ECC®

XGN2-10

固定式交流金属封闭开关设备

Fixed Type AC Metal-enclosed Switchgear

中国·上海中科电气集团

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概述

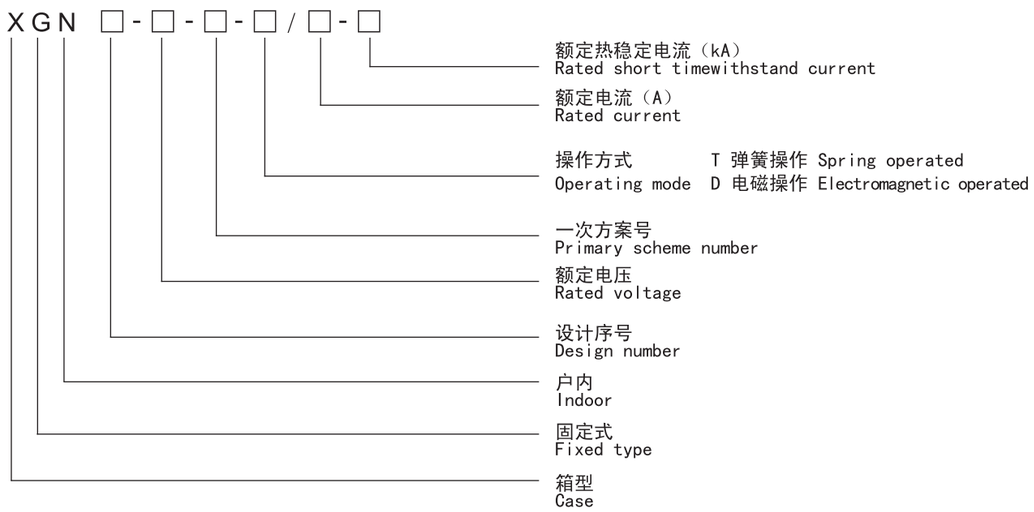
XGN□-10箱型固定式金属封闭开关设备是由西安高压电器研究所开发和研制的高压成套开关设备。设备所用主要一次元件均属重新设计，与目前主要使用的手车式开关柜和GG-1(A)F型开关柜相比具有较高的绝缘水平和防护等级，内部不采用任何形式的相间和相对地隔板及绝缘气体；二次回路不采用二次插头（即不管设备在何种状态下，保护和控制回路是始终贯通的）；产品采用3-10kV单母线，单母线带旁路系统中作为接受和分配电能的高压成套设备。本产品符合“五防”要求。产品各项指标符合GB3906《3-35kV交流金属封闭开关》、IEC298技术标准。

General

XGN□ – 10 Case Fixed Metal-Enclosed Switchgear is a kind of high voltage apparatus developed and researched out by Xi'an High Voltage Apparatus Research Institute. Compared with currently used truck type switchgear such as GG – 1(A)F, it owns higher insulating level and protective level since main primary components in cubicle are re-designed and not any kind of partitions or insulating gaseous set between phases and from phase to earth. As there is no secondary plugs for connection for the secondary circuit, the protective and control circuits are always energized at any status of the equipment. The product is widely applied in 3 – 10kV single busbar and that with bypass electric systems for electricity acceptance and distribution.

Meeting the “Five Preventives” requirement, the product complies GB3906 “3 – 35kV AC Metal-Enclosed Switchgear” and IEC 298 standard in terms of each parameter.

型号含义
Type designation



使用条件

- 环境温度上限+40℃下限-25℃（户内）
- 海拔高度1000m
- 相对湿度日平均值不大与95%、月平均值不大与90%
- 地震强度不超过8度
- 没有火灾、爆炸危险、严重污染、化学腐蚀及剧烈振动的场所

Working conditions

- Ambient temperature from low limit- 25℃to up limit +40℃(indoors)
- Altitude 1000 meters above sea level
- Relative humidity: Daily average not greater than 95% and monthly average not over 90%
- Earth intensity not exceeding Force 8
- Places where there is no conflagration, potential explosion, severe pollution, chemical corrosion and violent shock

