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# 使用说明书

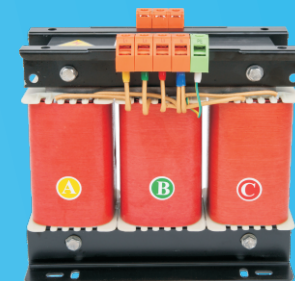
变压器系列产品

*Transformer Series Products*

ISO9001-2000质量体系认证

*ISO9001-2000 Quality System Certification*

专业、所以我能.....



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上海诺稳电器设备制造有限公司

Shanghai Nuo Wen Electric Equipment Manufacturing Co., Ltd.

# SG、SBK(ZSG)、JMB.BK.JBK.BKC系列控制变压器

## SG, SBK(ZSG), JMB, BK, JBK, BKC series control transformers

### 一、概述 General:

JMB.BK.JBK.BKC系列控制变压器系本公司最早推出的电器产品，采用进口材料和严谨设计，具有性能优良，工作可靠，适用性广等特点。本系列变压器为立床式安装方式，在额定容量下可长期连续工作，被广泛用作于机床和机械设备中一般电器的控制电源，局部照明用指示灯电源。

JMB, BK, JBK and BKC series control transformers are the earliest electrical products of our factory, adopt imported materials and strict design, are featured with excellent performance, reliable operation, wide application, etc. This series of transformers has vertical bed installation mode, it is able to work continuously for long term at rated capacity. The products are widely applied to control power sources of general electrical appliances on machine tools and mechanical equipment, and indicator lamp power supplies of local lighting.

### 二、产品规格及安装尺寸:

#### II. Product specifications and installation dimensions:

系 列 Series	规格 Spec. (VA)	额定输入电压 Rated input voltage(V)	额定输出电压 Rated output voltage(V)	外形尺寸长X宽X高 Overall dim. L×W×H(mm)	安装尺寸 长X宽 Installation dim. L×W(mm)
JBK	40	220 (361) 380 (399)	6 (6.3) 12 24 36 110 127 220 (380)	80×77×90	55×50
	63			80×85×90	55×50
	100			86×95×92	64×70
	160			98×105×110	83×87
	250			98×110×113	82×87
	400			120×115×120	102×90
	630			150×110×140	128×92
	1000			180×220×155	155×160
	1600			57×82×82	155×182
				70×88×100	68
BKC	25			80×100×105	50×70
	50			86×100×125	57×83
	100			105×100×136	56×84
	150				78×83
	250				

voltmeter is used to test these secondary voltages one by one.

7.4.4 Insulation resistance test: To keep the transformer in the normal run state, the insulation resistance must be tested to prevent the insulation being affected with the damp and accident. The insulation of transformer should be tested with megohmmeter under power failure, the tested value should not be less than the former tested one.

## 八、售后服务 VIII. After-sale service

本公司生产的变压器，自购买之日起，保修为一年，保修期内凡属制造质量问题，用户可能凭销售发票信誉卡到本公司维修部（或经销公司）联系，您会得到满意回复。

The transformer produced by us is guaranteed one year from the date of purchasing, in the guarantee period, if the products are damaged for quality problem, we will give your satisfying reply as long as you take the sale invoice and warranty card to our service department or dealer.

## 九、订货须知 IX. Notification of order

用户在购买商品时，应标明以下几点：

1. 变压器的基本型号规格、容量及数量；
2. 变压器的初、次级电压；
3. 连接组别；
4. 提供多绕组变压器电压时，必须提供电压的容量分配。
5. 对外形尺寸和安装尺寸有特殊需要，在订货时加以说明。

User should indicate following points when purchasing the products:

1. Basic model & specification, capacity and quantity of transformer;
2. Transformer primary and secondary voltage;
3. Connection group
4. While providing the multi-winding transformer voltage, please present the capacity distribution of voltage.
5. If any special needs about the outline dimension and installation dimension, please give the indication while ordering.

BK系列BK series			JMB系列JMB series
规格 Spec.	外形尺寸Overall dim.	安装尺寸Installation dim.	外形尺寸Overall dim.
25VA	79×72×86	64×47	150×160×130
50VA	87×68×96	70×57	
100VA	105×94×110	84×68	
150VA	105×100×110	84×74	160×170×135
200VA	105×108×110	84×84	
250VA	120×116×134	95×80	130×210×155
300VA	120×126×134	95×90	
400VA	134×137×150	110×100	210×230×175
500VA	134×150×150	110×110	
700VA	155×155×164	125×114	218×290×185
1000VA	155×170×164	125×128	
1500VA	175×185×195	143×130	260×330×235
2000VA	175×200×195	143×140	
3000VA	205×220×230	170×160	280×350×230
4000VA	230×210×340	190×155	360×355×280
5000VA	310×27×28	200×140	

