



## 预装式变电站 – 欧式、美式箱变 Prefabricated Substation

# YB-12

天仑电气 – 为您提供一流的电力系统解决方案  
Tianlun Electric, provide you with first-class power system solution



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宁波天仑电气有限公司  
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## 公司简介 Introduction

宁波天仑电气有限公司(以下简称公司)成立于2001年1月。

公司坐落于浙江宁波,毗邻“东方大港”北仑港。拥有10000平方米的研发生产基地,年产值超亿元,目前有80多名年轻朝气的员工,其中60%为本科学历。公司是集研发、生产、销售、服务于一体的高新技术企业,致力于打造高品质的智能化、节能型、定制模式的输变电设备产品。

公司目前有符合国际及国内标准3大类18种产品,包括24kV中置式开关柜及环网柜,12kV中置式开关柜及环网柜,440V固定式分隔柜,抽屉式开关柜,预装式变电站,低压母线槽(合作生产),10kV变压器(合作生产)等等,同时部分为ABB、Schneider的授权产品。公司立足于浙江,为很多大型的制造企业、房产开发、学校、港口等用户提供了许多高质量的产品和服务,同时也出口到东非、北非及东南亚国家,获得了客户的一致满意。

公司严格执行ISO9001质量保证体系,标准化体系,安全生产标准体系,国家CCC认证体系。坚持持续提升产品质量,追求零缺陷产品,全心全意服务用户的质量方针,坚持以人为本,鼓励创新,精细化的管理理念,坚持以感恩在心为核心价值观,为我们的用户提供最好的产品和服务。

Ningbo TIANLUN Electric Co., Ltd was established in year 2001, January. It is located in Ningbo, near Beilun port, which is called “oriental grand port”. TIANLUN has 10000-square-meter researching and developing workshop and annual output value exceeds 100 million. TIANLUN has a professional team composed of 80 innovative staff, most of them have bachelor's degrees. TIANLUN is a company that integrates researching, developing, selling and service. Our purpose is to create high quality electric equipment product which is intelligentized, energy-saving and customized.

TIANLUN mainly have 18 types of products which belong to 3 majors as follow: 24 kV Intermediate switchgear and Ring Main Unit Switchgear, 12kV Intermediate Switchgear and Ring Main Unit Switchgear, 440V Fixed Isolated Switchgear, Preparatory Transformer Substation, Low Voltage Bus Duct (coproduction) and 10kV transformer (coproduction). Some products are Licensed by ABB and Schneider. TIANLUN have been providing high quality products to large manufacture enterprise, real estate, school and port constructions. At the mean time, our product are exported to Africa and southeastern countries and win satisfaction from the overseas customers.

TIANLUN strictly stick to ISO9001 standard system, standardization system, safety standard system and CCC authentication system. Our quality policy is producing good and zero defect product, having customers well served. Our management policy is people orientation, creation encouragement and high-effective system. TIANLUN always hold a thankful heart and provide top-level product with best service.

## 产品概述

### Product Overview

YB-12预装式变电站是适用于交流50Hz,额定电压为6、10kV的网络中,容量为1600kVA及以下的独立成套变配电装置。具有投资少、占地面积小、安装简单、运行可靠、维修方便等优点。能直接深入负荷中心,一次安装即能实现送电目的。广泛应用于城市高层建筑、居民小区、商场、宾馆、医院、机场、码头、工矿企业、旅游景点、高速公路及临时性设施等户内、外场所。

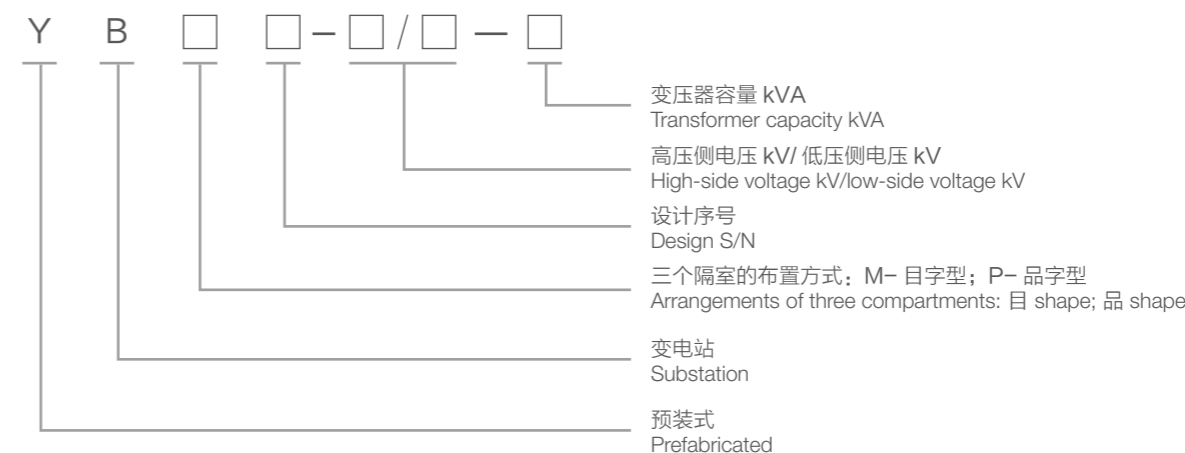
YB-12预装变电站既可用于环网配电系统,也可作为放射式电网终端供电。

YB-12 Prefabricated Substation applies to the network of AC 50Hz and rated voltage 6/10kV, and the independent complete transformation and distribution device of capacitance 1600kVA or less. This station is small in investment, small in ground area, simple in installation, reliable in operation and easy in maintenance. The station can be directly put into load center, and the goal of power supply can be realized only by one-time installation. It is widely used in urban high buildings, residential quarters, shopping malls, hotels, hospitals, airports, wharves, industrial and mining enterprises, tourism spots, expressways and temporary facilities both indoor and outdoor.