结构与防误装置

- 结构

本开关柜为金属封闭箱型结构，柜体骨架由角钢焊接而成，柜内用钢板分隔成断路器室、母线室、电缆室、继电器室，并可通过门面上的观察窗和照明灯观察柜内各主要元件的运行情况。为提高开关柜的技术性能，各主要元件进行了重新设计（如断路器、旋转式隔离开关等）。根据柜体布置、继电器室可安装继电器、门上可安装信号继电器、指示仪表、信号灯、转换开关安装与操作小室。后部为母线室。下部为电缆室，用户可方便地进行接线。前面为断路器室，方便了开关柜的检修。柜体的内部机构参见图一、二和产品说明书。

- 防误装置

“五防”功能 ：防止误分、误和断路器；防止带负荷误分、误和隔离开关；防止带电关合接电开关；防止接地开关闭合时接通电源；防止误入带电间隔。

本开关柜采用了强制性机械闭锁方式，闭锁装置由支座、原盘、面板、锁板、手柄、联杆等主要部件构成。具有性能可靠、功能齐全、结构简单、操作方便的特点，从而简便、有效地达到“五防”。

- 带红绿翻牌的控制开关（KW开关）使用于断路方案，用于防止因走错间隔而误分、误和断路器；
- 只有在断路器确实分断后，才能将小手柄从“工作”位置拉出右旋至“分断闭锁”位置。分、合隔离开关，防止了带负荷误分、误和隔离开关。闭锁与反闭琐的可逆性具有双重的防误功能，既：小手柄处于分断闭锁”位置时，只能合、分上下隔离开关，不能合断路，避免了误合断路器；
- 当断路器及上下隔离开关均处于合闸状态，小手柄处于“工作”位置时，前后柜门不能打开，防止误入带电间隔；
- 当上、下隔离开关未分闸、接地开关就不能合上，小手柄不能从“分断闭锁”位置旋至“检修”位置、可防止带电 接地线；
- 接地开关未分闸，上下隔离开关就不能合上，可防止接地线合上、下隔离开关。

Structure and mal-operation prevention

- Structure

It is of metal-enclosed enclosure structure. The cubicle frame is formed by welded angle steel. Sheet steel separates the inner cubicle into circuit breaker compartment, busbar compartment, cable compartment and relay compartment. One may watch the operation of main components in cubicle through a viewing window in panel and a lighting lamp inside. In order to enhance technical performance of the switchgear, main components such as circuit breaker and rotating disconnecter are subjected to re-design. According to layout, relays may be mounted in relay compartment, signal relays, indicating instruments, signal lamps may be mounted on the door, and the changeover switch may be mounted in a cabinet. The cable compartment is located in lower part of the cubicle for customers to make connections just as easily. In front of the cubicle, there is circuit breaker compartment for convenient reparation. For the internal structure of the cubicle, please refer to Fig. 1, Fig.2 and its operating manuals.

- Mal-operation prevention device

“Five Preventive” functions are: mal-operating prevention of circuit breaker, mal-operating prevention of disconnecter with load, mal-operating prevention of earth switch when energized, energizing prevention when earth switch in closed position, prevention of operators from live bay access.

With enforced mechanical blocking mode, the device, composed of support, disc, panel, handle, connecting level and others, features reliable in performance, perfect in function, simple in structure and easy in operation. It can easily and effectively reach the target of “Five Preventives”.

- A control switch (KW) with red and green turnover plates is applied in circuit breaker scheme, for the purpose of mal-operating prevention of the circuit breaker due to mal-set at other bay.
- Only when the circuit breaker is actually in open position can the small handle be pulled out of the work position and rotated clockwise into open blocking position. At this, the disconnecter can be operated without load. The reverse of blocking and anti-blocking has double functions in mal-operation, i.e., when the small handle is in open blocking position, operation of disconnecter is possible whereas operation of the circuit breaker from open position to closed position is impossible.
- At the time when the circuit breaker, up and low disconnecters are all in closed position with the small handle in work position, the front and back cubicle doors are impossible to open so as to prevent operators from wrong access to live bay.
- If the up and low disconnecters remain closed position, the earth switch is impossible to be closed neither the small handle be rotated from open blocking position onto reparation position, preventing from earthing alive.
- When the earth switch is not yet open, up and low disconnecters are impossible to be closed, hence prevention against short circuit from line to earth.

