-24	1		1		1
避雷器 HY5WZ-32/84					
用途	架空进线 (左联络)	架空进线 (右联络)	架空进线 (右联络)	架空进线 (左联络)	架空进线 (左联络)

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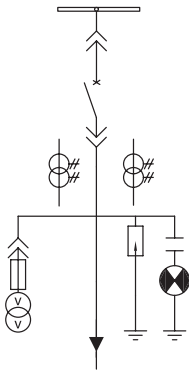
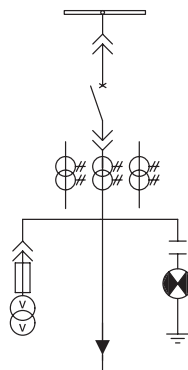
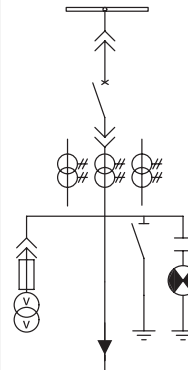
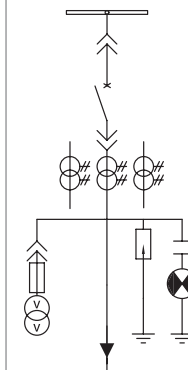
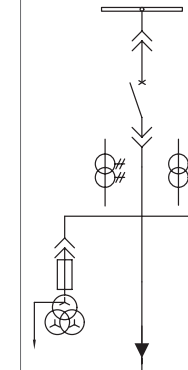
方案编号	021	022	023	024	025
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24	1	1	1	1	1
电流互感器 LZZB9-24	3	3	2	2	2
电压互感器 JDZ11-20/JDZX11-20					
高压熔断器 XRNP-24 0.5A					
接地开关 JN15-24		1		1	1
避雷器 HY5WZ-32/84					3
用途	架空进线 (联络右)	架空进线 (联络右)	架空进出线	架空进出线	架空进出线

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开关设备

方案编号	026	027	028	029	030
一次方案					
额定电流（A）	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24	1	1	1	1	1
电流互感器 LZB9-24	3	3	3	2	2
电压互感器 JDZ11-20/JDZX11-20				2/	2/
高压熔断器 XRNP-24 0.5A				3	3
接地开关 JN15-24		1	1		1
避雷器 HY5WZ-32/84			3		
用途	架空进出线	架空进出线	架空进出线	受电、馈电	馈电

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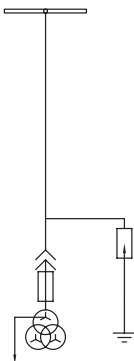
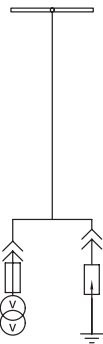
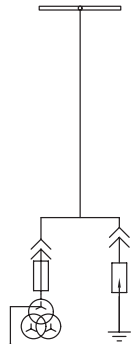
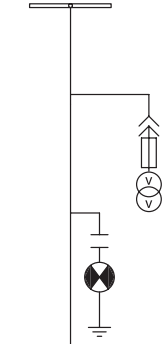
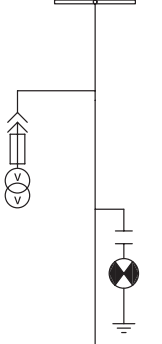
方案编号	031	032	033	034	035
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24	1	1	1	1	1
电流 互感器 LZZB9-24	2	3	3	3	2
电压互感器 JDZ11-20/JDZX11-20	2/	2/	2/	2/	/3
高压熔断器 XRNP-24 0.5A	3	3	3	3	3
接地开关 JN15-24			1		
避雷器 HY5WZ-32/84	3			3	
用途	受电、馈电	受电、馈电	馈电	受电、馈电	受电、馈电

KYN28-24
型铠装移开式金属封闭
开关设备

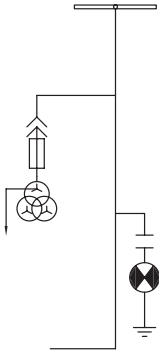
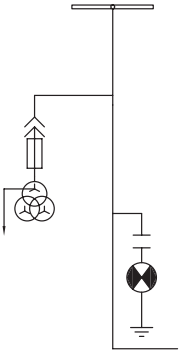
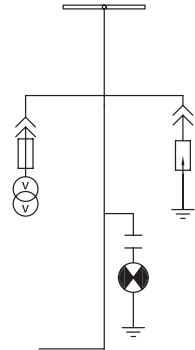
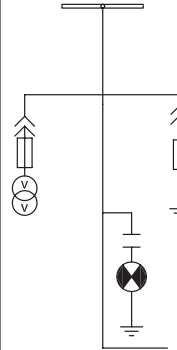
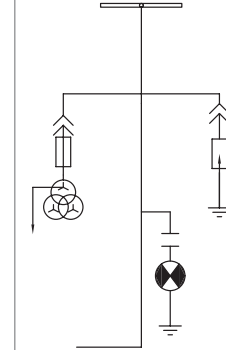
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一次方案					
额定电流（A）	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24	1	1			
电流互感器 LZZB9-24	2	2			
电压互感器 JDZ11-20/JDZX11-20	/3	/3	2/	/3	2/
高压熔断器 XRNP-24 0.5A	3	3	3	3	3
接地开关 JN15-24	1				
避雷器 HY5WZ-32/84		3			3
用途	馈电	受电、馈电	电压测量	电压测量	电压测量 + 避雷器

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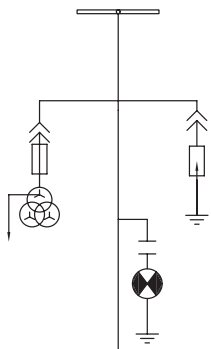
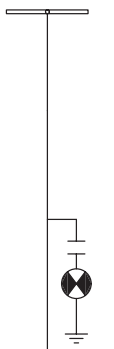
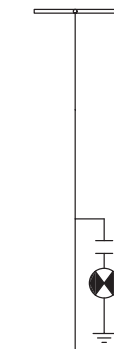
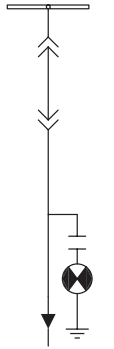
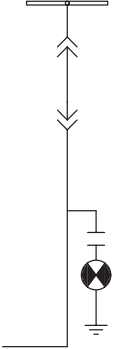
Metal-Clad Movable AC Metal-Enclosed Switchgear

方案编号	041	042	043	044	045
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24					
电流互感器 LZZB9-24					
电压互感器	3/	2/	/3	2/	2/
JDZ11-20/JDZX11-20					
高压熔断器 XRNP-24 0.5A	3	3	3	3	3
接地开关 JN15-24					
避雷器 HY5WZ-32/84	3	3	3		
用途	电压测量 + 避雷器	电压测量 + 避雷器	电压测量 + 避雷器	电压测量 + 右联	电压测量 + 右联

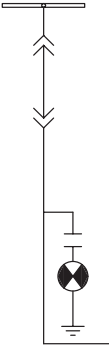
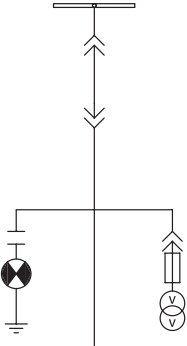
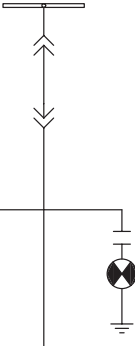
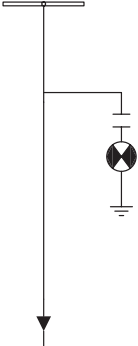
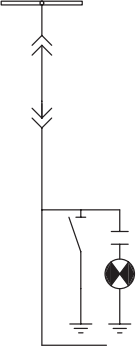
KYN28-24
型铠装移开式金属封闭
开关设备

方案编号	046	047	048	049	050
一次方案					
额定电流（A）	630~3150	630~3150	630~3150	630~3150	630~3150
— 真空断路器 ZN73-24	1	1			
次 电 流 互 感 器 LZZB9-24					
主 电 压 互 感 器	/3	/3	2/	2/	/3
电 压 互 感 器 JDZ11-20/JDZX11-20					
器 高 压 熔 断 器 XRNP-24 0.5A	3	3	3	3	3
元 接 地 开 关 JN15-24					
件 避 雷 器 HY5WZ-32/84			3	3	3
用途	电压测量 + 左联	电压测量 + 右联	电压测量 + 避雷器 + 左联	电压测量 + 避雷器 + 右联	电压测量 + 避雷器 + 左联

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Metal-Clad Movable AC Metal-
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方案编号	051	052	053	054	055
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24					
电流互感器 LZZB9-24					
电压互感器	/3				
JDZ11-20/JDZX11-20					
高压熔断器 XRNP-24 0.5A	3				
接地开关 JN15-24					
避雷器 HY5WZ-32/84	3				
用途	电压测量 + 避雷器 + 右联 联络 (右)		联络 (左)	隔离	隔离 + 联络 (左)

KYN28-24
型铠装移开式金属封闭
开关设备

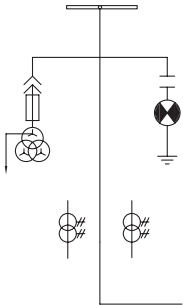
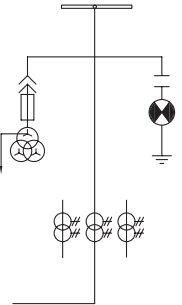
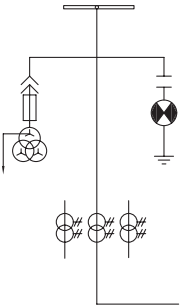
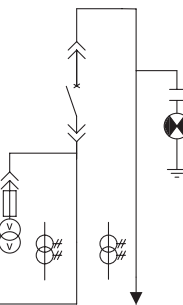
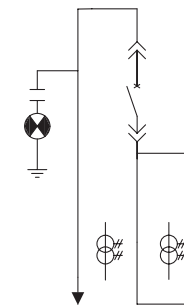
方案编号	056	057	058	059	060
一次方案					
额定电流（A）	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24					
电流互感器 LZB9-24					
电压互感器		2/	2/		
JDZ11-20/JDZX11-20					
高压熔断器 XRNP-24 0.5A		3	3		
接地开关 JN15-24					1
避雷器 HY5WZ-32/84					
用途	隔离 + 联络（右）	隔离 + 联络（左）	电压测量 + 联络（右）	电压测量 电缆进出线	隔离

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方案编号	061	062	063	064	065
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
— 真空断路器 ZN73-24					
次 主 要 电 器 元 件	电流 互感器 LZZB9-24	2	2	3	3
电压互感器	2/	2/	2/	2/	/3
JDZ11-20/JDZX11-20					
高压熔断器 XRNP-24 0.5A	3	3	3	3	3
接地开关 JN15-24					
避雷器 HY5WZ-32/84					
用途	计量 + 右联	计量 + 左联	计量 + 左联	计量 + 右联	计量 + 左联

KYN28-24
型铠装移开式金属封闭
开关设备

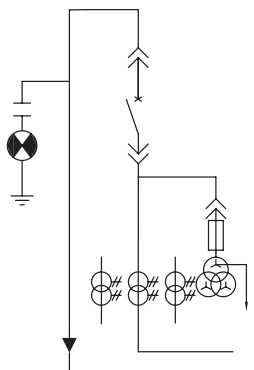
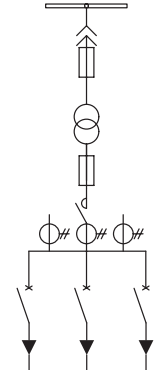
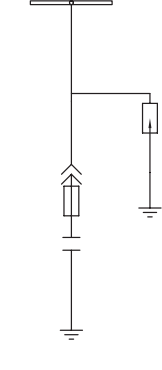
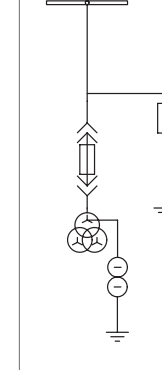
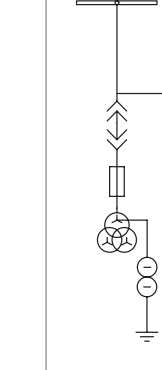
方案编号	066	067	068	069	070
一次方案					
额定电流（A）	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24				1	1
电流互感器 LZZB9-24	2	3	3	2	2
电压互感器 JDZ11-20/JDZX11-20	/3	/3	/3	2/	2/
高压熔断器 XRNP-24 0.5A	3	3	3	3	3
接地开关 JN15-24	1				
避雷器 HY5WZ-32/84					
用途	计量 + 右联	计量 + 左联	计量 + 右联	进线 + 计量	进线 + 计量

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Metal-Clad Movable AC Metal-Enclosed Switchgear

方案编号	071	072	073	074	075
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24	1	1	1	1	1
电流互感器 LZZB9-24	3	3	2	2	3
电压互感器 JDZ11-20/JDZX11-20	2/	2/	/3	/3	/3
高压熔断器 XRNP-24 0.5A	3	3	3	3	3
接地开关 JN15-24					
避雷器 HY5WZ-32/84					
用途	进线 + 计量	进线 + 计量	进线 + 计量	进线 + 计量	进线 + 计量

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型铠装移开式金属封闭
开关设备

方案编号	076	077	078	079	080
一次方案					
额定电流 (A)	630~3150	630~3150	630~3150	630~3150	630~3150
真空断路器 ZN73-24	1				
电流互感器 LZZB9-24	3				
电压互感器 JDZ11-20/JDZX11-20	/3	干式变压器容量 由用户自定	并联电容器 SM24 3-16-1	/4	/4
高压熔断器 XRNP-24 0.5A	3	XRNT3	XRNT3	3	3
接地开关 JN15-24					
避雷器 HY5WZ-32/84			3	3	3
用途	进线 + 计量	所用变压器柜	电容器柜	电压测量 + 避雷器	电压测量 + 避雷器

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Metal-Clad Movable AC Metal-Enclosed Switchgear

开关设备的维护和保养

设备 / 元件（如易损件）的检查和维修周期，取决于其运行时间的长短、操作频繁程度和故障开断情况等。根据运行条件和现场环境，每 3-5 年对开关设备进行一次检查和保养。

- a) 按真空断路器使用说明书的要求，检查断路器和操动机构的工作情况，并进行必要的调整和润滑；
- b) 检查手车进车、出车全过程的工况，必要时进行调整和润滑；
- c) 检查联锁装置是否灵活可靠；必要时进行调整和润滑；
- d) 检查动、静隔离触头接触表面有无损伤，插入深度是否符合要求，弹簧压力有无减弱，表面镀层有无异常氧化现象，并更换隔离触头上的陈旧导电膏；
- e) 检查母线和各导电连接部位的接触情况并紧固连接，发现表面有发热现象要进行处理；
- f) 检查接地回路部分的情况，如接地触头、主接地线及过门接地线的接触情况，保证其导电的连续性；
- g) 用软布擦拭真空灭弧室和绝缘件表面的灰尘。如因凝露致使出现局部放电现象，可以在放电表面涂一层薄的硅脂作为临时修补。

Maintenance of Switchgear

The inspection and maintenance cycle of equipments/components (such as wearing parts) are decided by the length of running time, operation frequency, and fault breaking conditions etc. In accordance with running conditions and site environment, the switchgear shall be conducted with one inspection and maintenance for every 3-5 years.

- a) In accordance with requirements of instruction manual of vacuum circuit breaker, check the working situation of circuit breaker and control mechanism, and adjustment and lubrication shall be conducted with when necessary;
- b) Check the operation mode of full process on pulling in and drawing out the handcart; and conduct adjustment and lubrication when necessary;
- c) Check whether the interlocking device is flexible and reliable; and conduct adjustment and lubrication when necessary;
- d) Check whether the contact surfaces of dynamic and static isolation contact are damaged, whether the insert depth meets the requirements, whether the spring pressure is reduced, whether the surface clad layer is provided with abnormal oxidation phenomenon, and replace the old conductive jelly on isolation contact;
- e) Check the contact situation of bus-bar and various conductive connection parts and fasten the connection, and conduct treatment when finding the heating phenomenon on the surface;
- f) Check the situation of grounding return circuit, such as contact situation of grounding contact, main grounding wire, and transition grounding wire, so as to ensure conduction continuity;
- g) Wipe the dust on surfaces of vacuum arc extinguish chamber and insulators with soft cloth. If the condensation generates partial discharge phenomenon, the discharge surface can be coated with one layer of thin silicon grease for temporary repair.

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型铠装移开式金属封闭
开关设备

随机文件 Enclosed Documents

- a) 产品合格证;
 - b) 出厂检验报告;
 - c) 安装使用说明书;
 - d) 二次接线图;
 - e) 装箱单;
 - f) 专用工具;
 - g) 开关设备主要元件的使用说明书等技术文件和附件。
- a) Product Qualification Certificate;
 - b) Delivery Inspection Report;
 - c) Installation Manual;
 - d) Secondary Connection Diagram;
 - e) Packing List;
 - f) Special Tools;
 - g) Technical Documents and Accessories such as Instruction Manual of Switchgear Main Components etc.

订货须知

- a) 主接线方案图;
- b) 开关设备排列和配电室平面布置图;
- c) 开关设备内主要电器设备的型号、规格和数量;
- d) 二次回路图;
- e) 开关设备在特殊环境条件使用时, 应在订货时说明;
- f) 其它特殊要求。

Ordering Instructions

- a) Main Connection Plan Diagram;
- b) Switchgear Arrangement and Distribution Chamber Layout Plan;
- c) Types, Specifications, and Quantity of Main Electrical Equipment in Switchgear;
- d) Secondary Return Circuit Diagram;
- e) If the switchgear will be used under the special environmental conditions, which shall be explained when you order it;
- f) Other particular requirements.

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Metal-Clad Movable AC Metal-Enclosed Switchgear

技术要求

- 1. 开关状态为：未储能，分闸位置，手车试验位置；
 - 2. 控制回路选用 1mm2 线，接地线选用 2.5 mm2；
 - 3. XT 选用 58 芯针孔航空插头；
 - 4. Y7、Y8、Y9、Y1、KO 为可选用件；
 - 5. 可选功能配置见表
- （注：KO、V1 ~ V4、L1 ~ L11、A1 ~ A14、B1 ~ B15、RO ~ R1 为线路板上的元件）。

Technical Requirements

- 1. Off/On State: no energy storage, opening position, and handcart test position;
 - 2. The control return circuit selects the wire of 1mm2, and the grounding wire selects 2.5 mm2;
 - 3. XT selects 58-core pinhole aviation plug;
 - 4. Y7, Y8, Y9, Y1, and KO are optional parts;
 - 5. See the tale for optional functional configuration
- (Note: KO, V1 – V4, L1 – L11, A1 – A14, B1 – B15, and RO – R1 are components on the circuit board).

符号	名称	作用	符号	名称	作用
HQ	合闸电磁铁	控制开关合闸	SP1 ~ SP4	微动开关	合闸弹簧蓄能后切
TQ	分闸电磁铁	控制开关分闸	SP5	限位开关	换实现闭锁功能
M	储能电机	为开关合闸储能	S8	底盘车辅助开关	试验位置时切换
HK	辅助开关	分合操作时切换	S9	底盘车辅助开关	工作位置时切换
V1 ~ V4	整流元件	为电路整流	Y1	闭锁电磁铁	控制合闸回路
XT	航空插头	控制线汇总	RO ~ R1	电阻	分压电阻
LXφ	接线端子	连接手车连线	Y7 ~ Y9	过流脱扣器	过电流保护
KO	防跳继电器	防止开关跳跃	L1 ~ L11	连接线	实现功能转换

注：■号表示为连线，空格表示断开

KYN□-12(8BK80)

型户内金属铠装移开式开关设备



概 述

KYN□- 12(8BK80)户内金属铠装移开式开关设备(以下简称开关柜)是我公司生产的一种新型户内电气成套装置,其设计技术不仅充分考虑了中国的现有标准要求,而且符合我国国情;柜体有普通钢板和进口敷铝锌板两种,防护等级达到IP4X,适用于3.6-12kV三相交流50Hz的单母线分段系统,对电路进行控制、保护、监视和测量之用。该产品符合GB3906、GB311、GB11022、DL/T404、IEC298等标准规定。KYN□-12(8BK80)系不

The production summary

KYN□- 12(8BK80) steel-clad movable-type AC metallic packing switch equipment is the indoor whole set electric power distributed setting, its frame standard not only takes into account Chinese standard demand in existence, but also accords with our country's circumstance. That these are two kinds to be made of the cabinet body is common steel plate and steel plate with plating zinc and aluminium of import. The switch cabinet's safety rate is IP4X., and it can be used to 3.6~12kV three phase alternative current system of single busbar subsection, at the same time, the setting is able to control, protect, watch, and survey the electric circuit. The production are all built in accordance with the specifications of standard GB3906, GB311, GB11022, DL/T404, IEC298, etc. KYN□-12(8BK80) is not fixing to lean against walls.

使用环境

2.1 正常使用环境条件:

海拔高度不超过: 1000m;

地震烈度不超过: 8 度;

最高温度: +40℃;

最低温度: -25℃;

日平均值: +35℃;

日平均相对湿度 95%以下; 月平均相对湿度 90%以下;

开关柜安装在户内没有火灾、爆炸危险, 没有严重污秽、化学腐蚀及剧烈振动的场所。

2.2 特殊使用环境条件

当开关柜安装在海拔高度大于1000m的地区时, 必须与厂家协商制造技术。当开关柜安装环境温度升高超过规定时, 须在柜内强迫通风, 以提高母线的载流量。当开关柜运行于有凝露的环境中时, 必须安装凝露控制器, 该型柜体在手车室和电缆室各装有一只加热器, 其功率有75W, 100W, 150W三种规格, 3150A柜体在手车室上方加装150mm轴流风机两个。

The environmental condition of the setting work

2.1 Normal using environmental conditon:

Altitude not exceed: 1000m.

Earthquake intensity not exceed: 8 degree.

The highest temperature: +40℃.

The lowest temperature: -25℃.

Mean level over 24 hours: +35℃.

Mean relative humidity a day: <95%.

Mean relative humidity a month: <90%.

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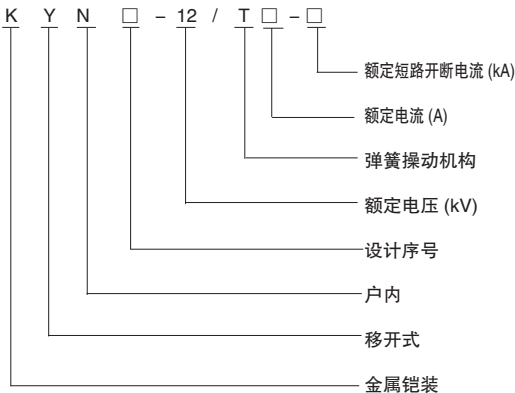
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The switch cabinet is fixed indoor at the place of no fire, no danger of exploding, no serious chemistry eroding and no acute vibration.

2.2 Special using environmental conditon:

When the switch cabinet is fixed at the area of the altitude higher than 1000 m, it should be negotiated with the manufacturer about producing technology. When the switch cabinet is fixed at the place of the environmental temperature rising over the prescript, it should be forced to ventilate in the cabinet, so that it can increase the busbar carrier current capacity. When the switch cabinet is working in the environmental of having sweat, it should be fixed the control of sweat setting, the cabinet body is fixed a heater at the handlebar room and cable room each, its power has three specs of 75W, 100W, 150W, 3150A cabinet body is added fixing two 150mm shaft fans above the handlebar room.

型号及其含义 Type and its meaning



名词解释

- 4.1 工作位置：是指可移开部件在柜内的一种定位状态。在工作位置时，开关柜的主回路及辅助回均接通。
- 4.2 试验位置：是指可移开部件在柜内的一种定位状态。在试验位置时，开关柜的辅助回路接通，但主回路断开，并且动、静触头被金属活门分隔。
- 4.3 隔离位置：如果可移开部件在柜内试验位置再切断辅助回路，可移开部件就处于隔离位置。

The term explain

- 4.1Work position: it means that the movement part is at some position in the cabinet. At the work position, the switch cabinet’ s main loop and secondary loop are all switched on.
- 4.2.Test position: it means that the movement part is at some position in the cabinet. At the test position, the switch cabinetXs secondary loop is switched on, but the main loop is cut off, and at the same time the contact

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terminal of movement, the contact terminal of steady are comparted by the metal active door.
4.3 Isolation position: it means that the movement part is at the test position and cutting off the secondary loop, so that it is at the isolation position

性能特点

- 5.1 零部件少，重量轻，属于 8BK 系列。
- 5.2 模块化设计，结构简单、紧凑、可靠。
- 5.3 移开式手车，通过丝杆机构驱动操作，无需升降操作小车。
- 5.4 联锁机构符合 IEC 和 GB、DL 标准，前门完全和机械联锁结构配合。
- 5.5 操作时高压室门关闭，分合、接地、移动操作时极为安全。
- 5.6 可装国产高质量的真空断路器。
- 5.7 铆钉结构泄压通道，结构简单，故障时对运行操作人员安全可靠。
- 5.8 防护等级高达 IP4X。
- 5.9 适用于各种方案，可用作进线柜、出线柜、母线提升柜、PT 柜等。
- 5.10 横向绝缘和水平抽出式结构使开关柜易于左右扩展。
- 5.11 柜体采用普通钢板或进口敷铝锌板，外形美观，经济性好，使用于不同地区选用。

Capability and specialty

- 5.1The amount of parts is a few, the weight of the setting is small, the setting belongs to the 8BK series.
- 5.2blocking design, the structure is simple, fast, reliable.
- 5.3withdrawing handlebar, operated by thread pole organ drive, not need ascending–dropping vehicle.
- 5.4Linking–lock organ is in accordance with standard IEC, GB, DL, the front door is working in the mechanism linking–lock organ.
- 5.5When it is operated, the high voltage room is closed, so detach–unite, earthing, movement operating is safe enough.
- 5.6It can be fixed with homemade high quality vacuum open–circuit instrument.
- 5.7The rivet structure of evacuating voltage way is simple, and it is safe for the people that when it is fault working.
- 5.8The switch cabinets safety rate is IP4X.
- 5.9It is used for a variety of projects, and it can be working as inline cabinet, outline cabinet, busbar upgrade cabinet, PT cabinet and so on.
- 5.10Landscape orientation insulation and level draw–out structure can make the cabinet easy to expand around.
- 5.11The cabinet body is made up of the common steel plate or the steel plate with plating zinc and aluminium of import, looks well, cheap, easy to operate, and chosen to be used in the different regions.

结构特征

每台开关柜分为四个小室 (见图 1): 手车室、母线室、电缆室、仪表室。每个独立的小室都用金属隔板隔开并用螺栓连接，高，低压室门采用铰链固定。

6.1 手车室

手车室通常装有真空断路器或真空接触器的可移开式手车。断路器或真空接触器的上下出线装有导电触臂及动触头。

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手车通过两个内置可折叠式斜坡导轨推入手车室，用螺栓将手车的驱动机构和柜体连接在一起，在高压室门关闭的情况下，用操作手柄可以将手车在试验和工作位置间移动。

在工作位置和手车的上触臂动触头与连接主母线的静触头相连接，下触臂动触头连接于出线回路的静触头。

在试验和隔离位置时，手车动触头与静触头被金属活门分隔开。

手车从柜内隔离位置移出时，必须先拆去驱动机构与柜体连接的螺栓。

6.2 母线室

母线室包括：主母线、支母线、绝缘套管、上绝缘触头罩。

主母线是指贯穿各开关柜的延伸母线，相邻两段母线的两端用螺栓固定在连接铜排上，母线连接铜排安装在同环氧树脂浇注的绝缘子上。

6.3 电缆室

电缆室包括：下绝缘触头罩、电缆连接铜排、部分主接地母线、电流互感器、接地开关。电缆室的底板结构使施工人员安装电缆更方便。电缆接线端头从后面观看是显而易见的。

6.4 仪表室

所有的仪表元件（保护继电器、端子排、指示灯等）装在仪表室内。指示灯和继电器安装在仪表门上预留的安装孔内。

Specialty of structure

Each switch cabinet is divided into four rooms (view the picture 1): handlebar room, busbar room, cable room, instrument room. Each independent room is divided by the metal plate and connected by bolts, the high, low voltage rooms door is fixed by the gemel.

6.1 handlebar room

The handlebar room installed the withdraw handlebar of vacuum open-circuit implements or vacuum contact implements. The vacuum open-circuit or vacuum contact implements'inlet wire and outlet wire fixed contact terminal of the electricity conduction.

The handlebar is pushed by two inner-laying foldaway inclines oriented track into the handlebar room, whose drive is connected with the cabinet body by bolts. When the high voltage room's door is closed, using handle can move the handlebar at the position of the test and work..

At work position, the handlebar, s above contact terminal is connected with the steady contact terminal of the main busbar, the below contact terminal is connected with the out-loop' steady contact terminal.

At the position of the test and work, the handlebar's movement and steady contact terminal is comparted by the metal active door.

The handlebar is moved out from the isolation position in the cabinet, it should be removed bolts of the joint with the drive and cabinet body.

6.2 busbar room

the busbar room including: main busbar, branch busbar, insulation sleeve, over contact terminal capouch of insulation The main busbar is extending busbar running through each switch cabinet, the twain end of the border busbar is fixed by bolts on the amphend connector, the amphend connector is fixed on the insulation part made of epoxy irrigating.

6.3 cable room

Cable room including: below contact terminal capouch of insulation, cable connector, part of the main earthing busbar, current mutual inductor, the switch of earthing. The cable room's bottom floor structure makes the builder fixing cable more convenient.The amphend connector is visible from the back.

6.4 instrument room

All of the instrument component (protection relay, amphend connector, indicated lamp, etc.) is fixed in the instrument room. The indicated lamp and relay is fixed in the beforehand fixing pole on the instrument door.

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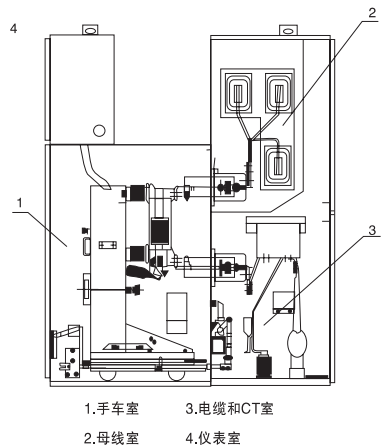


图 1 开关柜结构示意图

6.5 联锁 unite lock

状 态	下述操作不可能实现
手车在工作位置	- 打开高压门
	- 操作接地开关
	- 拔出二次插头
手车在工作位置，开关装置合闸	- 移动手车
手车在试验和工作位置的中间时	- 开关装置合闸
	- 打开高压门
	- 拔出二次插头
手车在试验位置，开关装置合闸	- 移动手车
拔出手车二次插头	- 关闭高压门
高压门开启	- 移动手车

开关柜外形尺寸 The switch cabinet figure dimension

电 压	额定电流	W	h	h1	d1	d1	d1	d1
3.6-12kV	630-3150A	800	2200	2000	380	750	1750	1816

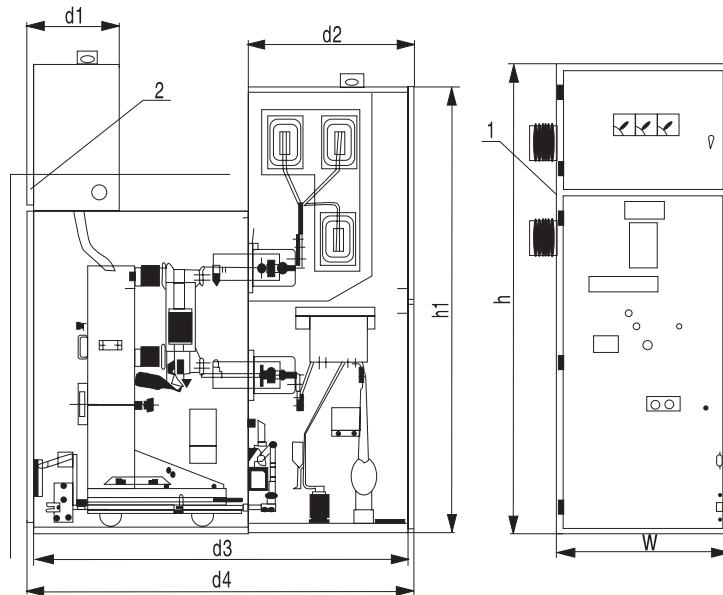
注：1、在整个排列的左右端柜装有侧板。 2、电缆室的压力释放通道的深度 110mm.

Noted: 1. it is fixed flanking board at the all arraying left and right end of the cabinet.

2. the cable rooms pressure releasing way is 110 mm depth.

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基础安装

基础可以有辅助平板的地面或者是由加强水泥铺成的地面。

辅助平板的地面：

在全部开关柜或者几台柜子的开孔下预埋钢梁，钢梁平面平整度不得超过 2mm，钢梁平面与前操作平面相平行；两平面误差不得超过 10mm，钢梁在如图 3 所示处开孔，以支撑开关柜的底部。

水泥地面：

在水泥地面上应该预埋轨道支撑，以便安装开关柜，轨道平面平整度不得超过 2mm，轨道平面与水泥地面相平行；两平面误差不得超过 10mm，安装固定开孔按照图 3 所示。在开关柜运到之前，基础应该就绪。

Foundation fixed

Foundation is the ground with secondary flat or the ground made of paving strengthen cement
The ground with secondary flat:

The steel girder is buried beforehand under all the switch cabinet or some cabinets pole, the girder plane is not higher than 2 mm, the girder plane is paralleled with fore-operated plane; the two planes error is not exceeding 10 mm, the steel girder is opened a hole as the 3 map, to sustain the bottom of the switch cabinet.

It should be buried track bolster beforehand at the cement ground, so that it is easy to fix the switch cabinet, the track plane is not higher than 2 mm, the track plane is paralleled with the cement ground; the two planes error is not exceeding 10 mm, the fixing hole is opened as the 3 map, Before the switch cabinet is coming, the foundation should be ready.