YB-12 Prefabricated Substation can be used in the ringed network distribution system and be for the purpose of terminal power supply of radial grid as well.

## 型号含义

### Model Description



本公司生产的预装式变电站共有三类: YBM29-12/0.4(欧式)变电站、YBM(J)-12/0.4(紧凑型)变电站、YB-12/0.4(美式)变电站。

There are three types of prefabricated Substations manufactured by the company: YBM29-12/0.4 (European) Substation, YBM(J)-12/0.4 (Compact) Substation, YB-12/0.4 (American) Substation.



ISO9001-2000



CCC 认证



WSC 北京世标认证中心



## 正常使用条件

### Normal Service Conditions

- a. 周围环境温度 -25℃ ~ +40℃  
 最热日平均温度 +30℃  
 最高年平均温度 +20℃
- b. 空气相对湿度 在 25℃ 时, 相对湿度日平均不超过 95%, 月平均值不超过 90%。
- c. 海拔高度不超过 1000m
- d. 户外风速不超过 34m/s
- e. 安装地点 应安装于无火灾、无剧烈震动、无化学腐蚀及无爆炸危险的场所
- a. Ambient temperature: -25℃ ~ +40℃  
 Max daily average temperature: +30℃  
 Max yearly average temperature: +20℃
- b. Relative humidity: at 25℃, the daily average is not higher than 95%; The monthly average is not higher than 90%.
- c. Altitude not more than: 1000m
- d. Outdoor wind speed not more than: 34m/s
- e. Installation location: it shall be installed where there is free of fire, violent vibrations, chemical corrosion or explosion risks.

## YBM29-12/0.4 (欧式) 变电站 特点、结构和外形

### YBM29-12/0.4 (European) Substation Features, Structure and Shape

变电站外壳具有牢固、隔热通风性好、防尘、防小动物、维护方便、外形与环境相适应等特点, 外壳材料有钢板、铝合金板、复合板等多种材料可供选择。

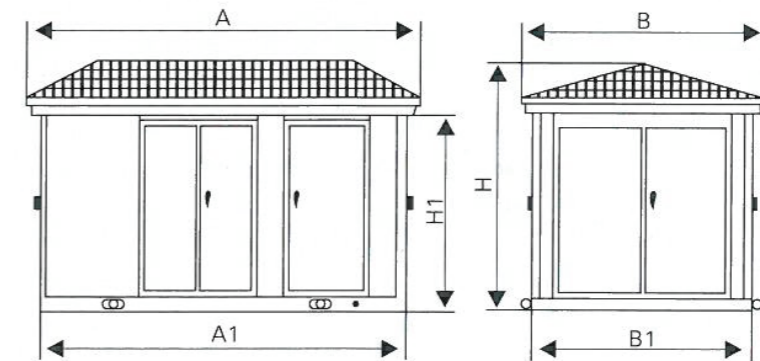
特殊的双层屋顶设计使其具有隔热功能, 同时能保证良好的通风。顶盖采用别墅型屋顶设计, 美观大方且美化了环境。

变电站各室之间均被隔离成独立的小室, 按其内部布置可分为目字形 (见图 1)、品字形 (见图 2), 变电站采用自然通风和强迫通风相结合的方式, 内设有温控及照明装置。

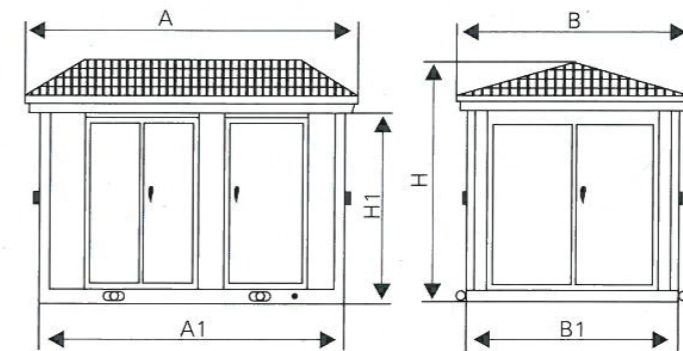
The housing of substation has the features including fastness, good thermal insulation and ventilation, dust-proof and preventing small animals, convenient maintenance, and adaptability to environment. There are such materials as steel sheet, aluminum alloy sheet and composite sheet provided for housing.

The roof adopts special double-layer design, which ensures thermal insulation and good ventilation. The roof cover is of villa type, beautiful and landscaping.

All cubicles of substation are separated and independent. From the internal layout, the substation is divided into 目 shaped (see Figure 1) and 品 shaped (see Figure 2) type. The substation combines natural ventilation and forced ventilation, with temperature control and lighting devices inside.



结构示意图 Structure Diagram	设计序号 Design S/N	外形尺寸 Overall Dimension (mm)						电器配置选择 (10kV 系统) Configuration Selection (10kV system)		
		A	B	H	A1	B1	H1	变压器容量 Transformer Capacity	高压方案 High-voltage Scheme	低压方案 Low-voltage Scheme
	101	3150	2100	2720	2850	1800	2220	30-315	1X,2X,5X,7X	01,02,03,04,09
	102	3500	2450	2840	3200	2150	2340	400-630	1X,7X	01,02,03,04,09
	103	1034	2450	2840	4450	2150	2340	800-1600	1X,7X	01,09



结构示意图 Structure Diagram	设计序号 Design S/N	外形尺寸 Overall Dimension (mm)						电器配置选择 (10kV 系统) Configuration Selection (10kV system)		
		A	B	H	A1	B1	H1	变压器容量 Transformer Capacity	高压方案 High-voltage Scheme	低压方案 Low-voltage Scheme
	201	2900	2200	2720	2600	1900	2220	50-315	1X,3X,5X,7X	01,02,09
	202	3400	2450	2840	3100	2150	2340	400-630	1X,3X	01,09

