奥凯电气

—— 品质铸就辉煌 ——

母线槽系统

BUSBAR TRUNKING SYSTEMS

江苏奥凯电气有限公司

JIANGSU OKEY ELECTRIC CO.,LTD.

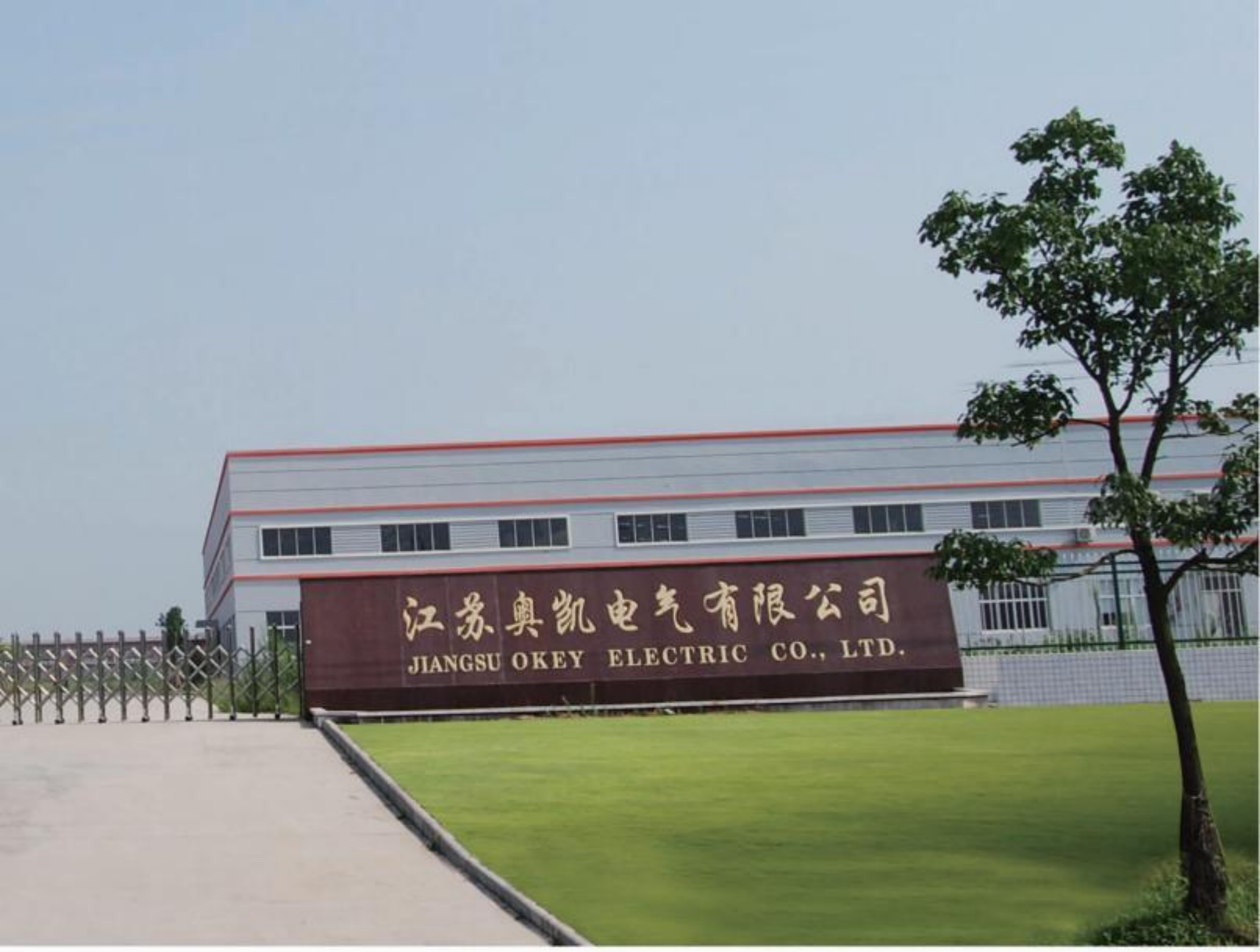
COMPANY 企业简介
INTRODUCTION

江苏奥凯电气有限公司是一家中外合资企业，位于风景秀丽的中国江苏省镇江新区港南大道88号，周边环境优雅，交通便捷。公司注册资金1868万美元，现拥有5.6万平方米的研发、制造基地和标准化厂房。公司引进现代化生产设备，先进的检测仪器，研制、开发、制造、销售输配电设备成套高新技术产品。公司管理规范，资质齐全，技术力量雄厚，已通过国家质量管理体系、职业健康管理体系以及环境安全管理体系的认证和验收。

本公司主要产品：生产输配电设备、箱式变电站、高低压开关柜、电源治理设备、断路器、高低压封闭母线、电缆桥架、支吊架及光伏、风力发电配套产品，并从事工业产品的设计、技术研发、技术转让、技术咨询服务及以上产品安装等配套服务。产品严格按国家标准生产并已通过国家强制性3C认证，且达到国际先进水平，产品广泛应用于发电厂、输配电、化工、冶金、石油、房产及标准化工厂等重要建设工程项目，品种齐全，完全满足不同用户，不同场合与不同环境的客户需求，且得到用户一致好评。

公司于2012年正式引进现代化生产设备、先进的检测仪器，研制开发预警系统成套高新技术产品，产品达到国际先进水平，得到用户一致好评。2012年11月，爆炸物危险实时监控安全预警系统荣获军队科技进步一等奖。