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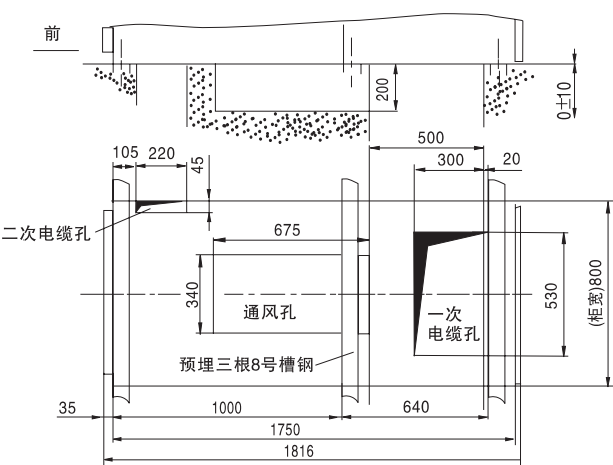


图 3 基础平面图

主要技术参数 Technology parameter

9.1 KYN□-12开关设备主要技术参数 KYN□-12 switch setting main technology parameter 表 1

序号	项 目			技术参数	
1	额定电压 (kV)			7.2	12
2	绝缘水平	Imin 工频耐受电压 (有效值 kV)	对地及相间	32	42
			一次断口间	36	48
		雷电冲击耐受电压 (峰值 kV)	对地及相间	60	75
			一次断口间	70	85
3	额定频率 (Hz)			50	
4	主母线额定电流 (A)			1250, 1600, 2000, 2500, 3150	
5	额定短路开断电流 (kA)			25, 31.5, 40	
6	额定短路关合电流 (kA)			63, 80, 100	
7	动稳定电流 (kA)			63, 80, 100	
8	热稳定电流 (kA)/ 持续时间 (s)			25/4, 31.5/4, 40/4	
9	机械寿命 (次)		真空断路器	10000, 30000	
			接地开关	2000	
10	防护等级			IP4X	

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9.2 KYN□-12(F-C)开关设备主要技术参数 KYN□-12 (F-C) switch setting main technology parameter 表 2

序号	项 目			技术参数		
1	额定电压 (kV)			3.6	7.2	12
2	绝缘水平	Imin 工频耐受电压 (有效值 kV)	对地及相间	24	32	42
			一次断口间	26	36	48
		雷电冲击耐受电压 (峰值 kV)	对地及相间	40	60	75
			一次断口间	46	70	85
3	额定频率 (Hz)			50		
4	主母线额定电流 (A)			630, 1250, 1600, 2000, 2500, 3150		
5	F-C 回路额定电流 (A)			100, 160, 224		
6	预期短路开断电流 (kA)			40		
7	预期短路关合电流 (kA)			100		
8	主母线 4s 热稳定电流 (kA)			40		
9	主母线动稳定电流 (kA)			100		
10	分支母线 4s 热稳定电流 (kA)			4		
11	分支母线 4s 热稳定电流 (kA)			10		
12	机械寿命 (次)		真空断路器	按自身技术条件规定		
			接地开关	2000		
13	防护等级			IP4X		
14	外型尺寸 (宽 × 深 × 高)mm			800 × 1816 × 2200		

9.3 SIEMENS 3AH 系列真空断路器主要技术参数 9.3 SIEMENS 3AH series vacuum breaker' s main technology parameter 表 3

序号	项 目			技术参数	
1	额定电压 (kV)			7.2	12
2	绝缘水平	Imin 工频耐受电压 (有效值 kV)	对地、相间、断口间	32	42
		雷电冲击耐受电压 (峰值 kV)	对地、相间、断口间	60	75
3	额定频率(Hz)			50	
4	额定电流 (A)			630, 1250, 1600, 2000, 2500, 3150	
5	额定短路开断电流 (kA)/ 开断次数 (次)			25/50, 31.5/50, 40/30	
6	额定短路关合电流 (kA)			63, 80, 100	
7	动稳定电流 (kA)			63, 80, 100	
8	热稳定电流 (kA) / 持续时间 (s)			25/4, 31.5/4, 40/4	
9	额定操作顺序 (40kA 及以上)			分-0.3s(180s)-合分-180s-合分	
10	开断电容器组的额定值 (A)			630	
11	合闸时间 (ms)			≤ 75	

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序号	项 目	技术参数
12	分闸时间（ms）	50-60(常规设计用 1# 脱扣器)
		40-50(增加 2# 脱扣器)
13	燃弧时间（ms）	< 15
14	储能电动机功率 (W)	200
15	(弹簧) 储能时间 (s)	≤ 15
16	电动机的额定电压 (V)	交、直流：110、220
17	合闸电磁铁功率 (W)/ 动作电流（A）	120/0.55
18	脱扣器功率（W）/ 动作电流（A）	120/0.55
19	控制电压及信号引出方式	插头 / 插座或接线端子排
20	机械寿命（次）	10000，30000

9.4 ZN63C-12(VBI-12) 系列真空断路器主要技术参数

9.4 ZN63C-12 (VBI-12) series vacuum breaker' main technology parameter

表 4

序号	项 目			技术参数	
1	额定电压 (kV)			7.2	12
2	绝缘水平	1min工频耐受电压(有效值kV)	对地及相间、一次断口间	32	42
		雷电冲击耐受电压(峰值kV)	对地及相间、一次断口间	60	75
3	额定频率(Hz)			50	
4	额定电流 (A)			630，1250，1600，2000，2500，3150	
5	额定短路开断电流 (kA)/ 开断次数（次）			25/50，31.5/50(75)，40/30	
6	额定短路关合电流（kA）			63，80，100，130	
7	动稳定电流（kA）			63，80，100，130	
8	热稳定电流（kA）/ 持续时间（s）			25/4，31.5/4，40/4	
9	额定操作顺序（40kA 及以上）			分-0.3s(180s)-合分-180s-合分	
10	开断电容器组的额定值（A）			630	
11	合闸时间（ms）			≤ 75	
12	分闸时间（ms）			≤ 50	
13	燃弧时间（ms）			<15	
14	储能电动机功率 (W)			75	
15	(弹簧) 储能时间 (s)			≤ 10	
16	电动机的额定电压 (V)			交、直流：110、220	
17	合闸电磁铁功率 (W)/ 动作电流（A）			367.4/1.67	
18	脱扣器功率（W）/ 动作电流（A）			367.4/1.67	
19	控制电压及信号引出方式			插头 / 插座或接线端子排	
20	机械寿命（次）			10000	

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9.5 3TL61、3TL65 型真空接触器主要技术参数
9.5 3TL61, 3TL65 type vacuum contactor's main technology parameter

表 5

序号	项 目			技术参数	
				3TL61	3TL65
1	额定电压(kV)			7.2	12
2	绝缘水平	Imin工频耐受电压(有效值kV)	对地、相间断口	20	28
				雷电冲击耐受电压(峰值 kV)	对地、相间
		断口	40		60
3	额定频率频率(Hz)			50/60	
4	额定电流(A); +55℃/+80℃			450/315	
5	额定短路开断电流(A)			3600	
6	额定短路关合电流(A)			4500	
7	额定热稳定电流(kA)/持续时间(s)			8/1	
8	额定电容器电流(A)			250	
9	最大关合电容器电流(峰值 kA)			10	
10	操作频率(次/h)			1200	600
11	机械寿命(次)			2×10 ⁶	1×10 ⁶
12	电气寿命(次)			1×10 ⁶	0.5×10 ⁶
13	线圈合闸功率(W)/保持功率(W)			650/90	
14	操作电压范围			0.8–1.1Uc	
15	合闸时间(ms/Uc)			100/0.85; 80/1.0; 60/1.1	
16	分闸时间(ms/Uc)			30/0.8; 50/1.0; 50/1.1	

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9.6 JCZ5 系列真空接触器主要技术参数
9.6 JCZ5 series vacuum contactor's main technology parameter

表 6

序号	项 目		技术参数		
			JCZ5-3.6	JCZ5-7.2	JCZ5-12
1	额定电压 (kV)		3.6	7.2	12
2	额定电流 (A)		250	400	400
3	额定关合电流 (A)		2500	4000	4000
4	最大额定开断电流 (A)		2000	3200	3200
5	绝缘水平	Imin 工频耐受电压 (有效值 kV)	23	32	42
		雷电冲击耐受电压 (峰值 kV)	40	60	75
6	额定短路开断电流 (kA)		4	4	4
7	额定短路关合电流 (峰值 kA)		10	10	10
8	4s 热稳定电流 (kA)		4	4	4
9	额定峰值耐受电流 (kA)		10	10	10
10	额定操作电压 (V)		110/220	110/220	110/220
11	额定操作频率 (次 /h)		300	300	300
12	机械寿命 (次)		30 × 10 ⁴	30 × 10 ⁴	30 × 10 ⁴
13	电寿命 (次)	AC-3	25 × 10 ⁴	25 × 10 ⁴	25 × 10 ⁴
		AC-4	10 × 10 ⁴	10 × 10 ⁴	10 × 10 ⁴
14	触头开距 (mm)		3.5 ± 0.5	4 ⁺¹ _{-0.5}	6 ⁺¹ _{-0.5}
15	超程 (mm)		1.5 ± 0.5	1.5 ± 0.5	1.5 ± 0.01
16	触头合闸弹跳时间 (ms)		≤5	≤5	≤5
17	平均合闸速度 (m/s)		01.5 ± 0.05	01.5 ± 0.05	0.2 ± 0.1
18	平均分闸速度 (m/s)		0.35 ± 0.05	0.45 ± 0.15	0.45 ± 0.15
19	合闸时间 (ms)		≤100	≤150	≤150
20	固有分闸时间 (ms)		≤50	≤50	≤50
21	外形尺寸 (mm)		355 × 353 × 190	400 × 240 × 400	502 × 300 × 450

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9.7 高压限流熔断器主要技术参数
9.7 The high voltage current-limiting fuse' s main technology parameter
9.7.1 电动机保护用高压限流熔断器主要技术参数
9.7.1The protection of electromotor high voltage current-limiting fuse' s main technology parameter 表 7

型 号	额定电压(kV)	熔断器额定电流(A)	熔体额定电流(A)
XRNM1-3(WDFHO)	3.6	125	50, 63, 80, 100, 125
XRNM1-3(WFFHO)	3.6	200	125, 160, 200
XRNM1-3(WKFHO)	3.6	400	250, 315, 355, 400
XRNM1-6(WFNFHO)	7.2	160	25, 31.5, 40, 50, 63, 80, 100, 125,160
XRNM1-6(WKNHO)	7.2	355	200, 224, 250, 315, 355

9.7.2 变压器保护用高压限流熔断器主要技术参数
9.7.2 The protection of transformer high voltage current-limiting fuse main technology parameter 表 8

型 号	额定电压(kV)	熔断器额定电流(A)	熔体额定电流(A)
XRNT1-10(BDGHC)	12	50	6.3, 10, 16, 20, 22.4, 25, 31.5, 35.5, 40,
XRNT1-10(BFGHD)	12	100	45, 50
XRNT1-10(AKGHD)	12	125	50, 63, 71, 80, 90, 100, 112, 125

9.8 电流互感器主要技术参数
9.8 The current mutual inductor main technology parameter
a、额定绝缘水平：12/42/75kV
a. rated insulation level: 12/42/75kV
b、负荷的功率因数：COS ϕ =0.8(滞后)
b. load power factor: COS ϕ =0.8 (delay)
c、额定二次电流：5A 或 1A
c. rated secondary current: 5A or 1A

9.8.1 LZBJ9-10/150b/2、LZBJ18-10/150b/2 型准确级次组合及相应的二次输出
9.8.1 LZBJ9-10/150b/2, LZBJ18-10/150b/2 type exact degree combination and correspond secondary output 表 9

准确级次组合	20-500A				600-2500A			
	0.2	0.5	10P10	10P15	0.2	0.5	10P10	10P15
0.2/0.2;10P10/10P10 0.2/0.2;10P15/10P15	10	15	10		15	15	15	10
0.2/10P10;0.2/10P15 0.5/10P10;0.5/10P15	10	15	15	15	10	15	20	15
0.2/0.2/0.2;0.2/0.5/0.5 0.5/0.5/0.5;10P10/10P15	10	15	10	10	15	15	15	15
0.2/0.5/10P10 0.2/0.5/10P15	10	15	15		10	15	15	10

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9.8.2 LZZBJ9-10/150、LZZBJ18-10/150 型动热稳定电流

9.8.2 LZZBJ9-10/150、LZZBJ18-10/150 type dynamic heat endurance current

表 10

额定一次电流 A	Is 热稳定电流 (kA)	动稳定电流 (kA)	准确级组合 (1K/2K)	额定二次输出				
				0.2s	0.5s	0.2级	0.5级	10P级
5	2	5	0.2/10P 0.2S/10P 0.5/10P 0.5S/10P	10	10	10	10	15
10	4.5	11						
15	6.3	15						
20	9.5	23						
30	12.6	31.5						
40	18	45						
50	22	55						
75	36	80						
100-200	50	90						
300-600	72	100						
800-1250	80	110						
1500-3150	100	130						

9.8.3 LZZBJ9-10/185h/2、LZZBJ18-10/185/2 型准确级次组合及相应的二次输出

9.8.3 LZZBJ9-10/185h/2、LZZBJ18-10/185h/2 type exact degree combination and correspond secondary output

表 11

准确级次组合 额定二次输出	20-500A				600-2500A			
	0.2	0.5	10P10	10P15	0.2	0.5	10P10	10P15
0.2/0.2;10P10/10P10 0.2/0.5;10P15/10P15	15	20	15		15	20	20	15
0.2/10P10;0.2/10P15 0.5/10P10;0.5/10P15	10	15	20	15	15	20	30	20
0.2/0.2/0.2;0.2/0.5/0.5 0.5/0.5/0.5;10P10/10P15	10	15	15	10	15	15	20	15
0.2/0.5/10P10 0.2/0.5/10P15	10	15	15		10	15	20	15

9.8.4 LZZBJ9-10/185、LZZBJ18-10/185 型动热稳定电流

9.8.4 LZZBJ9-10/185、LZZBJ18-10/185 type dynamic heat endurance current

表 12

额定一次电流 A	10-40	50-100	150-300	400-500	600-1000	1200-1600	2000-3150
Is 热稳定电流 (kA)	200I _n	250I _n	45	100	140	170	240
动稳定电流 (kA)	500I _n	625I _n	100	250	350	425	600

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9.9 电压互感器主要技术参数
9.9 Voltage mutual inductor main technology parameter
9.9.1 JDZ8-10、JDZ18-10 系列电压互感器主要技术参数
9.9.1 KDZ8-10.KDZ18-10 series voltage mutual inductor main technology parameter

表 13

额定电压比 (V/V)	额定输出 (VA)				极限输出 (VA)	额定绝缘水平 (kV)	表面爬电距离 (mm)
	0.2 极	0.5 极	1 极	3 极			
6000/100	15	30	60	150	200	7.2/32/60	210
10000/100						12/42/75	

9.9.2 JDZX8-10、JDZX18-10 系列电压互感器主要技术参数
9.9.2 JDZX8-10、JDZX18-10 series voltage mutual inductor main technology parameter

表 14

额定电压比 (V/V)	额定输出 (VA)				极限输出 (VA)	额定绝缘水平 (kV)	表面爬电距离 (mm)
	0.2 极	0.5 极	1 极	3 极			
$\frac{6000}{\sqrt{3}} / \frac{100}{\sqrt{3}} / \frac{100}{\sqrt{3}}$	15	30	60	150	200	7.2/32/60	260
$\frac{10000}{\sqrt{3}} / \frac{100}{\sqrt{3}} / \frac{100}{\sqrt{3}}$						12/42/75	

9.10 JN16-10 户内高压接地开关主要技术参数
9.10 JN16-10 high voltage earthing indoor switch main technology parameter

表 15

序号	项 目		技术参数	
1	额定电压 (kV)		12	
2	额定热稳定电流 (kA)/ 持续时间 (s)		31.5/4	
3	额定短路关合电流 (kA)		65/80	
4	额定动稳定电流 (kA)		80	
5	极间中心距 (mm)		150;210;275	
6	额定绝缘水平	Imin 工频耐受电压 (有效值 kV)	极间及极对地	42
		雷电冲击耐受电压 (峰值 kV)		75

9.11ZR 型 LG 型阻容吸收器主要技术参数
9.11 ZR type LG type resistance-capacitance absorber main technology parameter
9.11.1 ZR 型阻容吸收器主要技术参数
9.11.1 ZR type resistance-capacitance absorber main technology parameter

表 16

型号	额定电压	额定电阻	电容 (μ F)	耐受电压 (kV-10s)	
				AC : 2.15Un	DC:4.3Un
ZRI-6-100/0.1	7.2	100	0.1	AC: 12.9;DC:25.8	
ZRI-10-100/0.1	12	100	0.1	AC:21.5;DC:43	

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9.11.2 LG 型阻容吸收器主要技术参数
9.11.2 LG type resistance-capacitance absorber main technology parameter 表 17

额定电压(kV)	额定电容 (μ F)	额定电阻 (Ω)	工频电介质试验电压 (kV lmin)	备注
3.6	0.05(0.1)	100	11	
7.2	0.05 (0.1)	100	22	
12	0.05 (0.1)	100	36	
	0.05 (0.1)	100	42	Q 型 (加强型)

- 使用须知：
- (1) 阻容吸收器应连接在真空断路器或真空接触器与电动机或变压器之间。
- (2) 阻容吸收器保护信范围：保护电动机容量为 100-10000W，保护应压器容量为 100-31500KVA。
- (3) 阻容吸收器退出运行时应对阻容吸收器放电。

Using notice:

(1). Resistance-capacitance absorber should be connected between the vacuum breaker or vacuum contactor, and electromotor or transformer.

(2). Resistance-capacitance absorber protection range: the capability of protection electromotor is 100-10000W, the capability of protection transformer is 100-31500KVA.

(3). When the resistance-capacitance absorber is out of work, it should be released electricity to the resistance-capacitance absorber.

9.12 L XK- φ 120 型零序电流互感器配用继电器主要技术参数
说明：电缆出线柜可根据用户需要配零序电流互感器。一般配用LXK- φ 120型零序电流互感器(最大穿过电缆直径 φ 120mm)。
9.12 L XK-F120 type zero sequence current mutual inductor assorting relay main technology parameter
notice: the cable room is assorted with zero sequence current mutual inductor according to the user need. In general, it is assorting with LXK-F120 type zero sequence current mutual inductor (maximal diameter of cable is 120mm.) 表 18

继电器型号	继电器线圈连接方式	继电器刻度值	一次零序电流值 (A)
DD-11/60	串联	15 × 1	2.4-4.5
		30 × 1	
	并联	15 × 1	3-5
		30 × 1	
DD-1/60	串联	15 × 1	3-5
		30 × 1	
	并联	15 × 1	3-6
		30 × 1	

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9.13 HY5WS1 型复合绝缘氧化锌避雷主要技术参数

9.13 HY5WS1 type complicated insulation zinc oxide lightning protector main technology parameter 表 19

产品型号	额定电压 (kV)	持续运行 电压 (kV)	直流 1mA 参考电压(kV)	8/20us 标称 电流下残压(kV)	2ms 方波通流 容量 (kA)	4/10us 冲击 电流容量 (kA)
HY5WS1-7.6/30	7.6	4.0	≥ 15.0	≤ 30	100	65
HY5WS1-12.7/50	12.7	6.6	≥ 25.0	≤ 50	100	65
HY5WZ1-7.6/27	7.6	4.0	≥ 14.5	≤ 27	150	65
HY5WZ1-12.7/45	12.7	6.6	≥ 24.0	≤ 45	150	65
HY5WR1-7.6/27	7.6	4.0	≥ 13.8	≤ 27	400	65
HY5WR1-12.7/45	12.7	6.6	≥ 23.0	≤ 45	400	65
HY2.5WD1-7.6-19	7.6	4.0	≥ 11.3	≤ 19	200	40
HY2.5WD1-12.7/31	12.7	6.6	≥ 18.9	≤ 31	200	40
HY5WS1-10/30	10	8.0	≥ 15.0	≤ 30	100	65
HY5WS1-17/50	17	13.6	≥ 25.0	≤ 50	100	65
HY5WZ1-10/27	10	8.0	≥ 14.5	≤ 27	150	65
HY5WZ1-17/45	17	13.6	≥ 24.0	≤ 45	150	65
HY5WR1-10/27	10	8.0	≥ 14.4	≤ 27	400	65
HY5WR1-17-45	17	13.6	≥ 24.0	≤ 45	400	65
HY5WS1-16.5/50	16.5	12.7	≥ 25.0	≤ 50	150	65
HY5WZ1-16.5/45	16.5	12.7	≥ 24.0	≤ 45	400	65
HY5WS1-3.8/17	3.8	2.0	≥ 7.5	≤ 17		65
HY5WZ1-3.8/13.5	3.8	2.0	≥ 7.2	≤ 13.5		65
HY5WR1-5/13.5	5	4.0	≥ 7.2	≤ 13.5		65

开关柜及母线的安装

10.1 开关柜安装

10.1.1 开关柜运至现场，断路器手车应单独存放。

10.1.2 用吊车或铲车将开关柜运至安装位置，在柜与柜之间保持 0.5m 距离，以便于移动开关柜。较长的开关柜排列，拼柜工作应从中间部位开始。

10.1.3 在基础上一个接一个安装开关柜，包括水平和垂直两方向。

10.1.4 当开关柜已完全组合（拼接）好时，可用地脚螺钉将其与基础构架相联或用电焊与基础构架焊牢。

10.2 母线的安装

10.2.1 用清洁干燥软布擦揩母线，检查绝缘套管有无损伤，在连接部位上涂导电膏或中性凡士林。

10.2.2 安装好主母线后，将主母线和对应的分支母线接在一起，用内六角螺栓拧紧。

10.2.3 套好连接处需要的绝缘套。

10.2.4 在母线端部，螺栓接头外侧插入需要的绝缘盒。

10.2.5 盖好母线终端帽。

10.3 连接高压接线

为了方便在电缆室内作业，应先取下柜后的封板，所有工作完成后需重新封好。有关的注意事项由各电缆终端头制造厂提供。

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10.4 开关柜的接地
至少将整个排列中的一台接地端接到变电站的接地系统上。

The switch cabinet and busbar fixed

- 10.1 the switch cabinet fixed
 - 10.1.1 The switch cabinet is taken to the place, breaker handlebar should be deposited alone.
 - 10.1.2 The switch cabinet is taken to the fixing place by the forklift or crane, it should keep 0.5m distance between the cabinet, so that it can be convenient to move the cabinet. Fixing the cabinet should begin at the middle of part if the switch cabinet is long enough.
 - 10.1.3 At this base, fix the cabinet one by one, including level and vertical direction.
 - 10.1.4 When the switch cabinet has already been fixed, it can be connected with groundwork by foundation, or using solder to be connected with groundwork.
- 10.2 the busbars fixed
 - 10.2.1 Using clean and dry fabric to wipe the busbar, and to check the insulation sleeve situation, spread cream of electric conduction or vaseline at the joint.
 - 10.2.2 After fixing main busbar, connect the main busbar with the branch busbar by bolts screwing.
 - 10.2.3 Cover the insulation sleeve at the joint.
 - 10.2.4 At the bottom of the busbar, insert the insulation box out of the busbar
 - 10.2.5 Cover the cap of the busbar.
- 10.3 connecting high voltage wire
To be convenient to work in the cable room, it should take off the board behind cabinet at first, and recover it after all the work is end. Concerned notice is provided by each cable manufacturer.
- 10.4 earthing of the switch cabinet
At least take an earthing setting of all arraying setting to earthing system of transformer substation.

订货须知

- 用户订货时应提供下列资料:
- 11.1 主接线方案及单线系统图、设备型号 (容量)、排列图及平面布置图。
 - 11.2 二次回路功能图, 端子排列图 (如用户未提供要求, 制造厂按标准提供)。
 - 11.3 开关柜内的主要电器元件的型号民、规格等。
 - 11.4 电气设备汇总表。
 - 11.5 需要母线桥 (两列柜间母线桥和墙柜间母线桥) 时, 需提代跨距和高度尺寸。
 - 11.6 开关柜使用在特殊环境条件时应在订货时提出。
 - 11.7 需要其它或超出附件、备件时应提出种类和数量。

Order notice

- User makes an order to provide these message:
- 11.1 Main wiring diagram and single-lined system, setting model (capability), array map and floor plan
 - 11.2 Secondary loop function map, binding post array map (if the user does not provide demand, manufacturer will provide it by standard)
 - 11.3 The main electric component model, spec, etc. in the switch cabinet
 - 11.4 Electricity setting collect table
 - 11.5 If it requires busbar bridge (between two cabinets and between the cabinet and wall), user should provide the span and dimension of highness.
 - 11.6 It should be put forward when the switch cabinet is used in special environment condition.
 - 11.7 User should put forward to type and quantity when it demands others either overtakes accessory and spare part.

KYN58-40.5

Metal-clad withdrawable switchgear



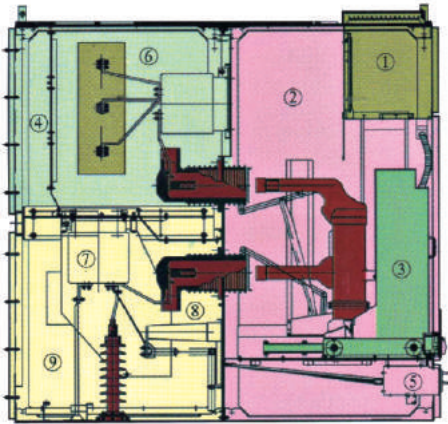
概述

KYN□-40.5是人民电器(集团)有限公司引进国外技术开发的新概念开关柜，符合GB、IEC、DIN等标准，适用于不同类型的变电站、发电厂、工矿企业及高层建筑等场所。特别适合频繁操作。

General

KYN58-40.5 Shang Hai TENGGEN M&E(Group)Co.,Ltd. On the basis of imported technology. It complies with the standards of GB,IEC and DIN. It is suitable for differentkinds of substation, powerplantand highbuilding etc.The switchgear has particular advantage for use in place where there is a high switching frequency in the working current range and or where a certain number of short-circuit breaking operations are expected.

型号含义



- ①—仪表室 Instrument compartment
- ②—开关室 CB compartment
- ③—主开关 Main switch
- ④—泄压通道 Pressure relief passage
- ⑤—接地操作机构 Earthing mechanism
- ⑥—母线室 Busbar compartment
- ⑦— CT CT
- ⑧—接地开关 Earthing switch
- ⑨—电缆室 Cable compartment

KYN58-40.5

金属铠装移开式
开关设备

工作环境条件

- 1、环境温度：-25℃ ~ +40
 - 2、海拔高度：不高于 1000m
 - 3、相对湿度：不大于90%(+25℃)
 - 4、地震烈度：不超过 8 度
 - 5、无火灾、爆炸危险、严重污秽、化学腐蚀及剧烈震动的场所。
- 注：当实际使用环境条件与上述条件不同时，用户可与我厂协商。

Environmental conditions

- 1.Ambient temperature :-25℃~+40℃
 - 2.Altitude: ≤ 1000m
 - 3.Relative humidity: ≤ 90%(+25℃)
 - 4.Earthquake intensity: ≤ 8 degree
 - 5.Away from the places of fire、explosion、dirt、chemical corrosives and strong vibration.
- NOTE: Please contact with us when the actual environmental conditions are different from the above conditions.

KYN口-40.5开关柜的主要特点

操作面板 Operating plate

- 1、友好的人机界面使开关柜操作程序化、公式化，操作者一目了然。
- The intelligent interface makes the operation more programmable and clear so that it is very convenient for operator to know every conditions of the equipment.

推进机构 Propelling mechanism

- 2、设计独特的推进机构使手车在推进推出过程中能自动找位，一次隔离触头接触更可靠。
- Unique propelling mechanism:
The truck is capable of finding its position automatically while pulling out or pushing in. The connection of the primary disconnecting contacts is more reliable.

工具手车 Auxiliary movable truck

- 3、上、下升降，宽度可调的工具手车，可以轻松将不同类型手车放到地面或工作平台检修。工具手车与开关柜设有可靠闭锁：工具手车未与柜体可靠接合，不能将手车推入柜内或将手车由柜内拉出。
- The auxiliary movable truck can be moved up and down, and the width of it can be adjusted so that it is easy to put the different kinds of CB truck on ground or platform for maintenance. There is reliable interlock between the auxiliary movable truck and the switchgear. If the auxiliary movable truck is not connected with the cubicle reliably, it is unable to pull out or propel in the CB truck.

- 4、CT 安装由柜后立装改为吊装，增大了电缆室空间、电缆联接高度大于 800mm，使维护简单，电缆安装方便。
- The space of cable compartment is larger than before since the CT now is suspended in the cubicle. The connection height of cable is more than 800mm so that it is very convenient to install the cable.

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Metal-clad withdrawable switchgear

二次联锁 Secondary interlock

5、二次插头闭锁完全

- a. 不插上二次插头，断路器室门不能关闭，不能将断路器移到工作位置。
- b. 工作位置二次插头不能拔下。
- c. 断开位置，二次插头不拔下，断路器不能移开。

Entire interlock of secondary plug

- a. The door of CB compartment can't be closed and the CB can't be moved to "Service" position if the secondary plug is not inserted.
- b. If it is in "Service" position, the secondary plug can not be pulled out.
- c. If the truck is in "Disconnected" position, the secondary plug isn't be pulled out and the CB can't be drawn out.

接地联锁模块 Earthing interlock block

6、接地联锁简单可靠

- a. 手车处于工作位置，接地开关操作选择旋钮被锁定，接地开关不能合上。
- b. 接地开关合闸，手车推进推出操作孔被遮挡，手车不能移动。
- c. 接地开关未合上，不能打开进入电缆室的后门检修电缆。

Simple and reliable earthing interlock

- a. When the truck is in "Service" position, the select button of earthing switch is locked and the earthing switch can't be closed.
- b. When the earthing switch is closed, the operating hole of truck is covered and the truck can not be moved.
- c. If the earthing switch is not closed, the back door can not be opened for maintaining the cable.

7、组合式活门开启灵活，随着断路器的拉出，活门自动关闭并强制闭锁，杜绝了误碰高压电的危险。

Flexible shutter:

The shutter will be automatically closed and locked mandatorily when the CB is drawn out so as to prevent contacting high voltage by mistake.

8、四销锁门结构解除了往常关门、开门操作繁琐的烦恼，无论何种状态，坚固可靠的门都能有效禁受内部故障电弧的冲击。

It is very convenient for operator to close and open the door with the special locking device. In any circumstances, it can withstand the impact caused by the arc of internal fault.

9、断路器室门与断路器有可靠的联锁，只有断路器室门关上，才能操作断路器，有效防止了关合故障电流时电弧冲出对人的伤害。

There is reliable interlock between the CB and the door. The CB can be operated only when the door of CB compartment is closed. It can effectively prevent doing harm to operator caused by arc while making fault current.

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金属铠装移开式
开关设备

10、坚固的柜体，有效的压力释放通道能禁受内部故障电弧冲击和灼烧，有效保障操作者人身安全。
Because of the tight cubicle. the efficient pressure relief passage can withstand the impact and fire caused by the arc of internal fault so as to assure the safety of operator.

11、合理的电场分布和绝缘结构设计，使开关柜绝缘可靠，满足全工况要求（该柜通过了凝露，污秽试验）。
It has the advantages of reasonable arrangement of electric field and insulating construction. This kind of design makes the switchgear more reliable and satisfying all kinds of requirements. (It has passed the artificial pollution and condensation tests).

主要技术参数 Specifications

表1 KYN 40.5 开关柜主要技术参数

项目 Item	单位 Unit	数值 Data	
		配 ZN48A/B-40.5 开关	配 SF1/SF2 开关
额定电压 Rated voltage	kV	40.5	
额定电流 Rated current	A	630,1250,1600,2000,2500	630, 1250,2500
额定频率 Rated frequency	Hz	50	50
额定短路开断电流 Rated short-circuit breaking current	kA	20,25,31.5	25,31.5,40
额定短路关合电流 Rated short-time withstand current	kA	50,63,80	63,80,100
额定短时耐受电流 Rated short-time withstand current	kA/s	20,25,31.5/4s	25,31.5,40/3s
额定峰值耐受电流 Rated peak withstand current	kA	50,63,80	63,80,100
4min 工频耐受电压 4min power frequency withstand voltage	kV	95	70(95)
雷电冲击耐受电压 Lightning impulse withstand voltage	kV	185	170(185)
防护等级 Degree of protection	IP4X		

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Metal-clad withdrawable switchgear

表2 ZN48A/B 及六氟化硫断路器主要技术参数

项目 Item		数值 Data	
		ZN48A/B-40.5	SF6
额定电压 (kV) Rated voltage		40.5	
额定频率 (Hz) Rated frequency		50	
额定绝缘水平 Rated insulation level	1min 工频耐受电压 (kV) 1min power frequency withstand voltage	95	75(95)
	雷击冲击耐受电压 (kV) Lightning impulse withstand voltage	185	170(185)
额定电流 (A) Rated current		630, 1250, 1600, 2000, 2500	630, 1250, 2500
额定短路开断电流 (kA) Rated short-circuit breaking current		20, 25, 31.5	25, 31.5, 40
额定短路关合电流 (kA) Rated short-time withstand current		50, 63, 80	63, 80, 100
额定短时耐受电流 (kA/s) Rated short-time withstand current		20, 25, 31.5/4s	25, 31.5, 40/3s
额定峰值耐受电流 (kA) Rated peak withstand current		50, 63, 80	63, 80, 100
额定短路电流开断次数 Rated short circuit current breaking times		20	20
机 械寿命 (次) Mechanical life		10000	10000

表3 电流互感器主要技术参数

型号 Type	额定电压 Rated voltage(kV)	额定一次电流 Rated primary current(A)	额定二次电流 Rated secondary current(A)	准确级次 Accuracy level	额定负荷 Rated load
LCZ-35Q	40.5	20-1560	5	0.2/0.5/10P	10-50
LZZQB8-35	40.5	20-3150	5	0.2/0.5/10P	15-25

表4 电压互感器主要技术参数

型号 Type	额定电压 Rated voltage(kV)	准确级次及容量 Accuracy leveland capacity	额定负荷 Rated load
JDZX ₈ -35	35/ $\sqrt{3}$, 0.1/ $\sqrt{3}$, 0.1/3	0.2/45, 0.5/100, 1/200	600
JDZJX ₈ -35	35/0.1	0.2/45, 0.5/100, 1/200	600

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表5 接地开关主要技术参数

型号 Type	额定电压 Rated voltage(kV)	4s 热稳定电流 4s short-time withstand current (kA)	动稳定电流 (峰值) Peak withstand current(kA)	关合速度 Making speed(m/s)	主回路接触电阻 Resistance of main circuit (μ Ω)
JN-35/31.5	35	31.5	80	≥ 6	<120

表6 避雷器主要技术参数

型号 Type	系统额定 电压 System rated voltage(kV)	MOA额定 电压 (kV) Ratedvoltage of arrester	MOA 持续运 行电压 (kV) Continuous voltage of MOA	最大陡波 残压 kV MAX.Steep wave residual voltage	最大雷电 残压 kV MAX. Lightning residual voltage	最大操作 残压 kV MAX. Operating residual voltage	2ms 方波 容量 A 2ms square wave impulse withstand current	直流 1mA 参考电压 Reference(kV) voltage 1mA DC
HY5WZ-M34	35	51	40.8		134		400	73

开关柜一次单线图 Switchgear's Primary Circuit

- 1、本表所列一次方案均为基本方案，接地开关、避雷器、带电显示器等元件可根据用户设计要求增减。

2、本表所列一次方案适合于40.5KV系统。

3、开关柜之间的联锁方式由用户自定。

4、用户订货图纸中如不画出接地开关、避雷器、带电显示器等元件，则开关柜中不予装设。
- 1.The main circuit connection plan is the basic main circuit scheme,various apparatusese numerated in scheme are for reference only. According to the equipment of clients,Earthing switch, Attester、Charged display and other apparatuses might be chosen.

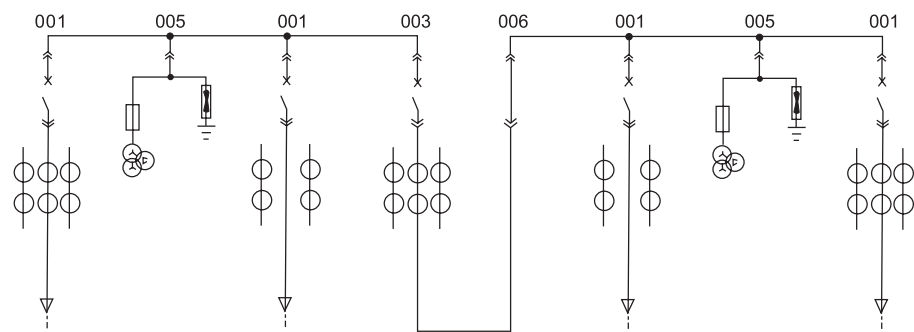
2.The maincircuit connection planis suitablefor the 40.5kV system.

3.Clients can choose the interlock versions between the switchgears.

4.If the Earthing switch、Arrester、Charged display and other apparatuses shouldn't be given in order paper,they wouldn't be installed into t he switchgears.