## 主要技术参数表 (表 1)

### Main Technical Data (Table 1)

	项目 Item	单位 Unit	参数 Data
高压 high voltage	额定频率 / rated frequency	Hz	50
	额定电压 / rated voltage	kV	12
	1min 工频耐受电压 / 1min power frequency withstand voltage	kV	42
	雷电冲击耐受电压 / impulse withstand voltage	kV	75
	额定电流 / rated current	A	200 400 630
	额定短时耐受电流 / rated short-time withstand current	kA	25/1s 20/3s
	额定峰值耐受电流 / rated peak withstand current	kA	63/50
低压 low voltage	额定电压 / rated voltage	V	400
	主回路额定电流 / rated current of main circuit	A	100 ~ 2500
	支路电流 / current of branch	A	10 ~ 800
	分支回路数 / circuit number in branch	路 Circuit	1 ~ 12
	补偿容量为变压器容量的 / percentage of compensating capacity in transformer capacity	kvar	15 ~ 30%
变压器 transformer	额定容量 / rated capacity	kVA	50 ~ 1600
	分接范围 / tapping range		±2×2.5% 或 (or) ±5%
	联接范围 / connection group		Yyn0 或 (or) Dyn11
箱体 cabinet	外壳防护等级 / degree of protection		IP23D
	声级水平 / sound level	dB	≤ 55

高压室装有环网柜，柜内一般采用负荷开关，具有齐全的防误操作功能。采用高压计量时还可装高压计量柜。若选用 SM6、RM6 系列 SF6 环网柜，则结构更紧凑、少维护。

变压器既可采用全密封变压器、油浸变压器，又可采用干式变压器。变压器室设有轨道和小车，以方便安装和检修。变压器室顶装有排风扇，自动控制变压器室温度，以保证变压器的正常运行。

低压室可分带操作走廊，和不带操作走廊二种形式。可根据用户要求配多路低压出线、无功补偿、电能电量和测量等多种功能。

The high-voltage compartment is equipped with looped-network cabinet, in which the load switch with complete faulty operation prevention is always employed. To make high-voltage metering, the high-voltage metering cabinet shall be installed. If our SM6 and RM6 series SF6 looped-network cabinets are used, the structure will be more compact and less maintenance.

The transformer can be fully-enclosed, oil-immersed or dry type. The transformer compartment should be provided with rails and dolly for the purpose of installation and maintenance. In the ceiling of transformer cubicle, the exhaust fan is provided to control temperature automatically so that the transformer can operate normally.

The low-voltage compartment includes the one with or without operating corridor. It can be functioned with multiple low-voltage outgoing, reactive compensation, energy metering and measurement etc.

## 安装、使用、维护

### Installation, Operation and Maintenance

用户收货后，对暂不安装的产品应按正常使用条件规定安放于适当的场所。

After taking delivery of goods, the users should keep the products not installed temporarily in proper place as specified in normal service conditions.

## 安装

### Installation

- 将产品运到现场，用钢丝绳从产品底框处起吊，并用木头垫在变电站顶盖边与钢丝绳连接处，以防损坏变电站，用起吊设备将产品吊至砌好的基础上，放好后用水泥封住产品底座与基础间的间隙。
- 按顺序接好输入、输出电源及触电网。

- Transport the product to site, lift it with steel wire ropes from the bottom frame, and put a wood at the joint of substation top and steel wire rope to prevent damages. Lift the product with hoisting equipment onto the constructed foundation, and seal the gap between the base and foundation with cement.
- Connect the input, output power supply and electric-shock network in a order.

## 使用

### Operation

变电站在安装或维修后，在投入运行前应进行下列检查：

After installation or repair and before putting into operation, the substation should be inspected as follows:

- 检查漆膜有无脱落，成套装置内是否清洁；
- 操作机构是否灵活，联锁是否可靠；
- 主要电器的通断是否可靠、正确；
- 所有母线是否连接良好；
- 电器安装紧固件是否拧紧，电器安装是否可靠；
- 电气整定值是否符合要求，熔断器是否正确；
- 表计及继电器的动作是否准确无误；
- 主回路及辅助回路的电气接点是否符合电气原理图；
- 变压器室内的温控仪是否已调到允许使用的温度。

- Check the falling of paint film and the cleanness of complete device;
- Check the flexibility of operating mechanism the reliability of interlocking;
- Check the on-off reliability and accuracy of main apparatus;
- Check the connection of bus;
- Check the tightening of fasteners and the reliability of installation;
- Check the compliance of electrical setting value and the correctness of fuse;
- Check the correctness of metering and relay operation;
- Check the electrical connection in main and auxiliary circuit in compliance with electrical wiring diagram;
- Check the temperature control instrument in transformer compartment has been adjusted to allowable temperature.

将所有开启的门关闭

闭合 10kV 电源后观察指示仪表工作情况，若正常即可投入运行。

Close all opened doors.

Disconnect with 10kV power supply and observe the instrument. If normal, the substation can be put into operation.

## 维护

### Maintenance

- 变电站所有元件按各自的要求进行维护；
  - 若采用油浸式变压器，在投运中每年应至少按规定进行一次抽样分析；
  - 低压开关设备跳闸后，应检查和分析故障原因，待排除后方能重新投入；
  - 避雷器应在每年雷雨季节前后进行一次预防性试验。
- All components of substation shall be maintained according to relevant requirements;
  - If the oil-immersed transformer is used in the substation, it shall make sampling analysis as required at least once a year;
  - If the low-voltage switching equipment trips, it shall check and analyze the fault causes. Before the trouble is removed, it cannot be put into operation;
  - The arrester should be conducted with a preventive test before or after thunderstorm seasons every year.

