

# BOE

用心改变生活 *Change life with heart*



## **BVVS-12 固体绝缘环网柜** BVVS-12 Solid Insulate Switchgear

**北京京东方真空电器有限责任公司**  
Beijing Orient Vacuum Electric Co.,Ltd.

股票代码：京东方A 000725；京东方B 200725 Ticker Symbol：A000725；B200725



## 公司简介

### Company Profile

北京京东方真空电器有限责任公司(简称 BOV),是由京东方科技集团股份有限公司和北京能源集团有限责任公司等共同出资,注册于 1998 年。

BOV 公司是一家掌握触头制造、陶瓷金属化、整管封排三项核心技术和工艺的真空灭弧室提供者;

BOV 公司是一家专业开发和生产高性能真空断路器的产品供应商;

BOV 公司是一家高可靠环保型真空环网柜方案的提供者和产品供应商;

BOV 公司是一家致力于为用户提供优质电器产品及方案的技术合作者。

清晰的自主知识产权,鲜明的产品技术特点,完整的工艺过程控制,深厚的电真空技术底蕴,构成了 BOV 公司的核心竞争力,也是 BOV 公司参与国际竞争的基础,目前 BOV 公司的产品已被国内外多家知名企业列为首选产品。



Beijing Orient Vacuum Electric Co., Ltd (BOV) was founded in 1998 with a joint capital contribution made by BOE Technology Group Co., Ltd and Beijing Energy Investment Holding Co., Ltd.

BOV is a provider of vacuum interrupters with three core technologies, contact manufacturing, ceramic metallization, and whole-tube sealing.

BOV is a professional developer and manufacturer of high-performance vacuum circuit-breaker.

BOV is a solution provider and product supplier of highly-reliable environment-friendly ring main unit.

BOV is a technical cooperater with customers on high-quality electrical products and solutions.

Independent intellectual property, distinctive technical features, complete process control and profound electric vacuum technologies constitute the core competence of BOV and also lay the foundation for its international competition. At present, products made by BOV have become the first choice by many famous enterprises from both domestic and overseas.

## 公司发展历程

### Development history



- 1990 年：开发真空灭弧室
- 1993 年：开始生产 ZN12 用真空灭弧室，年产 2000 只（此年 774 厂改制为京东方）
- 1997 年：京东方集团与北京能源集团等组建专业生产真空灭弧室的合资公司—北京京东方真空电器有限责任公司 (BOV)
- 1998 年：正式注册北京京东方真空电器有限责任公司 (BOV)
- 1999 年：引进国外设备，开发、生产样管
- 2000 年：真空灭弧室产品通过 VS1、ZN65 等型式试验
- 2003 年：通过 12KV 固封极柱产品 (31.5KA、40KA、50KA) 等型式试验
- 2004 年：真空灭弧室产品通过 ZN85 (40.5KV/2500-31.5KA) 等型式试验
- 2005 年：完善 12KV 固封极柱产品，实现大批量生产
- 2006 年：完成 24KV 固封极柱产品等型式试验
- 2008 年：开始研发生产真空断路器，主要为用户提供试验样机，并通过型式试验验证
- 2008 年：完成 27.5KV 和 40.5KV 固封极柱产品等型式试验
- 2009 年：真空灭弧室产品完成 72.5KV 产品型式试验、固封极柱产品 40.5KV 产品切电容试验
- 2010 年：开始大批量生产真空断路器，电压等级包括 12kV，24kV，40.5kV
- 2010 年：真空灭弧室产品完成 126KV/31.5KA 产品 -2500A 型式试验并批量出口乌克兰、俄罗斯市场
- 2011 年：BOV 公司推出自主品牌 DVB 型真空断路器，并在多个领域得到推广使用
- 2012 年：推出 ZW32、ZW20、FZW28 等户外柱上开关
- 2013 年：完成下隔离固体绝缘柜 BVVS1 产品开发并通过型式试验
- 2014 年：真空灭弧室产品在莫斯科完成 126kV/3150A-40kA 型式试验
- 2014 年：完成 12KV 箱式变电站开发并成功投运
- 2016 年：推出全新一代 DVB 型高可靠、长寿命固封式真空断路器