奥凯电气正以“科技先行，质量为本，客户至上，服务至佳”为原则，继往开来，不断进取，团结奋进，走向更加辉煌的明天!



办公楼大厅

研发中心

奥凯电气
AOKEYER ELECTRIC

选型安装表示方法
selection and Installation

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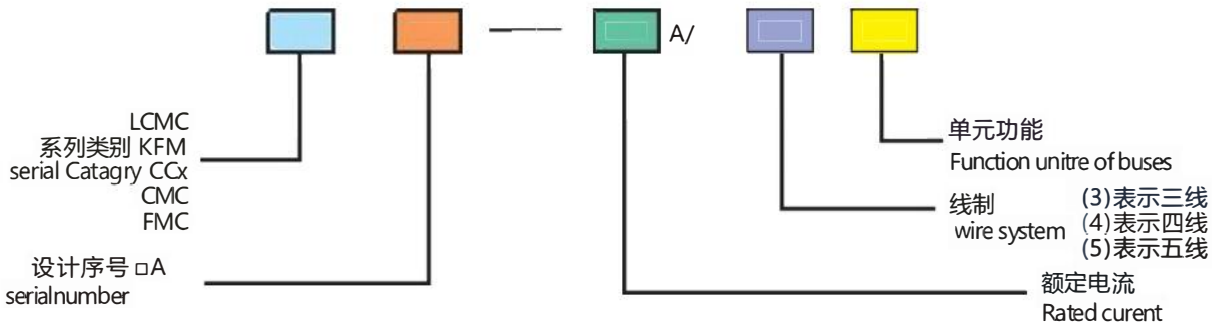
产品型号说明 Product Model Description



母线单元功能代号 unite Number

A	普通母线	P	膨胀接头
S	始端母线	BY	变容量接头
Z	终端盖	BX	调节接头
LS	L 型水平接头	SC	+ 字型垂直接头
LC	L 型垂直接头	ZS	Z 型水平接头
TS	T 型水平接头	ZC	Z 型垂直接头
TC	T 型垂直接头	SH	始端进线盒

A	Ordinary bus	P	Expansion
S	Source bus	BY	Peducer
Z	Terminal cover	BX	Changed
LS	L Horizontal joint	SC	+vertial joint
LC	L vertical joint	ZS	Z horizontal joint
TS	T Horizonta joint	ZC	Z vertical
TC	T vertical joint	SH	Flanged end