开关柜主要技术参数　Main parameters

表1

序　号 No	名　称 Description	单　位 Unit	数　值 Value
1	额定电压 Rated voltage	kV	3，6，10
2	最高工作电压 Maximum working voltage	kV	3.5，8.9，11.5
3	额定电流 Rated current	A	5–3000
4	额定开断电流 Rated breaking current	kA	16，20，31.5，40
5	额定短路开合（额定短路并合电流）Rated short circuit making current	kA	40，50，80，100
6	额定短路动稳定电流 Rated peak value withstand current	kA	40，50，80，100
7	额定热稳定电流 Rated short time withstand current	kA	16，20，31.5，40
8	额定热稳定时间 Duration of rated short time withstand current	S	4
9	防护等级 Level of protection		1P2X
10	母线系统 Busbar system		单母线、单母线带旁路 Single busbar, single busbar with bypass
11	操作方式 Operating mode		电磁式、弹簧储能式 Electromagnetic, spring
12	外形尺寸 宽×深×高 Overall dimension W × D × H	mm	1100 × 1200 × 2650（1000A以下）
13	重量 Weight	kg	1000

订货须知：

订货时用户需提供下列资料

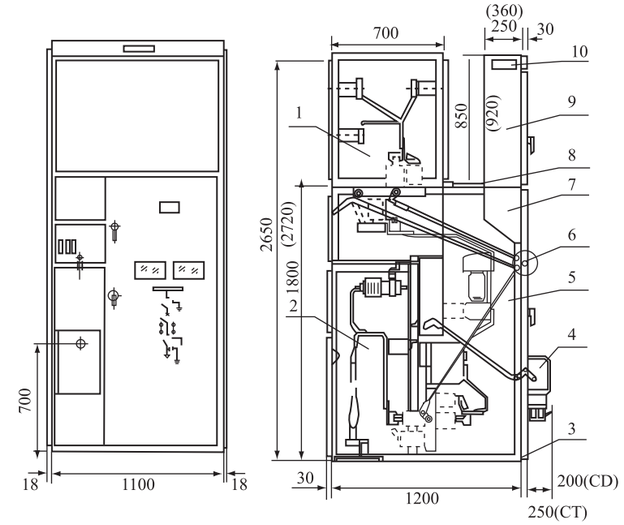
- 主接心方案编号及母线系统图、排列图；
- 二次回路接线原理图，端子排列图，如端子无排列图时按制造厂规定；
- 开关柜内电器元件的型号、规格数量；
- 主母线、支母线的材质、规格，否则按照制造厂规定供应；
- 开关柜使用的特殊环境条件，应在订货时提出；
- 需要附件、备件时应提出其种类和数量。

Information given when ordering

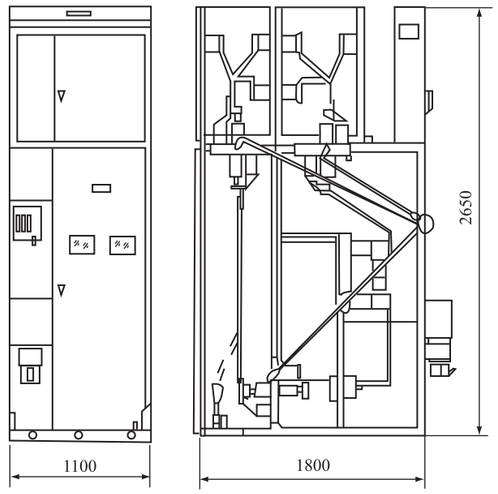
- Main circuit scheme number, busbar system diagram, layout;
- Secondary circuit schematic drawing, terminal layout (if no such layout drawing provided, it will be done as per regulations of the manufacturer);
- Type, specification and quantity of electrical components in cubicle;
- Material and specs of main busbar and branch busbar, otherwise, as per regulations of the manufactuer;
- If the working conditions are other than the specified in this manual, the case should be proposed when ordering;
- Specs and quantity of accessories if necessary.