## 变电站高压侧一次方案图

### Primary circuit diagram on the high-voltage side of substation

高压回路主 电路方案 Main circuit scheme on high-voltage side				
方案号及说明 Scheme No. and Description	11 进线无避雷器 12 进线带避雷器 11 Incoming line without arrester 12 Incoming line with arrester	21 进线无避雷器 22 进线带避雷器 21 Incoming line without arrester 22 Incoming line with arrester	31 进线无避雷器 32 进线带避雷器 31 Incoming line without arrester 32 Incoming line with arrester	41 进线无避雷器 42 进线带避雷器 31 Incoming line without arrester 32 Incoming line with arrester
高压回路主 电路方案 Main circuit scheme on high-voltage side				
方案号及说明 Scheme No. and Description	51 RM6-IQI 开关组 51 进线无避雷器 52 进线带避雷器 51 RM6-IQI switching group 51 Incoming line without arrester 52 Incoming line with arrester	61 进线无避雷器 62 进线带避雷器 61 Incoming line without arrester 62 Incoming line with arrester	71 RM6-IQI 开关组 71 进线无避雷器 72 进线带避雷器 71 RM6-IQI switching group 71 Incoming line without arrester 72 Incoming line with arrester	

## 变电站低压侧一次方案图

### Primary circuit diagram on the low-voltage side of substation

低压回路主 电路方案 Main circuit scheme on high-voltage side					
方案号及说明 Scheme No. and Description	01	02	03	04	05
低压回路主 电路方案 Main circuit scheme on high-voltage side					
方案号及说明 Scheme No. and Description	06	07	08	09	

## 基础图

### Foundation layout

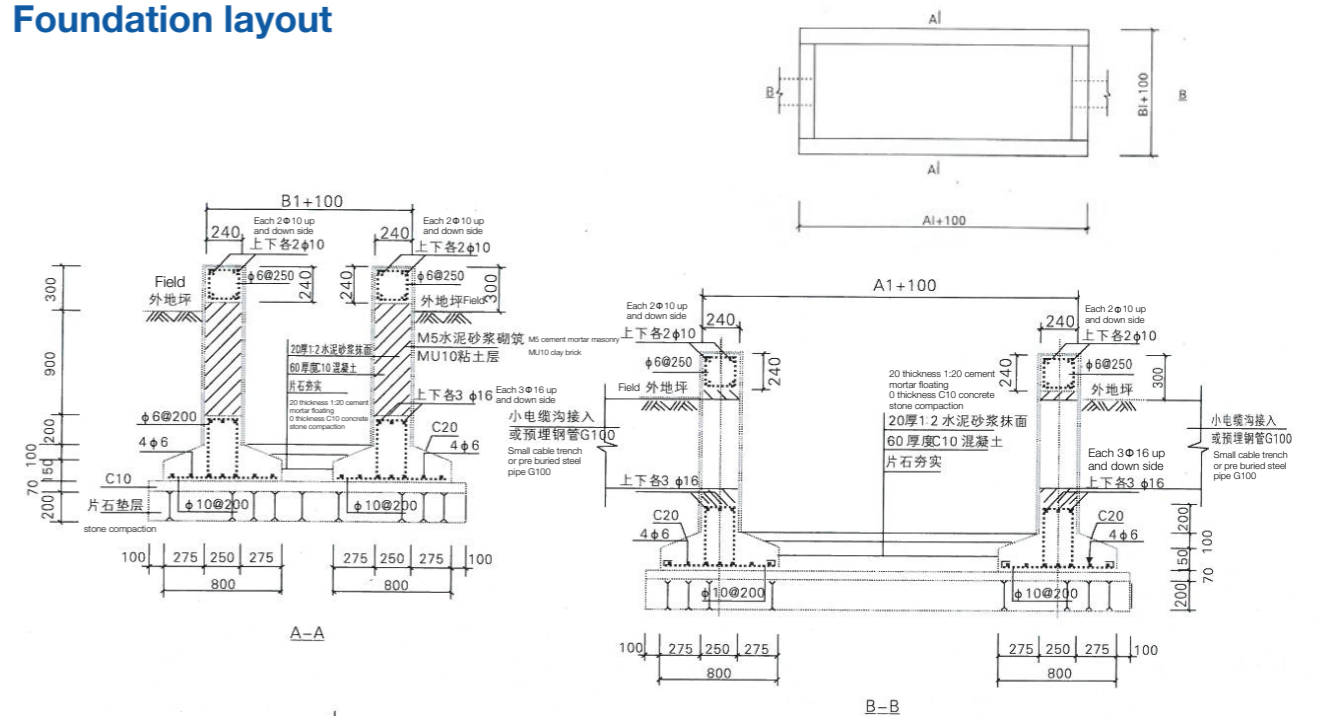


图 5( 具体基础线由厂方提供 )  
Figure 5, the specific basic line is provided by factory .

### 说明 Instruction

- 基础顶面预埋 120x120x8 钢板，锚筋 4-Φ6，长 120，钢板间距 0.8m，用于设备固定。
- 基础砖粉墙 20 厚 1: 2 水泥砂浆，露出地面部分贴面砖或涂外墙涂料。
- 箱变基础需设置 Φ150 混凝土排水管至临近窰井。
- 基础需清除杂填土，施工在持力层上。
- 未注砼强度等级为 C20，垫层为 C10。
- 箱变基础酌情增设通风窗。
- 若箱变内下人孔，基础需增设下人孔。
- A1、B1 分别为箱变底盘的长和宽尺寸。

- Pre embedded steel plate 120\*120\*8, anchor bar 4- 6, length 120, steel plate spacing 0.8M, for equipment fixation
- Based on 20 thick 1:2 brick wall with cement mortar, exposed part of the ground tiles or exterior wall painted
- The box set becomes the basis of concrete drainage pipes 150 to nearby manhole
- The Basement needs to remove the soil, construction on the bearing layer
- The strength grade is C20, the cushion is C10
- On the basis of the box set, adding the ventilation window as appropriate.
- If the box set add a hole, the foundation should also added a hole.
- A1,B1, respectively, for width and length of box set