方案组合示例

双电源、单母线方段方案



KYN58-40.5

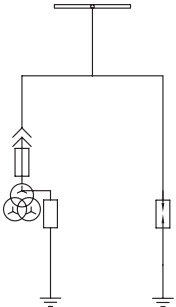
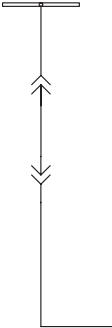
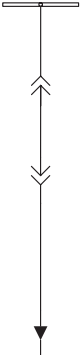

Metal-clad withdrawable switchgear

KYN□-40.5开关柜一次单线图

方案编号	001	002	003	004
主 接 线 方 案				
额定电流 (A)	630~1600	630~2500	630~2500	
主 要 设 备	主开关 ZN85-40.5	1	1	
电 流 互 感 器	2(3)	2(3)	2(3)	
电 压 互 感 器				2
高 压 熔 断 器				3
接 地 开 关	1	1		
避 雷 器	3			3
带 电 显 示 装 置	1	1		
用 途	电 缆 进 出 线	架 空 进 出 线	母 线 联 络	电 压 测 量 PT

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方案编号	005	006	007	008
主 接 线 方 案				
额定电流（A）		630~2500	630~2500	630~2500
主开关				
ZN85-40.5				
主 要 设 备	电 流 互 感 器			
	电压互感器	3		
	高压熔断器	3		
	接地开关			
	避雷器	3		
带电显示装置				
用途	电压测量 PT	隔离及引线柜	隔离及引线柜	引线柜

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方案编号	009	010	011	012
主 接 线 方 案				
额定电流 (A)	630		630~2500	630~2500
主开关 ZN85-40.5	隔离开关 1 台	变压器1台(80KVA)	1	1
主 要 设 备	电 流 互 感 器		4(6)	4(6)
	电 压 互 感 器	2(3)		
	高 压 熔 断 器	3		
	接 地 开 关			
	避 雷 器	3		
	带电显示装置			
用途	接地及 PT 柜	所用变	架空进出线	母线联络

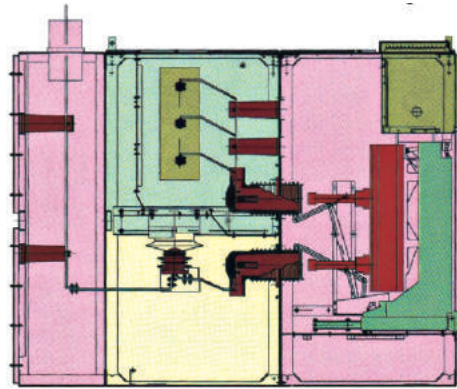
KYN58-40.5
金属铠装移开式
开关设备

方案编号	013	014	015
主 接 线 方 案			
额定电流 (A)	630~2500	630~2500	630~2500
主开关 ZN85-40.5	1	1	1
主 电 流 互 感 器	4(6)	4(6)	4(6)
要 电 压 互 感 器			
设 高 压 熔 断 器			
备 接 地 开 关	1		1
避 雷 器	3		3
带 电 显 示 装 置	1	1	1
用 途	电 缆 进 出 线	架 空 进 出 线	电 缆 进 出 线

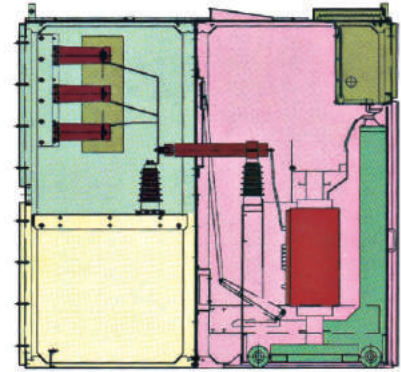
KYN58-40.5

Metal-clad withdrawable switchgear

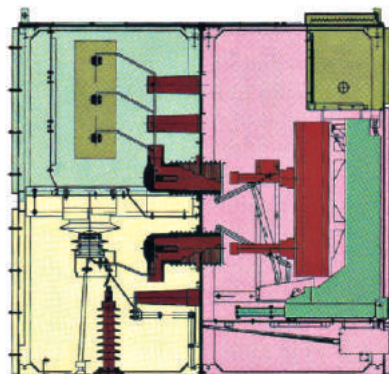
开关柜结构示意图 Switchgear Structure Layout



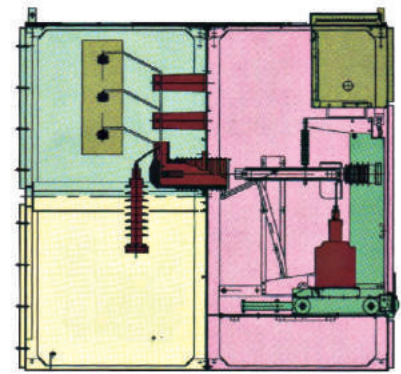
架空进出线柜 Overhead line incoming cubicle



变压器柜 Transformer cubicle



电缆进出线柜 Cable incoming cubicle



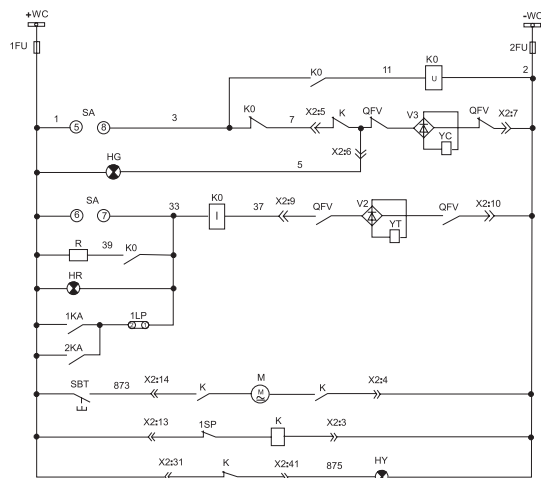
PT 柜 PT Cubicle

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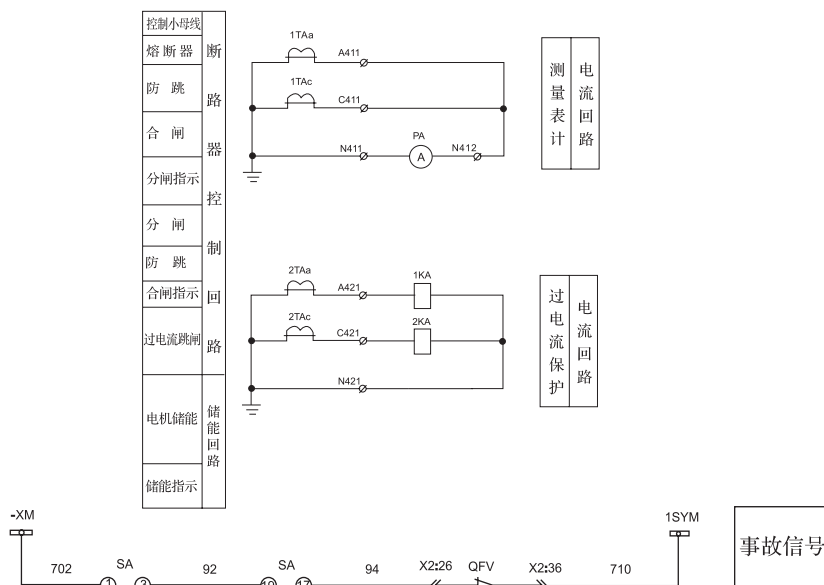
金属铠装移开式开关设备

典型二次回路控制图 The secondary circuit diagram

馈线二次方案 A Scheme A



馈线二次方案 B Scheme B



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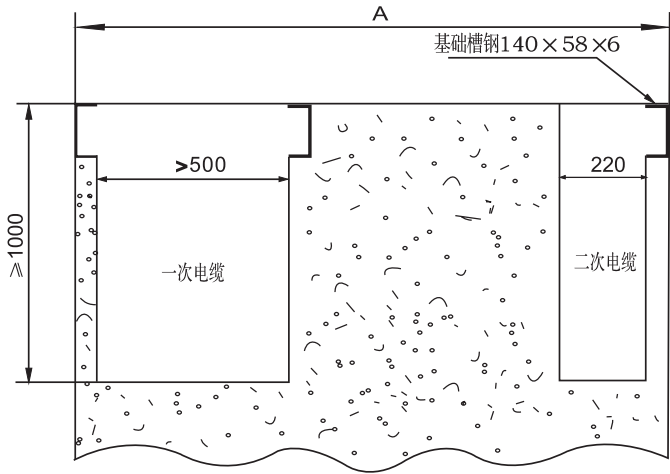
注：二次插头内为断路器内部设备

ILP	连接片	YY1-D	SA	红、绿按钮	LW2-Z-la,4,6a,40,20/F8
KO	防跳继电器	DZB-115 DC220W IA	HG.HR.HY	绿、红、黄信号灯	AD11-25/21-5G DC220V
R	电阻	ZG11-25W IΩ	1~2KA	过流继电器	GL-11/10A
1FU-2FU	熔断器	R1-10/6A	PA	电流表	42L6-A × /5A
SBT	旋钮开关	PBC22-DB11			

外形尺寸 Overall dimensions

内容 型号 尺寸	额定电流 ≥ 2000A Rated current 开断电流 ≥ 40kA Breaking current	额定电流 <2000A Rated current 开断电流 <40kA Breaking current	架空进线 Overhead line incoming	所用变 Substation transformer
	宽 Wide(mm)x 深 Deep(mm) 高 Highness(mm)			
KYN□-40.5kV	1200 x2600x2500 1400	1200 x2600x2500 1400	1200 x3250x2500 1400	1500x2600x2500

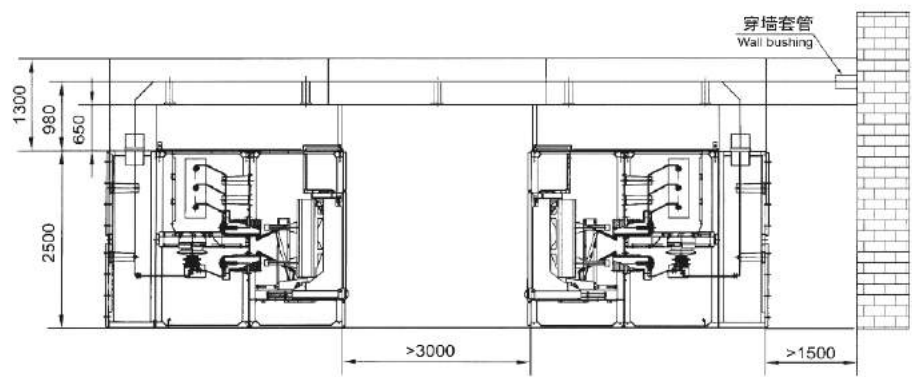
开关柜安装基础 Installing Basis of Switchgear



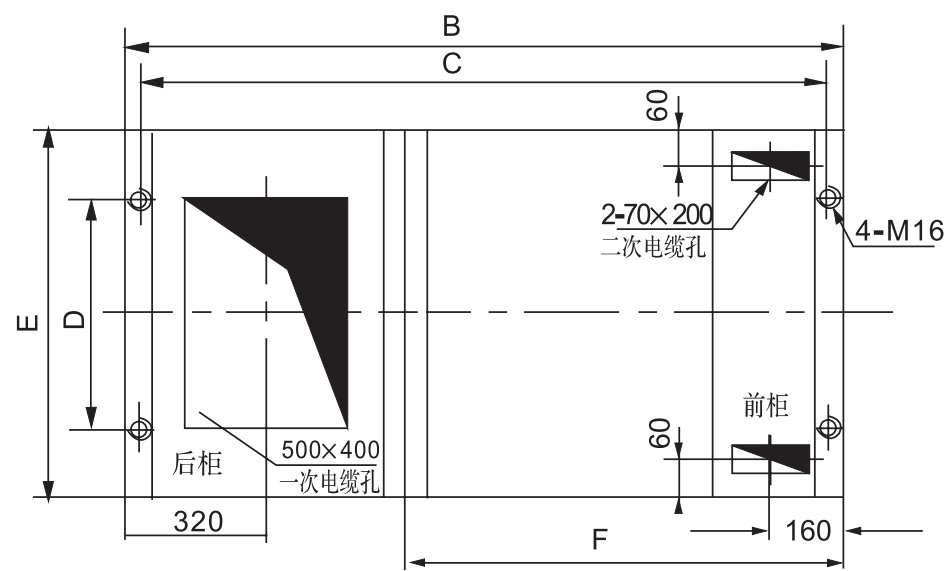
- 注：1. 二次浇灌的基础槽钢可以反扣。
2. 开关柜固定在槽钢上允许焊接。

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金属铠装移开式
开关设备

40.5kV 开关柜母线桥布置示意图
Busbar Bridge Layout of 40.5kV Switchgear



开关柜底框开孔图 Opening Drawing of Switchgear Base Plate



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Metal-clad withdrawable switchgear

外形尺寸 Overall dimensions

产品型号 \ 尺寸	A	B	C	D	E	F
KYN□-40.5kV	2600	2600	2550	800	1200	1300
				所用变 Substation transformer	所用变 Substation transformer	所用变 Substation transformer
				1000	1500	1400

KYN61-40.5

型铠装移开式交流金属封闭
开关设备



概述

KYN61-40.5 铠装移开式交流金属封闭开关设备 (以下简称开关柜) 适用于三相交流 50Hz、40.5kV 单母线及单母线分段电力系统, 主要应用于发电厂、变电所及工矿企业、高层建筑的变配电中作为接受和分配电能之用, 并对电路实行控制、保护和监测, 满足 IEC60298、GB3906、DL404 等标准的要求, 并具备完善的“五防”功能。

Brief Introduction

KYN61-40.5 Armoured movable AC metal enclosed switchgear (hereinafter referred to as switch cabinet) is applicable to 3-phase AC 50Hz and 40.5kV single bus and single-bus staged power system. It is mainly used as the reception and distribution of electrical energy transformation and distribution in the power transformation and distribution power plant, substation and industrial and mining establishment as well as high-rise. It controls and protects as well as monitors the circuit. It meets the requirement of IEC60298, GB3906 and DL404 standards and so on. It has the perfect “5 protections” function.

使用环境条件

海拔高度: 不超过 2000 米;
环境温度: 上限为+40℃, 下限为-15℃;
相对湿度: 日平均值不大于 95%, 月平均值不大于 90%;
地震烈度: 不超过 8 度;
没有火灾爆炸危险, 没有剧烈震动及化学腐蚀等严重污秽的场所。

Service Environmental Condition

Altitude: No higher than 2000m;
Ambient temperature: the upper limit is +40℃ and the lower limit is -15℃;
Relative humidity: The daily average value is not more than 95% and the monthly mean value is not more than 90%;
Earthquake intensity: Not more than 8 degrees;
The location without severe dirtiness such as fire explosion hazard and strenuous vibration as well as chemical corrosion and so on.

特点

采用热缩绝缘材料及环氧涂覆绝缘工艺, 优化电极形状, 柜体结构紧凑, 缩小占地面积;
开关柜柜体选用优质冷轧钢板经数控钣金加工成形后, 通过高强度螺栓螺母和铆螺母连接而成, 构件表面采用喷塑或镀锌工艺;
可配用国产 ZN85-40.5(3AV3) 真空断路器和法国施耐德 SF1、SF2 型及阿尔斯通 FP 系列六氟化硫断路器, 以满足不同用户的需求;
开关柜各功能小室均采用金属隔板分隔, 并设有独立的压力释放通道;
断路器、接地开关等操作均可在开关柜门关闭情况下进行, 即可实现关门操作;
开关柜的结构适应性强, 主结线方案可以达到 198 种以上, 能满足不同用户的需要;
手车, 断路器, 接地开关和后柜门之间设有防止误操作的机械联锁装置, “五防”功能齐全, 安全可靠。

feature

The thermal shrinkage insulating material and epoxy-coated insulating process is used. The electrode shape is optimized. The structure of cabinet body is compact and the floor area is reduced. For the switch cabinet body, the high-grade cold rolled steel plate is formed by the NC sheet-metal processing and then it is connected by the high-strength bolt and nut as well as riveting nut. For the surface of structural member, the plastic-spraying or galvanizing process is adopted.

KYN61–40.5

type outdoor AC armoured movable
type metal sealed switchgear

It can be equipped with the homemade ZN85–40.5 (3AV3) vacuum circuit breaker and French Schneider SF1 and SF2 model as well as Alston FP series of sulfur hexafluoride circuit breaker to meet the demands of different clients.

The metal partition is used to separate among every function chamber in the switch cabinet. The individual pressure relief channel is installed.

Operations of circuit breaker and grounding switch and so on can be performed under the situation that the door of switch cabinet is closed. The door–close operation can be realized.

The structure adaptability of switch cabinet is strong. The main wiring scheme can be up to above 198 types. Therefore, demands from different clients can be met.

The mechanical interlocking device preventing misoperation is installed among trolley, circuit breaker, grounding switch and rear cabinet door. “5 protections” function is complete and safe as well as reliable.

技术参数 Technical parameter

开关柜技术参数 Technical parameter of switch cabinet

序号 Serial number	项目 Item		单位 Unit	参数 Parameter	
1	额定电压 Rated voltage		kV	40.5	
2	额定频率 Rated frequency		Hz	50	
3	主母线额定电流 Rated current of main bus–bar		A	1250, 1600, 2000	
4	分支母线额定电流 Rated current of branch bus–bar		A	630, 1250, 1600	
5	额定绝缘水平 Rated insulating level	1min 工频耐受电压 (有效值) 1min Power–Frequency withstand voltage (Valid value)	kV	相间、相对地 Interphase & phase to ground	一次隔离断口 Primary separation fracture
		雷电冲击耐受电压 (峰值) Rated lightning impulse withstand voltage (peak value)		95	115
				185	215
	辅助控制回路 1min 工频耐受电压 1min Power–Frequency withstand voltage in the auxiliary control circuit		V	2000	
6	额定短路开断电流 Rated short circuit breaking current.		kA	25, 31.5	
7	额定短路关合电流 (峰值) Rated short–circuit making current (peak value)		kA	63, 80	
8	额定短时耐受电流 (4s) Rated short–time withstand Current (4s)		kA	25, 31.5	
9	额定峰值耐受电流 Rated impulse Withstand Current		kA	63, 80	
10	辅助控制回路额定电压 Rated voltage of auxiliary control circuit		V	–110, –220, –220	
11	防护等级 Protection degree			外壳 IP4X Housing IP4X 隔室间，断路器室门打开时 IP2X Among compartments and when the door of circuit breaker room is opened: IP2X	
12	外形尺寸 (宽 × 深 × 高) Physical dimension (W × D × H)		mm	1400 × 2800(3000) × 2800 [*] (* 括号内数字为 SF6 手车方案) (*the number in the parenthesis is scheme of SF6 trolley)	
13	重量 Weight		kg	约2300 bout 2300	

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型铠装移开式交流金属封闭
开关设备

ZN85-40.5(3AV3) 真空断路器技术参数 Technical parameter of ZN85-40.5(3AV3) vacuum circuit breaker

序号 Serial number	项目 Item	单位 Unit	参数 Parameter
1	额定电压 Rated voltage	kV	40.5
2	额定频率 Rated frequency	Hz	50
3	额定绝缘水平 Rated insulating level	工频耐受电压 (有效值) Power-Frequency withstand voltage (Valid value)	95
		雷电冲击耐受电压 (峰值) Rated lightning impulse withstand voltage (peak value)	185
4	额定电流 Rated current	A	630, 1250, 1600, 2000
5	额定短路开断电流 Rated short-circuit breaking current.	kA	25, 31.5
6	额定短路关合电流 (峰值) Rated short-circuit making current (peak value)	kA	63, 80
7	额定短时耐受电流 (4s) Rated short-time withstand Current (4s)	kA	25, 31.5
8	额定峰值耐受电流 Rated peak-value withstand current	kA	63, 80
9	额定电容器组开断电流 Rated drop-out current of capacitor bank	A	630
10	额定短路开断电流开断次数 Total breaking times of rated short circuit breaking current	次 Times	20
11	额定操作顺序 Rated operation sequence		0-0.3s-CO-180s-CO
12	分闸时间 Switching-off time	ms	35-60
13	合闸时间 Switching-on time	ms	45-100
14	机械寿命 Mechanical life	次 Times	10000
15	触头开距 Open distance of contact	mm	20 ± 2
16	超行程 Over stroke	mm	6 ± 2
17	触头允许磨损累积厚度 Allowable wearing accumulation thickness of contact	mm	3
18	平均合闸速度 Average switching-on speed	m/s	0.5-0.8
19	平均分闸速度 (刚分 10mm) Average switching-off speed (10mm)	m/s	1.6-2.0

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序号 Serial number	项目 Item	单位 Unit	参数 Parameter
20	触头合闸弹跳时间 Rebound time of contact switching on	ms	≤ 2
21	三相触头分闸不同期 Asynchronous switching off of 3-phase contact	ms	≤ 2
22	三相触头合闸不同期 Asynchronous switching on of 3-phase contact	ms	≤ 2
23	每相回路直流电阻 DC resistance of circuit for every phase	μ Ω	≤ 50
24	合闸状态额定触头弹簧压力 Rated spring pressure of contact under the switching-on state	N	3100 ± 200
25	相间中心距 Interphase center distance	mm	300

FP40 系列六氟化硫断路器技术参数

Technical parameter of FP40 series of sulfur hexafluoride circuit breaker

最高工作电压 kV Maximum operating voltage kV	绝缘水平 Insulating level		开断电流 kA Drop-out current kA	工作电流 A Operating current A							
	冲击耐击 kVp Impact withstand kVP	工频耐压 50Hz Power-frequency withstand voltage 50Hz kV1min									
	400	630		800	1250	1600	2000	2500	3150		
40.5	185	95	12.5	FP4012A	FP4012B	FP4012C	FP4012D				
			16		FP4016B	FP4016C	FP4016D	FP4016E			
			20			FP4020C	FP4020D	FP4020E	FP4020F	FP4020G	FP4020H
			25			FP4025C	FP4025D	FP4025E	FP4025F	FP4025G	FP4025H
			31.5								

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SF 型六氟化硫断路器技术参数
Technical parameter of Schneider SF-type sulfur hexafluoride circuit breaker

序号 Serial number	项目 Item		单位 Unit	参数 Parameter
1	额定电压 Rated voltage		kV	40.5
2	额定绝 缘水平 Rated insulating level	工频耐受电压 Power-frequency withstand voltage	kV	95
		雷电冲击耐受电压 (峰值) Rated lightning impulse withstand voltage (peak value)	kV	185
3	额定电流 Rated current		A	630, 1250, 2000
4	额定短路开断电流 Rated short-circuit breaking current		kA	25, 31.5
5	额定短路关合电流 Rated short-circuit making current		kA	63.80
6	额定短时耐受电流 (3s) Rated short-time withstand Current (3s)		kA	25, 31.5
7	额定峰值耐受电流 Rated peak-value withstand current		kA	63, 80
8	额定电容器组开断电流 Rated drop-out current of capacitor bank		A	440, 875, 1750
9	额定短路开断电流开断次数 Total breaking times of rated short circuit breaking current		次 Times	20
10	额定操作顺序 Rated operation sequence			0-0.3s-CO-180s-CO
11	分闸时间 Switching-off time		ms	45 ± 4
12	合闸时间 Switching-on time		ms	68 ± 4
13	机械寿命 Mechanical life		次 Times	10000

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LZZB9-35 型电流互感器技术参数
Technical parameter of LZZB9-35 Current transformer

额定一次 电流 (A) Rated primary current (A)	准确级 组合 Combination of accuracy class	相应准确级下的额定输出 (VA) Rated output under the corresponding accuracy class (VA)					额定短时耐受电流 (1s 有效值)(kA) Rated short-time withstand Current (1S valid value) (kA)	额定峰值耐受电流 (峰值)(kA) Rated peak-value withstand Current (peak value) (kA)
		0.2	0.5	10P10	10P15	10P20		
30-100	0.2/10P10	15	30	50	30	20	150lin	375lin
150	0.2/10P15	15	30	50	30	20	31.5	80
200	0.2/10P20	15	30	50	30	20	44.5	80
300-500	0.5/10P10	15	30	50	30	20	54.5	80
600-800	0.5/10P15	30	50	50	40	30	63	80
1000-2000	0.5/10P20	40	50	50	50	30	80	100

LDBJ8-40.5 型环氧树脂浇注全封闭触头
盒式电流互感器技术参数主要技术参数：
额定绝缘水平：95/185kV
表面爬距：830mm
额定二次电流：5A(或 2A， 1A)
局部放电量：≤ 20PC
准确级次：0.2S,0.2,0.5,10P10,10P15， 10P20

Technical parameter of LDBJ8-40.5 box current
transformer for fully-enclosed contact box poured
with epoxy resin
Main technical parameter:
Rated insulating level: 95/185kV
830mm Surface creeping distance: 830mm
Rated secondary current: 5A(or 2A, 1A)
Amount of partial discharge: ≤ 20PC
Accuracy class: 0.2S,0.2,0.5,10P10,10P15, 10P20

额定一次 电流 (A) Rated primary current (A)	准确级组合与相应的额定输出 (VA) Combination of accuracy class & corresponding rated output (VA)				额定短时耐受电流 (1s 有效值)(kA) Rated short-time withstand Current (1S valid value) (kA)	额定峰值耐受电流 (峰值)(kA) Rated peak-value withstand Current (peak value) (kA)
	0.2/10P10	0.5/10P10	0.2/0.5	10P10/10P10		
5-300	10/30	20/30	10/20	20/20	150lin	375lin
400-500	10/40	15/40	10/15	25/25	63	130
600-800	20/50	30/50	20/30	30/30	63	130
1000-1600	30/50	50/50	30/50	40/40	80	180
2000-3150	40/50	50/50	40/50	50/50	100	180

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JN22-40.5/31.5 型接地开关技术参数
Technical parameter of JN22-40.5/31.5 grounding switch

序号 Serial nuumber	项目 Item		单位 Unit	参数 Parameter
1	额定电压 Rated voltage		kV	40.5
2	额定绝 缘水平 Rated insulating level	工频耐受电压 Power-Frequency withstand voltage	kV	95
		雷电冲击耐受电压 (峰值) Rated lighting impulse withstand voltage (peak value)	kV	85
3	额定短时耐受电流 (4s) Rated short-time withstand Current (4s)		kA	31.5
4	额定峰值耐受电流 (峰值) Rated peak-value Withstand Current (Peak value)		kA	80
5	额定短路关合电流 (峰值) Rated short-circuit making current (Peak value)		kA	80

结 构 Structure

结构

KYN61-40.5型金属封闭开关设备主要由柜体和断路器手车等两大部分组成。柜体分为断路室(也称手车室)、母线室、电缆室和继电器仪表室等四个单独隔室。外壳防护等级为 IP4X，断路器门打开时防护等级为 IP2X。产品具有电缆进出线、架室进出线、联络、计量、隔离及其它功能方案。

Structure

KYN61-40.5 metal enclosed switchgear mainly consists of two parts, namely, cabinet body and trolley. The cabinet body is divided into 4 individual compartments, namely, circuit breaker compartment (it is also called trolley compartment), bus-bar compartment, cable compartment and relay instrument compartment. The protection degree of casing is IP4X. The protection degree is IP2X when the door of circuit breaker is opened. The trolley of circuit breaker consists of two parts, namely, circuit breaker and chassis trolley. It has leading in and outlet of cable, leading-in and outlet of rack chamber, contact, counting and isolation and other function schemes.

柜体

柜体是选用优质冷轧钢板或敷铝锌板经过数控钣金设备加工折弯成形，通过高强度螺栓、螺母（ 8.8 级 ）或拉铆螺母组装而成。柜体各构件采用喷塑或表面镀锌工艺，这样使柜体不仅具有很高的精度，而且与同类设备相比具有重量轻、机械强度高、外形美观的特点。同时由于采用了组装式结构使零部件通用性强、加工周期短、生产占地面积小，可以根据订货情况便捷地组织生产。

Cabinet body

The cabinet body is made from the high-grade cold-cooled steel plate or aluminized zinc plate. It is assembled through the high-strength bolt and nut (grade 8.8) or riveted nut after the plate is machined and bent as well as formed by the NC sheet metal equipment. For every structural member of cabinet body, the plastic-spraying or surface galvanizing process is used. Therefore, the cabinet body not only has the very high height but also it can have such features as lightweight and high mechanical strength as well as beautiful appearance comparing with the similar equipment. At same time, there are such features as strong versatility, short machining period, small floor area for production of component because the assembly-type structure is adopted. The production can be organized conveniently depending on the ordering condition.

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手车

1. 手车骨架由优质钢板折弯焊接而成。根据用途手车可分为断路器手车、隔离手车、电压互感器手车和避雷器手车等。同规格手车可以互换。

2. 手车之推进装置采用丝杠螺母推进机构，与超越离合器和联锁机构等组成。丝杠螺母推进机构可轻便地使手车在试验位置和工作位置之间移动。借助丝杠螺母自锁性可使手车可靠地锁定在工作位置，而防止因电力作用引发事故。超越离合器在手车移动退至试验位置和进至工作位置时使操作轴与丝杠自动脱离而空转，可防止超限操作损坏推进机构。

Trolley

1. The framework of trolley is bent and welded by the high-grade sheet steel. The trolley can be divided into the trolley of circuit breaker, separation trolley, trolley of voltage transformer and trolley of lightning arrester and so on according to the purpose. Trolley of same specification can be interchangeable.

2. The pushing device of trolley consists of leading screw nut pushing mechanism, overrunning clutch and interlocking mechanism and so on. The leading screw nut pushing mechanism can operate easily to make the trolley move between the testing position and working position. The self-locking property of leading screw nut can be utilized to lock the trolley at the working position reliably and prevent the accident from play of trolley due to action of electrical force. The overrunning clutch will enable the operating shaft to separate from the lead screw automatically and the operating shaft runs idly when the trolley moves back to the testing position and advances to the working position, and thus avoid damage to the construction.

隔室

KYN61-40.5型金属封闭开关设备设有独立的隔室，即断路器室，母线室，电缆室和继电器仪表室。而且断路器室，母线室和电缆室都设有泄压通道。

1. 断路器室

断路器室底部装有导轨，对手车在试验位置和工作位置间平稳运动起正确导向作用。触头盒前装有活门，上下活门在手车从试验位置移动到工作位置过程中自动打开，当手车反方向移动时自动关闭并形成有效的隔离。上下活门联动，检修时可锁定，以保证检修人员不会触及带电体。柜门关闭时手车可以操作，门面开有紧急分闸操作孔，供手动分闸操作。通过门上的观察窗可以观察到手车所处位置、断路器分合位置指示器及合闸弹簧储能状态。

2. 母线室

主母线、分断母线，通过分支母线和触头盒固定，不需要其它绝缘子支撑。主母线、分支母线及联络母线均为紫铜母线。相邻柜间用穿墙套管隔开，能有效防止事故蔓延，同时对主母线起到辅助支撑作用。母线室的主绝缘采用复合绝缘技术，确保绝缘的可靠性。

3. 电缆室

每相可并接1-3根电缆，最多并接6根单芯电缆。手车移开后，安装维修人员可从正面进入电缆室，对其电流互感器、电压互感器、接地开关、避雷器等元件进行维护安装。柜底配置开缝的可拆卸式封板，方便电缆的施工。

4. 继电器仪表室

继电器仪表室供安装继电保护控制元件、仪表以及特殊要求的二次设备。小母线室位于继电器仪表室内的顶部，供敷设控制小母线用。

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型铠装移开式交流金属封闭 开关设备

Compartment

The individual compartment, namely, compartment of circuit breaker, bus compartment, cable compartment and compartment of relay instrument, is installed in the KYN61-40.5 metal enclosed switchgear. The pressure-relief channel is installed in the compartment of circuit breaker and bus compartment as well as cable compartment.

1. compartment of circuit breaker

The guide rail is installed at the bottom of circuit breaker compartment to function as the correct guidance for the smooth operation of trolley between the testing position and working position. The valve is installed in front of the contact box. The upper and lower valve opens automatically during the process that the trolley moves to the working position from the testing position. When the trolley moves oppositely, the valve closes automatically to form the effective separation. The upper and lower valve can be locked while overhauling so that it can ensure that the maintainer will not contact the charged body. The trolley can be operated when the cabinet door is closed. The emergency switching-off operating hole is installed at the door face for manual switching off. The position where the trolley is located at and on/off position indicator of circuit breaker as well as energy-storage state of switching-on spring can be observed through the observation window on the door.

2. Bus compartment

The main bus and staged bus is fixed through the branch bus and contact box and the support from the other insulator is not necessary. The main bus and connecting bus as well as branch bus is the red copper bus. The wall sleeve is separated between adjacent cabinets so that it can prevent the accident from spreading effectively. At same time, it functions as the auxiliary support for main bus. The compound insulation technique is used for main insulation in the bus compartment to ensure the insulation reliability.

3. Cable compartment

1-3 cables can be connected in parallel in every phase. Maximum 6 single-core cables can be connected in parallel. After the trolley is moved away, the installer and maintainer can enter into the cabinet from the front side to repair and install such elements as current transformer, voltage transformer, grounding switch and lightning arrester and so on. It is equipped with the slotted dismountable sealing plate for easy cable construction.

4. Compartment of relay instrument

The relay protection and control element and instrument as well as secondary equipment with special requirement can be installed in the compartment of relay instrument. The small bus is located at the top of compartment of relay instrument for laying and control of small bus.

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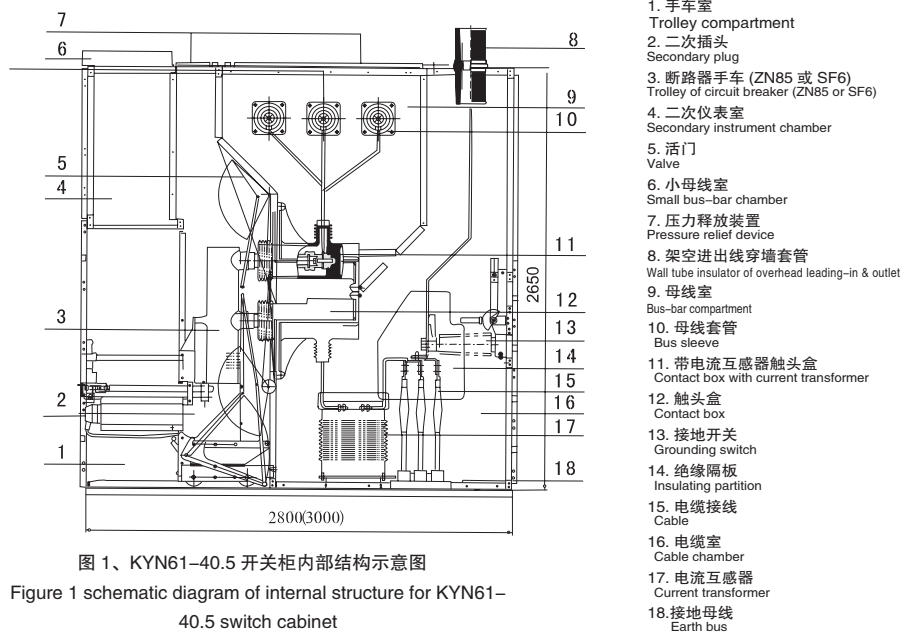


图 1、KYN61-40.5 开关柜内部结构示意图

Figure 1 schematic diagram of internal structure for KYN61-40.5 switch cabinet

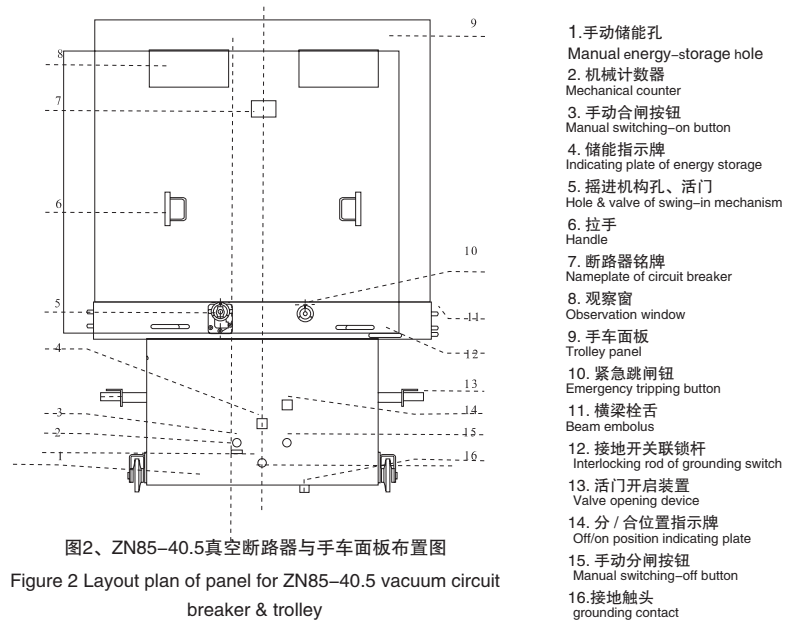


图2、ZN85-40.5真空断路器与手车面板布置图

Figure 2 Layout plan of panel for ZN85-40.5 vacuum circuit breaker & trolley

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型铠装移开式交流金属封闭开关设备

防止误操作联锁装置

KYN61-40.5 型金属封闭开关设备装有可靠的防误联锁装置，可满足“五防”要求。

1. 继电器仪表室门上有明显提示标志的操作按钮或 KK 转换开关，以及与用户之模拟图板上提示标志（如红绿翻牌）相配合以防误合、误分断路器。
2. 断路器手车只有处在试验或工作位置时断路器才能进行分合闸操作；而且断路器只有处在分闸位置时手车才能从试验位置推向工作位置，或者从工作位置退到试验位置，从而防止带负荷分合隔离触头。
3. 手车只有在试验位置接地开关才能进行合闸操作，防止带电合接地开关。
4. 接地开关处于合闸状态，手车不能进到工作位置，防止带接地开关合闸。
5. 接地开关不关合则开关柜后门不能打开，反之，后门不关，则接地开关不能分闸，从而防止误入带电间隔。
6. 无接地开关的断路器柜、母线分段柜和母线联络柜等由相应的电磁锁（或程序锁）配合完成全部防误功能。
7. 手车二次插件只有在试验位置才能插入或拔出，在工作位被锁定不能拔出。

Interlocking device preventing false operation

KYN61-40.5 metal enclosed switchgear is equipped with reliable interlocking device preventing false operation so that it can meet the “5-pretection requirement” .

1. There are operating button with obvious prompting sign or KK changeover switch and prompting sign on the analog drawing board from the client (e.g. red/green drawing) on the door of relay instrument compartment. They are cooperated to prevent the circuit breaker from wrong switching on and off.
2. The switching-on/off operation of circuit breaker can be done only when the trolley of circuit breaker is located at the testing position or working position. Moreover, the trolley can be pushed to the working position from the testing position or returned back to the testing position from the working position only when the circuit breaker is located at the switching-off position. Thus, it prevents switching on and off isolating contact with charge.
3. The switching-on operation of grounding switch can be done only when the trolley is located at the testing position to prevent switching on the grounding switch with charge.
4. When the grounding switch is located at the switching-on state, the trolley cannot be entered into the working position to prevent switching on the grounding switch.
5. The rear door of switch cabinet cannot be opened if the grounding switch does not switch on. On the other hand, the grounding switch cannot switch off if the rear door is not closed. Thus, it can be prevented that the charged compartment is entered wrongly.
6. For the circuit breaker cabinet and subsection cabinet of bus as well as bus contact cabinet and so on without installation of grounding switch, the corresponding electromagnetic lock (or program lock) is needed to cooperate and finish all mistake-prevention functions.
7. The secondary plug-in unit can be inserted in or plugged out only when the trolley is located at the testing position. The secondary plug-in unit is locked at the working position and it cannot be plugged out if the trolley is located at the working position.

接地装置

1. 手车与柜体间有可靠的接地装置。
2. 电缆室内单独设有 $5 \times 40(\text{mm}^2)$ 接地铜排，此铜排能贯穿整个排列与柜体接触良好，供直接接地元件使用，从而使整个柜都外于良好的接地状态之中。

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Earthing device

1. There is a reliable earthing device between the trolley and cabinet body.
2. The $5 \times 40(\text{mm}^2)$ copper grounding bar is installed in the cable compartment individually. This copper bar can be through the whole arrangement and contacts with the cabinet body well. It is provided to the direct grounding element for its use. Thus, the whole cabinet is located at the good grounding state.

泄压装置

断路器室、母线室和电缆室均设有泄压通道，各泄压室盖板的一端用金属螺栓固定，另一端用塑料螺栓固定，当故障时，内部高压气体能容易地将泄压盖板冲开释放压力，以确保操作人员和开关设备安全。

① Switching-on operation of grounding switch:

At first, it is confirmed that the trolley has been located at the testing position and the indicating lamp of voltage display device has extinguished entirely. Afterwards, the locking between the trolley and operating shaft of grounding switch is unlocked. The operating handle of grounding switch is inserted to rotate by 270° in the clockwise direction. The grounding switch is switched on.

② Switching-off operation of grounding switch:

At first, it is confirmed that the trolley has been located at the testing position and the front and rear door is closed. Afterwards, the locking between the trolley and operating shaft of grounding switch is unlocked. The operating handle of grounding switch is inserted to rotate by 270° in the counter-clockwise direction. The grounding switch is switched off.

3. Operation of isolation cabinet:

The isolation trolley has not the capacity connecting and breaking the load current. Therefore, the isolation trolley accesses into the working position from the testing position and return back to the testing position from the working position in the cabinet, the operation correctness can be ensured through the electrical interlock between the isolation trolley and self-contained circuit breaker. It means that the isolation cabinet door can be opened only the circuit breaker is in the switching-off position. The other detailed operating procedure is the same as the circuit breaker trolley.

