



## 母线槽系统 Busways System

# GSM-I

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。

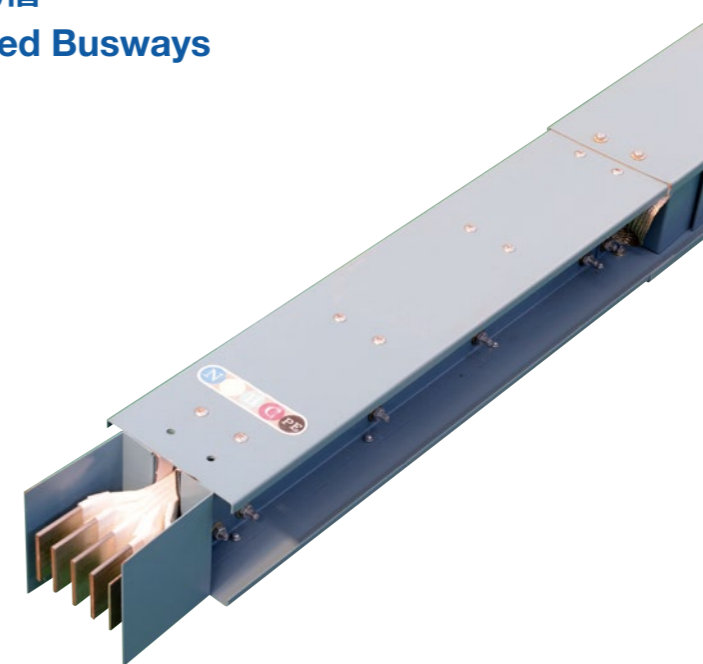
Ningbo TIANLUN Electric Co., Ltd was established in year 2001, January. It is located in Ningbo, near Beilun port, which is called "oriental grand port". TIANLUN has 10000-square-meter researching and developing workshop and annual output value exceeds 100 million. TIANLUN has a professional team composed 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.



## 密集型绝缘母线槽 Closed Insulated Busways



### 产品特点 Product Features

- 电流: 400~6300A
  - 排之间保持紧凑的“三明治”结构,可有效避免“烟囱效应”。
  - 外壳采用优质高强度冷轧钢一次冷轧成波纹结构,不仅外形美观大方,更大大增强母线槽的机械强度和系统的动热稳定性,可彻底解决施工现场大跨距安装的难题。
  - 选用铝镁合金外壳为非磁材料,散热快,可避免钢制外壳母线运行时产生磁滞涡流损耗现象。
  - 系统选择具有大于相线50%容量的整个外壳作接地系统,保证足够的安全性,为接地故障提供可靠的接地路径,当发生高容量的接地故障时,可有效的接地和保护整个系统。
  - 母线槽防护等级最高可达IP65。
  - 导体采用2#电解铜,原材料从国外进口,纯度高。
  - 导体表面整体镀锡,全长包裹美国杜邦公司的聚酯薄膜,该绝缘材料抗老化能力强,达到B级绝缘,耐温130℃。
  - 本系列母线槽广泛适用于变配电中心、高层商住楼、综合写字楼、工厂生产线及大型商业中心等高效、安全的输配电场所。
- Rated current: 400-6,300A
  - Maintaining compact "sandwich" structure between copper bars may effectively avoid "chimney effect".
  - The shell adopts high-quality and high-strength cold-rolled steel which is cold rolled into a corrugated structure at a single time. with a nice outlook, the structure also greatly enhances the mechanical strength of busway and good dynamic thermal stability of the system. Therefore, it may thoroughly solve the problem of large-span installation at construction site.
  - The shell of busway adopts aluminum magnesium alloy, which enjoys non-magnetism and fast heat dissipation capability, and may avoid magnetic lag and eddy current loss generated during the running of busbar with steel shell.
  - The whole enclosure with more than 50% of the capacity of phase line is chosen as grounding system, which guarantees system safety and provide reliable grounding path for ground fault, and can be effectively grounded and protect the entire system when a high-capacity ground fault occurs.
  - The protection level of busways is IP65.
  - The conductor adopts superior electrolytic copper (2#), the raw material of which is imported abroad and is highly pure.
  - The surface of conductor is coated with tin and totally covered with polyester film produced by USA Dupont. Such insulating material has strong anti-oxidant corrosion ability, with insulation grade B and resistance to the temperature of 130℃.
  - This series of busways is applicable to high-efficient and safe PTD occasions, such as power transformation and distribution centers, high-rise commercial and residential buildings, integrated office buildings, factory production lines and large commercial centers, etc.