## YBM (J) -12/0.4 (紧凑型) 变电站 YBM(J)-12/0.4 (Compact) Substation

### 特点、结构和外形

#### Features, Structure and Shape

YBM (J) -12/04 预装式变电站是一种新型的变电站。集合了欧式箱变和美式箱变体积小、散热好的优点，有效排除了美式箱变中熔断器与负荷开关无联锁，一旦发生某相熔丝熔断，则箱式变电站存在缺相运行的弊端。

YBM (J) -12/04 型预装式变电站的高压室、低压室为独立的小室，便于操作人员安全操作，在变压器的两侧为“目”字型排列，结构紧凑，体积小。

变压器油箱为全密封结构，暴露于空气中，散热条件好。

变压器两侧设有小箱，装有压力释放阀，压力表，温度表，油位计，无励磁调压分接开关等，用户可通过观察窗对运行的变压器进行油温、油位及压力等的监察，也可对变压器分接开关进行调整。

高、低压室箱体体系采用的材料可选用铝合金、不锈钢、复合板等，底框，骨架等分别用钢槽和角钢焊接而成。整个箱体防腐性能好，使用寿命长。

顶盖采用双层，斜顶结构，有隔热作用，减少日照引起箱内温度的升高；并确保箱顶不渗水、滴漏。

YBM(J)-12/0.4 Prefabricated Substation is a new box-type substation that combines the advantages of European and American type. On the high-voltage side, it uses RM6, SM6 or HXGN-12 medium-voltage looped-network cabinet with small size and good performance, which not only has the advantages as small size and good heat dissipation, but also eliminates the weakness that no interlocking between substation and load switch in American type (once a fuse is blowing, the substation will operate at lacking of phase).

YBM(J)-12/0.4 Prefabricated Substation has independent high-voltage and low-voltage compartment, compact, small and arranged on both sides of transformer. Such structure is convenient for operators to make safety operation.

The oil tank of transformer is a full-enclosed structure, exposed in the air and good for heat dissipation.

On the two sides of transformer, a small box is set to contain pressure relief valve, pressure meter, temperature gauge, oil level gauge, oil hole, off-circuit voltage regulation switch etc. Any users can monitor the oil temperature, oil level and pressure of transformer from observation window, and also adjust the tapping switch of transformer.

The high-voltage and low-voltage compartment is made of aluminum alloy, stainless steel or composite sheet, and the bottom frame and skeleton are welded by steel channel and iron angle. The overall cabinet has good anti-corrosion, and can be used for a long time.

The top cover is a double-layer pitched structure. It is functioned with thermal insulation, reducing temperature rise inside and preventing seepage or leakage.

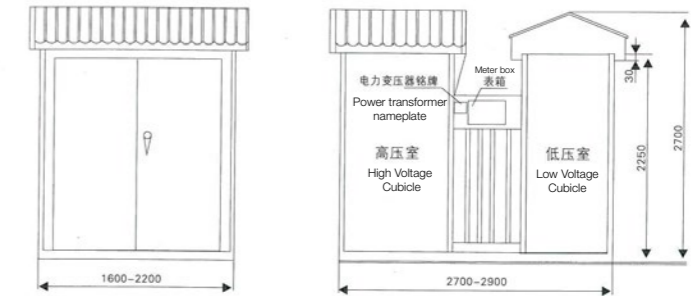


图6 Figure 6

### 主要技术参数表 (表 2)

#### Main Technical Data (Table 2)

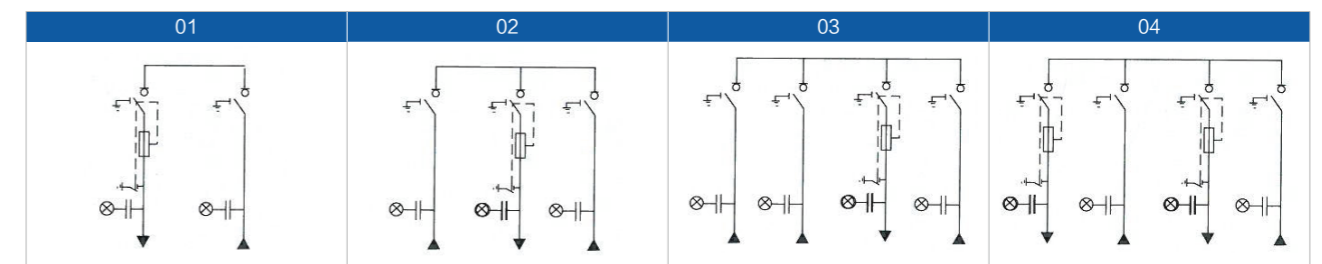
	名称 Overall Dimension (mm)	单位 (unit)	高压侧 (high voltage side)	变压器 (Transformer)	低压侧 (low voltage side)
1	额定电压 /Rated voltage	kV	12	12/0.4	0.4
2	额定电流 /Rated current	A	200 630		100~2500
3	额定频率 /Rated frequency	Hz		50	
4	额定短路开断电流 /Rated short-time breaking current	kA	20		
5	热稳定电流 /Rated short-time withstand current	kA/s	20/3s		20/1s
6	动稳定电流 /Dynamic stability current	kA	50		
7	1min 工频耐压 /1min power frequency withstand voltage	kV	42	35	2.5
8	雷电冲击水平 /Lightning impulse level	kV	75	75	
9	额定容量 /Rated capacity	kVA		50~1600	
10	防护等级 /Degree of protection			IP30	
11	噪声 /Noise	dB		≤ 55	