- 1990:** Start developing vacuum interrupter
- 1993:** Start producing vacuum interrupter used in ZN12, with the production of 2000 units per year
- 1997:** The establishment of Beijing Orient Vacuum Electric Co., Ltd specializing in producing vacuum interrupter  
By BOE WTechnology Group Co., Ltd and Beijing Energy Investment Holding Co., Ltd etc.
- 1998:** Officially registered as Beijing Orient Vacuum Electric Co., Ltd
- 1999:** Introduced foreign equipment to develop and produce samples and passed the type tests of products used in ZN12
- 2000:** Passed the type test of products used in VS1, ZN65, etc.
- 2001:** Passed the type test of products used in ZN7, ZW32, etc.
- 2003:** Passed the type test of 12KV embedded pole (31.5KA, 40KA, 50KA)
- 2004:** Passed the type test of products used in ZN85 (40.5KV/2500A-31.5KA), etc.
- 2005:** The improvement and mass production of 12KV embedded pole
- 2006:** Passed the type test of 24KV embedded pole (25KA), etc
- 2008:** Start to product VCB, Main market is supply the VCB for switchgear factory to past the type test.
- 2008:** Passed the type test of 27.5KV and 40.5KV embedded pole, etc
- 2009:** Passed the type test of 72.5KV products and the capacitor test of 40.5KV products
- 2010:** Mass production of DVB vacuum circuit-breaker, including 12KV, 24KV and 40.5KV
- 2010:** Completed the trial-production of 126KV (31.5KA) products and exported to Ukraine in batches
- 2011:** Completed the development and production of vacuum load switch tube used at an altitude of 4000m
- 2012:** Completed the development of subminiaturization of 12KV/630A-20KA vacuum interrupter
- 2013:** Completed the development and passed the type test of BVVS1 solid insulated switchgear
- 2014:** Passed the type test of 126kV/3150A-40kA in Moscow test centre
- 2014:** Completed the development of 12KV ring main unit and succeeded running for grids
- 2016:** BOV launches the new generation DVB vacuum circuit breaker, which more reliable and longer life.

# 产品简介

## Product Introduction

BVVS-12 型固体绝缘环网柜是北京京东方真空电器有限责任公司结合国内外固体绝缘开关设备的特点，经过两年的研制完成的一种中压智能环保型开关设备，是中压配电自动化系统的一个重要组成部分。

此固体绝缘环网柜专利产品完全是模块化设计，由固封极柱模块、机构模块、全绝缘可触摸母线模块及柜体模块组成，隔离、接地三工位开关，且接地开关可实现不少于 10 次的接地关合性能，隔离开关断口可视，完全满足环网和辐射式配电网的各种方案。

BVVS-12 固体绝缘环网柜还可以使用我公司研发的智能磁机构，在可靠性、开关速度、动作准确性等方面有明显优势。更适用于快速开关、投切电容器场合以及长机械寿命等场合。

BVVS-12 solid-insulated switchgear is a kind of intelligent environment-friendly medium-voltage switchgear that Beijing Orient Vacuum Electric Co., Ltd spent two years completing developing. It is an important component in the automatic medium-voltage distribution system.

Such switchgear is a complete modular design. It is constituted of embedded pole module, mechanism module, fully insulated tangible busbar module and panel module. As a disconnecting and grounding three-position switch, the grounding switch can achieve grounding closing operation no less than 10 times, and the contacts of the isolating switch is visible. It completely meets various programs of power grid.

BVVS-12 solid-insulated switchgear can also use the intelligent magnetic mechanism developed by BOV to make sure the significant advantage in reliability, opening-closing speed and moving accuracy. It is also applicable in the occasion such as high-speed opening-closing、conditioning and long mechanical life.





BVVS-12 型固体柜可以与市面上各种自动化智能终端设备连接，实现多种配网自动化方案。  
 BVVS-12 型固体柜已取得了全套《型式试验报告》（执行标准为 GB3804、GB3906、GB/T11022、Q/GDW 730）

BVVS-12 solid-insulated switchgear can connect with all kinds of automatic intelligent terminal equipment, realizing diversified automatic distribution network program.

BVVS-12 solid insulated switchgear passed the complete test several years ago . (operation standard: GB3804、GB3906、GB/T11022、Q/GDW730)



# 产品特点

## Product Characteristics



### ①环保 Environment-friendly:

全固体绝缘，有害气体零排放。

Complete solid insulated, without harmful gas emitted.



### ①安全 Safe:

人可触及部位均可靠接地，机构、电气五防连锁齐备、严密，有效保障作业人员安全。

The places people can touch are connected with the ground. Five safe chains of mechanism and electric guarantee the workers, safety effectively.



### ①可靠 Reliable:

隔离断口距离大、耐电压能力强，断口可见；

真空接地，可多次关合短路故障电流；

操作机构模块化设计，操作可靠，寿命高；

全密封结构，可满足全天候使用条件。

Long distance between insulation and contacts, strong voltage-resistance, visible fracture;

Vacuum grounding, realizing many times breaking of short circuit current;

Modular design of operating mechanism with long lifetime;

Completely sealed, meeting the requirement of full-time usage.

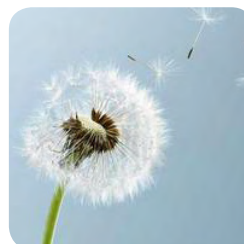


### ①灵活 Flexible:

单元式设计，便于扩展及电气方案更改；

标准母线，安装简便、可靠。

Unit design, convenient for electrical scheme changing; standard busbar, reliable and simple for installation.



### ①精巧 Delicate:

体积小、重量轻，只有传统中置柜 20% 左右。

Small in size and light in weight, 20% of the traditional centrally installed switchgear.