母线变向节(弯头),用于水平或垂直安装时配电母线的连接及改变母线的走向。

直母线单元,与母线变向节配合,用于将电源接送至用电设备。

插接箱,用于由母线上引出电源分路。

始端母线,为电源引入单元,可直接与变压器或低压配电屏连接。

变容量节,为母线变换容量时的过渡节。膨胀节,为吸引因母线长期工作而引起热膨胀变形而设备的功能单元。

中间进线箱,适用于多种场合,一般在母线连接长度较长的情况下,将大大改善单端供电而至末端压降损失较大的状况。

终端封盖,安装于母线(或各分路)终端处,使外界不能接触到带电部位。

Busbar bend (elbow) is used for connecting and changing the direction of distribution busbars during horizontal or vertical installation. Straight busbar unit, in conjunction with the busbar bend, is used to deliver power to electrical equipment.

Plug-in box is used to draw power from the busbar for branch circuits.

Starting busbar is the power input unit that can be directly connected to transformers or low-voltage distribution panels.

Variable capacity section is a transitional section for changing the capacity of the busbar. Expansion joint is a functional unit designed to absorb thermal expansion deformation caused by long-term operation of the busbar.

Mid-entry box is suitable for various occasions and generally improves the situation of significant voltage drop loss at the end due to single end power supply when the length of busbar connection is long.

Terminal cover is installed at the end of the busbar (or each branch) to prevent external contact with live parts.

技术数据 The Main Techno—parameter

本厂生产的各种系列母线槽,适用于高层建筑,多层工业厂房,机床密集的车间,产品工艺多变的车间,老车间及厂房的改造,各种实验室、展览馆、体育馆、宾馆、银行、娱乐等场所作电力馈电及配电使用。具有安全可靠,安装方便、施工灵活,体积小容量大,设计施工周期短,使用寿命长等特点,具体的技术数据见下表:

The various series of bus ducts produced by our factory are suitable for high-rise buildings, multi-story industrial plants, workshops with dense machine tools, workshops with changing product processes, renovation of old workshops and factories, as well as for power supply and distribution in various laboratories, exhibition halls, gymnasiums, hotels, banks, entertainment venues, etc. They feature reliability, convenient installation, flexible construction, small size with large capacity, short design and construction period, and long service life. For specific technical parameters are as follows:

符合标准 Standard		IEC 439-2-1982 ZBK36002-89 GB 1497 GB7251.2-2006					
海拔 Sea Level	m	不大于 2000 Not higher than 2000					
环境温度 Ambient Temp	℃	-5~+40(24 小时内平均温度不大于 +35℃) -5~+40(average temp is not higher than+35 within 24 hrs.)					
相对湿度 Ralative Humidity		+40℃时不大于 50%,+20℃时不大于 90%, Not higher than 5% when +40℃ ;not higher than 90% when +20℃I					
防护等级 Protective Grade		P42~IP54					
安装类别 Installation Category		IV 类 Clnsses IV					
污染等级 Polluted Grade		2 级 Grade2					
额定绝缘电压 Rated Insulation Voltage	V(AC)	500					
额定工作电压 Rated Working Voltage	V(AC)	400					
额定频率 Rated Fregquency	HZ	50-60					
额定工作电流 Rated Working Current	A	100	250	400	630	800	1000
电阻 Resistance	R × 10/m	96. 7	94.4	70.8	73.0	61.4	46.6
阻抗 Impedance	Z × 10/m	106.8	103.8	83.2	72.4	69.8	53.8
电压降 Reduction	V/m	0.0432	0.0475	0.0360	0.089	0.1	0.0485
短路强度 t=IS Short Circuit Strength t=IS	KA(峰值) KA(Peak Value)	20	35	50	70	75	85
额定工作电流 Rated Working Current	A	1250	1600	2000	2500	3150	4000
电阻 Resistance	R × 10/m	28.9	23.6	21.3	14.4	12.1	10.0
阻抗 Impendence	Z × 10/m	40.6	38.0	24.1	19.7	16.5	12.1
电压降 Redution	V/m	0.059	0.063	0.0814	0.0705	0.0684	0.068
短路强度 t=IS Short Circuit Strength t=IS	KA(峰值)	100	115	129	135	150	150
各部位温升 Temp.Riseo f Each Position	(k)	连接端子 60 Connective terminal 60		金属外壳 30 Metal Shell 30		绝缘件表面 40 Surface of insulating part 40	
电强Dielectric Stength		交流工频电压有效值 3750V Imin A.C. working frequency(effective value)					
绝缘电阻 Insulating Resistance		相与相及外壳之间不小于 20m not less then 20m between phases and the shells					