### 安装、使用、维护 (见第 3 页)

#### 变电站高压侧一次方案图 (见图 3 及图 7)

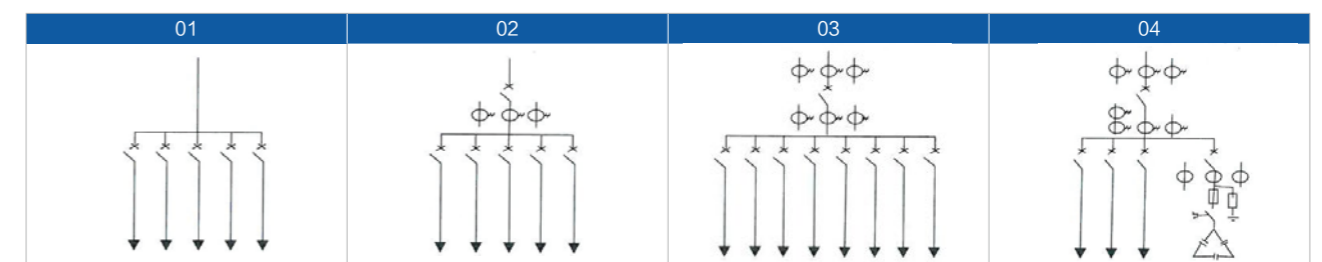
#### Installation, Operation and Maintenance (See Page 3)

#### Primary circuit diagram on the high-voltage side of substation (see Figure 3 and Figure 7)



#### 变电站低压侧一次方案图

#### Primary circuit diagram on the low-voltage side of substation



## 基础图

### Foundation layout

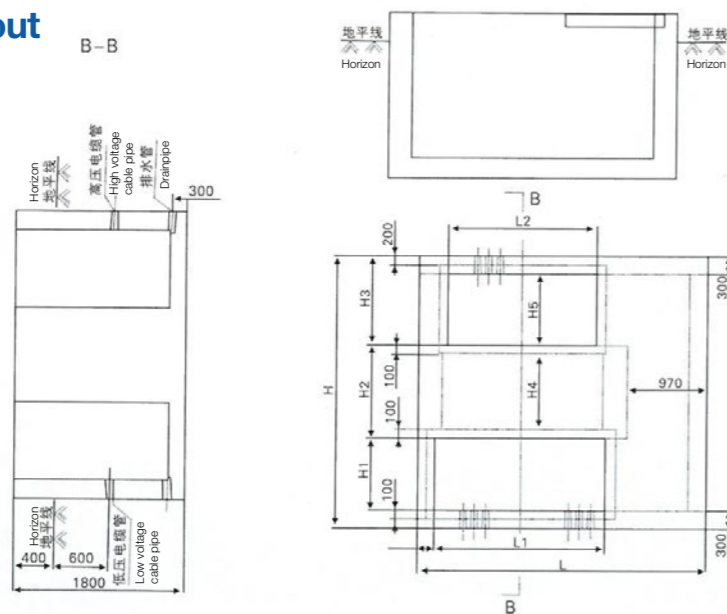


图9(具体基础线由厂方提供)

Figure 9 (specific base line provided by the manufacturer)

## YB-12/0.4 (美式) 变电站

### YB-12/0.4 (American) Substation

#### 特点、结构和外形

#### Features, Structure and Shape

产品分变压器室和低压室二个独立部分。

变压器性能符合 S9 或 S11 型变压器的要求。油箱为全封闭结构，暴露于空气中，散热条件好。

高压侧采用负荷开关加两级熔断器保护，限流熔断器用于线路保护，开断容量大；插入式熔断器用于保护变压器的二次侧过载及短路。

高压侧进线采用高压电缆插头，高压室内全绝缘。

低压出线根据用户要求可加装计量和补偿。

箱体采用钢板焊接，全密封、防盗型，经特殊工艺处理，防腐能力强，体积小，外形美观。

箱体装有压力释放阀，压力表，温度表，油位计，无励磁调压分接开关及油样活门等，用户可对运行中的变压器进行油温、油位及压力等的监察，也可对变压器分接开关进行调整。

This substation consists of two independent parts: transformer compartment, and low-voltage compartment.

The transformer performance complies with that of S9 or S11 transformer. The oil tank is a fully-enclosed structure, exposing in the air and good for heat dissipation.

The load switch and two-level fuse protection are used on the high-voltage side: current limiting fuse with large capacity for line protection; pull-out fuse for over-load and short-circuit protection on the secondary side of transformer.

The incoming line on the high-voltage side is connected with cable connector. All lines in the high-voltage compartment shall be fully insulated.

The outgoing line on the low-voltage side can be added with metering and compensation unit as requested.

The cabinet is steel-welded, fully-enclosed and anti-theft type. With the special processing, it is beautiful and has small size and strong anti-corrosion.

The cabinet contains pressure relief valve, pressure meter, temperature gauge, oil level gauge, off-circuit voltage regulation switch and oil sampling valve etc. Any users can monitor the oil temperature, oil level and pressure of transformer from observation window, and also adjust the tapping switch of transformer.