# 柜型比较

## Cabinet-type comparison

项目 Item	SF6 环网柜 SF6 Ring main unit	KYN28 中置柜 KYN28 Centrally installed switchgear	XGN15 开关柜 XGN15 Switchgear	固体绝缘环网柜 Solid insulated ring main unit	固体柜绝缘环网柜优势 Advantage of solid insulated ring main unit
额定值 Rated data	额定电压: 12KV 额定电流: 630A Rated voltage: 12KV Rated current: 630A				
结构 Structure	三相一体 Three-phase integration	三相独立 Three-phase independent	三相一体 Three-phase integration	三相独立 Three-phase independent	不会发生相间短路 No chance of interphase short circuit
操作机构 Operating mechanism	三相一体 Three-phase integration	三相一体 Three-phase integration	三相一体 Three-phase integration	三相一体全密封 Three-phase integration completely insulated	免维护 Maintenance-free
灭弧方式 Arc breaking way	SF6 气体 SF6 vacuum	真空 Vacuum	SF6 气体 SF6 vacuum	真空 Vacuum	真空灭弧开断寿命长 Long lifetime of vacuum interrupter
绝缘方式 Insulation	SF6 气体 SF6 vacuum	环氧树脂 Epoxy resin	SF6 气体 SF6 vacuum	环氧树脂 Epoxy resin	高绝缘可靠性; 无气体泄漏 High insulation, without gas leakage
四回路尺寸 Dimension of four loops	1470x845x1500	3200x1500x2300	2000x840x1600	1640x820x1500	固体柜占地空间小 Small occupied space

# 核心技术

## Core Technology

### ⊙安全的一次回路 Reliable Main circuit

主回路采用高性能环氧树脂，并可进行接地涂层处理；  
全屏蔽母线及电缆，可完全触摸。

In addition to the epoxy resin of embedded pole in the main loop, BVVS-12 solid insulated switchgear can also be processed with complete insulation according to the clients' requiremen.

The main busbar between panels and cable plug of incoming-outgoing feeder are completely insulated, realizing the touchable of the total switchgear, which is very safe and reliable.



全屏蔽母线 Full shield busbar

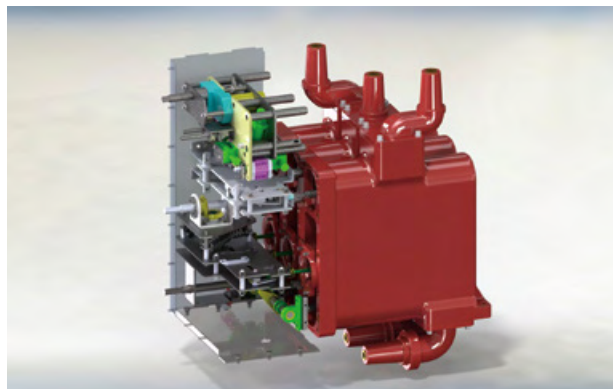
### ⊙稳定的操作机构 Stable and reliable operating mechanism

操作机构采用模块化设计，分为断路器 / 负荷开关模块、隔离模块和接地模块，各模块之间相对独立，  
并采用严密的五防设计，彻底杜绝误操作。

机构箱全密封，可满足 180 小时盐雾试验的要求，可以安全运行在户外以及沿海等恶劣环境下。

The mechanism installed in BVVS-12 is in modular design, which includes circuit breaker/ load-break switch modular, disconnecting and grounding modular. All the modular are independent and combined with reliable chain, realizing the function of preventing wrong operation.

The mechanism case is completely sealed, which can meet the requirement of 180hs salt spray test and make sure the operation in extreme environment in outdoor and along coastland.