外型和安装基础参考图　Reference drawings for overall and installation foundation

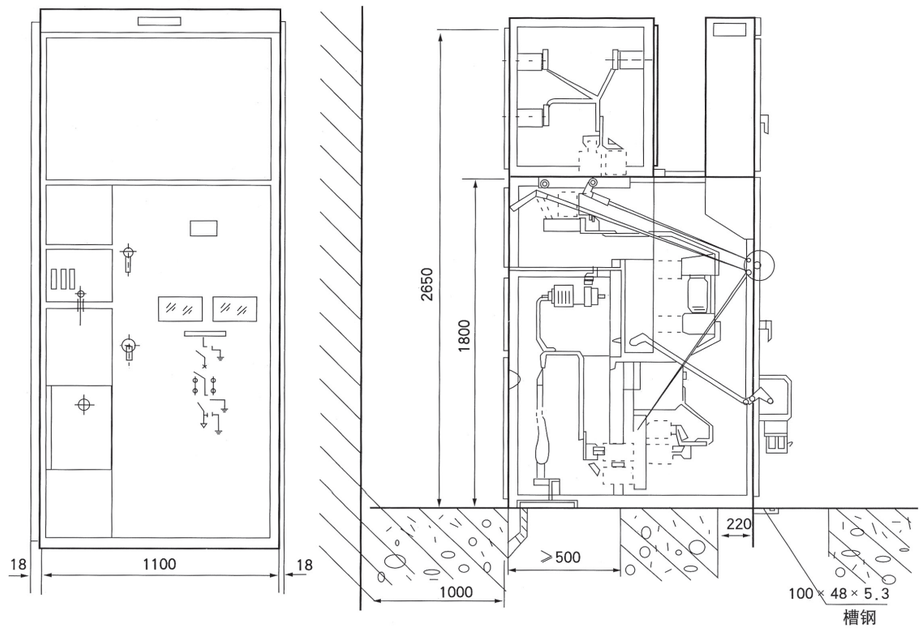
1、母线室 Busbar compartment
2、电缆室 Cable compartment
3、接地母线 Earthing busbar
4、电磁（弹簧）机构
Electromagnetic (Spring) operating mechanism
5、断路器室 Circuit breaker compartment
6、手动操作及联锁机构
Manual operating and interlocking device
7、操作小室 Operating compartment
8、压力释放通道 Pressure release vent
9、仪表室 Instrument compartment
10、小母线端子 Smalll busbar terminals

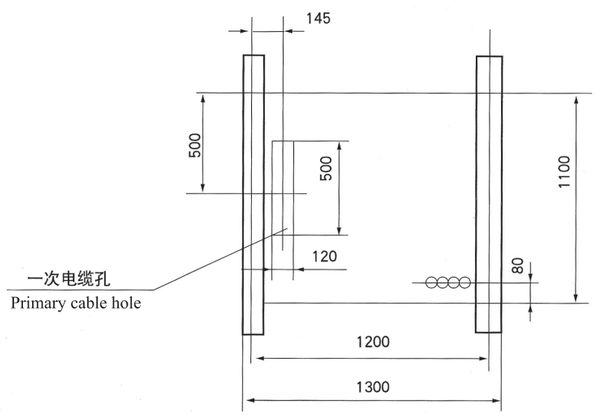


图一、XGN–10/07D外型图 Overalls of XGN – 10/07D
Overalls of XGN – 10/07D



图二、XGN□–10（旁路电缆出线）外形图
Overalls of XGN□ – 10 (bypass cable outgoing)





图三、基础参考图
Reference drawing of foundation

一次接线方案 Primary connection scheme

表 2 (Table 2)

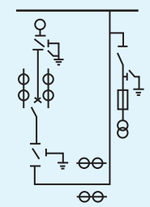
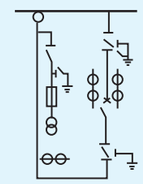
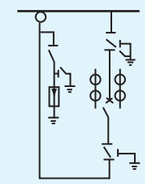
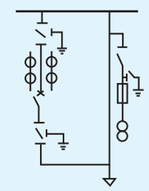
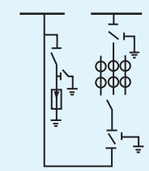
38	44	50	29	52	29	29	53	46	30
									
630-1000A		630-1000A		630-1000A		630-1000A		630-1000A	
架空进线、计量 (Overhead incoming, metering)		架空进线、计量 (Overhead incoming, metering)		架空进线、带避雷器 (Overhead incoming, with arrester)		电缆进线带PT (Cable incoming with PT)		母线联络 (Busbar coupling)	