ISO9001-2000



CCC 认证

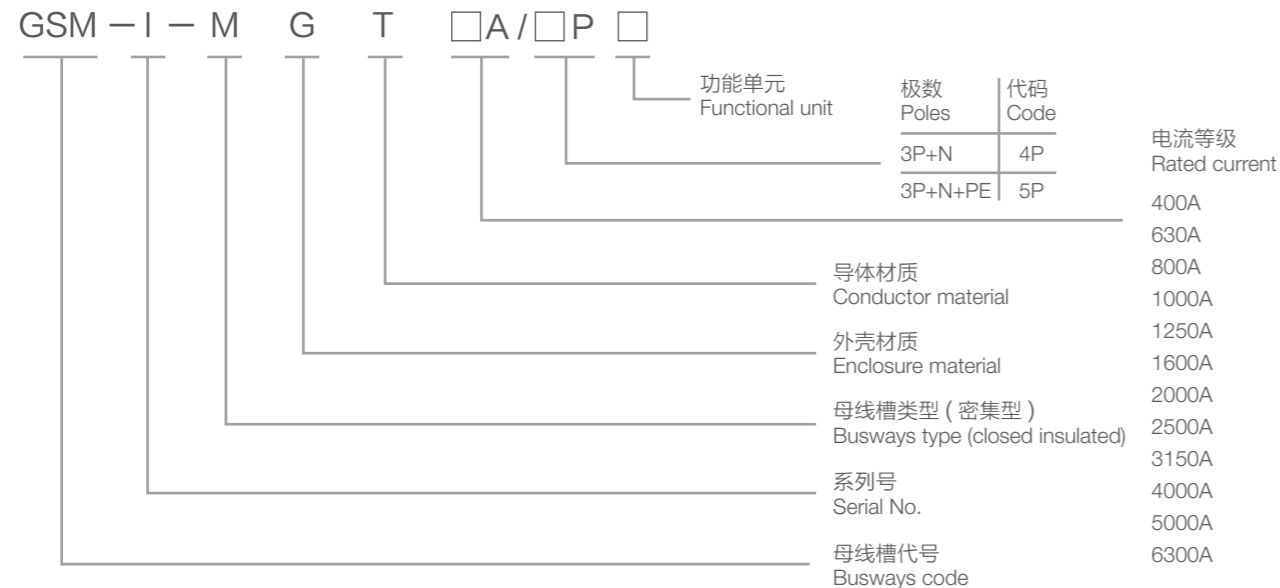


WSC 北京世标认证中心



## 型号含义

### Model Description



## 技术参数

### Technical Data

符合标准 /Standard	GB7251.1/GB7251.2
标准颜色 /Standard colors	RAL7046
额定工作电压 /Rated operating voltage $U_e$	690V
额定绝缘电压 /Rated insulation voltage $U_i$	1000V
额定频率 /Rated frequency	50/60Hz
防护等级 /Degree of protection	IP54/65

## 铜母线

### Copper busbar

额定电流 $I_e$ (A) Rated current $I_e$ (A)	400	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300
额定短时耐受电流 $I_{cw}$ (kA) Rated short-time withstand current $I_{cw}$ (kA)	30	30	30	50	50	50	80	80	80	80	100	100
额定峰值耐受电流 $I_{pk}$ (kA) Rated peak withstand current $I_{pk}$ (kA)	63	63	63	105	105	105	176	176	176	176	220	220
电阻 $R$ (mΩ/m) Resistance $R$ (mΩ/m)	0.109	0.094	0.073	0.060	0.050	0.036	0.026	0.016	0.013	0.010	0.007	0.004
电抗 $X$ (mΩ/m) Reactance $X$ (mΩ/m)	0.044	0.039	0.034	0.032	0.028	0.023	0.019	0.012	0.009	0.005	0.001	0.001
阻抗 $Z$ (mΩ/m) Impedance $Z$ (mΩ/m)	0.117	0.101	0.081	0.073	0.058	0.043	0.032	0.020	0.016	0.011	0.007	0.004
电压降 (v/m) Voltage drop (v/m)	0.076	0.102	0.100	0.091	0.087	0.079	0.073	0.071	0.072	0.071	0.063	0.071

## 铝母线

### Aluminum busbar

额定电流 $I_e$ (A) Rated current $I_e$ (A)	250	400	630	800	1000	1250	1600	2000	2500	3150	4000
额定短时耐受电流 $I_{cw}$ (kA) Rated short-time withstand current $I_{cw}$ (kA)	30	30	30	30	50	50	50	80	80	80	80
额定峰值耐受电流 $I_{pk}$ (kA) Rated peak withstand current $I_{pk}$ (kA)	63	63	63	63	105	105	105	176	176	176	176
电阻 $R$ (mΩ/m) Resistance $R$ (mΩ/m)	0.185	0.144	0.108	0.81	0.072	0.053	0.041	0.032	0.026	0.016	0.013
电抗 $X$ (mΩ/m) Reactance $X$ (mΩ/m)	0.039	0.034	0.030	0.025	0.023	0.019	0.015	0.012	0.009	0.008	0.006
阻抗 $Z$ (mΩ/m) Impedance $Z$ (mΩ/m)	0.189	0.148	0.112	0.085	0.076	0.055	0.043	0.035	0.027	0.016	0.013
电压降 (v/m) Voltage drop (v/m)	0.08	0.100	0.118	0.112	0.125	0.112	0.112	0.112	0.102	0.089	0.080

## GSM-I-MGT 系列密集型母线槽选型表

### Model Table of GSM-I-MGT Series Closed Insulated Busways

型号 /Model 外形尺寸 Overall dimension	GSM-I-MGT			
	高度 /Height (mm)	宽度 /Width (mm)		重量 /Weight (kg/m)
电流等级 Rated current (A)	(H)	三相四线 / TN-C	三相五线 / TN-S	(kg/m)
400	85	150	170	14
630	100	150	170	16
800	115	150	170	19
1000	105	150	170	21
1250	120	150	170	25
1600	150	150	170	32
2000	180	150	170	38
2500	250	150	170	54
3150	290	150	170	66
4000	420	150	170	93
5000	520	150	170	123
6300	595	200	220	159