稳定可靠的操作机构 Stable and reliable operating mechanism

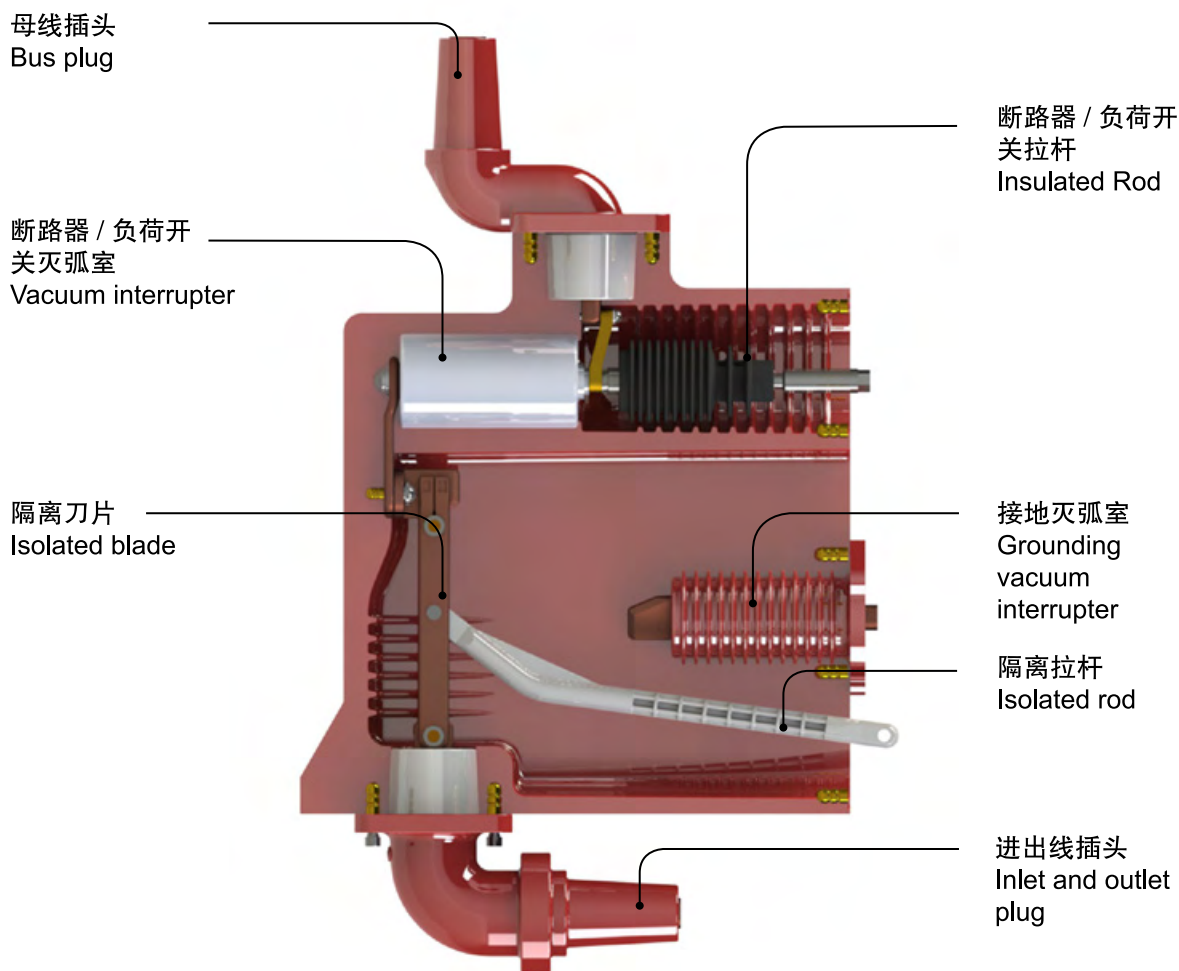
## ⊙可靠的电气性能 High electrical performance

使用本公司自制的真空灭弧室和固封极柱，灭弧室独特的纵向磁场，回路电阻小、开断能力强，投切电容器组性能优异，固封极柱使用进口环氧树脂制作，具有较高的机械性能和耐高低温性能。

隔离断口距离大于 150mm，耐电压能力强。真空接地，可真正满足 10 次以上接地关合功能。

The vacuum interrupter and embedded pole installed in BVVS-12 are developed and produced by ourselves. The vacuum interrupter with low circuit resistance, having obvious advantage in full capacity breaking and conditioning.

The embedded pole is manufactured with imported epoxy resin, with high mechanical performance and glass transition temperature.