表 3 (Table 3)

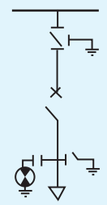
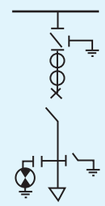
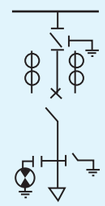
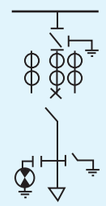
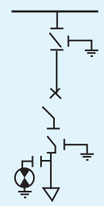
方案号 Scheme NO.		01	02	03	04	05
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□-10 Rotating Disconnecter	1	1	1	1	2
	电流互感器LZZJ-10 Current Transformer		1	2	3	
	真空断路器 Vacuum circuit breaker	1	1	1	1	1
	操作机构CD-10/17或CT-8/17 Operating Mechanism	1	1	1	1	1
	接地开关JN□-10 Earth switch	1	1	1	1	
	带电显示装置 Voltage display device	1	1	1	1	1
最大工作电流（A）Maximum working current		600, 3000				
备注 (Remarks)		电缆出线 (Cable incoming)				

表 3 (Table 3)

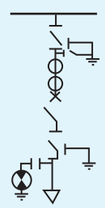
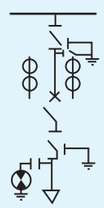
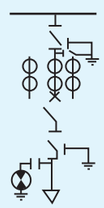
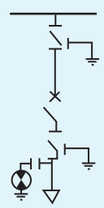
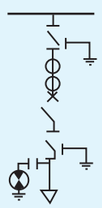
方案号 Scheme NO.		06	07	08	09	10
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□－10D Rotating Disconnecter	1	1	1		
	电流互感器LZZJ－10 Current Transformer	1	2	3		1
	真空断路器 Vacuum circuit breaker	1	1	1	1	1
	操作机构CD－10/17或CT－8/17 Operating Mechanism	1	1	1	1	1
	接地开关JN□－10 Earth switch	1	1	1	1	1
	带电显示装置 Voltage display device	1	1	1	1	1
	旋转式隔离开关GN□－10 Rotating Disconnecter	1	1	1	2	2
最大工作电流（A）Maximum working current		600, 1000				
备注 (Remarks)		电缆进出线 (Cable incoming and outgoing)				

表 3 (Table 3)

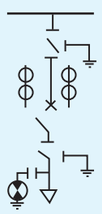
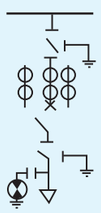
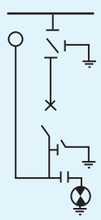
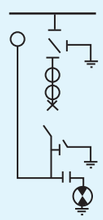
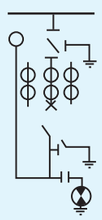
方案号 Scheme NO.		11	12	13	14	15
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□－10D Rotating Disconnecter					
	电流互感器LZZJ－10 Current Transformer	2	3		1	2
	真空断路器 Vacuum circuit breaker	1	1	1	1	1
	操作机构CD－10/17或CT－8/17 Operating Mechanism	1	1	1	1	1
	接地开关JN□－10 Earth switch			1	1	1
	带电显示装置 Voltage display device	1	1	1	1	1
	旋转式隔离开关GN□－10 Rotating Disconnecter	2	2	1	1	1
最大工作电流（A）Maximum working current		600, 3000				
备注 (Remarks)		电缆进出线 (Cable incoming and outgoing)		架空出线 (Overhead outgoing)		

表 3 (Table 3)

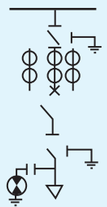
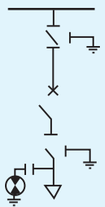
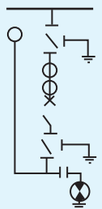
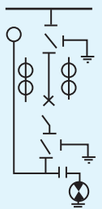
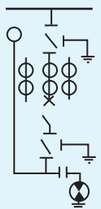
方案号 Scheme NO.		16	17	18	19	20
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□－10 Rotating Disconnecter	1	2	2	2	2
	电流互感器LZZJ－10 Current Transformer	3		1	2	3
	真空断路器 Vacuum circuit breaker	1	1	1	1	1
	操作机构CD－10/17或CT－8/17 Operating Mechanism	1	1	1	1	1
	接地开关JN□－10 Earth switch	1				
	带电显示装置 Voltage display device	1	1	1	1	1
最大工作电流（A）Maximum working current		630, 3000				
备注 (Remarks)		电缆出线 (Cable outgoing)		架空进出线 (Overhead incoming and outgoing)		