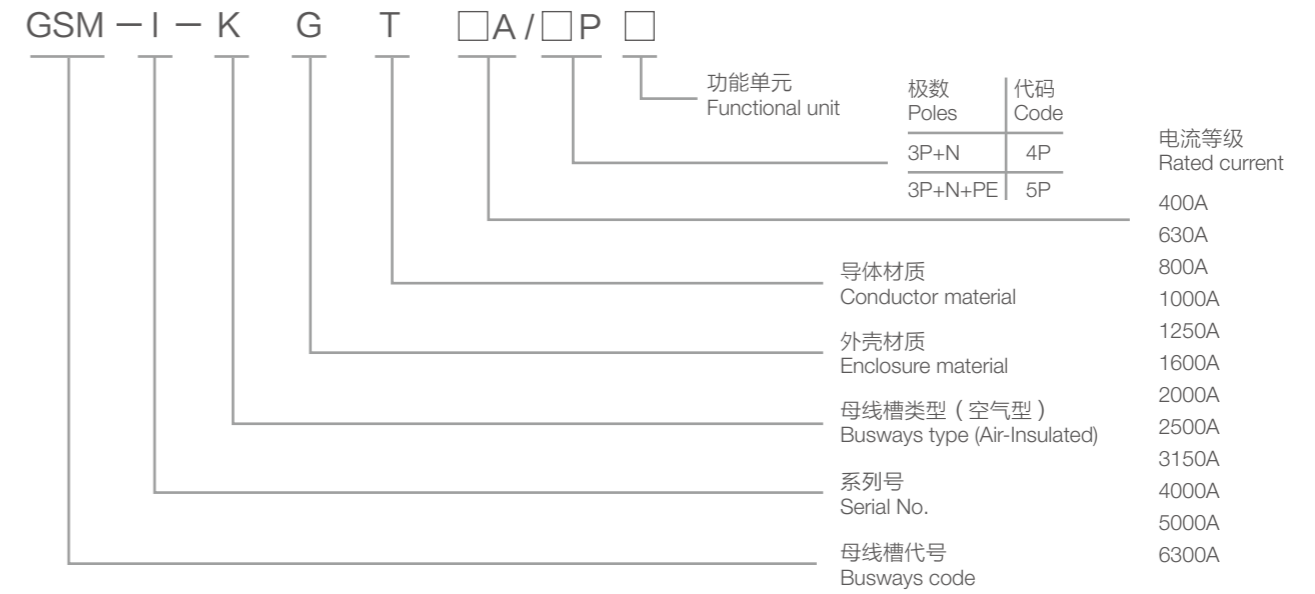
## 高强空气型 Enhanced Air-Insulated Busways



### 产品特点 Product Features

- 本系列母线槽是在传统空气型母线槽基础上的改进型产品，母线导体选用高纯度电解铜，导体表面全长镀锡，提高了导体抗氧化腐蚀能力，加工后再用 PVC 管热缩处理，相间和对地用绝缘块隔开，铜母排得到双重绝缘保护，绝缘性能大大提高，然后封闭在接地的金属外壳内。
- 母线槽插孔处设计了安全防护挡板，只有防护挡板拉开时，插接箱才能接入，有效防止了插口处灰尘和异物的进入，从而提高了母线槽的防护性，防护误操作，使母线的安全性得到了极大的提高。
- 外壳防护等级有 IP40~IP54，可根据安装使用环境灵活选择，达到母线槽最佳经济输电。
- 根据系统需求，可在母线槽任意位置设置插接口，安装快捷，分接方便，使用安全。
- 铜覆铝导体母线槽（GSM-I-KGF 型）在满足您安全可靠供电的同时还可减少您的投资；铜覆铝导电能力优于铝导体；铜覆铝从根本上解决了铝铜接触的难题；
- 本系列母线槽广泛适用于变配电中心、高层商住楼、综合写字楼、工厂生产线及大型商业中心等场所的变配电系统。
- This series of busways is modified products based on the traditional air-insulated busway. The bus conductor adopts high-purity electrolytic copper. The conductor surface is totally coated with tin, thus enhances the anti-oxidant corrosion ability of conductor. The conductor undergoes thermal shrinkage treatment with PVC tube after processing, and the phases and ground are isolated with insulating pieces. The copper busbar enjoys double insulation protection, thus greatly improving its insulation performance, and is enclosed within the grounded metal enclosure.
- The busway socket is designed with safety guard plate. The jack box can be connected only when the guard plate is pulled open, thus effectively preventing the entry of dust and foreign matters at the socket, so as to improve the protective property of busways and prevent wrong operation, and greatly improve the safety of busbar.
- The degree of protection of busway enclosure is IP40~IP54, which can be flexibly chosen according to installation environment, in order to reach the most economic power transmission.
- The user may reserve sockets at any position of the busways according to the system requirements, and the sockets are quick to install, convenient to tap and safe to use.
- The busways with copper clad aluminum conductor (GMS-I-KGF type) can satisfy your safe and reliable power supply and reduce your investment and lower your investment; The conductivity of copper clad aluminum outshines that of aluminum conductor; The copper cladding aluminum fundamentally solves the problem of copper and aluminum contact;
- This series of busways is widely used in high-efficient and safe PTD occasions, such as power transformation and distribution centers, high-rise commercial and residential buildings, integrated office buildings, factory production lines and large commercial centers, etc.