主回路示意图

Schematic diagram of main circuit

# 应用领域

## Application Fields

- ⊙ 小型配电站  
Small power distribution station



- ⊙ 风力发电场  
Wind power generation



- ⊙ 光伏发电场  
Photovoltaic power generation



- ⊙ 高速铁路  
High-speed railway



- ⊙ 智能电网应用  
Smart grids

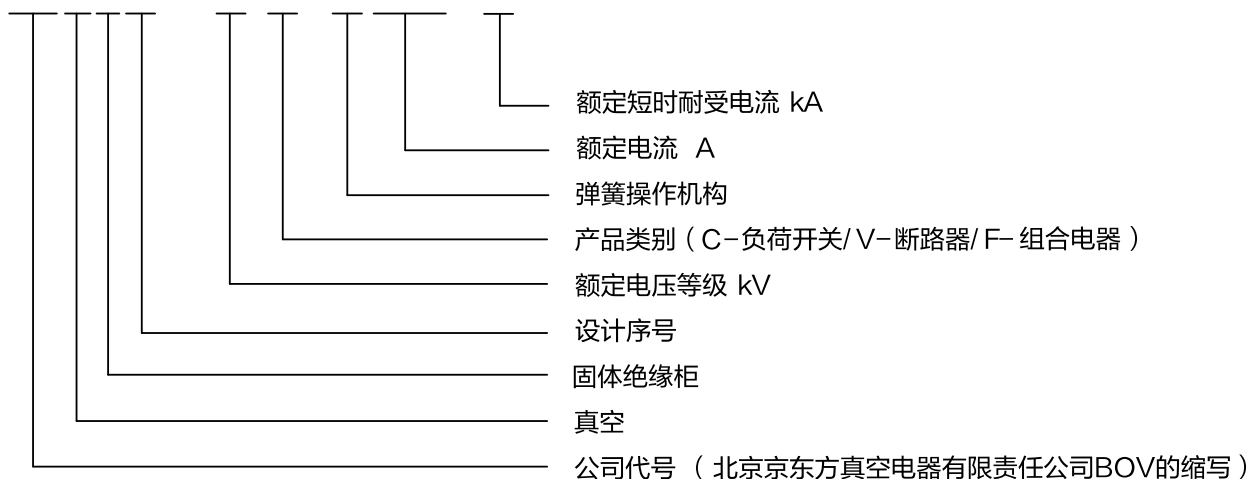
# 型号说明

## Model Description

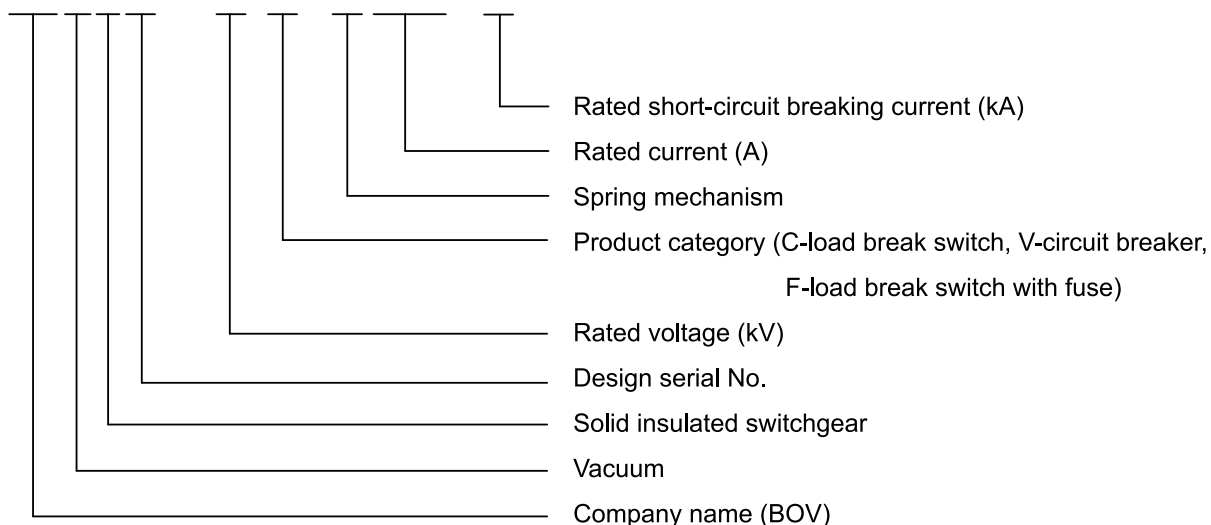
例如：BVVS1-12V/T630-20 即指京东方生产真空固体绝缘环网柜，断路器柜，采用弹簧操作机构，额定电压 12KV，额定电流 630A，额定短路开断电流 20KA。

For example: BVVS1-12V/T630-20 refers to vacuum solid insulated switchgear produced by BOV, circuit breaker panel, with spring operating mechanism, rated voltage 12kV, rated current 630A, rated short-circuit breaking current 20kA.

BVVS□ - 12 □ / T 630 - 20

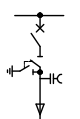
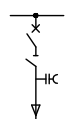
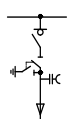
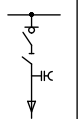
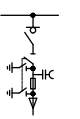
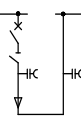
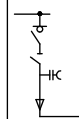
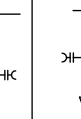
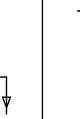
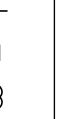
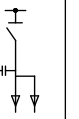


BVVS□ - 12 □ / T 630 - 20

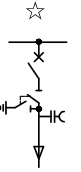

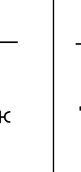
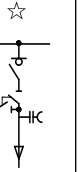
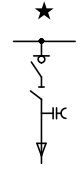

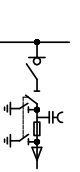

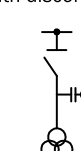

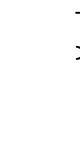
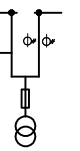


# 典型方案

## Typical Scheme

典型方案及型号										
V 柜	C 柜		F 柜	VL 柜	CL 柜	D 柜 (DF 柜)	PT 柜	G 柜 (GF)	PT 柜	ME 柜
断路器柜 (带接地/不带接地)	负荷开关柜 (带接地/不带接地)		组合电 器柜	断路器联 络柜	负荷开关 联络柜	直通柜 (分支箱)	压变柜 (无隔离)	隔离柜 (分支箱)	压变柜 (带隔离)	计量柜
										

京东方 BVVS-12 固体绝缘开关设备有以上 12 种标准方案，如有特殊需要，订货前与我司联系。

Typical Scheme						
V	C		F	VL	CL	
Circuit breaker panel	Load-break switch panel		Load-break switch/fuse panel	Busbar section panel with circuit breaker	Busbar section panel with load-break switch	
						