表 3 (Table 3)

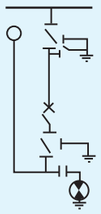
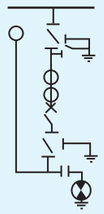
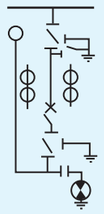
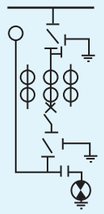
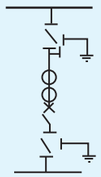
方案号 Scheme NO.		21	22	23	24	25
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□－10D Rotating Disconnecter	1	1	1	1	2
	电流互感器LZZJ－10 Current Transformer			2	3	1
	真空断路器 Vacuum circuit breaker	1	1	1	1	1
	操作机构CD－10/17或CT－8/17 Operating Mechanism	1	1	1	1	1
	接地开关JN□－10 Earth switch					
	带电显示装置 Voltage display device	1	1	1	1	
	旋转式隔离开关GN□－10 Rotating Disconnecter	1	1	1	1	2
最大工作电流（A）Maximum working current		600, 3000				
备注 (Remarks)						

表 3 (Table 3)

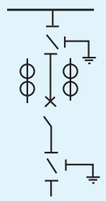
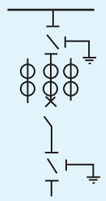
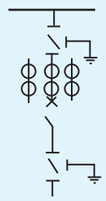
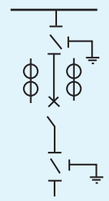
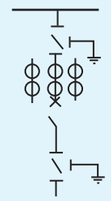
方案号 Scheme NO.		26	27	28	29	30
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□－10 Rotating Disconnecter	2	2	2	2	2
	电流互感器LZZJ － 10 Current Transformer	2	3	1	2	3
	真空断路器 Vacuum circuit breaker	1	1	1	1	1
	操作机构CD－10/17或CT－8/17 Operating Mechanism	1	1	1	1	1
	接地开关JN□－10 Earth switch					
	带电显示装置 Voltage display device					
	旋转式隔离开关GN□－10 Rotating Disconnecter					
最大工作电流（A）Maximum working current		630, 3000				
备注 (Remarks)						

表 3 (Table 3)

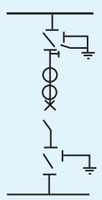
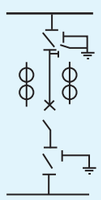
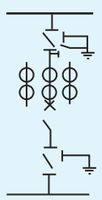
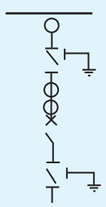
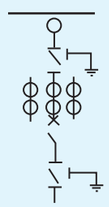
方案号 Scheme NO.		31	32	33	34	35
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□－10D Rotating Disconnecter	1	1	1		
	电流互感器LZZJ － 10 Current Transformer	1	2	3	1	2
	真空断路器 Vacuum circuit breaker	1	1	1	1	1
	操作机构CD－10/17或CT－8/17 Operating Mechanism	1	1	1	1	1
	接地开关JN□－10 Earth switch					
	带电显示装置 Voltage display device					
	旋转式隔离开关GN□－10 Rotating Disconnecter	1	1	1	2	2
最大工作电流（A）Maximum working current		630, 1000				
备注 (Remarks)						

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表 3 (Table 3)

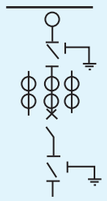
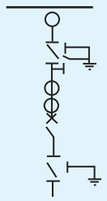
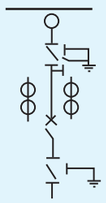
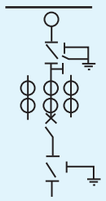
方案号 Scheme NO.		36	37	38	39	40
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□－10D Rotating Disconnecter		1	1	1	
	电流互感器LZZJ － 10 Current Transformer	3	1	2	3	
	真空断路器 Vacuum circuit breaker	1	1	1	1	
	操作机构CD－10/17或CT－8/17 Operating Mechanism	1	1	1	1	
	接地开关JN□－10 Earth switch					
	带电显示装置 Voltage display device					
	旋转式隔离开关GN□－10 Rotating Disconnecter	2	1	1	1	
最大工作电流（A）Maximum working current		630, 1000				
备注 (Remarks)						