## 型号含义 Model Description



## 技术参数 Technical Data

符合标准 / Standard	GB7251.1/GB7251.2
海拔高度 / Altitude	≤2000
额定绝缘电压 Ui / Rated insulating voltage Ui	AC660V, AC1000V
额定工作电压 Ue / Rated operating voltage Ue	AC380V, AC660V
额定频率 f / Rated frequency f	50/60Hz
防护等级 / Degree of protection	IP40/54

## 铜母线

### Copper Busbar

额定电流 Ie(A) Rated current Ie (A)	250	400	630	800	1000	1250	1600	2000	2500	3150	4000	5000
电阻 R(mΩ/m) Resistance R (mΩ/m)	125	112.3	94.3	75.2	55	44.3	29.9	25.1	19.7	16.7	10.5	7.2
电抗 X(mΩ/m) Reactance X (mΩ/m)	86.	79.6	68.1	59	51.2	39.4	30.5	18.6	15.1	11.2	9.8	5.4
阻抗 Z(mΩ/m) Impedance Z (mΩ/m)	151.8	137.6	116.3	95.6	75.1	59.3	42.7	31.2	24.8	20.1	14.4	9
电压降 (v/m) Voltage drop (v/m)	0.065	0.094	0.125	0.129	0.124	0.123	0.111	0.106	0.105	0.109	0.095	0.076
绝缘电阻 MΩ Insulation resistance (MΩ)						≥20						
电气间隙 mm Electric clearance (mm)						≥10						
爬电距离 mm Creepage distance (mm)						≥12						