D(DF)	PT		G(GF)	PT	ME	
Busbar connection panel (feeder pillar)	Power transformer panel		Disconnecting panel (feeder pillar)	Power transformer panel	Metering panel	
	Without disconnector 			With disconnector 		

“☆” means with ground connection

“★” means without ground connection

# 技术参数

## Technical Parameters

参数名称 Parameters	单位 Unit	技术要求 Technical Requirements				
		断路器 Circuit Breaker	负荷开关 Load-break Switch	组合电器 Load-break switch/fuse	隔离开关 Disconnecting Switch	接地开关 Grounding Switch
额定电压 Rated voltage	kV	12	12	12	12	12
额定电流 Rated current	A	630	630	125	630	630
额定频率 Rated frequency	Hz	50	50	50	50	50
额定工频耐受电压 (1min) Short-time(1min) power-frequency withstand voltage	kV	48/42*	48/42*	48/42*	48/42*	48/42*
额定冲击耐受电压 Rated impulse withstand voltage	kV	85/75*	85/75*	85/75*	85/75*	85/75*
额定短路开断电流 Rated short-circuit breaking current	kA	20/25	20	31.5		
额定短路开断次数 Operations of short-circuit breaking	次 times	30				
最大直流分量 Max. DC component		50%				
额定短路关合电流 Rated short-circuit making current	kA	50/63	50/63	80		50/5 次 times
额定操作顺序 Rated operating sequence		0-0.3s-CO-180s-CO				
额定峰值耐受电流 Rated peak withstand current	kA	50/63	50/63		50	50
额定短时耐受电流 Rated short-time withstand current	kA	20/25	20/25		20	20
额定短路持续时间 Rated short-circuit duration time	s	4	4		4	4
防护等级 Level of protection		IP4X	IP4X	IP4X		
机械寿命 Mechanical life	次 times	10000	10000	10000	3000	3000
回路电阻 Loop resistance	Ω	≤ 140	≤ 140	≤ 500#		
额定二次回路工频耐受电压 Rated secondary circuit power-frequency withstand current	kV	2	2	2	2	2

\* / 之前为隔离断口参数， / 之后为其他断口、相间、对地参数；

# 为熔丝换成导电棒时参数。

Before the “/” represent the parameters of disconnecting fracture, after the “/” represent the parameters of other fracture

“#” represent the parameters with conducting rod instead of fuse

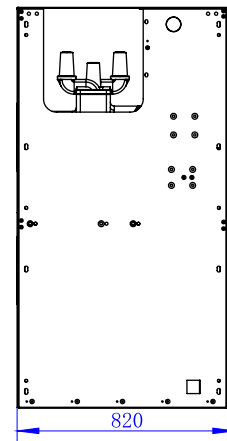
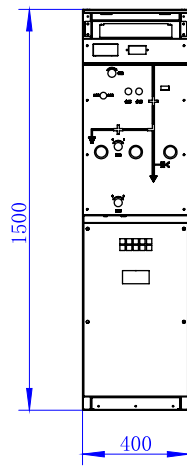
# 产品尺寸

## Dimensional Drawing

### ⊙ V/C/F 柜 (断路器柜 / 负荷开关柜 / 组合电器柜)

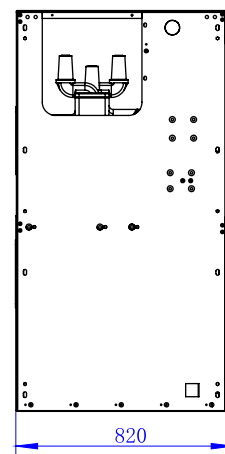
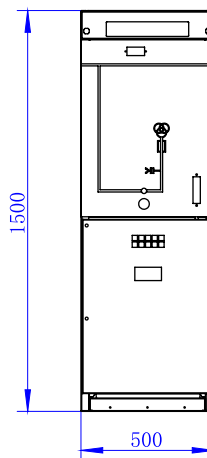
V/C/F panel

(circuit breaker panel /  
load-break switch panel  
/ load-break switch with  
fuse panel)



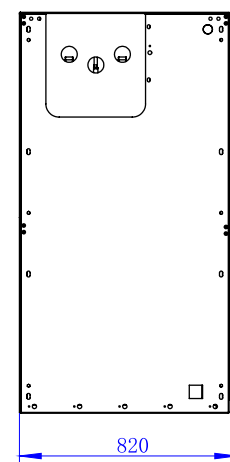
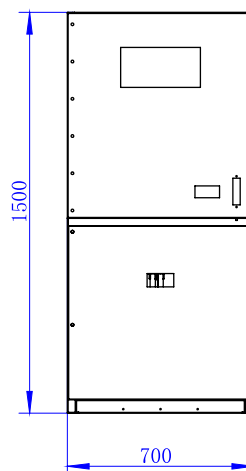
### ⊙ PT 柜 (压变柜)