## 三、适用环境 Operating environment:

本变压器在下列条件下能可靠工作：

- 1、海拔高度不超过2500M；
- 2、环境空气温度：最高不超过40℃，最低不低于-25℃；
- 3、空气相对湿度：电湿月的平均最大相对湿度为90%；
- 4、无爆炸危险的介质中，且介质中无腐蚀金属和破坏绝缘的气体及导电

尘埃的地方。

- 5、不受雨雪侵袭的场所。

The transformer is able to work reliably under the following conditions:

1. Altitude ≤2500M;
2. Ambient air temperature: -25℃~40℃
3. Relative humidity: average max relative humidity of the most dampest month should be 90%;
4. The installation site should be far away from explosive mediums, or gas or dust that would erode the metal or destroy the insulation.

5. The installation site should be free from rain or snow.

## 四、安装与使用说明 Installation and operation:

1、打开包装箱，取出说明书等备用件及本机，并仔细阅读《使用说明书》以便正确使用。

2、将本变压器可靠固定在通风散热的适当位置，保证不受振动和侵蚀。

3、使用前，必须测试电路，电网电压是否为额定输入电压值，允许偏差 $\pm 5\%$ ，若大大的超过该范围，应考虑前端添加稳压电源，以确保变压器可靠工作。

4、选用适当截面导线按标识接好线，检查分载无误后，即可通电，本变压器正常工作，安装导线截面的选择。

1. Open the packing box, take out the Operating Manual, spare parts and the transformer, please read the Operating Manual carefully for proper operation.

2. Fix the transformer in a suitable position where is helpful for ventilation and heat dissipation, and make sure that it is far away from vibration or corrosion.

3. Before operating, please test the circuit, make sure that the power grid voltage equals to the rated input voltage value, permissible deviation is  $\pm 5\%$ , if it is sharply beyond this range, please consider to add a voltage stabilizer in the front to guarantee reliable work of transformer.

4. Select suitable conductors with suitable sectional area, wire according to the marks, make sure that the load sharing is correct, than put through the power supply, the transformer begins to work normally. Selection of sectional area of conductor,

额定输入或输出电流 (A) Rated input or output current (A)	导线 (铜) 截面 (mm <sup>2</sup> ) Sectional area of conductor (copper)
5	0.75
5-10	1.00
10-16	1.50
16-25	2.50
25-32	4.00
32-45	6.00
45-63	10.00
63-80	16.00
80-110	25.00
110-130	35.00
130-170	50.00
170-220	70.00
220-270	95.00

7.4为保证变压器的正常运行应经常进行下列几项测试：

7.4.1温度测试：变压器运行状态是不是正常，温度高低是很重要的：

7.4.2负荷测定：为了提高变压器的利用率，减少电能的损失，防止过负荷运行，在运行中，必须测定变压器真正能承载能力，测定时间用钳形表直接测定。电流值应为变压器额定电流的75-90%，超过时说明过负荷，应立即进行调正。

7.4.3电压测定：变压器的电压变动量应在额定电压 $\pm 5\%$ 以内。如果超过这一范围，应采用分接头调正，使电压达到规定范围。一般用电压表分别测试次级电压。

7.4.4绝缘电阻测定：为了使变压器始终处于正常运行状态，必须进行绝缘电阻测定，以防绝缘受潮和发生事故。测定变压器的绝缘时应在停电情况下进行，利用兆欧表测定绝缘，要求所测电阻值不低于以前所测的值。

### 7.3 Keep from moisture

If the transformer is affected with the damp, the insulation of serving electrical products will be impaired, the leakage current is increased, even the electrical products can't run normally. SG, SBK and ZSG three-phase transformers are the indoor ones, can't be put outdoors. If these transformers are attacked by the drip, rain or snow, it should be dried.

7.4 To ensure the transformer runs normally, the follow tests should be often performed.

7.4.1 Temperature test: The temperature is important to the normal run of transformer;

7.4.2 Load test: To improve the utilization ratio of transformer, reduce the loss of energy and prevent the overload run, the transformer real carrying capacity must be tested when it runs, the testing time is tested directly with the clampammeter. The current should be 75-90% of rated current of transformer, if it runs overtime, this means it is in the overload state, this situation should be corrected.