安 装

1. 安装准备:

- a. 首先检查开关柜之型号、规格、数量等是否与合同相符，无问题后方可开箱。
- b. 按厂家提供的装箱单清点所收到的物品是否与装箱单一致，若有出入请及时与厂家电传联系。
- c. 检查柜体及断路器元件等有无损坏，如发现损坏应速与厂家联络。
- d. 清除脏污，尤其绝缘表面，应清扫干净。
- e. 手动使断路器分闸，同时手动储能进行合分闸，确认正常后进行开关柜安装。
- f. 产品在开箱、起吊、转运等过程中注意用力适中，轻起轻落，轻拿轻放，以保护产品不致受到不应有的损伤或损坏。

2. 安装:

- a. 首先检查基础是否符合设计以及本产品之基础（见图 18.1）要求，合格方可安装。
- b. 开关柜安装次序，先将中间柜子搬运到基础上，尔后将两则开关柜依次排列好并对齐，再紧固柜间螺栓，最后紧固好柜体与基础间螺栓。
- c. 分别清理主母线和分支母线搭接面，将主母线与分支母线连接好，并用 0.05mm 插尺插入各搭接处，其插入深度不大于 5mm。

注：各种断路器（包括操动机构）之安装前检查应按各断路器要求进行。

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开关设备

Installationa

1. Preparation for installation:
- a. At first, check the model and size and quantity of switch cabinet is conformed to the contract. It can be unpacked if there is no problem.
 - b. Please check if the received goods are in accordance with the packing list as per the packing list provided by the manufacturer. If there is a conflict, please contact with the manufacturer by telephone or fax in time.
 - c. Check the cabinet body and element of circuit breaker and so on for damage. The manufacturer shall be contacted quickly in case of any damage.
 - d. Remove the dirt especially insulating surface shall be cleaned up.
 - e. Manual switch off the circuit breaker and manual store the energy to switch on and off at same time. The switch cabinet is installed after it is in good condition.
 - f. Note that the proper force is applied and the product is lifted up and down slightly during the process of unpacking and handling as well as transportation to protect the product against the undesirable loss or damage.
2. Installation
- a. At first, check if the foundation meets the design requirement and foundation requirement of this product (see the figure 18.1). The installation can be proceeded after it is acceptable
 - b. For the installation of switch cabinet, the intermediate cabinet shall be conveyed on the foundation at first. Afterwards, the both sides of switch cabinet are well arranged and aligned. The bolt among cabinets is tightened. Afterwards, the bolt between the cabinet body and foundation is fixed.
 - c. Clean up the lapped face of main bus and branch bus respectively. Check if connection of every bus and branch end bus is tightened. The 0.05mm ruler shall be used. The insertion is not more than 5mm. Note: The inspection shall be carried out according to the requirement of every circuit breaker before various circuit breakers (including the actuator) is installed.

检 测

- 1. 检验手车进出柜是否顺利；
 - 2. 检验活门动作是否良好可靠；
 - 3. 检验同类型手车互换性是否良好；
 - 4. 检验“五防”功能是否良好可靠；
 - a. 检验断路器手车在工作或试验位置的锁定状态下，应能合闸、分闸，在工作位置和试验位置之间，应合不上闸。
 - b. 检验接地开关处于合闸状态，手车推不到工作位置，手车在工作位置时接地开关不能合闸。
 - c. 检验接地开关不合则后门不能打开，后门不关则接地开关分不了。
 - d. 检验手车在工作位置二次插头应拔不下。
 - 5. 检查各行程开关动作是否良好；
 - 6. 检测隔离插头插入深度，符合要求；
 - 7. 测试回路电阻；
 - a. 主回路（断路器）
 - b. 每相总回路（包括断路器和出入口隔离触头，不含电流互感器）阻值不大于 400 μ Ω
 - 8. 工频而耐压试验；
 - a. 主回路：相间、对地（手车应在工作位置进行）
 - b. 断路器断口、隔离断口
 - c. 二次控制回路对地 2000V.1min
- 注：断路器之检测项目按各类断路器（包括操动机构）要求进行。

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Inspection

1. Check if the trolley enters into and exits the cabinet smoothly.
 2. Check if the action of valve is good and reliable.
 3. Check if the interchangeability of same type of trolley is good.
 4. Check if the "5-protection" function is good and reliable.
 - a. Check that the circuit breaker shall switch on and off when the trolley of circuit breaker is at the locking state of working position or testing position and the circuit breaker shall not switch off when the trolley of circuit breaker is located between the working and testing position.
 - b. Check that the trolley is not pushed to the working position when the grounding switch is at the switching-on state and the grounding switch shall not switch on when the trolley is located at the working position.
 - c. Check that the rear door cannot be opened when the grounding switch does not switch on and the grounding switch does not switch off when the rear door is not closed.
 - d. Check that the secondary plug shall not be plugged out when the trolley is located at the working position.
 5. Check if the action of every stroke switch is good.
 6. Check the insertion strength of isolation plug and it meets the requirement or not.
 7. Testing of circuit resistance
 - a. Main circuit (circuit breaker)
 - b. The resistance value of total circuit of every phase (it includes the circuit breaker and isolating contact at the entrance and exit and does not contain the current transformer) is not more than $400 \mu \Omega$.
 8. Power-frequency withstand voltage test
 - a. Main circuit & interphase and phase to ground (the trolley shall be at the working position)
 - b. Circuit breaker fracture & isolation fracture
 - c. Secondary control circuit for ground 2000V, 1min
- Note: The inspection item for circuit breaker is carried out according to the requirements of various circuit breakers (including the actuator)

操作试验

当上述检测良好后进行下列操作试验:

1. 手车处于试验位置将二次插头插好, 合上控制电源, 检查仪表盘上的信号是否正常, 如用弹簧机构手动储能其储能信号灯是否正常。
2. 按动仪表盘上合闸按钮进行合闸, 良好后分闸, 尔后合分闸, 各进行 5 次, 动作和信号应表示正常。
3. 手车推至工作位置, 检查控制室内控制盘上之信号是否正常, 然后进行合分闸操作, 无问题各合分 5 次, 来检验动作, 报警和信号是否正常。
4. 断路器合闸后模拟继电保护动作进行重合闸动作试验, 共 2 次, 检验其动作, 报警和信号是否正常, 同时也验证出继电保护, 断路器和二次控制回路接线是否正确。
5. 将断路器合闸, 于现场手动分闸, 重合闸继电器动作合闸后, 立即手动合闸, 这时断路器不能立即合闸, (持续时间不超过 10 秒) 检验其动作和信号及报警是否正确及不成功重合闸时间设定是否正确。

Operation test

The next operation test shall be done after the foregoing inspection is proved good:

1. The secondary plug-in unit is inserted after the trolley is located at the testing position. The control power supply is switched on. Check if the signal on the instrument board is regular. For example, the energy-storage signal lamp is regular or not if the spring mechanism stores the energy manually.

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- 2.The switching-on button on the instrument panel is pressed to switch on. After it is in good condition, the switching off is executed. Afterwards, switching on and off is executed. The switching and off action shall be performed for 5 times respectively. The signal indicates it is good.
- 3.The trolley is pushed to the working position to check if the signal on the control board in the control room is regular. Afterwards, the switching on and off operation is carried out for 5 times if there is no problem to check if the action and alarm as well as signal are good.
- 4.After the circuit breaker is switched on, the analog relay protection action switches on again for action test for totally twice to check if the action and alarm as well as signal are good. At the same time, check if the relay protection, circuit breaker and wiring of secondary control circuit are correct.
- 5.The circuit breaker is switched on and off manually on site. After the re-switching on relay acts to switch on, the manual switching on is carried out immediately. At this time, the circuit breaker cannot be switched on immediately (duration is not more than 10s). Check if the action and alarm as well as signal are correct and unsuccessful re-switching-on time is set correctly.

日常维护

1. 应按电力部门规定的状态维护制度进行，在进行小修时应进行预防性试验，并对断路器断口进行工频耐压试验。
2. 对 SF6 断路器应每年进行水份含量试验，不大于 300PPm
3. 根据开关柜工作情况进行停电维修（包括小修项目）
 - a. 对开关柜内外进行清扫；
 - b. 检查导体连接部位紧固是否良好，否则应紧固；
 - c. 检查隔离触头是否有过热变色情况，否则修正或更换：必要时测试隔离触头插入深度和接触电阻；
 - d. 必要时检验“五防”联锁是否良好；
 - e. 检查二次线接线端接触是否良好（包括端子排），否则应紧固；
 - f. 应按各类断路器之检修项目进行（包括操动机构）；
 - g. 频繁操作（电容器组）达 1000 次应进行临检；
 - h. 根据电力部门规定 6-12 年进行大修一次，按规定的大修项目进行。

Routine maintenance

- 1.The state maintenance system specified by the electrical power department shall be followed. The preventive test shall be performed when carry out the minor overhaul. The power-frequency withstand voltage test is performed at the circuit breaker fracture.
- 2.The moisture content test shall be performed for circuit breaker every year: not more than 300PPm.
- 3.Power failure maintenance (including the minor overhaul item) is carried out depending on the working condition of switch cabinet.
 - a.Clean the internal and external part of switch cabinet
 - b.Check if the connecting position of conductor is well tightened.
 - c.Check if the isolation contact overheats and the color is changed. Otherwise, it is amended or replaced. If necessary, the insertion depth of isolation contact and contact resistance is tested.
 - d.Check if the “5-protection” interlocking is good if necessary
 - e.Check if the terminal of secondary line contacts well (including the terminal block). Otherwise, it shall be tightened.
 - f.It shall be carried out according to the overhauling item of various circuit breakers (including the actuator)

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g. The temporary inspection shall be carried out when the frequent operation (capacitor bank) is up to 1000 times.

h. The major overhaul is carried out once every 6-12 year according to the regulation from the power department. It is carried out according to the specified item of major overhaul.

包装运输与贮藏

1. 手车与柜体分开包装。断路器处于合闸位置，弹簧机构的分、合闸弹簧处于释放状态，包装箱的外部注明开关柜型号、到货地点、订货单位及其它有关标志。

2. 在运输及吊卸过程中应避免强烈震动、颠簸、碰撞和倒置，不得受潮和腐蚀，装卸和放置时应按包装箱上标志要求进行。

3. 产品放在通风干燥的室内，不得遭受潮湿和有害物质侵蚀，周围不得有易燃和易爆物品。

Packing & transportation and storage

1. The trolley and cabinet body is packed separately. the trolley of circuit breaker is located at the switching-on position. The spring mechanism is located at the releasing state. For the packing & transportation and storage, the special packing unit is used. It is packed according to the single cabinet. The model of switch cabinet and delivery place as well as ordering unit and other related signs are indicated outside.

2. During the transportation and handling process, the severe vibration, jolt, impact and inversion shall be avoided. The damping and corrosion is not allowed. The handling and placement shall be carried out according to the requirements in the sign on the packing box.

3. The product is placed in the well-ventilated and dry room. The damping and harmful corrosion is not allowed. It is not allowed that there is the combustible and explosive substance around the product.

随机文件及清单

“产品合格证书”；

《产品样本》或《产品安装使用说明书》(包括断路器)；

装箱清单；

“产品出厂检验报告”；

二次结线图；

备品备件、易损件及专用工具。

Attached document & list

Conformity certificate of product;

<<Product catalog>> or <<Installation & operating instruction of product>> (including the circuit breaker

Packing list

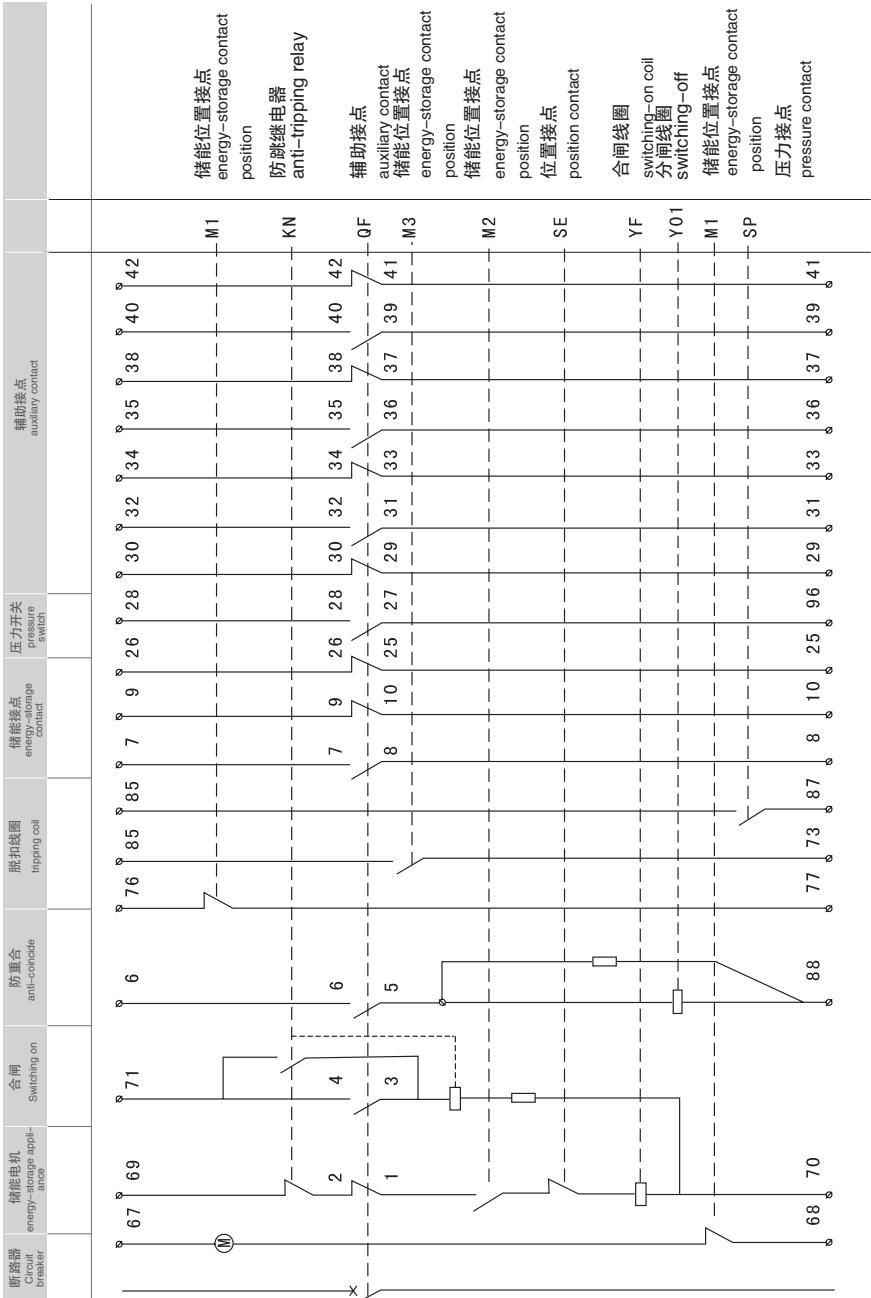
“factory inspection report of product”

Secondary wiring diagram

Spare part & wearing part and special tool

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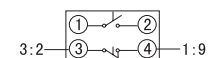
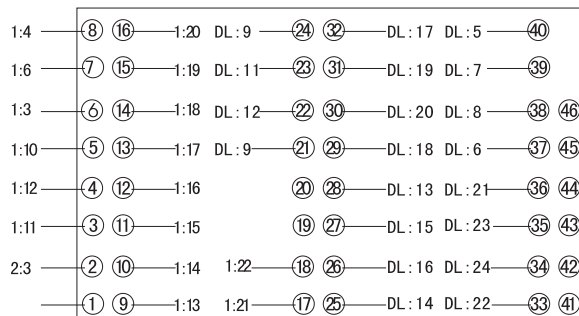
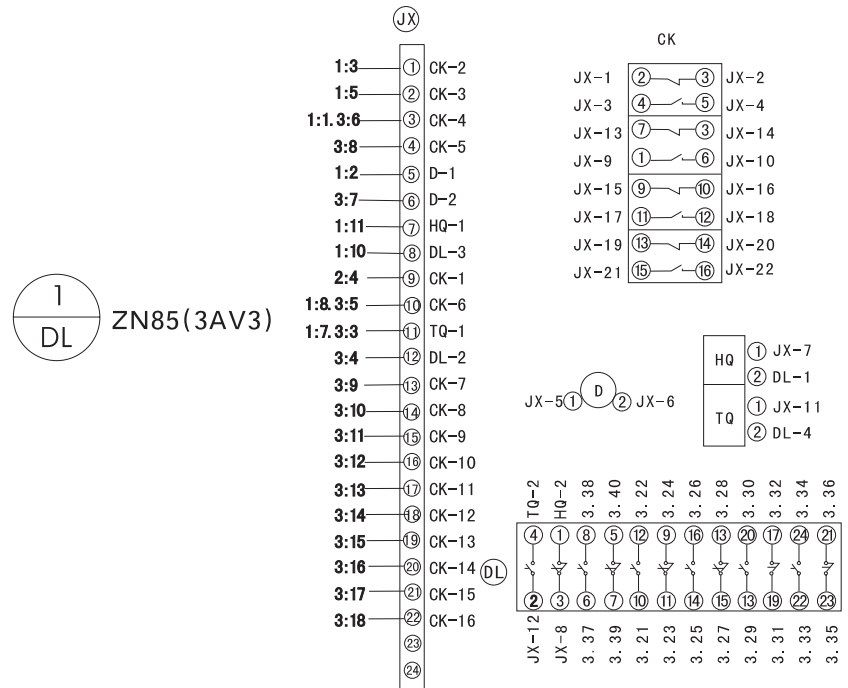
Schematic diagram of SF2 sulfur hexafluoride circuit breaker SF 型六氟化硫断路器控制原理图



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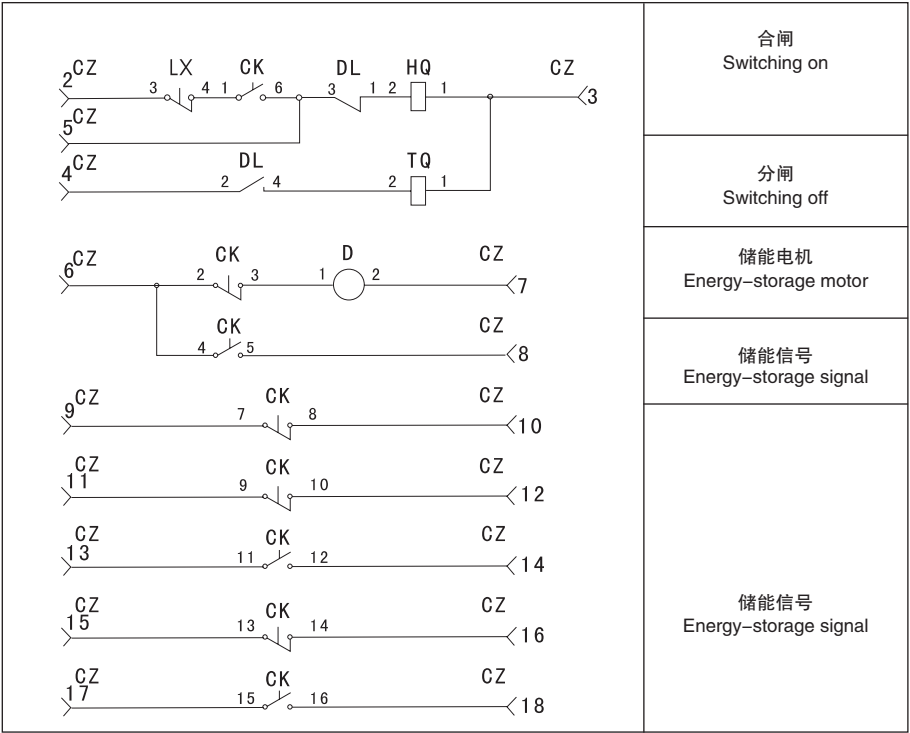
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真空断路器机构接线图 Wiring diagram of vacuum circuit breaker



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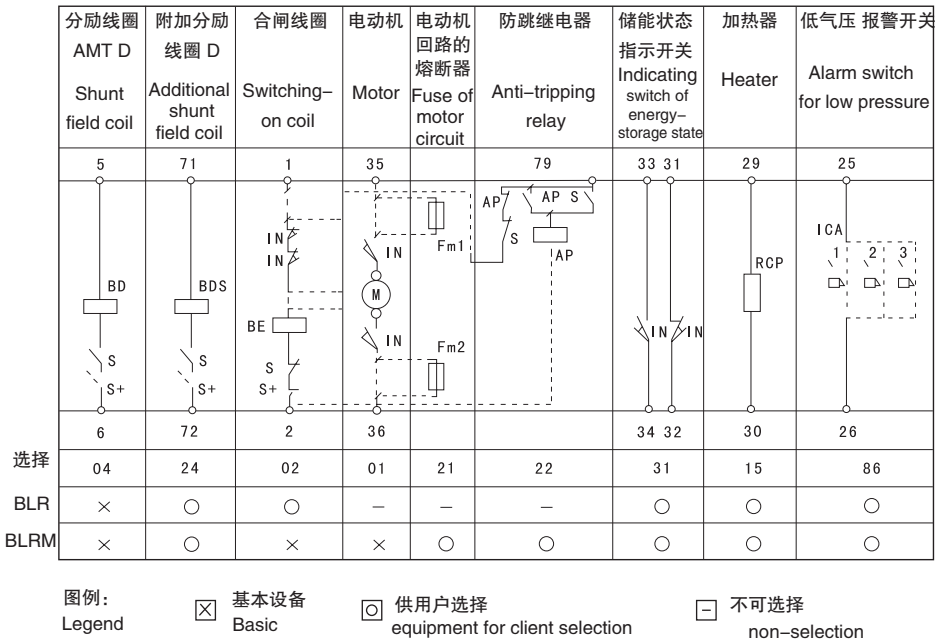


序号 Serial number	标号 Label	名称 Name	型号规格 Model & specification	数量 Quantity	备注 Remarks
1	LX	微动开关 Micro switch	LXW20-11	1	
2	CZ	二次插头 Secondary plug	CZ-46	1	
3	DL	辅助开关 Auxiliary switch	弹簧操动机构内附件 Accessories in the spring actuator	1	
4	CK	行程开关 Stroke switch	弹簧操动机构内附件 Accessories in the spring actuator	4	
5	HQ	合闸线圈 Switching-on coil	弹簧操动机构内附件 Accessories in the spring actuator	1	
6	TQ	分闸线圈 Switching-off coil	弹簧操动机构内附件 Accessories in the spring actuator	1	
7	D	储能电机 Energy-storage motor	弹簧操动机构内附件 Accessories in the spring actuator	1	
8	JX	接线端子 Terminal	弹簧操动机构内附件 Accessories in the spring actuator	24	

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FP 控制原理图 FP schematic diagram



选某些选拨项 (如 04、24、02、22) 必须配用辅助开关。这些辅助开关与选择项用相同的颜色加以表示。若选项没有被选用, 则该项涂色的辅助开关仍可选用, 端子排仍保留。接入防跳时, 合闸回路接 79, 监视信号回路接 1。

If some options are selected (e.g. 04, 24, 02 and 22), it must be equipped with the auxiliary switch. For these auxiliary switch and option, the same color is used to indicate.

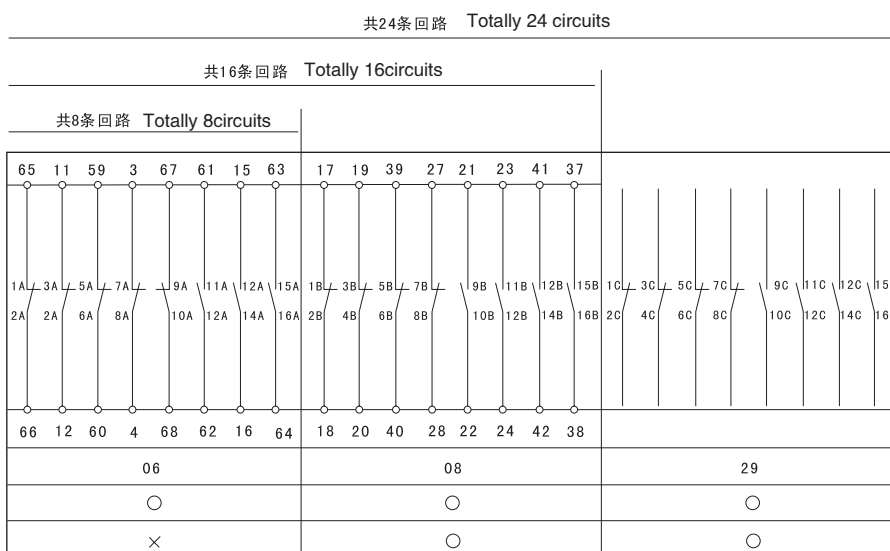
If the option is not selected, this color-coated auxiliary switch still can be selected. The terminal block is still maintained. When connecting in the anti tripping, the switching-on circuit is connected to 79 and the monitoring signal circuit is connected to 1.

端子排列图 Terminal arrangement diagram

接线座号 Number of wire holder	9	13	25	26	1	2	3	4	5	6	11	12	15	16	17	18	19	20	21	22	23	24	27	28	29	30	31	32	33	34
选择号 Option number	01	86	02	06	04	06		08										15	31											

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型铠装移开式交流金属封闭 开关设备

[illegible]

注意：

单台断路器接至端子的辅助接点最多为 6NO, 6NC。

由于端子排空间有限，提供给用户使用的辅助接点引至端子的数量需根据用户选用的项目而定。我们将根据用户要求提供相应的原理图及端子排图。

对于未能引至端子排的辅助接点 (如选项 29 均不引线), 用户可使用我们提供的接线头 (SQA-5N) 直接由辅助开关接出。

Note

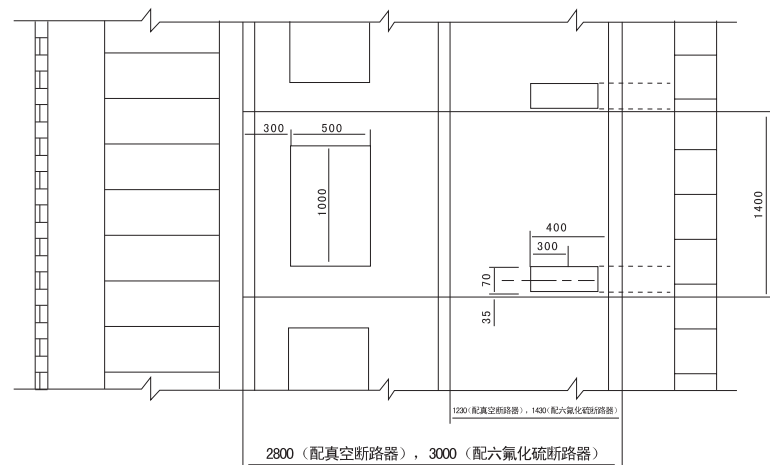
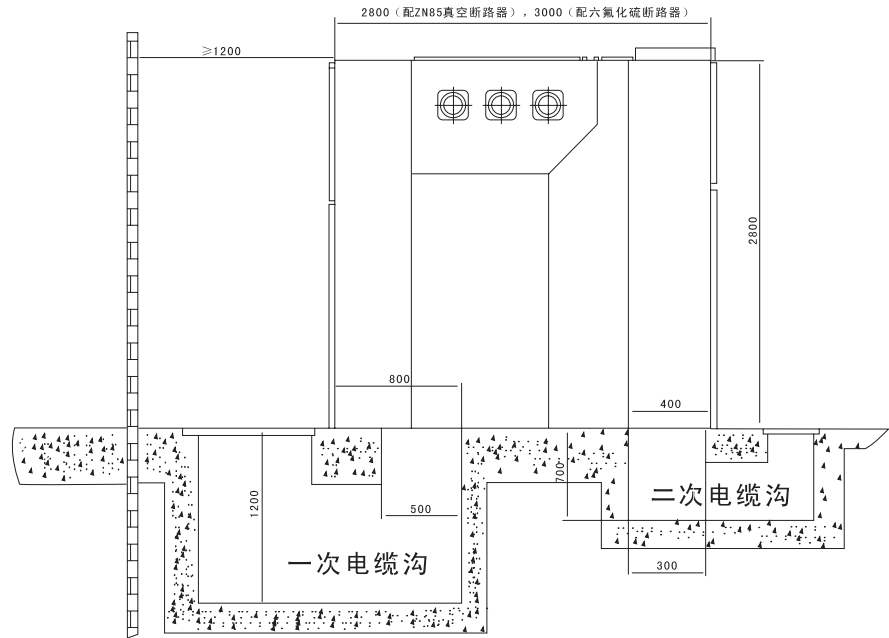
The maximum auxiliary contact connected to the terminal with the single circuit breaker is 6NO and 6NC.

The quantity that auxiliary contact is connected to the terminal provided to the client for use is determined depending on the item selected by the client because there is limited space in the terminal block. We will provide the corresponding schematic diagram and terminal block diagram according to the requirement from client. For the auxiliary contact which cannot be led to the terminal block, (e.g. for option 29, the wire is not led.), the client can use the connector lug provided by us to and the connector lug is connected from the auxiliary contact.

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安装基础图 Installation foundation drawing



KG-12

高效节能型智能化
开关柜



特点

RE(KG)-12 高效节能型智能化开关柜
采用荣获国家专利的 E-1 智能化控制系统，设有配电节能智能控制平台和手机短信报警。
采用多项节能技术和元器件，降耗 80%
上隔离开关、断路器、下隔离开关分别装在金属隔室中：
各室具有独立的泄压通道：
外形紧凑小巧，且留有足够维护空间，柜宽 650mm：.
柜体采用敷铝锌钢板，防护等级 IP4X：
配装德国特瑞德公司 ISM 型单稳态永磁免维护型真空断路器或国产 VEC 侧装固定式真空断路器：
全进口 ISM 型永磁真空断路器最高机械寿命可达 15 万次，实现 20 年免维护；
配置 GN38 三工位隔离开关和快速合闸接地开关：
配置完善联锁装置，操作安全可靠；
产品通过全部型式试验（包括内部故障电弧试验），产品符合 IEC 国际标准和 GB 国家标准。

Characteristic

Awarded national patent, E-1 intelligent control system has distribution energy saving and intelligent control platform as well as mobile phone message alarm.
Using multiple items of energy saving technique and elements which can decrease 80% of energy consumption.
Upper disconnector, circuit breaker and lower disconnector are fixed in metal isolation chamber respectively. Every chamber has respective pressure relief channel.
Compact and small figuration and sufficient maintenance room, width of cabinet is 650mm.
Aluminizing and galvanizing steel plate is used for cabinet, and its protection grade reaches IP4X.
Monostable, permanent magnet and maintenance-free of ISM type vacuum breaker made by Tavrida Electric AG or domestic VEC side fixed type of vacuum breaker.
The maximum mechanical life of ISM type permanent magnet vacuum breaker can reach to 150000 cycles, and 20 years maintenance-free can be realized.
Three working position disconnector and quick closing grounding switch.
Perfect interlocking device makes the operation more safety and reliability.
Produces have experienced all kinds of testing (including inner trouble arc testing) and accord with IEC international standard and GB national standard.

应用

RE(KG)-12 开关柜适用于 12kV 单母线及单母线分段系统。开关柜结构紧凑，性能可靠，是一种技术先进、经济实用的供配电设备。广泛用于城市配电开闭所，如二级变电站、工矿企业、高层建筑、大型住宅小区等地方。

Application

NJE (KG) switchgear is suitable for 12kV single bus and single bus segment system. As one of advance technical, economical and practical power supply equipment, the switchgears have feature of compact construction and reliable performance. They are widely used in city distribution switching station, such as secondary substation, industrial and mining enterprises, high-rise building, large residence building etc.

KGN-12

high efficiency and energy saving
type of intelligent switchgear

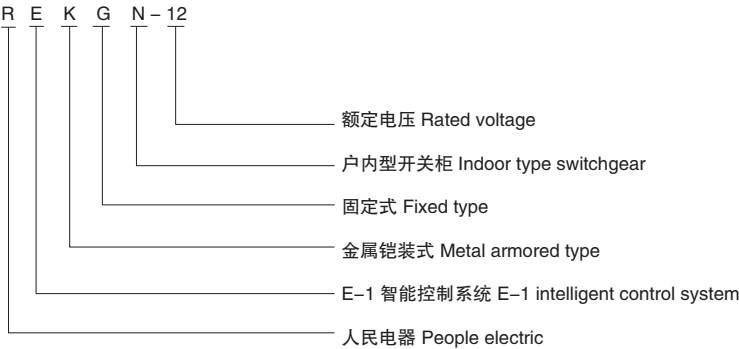
标准 产品符合

GB3906 3-35kV 交流金属封闭开关设备
IE0298 1kV 以上 52kV 以下交流金属封闭开关设备和控制设备

Standard products according with

GB3906 3-35kV alternating metal closed switch equipment
IEC298 larger than 1kV and less than 52kV alternating metal closed switch equipment and control equipment

产品及其含义 Type and its meaning



工作环境条件

环境温度: -25℃ +40℃
相对湿度: 日平均 ≤ 95% 月平均 ≤ 90%
海拔高度: 不超过 1000 米
地震烈度: 不超过 8 度
使用场所: 无爆炸危险, 化学和剧烈振动

Normal using environment

Ambient temperature: -25℃ +40℃
Relative humidity: daily mean ≤ 95% monthly mean ≤ 90%
Altitude: less than 1000m
Seismic intensity: Less than 8 degree
Using place: the place no explosion hazards, chemical and intensity vibration

KGn-12
 高效节能型智能化
 开关柜

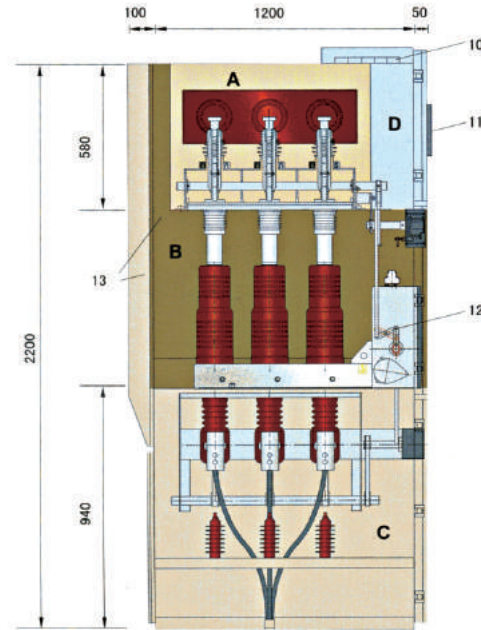
电气数据 Electric data

项目 Item	单位 Unit	数值 Data
额定电压 Rated voltage	kV	40.5
额定短路开断电流 Rated short-circuit breaking current	kA	20, 25, 31.5
额定短路关合电流 Rated short-time withstand current	kA	50, 63, 80
4s 额定热稳定电流	kA	20, 25, 31.5
额定动稳定电流	kA	50, 63, 80
开关柜额定电流	A	630, 1000, 1250, 1600, 2000
母排额定电流（最大值）	A	2000
1min 工频耐受电压 1min power frequency withstand voltage	kV	42
雷电冲击耐受电压 Lightning impulse withstand voltage	kV	75
防护等级 Degree of protection		IP4X

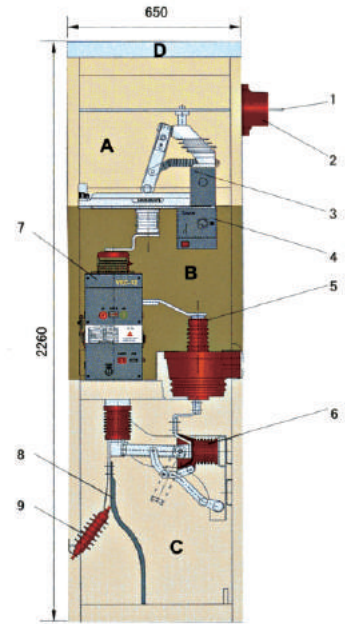
KGN-12

high efficiency and energy saving
type of intelligent switchgear

结构示意图 Structure scheme



侧面内部结构
Lateral internal structure



正面内部结构
Frontal internal structure

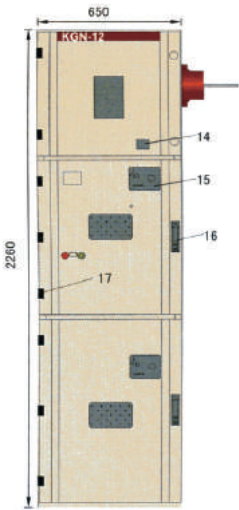
A 主母排 Bus room
B 断路器 Breaker room
C 电缆室 Cable room
D 仪表室 Equipment room

- | | |
|-------------|--------------|
| 1.主母排 | 10.二次小母线 |
| 2.三相一体母线绝缘套 | 11.显示保护仪表 |
| 3.上隔离开关 | 12.断路器联锁 |
| 4.隔离开关操作机构 | 13.泄压通道 |
| 5.电流互感器 | 14.液晶内视镜 |
| 6.下隔离开关 | 15.操作机构防爆透明盖 |
| 7.侧装真空断路器 | 16.闭锁门锁 |
| 8.出线电缆 | 17.新型高强度铰链 |
| 9.避雷器 | |

- | | |
|---|--|
| 1. Main trunk | 10. Secondary small bus |
| 2. Three-phase integration insulating bush of bus | 11. Display protection instrument |
| 3. Upper disconnector | 12. Breaker interlocking |
| 4. Disconnector operation mechanism | 13. Pressure releasing channel |
| 5. Current transformer | 14. Liquid crystal endoscope |
| 6. Lower disconnector | 15. Explosion-proof transparent cover of operation mechanism |
| 7. Side vacuum breaker | 16. Blocking door lock |
| 8. Outlet cable | 17. New high strength hinge |
| 9. Arrester | |

KGN-12
高效节能型智能化
开关柜

门板选用凸型结构并配置新型高强度铰链门锁
所有隔室采用钢板制造，形成各自独立的隔室
各隔室都有独立的泄压通道
各隔室之间钢板能承受故障电弧产生的气体压力
Using convex type structure and new high strength hinge for hilar plate
Using steel plate for all chamber, and forming independent room
Each room has independent pressure releasing channel
The steel plates between each room can endure gas pressure produced by trouble arc

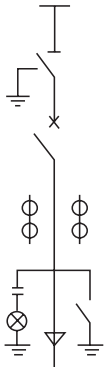
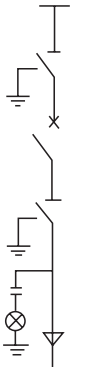
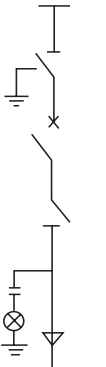


一次方案

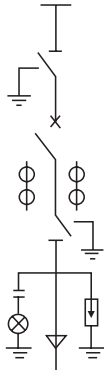
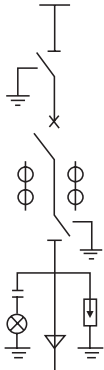

方案编号		01	02	03
一次电路方案				
主 要 电 器 设 备	隔离开关	1	1	1
	真空断路器	1	1	1
	电流互感器		2-3	
	综合显示器	1	1	1
	接地开关			1
	保护继电器	1	1	1
	避雷器	3	3	
外形尺寸 (宽 x 深 x 高)		650x1200x2200	650x1200x2200	650x1200x2200
用途		进出线	进出线	进出线