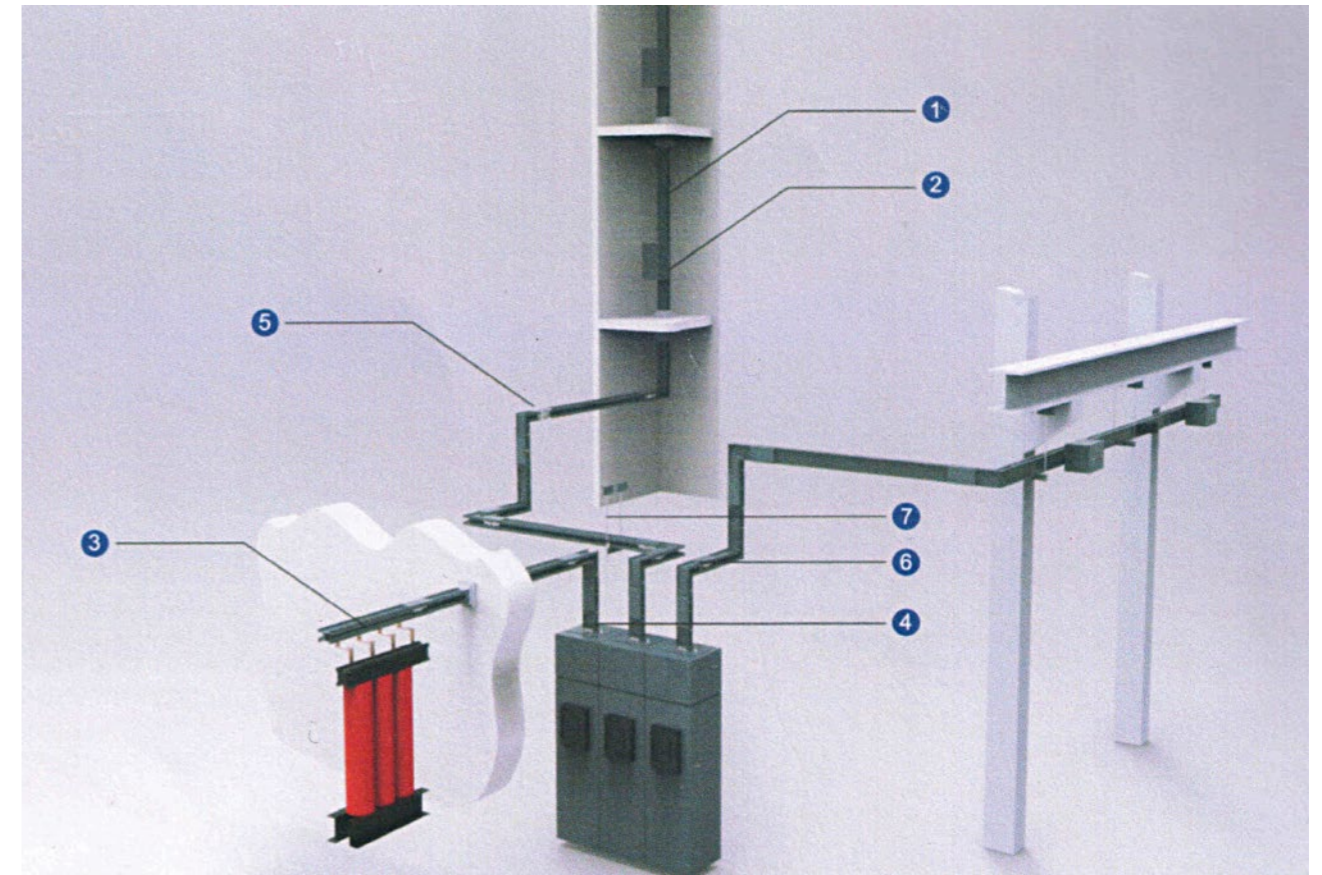
## GSM-I-KGT 系列高强空气型母线槽选型表

### Model Table of GSM-I-KGT Series Enhanced Air-insulated Busways

型号 / Model 外形尺寸 Overall dimension	GSM-I-MGT					
	高度 Height (mm) (H)	三相四线 TN-C (W1)	重量 Weight (kg)	高度 Height (mm) (H)	三相五线 TN-S (W1)	重量 Weight (kg/m)
250	101	174	15	101	200	17
400	111	174	18	111	200	20
360	126	174	21	126	200	24
800	141	174	26	141	200	27
1000	156	174	27	156	200	30
1250	181	174	33	181	200	37
1600	211	174	40	211	200	46
2000	239	174	50	239	200	57
2500	379	174	68	379	200	72
3150	455	174	80	455	200	87
4000	555	174	115	555	200	125
5000	655	174	139	655	200	150

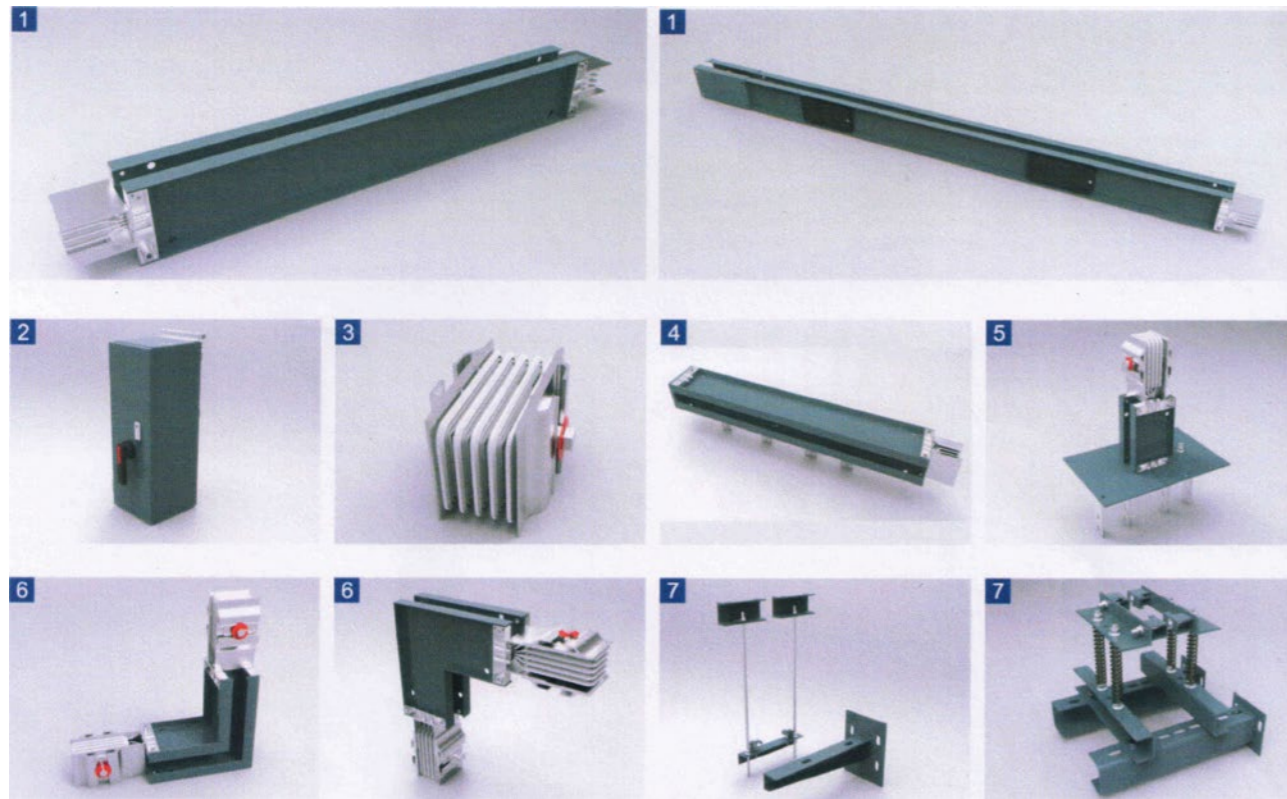
## 母线槽系统

### Power Busways System



- |           |   |
|-----------|---|
| 1 直线段单元   | 1. Straight line segment unit             |
| 2 插接箱单元   | 2. Jack box unit                          |
| 3 变压器连接单元 | 3. Transformer connection unit            |
| 4 低压柜连接单元 | 4. Low-voltage switchgear connection unit |
| 5 连接器单元   | 5. Connector unit                         |
| 6 换向单元    | 6. Reversing unit                         |
| 7 安装附件    | 7. Installation accessories               |