7.4.3 Voltage test: The voltage variation of transformer should be less than 5% of rated voltage. If beyond this range, it should be adjusted with the tap, to make the voltage reach the specified range. In general, the



过负荷运行是指变压器运行时超过铭牌上规定的电流值，过负荷运行使变压器温度升高，促使绝缘老化，降低使用寿命，所以不允许变压器过负荷运行；特殊情况下，变压器短时间内的过负荷运行，允许时间见表3。

#### 7.1 Determining the reasonable capacity of transformer

First, investigate the local supply voltage, user's actual load and local conditions; second, select the parameters according to the technical data given in the transformer nameplate. Generally, the transformer capacity, voltage, current and environment conditions are taken into consideration, hereinto, the capacity is selected according to the loads that are determined by powered device capacity, performance and service time.

In normal run, the load carried by the transformer should be 75–90% of its rated capacity.

#### 7.2 Never run long time under overload

Overload run refers to that the transformer runs under the current that exceeds the value stipulated in the nameplate, this run will make the transformer temperature rise, accelerate aging and lower the service life, therefore, it is unallowable to use the transformer under overload; but under special circumstances, the overload run is allowed in short time, the permissible time is shown as table 3.

表3 Table 3

序号 Number	额定负荷的倍数 Multiple of rated load	过负荷允许时间 Permissible time under overload
1	1.30	1 小时 Hour
2	1.60	15 分钟 Min
3	1.76	8 分钟 Min
4	2.00	4 分钟 Min

#### 7.3 严禁受潮

所有的电气产品受潮后绝缘下降，泄露电流增大，甚至不能正常使用。SG、SBK、ZSG、三相变压器为户内使用变压器，不准安放在室外，经水渍、雨淋、风雪侵蚀等，受潮的变压器要进行干燥处理。

额定电流计算 Calculation of rated current:

$$\text{电流 Current} = \frac{\text{额定容量(VA) Rated capacity (VA)}}{\text{额定输出(输入)电压(V) Rated output (input) voltage (V)}} \text{ A}$$

## 五、注意事项 Notices:

- 1、购买前，先估算好您所适用的电器的总容量，并先用留有相当容量的变压器，确保瞬时启动时不烧坏变压器。
- 2、本变压器严格按国家有关标准设计生产，当您使用双绕组，多控制电压（即抽头式），如BK、JMB变压器时应分别按初次级最高电压比例减少容量，即电流不应超过最高电压计算值：对于绕组分功率的变压器应严格控制各绕组的功率，以免烧坏变压器。绕组结构与特性附图一。
- 3、安装前，应仔细校核铭牌所列各项数据是否符合您的要求，确认无误后，方可安装使用。
- 4、通电工作后，变压器铁芯和线圈将发热（但温度不超过80℃）属正常现象，若温升超过80℃，甚至冒烟，则应切断电源开关，重新检查您的所用电器容量，且予调整。

1. Before purchasing, please estimate the total capacity of your electrical equipment, and select a proper transformer with enough overmeasure, make sure that the transformer would not be burnt out due to instantaneous starting.

2. This series of transformers is designed and produced strictly in accordance with relative national standards. When applying double windings and multi control voltage (i.e. Tapping type), such as BK and JMB transformers, their capacity should be reduced correspondingly according to the primary and secondary max voltage proportion, the current should not be larger than the calculated value of max voltage; for transformers have branch-power windings, please control the power of each winding strictly, otherwise the transformer may be burnt. See attached fig.1 for structure and characteristic of windings.

3. Before mounting, please make sure that the data on the

nameplates should be in line with your requirements, only after confirmation that you can install and use.

4. After power on, iron core and coil of transformer become hot, it is normal when the temperature does not exceed 80°C, if over 80°C or there is smoke, please turn off the main switch immediately, check the capacity of electrical appliances, and make reasonable adjustment.

## 六、售后服务 After-sale service

凡本公司生产的控制或照明行灯变压器，自购买之日起，保修期为壹年，保修期内凡属制造质量问题，用户可凭销售发票或信誉卡到本公司维修部（经销部）或本公司联系。

All the control or lighting transformers produced by our company will enjoy a warranty period of one year since the purchasing day, users please contact with our maintenance service department (or sales agency) against the sales invoice or credit standing card if there is any manufacturing quality problem within this period.

## 七、装箱单 VII. Packing list:

- 1、产品一台
- 2、使用说明书一份
- 3、信誉卡一份
- 4、合格证一份

注：如客户有特殊要求，  
本厂可代为设计制造

1. One set of product
2. One copy of Operating Manual
3. One copy of Credit Standing Card
4. One copy of Certificate of Conformity

Note: The factory also is capable to design and manufacture products according to your special requirements.