KGN-12

high efficiency and energy saving
type of intelligent switchgear

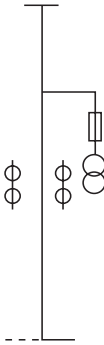
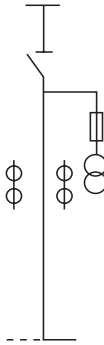

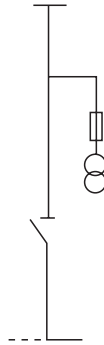
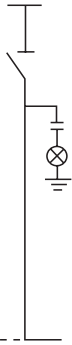
方案编号		04	05	06
一次电路方案				
主 要 电 器 设 备	隔离开关	1	2	2
	真空断路器	1	1	1
	电流 互感器	2~3		
	综合显示器	1	1	1
	接地开关	1		
	保护继电器	1	1	1
	避雷器			
外形尺寸 (宽 x 深 x 高)		650x1200x2200	650x1200x2200	650x1200x2200
用途		进出线	进出线	进出线

KGN-12
 高效节能型智能化
 开关柜

方案编号		01	02	03
一次电路方案				
主 要 电 器 设 备	隔离开关	2	2	1
	真空断路器	1	1	
	电流 互感器	2-3	2-3	
	综合显示器	1	1	1
	接地开关			
	保护继电器	1	1	
	避雷器			
外形尺寸 (宽 x 深 x 高)		650x1200x2200	650x1200x2200	650x1200x2200
用途		进出线	进出线	进出线

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high efficiency and energy saving
type of intelligent switchgear

方案编号		08	09	10	11	12
一次电路方案						
主要电器设备	隔离开关	1	1	1	1	1
	真空断路器	2-3 供电	2-3 供电			
	电流互感器	1	1	1	1	1
	综合显示器	2-3 供电	2-3 供电	2-3	2-3	
	接地开关	3	3	3	3	
	保护继电器					
	避雷器					
外形尺寸(宽x深x高)		700x1200x2200	700x1350x2200	650x1200x2200	700x1200x2200	650x1200x2200
用途		计量	计量	PT	PT 联络	联络

KGN-12
 高效节能型智能化
 开关柜

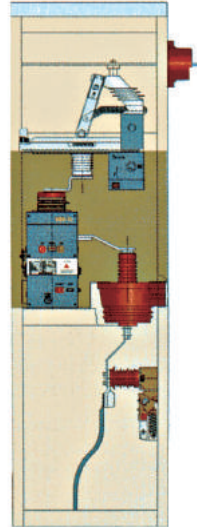
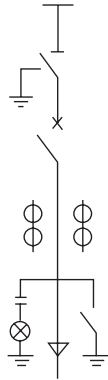
方案编号		13	14	15
一次电路方案				
隔离开关		1	1	1
真空断路器		1		1
主 要 电 器 设 备	电流 互感器			2-3
	综合显示器	1	1	1
	电压互感器	2-3		
	熔断器	3		
	干变式压器			
	保护继电器	1		1
	避雷器	3		
外形尺寸 (宽 x 深 x 高)		700x1200x2200	400x1200x2200	650x1200x2200
用途		进出线	联络	联络

KG-12

high efficiency and energy saving
type of intelligent switchgear

典型方案

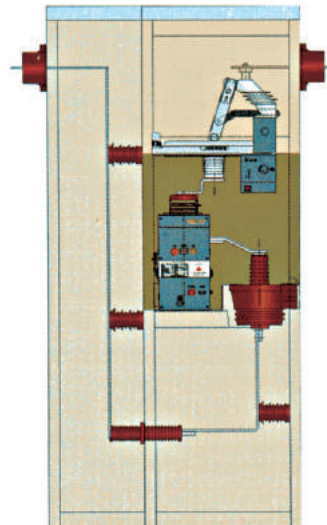
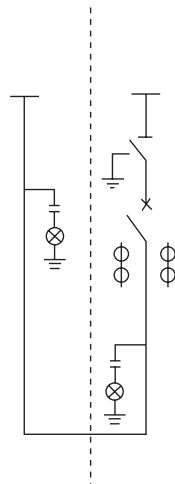
KYN12/04



电缆进出线 + 接地开关断路器柜

外型尺寸(宽 × 深 × 高):
650 × 1200 × 2200(mm)

KG-12/15、16

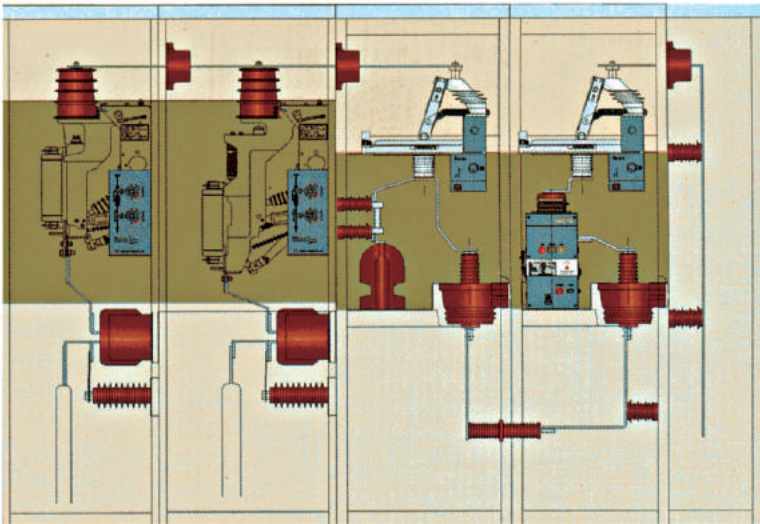
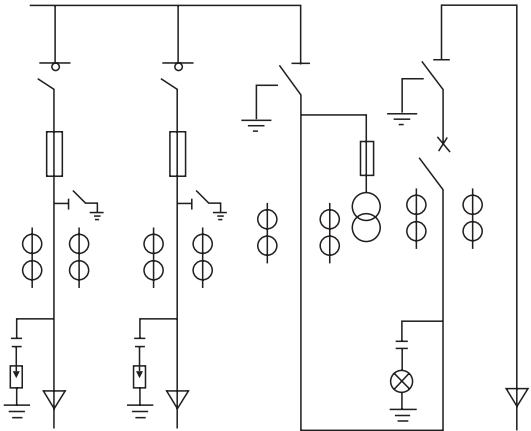


联络 + 断路器柜

外型尺寸(宽 × 深 × 高):
(400+650) × 1200 × 2200(mm)

KG-12

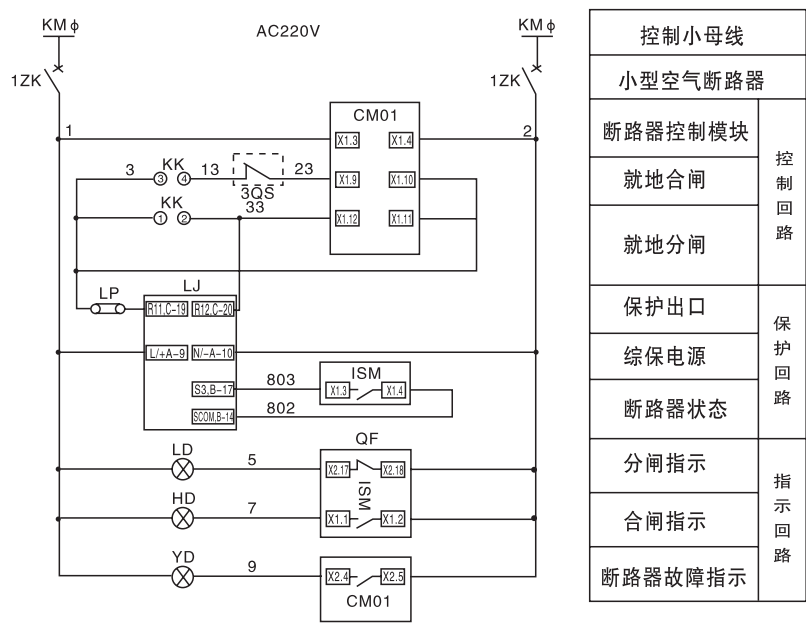
高效节能型智能化
开关柜



负荷开关出线 负荷开关出线 计量 进线断路器

外型尺寸 (宽 × 深 × 高): (600+650+700+650+400) × 1200 × 2200(mm)

KGN-12
 高效节能型智能化
 开关柜



订货须知

订货时用户须提供资料：
 主接线方案编号及单线系统图、排列图
 二次回路接线原理图、端子排列图，如无端子排列图则按制造厂规定
 开关柜内的电器元件的型号、规格、数量
 主母线、支母线的材料、规格，否则按制造厂规定供应
 开关设备使用在特殊环境条件时，应在订货时详细说明
 额定电流大于 1600A 时，柜宽为 800mm

Ordering Instructions

Following documents should be provided by customer when ordering:
 Main connection scheme numbering and system diagram and arrangement diagram of single line.
 Connection principle diagram of secondary circuit, terminal arrangement diagram, if there is no terminal arrangement, we will supply according to the regulation of manufacturer.
 The type, specification and amount of electric elements in switchgear.
 The material, specification of main bus and secondary bus, otherwise we will supply according to the regulation of manufacturer.
 If switchgear is used in specific environment, customer should explain briefly when ordering.
 If rated current is larger than 1600A, the width of cabinet will be 800mm.

XGN2-12(Z)

box stationary-type AC metal closed-loop network switch equipment



概述

XGN2-12(Z) 箱型固定式交流金属封闭开关设备（简称开关柜），是按国家标准 GB3906《3 ~ 35kV 交流金属封闭开关设备》设计的，符合国际电工委员会 IEC298《交流金属封闭开关设备和控制设备》标准，满足 DL402、DL404 标准，达到“五防”闭锁要求。

General description

XGN2-12 (Z) box stationary-type AC metal closed-loop network switch equipment (shortly named switch box) is designed according to the national standard of 《3~35KV AC metal closed-loop switch devices 》, and comply to IEC298《 AC metal closed-loop switch devices and control devices 》, and accord with DL 402、DL404 standard, at the same time it attach to the atresia requirement of “five preventions” .

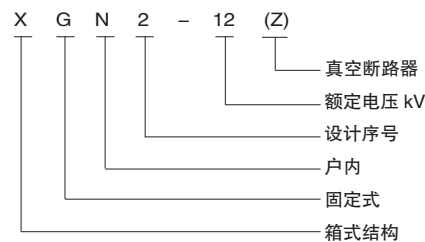
适用范围

本产品适用于额定电压为 3.6 ~ 12kV、50Hz, 额定电流 630 ~ 3150A 三相交流单母线、双母线、单母线带旁路系统，作为接受和分配电能之用。可满足各种类型发电厂、变电站（所）及工矿企业的使用要求。

Scope of application

The production suit for triphase AC single-busbar and single-busbar subsection system which the rated voltage is 3~10kV, 50Hz and the rated current is 630~3150A, for receiving and distributing power. It can meet the operating requirement of various power plants, electric substations and industrial enterprises.

型号及其含义



使用环境条件

- 4.1 环境温度：上限+40℃, 下限-10℃。
- 4.2 相对湿度：日平均值不大于95%；
月平均值不大于90%。
- 4.3 海拔高度：1000m 以下（超过时可与我公司协商）
- 4.4 地震烈度：小于8度。
- 4.5 无火灾、爆炸危险、严重污秽，化学腐蚀及剧烈震动的场所。

XGN2-12(Z)
箱型固定式交流金属封闭
开关设备

Operation environment conditions

- 4.1 ambient temperature: max +40℃, min-10℃
4.2 ambient humidity: daily average relative humidity ≤ 95%
monthly average relative humidity ≤ 90%.
4.3 absolute altitude: less then 1000m.
4.4 earthquake-resistance: earthquake intensity less then 8.
4.5 ambient air is not apparent polluted by corrosive or flammable gas and water vapor.

使用环境条件 Usage environment conditions

5.1 开关柜主要技术参数见表 1 The main technical data of the switch box (see table 1) 表 1

序 号	项 目	单 位	技术参数
1	额定电压（最高工作电压）	kV	3.6, 7.2, 12
2	额定电流	A	5-3000
3	额定短路开断电流	kA	16, 20, 31.5, 40
4	额定短路关合电流（峰值）	kA	40, 50, 80, 100
5	额定短路动稳定电流（峰值）	kA	40, 50, 80, 100
6	额定热稳定电流	kA	16, 20, 31.5, 40
7	额定热稳定时间	s	4
8	防护等级		IP2X
9	结构型式		单母线分段及单母线带旁路
10	操作方式		电磁式，弹簧储能式
11	外形尺寸 宽 × 深 × 高	mm	1100 × 1200 × 2650（一般型）
12	重量	kg	1000

5.2 开关柜内主要电器设备技术参数 The technical data of main electrical applicances in switch box

5.2.1 大电流隔离开关技术参数见表 2 The heavy current disconnecting switch technical data (see table 2) 表 2

名 称			单 位	GN22-10/2000-40	GN22-10/3150-50
额定电压（最高工作电压）			kV	12	
额定电流			A	2000	3150
4s 热稳定电流（有效值）			kA	40	50
动稳定电流（峰值）			kA	100	125
额定 绝缘 水平	雷电冲击电压	断口间、相对地、相间	kV	75	
				85	
	1min工频耐压	断口间、相对地、相间		42	
				53	

XGN2-12(Z)

box stationary-type AC metal closed-loop network switch equipment

5.2.2 大电流隔离开关调整参数见表 3 The heavy current disconnecting switch adjusted data (see table 3)

表 3

名 称	单 位	GN22-10/2000	GN22-10/3150
各相回路电阻	到	12.5	8
三相刚合位置同期性	mm	≧ 3	
三相刚合位置偏斜	mm	≧ 2	
主回路导体（高电位）对地距离	mm	≧ 125	

5.2.3 隔离开关技术参数见表 4 The disconnecting switch technical data (see table 4)

表 4

名 称		单 位	GN30-10/400-12.5	GN30-10/630-20	GN30-10/1000-31.5
			GN30-10D/400-12.5	GN30-10D/630-20	GN30-10D/1000-31.5
额定电压（最高工作电压）		kV	12		
额定电流		A	400	630	1000
4s 热稳定电流（有效值）		kA	12.5	20	31.5
动稳定电流（峰值）		kA	31.5	50	80
额定 绝缘 水平	雷电冲击耐压 1.2/50 s	kV		75	
	1min 工频耐压	kV		42	

5.2.4 隔离开关技术参数见表 5 The disconnecting switch technical data (see table 5)

表 5

名 称	单 位	GN30-10/400	GN30-10/630	GN30-10/1000
弹簧正压力	N	400 ± 40	400 ± 40	600 ± 60
三相刚合位置同期性	mm	≧ 3		
三相刚合位置偏斜	mm	≧ 2		
主回路导体（高电位）对地距离	mm	≧ 125		
相间绝缘距离	mm	≧ 125		
接地刀开距	mm	≧ 125		
各相回路电阻（主回路）	到	≧ 75	≧ 70	≧ 45

5.2.5 接地开关技术参数接地开关技术参数应能与相应的隔离开关的动、热稳定电流，接触压力与相应的隔离开关一致，并且接地开关断口间的距离不小于 125mm。

The earth switch technical data
The technical data of earth switch should be uniform to the one corresponding disconnecting switch on the dynamic stability、thermostable current and contact stress, and the distance between the nicks of earth switch should be not less than 125mm.

XGN2-12(Z)
箱型固定式交流金属封闭
开关设备

5.2.6 LZZJ-10 电流互感器技术参数见表 6
The current transformer of the type LZZJ-10 technical data (see table 6) 表 6

额定一次 电流 A	二次电流A	级 比	额定输出容量 vA	额定热稳定 电流kA	持续时间 s	额定动稳定 电流kA
5	5	0.5	10	0.3	2	0.75
		B	15			
10	5	0.5	10	1	2	2.5
		B	15			
15	5	0.5	10	1.5	2	3.75
		B	15			
20	5	0.5	10	2	2	5
		B	15			
30	5	0.5	10	3	2	7
		B	15			
40	5	0.5	10	4	2	10
		B	15			
50	5	0.5	10	5	2	12.5
		B	15			
75	5	0.5	10	8	2	20
		B	15			
100	5	0.5	10	10	2	25
		B	15			
150	5	0.5	10	16	2	40
		B	15			
200	5	0.5	10	20	4	50
		B	15			
300	5	0.5	10	20	4	50
		B	15			
400	5	0.5	10	20	4	50
		B	15			
500	5	0.5	10	20	4	50
		B	15			
630	5	0.5	10	20	4	50
		B	15			
800、1000	5	0.5	10	31.5	4	80
		B	15			
1250、2000	5	0.5	10	31.5	4	80
		B	15			
2500、3000	5	0.5	10	40	4	100
		B	15			

XGN2-12(Z)

box stationary-type AC metal closed-loop network switch equipment

5.2.7 SN10-10少油断路器技术参数见表7 Oil-minimum breaker of the type SN10-10 technical data(see table 7)

表 7

名 称	单 位	技 术 参 数		
		SN10-10 I / 630-16 1000-16	SN10-10 II / 1000-31.5	SN10-10 III / 1250-40 3000-40
额定电压 (最高工作电压)	kV	12		
额定电流	A	630, 1000	1000	1250, 2000, 3000
额定频率	Hz	50		
额定短路开断电流	kA	16, 20 (7.2kV)	31.5	40
额定短路关合电流 (峰值)	kA	40, 50 (7.2kV)	80	100
热稳定电流	kA	16, 20	31.5	40
热稳定时间	s	4	4	4
机械寿命	次	2000		

5.2.8 SN10-10少油断路器调整参数见表8 Oil-minimum breaker of the type SN10-10 adjustable data (see table 8)

表 8

名 称	单 位	SN10-10 I		SN10-10 II	SN10-10 III		
					主筒	副筒	
导电杆行程	mm	145±3		155±3	157±3	66 ⁺⁴ ₋₂	
各相回路电阻	到	630A ≥ 100	1000A ≥ 55	1000A ≥ 60	1250A ≥ 40	2000A ≥ 25	3000A ≥ 17
刚合速度	m/s	≤ 3.5		≤ 4	≤ 4		
刚分速度	m/s	3+0.3					
合闸缓冲器合闸时间隙	s	2 ~ 6					

5.2.9 ZN28A-10 真空断路器技术参数见表 9 Vacuum interrupter of the type ZN28A-10 technical data (see table 9)

表9

序号	名 称	单 位	技 术 参 数			
1	额定电压 (最高工作电压)	kV	12			
2	额定电流	A	630	1000	1250, 2000	2500, 3000
3	额定短路开断电流	kA	16	20	31.5	40
4	额定短路关合电流 (峰值)	kA	40	50	80	100
5	额定动稳电流 (峰值)	kA	40	50	80	100
6	额定热稳定电流	kA	16	20	31.5	40
7	额定热稳定时间	s	4			
8	额定短路开断电流开断次数	次	30 (50)			
9	额定操作顺序		分-0.3s-合分-180s-合分			
10	一分钟工频耐压 (有效值)	kV	42			
11	雷电冲击耐压	kV	75			
12	机械寿命	次	10000			

XGN2-12(Z)
箱型固定式交流金属封闭
开关设备

5.2.10 ZN28A-10 真空断路器调整参数见表 10 Vacuum interrupter of type ZN28A-10 technical data (see table 10) 表 10

序号	名 称	单 位	数 据	
			20、31.5kA	40kA
1	触头开距	mm	11 ± 1	
2	接触行程	mm	4 ± 1	
3	三相合闸同期性	ms	≤ 2	
4	合闸触头弹跳时间	ms	≤ 2	
5	相间中心距	mm	250 ± 5	
6	平均分闸速度（接触油缓冲器前）	m/s	1 ± 0.3	1.1 ± 0.2
7	平均合闸速度	m/s	0.55 ± 0.15	0.6 ± 0.2
8	动静触头累积允许磨损厚度	mm	3	

5.2.11 操动机构技术参数见表 11 Operating mechanism technical data (see table 11) 表 11

型 号				CD10 I	CD10 II	CD10 III	
配 用 机 构	电 磁 机 构	工作电压 V	合闸线圈		110 220		
			分闸线圈		24, 48, 110, 220		
		工作电流 A	合 闸	110V	196	240	294
				220V	98	120	147
			分 闸	24V	37	37	37
				48V	18.5	18.5	18.5
				110V	5	5	5
				220V	2.5	2.5	2.5
	弹 簧 机 构	型 号		≧ CT8- I CT8- II			
		工作电压 V	储能电机	≧ 110, ≧ 220, ~ 380			
			分励脱扣	≧10,≧220,≧380,≧48			
			失压脱扣	~ 110 (110), ~ 220, ~ 380			
			储能时间		s	5	
		过流脱扣		A	⩾ 5		
合闸时间		s	直流电磁 ⩾ 0.20 弹簧储能 ⩾ 0.15				
分闸时间			⩾ 0.06				

结构特点

XGN2-12(Z) 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、继电器室等，室与室之间用钢板隔开。

6.1 断路器室在柜体前下部，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的接线端子连接，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。

XGN2-12(Z)

box stationary-type AC metal closed-loop network switch equipment

6.2 母线室在柜体后上部，为了减小柜体高度，母线呈品形排列，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。

6.3 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。

6.4 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，在断路器室和电缆室均装有照明灯。

前门的下方设有与柜宽方向平行的接地铜母线，其截面为 $4 \times 40\text{mm}^2$ 。

6.5 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：

6.5.1 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，再将小手柄扳到“分断闭锁”位置，这时断路器不能合闸，将操作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，从下向上推，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。

6.5.2 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，这时前门被锁定，断路器不能合闸，用操作手柄插入接地开关操作孔内，从上向下拉，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，从下向上推，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，从下向上推，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。

Structural featur

The switch box of type XGN2-12 (Z) is metal-closed box structural; the cabinet framework is welded by angle iron. Space in box can be divided into interrupter room bus room relay room and so on. The room is artitioned with other rooms by steel plate.

6.1 The interrupter room locates in ex-lower part of the box, the turning of interrupter is controlled by drag rod connecting to operating mechanism. Upside connecting terminals on one connect to upper disconnecting switch, underside ones are connected to current transformer. And the current transformer are connected to connecting terminals on the underside disconnecting switch, the interrupter even has a pressure releasing channel, if there is electric arc inside, pressure can be released by means of venting gas through the releasing channel.

6.2 Bus room is in the upper part of the box, in order to reduce the box height, the arrangement of bus likes and is supported by ceramic isolator which bending strength is 7350N. Bus is connected to the terminals on the upper disconnecting switch, the bus room can be isolated to one of the adjacent box.

6.3 The cable room lies in rear of the under part of box, the voltage supervisory unit can be placed on supporting isolator. Cable is fixed on the bracket, when main connection is tie scheme; this room is tie cable room.

Relay room is located in the front of upper part of the box, the inside mounted panel can mount all kinds of relays, there is terminal block bracket, the door can some secondary units such as mount indicating instrument, signal element, the top can place secondary small bus.

6.4 The operating mechanism of interrupter is installed in left of box face. On it is operating and interlock mechanism of disconnecting switch.

The switch box is two-faced maintenance; in the front the secondary units in relay room are repaired. Maintain the operating mechanism, mechanical interlocking and driving unit. Examine and repair the

XGN2-12(Z)

箱型固定式交流金属封闭
开关设备

interrupter, Maintain main bus and cable terminals from rear, lamps are installed both interrupter room and cable room.

A grounding copper busbar is placed on the lower of front door, its section is 4X40mm².

6.5 Mechanical interlocking: in order to prevent from switching on and off disconnecting switch with loads and from mishandling interrupter, from missing electrical interval, from switching on the grounding switch with electric, from grounding knife being switched in , the switch box should use mechanical interlocking.. The operating principle as follows:

6.5.1 Power-off operation (running – repairing)

The switch box is running , then the upper and under disconnecting switch、 interrupter are placed in the state of switched in.

The front and rear door have been locked and running with electric, at this time the small handle is in working place, Firstly switching off the interrupter, then taking the small handle to the place of disconnect interlock , at this time the interrupter cannot been switched on, then taking the operating handle insert into handle hole of lower splitting place and pulling it from up to down and making it to lower isolating splitting place, taking out the handle and insert it into handle hole of upper splitting place, pulling it from up to down and making it to upper isolating splitting place, then taking out the handle and inserting into grounding switching hole, pushing it from down to up, making grounding switch on, at this time pushing the handle to the place of repairing, so firstly opening the front door and taking the key of rear door, then opening the rear door, when power-off operation being completing, the maintainer can maintain and repairing the interrupter room and cable room.

6.5.2 Power-on operation (repairing– running)

If the repairing has been completed and power needed to be on, the operational sequence as follow: Closing the rear door, taking out the key and closing front door, pushing the handle from the place of repairingto disconnect interlock, at this time the front door being locked, and the interrupter not being switched on, inserting the handle into handle hole in the grounding switch, then pulling it from up to down and making grounding switch off, taking out the handle and inserting the handle hole of upper splitting again, then pulling it from down to up, making the disconnecting switch on, then taking the handle out and inserting it into handle hole of lower disconnecting switch, pulling it from down to up, and making low disconnecting switch on, taking handle out , pulling the handle to working place, at this time, the interrupter can be switched on.

6.6 产品外形尺寸及结构图 (见图 1、图 2、图 3)

The product outline dimension and structural diagram (see draw 1,2,3)

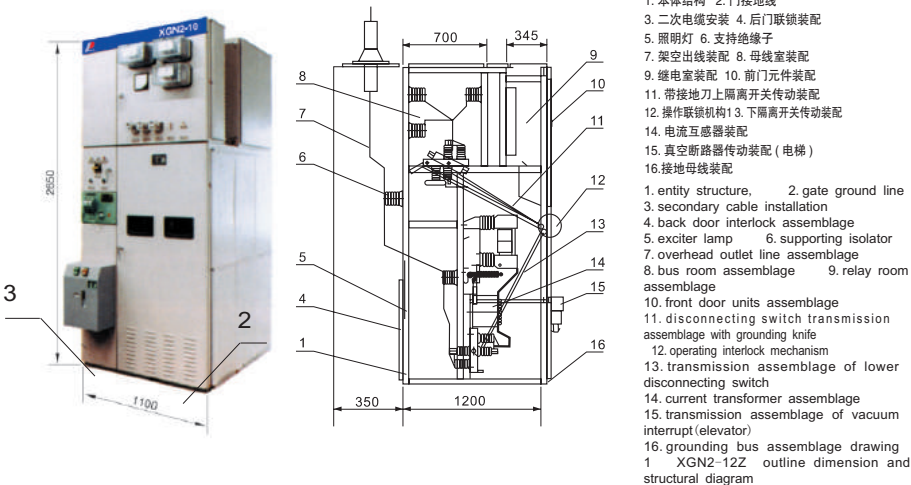


图 1 XGN2-12Z外形尺寸及结构图

XGN2-12(Z)

box stationary-type AC metal closed-loop network switch equipment

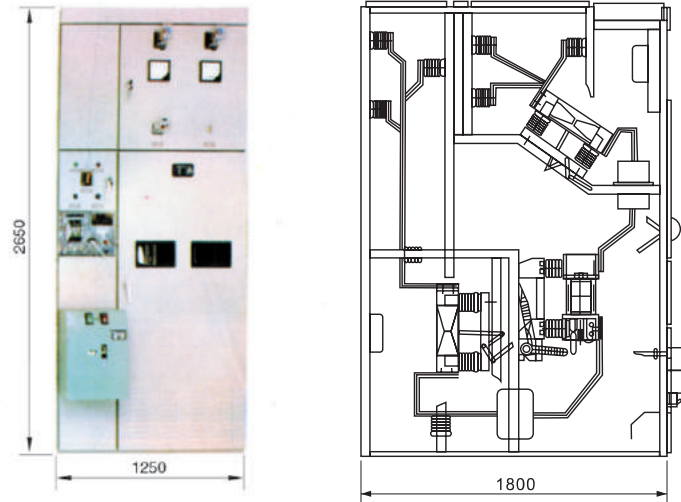


图2 XGN2-12Z大电流柜外形结构图

Draw 2 XGN 2-12Z heavy current box outline dimension

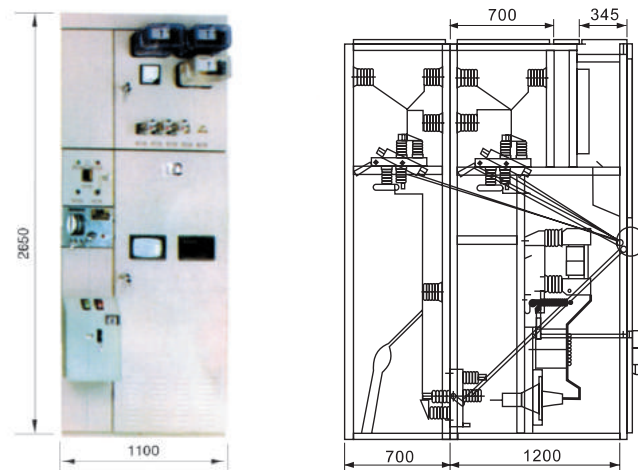


图3 XGN2-12Z 旁路电缆出线柜外形结构图 (配有 ZN28A 系列真空断路器)

Draw 3 XGN2-12Z shunt circuit cable outlet line box outline dimension(with ZN28A vacuum interrupter)

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箱型固定式交流金属封闭
开关设备

产品安装尺寸及基础示意图（见图 4、5）

Product installation dimension and the foundation demonstration(see table 4,5)

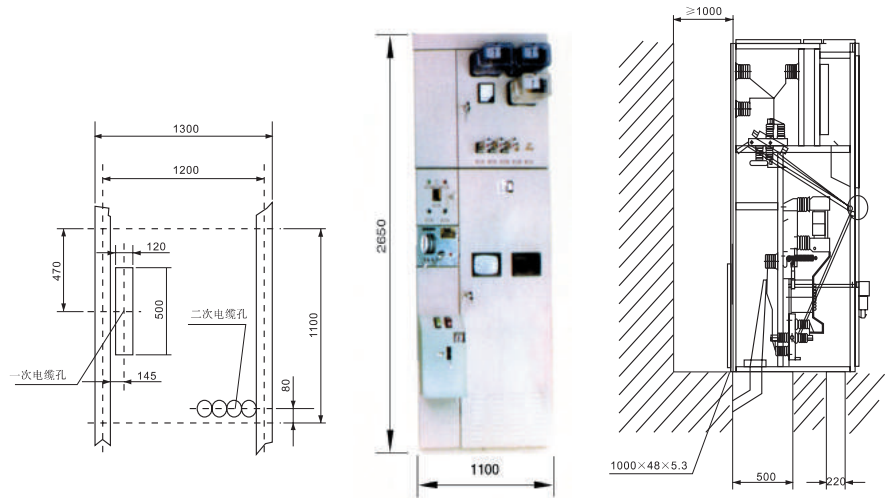


图 4 XGN2-10 型安装尺寸图

Figure 4 XGN2-10 installation dimension drawing

图 5 XGN2-10Z- 型基础示意图

Figure 5 XGN2-10Z base sketch drawing

订货须知

- 7.1 一次线路主方案编号、单母线系统图、排列图、平面布置图。
- 7.2 二次线路电气原理图、端子排列图。
- 7.3 开关柜内电器元件的型号、规格、数量。
- 7.4 主母线、分支母线的规格、材质。
- 7.5 备品、备件的名称及数量。
- 7.6 特殊要求同我方协商。

Ordering criterions

The consumer must provided the following data at the time of ordering:

- 7.1 Serial number of first-wiring main project, single busbar system diagram, arrangement diagram and layout chart.
- 7.2 Secondary wiring electric schematic diagram, connector arrangement diagram
- 7.3 Type, serial and number of electric elements in switchgear
- 7.4 Serial and material of main busbar and branch busbar
- 7.5 Number and name of the spare parts and components
- 7.6 Consult the manufacturer, if there is special requirement.

XGN15-12(L · R)

box-type stable type AC metal sealed switchgear



概述

XGN15-12(L)/T630-25 及 XGN15-12(L · R)/T100-31.5 箱型固定式交流金属封闭开关设备主要用于三相交流 50Hz, 额定电压 10kV 的电力系统的环网供电或双辐射供电, 也可用于终端供电作为电能的控制和用电设备的保护装置, 它也适用于装入箱式变电站, 尤其是紧凑型箱变中。

Brief Introduction

XGN15-12(L)/T630-25 or XGN15-12(L · R)/T100-31.5 box-type fixed AC metal enclosed switchgear is mainly used for looped network power supply or biradial power supply of electric power system with 3-phase AC 50Hz and rated voltage 10KV. It also can be used for terminal power supply as the control device of electric energy and protection device of utilization equipment. More over, it also can be suitable for this switchgear to be installed in the box substation, especially compact box substation.

使用环境条件

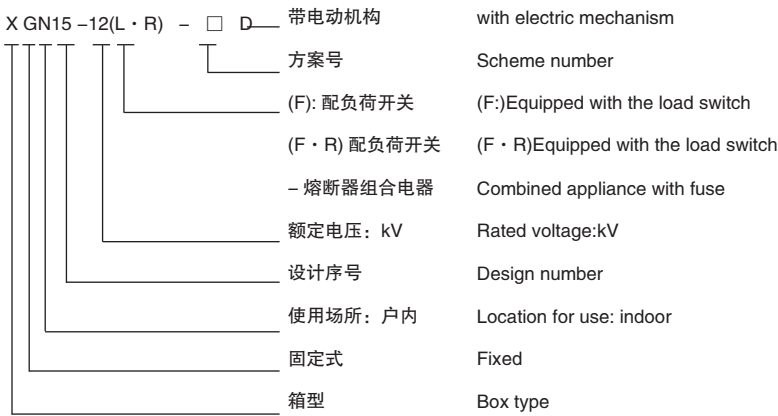
1. 海拔高度: $\leq 1000\text{m}$;
2. 环境温度: $-25^{\circ}\text{C} \sim +40^{\circ}\text{C}$
3. 相对湿度: 日平均值不大于 95%, 月平均值不大于 90%;
4. 周围空气应不受腐蚀性、可燃性气体、水蒸气等明显污染;
5. 无经常性的剧烈震动的场所。

Service Environmental Condition

1. Altitude: $\leq 1000\text{m}$
2. Ambient temperature: $-25^{\circ}\text{C} \sim +40^{\circ}\text{C}$
3. Relative humidity: The daily average value is not more than 95% and the monthly mean value is not more than 90%.
4. The surrounding air shall not be polluted by corrosive gas and flammable gas as well as water vapor and so on obviously.
5. No location of recurrent strenuous vibration

XGN15-12(L·R)
箱型固定式户内交流金属封闭开关设备

型号及含义 Model&meaning



开关柜主要结构

由母线室、三工位负荷开关室(或断路器室)、电缆室、操动机构、联锁机构和低压控制室以及测量或计量回路等部分组成。各隔室用钢板分隔,可避免故障部位影响到邻室。

符合 GB3906, IEC298 等标准。

1、母线室

母线室布置在柜体的上部,在母线室中主母线连接在一起,贯穿整排开关柜。母线呈水平布置,可方便地扩展。

2、负荷开关室

开关室内装有一个三工位负荷开关,负荷开关的外壳为环氧树脂浇注而成,内充 SF6 气体作灭弧和绝缘介质,在操作轴引出端设有两个透明的热压成型的塑料端盖,透过它可以观察触头状态。开关室可根据用户要求装设 SF6 气体密度表或带报警触点的气体密度继电器。

3、电缆室

电缆室主要用于电缆连接,使单芯电缆可以采用最简单的非屏蔽电缆头进行连接,同时充裕的空间还可以容纳避雷器、电流互感器、下接地开关等元件。按标准设计,柜门有观察窗和安全联锁装置。电缆室底板配密封盖和带支撑的大小相宜的电缆夹。电缆室底板的门前框可以拆下,方便电缆安装。

4、操动机构、联锁机构和低压控制室

带联锁的低压室同时起到控制屏的作用。低压室内装有带位置指示器的弹簧操动机构和机械联锁装置,也可以装设辅助触点、跳闸线圈、紧急跳闸机构、电容式带电显示装置、钥匙锁和电动操作装置,同时低压室空间还可以供装设控制回路、计量仪表和保护继电器,750mm 宽柜设有两个相同的低压室,可以装更多附件。

XGN15–12(L · R)

box–type stable type ACmetal
sealed switchgear

Main structure of switch cabinet

It consists of such parts as bus compartment, 3–position load switch compartment (or circuit breaker compartment), cable compartment, actuator, interlocking mechanism and low–voltage control room as well as measuring circuit or metering circuit and so on. Every compartment is separated by the steel plate so that the fault part avoids affecting the adjacent compartment.

It conforms to the GB3906 and IEC298 standard and so on.

1. Bus compartment

The bus compartment is arranged on the upper part of cabinet body. The main buses are connected together in the bus compartment and they pass through the whole array of switch cabinet. The arrangement of bus is horizontal and it can be spread out conveniently.

2. Load switch compartment

There is a 3–position load switch installed in the switch compartment. The casing of load switch is poured by the epoxy resin. The SF₆ gas is refilled as the arc–extinguishing and insulating medium in the compartment. There are 2 transparent plastic end covers by means of thermal forming installed at the leading end of operating shaft. The contact state can be observed through it. The SF₆ gas density gauge or gas density apparatus with alarm contact is installed in the switch compartment according to the client requirement.

3. Cable compartment

The cable compartment is mainly used for cable connection. For the connection of single–core cable, the simplest non–shielded cable head is used. At the same time, there are such elements as lightning arrester, current transformer and lower grounding switch and so on also can be contained in the enough room. There are observation window and safety interlocking device in the cabinet door as per the standard design. The back plate in the cable compartment is equipped with the sealing cover and appropriate size of cable clamp with support. The frame in front of door at the back plate in the cable compartment can be dismantled for easy cable installation.

4. Actuator & interlocking mechanism and low–voltage control room

The low–voltage room with interlocking functions as the screen control at the same time. The low–voltage room is equipped with the spring actuator with position indicator and mechanical interlocking device. The auxiliary contact, tripping coil, emergency tripping mechanism, capacitor–type charged display device, key lock and electrical operation device are installed in the low–voltage room. At the same time, the control circuit and metering instrument as well as protection relay also can be installed in the space of low–voltage room. There are 2 same low–voltage rooms installed in the 750mm wide cabinet and more accessories can be installed in this size of cabinet.