## 系统部件 System Unit



1. 直身段分为馈电式和插接式，从 250A 到 6300A 共 13 个电流等级，标准长度为 3m 或 4m。
2. 插接箱内配置断路器对负载进行保护，额定电流从 16A 至 1600A。（630A 以上的连接采用特殊的工艺）
3. 连接器提供可靠、方便快捷的连接，用于连接母线的两个单元。
4. 变压器连接单元实现完整的变压器连接，配备柜顶箱及软连接，提高系统的防护等级和安全可靠性。
5. 低压柜连接单元实现母线槽与配电柜的连接，可根据低压柜的具体出线方式进行设计，始端母线配置连接法兰，以保证较高的防护等级。
6. 换向单元包括水平弯头、垂直弯头、T 型弯头、组合弯头等，用于改变母线的走向。
7. 安装附件有水平吊架、支撑托架、弹簧支架等，用于水平或垂直方向上固定母线槽，另外还包括终端盖。

1. The straight segment falls into feeder type and plug-in type, totally with thirteen current grades ranging from 250A to 6,300A. The standard length is 3m or 4m.
2. The circuit breaker is equipped in jack box to protect the load, with rated current ranging from 16A to 1,600A. (Connection above 630A adopts special process)
3. The connector provides reliable, convenient and efficient connection for connecting two units of the bus.
4. The transformer connection unit completely connects the transformer and is equipped with cabinet top box and flexible connection, thus improving the degree of protection and safe reliability of the system.
5. The low-voltage switchgear connection unit connects busway and power distribution cabinet. It can be designed according to the specific outgoing method of low-voltage switchgear. The top bus is equipped with connecting flange to ensure high degree of protection.
6. The reversing unit including horizontal elbow, vertical elbow, T-shaped elbow and combined elbow, etc. is used for changing the trend of bus.
7. The installation accessories including horizontal hanging bracket, support bracket and spring bracket, etc, as well as terminal cover, are used for fixing busways horizontally or vertically.

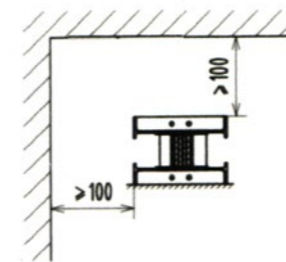
## 母线安装 Busbar Installation

母线槽安装时可以水平安装，也可以垂直安装，具体可以根据现场情况而制作，而设计时必须考虑到系统安装的最小尺寸。  
The busways can be horizontally or vertically installed depending on the field situation. The minimum installation dimension of system should be considered at the design.

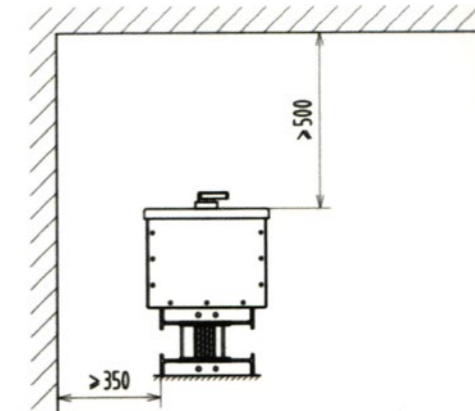
### 水平安装 Horizontal Installation

水平安装尺寸要求（单位为 mm）  
Dimension of horizontal installation: (unit: mm)

馈电式母线槽（不带插接箱）  
Feeder busways (without jack box)

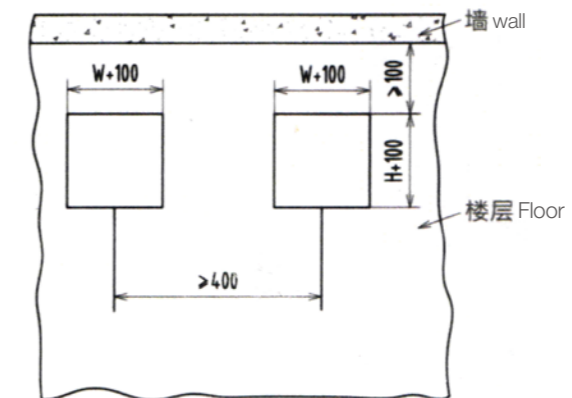


插接式母线槽（带插接箱）  
Plug-in busways (with jack box)



### 水平穿墙安装 Horizontal Through-wall Installation

水平穿墙安装预留孔尺寸见下图，如有两列或两列以上母线穿越时，则应保证两列母线的间距不小于 400mm。  
See the dimensions for preformed hole of horizontal through-wall installation in the figure below. If there are two or more rows of buses, the spacing between two rows of busbar should not be less than 400mm.