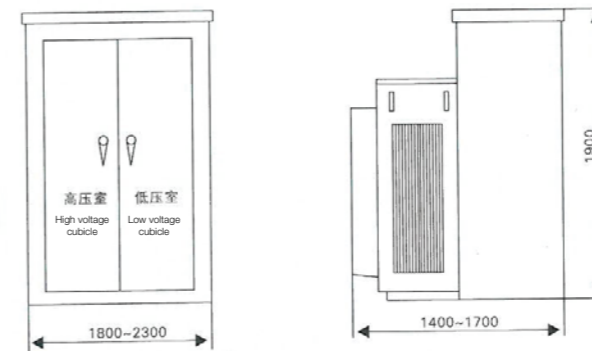


图10 Figure 10

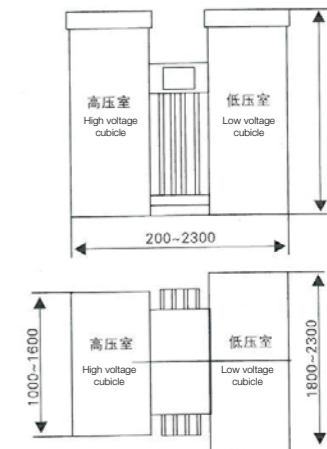


图11 Figure 11

## 主要技术参数表 (表 3)

### Main Technical Data (Table 3)

	名称 Name	单位 Unit	技术参数 Technical Data	
1	额定容量 /Rated capacity	kVA	50~1600	
2	额定电压 /Rated voltage	高压侧 / 低压侧 /high-voltage side/low-voltage side	kV	12/0.4
3	额定工频耐受电压 Rated power frequency withstand voltage	高压侧 /high-voltage side 低压侧 /Low-voltage side	kV	42kV/1min 2.5kV/1min
4	雷电冲击电压 (高压侧) /Lightning impulse voltage (high-voltage side)	kV	75	
5	高压负荷开关额定电流 /Rated current of high-voltage load switch	A	300 600	
6	高压负荷开关热稳定电流 /Thermal stability current of high-voltage load switch	kA/s	16	
7	高压负荷开关动稳定电流 /Dynamic stability current of high-voltage load switch	kA	40	
8	噪声水平 /Level of noise	dB	≤ 55	

## 安装、使用、维护

### Installation, Operation and Maintenance

用户收货后，对暂不安装的产品应按正常使用条件规定安放于适当的场所。

After taking delivery of goods, the users should keep the products not installed temporarily in proper place as specified in normal service conditions.

## 安装

### Installation

起吊时只能使用专用吊攀，不得推、拉油箱的散热片或其他零部件；起吊钢缆拉伸时与垂直线之间的角度不超过 30° 以避免箱体的变形。

变电站底部与基础连接部位用水泥封闭，防止异物进入。

The special lifting equipment should be used in lifting. Do not push or pull the cooling fin or other parts of oil tank: in order to avoid deformation, the angle between the steel rope and vertical line should not exceed 30°.

The substation bottom and foundation connection should be sealed with cement so as to prevent foreign matters.

## 产品就位后投运前经过以下试验

### The following tests should be made to substation before putting into operation:

- |   |  |
|---|--|
| a. 测量高压侧和低压侧的绝缘电阻。  | a. Test the insulation resistance on the high-voltage and low-voltage side.  |
| b. 测量直流电阻。  | b. Test the DC resistance.   |
| c. 电压比测量及电压矢量关系校订。  | c. Test the voltage ratio and calibrate the voltage vector relationship.   |
| d. 工频耐压试验, 按出厂试验标准的 90%, 历时 1 分钟, 如果产品要重新注油, 上述试验应在注油至少 10 小时后进行。 | d. Conduct power frequency withstand voltage test for 1 minute according to 90% of factory test standard. If the product is to be refilled, the above test should be made at least 10 hours after oil filling. |

## 投运前检查

### Inspections before operation

- |  |  |
|--|--|
| a. 插入式的熔管的安装是否到位。                        | a. Check the installation of plug-in fuse tube.  |
| b. 高压套管插头连接是否可靠。                         | b. Check the reliability of high-voltage sleeve connector.   |
| c. 变压器的分接开关是否处于正确位置。                     | c. Check the location of tapping switch of transformer.  |
| d. 负荷开关的转动是否灵活, 各处的连接是否可靠, 箱体的接地螺钉是否已紧固。 | d. Check the flexibility of load switch, the reliability of connection, and the tightening of grounding bolts. |

## 熔管的使用及更换

### Application and replacement of fuse tube

- a. 后备式限流熔断器装在变压器油箱的上部, 浸在油中, 更换时先将负荷开关断开, 高压肘型电缆插头拔出, 使整个产品处于隔离状态, 打开油箱盖更换熔断器。
- b. 插入式熔断器在拔出前先将负荷开关断开, 将油箱内压力释放后, 再进行操作, 操作时使用绝缘操作杆。

- a. The backup current-limiting fuse is installed in the upper of oil tank and immersed in the oil. Before replacement, it must disconnect the load switch and pull out the high-voltage elbow cable connector so that the fuse is in an isolated condition. Then, you can open the oil tank to replace fuse.
- b. As for pull-out fuse, it must disconnect load switch and discharge the oil tank before operation. All operations should be done by lever.

## 负荷开关的操作

### Operation of load switch

负荷开关的三相连动机构, 可完成负荷开关分合操作。负荷开关分为两种, 用于环网电系统的负荷开关为四位置负荷开关; 用于终端供电系统的负荷开关为二位置负荷开关, 可实现变压器的投运和切除。

Load switch is a three-phase linked gear, which can achieve the operations of load switch and on-off operations. The load switch includes two types: the four-position switch is for looped-network system and the two-position switch is for terminal supply system. Both two types of load switch can achieve to start and cut off operation of transformer.

## 负荷开关操作步骤

### Operation steps of load switch

- a. 负荷开关可以顺时针或逆时针旋转, 每次旋转 90° 为一工位。
- b. 先确定负荷开关所处的位置, 再根据线路图确定要操作到的位置。
- c. 使用操作杆将负荷开关旋转到需要的位置, 操作即完成。

注: 变压器用硅油时, 负荷开关不能切换。

- a. The load switch can be rotated in a clockwise or anti-clockwise direction for 90° every time as a position;
- b. Identify the location of load switch, and determine the target location according to wiring diagram;
- c. Rotate the load switch with operating lever to the required location.

Note: if the silicone oil is used in the transformer, the load switch is not switchable.

## 维护

### Maintenance

变压器油每年进行一次抽样分析, 油中如有水分, 必须对变压器做干燥处理。

- b. 油位过低时应及时予以补充, 油的牌号和箱体内的油牌号相同。
- c. 熔断器熔断后应及时检查故障原因, 再更换熔管, 熔管的型号按照规定选用。
- d. 带电操作时为确保安全, 必须使用绝缘操作杆操作。

- a. The transformer oil should be made sampling analysis once a year. If the water presents, the transformer must be dried.
- b. If the oil level is too low, it must be filled with the same brand to that in the tank.
- c. If the fuse is blowing, it must identify the fault cause immediately. The fuse tube must be replaced as specified.
- d. In order to assure safety, any electrified operation must be done by operating lever.