- 6.2 周围介质温度；
    - 6.2.1 最低温度不低于-25°C
    - 6.2.2 最高空气温度不高于+40°C；
  - 6.3 空气相对湿度；最湿月的平均最大相对湿度不大于95%；同时该月的月平均最低温度为+25°C；
  - 6.4 电流电压波形近似于正弦波；
  - 6.5 不受雨雪侵蚀的场所；
  - 6.6 无显著摇动和冲击振动的地方；
  - 6.7 无爆炸危险的介质中，且介质中无足以腐蚀金属和破坏绝缘的气体及导电尘埃。
- The transformer can work reliably under following conditions:
- 6.1 Altitude should not exceed 2,500m;
  - 6.2 Ambient temperature
    - 6.2.1 The min temperature should not be lower than -25°C.
    - 6.2.2 The max air temperature should not be higher than +40°C.;
  - 6.3 Air relative humidity: The average max relative humidity is not more than 95% in the dampest month; and the monthly average min temperature is +25°C in this month;
  - 6.4 The current and voltage waveform approaches to the sine wave;
  - 6.5 The location that is not attacked by the rain and snow;
  - 6.6 The location that has no visual impact, shake or vibration;
  - 6.7 The environment that is free of explosion danger, corrosive metal, gas destroying the insulation or conductive dust.

## 七、使用注意事项 Attentions in use

### 7.1 确定变压器的合理容量

首先要调查用电地方的电源电压，用户的实际用电负荷和所在地方的条件，然后参照变压器铭牌的技术数据逐一选择。一般应以变压器容量、电压、电流及环境条件综合考虑，其中容量选择应根据用电设备的容量、性质和使用时间来确定所需的负荷量，以此来选择变压器的容量。

在正常运行时，应使变压器承受的用电负荷为变压器额定容量的75-90%左右。

### 7.2 不能长期过负荷运行

copper wire, Qz high-strength enameled wire or copper bar respectively according to the capacity.

4.4 Insulation level: class B

## 五、基本参数 V. Basic parameters

5.1适用于50Hz电压至1000V以下的电路中。

5.2额定工作制：短期工作制和长期工作制。

5.3主要容量见表1

5.1 It is suitable for circuits of 50Hz and voltage up to 1000V.

5.2 Rated duty: short-time duty and uninterrupted duty.

5.3 See table 1 for main capacity specifications

序号No.	规格容量Capacity	序号No.	规格容量Capacity
1	SG/SBK-300VA	14	SG/SBK-8000VA
2	SG/SBK-500VA	15	SG/SBK-10KVA
3	SG/SBK-750VA	16	SG/SBK-15KVA
4	SG/SBK-1000VA	17	SG/SBK-20KVA
5	SG/SBK-1500VA	18	SG/SBK-25KVA
6	SG/SBK-2000VA	19	SG/SBK-30KVA
7	SG/SBK-2500VA	20	SG/SBK-40KVA
8	SG/SBK-3000VA	21	SG/SBK-50KVA
9	SG/SBK-3500VA	22	SG/SBK-60KVA
10	SG/SBK-4000VA	23	SG/SBK-100KVA
11	SG/SBK-5000VA	24	SG/SBK-150KVA
12	SG/SBK-6000VA	25	SG/SBK-200KVA
13	SG/SBK-7000VA	26	SG/SBK-300KVA

5.4额定电源电压和额定输出电压的组合按表2优先选取

5.4 The combination of rated supply voltage and rated output voltage is preferred according to table 2.

表2 Table 2

额定电源电压 Rated supply voltage	额定输出电压 Rated output voltage
660 380 220 127	380 220 127 110 36 24 12 6

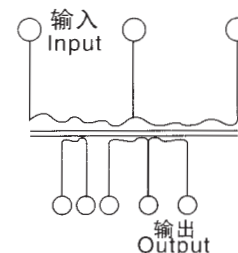
## 六、正常使用条件 VI. Normal service condition

变压器在下列条件下能可靠工作：

6.1海拔高度不超过2500m；

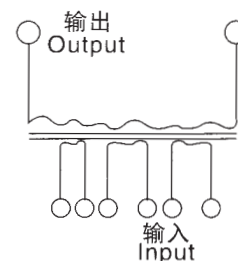
## 控制变压器绕组结构与特性 Structure and characteristics of windings of control transformer

双绕组抽头式特性，如图一，变压器初、次级绕组分别以同规格导线抽头改变电压值，并以高压挡定为额定值，随电压降低比例减少容量；输出端两种电压同时使用时，也不能超出电流值。（电流为定值）。



图一 Fig.1

Characteristics of double-winding of tap type, see fig.1, voltage values of primary and secondary windings of transformer are changed by conductor taps of same specification respectively, the high-voltage one is determined as the rated value, and the capacity is reduced according to the voltage reducing proportion; when the two types of voltage on output terminal are used synchronously, it also should not exceed the current value. (The current is a fixed value).