XGN15-12(L · R)
箱型固定式户内交流金属封
闭开关设备

主要技术参数 Main Technical parameter

序号 Serial number	项目 Item		单位 Unit	技术参数 Technical parameter	
				XGN15-12L	XGN15-12(L · R)
1	额定电压 Rated voltage		kV	12	
2	额定频率 Rated frequency		Hz	50	
3	额定绝缘水平 Rated insulating level	1min 工频耐压 1min Power-Frequency withstand voltage	kV	对地及相间 42，隔离断口 48 For ground, interphase 42; isolating fracture 48	
		雷电冲击耐压 Rated lightning impulse withstand voltage	kV	对地及相间 75，隔离断口 85 For ground, interphase 75; isolating fracture 85	
4	主母线额定电流 Rated current of main bus		A	630	
5	额定电流 Rated current		A	630	100
6	额定闭环开断电流 Rated closed-loop breaking current		A	630	
7	额定有功负载开断电流 Rated breaking current of resistive load		A	630	
8	额定电缆充电开断电流 Rated cable charged breaking current		A	10	
9	额定转移电流 Rated transfer current		A		1700
10	开断空载变压器容量 No-load transformer breaking capacity		kVA	1250	
11	额定关合电流（峰值） Rated making current (peak value)		kA	63	
12	额定短时耐受电流 (2s) Rated short-time withstand current (2s)		kA	25	
13	额定峰值耐受电流 Rated peak-value withstand current		kA	63	
14	额定短路开断电流 Rated short-circuit breaking current		kA		31.5(预期) 31.5(expectancy)
15	接地回路峰值耐受电流 Peak-value withstand current of grounding circuit		kA	63	
16	接地回路短时耐受电流 (2s) Short-time withstand current of grounding circuit (2s)		kA	25	
17	配用熔断器型号 Mode of self-contained fuse				S □ LAJ
18	辅助回路额定电压 Rated voltage of auxiliary circuit		V	≤ 220，-110	
19	防护等级 Protection degree			IP3X	
20	机械寿命 Mechanical life	负荷开关 Load switch	次 Times	5000	
		接地开关 Grounding switch	次 Times	2000	

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熔断器保护变压器参考表 Reference table of fuse protection transformer

变压器容量 (kVA) Capacity of transformer(kVA)	50	100	125	160	200	250	315	400	500	630	800	1000	1250
熔断器额定电流 (A) Rated current of fuse(A)	10	16	16	16	20	25	31.5	40	50	63	63	80	100

开关柜类型 Type of switch cabinet

1、负荷开关柜

负荷开关柜主要用作环网接线和放射式接线中的进线柜。该柜一般配备一台三工位负荷开关及其操动机构。三工位负荷开关仅可置于合闸、分闸、接地运行位置中的一个，可防止误操动。当负荷开关处于接地状态时才可能进入电缆室。负荷开关的位置指示器符合 IEC60129A2(1996) 的要求。运行人员可通过低压室门后的观察窗检查开关是否处于分闸或接地的状态，运行人员在设备运行时也可透过前门窗口容易地观察到电缆连接和故障指示 (如果装有的话)。

1.Cabinet of load switch

The cabinet of load switch is mainly used for leading-in cabinet in the looped network wiring and radiation wiring. This cabinet is typically equipped with a 3-position load switch and actuator. Only 3-position load switch can be placed at one of switching-on, switching-off and grounding as well as operating position. Therefore, it can prevent the false operation. The cable compartment can be entered in when the load switch is located in the grounding state. The position indicator of load switch meets the IEC60129A2 (1996) requirement. The operator can check if the switch is in the switching-off or grounding state through the observation window behind the door of low-voltage compartment. The operator also can observe the cable connection and fault indicator (if it is installed) easily from the window at the front door.

基本设备

- 壳体
- 三工位负荷开关
- 配机械式位置指示装置的操动机构
- 联锁装置
- 母线
- 配电缆支撑件的电缆底板

Basic equipment

- shell
- 3-position load switch
- Actuator equipped with mechanical position indicating device
- Interlocking device
- Bus
- Cable back plate equipped with strutting piece for cable

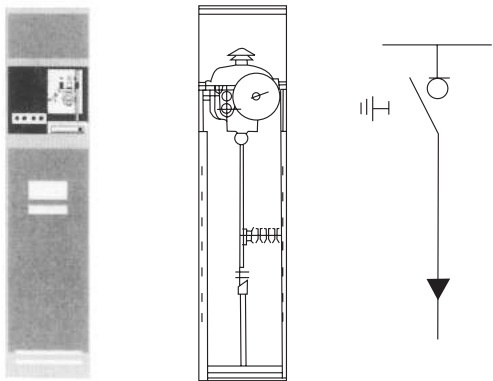
开关柜的可选件

- 带电显示器
- 各位置的辅助触点：2常开+2常闭
- 气体密度表或带报警触点的气体密度继电器
- 电动操动装置
- 电流互感器
- 电压互感器 (代替电缆连接)
- 压力释放通道
- 控制电缆通道
- 接地母线
- 避雷器

Option of switch cabinet

- Charged indicator
- Auxiliary contact of every position: 2NOs + 2 NCs
- gas density gauge or gas density apparatus with alarm contact
- Electrical operating device
- Current transformer
- Voltage transformer (instead of cable connection)
- Pressure-relief channel
- Control cable channel
- Earth bus
- Lightning arrester

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序号 Serial number	项目名称 Name of item		单位 Unit	数据 Data
1	额定电流 Rated current		A	630
2	额定短时耐受电流 Rated short-time withstand current		kA	25
3	额定短路持续时间 Rated short-circuit duration		S	2
4	外形尺寸 Physical dimension	宽 Width	mm	375/500
		深 Depth		940
		高 Height		1635/1885

2、负荷开关 – 熔断器组合电器柜

负荷开关-熔断器组合电器柜主要用于变压器保护。该型柜配一台三工位负荷开关和一台独立的辅助接地开关。内置于负荷开关内的接地开关关合可使熔断器上触头接地，而独立的辅助接地开关关合可使熔断器下触头接地。操动机构为双卷簧式，具有熔断器熔断自动跳闸功能。只有负荷开关处于接地位置时，才可能进入电缆室。SF6负荷开关的位置指示器符合IEC60129A2(1996)的要求。运行人员可通过低压室门后的观察窗观察开关是否处于分闸或接地的位置。运行人员在设备运行时也可透过前门窗口容易地观察到电缆连接和故障指示器。

2. Combined electrical cabinet with load switch and fuse

The combined electrical cabinet with load switch and fuse is mainly used for transformer protection. This type of cabinet is equipped with a 3-position load switch and one individual auxiliary grounding switch. The making of grounding switch built in the load switch can enable the contact on the fuse to ground. However, the making of individual auxiliary grounding switch can enable the contact under the fuse to ground. The actuator is double spiral spring type. It has the function that the fuse melts and the automatic tripping can be performed. Only when the load switch is located at the grounding position, it can be entered into the cable compartment. The position indicator of SF6 load switch meets the IEC60129A2 (1996) requirement. The operator can observe that the switch is located at the switching-off or grounding position or not from the observation window at the rear side of low-voltage compartment door. The operator also can observe the cable connection and fault indicator easily from the window at the front door.

XGN15-12(L · R)

box-type stable type AC metal sealed switchgear

基本设备

- 壳体
- 三工位负荷开关
- 配机械式位置指示装置的操动机构
- 联锁装置
- 母线
- 带指示器的熔断器跳闸装置
- EF 型接地开关
- 熔断器基座
- 电缆室壳体
- 配电缆支撑件的电缆底板

Basic equipment

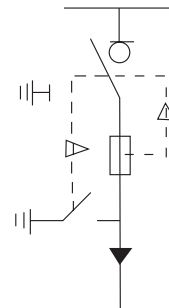
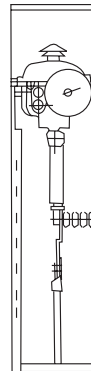
- Shell
- 3-position load switch
- Actuator equipped with mechanical position indicating device
- Interlocking device
- Bus
- Fuse tripping device with indicator
- EF-type grounding switch
- Fuse pedestal
- Shell of cable compartment
- Cable back plate equipped with strutting piece for cable

开关柜的可选件

- 带电显示器
- 各位置的辅助触点: 2常开+2常闭
- 气体密度表或带报警触点的气体密度继电器
- 电动操动装置
- 紧急跳闸机构
- 压力释放通道
- 控制电缆通道
- 电压互感器 (代替电缆连接)
- 跳闸线圈
- 接地母线

Option of switch cabinet

- Charged indicator
- Auxiliary contact of every position: 2NOs + 2 NCs
- Gas density gauge or gas density apparatus with alarm contact
- Electrical operating device
- Emergency tripping mechanism
- Pressure-relief channel
- Control cable channel
- Voltage transformer (instead of cable connection)
- Tripping coil
- Earth bus



XGN15-12(L · R)
箱型固定式户内交流金属封闭开关设备

序号 Serial number	项目名称 Name of item		单位 Unit	数据 Data
1	熔断器额定电流 Rated current of fuse		A	100
3	熔管长度 Length of fusion tube		mm	292
4	外形尺寸 Physical dimension	宽 Width	mm	375/500/625
		深 Depth		940
		高 Height		1635/1885

3、母线联络柜

母线联络柜用于电缆与母线的连接。该柜内有连接座用于固定电缆。在 500mm 柜中可安装 CT。如果柜中无接地开关，前门固定，只能用工具开启。

3.Bus contact cabinet

The bus contact cabinet is used for connection between the cable and bus. The connecting base is installed in this cabinet to fix the cable. The CT can be installed in the 500mm cabinet. If there is no grounding switch in the cabinet, the front door is fixed. Only the tool can be used to open the front door.

基本设备

- 壳体
- 母线支撑
- 联锁装置（有接地开关配该装置）
- 母线
- 电缆底板配电缆支撑
- 连接多根电缆的连接头

Basic equipment

- Shell
- Bus support
- Interlocking device (it is equipped with this device if there is a grounding switch)
- Bus
- The cable back plate is equipped with the cable support
- Connector connecting several cables

开关柜的可选件

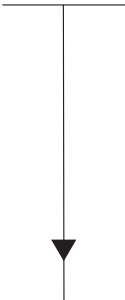
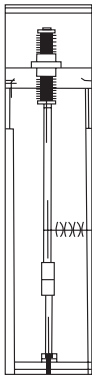
- 带电显示器
- 电流互感器
- CT 下接地开关
- 压力释放通道
- 控制电缆通道
- 接地母线
- 避雷器

Option of switch cabinet

- Charged indicator
- Current transformer
- Grounding switch under CT
- Pressure-relief channel
- Control cable channel
- Earth bus
- Lightning arrestor

XGN15-12(L · R)

box-type stable type ACmetal
sealed switchgear



序号 Serial number	项目名称 Name of item		单位 Unit	数据 Data
1	额定电流 Rated current		A	630/1250
2	额定短时耐受电流 Rated short-time withstand current		kA	25
3	额定短路持续时间 Rated short-circuit duration		S	2
4	外形尺寸 Physical dimension	宽 Width	mm	375/500
		深 Depth		940
		高 Height		1635/1885

4、分段柜

分段柜可与母线提升柜一起使用，标准型柜宽375mm，配备一台 FLN36B-12D 型三工位负荷开关用于母线分段。

基本设备

- 壳体
- 三工位负荷开关
- 配机械式位置指示装置的操动机构
- 联锁装置
- 母线

4.Section cabinet

The section cabinet can be used together with the bus lifting cabinet. The width of standard cabinet is 375mm. It is equipped with a FLN36B-12D 3-position load switch used for bus sectioning.

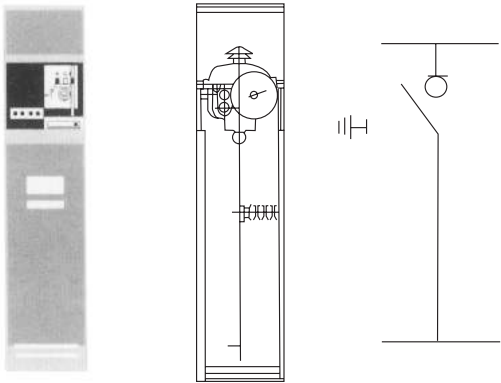
Basic equipment

- Shell
- 3-position load switch
- Actuator equipped with mechanical position indicating device
- Interlocking device
- Bus

XGN15-12(L · R)
箱型固定式户内交流金属封
闭开关设备

- 开关柜的可选件
- 带电显示器
 - 各位置的辅助触点：2常开+2常闭
 - 气体密度表或带报警触点的气体密度继电器
 - 电动操动装置
 - 压力释放通道
 - 控制电缆通道
 - 电流互感器
 - 电压互感器
 - 接地母线

- Option of switch cabinet
- Charged indicator
 - Auxiliary contact of every position: 2NOs + 2 NCs
 - Gas density gauge or gas density apparatus with alarm contact
 - Electrical operating device
 - Pressure-relief channel
 - Control cable channel
 - Current transformer
 - Voltage transformer
 - Earth bus



序号 Serial number	项目名称 Name of item		单位 Unit	数据 Data
1	额定电流 Rated current		A	630
2	额定短时耐受电流 Rated short-time withstand current		kA	25
3	额定短路持续时间 Rated short-circuit duration		S	2
4	外形尺寸 Physical dimension	宽 Width	mm	375/500
		深 Depth		940
		高 Height		1635/1885

XGN15-12(L · R)

box-type stable type AC metal sealed switchgear

5、母线提升柜

母线提升柜把母线与装有负荷开关的顶部连接起来。该柜宽达 500mm，可用作计量柜，该柜空间可容纳 3 个电压互感器和 3 个电流互感器。前面板固定在柜上，须用专用工具开启。前门板上有观察窗。

5. Bus lifting cabinet

The bus lifting cabinet connects the bus with the top installed with the load switch. The width of this cabinet is up to 500mm. it can be used as the metering cabinet. 3 voltage transformers and 3 current transformers can be accommodated in the space of this cabinet. The front panel is fixed on the cabinet and the special tool must be used to open the front panel. There is an observation window in the front door plate.

基本设备

- 壳体
- 开关替代品
- 下盖板

Basic equipment

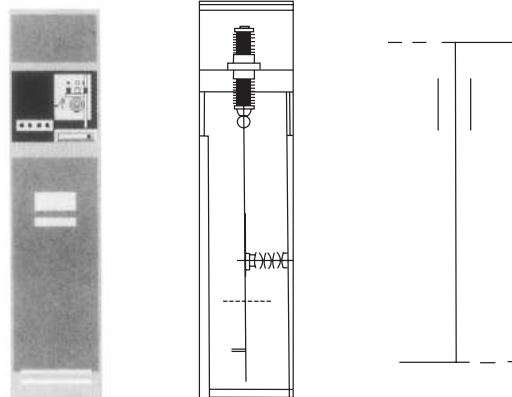
- Shell
- Switch substitute
- Lower cover plate

开关柜的可选件

- 电流互感器
- 电压互感器
- 接地开关，配位置指示器
- 接地开关的辅助触点：2常开+2常闭
- 压力释放通道
- 控制电缆通道
- 接地母线

Option of switch cabinet

- Current transformer
- voltage transformer
- Grounding switch equipped with the position indicator
- Auxiliary contact of grounding contact: 2NOs + 2 NCs
- Pressure-relief channel
- Control cable channel
- Earth bus



XGN15-12(L·R)
箱型固定式户内交流金属封闭开关设备

序号 Serial number	项目名称 Name of item		单位 Unit	数据 Data
1	额定电流 Rated current		A	630/1250
2	额定短时耐受电流 Rated short-time withstand current		kA	25
3	额定短路持续时间 Rated short-circuit duration		S	2
4	外形尺寸 Physical dimension	宽 Width	mm	500
		深 Depth		940
		高 Height		1635/1885

6、分段计量柜

分段计量柜主要用于测量计量。该型柜包括两个独立操作的 FLN36-12D 型三工位负荷开关。两负荷开关布置在分段母线两端。负荷开关与开关柜前门有联锁，只有在两个负荷开关都处于接地位置时，开关柜的前门才有可能打开。

6.section metering cabinet

The section metering cabinet is mainly used for measurement and metering. This type of cabinet includes two individually operated FLN36B-12D 3-position load switches. Two load switches are arranged at both ends of section bus. The load switch is interlocked with the front door of switch cabinet. The front door of switch cabinet can be opened only when two load switches are located at the grounding position.

基本设备

- 壳体（右侧）
- 三工位负荷开关
- 配机械式位置指示装置的操动机构
- 联锁装置
- 母线
- 壳体（左侧）
- 三工位负荷开关
- 操动机构配机械式位置显示
- 联锁装置
- 母线

Basic equipment

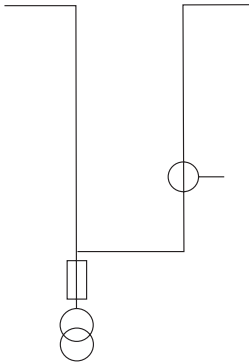
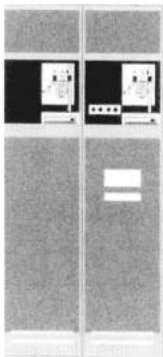
- Shell (right side)
- 3-position load switch
- Actuator equipped with mechanical position indicating device
- Interlocking device
- Bus
- Shell (left side)
- 3-position load switch
- Actuator equipped with mechanical position indicating device
- Interlocking device
- Bus

XGN15-12(L · R)

box-type stable type ACmetal
sealed switchgear

- 开关柜的可选件
- 带电显示器
 - 各位置的辅助触点：2常开+2常闭
 - 气体密度表或带报警触点的气体密度继电器
 - 紧急跳闸机构
 - 跳闸线圈
 - 电动操动装置
 - 电压互感器
 - 电流互感器
 - 压力释放通道
 - 控制电缆通道
 - 接地母线

- Option of switch cabinet
- Charged indicator
 - Auxiliary contact of every position: 2NOs + 2 NCs
 - Gas density gauge or gas density apparatus with alarm contact
 - Emergency tripping mechanism
 - Tripping coil
 - Electrical operating device
 - Voltage transformer
 - Current transformer
 - Pressure-relief channel
 - Control cable channel
 - Earth bus



序号 Serial number	项目名称 Name of item		单位 Unit	数据 Data
1	额定电流 Rated current		A	630
2	额定短时耐受电流 Rated short-time withstand current		kA	25
3	额定短路持续时间 Rated short-circuit duration		S	2
4	外形尺寸 Physical dimension	宽 Width	mm	750
		深 Depth		940
		高 Height		1635/1885

XGN15-12(L · R)
箱型固定式户内交流金属封闭开关设备

7、断路器柜

断路器柜用于额定电流 1250A 开关柜的进线柜。该断路器柜配备有可移开式的 VS1⁺ 真空断路器。运行人员可以透过断路器室门上的观察窗，观察断路器手车的位置及断路器的状态。也可以透过电缆室门上的观察窗观察电缆连接情况，该断路器柜可同时配备电流互感器和电压互感器。

7.Circuit breaker cabinet

The circuit breaker cabinet is used as the inlet cabinet for switch cabinet whose rated current is 1250A. This circuit breaker cabinet is equipped with the removable VS1⁺ vacuum circuit breaker. The operator can observe the position of circuit breaker trolley and state of circuit breaker through the observation window on the door of circuit breaker compartment. The operator also can observe the cable connection from the observation window on the cable compartment door. This circuit breaker cabinet can be equipped with the current and voltage transformer simultaneously.

基本设备

- 壳体
- 母线
- 可移开式 VS1⁺ 真空断路器
- 电缆入口，配电缆支撑
- 接地母排

Basic equipment

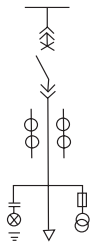
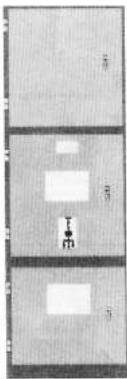
- Shell
- Bus
- Removable VS1⁺ vacuum circuit breaker
- Cable inlet equipped with cable support
- Earth bus

开关柜的可选件

- 电流互感器
- 电压互感器
- 带电显示器
- 压力释放通道
- 绝缘隔板

Option of switch cabinet

- Current transformer
- Voltage transformer
- Charged indicator
- Pressure-relief channel
- Insulating partition



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序号 Serial number	项目名称 Name of item		单位 Unit	数据 Data
1	额定电压 Rated voltage		kV	12
2	额定工频耐受电压 (1min) Power-Frequency withstand voltage (1min)		kV	42
3	额定雷电冲击耐受电压 Rated lightning impulse withstand voltage		kV	75
4	额定频率 Rated frequency		Hz	50
5	额定主母线电流 Rated current of main bus		A	1250
6	额定峰值耐受电流 Rated peak-value withstand current		kA	80
7	额定短时耐受电流 Rated short-time withstand current		kA	31.5
8	额定短路持续时间 Rated short-circuit duration		S	4
9	辅助电源电压 Auxiliary supply voltage		V	AC: 220 DC: 110/220
10	外形尺寸 Physical dimension	宽 Width	mm	800
		深 Depth		1010
		高 Height		1885

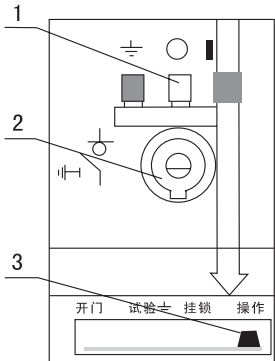
使用与操作 Operation

1. 操动机构的操作顺序 Operating procedure of actuator

1.1 负荷开关的手动操作 Manual operation of load switch

A. 负荷开关的合闸

将负荷开关位置指示器放在右图中 (1) 所示位置。
选择器放在操作位置图中 (3) 所示位置，核对转轴槽口应向下，图中 (2) 所示位置。当装有熔断器而槽口处在合闸位置，这是由于熔丝烧断或电动操作所至，开关操作到合闸位置之前转轴槽口已旋至向下。将操作把手插入孔内，导向键对准转槽口，顺时针方向转动 80° 左右，直到开关合上为止。若开关设备双弹簧操作机构，在朝终点转动时须加大转动力矩，直至开关最终合上，操作应连续一次完成。



XGN15-12(L · R)

箱型固定式户内交流金属封闭开关设备

A.Switching-on of load switch

The position indicator of load switch is placed at the position shown in the right figure (1). The selector is placed at the position shown in the operating position figure (3). Check that the axle groove shall face downward and the position is shown in the figure (2). When the fuse is installed, the groove is located at the switching-on position. This is why the fuse is burned out or due to electrical operation. The axle groove has been rotated downward before the switch operates to the switching-on position. The operating handle is inserted in the hole and the guide key aligns to the axle groove. It is rotated about 80° in the clockwise direction until the switch is switched on. If the switchgear is equipped with the double-spring actuator, the rotating torque must be enlarged when it rotates to the terminal until the switch is switched on finally. The operation shall be completed continuously at a time.

B. 负荷开关的分闸

将负荷开关位置指示器，放在右图中图示 (1) 的位置。选择器放在图示 (3) 的位置。核对转轴口应在图示 (2) 的位置。将操作把手插入孔内，导向键对准转轴槽口，逆时针方向转动 80° 左右，直至开关断开为止。

B.Switching-off of load switch

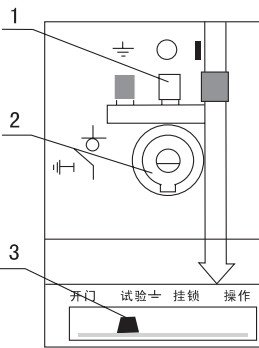
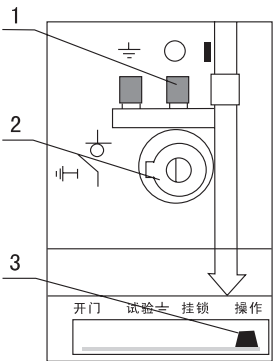
The position indicator of load switch is placed at the position shown in the right figure (1). The selector is placed at the position shown in the figure (3). Check that the axle groove shall face downward and the position is shown in the figure (2). The operating handle is inserted in the hole and the guide key aligns to the axle groove. It is rotated about 80° in the counter-clockwise direction until the switch is switched off.

C. 负荷开关操作到接地位置

将负荷开关位置指示器，放在右图中图示 (1) 的位置。选择器放在图示 (3) 的检查 (试验) 位置。核对操作把手转轴槽口应在向下位置，如图示 (2) 的位置。将操作把手插入孔内，导向键对准转轴槽口，逆时针方向转动 80° 左右，直至开关动作到接地位置。

C.Operation of load switch to the grounding position

The position indicator of load switch is placed at the position shown in the right figure (1). The selector is placed at the inspection (testing) position shown in the figure (3). Check that the axle groove shall be located at the downward position and the position is shown in the figure (2). The operating handle is inserted in the hole and the guide key aligns to the axle groove. It is rotated about 80° in the counter-clockwise direction until the switch acts up to the grounding position.



XGN15-12(L · R)

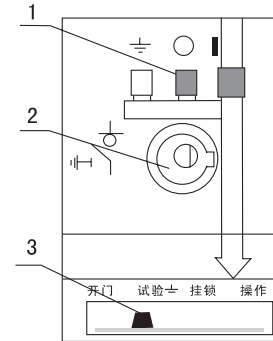
box-type stable type ACmetal
sealed switchgear

D、负荷开关由接地位置操作到分闸位置

将负荷开关位置指示器，放在接地位置，右图中图示 (1) 所示。选择器放在检查 (试验) 位置。图中图示 (3) 所示。核对操作把手转轴槽口应在水平位置。如图示 (2) 所示。将操作把手插入孔内，导向键对准转轴槽口，顺时针方向转动 80° 左右，直至开关动作分闸位置。

D.Operation of load switch from the grounding position to the switching-off position

The position indicator of load switch is placed at the position shown in the right figure (1). The selector is placed at the inspection (testing) position shown in the figure (3). Check that the axle groove shall be located at the horizontal position and the position is shown in the figure (2). The operating handle is inserted in the hole and the guide key aligns to the axle groove. It is rotated about 80° in the counter-clockwise direction until the switch acts up to the switching-off position.



1.2 负荷开关的电动操作

操作机构可以采用电动操作，分别为就地或远方操作。

2、电缆室的门开启

当开关在接地位置，选择器在门打开位置，电缆室门即可打开移去。

提示：开门：托起把手将门提起→将门移开

关门：首先把门提起放在门槛上→再将门合上→然后尽量把门向下推移

操作机构小室的关闭：将把手顺时针方向转动，门即可打开，逆时针方向转动，门即可关上。

3、带电显示装置

环网柜如果要求配置电压显示，则应按 IEC61243-5 标准要求提示开关柜带电或不带电。

1.2Electrical operation of load switch

For the actuator, the electrical operation can be adopted. It can be divided into local or remote operation.

2.door opening of cable compartment

When the switch is at the grounding position, the selector is located at the door-open position. The door of cable compartment can be opened to remove.

Hint: Door-open: The handle is picked up to lift up the door → Remove the door

Door-close: Lift up the door at first and place it on the threshold → Close the door → Then move the door downward.

Door Opening and closing of actuator chamber door: Rotate the handle in the clockwise direction and open the door immediately. Rotate the handle in the counter-clockwise direction and close the door immediately.

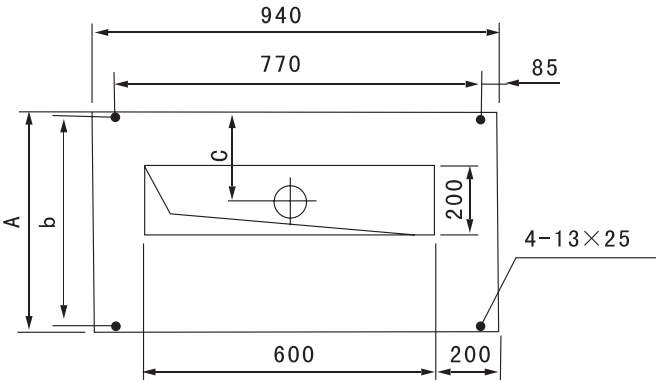
3.Charging indicating device

If the looped-network cabinet is equipped with the voltage display, it shall be prompted that the switch cabinet is charged or not charged according to the requirement of IEC61243-5 standard.

XGN15-12(L · R)
箱型固定式户内交流金属封
闭开关设备

基础安装尺寸 Foundation installation dimension

方案号 Scheme number	001 005 009 010 011 012	002 003 004	006 007 008	013 014	015
柜宽 a Cabinet width	375	500	625	750	800
安装孔柜 b Cabinet of installation hole	335 × 770	460 × 770	585 × 770	710 × 770	760 × 770
基础尺寸 c Foundation dimension	188	288			400



订货须知

- 用户订货时须提供以下技术资料：
- 1、主回路接线方案编号及主回路图、排列图、平面布置图；
 - 2、开关柜二次线路原理图；
 - 3、开关柜内所有电器元件型号、规格、数量；
 - 4、如需设置低压箱应说明；
- 电气设备汇总表；
- 开关柜使用在特殊环境条件时应说明。

Ordering instruction

- The client must provide the following technical data when ordering:
- 1.Wiring scheme number of main circuit and main circuit diagram, arrangement diagram and plan layout
 - 2.Schematic diagram of secondary circuit for switch cabinet
 - 3.Model, specification and quantity of all electrical elements in the switch cabinet
 - 4.The client shall indicate if the installation of low-voltage box is required.
- Summary sheet of electrical equipment
- The client shall indicate when the switch cabinet is used in the special environmental condition.

XGN□-40.5

Fixed Switch Cabinet with Metal-clad Enclosure



概述

XGN□-40.5型固定式金属封闭开关设备（以下简称开关柜）。系三相交流50Hz单母线及单母线带旁路系统的户内成套设备。柜内配有ZN□-40.5真空断路器，作为40.5kV交流系统接受和分配电能之用。开关柜具有安全联锁装置、防误性能，运行安全可靠。真空灭弧室免维护。
该产品满足 GB3906-91《3-35kV 交流金属封闭开关设备》等标准。

Brief Introduction

XGN□-40.5Fixed Switch Cabinet with Metal-clad Enclosure (hereinafter referred to as Switch Cabinet) , is a three-phase 50Hz indoor electric kits with single bus or single bus plus by-pass system. The ZN□-40.5 vacuum breaker assembled in the cabinet is designed to take and distribute electric energy for 40.5kV AC system. The switch cabinet equipped with interlock device can prevent from mistake operation and thereby has the virtues of safety and reliability. The vacuum arc extinguish chamber is free of maintenance. This product suits GB33906-91 3-40.5kV AC Metal Sealed Switch Devices and other relevant standards

使用环境条件

- 2.1 海拔不超过 1000m。
- 2.2周围空气温度不超过，上限+40℃，下限-15℃，高寒区-25℃。
- 2.3 相对湿度不超过 90%（+25℃）。
- 2.4 地震烈度不超过 8 度。
- 2.5 没有火灾、爆炸危险、严重污秽、化学腐蚀 及剧烈振动的场所。

Working conditions

- 2.1 Altitude: ≤ 1000m.
- 2.2 Environment temperature : -15℃ ~ +40℃ (-25℃ ~ +40℃ for freezing districts).
- 2.3 Relative humidity: ≤90% (+25℃).
- 2.4 Earth shock intensity: ≤ 8 .
- 2.5 The location must be free from fire, explosion, serious contamination, chemical erosion and turbulent vibration.

型号及其含义



主要技术参数

开关柜所装配的一次元件包括真空断路器、电流互感器、隔离开关、电压互感器、熔断器、避雷器、电力变压器等，在本产品的装置条件下，仍满足各自产品的技术性能。

XGN□-40.5

型固定式金属封闭开关设备

Technical data

The first-order components assembled in the cabinet includes vacuum breakers, current inductors, isolated switches, voltage inductors, fuses, lightening arresters, transformers and so on. Each of them can meets respective technical performance.

5.1 开关柜主要技术参数 Main technical data of switch cabinet

序 号	项 目		单 位	数 据
1	额定电压		kV	40.5
2	额定频率		Hz	50
3	额定电流		A	1600
4	绝缘水平	Imin 工频耐压 kV	kV	95
		雷电冲击耐压 (峰值)	kV	185
5	额定短路开断电流		kA	25
6	额定关合电流 (峰值)		kA	63
7	4s热稳定电流		kA	25
8	动稳定电流 (峰值)		kA	63
9	辅助回路和控制回路工频耐压		kV	2
10	外壳防护等级			IP2X
11	操作方式			电磁式或弹簧储能式
12	柜体外形尺寸 (宽 × 深 × 高)		mm	1818 × 3000 × 3300 2000 × 3000 × 3300

5.2 ZN□-40.5真空断路器技术数据 Technical data of ZN□-40.5 vacuum breaker

序 号	名 称		单 位	数 据						
				I	Ⅱ	Ⅲ	Ⅳ	V	Ⅵ	Ⅶ
1	额定电压		kV	40.5	40.5	40.5	40.5	40.5	40.5	40.5
2	额定电流		A	1000	1250	1600	1600	1250	1600	2000
3	额定频率		Hz	25	25	25	25	31.5	31.5	31.5
4	额定短路开断电流		kA	50	50	50	50	50	50	50
5	动稳定电流（峰值）		kA	63	63	63	63	80	80	80
6	4s 热稳定电流		kA	25	25	25	25	31.5	31.5	31.5
7	额定关合电流（峰值）		kA	63	63	63	63	80	80	80
8	额定短路电流开断次数		次	20			12			
9	额定操作顺序			分-0.3s-合分-180s-合分						
10	绝缘水平	Imin 工频耐压 kV	kV	95						
		雷电冲击耐压（峰值）	kV	185						
11	机械寿命		次	6000						
12	额定电流开断次数		次	6000						
13	额定电容器组开断电流		A	630						
14	电磁机构或弹簧机构		V	AC、DC110； AC、DC220						

XGN□-40.5

Fixed Switch Cabinet with Metal-clad Enclosure

5.3 LCZ-35Q电流互感器主要技术数据 Technical data of LCZ-35Q current inductor (see Table 3 and Table 4)

表3

级次组合	额定一次电流 A	额定一次电流 A	准确级次	额定二次负荷 VA	10% 倍数不小于
0.5/3 0.5/0.5	20-1000 20-800 1000	5	0.5	50	
			3	50	10
0.5/B 3/3			B	20	27
3/B B/B			B	20	35

表 4

一次电流 A	热稳定电流 kA	动稳定电流 kA	一次电流 A	热稳定电流 kA	动稳定电流 kA
20	1.2	4.2	200	13	42.4
30	2.0	6.4	300	19.5	63.6
40	2.6	8.5	400	26	84.9
50	3.3	10.6	600	39	127.3
75	4.9	16	800	52	112
100	6.5	21.2	1000	65	141.4
150	9.8	31.8			

5.4 电压互感器技术数据 Table 5 Technical data of LCZ-35Q voltage inductor

表 5

型号	额定电压 V			额定容量 VA			最大容量 VA	联结组
	一次线圈 A、X	二次线圈 a、x	辅助二次线圈 aD、xD	0.5 级	1 级	3 级		
JDJ2-35	35000	100		150	250	500	1000	1/1-12
JDJJ2-35	$35000/\sqrt{3}$	$100/\sqrt{3}$	100/ 3	150	250	500	1000	1/1/1-12-12
JDZJ2-35	$35000/\sqrt{3}$	$100/\sqrt{3}$	100/ 3	150	250	500	1000	1/1/1-12-12

5.5 RN2 型高压熔断器技术数据 Table 6 Technical data of RN2 high voltage fuse

表 6

型号	额定电压 kV	额定电流 A	断流容量 (三相) MVA	开断电流 kA	当切断极限短路电流时的最大电流 (峰值)	熔丝电阻
RN2	35	0.5	1000	17	70	315
RW10	35	0.5,2,3,5,7.5,10				

XGN□-40.5

型固定式金属封闭开关设备

5.6 35KV合成套无间隙氧化锌避雷器技术数据Table 7

Technical data of 35kV composite free- clearance zinc oxide lightening arrester

表7

避雷器 型号	系统标称 电压 (kV)	避雷器额 定电压 kV	避雷器持 续运行电 压 kV	直流 ImA 参考电压 不小于 (峰 值)kV	残压 8/20US 50kV不大 于(峰值)KV	方波通 流容量 2msA	冲击小通 流容量 (4/10us) kV	总高度 H(mm)	爬电比距 不小于 kV
HY5WZ-52.7/134	35	52.7	40.5	74.5	1.34	200	40	600	2.5
HY5WR2-52.7/134	35	52.7	40.5	74.5	1.34	400	40	600	2.5

5.7 GN27-35 隔离开关技术数据见表八

表 8

型 号	额定电压 kV	最高电压 kV	额定电流 A	4s 热稳定电流 kA	动稳定电流 (峰值)
GN27-35/630-35-20	35	40.5	630	20	50
GN27-35/1250-31.5	35	40.5	1250	31.5	80

结构说明

6.1本开关柜为箱式金属封闭结构，采用空气绝缘，各相带电体之间及相对地之间绝缘距离不小于300mm，开关柜主母线和旁路母线采用矩形铝母线水平布置于柜体顶部，用母线罩遮盖。开关柜的正面、后面及柜的两侧，均采用钢板门或封板加以密封，其骨架由槽钢、角钢和钢板弯制焊接而成，开关柜外壳防护等级为IP2X。开关柜分为前柜和后柜，前柜装真空断路器，母线隔离开关、电流互感器、变压器，后柜装线路隔离开关，旁路母线隔离开关及氧化锌避雷器。从柜体的正面看，上右部为继电器室，有贯穿二次接线室的通道，上左部和两扇中门上设有观察窗，可看到主母线及隔离开关工作情况，中门还设有紧急分闸按钮，及断路器分合指示观察孔。左侧操作板装有母线隔离开关和线路隔离开关的操作手柄，旁路母线隔离开关操作手柄装于后柜左侧。

6.2 开关柜具有安全联锁装置及防误操作功能：

- a、防止带负荷分、合隔离开关
- b、防止误入带电间隔
- c、防止误分、合断路器

Description of the structure

6.1This product is of metal sealed cabinet type. It is assembled with air insulation device. The insulation distance between electriferous components in any phase or between each electriferous component and earth is not less than 300 mm. The main bus and bypass bus are designed to be rectangular style, enveloped with bus cover and arrayed flatly on the top of the cabinet. The front, the back and the two sides of the cabinet are all sealed with steel plate doors or boards. The frame of the cabinet is welding product made of slot steel, angle steel and steel plates in curving. The protection class of this product’ s enclosure is IP2X. The switch cabinet has two subcabinets , the front subcabinet and the rear subcabinet. The front is assembled with a vacuum breaker, a bus isolated switch, a current inductor, a transformer and so on. The rear is assembled with a circuit isolated switch, a bypass bus isolated switch, and a zinc oxide lightening arrester. The upper and right of the cabinet is relay chamber, in which there is a chunnel connecting to the wiring chamber. The upper and left of the cabinet and two middle doors are all equipped with view windows, from which the performance of main bus and isolated switch can be viewed. Besides, the middle doors are also equipped with an emergency switching-off button and a view hole showing the state of the breaker. There are snobs for

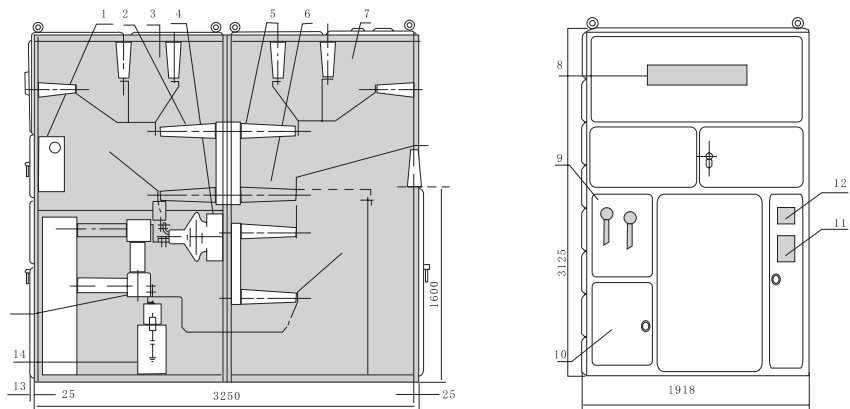
XGN□-40.5

Fixed Switch Cabinet with Metal-clad Enclosure

controlling the bus isolated switch and the circuit isolated switch in the operation board on the left side of the cabinet. The operation snob of the bypass bus isolated switch is assembled on the left side of the rear subcabinet.