PT panel (Power transformer  
panel)



### ⊙ ME 柜 (计量柜)

ME panel (Metering Panel)



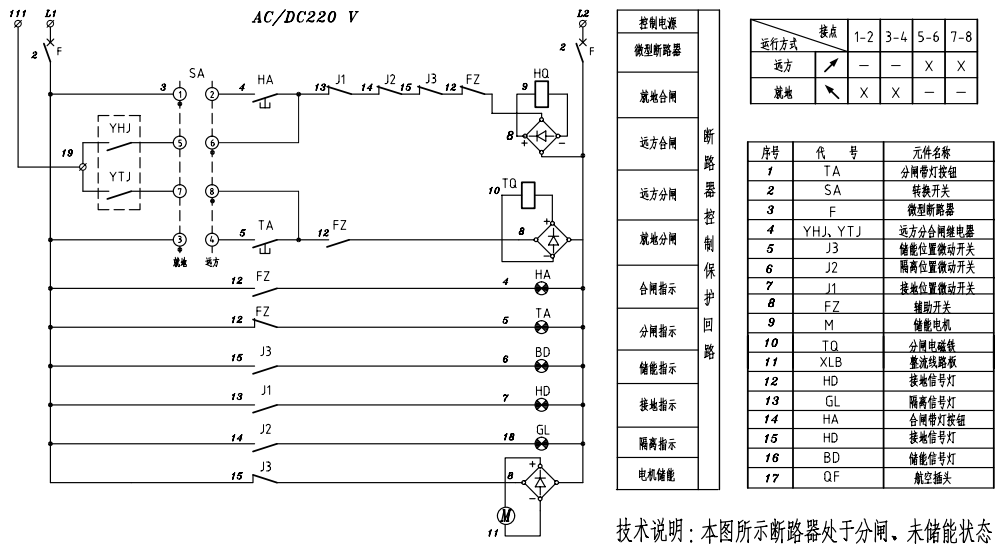


# 电气原理图

## Electrical Drawing

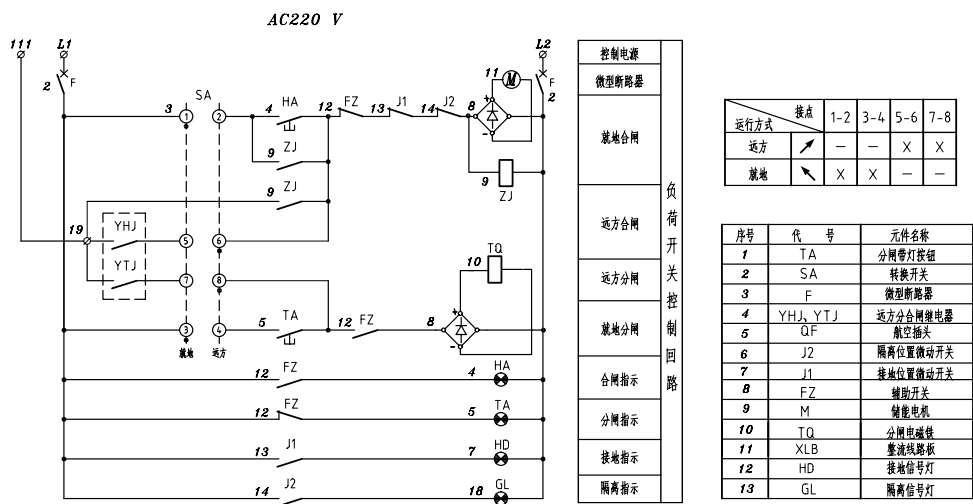
### ⊙ V 柜 (断路器柜) 电气原理图

#### V panel (circuit breaker panel) electrical drawing



### ⊙ C/F 柜 (负荷开关 / 组合电器柜) 电气原理图

#### C/F panel (load-break switch panel / load-break switch with fuse panel)



# 安装说明

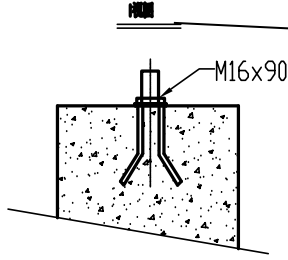
## Installation Notes

注：1、图中柜体，并柜排布，每个柜体宽度为 400mm；

Please refer to the picture. Place the panels side by side. The width of each panel is 400mm.

2、台基、横梁及盖板材料为 C20 钢筋混凝土，台基水平，可均匀承重；

The material of the base, crossgrider and coverplate shall be C20 reinforced concrete. The base shall be horizontal for balance weight bearing.



3、分支箱与基础用 4 只 M16 螺栓连接，并预埋在基础中；

The branch panel shall be connected with the base with four M16 bolts, which shall be pre-buried in the base.

4、接地扁钢引入箱体，便于与箱体相连，接地电阻符合电力部门要求；

The grounding steel flat shall be led into the case for connection. The grounding resistance shall meet the requirement of the electric department.