## 变电站高压侧一次方案图

### Primary circuit diagram on the high-voltage side of substation

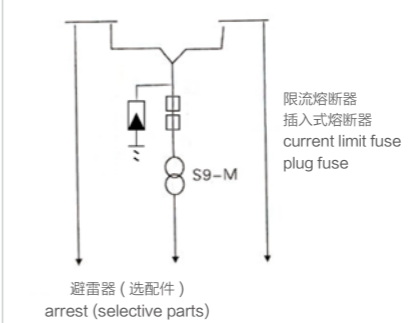
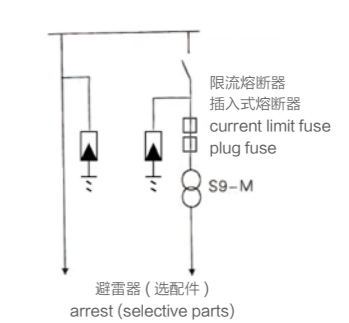
方案号 Scheme No.	01 (环网) (looped-network)	02 (终端) (terminal)
一次方案图 Primary circuit diagram		
名称 Name		
负荷开关 load Switch	1 (四位置负荷开关) (four-position load switch)	1 (两位置负荷开关) (two-position load switch)
限流熔断器 current-limiting fuse	3 (型号随容量定) (the types depend on capacity)	3 (型号随容量定) (the types depend on capacity)
插入式熔断器 pull-out fuse	3 (型号随容量定) (the types depend on capacity)	3 (型号随容量定) (the types depend on capacity)
避雷器 (选配件) arrestor (optional)	3	6

图 12 Figure 12



## 变电站低压侧一次方案图 (见图 8)

Primary circuit diagram on the low-voltage side of substation ( sees Figure 8 )

## 基础图 目字型结构箱变基础见图 13

Foundation layout The foundation of head-shaped box-type substation sees Figure 13.

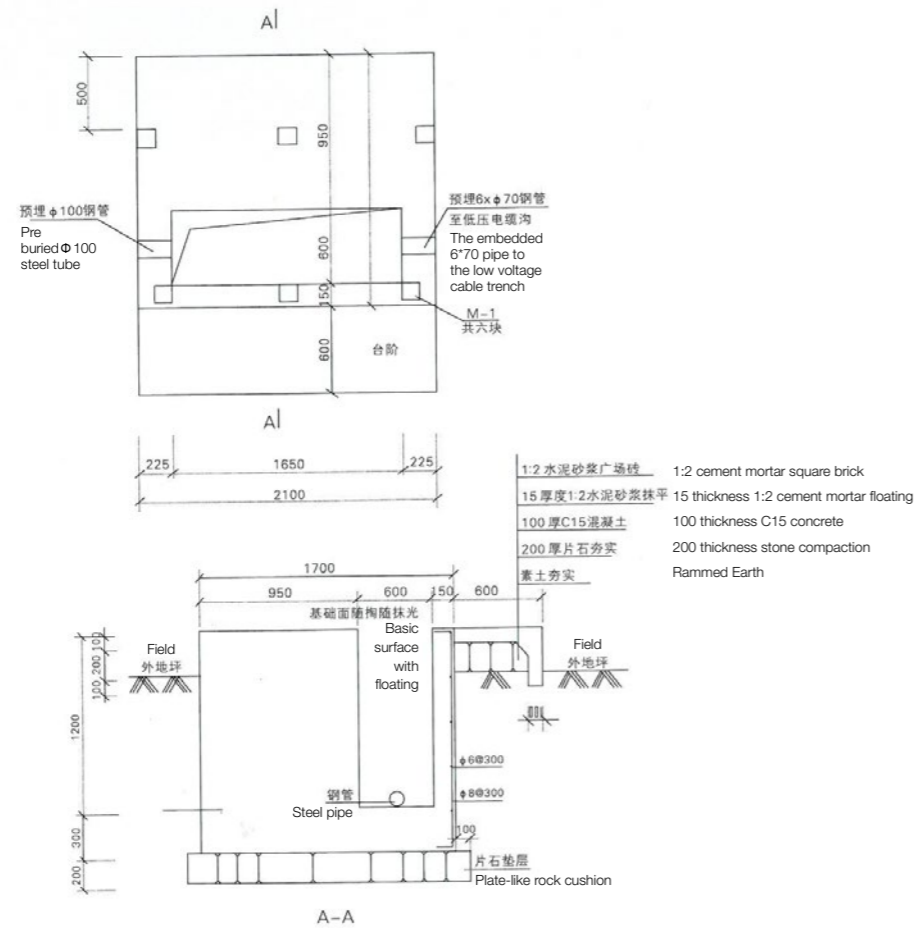


图 13 Figure 13

目字型箱变地基形状和尺寸示意图见图 9

The foundation shape and dimension of '目'-shaped box-type substation sees Figure 9.

## 随机文件及附件

### Accompanying Documents and Accessories

产品附有装箱单、合格证、使用说明书、电气原理图、钥匙和根据协议书提供的配件。

The product shall be accompanied by packing list, certificate of conformity, operating instruction, electrical diagram, keys and accessories required in the agreement.

## 订货须知

### Ordering Instruction

订货方在订货时应提供下列数据:

The following data shall be provided in ordering.

- 产品型号
- 壳体的颜色及材料
- 变压器容量及类型
- 需要的备品备件
- 高、低压室接线方案及选择的电气元件的类型和参数
- Product model
- Color and material of housing
- Transformer capacity and type
- Necessary spare parts
- Wiring diagram of high-voltage and low-voltage compartment, selected type and parameters of components

**备忘录 Memo**

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