6.2 The switch cabinet has interlock device and there by the prevention functions against mistake operations:

- Prevention against switching on/off the isolated switch when loaded.
- Prevention against entering electriferous areas by mistake.
- Prevention against switching on/off the breaker by mistake.



- 继电器、小母线及端子室
- 主母线隔离开关
- 主母线室
- 电流互感器
- 旁路母线隔离开关
- 线路隔离开关
- 旁路线母线室
- 用途牌
- 刀闸操作面板
- 左下小门
- 模拟母线牌
- 铭牌
- R-C 干式过电吸收器 (可变元件)
- 真空断路器

- Cabinet for relay, slim bus line and terminal
- Disconnecting switch for main bus line
- Cabinet for main bus line
- Current transformer
- Disconnecting switch for bus line on side circuit
- Disconnecting switch for circuit
- Bus line cabinet for side circuit
- Usage plate
- Operating panel for knife switch
- Small door on below left
- Simulating bus line plate
- Nameplate
- R-C dry type electricity absorber (changeable element)
- Vacuum circuit breaker

图 1 开关柜基本结构 [带旁路 (或电缆 “---” 部分) 进出线] 示意图 (以 08 方案为例)

Drawing 1 drawing of basic structure for switchgear (with side circuit in & out line)(take 08 for example)

XGN□-40.5

型固定式金属封闭开关设备

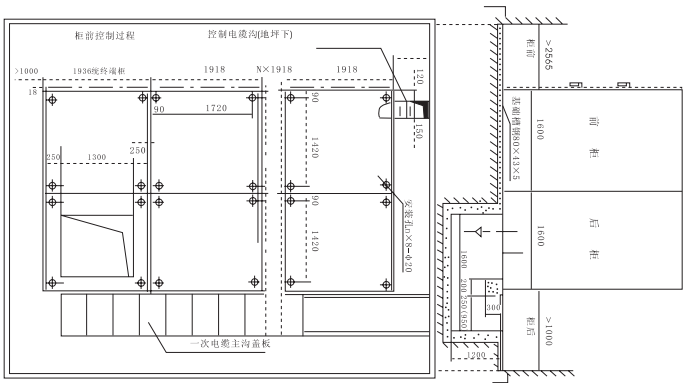


图 2 开关设备单例平面布置、基础槽钢埋放和一次电缆沟基础及二次控制电缆位置示意图
注：括号内尺寸用于小附柜

Drawing 2 singlerow horizontal layout drawing for switchgear, laid ground channel steel drawing, primary cable channel basis drawing and secondary control cable location drawing

Note: the parameter in the bracket used for the small attached cabinet

订货须知

订货时用户提供下列资料：

- 1、一次线路编号和一次系统图，并标明其额定电流。
- 2、二次线路原理图，如套用 GG-1A 型高压柜的 129 种直流操作标准方案 (Z 1Z 129) 时应标明方案及控制回路电压值。
- 3、高压柜平面排列图。
- 4、如选用非标准一次方案，请在订货时提出，协商解决。
- 5、母线规范由订货提出，如不提出柜内支母排按本厂标准 铝排制作。
- 6、开关柜喷漆颜色。

ordering notice

Following document should be supplied when ordering

- 1、Primary circuit code, primary system drawing and indicating rated current
- 2、Secondary circuit schematic diagram,taking GG-1A type high-voltage cabinet which has 129 kinds of DC operating plans(Z1-Z129) for example, the plan of each and control oilp voltage value should be indicated.
- 3、Ichnography for high-voltage cabinet
- 4、If non-standard primary plan is needed,please point it out when ordering
- 5、Specification of bus line should be required when ordering. If not, it will be nade according to the standard of our factory
- 6、Paint color for switchgear

HXGN15A-12(F · R)

box stationary-type AC metal closed
- loop network switch equipment



概 述

HXGN15A-12(F · R) 箱型固定式交流金属封闭环网开关设备（简称环网柜），是为城市电网改造和建设需要而生产的新型高压开关柜。在供电系统中亦作为开断负荷电流和短路电流以及关合短路电流之用，本环网柜配用真空负荷开关，操作机构为弹簧操动机构，该机构既可手动操作，也可电动操作。接地开关和隔离刀配用手动操作机构，本环网柜成套性强、体积小、无燃烧和爆炸危险，具有可靠的“五防”功能。

General description

The box stationary-type AC metal closed-loop network switch equipment shortly named rig-net box is produced for meeting the need of electric network reconstruct and construction in cities. It can be used to open the load current and short-circuit current and close the short-circuit current. This rig-net box is equipped with a vacuum load switch, and its operation mechanism is spring mechanism. This one can be operated not only by hand, but also by electric. The earth switch and isolated switch are equipped with hand-operating mechanism. The rig-net box packed easier, and its physical volume small, no combustion and explore risk, and has the capacity of five preventions.

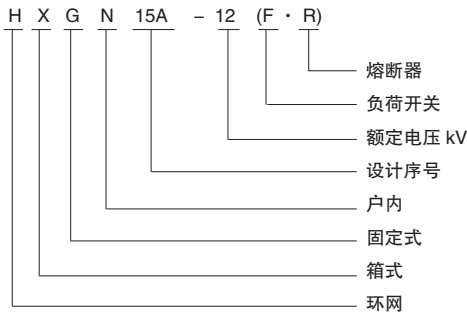
适用范围

环网柜适用于交流 3 ~ 10kV、50Hz 的配电系统中。广泛地用于城市电网建设和改造工程、工矿企业、高层建筑和公共设施等，作为环网供电单元和终端设备，起着电能的分配、控制和电气设备的保护作用，也可装在箱式变电所中。本环网柜符合 IEC420 《高压交流负荷开关-熔断器组合电器》、GB3906-91 《3 ~ 35kV 交流金属封闭开关设备》的有关规定。

The scope of application

The rig-net box is suitable for trophies AC 50Hz electric power system for distributing electric emergency. It is widely used electric network reconstruct and construction in cities industrial and mining business high-rise building and common facilities. As the rig-net electrical supplement units and terminal devices, it takes charge of the distribution and control of electric energy and the protection for electrical equipment. It can be also used in box-type substation. this rig-net box complies with pertinent regulations of 《High-voltage AC load switch and fuse combined electric appliances》 and 《3-35kv AC metallic packing switch equipment》

型号及其含义



HXGN15A-12(F·R)
箱型固定式交流金属封闭环网
开关设备

使用环境条件

- 4.1 海拔高度不超过 1000m；
- 4.2 周围环境温度-25℃ ~ +40℃；
- 4.3 相对湿度：日平均值不大于 95%，
月平均值不大于 90%；
- 4.4 无导电性尘埃、腐蚀性气体和水蒸汽的场所；
- 4.5 无火灾和爆炸危险的场所；
- 4.6 无经常性剧烈震动场所。

peration environment conditions

- 4.1 absolute altitude: less then 1000m.
- 4.2 ambient temperature: max +40℃， min-25℃
- 4.3 ambient humidity: daily average relative humidity ≤ 95%
monthly average relative humidity ≤ 90%
- 4.4ambient air is not apparent polluted by corrosive or flammable gas and water vapor.
- 4.5 earthquake-resistance: earthquake intensity less then 8.
- 4.6 place without frequent severe shock.

主要技术参数见下表
The main technical parameter (see the following table)

序 号	项 目	单 位	数 值
1	额定电压	kV	12
2	额定电流	A	630
			125
3	额定短路关合电流（峰值）	kA	50
4	额定短路开断电流	kA	31.5
5	额定有功负载开断电流	A	630
6	4s 热稳定电流	kA	20
7	额定动稳定电流（峰值）	kA	50
8	1min 工频耐受电压	kV	42(断口、4 8)
9	雷电冲击耐受电压	kV	75(断口、8 5)
10	机械寿命	次	10000
11	额定交接电流（组合电器）	A	3150
12	操作方式		手动或电动
13	防护等级		IP2X

环网供电原理

环网供电一般由三个基本单元组成（见图 1）进出线柜作为环网单元，当任一线路出现故障时，能及时隔离，并由另一单元保证用户变压器支路连续供电。用户回路环网柜对变压器起着保护和隔离作用，便于用户检修。环网柜可任意延展，并可根据用户要求由基本单元构成种组合方案。

HXGN15A-12(F · R)

box stationary-type AC metal closed
– loop network switch equipment

The rig-net current supply principle

The rig-net current supply is commonly comprised of three basic parts(see the following drawing) The in-and-out line boxes as the rig-net units, when the any circuit appears the breakdown, can be isolated in time, and another unit guarantees customer transformer a road consecution power supply. Customer rig-net box can protect and isolate the transformer, which is facility to examine and repair. The rig-net box can be arbitrarily extended, and have many schemes according to the customer requirements.

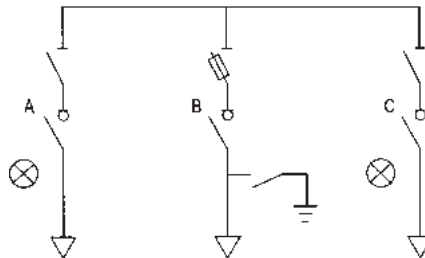


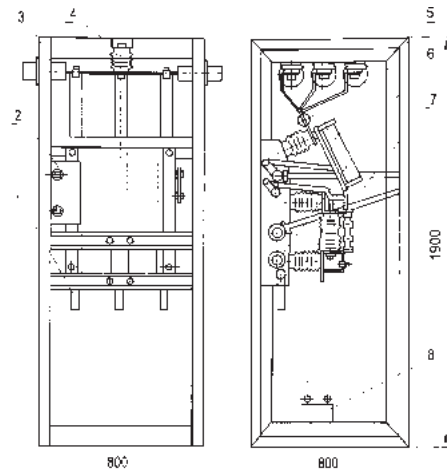
图 1 figure1

电缆进出线柜 in-and-out cable box
用户变压器支路柜 in-and-out cable box
电缆进出线柜

结构特点

7.1 结构性能特点

环网柜的外壳由基本骨架、顶板、面板、侧板组成封闭结构。环网柜的顶部为母线室，母线室的前面为仪表室，两室之间用钢板隔开，柜的上部为负荷开关室，中下部为电缆进出线和其它元件室。环网柜的主要设备有真空负荷开关、隔离开关（或带熔断器隔离刀闸）、接地开关、避雷器、操作机构、联锁机构及测量、计量回路等组成（见图2）。



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

1.earth switch 2.operation mechanism
3. sleeve through walls
4.isolator 5 protective fuse (isolating knife switch)
6 spring operating mechanism 7 load switch
8 current transformer

图2 Drawing2

HXGN15A-12(F·R) 箱型固定式交流金属封闭环网 开关设备

环网柜配用 FN25-12 型高压真空负荷开关，用真空开关开断故障与过载电流，其开关所组成的隔离开关、真空开关、接地开关、柜门之间按一定程序相互联锁，能有效地防止误操作；真空开关柜，配有电动弹簧储能操作机构可实现快速合分闸操作。并可根据用户要求，配装一定的保护继电器。熔断器组合电器柜，熔管带有撞针，短路情况下，撞针撞击跳闸机构，实现快速开断，能有效地保护电器设备。

7.2 功能单元环网柜主要配装 FN25-12D 二工位真空负荷开关，主要方案为进线柜和出线柜。

7.2.1 进线柜方案柜内配装一台 FN25-12D 二工位真空负荷开关，柜内还可灵活配装 CT、PT。主回路由一台 FN25-12D 真空负荷开关配装隔离刀和接地刀控制，可分别达到接通母线、隔离、接地三个工位。

7.2.2 出线柜方案柜内配装一台 FN25-12D·R 二工位真空负荷开关和配有撞击器的熔断器，并在柜内可灵活装配 CT、PT 和 ZnO 避雷器，由此可省去计量柜。

7.3 “五防”闭锁功能

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

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

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

The structural features

7.1 structural properties features the shell of rig-net box includes the basic framework、coverboard、enclosed construction comprised by lateral plate. The cover of rig-net box is bus room, and the front of bus room is load switch room, the middle and under of it is in-and-out cable and other components. The main devices of rig-net box are vacuum load switch、isolating switch (the isolating knife switch with protective fuse)、earth switch、lightning arrester、operating mechanism、interlocking gear and measurement and computation circuit (see drawing 2)the rig-net is assembled with vacuum load switch of the type FN25-12. the vacuum switch opens failures and excess current, the isolating switch、vacuum switch、earth switch and door interlock each other according to some program, which can effectively prevent from misoperations. The vacuum switch box and operation mechanism with electric spring storing energy can switch on and off knife switch fast. According to customer' s requirements it can assembled with some protective relay, protective fuse combined wiring box, fusion tube with firing pin, under the short circuit condition, the firing pin stock the knife switch and imply quickly closing and opening, which can effectively protect appliances.

7.2 Functional unit

The rig-net box mainly assemblies with two- service-position vacuum load switch of the type FN 25-12D, the main scheme is the incoming line and outlet line box

7.2.1The incoming line box scheme

the box assemblies with two- service-position vacuum load switch of the type FN 25-12D, the CT and PT can be placed in the box freely. The major loop is controlled by vacuum load switch of the type FN 25-12D assembled with isolation and earth knife switch, and can attach to three service positions including switching on generatrix、isolating、earth.

7.2.2 The outlet line box scheme

The box assemblies with two- service-position vacuum load switch of the type FN 25-12D.R and protective fuse. the CT and PT and lightning arrester can be placed in the box freely. Hence the computation box can be omitted

7.3 “Five preventions” atresia factions

7.3.1 Electric transmission: unless the box door is closed and locked, the console switch is place on the “turn on” , the operation load switch can be closed.

HXGN15A-12(F · R)

box stationary-type AC metal closed
– loop network switch equipment

7.3.2 power-off operation: unless the load switch is on the isolating place, the earth switch can be closed. The door of box can be opened unless the earth switch is on cut-on place and the insulating clapboard is infixed in its place.

环网供电原理

环网供电一般由三个基本单元组成（见图 1）进出线柜作为环网单元，当任一线路出现故障时，能及时隔离，并由另一单元保证用户变压器支路连续供电。用户回路环网柜对变压器起着保护和隔离作用，便于用户检修。

环网柜可任意延展，并可根据用户要求由基本单元构成种组合方案。

The rig-net current supply principle

The rig-net current supply is commonly comprised of three basic parts(see the following drawing) The in-and-out line boxes as the rig-net units, when the any circuit appears the breakdown, can be isolated in time, and another unit guarantees customer transformer a road consecution power supply. Customer rig-net box can protect and isolate the transformer, which is facility to examine and repair. The rig-net box can be arbitrarily extended, and have many schemes according to the customer's

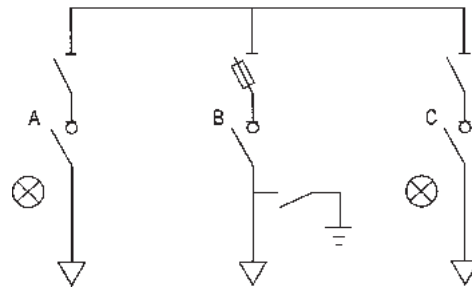
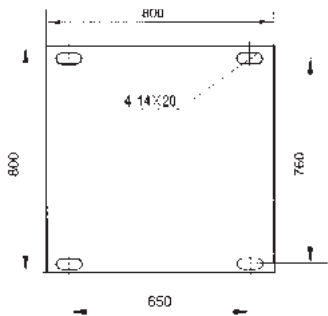


图 1 figure1

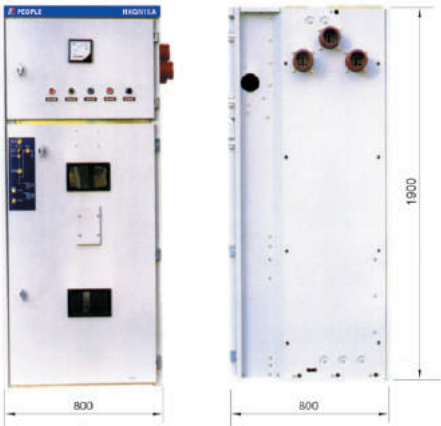
电缆进出线柜 用户变压器支路柜 电缆进出线柜
in-and-out cable box in-and-out cable box

HXGN15A-12(F · R)
箱型固定式交流金属封闭环网
开关设备

外形及安装尺寸 Outline and installation dimension



环网柜安装尺寸见图 3
see the drawing 3 about the rig-net
installation dimension



环网柜外形尺寸见图 4
see the drawing 4 about the rig-net
outline dimension

订货须知

- 订货时应提供：
- 10.1 一次线路方案、编号或一次系统图。
 - 10.2 二次电气原理图及控制回路电压。
 - 10.3 高压开关柜平面布置图。
 - 10.4 如需非标一次、二次线路方案，可委托本公司设计、生产。

Notice when ordering

- What should be supplied as follow when ordering
- 10.1 First circuit scheme, number or the first system diagram
 - 10.2 Secondary electrical schematic diagram and control loop diagram
 - 10.3 If needing nonstandard first, secondary circuit scheme, it can be committed to our company to design and produce.

HXGN1B-12(F · R)

box stationary-type AC metal closed-loop network switch equipment



概 述

HXGN1B-12 箱型固定式交流金属封闭环网开关设备（以下简称环网柜）是本厂自行设计、研制的新型金属封闭箱式开关设备。其性能达到 GB3906-91《3-35kV 交流金属封闭开关设备》标准和 IEC298《交流金属封闭开关设备和控制设备》（1981 年版）标准，并满足两部提出的有关“五防”的要求。本开关柜具有体积小、重量轻、组合灵活、操作力小、使用维护方便和不会发生火灾爆炸等特点。

Description of the product

Type HXGN1B-12 Fixed AC Cycle Network Switch Cabinet with Metal-clad Enclosure (here in after referred to as cycle network cabinet) is a new-model metal sealed switch cabinet designed and developed by our company. It suits GB3906-91 3-35kV AC Metal Sealed Switch Devices and IEC298 AC Metal Sealed Switch and Control Devices (1981version), and meets the requirements of relevant Ministries of China on Five Guard. This product integrates small space, small weight, flexible assembly and operation, easy maintenance and no explosion together.

适用范围

该产品系三相交流额定电压为 12kV，额定频率 50Hz 的户内金属封闭箱式开关设备，适用于工厂、车间、小区住宅、高层建筑、学校和公园等场所配电系统，可作环网供电和终端供电用。

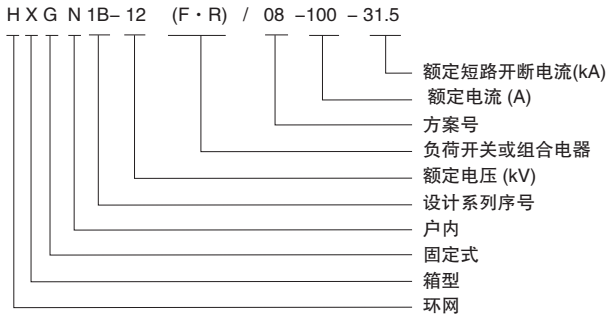
本开关柜可配装本公司生产的 FN15-12(D)/630-20 型负荷开关和 FN15-12R/100-31.5 型负荷开关一熔断器组合电器，也可配装国内生产的 FN5-12 型等相同参数的负荷开关和组合电器，及斯洛文尼亚生产的 BK3.BR3 负荷开关。

The scope of application

This product, which is an indoors metal sealed switch cabinet with 10kV three-phase AC rated voltage and 50HZ rated frequency, can be used in cycle network or terminal electric system of many fields including factories, workshops, communities, dwelling houses, buildings with many floors, schools and parks.

This product can be assembled with FN15-12(D)/630-20 loaded switch and FN15-12R/100-31.5 composite of the loaded switch and the fuse produced by our company, domestic loaded switch and combined electrical equipments of the same type and parameters as FN11-12 , and BK3.BR3 loaded switch produced by Slovenia.

型号及其含义 Explain for Model Number



HXGN1B-12(F · R)
箱型固定式交流金属封闭环
网开关设备

使用环境条件

- 4.1 环境温度：上限+40℃，下限-25℃；
4.2 海拔高度：不超过 1000 米；
4.3 相对湿度：日平均值不大于 95%，月平均值不大于 90%；
4.4 周围空气不受腐蚀或可燃气体、水蒸气等明显污染；
4.5 无经常性的剧烈震动。

Working Condition

- 4.1 Environment temperature in use: -25℃ ~ +40℃.
4.2Altitude:<1000m.
4.3 Relative humidity: average value per day> 95% RH, average value per month> 90% RH.
4.4 Surrounding air is not eroded and not contaminated evidently by combustible gas or vapor.
4.5 No frequent turbulent vibration.

主要技术参数见下表 Main Technical Indexes

序 号	项 目			单 位	参 数
1	额定电压			kV	12
2	额定频率			Hz	50
3	额定绝 缘水平	Imin 工频耐受电 压 (有效值)	相对地、相间	kV	42
			隔离断口	kV	48
		雷电冲击耐受电 压 (全波)	相对地、相间	kV	75
			隔离断口	kV	85
4	母线额定电流			A	400、630
5	额定负荷开断电流			A	400、630
6	额定热稳定电流 (有效值)			kA	20(17.5)
7	主回路额定热稳定时间			s	3(4)
8	接地回路额定热稳定时间			s	2
9	额定动稳定电流 (峰值)			kA	50
10	定额短路关合电流 (峰值)			kA	50
11	熔断器额定开断电流 (有效值)			kA	31.5
12	额定转移开断电流 (配 100A 熔断器)			A	1300
13	外形尺寸 (宽 × 深 × 高)			mm	(850 × 900 × 2000)

HXGN1B-12(F · R)

box stationary-type AC metal closed-loop network switch equipment

结构特点

6.1 柜体

开关柜的柜体结构用钢板弯制焊接而成，其防护等级符合 GB3906-91 标准的 IP2X 的规定。

柜体上部为母线室，仪表室位于母线室的前部，用钢板分隔，柜体上中部为负荷开关室，负荷开关与其他电气元件之间设有绝缘隔板，并在负荷开关前面装设透明的有机玻璃板。

对于电缆进出线柜，其柜底装有可拆装的活动盖板，对于架空进出线柜，根据用户的要求，其柜顶可装母线通道。

6.2 联锁

开关柜具备“五防”功能，防误操作的具体措施符合机械工业部和水利电力部联合提出的在金属封闭开关设备中安装电气防误操作装置的要求：

6.2.1 如果负荷开关配装接地开关时，负荷开关与接地开关之间以及接地开关与柜门之间装设联锁装置，其联锁符合以下要求：

6.2.1.1 只有当负荷开关在断开位置时，才能实现接地开关的分、合闸操作；也只有当接地开关在断开位置时，才能实现负荷开关的分、合闸操作；

6.2.1.2 只有当接地开关在关合位置时，才能开启关合柜门：

6.2.1.3 柜门开启后，接地开关不能分闸；

6.2.2 如果负荷开关未配装接地开关时，则负荷开关与柜门之间装设联锁装置，其联锁符合以下要求：

6.2.2.1 只有当负荷开关在断开位置时，才能开启或关闭柜门；

6.2.2.2 柜门开启后，负荷开关不能合闸。

6.2.3 对于电源电缆进线柜，可根据用户要求，在进线有电时，采用电磁锁控制柜门或采用挂锁。

6.2.4 至于其他需要附加的联锁，制造厂将根据与用户的协议装设，并提供联锁的特性及功能有关的全部的必要资料。

The character of structure

6.1 Cabinet

Cabinet structure of this product is welding with steel plate in curving. It's protection grade suits IP2X of GB3906-91. The upper of the cabinet is bus chamber, of which the front is meters chamber. The two chambers are separate by steel plates. The upper and middle of the cabinet is loaded switch chamber. The insulated plate is assembled between the loaded switch and other electrical components. The organic glass plate is equipped in front of the loaded switch. The bottom of cable inlets and outlets box is equipped with dismountable active cover board. The top of beam inlets and outlets box can be additionally equipped with bus ducts if users require.

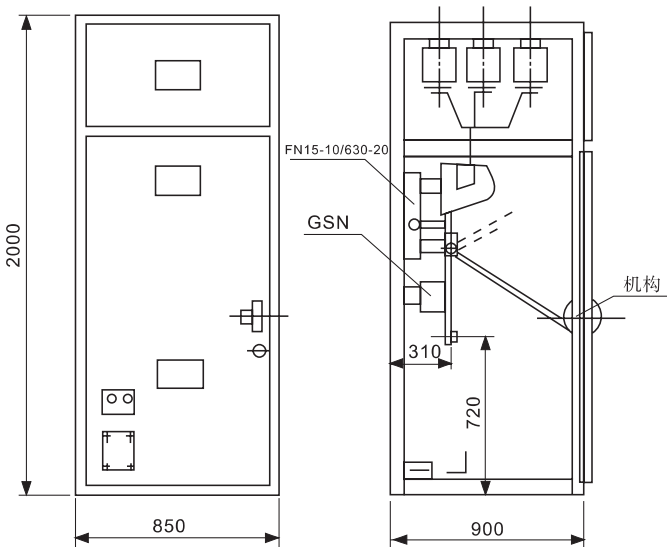
6.2 Interlock

This product provides Five Guard functions. It's protection system suits provisions on installation of prevention devices against mistake operation in metal sealed switch devices enacted by Machine Industry Ministry and Hydraulic and Electric power Ministry.

6.2.1 If the loaded switch is assembled with the grounding switch, the interlock device must be equipped between the loaded switch and the grounding switch, also between the grounding switch and the door of the cabinet. The interlock function must meet the following requirements:

HXGN1B-12(F · R)
箱型固定式交流金属封闭环
网开关设备

- 6.2.1.1 Only if the loaded switch is disconnected, the grounding switch can be switched off or switched on, Vice verse.
- 6.2.1.2 Only if the grounding switch is connected, the door of the cabinet can be closed.
- 6.2.1.3 If the door of the cabinet is opened, the grounding switch can' t be switched off.
- 6.2.2 If the loaded switch isn' t assembled with the grounding switch, the interlock device must be equipped between the loaded switch and the door of the cabinet. The interlock function must meet the following requirements:
- 6.2.2.1 Only if the loaded switch is disconnected, the door of the cabinet can be opened or closed.
- 6.2.2.2 If the door of the cabinet is opened, the loaded switch can' t be switched on.
- 6.2.3 The cable inlets box of the power, if cable inlets are designed to be energized, can be equipped with the electromagnetism–controlled door or the padlock according to the users' requirements.
- 6.2.4 Other interlock devices and all the necessary information about its' characters and functions will be provided by our company, if required in the agreement.

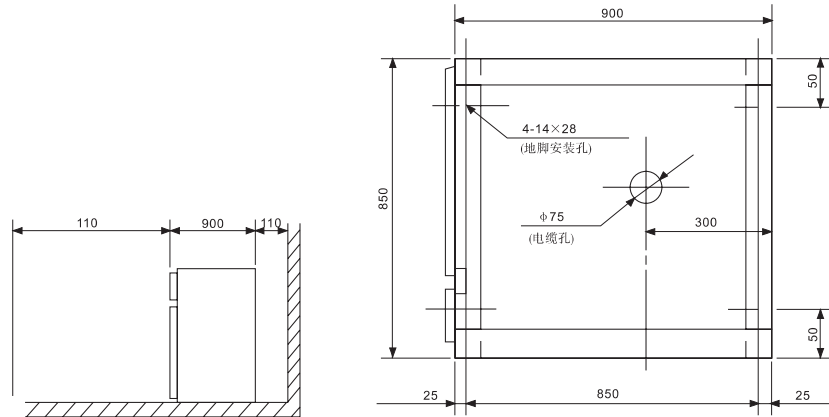


HXGN1B-12 电缆进出线柜示意图
The sketch diagram of HXGN1B-12 cable inlets and outlets box

HXGN1B-12(F · R)

box stationary-type AC metal closed-loop network switch equipment

外形及安装尺寸 Installation Dimensions



订货须知

订货时应提供下列技术参数：

- 8.1、开关柜的型号及一次方案编号；
- 8.2、一次系统图和开关柜的排列图、平面布置图；
- 8.3、二次原理图、端子排列图和对二次回路的要求；
- 8.4、母线、进线柜和出线柜的额定电流；
- 8.5、柜内各元件的额定参数；
- 8.6、特殊联锁的要求；
- 8.7、对外壳（包括柜内外）涂漆颜色的要求。

除以上所述的内容外，凡能影响订货的一切情况都应向制造厂提供，如特殊的装配和安装条件，引入高压的位置等。

Notice for ordering

When ordering, the following technical data must be provided:

- 8.1 Model NO. of switch cabinet and first-order solution No.
- 8.2 First-order system diagram and arrangement diagram of the switch cabinet, assembly plan diagram.
- 8.3 Secondary-order principle diagram, array diagram of terminals, and requirements for secondary circuit.
- 8.4 Rated current of buses, the cable inlets box and the cable outlets box.
- 8.5 Rated indexes of each component in the cabinet.
- 8.6 Special requirements for interlock.
- 8.7 Requirements for the color of enclosure coating (including inner and exterior of the cabinet)

Besides, the information related to ordering should be given to our company, such as special conditions about assembly and installation, the position of high voltage cable inlets.

HXGN□-12(VEI)
箱型固定式交流金属封闭环
网开关设备



概 述

HXGN□-12箱型固定式交流金属封闭环网开关设备(以下简称环网柜)是本厂自行设计、研制的新型金属封闭箱式开关设备。其性能达到 GB3906-91《3-35kV 交流金属封闭开关设备》标准和 IEC298《交流金属封闭开关设备和控制设备》(1981 年版)标准,并满足两部提出的有关“五防”的要求。本开关柜具有体积小、重量轻、组合灵活、操作力小、使用维护方便和不会发生火灾爆炸等特点。

Description of the product

Type HXGN□-12(VEI) Fixed AC Cycle Network Switch Cabinet with Metal-clad Enclosure (here in after referred to as cycle network cabinet) is a new-model metal sealed switch cabinet designed and developed by our company. It suits GB3906-91 3-35kV AC Metal Sealed Switch Devices and IEC298 AC Metal Sealed Switch and Control Devices (1981version), and meets the requirements of relevant Ministries of China on Five Guard. This product integrates small space, small weight, flexible assembly and operation, easy maintenance and no explosion together.

适用范围

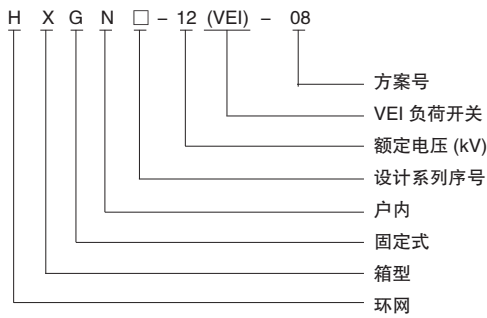
该产品系三相交流额定电压为 12kV, 额定频率 50Hz 的户内金属封闭箱式开关设备, 适用于工厂、车间、小区住宅、高层建筑、学校和公园等场所配电系统, 可作环网供电和终端供电用。

本开关柜可配装 VEI 公司生产的 ISARC-1、ISARC-2 型负荷开关, 也可配装国内生产的 FN11-12 型等相同类型和参数的负荷开关和组合电器。

The scope of application

This product, which is an indoors metal sealed switch cabinet with 12kV three-phase AC rated voltage and 50Hz rated frequency, can be used in cycle network or terminal electric system of many fields including factories, workshops, communities, dwelling houses, buildings with many floors, schools and parks.

型号及其含义



HXGN□-12(VEI)

Fixed AC Cycle Network Switch
Cabinet with Metal-clad Enclosure

使用环境条件

- 4.1 环境温度：上限+40℃，下限-25℃；
- 4.2 海拔高度不超过1000m；
- 4.3 相对湿度：日平均值不大于 95%，月平均值不大于 90%；
- 4.4 周围空气不受腐蚀或可燃气体、水蒸气等明显污染；
- 4.5 无经常性剧烈震动。

Working Condition

- 4.1 Environment temperature in use: -25℃ ~ +40℃
- 4.2 Altitude:<1000m
- 4.3 Relative humidity: average value per day>95% RH, average value per month>90% RH
- 4.4 Surrounding air is not eroded and not contaminated evidently by combustible gas or vapor.
- 4.5 No frequent turbulent vibration.

主要技术参数 Main Technical Indexes

5.1 开关柜主要技术参数 Main Technical Indexes of the switch cabinet

序号	项 目	单 位	参 数
1	额定电压	kV	12
2	额定频率	H z	50
3	主母线额定电流	A	400、630、800
4	额定电流 (功能单元)	A	400、630、800
5	3s 热稳定电流	k A	16
6	额定动稳定电流	k A	25
7	额定有功负载开断电流	A	400、630、800
8	额定闭环开断电流	A	400、630、800
9	额定空载变压器开断电流		1250kVA
10	额定电缆充电开断电流	A	10A
11	主回路额定短路关合电流 (峰值)	k A	31.5
12	额定转移开断电流 (配 100A 熔断器)	A	1250
13	1min 工频耐受电压 (相对地、相间)	k V	42
14	1min 工频耐受电压 (隔离断口)	k V	48
15	雷电冲击耐受电压 (相对地、相间)	k V	75
16	雷电冲击耐受电压 (隔离断口)	k V	85
17	二次回路 1min 工频耐受电压	kV	2
18	机械寿命	次	2000
19	负荷开关侧装时柜体尺寸 (宽 × 深 × 高)	m m	600 × 900 × 1800
20	负荷开关正装时柜体尺寸 (宽 × 深 × 高)	m m	900 × 900 × 2000

HXGN□-12(VEI)
箱型固定式交流金属封闭环
网开关设备

5.2 ISARC-1、ISARC-2 负荷开关主要技术参数
Main Technical Indexes of ISARC-1and ISARC-2 loaded switch

序 号	项 目	单 位	参 数
1	额定电压	kV	12
2	额定电流	A	400、630、800
3	相间距离	mm	210
4	热稳定电流（有效值）	kA	16
5	热稳定时间	s	3
6	动稳定电流（峰值）	kA	50
7	额定短路关合电流（峰值）	kA	50
8	20 次操作额定有功负载开断电流	A	400、630、800
9	额定闭环开断电流	A	400、630、800
10	额定空载变压器开断电流		1250kVA
11	额定电缆充电开断电流	A	25
12	机械寿命	次	2000

结构特点

6.1 柜体

开关柜的柜体结构用钢板弯制焊接而成，其防护等级符合 GB3906-91 标准的 IP2X 的规定。
柜体上部为母线室，仪表室位于母线室的前部，用钢板分隔，柜体上中部为负荷开关室，负荷开关在柜体中部，其他元件位于下部。
对于电缆进出线柜，其柜底装有可拆装的活动盖板，对于架空进出线柜，根据用户的要求，其柜顶可装母线通道。

6.2 联锁

开关柜具备“五防”功能，防误操作的具体措施符合机械工业部和水利电力部联合提出的在金属封闭开关设备中安装防止电气防误操作装置的要求：
6.2.1 如果负荷开关配装接地开关时，负荷开关与接地开关之间以及接地开关与柜门之间装设联锁装置，其联锁符合以下要求：
6.2.1.1 只有当负荷开关在断开位置时，才能实现接地开关的分、合闸操作；也只有当接地开关在断开位置时，才能实现负荷开关的分、合闸操作；
6.2.1.2 只有当接地开关在关合位置时，才能开启关合柜门：
6.2.1.3 柜门开启后，接地开关不能分闸；
6.2.2 如果负荷开关未配装接地开关时，则负荷开关与柜门之间装设联锁装置，其联锁符合以下要求：
6.2.2.1 只有当负荷开关在断开位置时，才能开启或关闭柜门；
6.2.2.2 柜门开启后，负荷开关不能合闸。
6.2.3 对于电源电缆进线柜，可根据用户要求，在进线有电时，采用电磁锁控制柜门或采用挂锁。
6.2.4 至于其他需要附加的联锁，制造厂将根据与用户的协议装设，并提供联锁的特性及功能有关的全部的必要资料。

HXGN□-12(VEI)

Fixed AC Cycle Network Switch
Cabinet with Metal-clad Enclosure

The character of structure

6.1cabinet

Cabinet structure of this product is welding with steel plate in curving. It' s protection grade suits IP2X of GB3906-91. The upper of the cabinet is bus chamber, of which the front is meters chamber. The two chambers are separate by steel plates. The upper and middle of the cabinet is loaded switch chamber. Loaded switch is in the middle of the cabinet vertically. The lower is other components. The bottom of cable inlets and outlets box is equipped with dismountable active cover board. The top of beam inlets and outlets box can be additionally equipped with bus ducts if users require.