5、建议电缆固定架用 5X50 的角钢，按实际电缆使用的抱箍打好孔；

5X50 steel angels is suggested for cable fixation.

6、电缆井及盖板的尺寸可以根据不同地方的实际情况施工，需考虑防水；

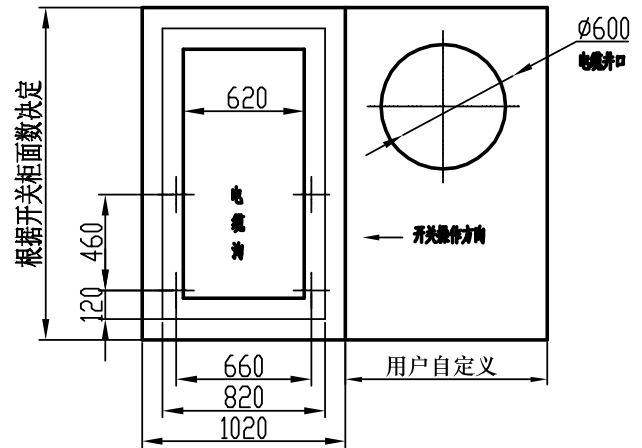
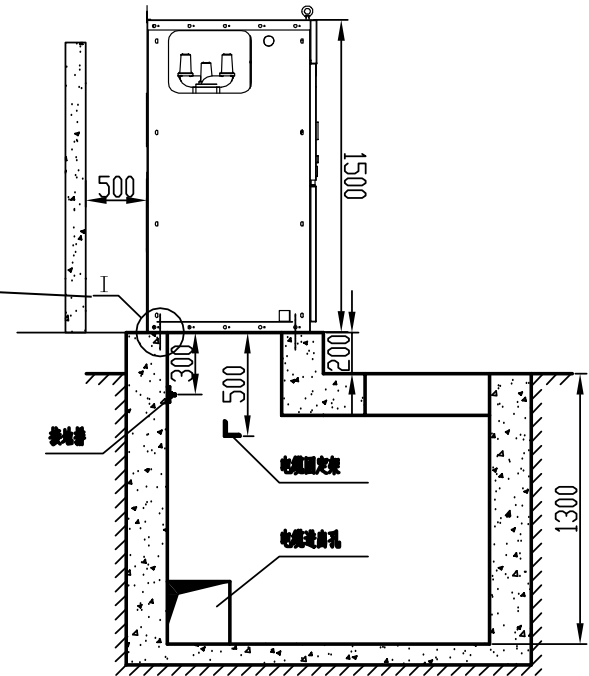
The size of cable well and coverplate can be changed according to the actual condition. Water-preventing shall be considered.

7、电缆沟内应考虑排水，电缆室地面须向排水槽略有倾斜，以免积水；

Drainage in cable groove shall be considered. The cable groove shall be inclined to the drainage tank in order to prevent ponding.

8、用户可根据自身的需要进行调整，此图仅供参考。

The clients can adjust according to your own requirement. This picture is only for reference.



## 应用环境

### Working Condition

- 1、适应环境温度：+40℃ ~ -45℃；  
日温差：日变化≤ 25℃；  
Ambient Temperature: +40℃ ~ -45℃ (daily range under 25℃ ).
- 2、海拔：3000m 及以下地区；  
Altitude: ≤ 3000m.
- 3、风速不大于 35m/s；  
Wind speed: ≤ 35m/s.
- 4、地震烈度不超过 8 度；  
Seismic strength: ≤ 8.
- 5、安装场所应无易燃物质，爆炸危险，化学腐蚀及剧烈振动。  
For places without the hazard of fire and explosion, chemical corrosion and violent vibration.

## 质量服务承诺

BOV 公司为保证用户放心使用其产品，既向用户承诺其产品在其使用寿命期限内可完全免维护安全运行，也向用户提供更长、更有力的质量服务承诺。同时为建立长期良好的合作伙伴关系，BOV 公司将秉承“质量为本，用户至上”的宗旨为用户提供高质量的服务。具体如下：

- 1、固体环网柜产品质量保证期三年，产品运行寿命不少于 20 年。
  - ◆ 如果属产品质量原因造成的事故，我公司无偿修复甚至更换，如果造成其他损失，我公司可承担相应损失。
  - ◆ 如果属用户操作原因造成的产品损坏，我公司进行修复或更换，仅收材料费、运费、制造费等直接费用，不收服务费和利润。
  - ◆ 如果在产品保修期内，用户要更改换代产品，我公司保证全方位协助。
- 2、BOV 销售部各区销售经理全天 24 小时保持电话畅通。
- 3、BOV 得到用户的售后服务信息，保证 1 小时内给予肯定的答复。如有必要及时派售后或技术支持工程师进行现场服务，BOV 保证 48 小时内到达现场，如遇紧急情况，保证 24 小时内到达现场。
- 4、故障处理时，BOV 工程师做好现场记录，产品回厂后做详细分析，为用户提供详细分析报告。

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