表 3 (Table 3)

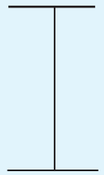
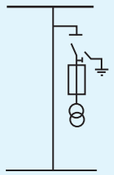
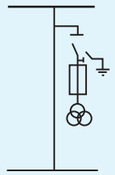
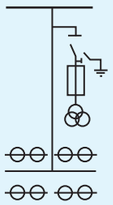
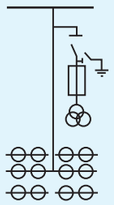
方案号 Scheme NO.		41	42	43	44	45
主接线图 Main circuit scheme						
主要元件 Main components	隔离开关GN24－10D Disconnecter		1	1	1	1
	高压熔断器RN2 － 10 High Voltage Fuse		1	1	1	1
	电压互感器JDZ Potential Transformer		2		2	
	电压互感器JDZJ Potential Transformer			3		3
	电压互感器LFZJ Potential Transformer				2	3
最大工作电流（A）Maximum working current		630, 1000				
备注 (Remarks)						

表 3 (Table 3)

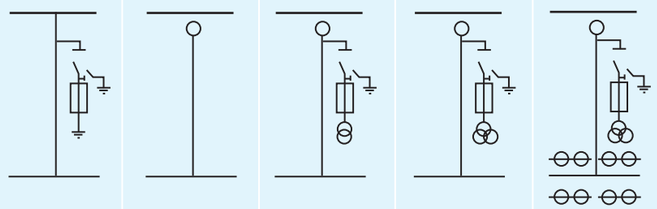
方案号 Scheme NO.		46	47	48	49	50
主接线图 Main circuit scheme						
主要元件 Main components	隔离开关GN24－10D Disconnecter	1		1	1	1
	高压熔断器RN2 － 10 High Voltage Fuse			1	1	1
	电压互感器JDZ Potential Transformer			2		2
	电压互感器JDZJ Potential Transformer			2	3	
	电压互感器LFZJ Potential Transformer					2
	避雷器 Surge arrester	1				
最大工作电流（A）Maximum working current		630, 1000				
备注 (Remarks)						

表 3 (Table 3)

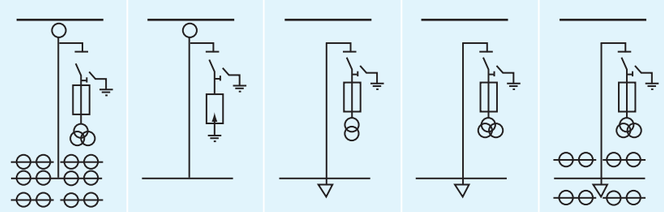
方案号 Scheme NO.		51	52	53	54	55
主接线图 Main circuit scheme						
主要元件 Main components	隔离开关GN24－10D Disconnecter	1	1	1	1	1
	高压熔断器RN2 － 10 High Voltage Fuse	1		1	1	1
	电压互感器JDZ Potential Transformer			2		2
	电压互感器JDZJ Potential Transformer	3			3	
	电压互感器LFZJ Potential Transformer	3				2
	避雷器 Surge arrester		3			
最大工作电流（A）Maximum working current		630, 1000				
备注 (Remarks)						

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表 3 (Table 3)

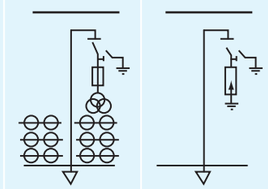
方案号 Scheme NO.		56	57	58	59	60
主接线图 Main circuit scheme						
主要元件 Main components	隔离开关GN24－10D Disconnecter	1	1			
	高压熔断器RN2 － 10 High Voltage Fuse	1				
	电压互感器JDZ Potential Transformer					
	电压互感器JDZJ Potential Transformer	3				
	电压互感器LFZJ Potential Transformer	3				
	避雷器 Surge arrester		3			
最大工作电流（A）Maximum working current		630, 1000				
备注 (Remarks)						