母线槽的宽度为 W，高度为 H  
Width of busways: W, height: H

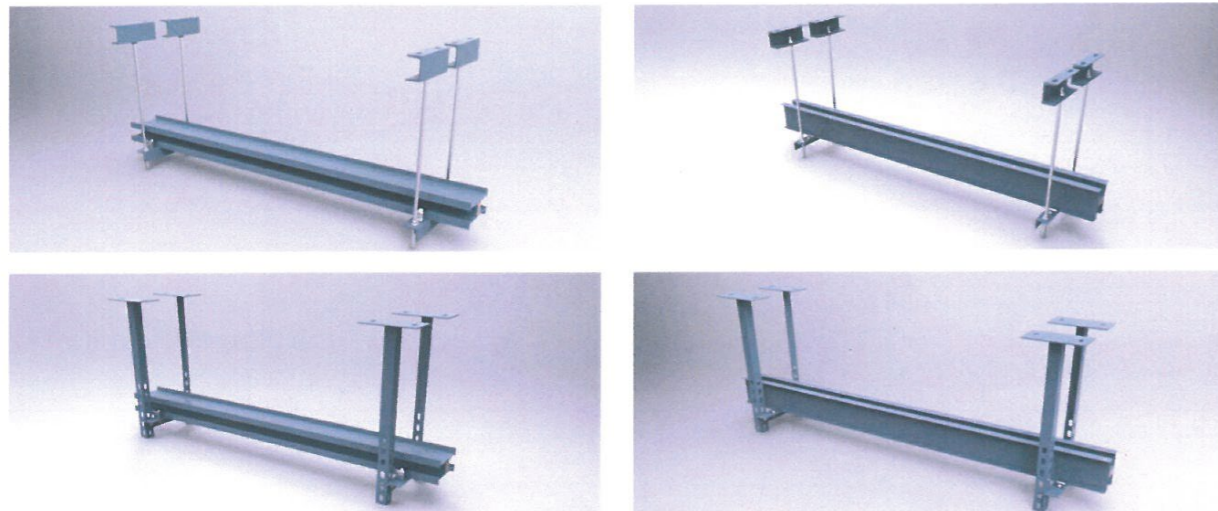
## 母线安装 Busbar Installation

水平安装方式  
Horizontal installation method

### 吊顶安装 Installation in Suspended Ceiling

母线槽吊顶安装时，应先预埋钢制吊架（或焊接），或者在楼板上打孔嵌入钢制膨胀螺栓，相邻吊架的距离一般不应超过 2m，如有特殊要求请订货时说明，吊装时有两种不同形式，见下图：

When installing the busways in the suspended ceiling, first embed the steel work hanging support (or welding), or perforate on the floor slab and insert the steel expansion bolt. The distance between adjacent hanging brackets usually shall not be more than 2m. If you have special requirements, please note it in ordering. There are two different forms of hanging, as shown in the figures below:



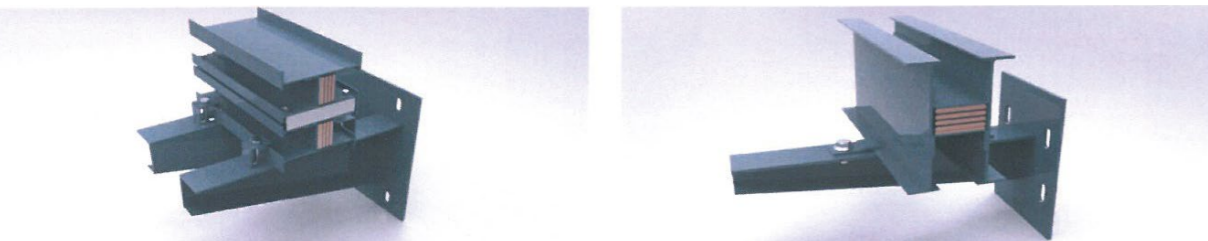
立式  
Vertical

卧式  
Horizontal

### 托架支撑安装 Bracket Support Installation

请注意安装孔的直线性（即整列支架安装在一水平面内），安装也有立式和卧式两种，见下图：

Please note the linearity of installing holes (i.e. the whole row of brackets should be installed in one horizontal plane). The support may be installed vertically or horizontally, as shown in the figures below:



立式  
Vertical

卧式  
Horizontal

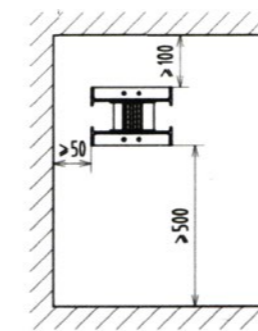
### 垂直安装方式 Vertical Installation Method

母线槽系统垂直安装时，对于插接箱的安装方式有着明确的规定，需采用底出线的方式。

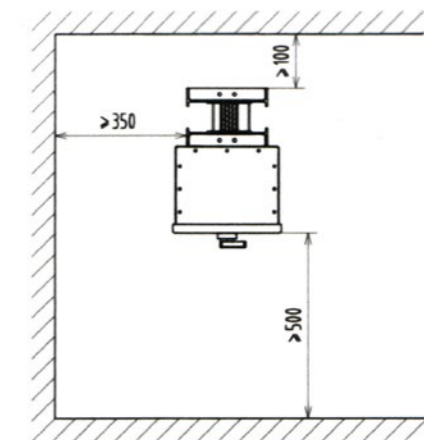
When the busway system is vertically installed, the installation method of jack box is explicitly stipulated. The lines should go out from the bottom.

垂直安装尺寸要求（单位为 mm）  
Dimensions for vertical installation: (unit: mm)

馈电式母线槽（不带插接箱）  
Feeder busways (without jack box)

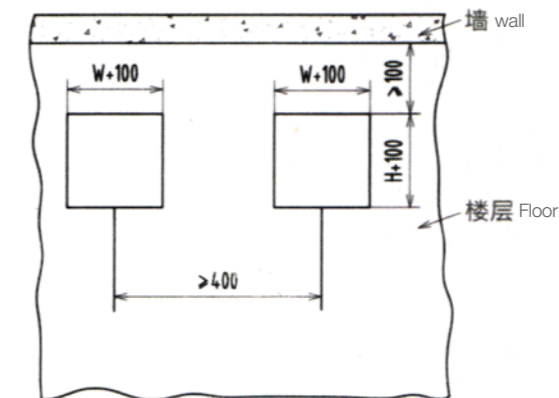


插接式母线槽（带插接箱）  
Plug-in busways (with jack box)



### 垂直穿越楼层安装 Installation of Vertically Traversing the Floor

垂直穿越楼层安装的母线预留孔尺寸见下图，如有两列或两列以上母线穿越时，则应保证每两列母线间距不小于 400mm。  
See the dimensions for preformed hole of bus vertically installed traversing the floor in the figure below. If there are two or more rows of buses, the spacing between two rows of busbar should not be less than 400mm.