6.2Interlock This product provides Five Guard functions. It is protection systemsuits provisions on installation of prevention devices against mistake operation in metal sealed switch devices enacted by Machine Industry Ministry and Hydraulic and Electric power Ministry.

6.2.1 If the loaded switch is assembled with the grounding switch, the interlock device must be equipped between the loaded switch and the grounding switch, also between the grounding switch and the door of the cabinet. The interlock function must meet the following requirements:

6.2.1.1 Only if the loaded switch is disconnected, the grounding switch can be switched off or switched on, Vice verse.

6.2.1.2 Only if the grounding switch is connected, the door of the cabinet can be closed.

6.2.1.3 If the door of the cabinet is opened, the grounding switch can it be switched off.

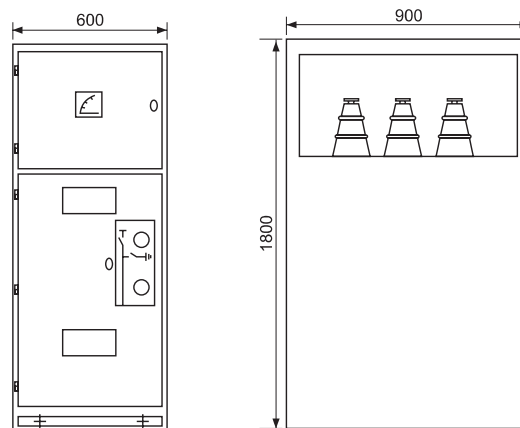
6.2.2 If the loaded switch isn' t assembled with the grounding switch, the interlock device must be equipped between the loaded switch and the door of the cabinet. The interlock function must meet the following requirements:

6.2.2.1 Only if the loaded switch is disconnected, the door of the cabinet can be opened or closed.

6.2.2.2 If the door of the cabinet is opened, the loaded switch cann' t be switched on.

6.2.3 The cable inlets box of the power, if cable inlets are designed to be energized, can be equipped with the electromagnetism-controlled door or the padlock according to the usersrequirements.

6.2.4 Other interlock devices and all the necessary information about itscharacters and functions will be provided by our company, if required in the agreement.



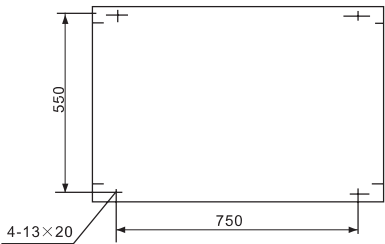
HXGN□-12(VEI)电缆进出线柜示意图

The sketch diagram of HXGN□-12(VEI) cable inlets and outlets box

HXGN□-12(VEI)

箱型固定式交流金属封闭环
网开关设备

外形及安装尺寸 Installation Dimensions



订货须知 Notice for ordering

订货时应提供下列技术参数：

- 1、开关柜的型号及一次方案编号；
- 2、一次系统图和开关柜的排列图、平面布置图；
- 3、二次原理图、端子排列图和对二次回路的要求；
- 4、母线、进线柜和出线柜的额定电流；
- 5、柜内各元件的型号及额定参数；
- 6、特殊联锁的要求；
- 7、对外壳（包括柜内外）涂漆颜色的要求。

除以上所述的内容外，凡能影响订货的一切情况都应向制造厂提供，如特殊的装配和安装条件，引入高压的位置等。

When ordering, the following technical data must be provided:

- 1.Model NO. of switch cabinet and first-order solution No.
- 2.First-order system diagram and arrangement diagram of the switch cabinet, assembly plan diagram.
- 3.secondary-order principle diagram , array diagram of terminals, and requirements for secondary circuit.
- 4.Rated current of buses, the cable inlets box and the cable outlets box.
- 5.Model No. and rated indexes of each component in the cabinet.
- 6.Special requirements for interlock.
- 7.Requirements for the color of enclosure coating (including inner and exterior of the cabinet)

Besides, the information related to ordering should be given to our company, such as special conditions about assembly and installation, the position of high voltage cable inlets.

GG-1AF(Z)

High Voltage Switch Board



概 述

GG-1AF(Z) 型高压开关柜 (以下简称开关柜), 适用于发电厂、变电站、工矿企业充电所内 3.6~12kV、三相交流 50Hz 单母线系统及单母线带旁路系统, 作为接受与分配电能之用。并对电路实行控制、检测、保护。该产品具有完善、可靠、操作方便的“五防”闭锁功能:

- 1.1 防止带负荷分、合隔离开关;
- 1.2 防止误入带电隔室;
- 1.3 防止误分、合断路器;
- 1.4 防止带接地线送电;
- 1.5 防止带电挂接地线。

Introduction.

GG-1AF (Z) High voltage switch board (switch board), is applicable for 3.6~12kV, three-phase AC 50Hz single main circuitry systems and single main circuit with bypass systems in power plants, transformer substations, and factories. It' s used for receiving and distributing powers, meanwhile control, inspect, and protect the circuit. The product is provided with a perfect, reliable, convenient closedown functions, so-called “Five Preventions” :

- 1.1 Prevent turning on/off the isolated switches with load.
- 1.2 Prevent entering the electriferous isolating rooms by mistake.
- 1.3 Prevent turning on/off the breakers by mistake.
- 1.4 Prevent transmitting electricity with earth-wire.
- 1.5 Prevent touching earth-wire with electricity.

使用环境条件

2.1 正常使用条件

- 2.1.1 海拔高度不超过1000m;
- 2.1.2 空气温度: 上限+40℃; 下限一般地区-10℃, 高寒地区-25℃;
- 2.1.3 相对湿度: 月平均值不大于90%; 日平均值不大于95%;
- 2.1.4 没有导电尘埃, 腐蚀性气体或蒸汽的场所;
- 2.1.5 没有爆炸和火灾危险的场所;
- 2.1.6 没有剧烈振动的场所。

2.2 特殊工作条件

当开关柜安装在高于1000m的海拔地区时, 必须与厂家协商。当环境温度升高超过规定时, 必须在柜内进行强迫通风, 以提高母线和分母支线的载流量。当开关柜运行在具有高温或温度变化较大的气候环境中时, 可能有凝露危险, 因此必须安装加热器以防事故与腐蚀发生。

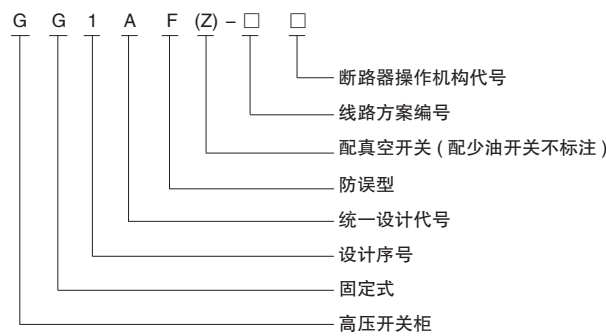
Ambient conditions.

1. Natural application conditions
 - a. Altitude level under 1000m

GG-1AF(Z)
型高压开关柜

- b.Air temperature: Upper limit +40℃ Lower limit -10℃ in common place, -25℃ in cold place.
 - c.Relative humidity: monthly mean value less than 90%;Daily mean value less than 95%;
 - d.No electric dust, corrosive air or steam around.
 - e.No explosion or fire threatened.
 - f.No acute vibration.
2. Special working conditions
- To install the switchboards above 1000m in altitude, it's necessary to consult with manufacturers first. When ambient temperature above the set value, compulsory ventilation in board is necessary, so as to increase the carrying capacity of main circuit and branches.
- When switchboard is working under high temperature or great changing temperature, condensation may occurs, so heaters must be installed to prevent accident or corrosion.

型号及其含义



结构简介

GG-1AF(Z) 型高压开关柜基本骨架用角钢焊接而成。前面板、前面大门、柜间隔板、终端侧板和柜内隔板均为薄钢板弯制而成。开关柜的前面左门装有监视仪表、继电器、指示灯及操作元件，门内小室可安装继电器、电度表等二次元件，电度表通过门上的观察窗观看指示。柜前面左中部为操作板，安装操动机构。左下角小门内安装合闸接触器及熔断器。操作板右侧之长条门内安装二次回路用端子排及柜内照明灯。柜前面右侧上下两扇门装有观察窗，可观察到柜内电器设备的运动情况。右上门装有带电显示装置，以便检测回路带电状况。

柜内用薄钢板分隔为上部为断路器室，下部为隔离开关室，并可安装柜间联络母线。隔板上可安装电流互感器等元件。上部母线隔离开关与断路器之间装有隔板，主母线安装于柜顶部支持绝缘子上。

母线可根据需要选用铝母线或铜母线。电气间隙不小于 125mm。

旁路方案是在主柜后增加深 600mm 的附柜，附柜有后门及操作板防护，后门与主柜前门装有可逆式机构连锁：

- 前门打开，后门才可打开 - 维修安全；
- 后门关闭，前门才可关闭 - 运行安全。

开关柜一次线路方案见表 3。表中所示为一般型，选用带接地刀的组合式隔离开关为 GN24-12。简易型选用的隔离开关为 GN19-12，接地元件为接地桩，一次接线图与一般型类同，不再另行示出。

GG-1AF(Z)

High Voltage Switch Board

Structure information

GG-1AF (Z) high voltage switchboard has frames welded with angle iron. The front board, front door, clapboard between cabinets, terminal sideboard, and clipboard in cabinet are all made by bended thin steel board.

The front left door of switchboard is equipped with monitoring meters, relays, instruction lamps and operation components, indoor small room can be equipped with twice components like relays, ammeters etc. the ammeter can be watched through window on the door. The left-center of front board is the operation board, the operational action machines are installed. In the left-down door, switch-on contactors and fuse boxes are installed. In strip door located in the right side of the operation board, terminal blocks of twice loop and in-board illumination lamps are installed. On the two doors of right front board, windows are installed for observing the operation conditions of inside electrical equipments. On the right-up door, power lights are equipped so as to inspect the power condition of the loop.

The cabinet is divided into the upper breakers “room and the lower isolated switches” room by the thin steel board; installation of communication circuit is available. On the clapboard, current mutual inductor may be installed. Between the main circuit isolated switch and breaker, clipboard is installed. The major main circuit is installed on the ceramic insulations supported on the top of board. Aluminum or copper wire can be chosen as the main circuit according to the requirement. The electric clearance should less than 125mm.

The bypass design is to add 600mm tall attached-cabinet behind the main cabinet, the attached-cabinet has back door and operation board as protection, and the back door and front door of main cabinet have reversible interlock:

After the front door opened, the back door can be opened----safe maintenance, After the back door closed, the front door can be closed----safe operation.

主要技术参数 Technique data

5.1 开关柜的技术数据

Technique data of switch board are in table 1 below:

表 1

序 号	项 目		单 位	数 据		
1	额定电压		kV	3.6	7.2	12
2	额定绝缘水平	(Imin) 工频耐压 kV	kV	24	32	42
		雷电冲击耐压 (峰值)	kV	40	60	75
3	额定频率		Hz	50		
4	母线额定电流		A	1250; 1600; 2500; 3150		
5	分支母线额定电流		A	6300; 1250; 1600; 2500; 3150		
6	额定热稳定电流 (4s)		kA	20; 25; 31.5; 40		
7	额定动稳定电流 (峰值)		kA	50; 63; 80; 100		
8	额定短路开断电流		kA	20; 25; 31.5; 40		
9	额定短路关合电流 (峰值)		kA	50; 63; 80; 100		
10	配用断路器			ZN28A 真空断路器 (电操、弹操)		
11	外形尺寸 (宽 × 深 × 高)	主柜	mm	1218 × 1200 × 2800		
		附柜	mm	1218 × 600 × 2300		
12	重量		kg	630		

GG-1AF(Z)
型高压开关柜

50.2 ZN28A-12 型真空断路器的技术数据

表 2

序 号	名 称	单 位	数 据			
1	额定电压	kV	12			
2	额定电流	A	630-1600		1250-3150	
3	额定短路开断电流	kA	20	25	31.5	40
4	额定短路开断电流开断次数	次	50		50	30
5	额定短路关合电流 (峰值)	kA	50	63	80	100
6	额定动稳定电流 (峰值)	kA	50	63	80	100
7	额定热稳定电流 (4S)	kA	20	25	31.5	40
8	合闸时间	s	≤ 0.2			
9	固有分闸时间	s	额定电压 (最高) ≤ 0.06 最低电压 ≤ 0.08			
10	额定绝缘水平	雷电冲击耐压	kA			
		Imin 工频耐压	kA			
11	额定操作顺序		0-0.3s-C0-180s-C0 (31.5kA 以下)			
			0-180s-C0-180s-C0 (40kA 以上)			
12	机构寿命	次	1000			
13	动静触头允许磨损厚度	mm	3			

外形及安装尺寸 (见图 1 至图 6)
Figuration and installation dimension (table 1~table 6)

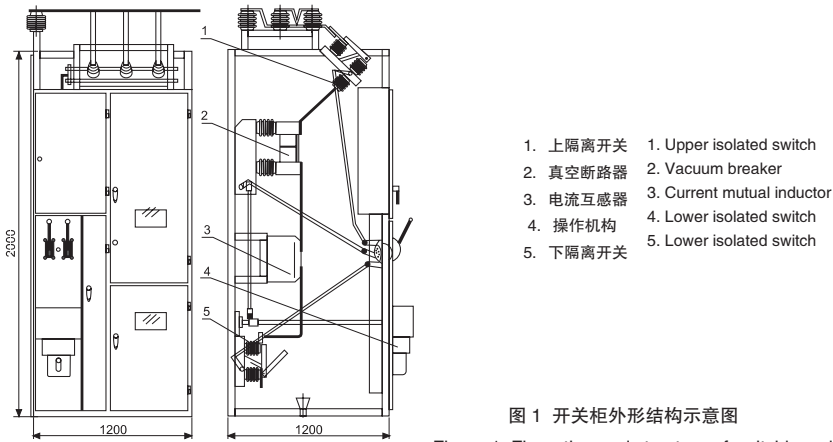
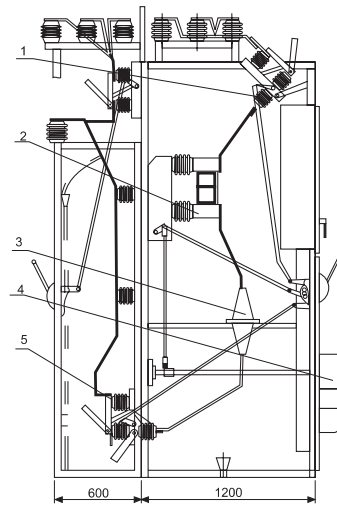


图 1 开关柜外形结构示意图
Figure 1. Figuration and structure of switchboard

GG-1AF(Z)

High Voltage Switch Board



- | | |
|----------|----------------------------|
| 1. 上隔离开关 | 1. Upper isolated switch |
| 2. 真空断路器 | 2. Vacuum breaker |
| 3. 电流互感器 | 3. Current mutual inductor |
| 4. 操作机构 | 4. Operational machine |
| 5. 下隔离开关 | 5. Lower isolated switch |

图2 带附柜结构示意图

Figure 2. Structure of cabinet with attached cabinet

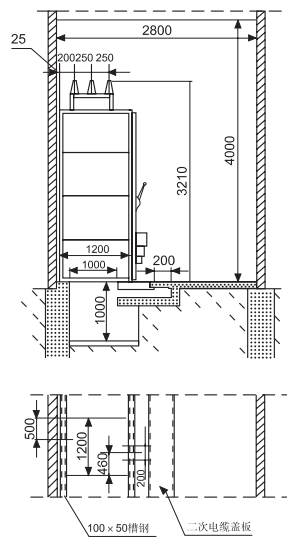


图 3 基础形式

Figure 3. Figuration of base

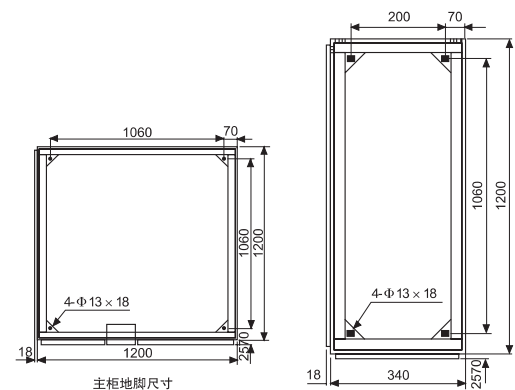


图 4 附柜地脚尺寸

Figure 4. Dimension of attached cabinet base

GG-1AF(Z)
型高压开关柜

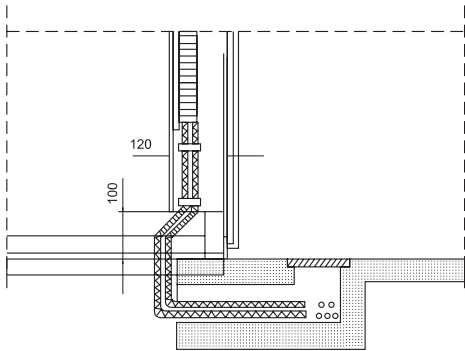


图 5 二次回路电缆的位置
Figure 5. Location of twice loop cable

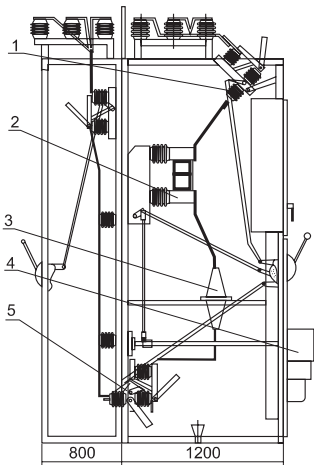


图6 带附柜结构示意图
Figure 6. Structure of cabinet with attached cabinet

1. 上隔离开关 2. 真空断路器
3. 电流互感器 4. 操作机构
5. 下隔离开关
1. Upper isolated switch 2. Vacuum breaker
3. Current mutual inductor 4. Operational machine
5. Lower isolated switch

订货须知：

订货时须提供：

- 7.1 一、二次线路方案及其设备型号、规格和一次线路方案排列图。
7.2 一般情况下均按简易闭锁方案供货。用户如需订一般闭锁方案，必须在合同中或图纸中注明。
7.3 一次方案号 25-28 大电流柜在一般情况下按小柜体 (宽 × 深 × 高 1200 × 1200 × 2800mm) 供货。用户若需要也可供大柜体 (宽 × 深 × 高 1540 × 1200 × 2800mm)，订货时必须予以注明。

Order notices

The following should offered while ordering:

- 7.1 The once and twice circuitry design and its equipment type, specification and circuitry arrangement drawing.
7.2 Generally, products are provided according to the simple closedown scheme. If customers order general closedown scheme, indication should be given clearly in the order contracts or order drawings.
7.3 In the once-scheme number 25-28 big current cabinet generally provided by small cabinet (1200mm × 1200mm × 2800m). Customers can order big cabinets (1540 × 1200 × 2800mm) if needed, indication should be made clear in the order.

JP

type low-voltage distribution integrated cabinet



概述

JP型低压配电无功补偿综合柜是一种本着安全、经济、合理、可靠的原则而设计的新型户外配电无功补偿综合柜。适用于城网、农网改造、工矿企业、路灯照明、住宅小区等交流50Hz、额定电压380V的配电系统中，具有电能分配、控制、保护、无功补偿、电能计量等多功能的新型户外综合配电箱，同时可根据用户要求加入漏电保护功能。产品具有结构新颖、合理、防护等级高、安装调试、维护及检修方便等优点,是目前电网改造中理想的低压成套装置。

Introduction

JP type low-voltage distribution integrated cabinet is a new type of outdoor power reactive compensation integrated cabinet designed based on the principle of security, economic, reasonable and reliable. It is suitable to city power net, upgrading of rural power grid, industrial and mining enterprises, street lighting, residential area and other power distribution system of Ac 50 Hz, rated voltage 380 v. The product has the multi-function of power distribution, control, protection, reactive power compensation, electric power measuring and so on, at the same time the electric leakage protection function can be added according to user requirements.

使用范围

- 1.1 本产品使用于城镇农网改造工程10~500KVA低压综合配电箱；
- 1.2 户外装设，装于配电变压器一侧或下方；
- 1.3 条件使用
 - 1.3.1 海拔高度：≤1000m
 - 1.3.2 温度范围：户外，-30~+40℃；。
 - 1.3.3 相对湿度：+40℃时，≤50%RH；+20℃时，≤90%RH
 - 1.3.4 环境条件：安装地点应无有害气体和导电性、爆炸性尘埃，无强烈震动，无强电场或强磁场，通风状态良好。
 - 1.3.5 安装倾斜度：不大于5°
 - 1.3.6 污秽等级：≥3级

Scope of Apply

- 1.1 This product is used in 10~500KVA LV Distribution Cabinet of Town Retrofit Project.
- 1.2 Outdoor installed on one side or bellow of the distribution transformer.
- 1.3 Service Condition
 - 1.3.1 Altitude: ≤1000m
 - 1.3.2 Temperature range: outdoor, -30~+40℃；。
 - 1.3.3 Relative humidity: +40℃，≤50%RH；+20℃，≤90%RH
 - 1.3.4 Environment condition: Installation site should be no harmful gas, electric conductivity, explosive dust, strong vibration, strong electric field or magnetic field and with good ventilation condition.
 - 1.3.5 Installation angle: no bigger than 5°
 - 1.3.6 Pollution level: ≥3

执行标准

本装置符合以下最新版本国家标准或行业标准：
GB4208-93 外壳防护等级；
GB2681-81 电工成套装置中导线的颜色等；
GB2682-81 电工成套装置中指示灯和按钮的颜色；
GB3797-89 电控设备第二部分装有电子器件的电控设备；
GB4720-84 电控设备第二部分低压电器电控设备；
GB4205 控制电器设备的操作件标准运动方向；
GB11463-89 电子测量仪器可靠性试验；
SD189-87 静态继电保护及安全自动装置通用技术条件；
GB/T15576-1995 低压无功功率静态补偿装置总技术条件；
DL/T5971996 低压无功补偿控制器定货技术条件。

Carried Standard

The device is in accordance with the following latest version of the national standards or industry standards:
GB4208-93 Enclosure protection grade
GB2681-81 The color of the wire, etc in complete sets of equipment
GB2682-81 Color of indicator and button in electrical complete set of equipment
GB3797-89 Electric control device Part II Electric control device with electric components
GB4720-84 Electric control device Part II LV electric control equipment
GB4205 Standard remote operation direction of electric equipment control
GB11463-89 Electric measurement instrument reliability test
SD189-87 General technical condition for static relay protection and security automatic equipment
GB/T15576-1995 General technical condition for static LV reactive power compensation device
DL/T5971996 Order technical conditions for low voltage reactive power compensation controller

技术要求

- 3.1低压综合配电箱分为类
- 1) 单相20KVA及以下为简易型（简称D型），20kVA及以下单相变压器。
 - 2) 100KVA及以下为小型（简称S型），最大容量可到125kVA变压器。
 - 3) 125KVA ~ 200KVA为中型（简称M型），最大容量可到250kVA变压器。
 - 4) 250KVA ~ 400KVA为大型（简称L1型）。
 - 5) 315KVA ~ 400KVA为加大型（简称L2型），最大容量可到500kVA变压器。
- 3.2低压综合配电箱进出线
- (1) 进出回路数, 乡村地区为1进1出，城镇地区为 1进1 ~ 2出。
 - (2) S型和M型低压综合配电箱采取上侧进底部出，进出线采用箱内接线方式，安装在配电变压器侧边，与配电变压器水平排列。
 - (3) L型低压综合配电箱采取箱体上侧正面进背面出，进出线通过外置装头连接，安装在配电变压器下方或侧边，与配电变压器垂直或水平排列。
- 3.3元器件的配置和性能
- (1) 无功补偿回路用电流互感器:电流互感器精度为0.5级， S型不装设， M型、 L1型和L2型各装设1只。
 - (2) 隔离刀闸: S、M型装设带辅助触点，防止带负荷操作的防误隔离刀闸。 L1、 L2型不装设隔离刀闸。

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(3) 断路器:

1) 按照乡村低压电网接地方式, S型和M型采用三相四线一体式剩余电流动作断路器具备:

- ①具备剩余电流继电器、交流接触器和空气断路器的功能。
- ②过载短路、剩余电流保护功能。
- ③自动跟踪(线路剩余电流)定档功能。
- ④动作电流可调。

2) 按照城镇低压电网接地方式, L1、L2型采用塑壳低压断路器, 具有过载、短路等保护功能。

(4) 无功补偿: (如有补偿)

1) S型采用固定补偿方式。装设1只8kVAR自愈式三相电容器和1只空气开关。

2) M型采用固定补偿与自动补偿相结合的方式。

- ①装设2只自愈式三相电容器, 1只10kVAR固定补偿, 1只20kVAR自动补偿;
- ②装设1台无功自动补偿控制器;
- ③装设2只空气开关和1只自动投切用复合开关;
- ④装设1只无功补偿用接线盒。

4) L1型采用固定补偿与自动补偿相结合的方式。

- ①装设4只自愈式三相电容器, 1只30kVAR固定补偿, 3只20kVAR自动补偿;
- ②装设1台无功自动补偿控制器;
- ③装设4只空气开关和3只自动投切用复合开关;
- ④装设1只无功补偿用接线盒。

5) L2型采用固定补偿与自动补偿相结合的方式。

- ①装设5只自愈式三相电容器, 1只30kVAR固定补偿, 1只30kVAR自动补偿, 3只20kVAR自动补偿;
- ②装设1台无功自动补偿控制器;
- ③装设5只空气开关和4只自动投切用复合开关;
- ④装设1只无功补偿用接线盒。

(5) 计量装置:

1) 装设1只(与单相配电变压器配合)或3只(与三相配电变压器配合)计量用电流互感器(电流互感器精度为0.2S级、型号根据变压器容量选定);

2) 预留1块电能表的安装位置(电能表精度为1.0, 根据配电变压器容量由供电公司计量及相关管理部门选型、安装);

3) 装设1只计量用联合接线盒。

(6) 装设1只集中器(具备数据采集、通信和远程监控功能)(D型不配置)

(7) 装设1组低压氧化锌避雷器。

(8) 装设指针式电压表和工作指示灯。

(9) 装设箱内配检修灯。

(10) L型外接瓷套铜螺栓配上仰角30°的螺旋线夹, 表面烫锡处理。

(11) 接地铜排与箱体接地桩头通过多股铜线可靠连接, 铜线不小于4mm²。

3.4外型、安装方式

(1) 箱体材料应采用SUS304不锈钢板或SMC绝缘板, 板厚不小于1.5mm。正面、背面开门, 低压综合配电箱的所有门铰链安装在进线侧, 门的最大开度为135度, 箱体设有便于查看的透明观察口, 箱门上设统一的(特殊)锁具(锁孔有防雨设计)。计量室的门锁与其它室的门锁同类型但规格小1号, 计量门有封铅扣。

(2) 箱体防护等级高于IP33。

(3) 在箱体进线侧设有供可靠接地用的M12螺栓桩头。

(4) 箱体设计散热性良好, 配置温控风冷装置, 45℃以上强制通风(D型不配置)。

(5) 低压综合配电箱装有铭牌, 并固定在明显可见位置, 铭牌上的文字和标识清晰且牢固。

(6) D型、S型和M型低压综合配电箱进出线孔打磨光滑、倒边并配有橡皮保护密封圈, 有防渗水设计。L1、L2型低压综合配电箱投运时, 配备接线桩头防护绝缘护套。

(7) 装卸用吊环采用斜对角方式设置。

(8) 箱体正面印有国家电网公司徽标、“×××供电有限责任公司”和“报修电话95598”字样; 正面和背面印有“有电危险 禁止触摸”的警示语。

Technical Requirement

3.1 Category of LV Integrated Distribution Cabinet

1) Single phase 20KVA and below is Simple Type (Referred as D type), 20KVA and below single phase transformer.

2) 100KVA and below is Small Type (Referred as S type), Max. Capacity 125KVA transformer.

3) 125KVA ~ 200KVA is Middle Type (referred as M type), Max. Capacity 250KVA transformer.

4) 250KVA ~ 400KVA is Large Type (Referred as L1 type).

5) 315KVA ~ 400KVA is Ex-Large Type (Referred as L2 type), Max. Capacity 500KVA transformer.

3.2 LV Distribution Cabinet Inlet & Outlet

(1)) No. of inlet & outlet loop, one inlet one outlet in rural area, one inlet two outlet in urban area.

(2) For S type and M type distribution cabinet, we adopt inlet upper going & outlet bottom going method. Inlet & outlet adopts in-box connecting method. The connection box is installed on the side of distribution transformer horizontally.

(3) For L type distribution cabinet, we adopt cabinet upper part inlet front side going & outlet back side going method. Inlet & outlet adopts outer head connecting method, installed on the side or lower part of distribution transformer horizontally or vertically.

3.3 Configuration and Performance of Components

(1) CT for reactive power compensation circuit: CT's accurate class 0.5, S type without CT, M type, L1 type and L2 type with one CT.

(2) Isolation knife switch: S & M type with auxiliary contact, error preventing isolation knife switch to prevent loading operation. L1 & L2 type is without isolation knife switch.

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(3) Circuit breaker:

1) According to rural LV power grid grounding method, S & M type adopt three phase four wire one-piece residual current breaker, which has the characteristic of below:

① Functions of residual current relay, AC contactor and air circuit breaker.

② Protection function of overload short circuit, residual current.

③ Function of line residual current automatic tracking gear setting.

④ Operating current is adjustable.

2) According to the Town LV Power Grid Grounding Method, L1 & L2 adopt molded case LV circuit breaker with overload, short circuit protection functions etc.

(4) Reactive power compensation: (If there is any compensation)

1) S type adopts fixed compensation method and equipped with one 8k VAR self-healing type three-phase capacitor and one air switch.

2) M type adopts a combination of automatic compensation and fixed compensation.

① With two self-healing three-phase capacitor, one 10k VAR fixed compensation, and one 20k VAR automatic compensation.

② With one set of automatic reactive power compensation controller.

③ With two air switch and one automatic switching composite switch.

④ With one reactive power compensation junction box.

4) L1 type adopts a combination of automatic compensation and fixed compensation.

① With 4 set of self-healing three-phase capacitor, one 30k VAR fixed compensation, three 20k VAR automatic compensation.

② With one automatic reactive power compensation controller.

③ With 4 air switch and three automatic switching composite switches.

④ With one junction box for reactive power compensation.

5) L2 type adopts a combination of automatic compensation and fixed compensation.

① With five pc of self-healing three phase capacitor, one 30k VAR fixed compensation, one 30k VAR automatic compensation, three 20k VAR automatic compensation.

② With one automatic reactive power compensation controller.

③ With five air switches and four automatic switching composite switches.

④ With one reactive power compensation junction box.

(5) Metering device:

1) With one (for single phase distribution transformer) or three (for three phase distribution transformer)

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current transformer for metering, whose accurate class is 0.2S, and model chosen according to the capacity of the transformer.

2) Leave a installation position for one Watt Hour Meter, whose accurate class is 1.0, and model, installation confirmed by Power Supply Company according to distribution transformer' s capacity.

3) With one combined junction box for measuring. °

(6) With one concentrator with data collection, communication and remote monitoring function. (Without concentrator for D type.)

(7) With one group of low voltage Zinc Oxide arrester.

(8) With pointer voltage meter and a working indicator.

(9) With inspection lamp in cabinet.

(10) L type connected with porcelain copper bolts with screw clamp in elevation angle of 30 degrees, whose surface is tin foil processed.

(11) The grounding copper bar and cabinet grounding pile head are connected by multi-strand copper wires, and the copper not less than 4mm².

3.4 Appearance and Installation

(1) The cabinet body adopts SUS304 stainless steel plate or SMC insulation board, whose thickness is no less than 1.5mm. The front and back sides are with door, whose max. open angle is 135 degree. The door hinge is installed in the inlet side. The cabinet is equipped with transparent observation window, and the cabinet doors have unified lock with special rainproof design on the keyhole. The lock of metering cabinet and that of other cabinets are of same type but smaller. The metering door has lead sealing buckle.

(2) Cabinet protection grade above Ip33.

(3) M12 bolt pile head for reliable grounding use on the inlet side of cabinet.

(4) Cabinet good heat dissipation design, and equipped with temperature controlled cooling device, forced ventilation when temperature above 45°C. (Without temperature controlled cooling device for D type)

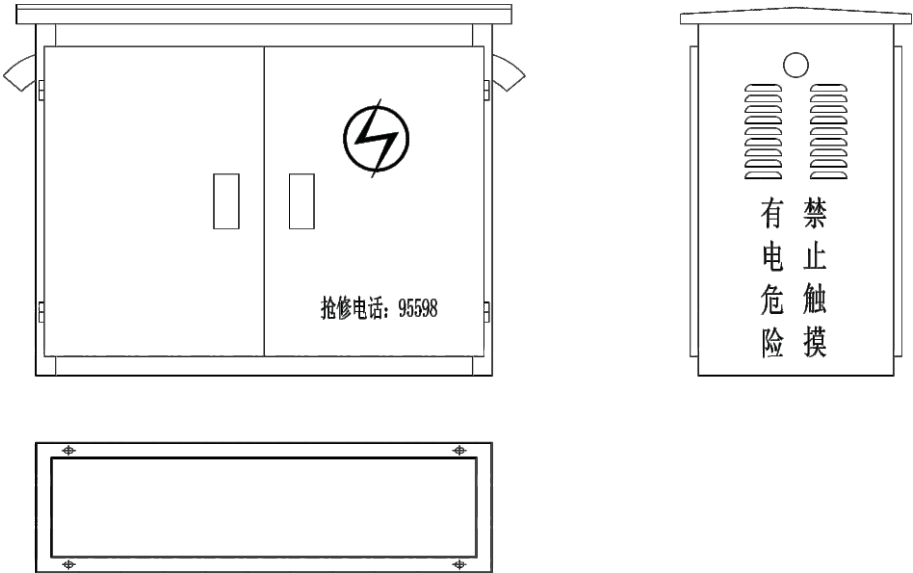
(5) Low-voltage comprehensive distribution cabinet is provided with a nameplate, and fixed in a visible position, the words and mark on the nameplate clear and firm.

(6) For D type, S type and M type low-voltage comprehensive distribution cabinet, the inlet & outlet hole is smoothed, the hole edge is equipped with rubber protective sealing ring and has anti seepage design. When L1 and L2 type comprehensive distribution cabinet running, it is equipped with wire pile head protective insulating sheath.

(7) Loading & unloading ring adopts diagonal method.

(8) The front side of cabinet is printed with China State Grid Company logo, Repair Service Hotline: 95598” , the front side and back side is printed with Dangerous to touch warning mark.

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型低压配电无功补偿综合柜



主要元件配置

10kV柱上式变压器台低压综合配电箱主要元件配置表
Main Components List for 10kV Pole Type Transformer Platform LV Integrated Distribution Cabinet

主要元件名称	型号	规格/ 数量	D型	S型	M型	L1型	L2型
			20KVA 及以下	100KVA 及以下	125 ~ 200KVA	250 ~ 400KVA	315 ~ 500KVA
测量电流互感器	BH 0.5级	只	/	/	300:5/1	400 ~ 600:5/1	500 ~ 800:5/3
计量互感器	BH 0.2S级	只	1只	3只	3只	3只	3只
防误隔离开关	HD11FA	只	100A/1	200A/1	400A/1	/	/
电容器刀开关	HD11刀开关	只	/	/	/	160A/1	
电容器空气开关	DZ47 /3P	只	/	25A/1	63A /2	63A /4	63A/5
复合开关	FK-△	只	/	/	1	3	4
电容器	BSMJ或BCMJ	Kvar/ 组数	/	8Kvar/1	10+20 Kvar/2	30+20+20 +20Kvar/4	30+30+20+ 20+20Kvar/5

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无功补偿接线盒		个	/	/	1	1	1
智能(网络)电表	供电公司配置	只	1 (单相)	1 (三相)	1 (三相)	1 (三相)	1 (三相)
集中器	供电公司配置	只	/	1	1	1	1
联合接线盒		个	/	1	1	1	1
-1低压避雷器	HY1.5W-0.28/1.3	只	1	3	3	3	3
无功补偿控制器		只	/	/	1	1	1
断路器		只	100A剩余电流动作断路器/1	250A剩余电流动作断路器/1	400A剩余电流动作断路器/1	800A三极塑壳断路器/1	630A三极塑壳断路器/2
指针式电压表		只	1	1	1	1	1
指示灯		只	/	1	3	3	3
铜排	TMY	千克	/	20 × 4/8	40 × 4/20	50 × 5/20	60 × 6/30
一次连接导线	BV/BVR	mm2	1.5mm2				
二次连接导线	BV/BVR	mm2	6mm2				
瓷套铜螺栓	配螺旋线夹、铜螺栓杆径不小于20mm	个	/	/	/	7	12
温控散热风扇		套	/	1	1	3	3
计量室隔板	镀锌板	厚度	不小于1.2 mm				
箱体	SUS304马氏体不锈钢板或SMC板	箱体尺寸	450 × 270 × 680	650 × 550 × 1080	750 × 600 × 1360	1030 × 550 × 900	1400 × 600 × 850
		厚度	不小于1.5mm				



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