表 3 (Table 3)

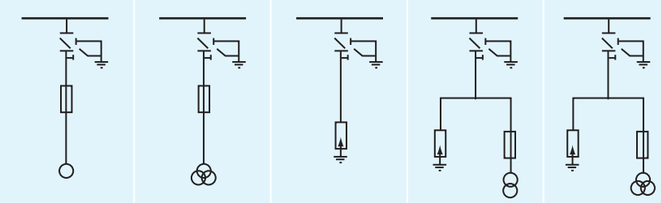
方案号 Scheme NO.		61	62	63	64	65
主接线图 Main circuit scheme						
主要元件 Main components	隔离开关GN24－10D Disconnecter	1	1	1	1	1
	高压熔断器RN2 － 10 High Voltage Fuse					
	电压互感器LDZJ或JSJW Potential Transformer		3或1			3或1
	电压互感器JDZJ Potential Transformer	2			2	
	避雷器 Surge arrester			3	3	3
最大工作电流（A）Maximum working current		630, 1000				
备注 (Remarks)						

表 3 (Table 3)

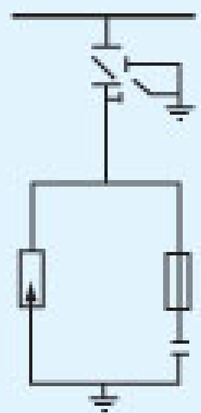
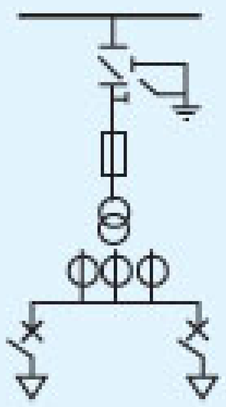
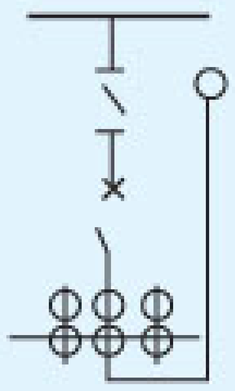
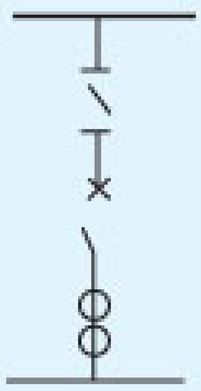
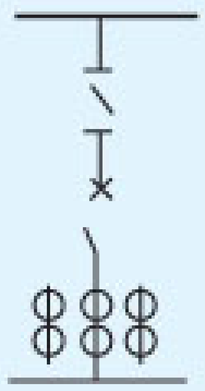
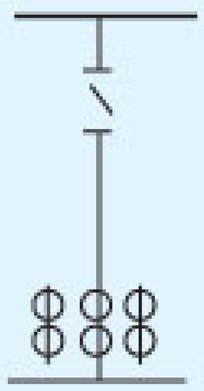
方案号 Scheme NO.		66	67	68	69	70
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□－10 Rotating Disconnecter	1	1			
	高压熔断器RN2 High Voltage Fuse	3				
	高压熔断器RN1 High Voltage Fuse		3			
	电容BWF18 Capacitor	3				
	电力变压器SL Power Transformer		1			
	避雷器 FS Surge Arrester	3				
	电流互感器LMZ1-0.5 Current Transformer		3			
	小型断路器DZ12－60 Miniature Circuit Breaker		6			
最大工作电流（A）Maximum working current		630, 1000				
备注 (Remarks)						

表 3 (Table 3)

方案号 Scheme NO.		71	72	73	74	75
主接线图 Main circuit scheme						
主要元件 Main components	旋转式隔离开关GN□－10 Rotating Disconnecter	1	1	1	1	
	电流互感器LZZJ－10 Current Transformer	3	1	3	3	
	真空断路器 Vacuum circuit breaker	1	1	1		
	操作机构CD－10/17或CT－8/17 Operating Mechanism	1	1	1		
	带电显示装置 Voltage display device	1	1	1		
最大工作电流（A）Maximum working current		630, 1000				
备注 (Remarks)		架空进出线 Overhead incoming and outgoing				

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