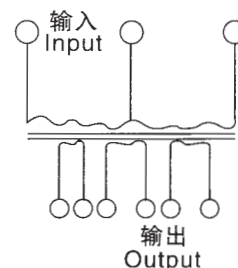


图二 Fig.2

分功率多绕组特性，如图二，初级为一个绕组，负极为若干个绕组，每个绕组独立负载，因此每个绕组不得超过规定值。

Characteristics of branch-power multi-winding, see fig. 2, primary has one winding, negative pole has several windings, each winding bears loads independently, so each winding should not exceed the specified value.

分功率混合式绕组特性，如图三，它具有以上两种特性，如初级380V改用为220V时，变压器容量为原来的0.578倍，输出绕组其中电流也不得超出原值的0.578倍。



图三 Fig.3

Characteristics of branch-power mixed windings, see fig.3, it has characteristics of the above two, when the primary 380V is changed into 220V, capacity of transformer is 0.578 times of original value, current of output windings should not exceed 0.578 times of original value.

## 一、范围 I. Range

本产品说明书简述了SG、SBK(ZSG)系列三相干式(整流)变压器的基本结构,基本参数,正常工作条件及使用注意事项等,作为用户选型、安全运行的指南。

This operating manual describes the basic structure, basic parameters, normal working conditions and notices of SG and SBK (ZSG) series three-phased dry type (rectifier) transformer, is a guide book for type selection and safety running for users.

## 二、引用标准 II. Normative reference

GB1094.1-1996电力变压器第一部份

JB/T9646-1999控制或照明用小型干式变压器

JB/T9639-1999封闭母线

GB1094.1-1996 Power transformers--Part 1: General

JB/T9646-1999 Small drytype transformer for control or luminary

JB/T9639-1999 Phase buses

## 三、产品概述 III. General

变压器是借助于电磁感应,以相同频率,在两个或更多的绕组之间变换电压或电流的一种静止电气设备。

SG、SBK型三相干式变压器,变压器的铁芯和绕组等构成的器身,均不浸在绝缘液体介质(变压器油)中,而是和空气直接接触,利用空气对流进行散热。

ZSG型三相干式整流变压器,是整流设备中重要组成部份(属于干式变压器),它和各种整流装置组成整流电路系统。为实现把交流电变为直流电,整流变压器首先将交流电网的电压变换成一定大小及相数的电压,再经过整流装置(整流器),输出给直流拖动设备。

Transformer is a kind of static electrical equipment that transform voltage or current between two or among more windings depending on electromagnetic induction with same frequency.

SG and SBK type three-phase dry type transformers whose

body that is composed of iron core, windings and so on will not be immersed in insulating liquid medium (transformer oil), but will be exposed in air directly, and carry out heat dispersion by making use of air convection.

ZSG type three-phase dry type rectifier transformer is an important component (belongs to dry type transformer) of rectifier equipment, it forms rectifying circuit system with various rectifying devices. In order to change the alternating current into direct current, the rectifier transformer will firstly transform the voltage of alternating current power grid into a voltage of certain magnitude and phase number, then output to direct current driving equipment through rectifying device (rectifier).

## 四、结构简介 IV. Structure description

4.1 结构形式见图1、图2。

4.1 See fig.1 and fig.2 for structure forms.

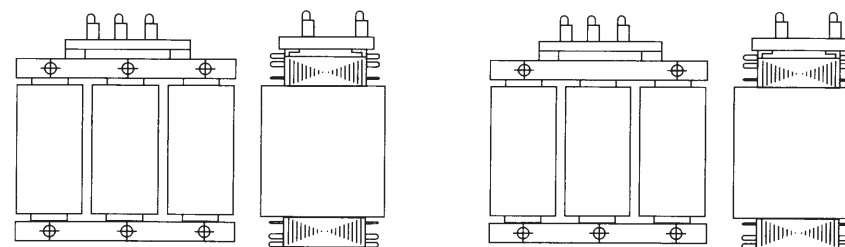


图1 Fig.1

图2 Fig.2

4.2 采用三柱式铁芯,铁芯材料为冷轧硅钢片,磁通密度 $\geq 12000$ 高斯。

4.3 绕组根据容量分别采用SBECR双玻璃丝包扁铜线;Qz高强度漆包线,或铜排。

4.4 绝缘等级: B级

4.2 It adopts three-column iron core, the core is made of cold-rolled silicon steel sheet, magnetic-flux density reaches 12000 gauss.

4.3 The windings adopt SBECR double-fiberglass-clad flat