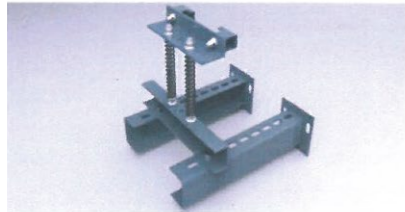
母线槽的宽度为 W，高度为 H  
Width of busways: W, height: H

### 垂直安装方式

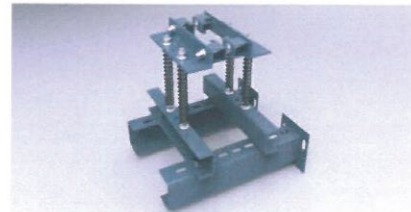
#### Vertical Installation Method

母线槽垂直安装时需要特殊的安装附件弹簧支架, 弹簧支架的作用主要是为了承载母线槽自身的重量及运行时产生的膨胀, 对于不同规格类型的母线槽进行不同的选择。

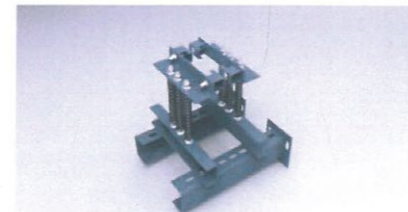
When the busway is vertically installed, it's necessary to install special installation accessories spring support. The spring support mainly intends to bear the weight of busway and expansion during operation, and it shall be selected as per the specification and type of busways.



图一  
Fig. I



图二  
Fig. II



图三  
Fig. III

#### 铜母线

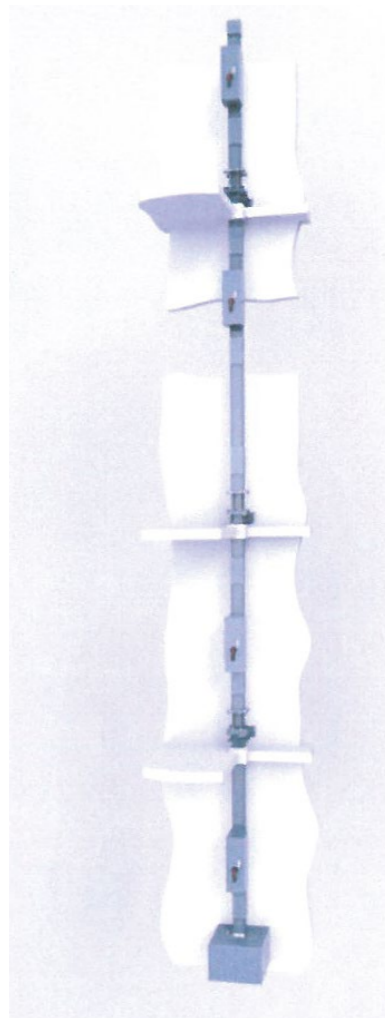
##### Diagram of Vertically Installed Busways

额定电流 Rated Current	弹簧支架 Spring Support
A	
400	图一 / Fig. I
630	图一 / Fig. I
800	图一 / Fig. I
1000	图一 / Fig. I
1250	图一 / Fig. I
1600	图二 / Fig. II
2000	图二 / Fig. II
2500	图二 / Fig. II
3150	图三 / Fig. III
4000	图三 / Fig. III
5000	图三 / Fig. III
6300	图三 / Fig. III

#### 铝母线

##### Aluminum Busbar

额定电流 Rated Current	弹簧支架 Spring Support
A	
250	图一 / Fig. I
400	图一 / Fig. I
630	图一 / Fig. I
800	图一 / Fig. I
1000	图一 / Fig. I
1250	图一 / Fig. I
1600	图一 / Fig. I
2000	图一 / Fig. I
2500	图二 / Fig. II
3150	图二 / Fig. II
4000	图三 / Fig. III
6300	图三 / Fig. III



垂直安装的母线槽示意图  
Diagram of Vertically Installed Busways

#### 垂直安装的要点

Key points for vertical installation:

1. 母线槽垂直安装时, 接头距地面距离不应小于 600mm, 母线槽背面距墙边不应小于 100mm;
2. 母线槽连接点不应在穿楼板处进行;
3. 每层楼至少需加装一套弹簧支架装置;
4. 安装在竖井里的母线槽应在中间部位对其加固。

1. When the busway is vertically installed, the distance between the joint and the ground shall not be less than 600mm, and the distance between the back of busway and the wall shall not be less than 100mm;
2. The connection point of busways shall not be at the floor-through position;
3. Each floor shall be installed with at least one set of spring support;
4. The busway installed in vertical shaft shall be reinforced in the middle.

## 备忘录 Memo