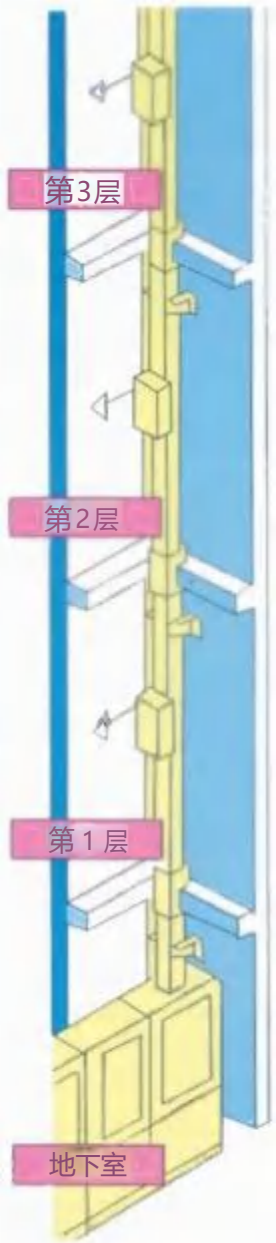
母线槽与电缆供电系统比较 Comparison Between Busbar;And The:Cable!In Power System

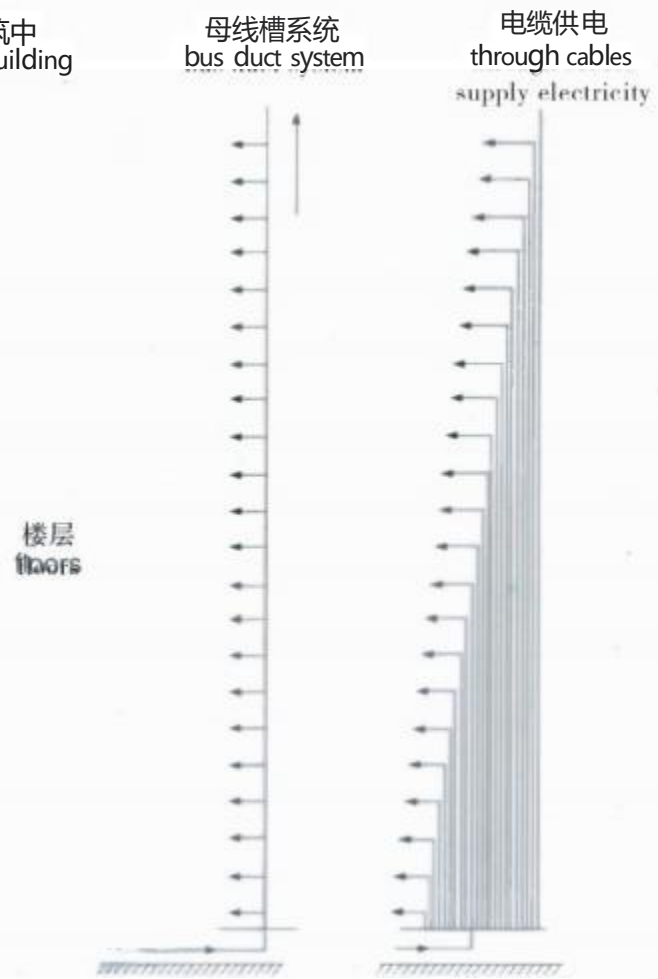
方便、安全、可靠

对于高层建筑，母线槽系统的技术和经济优势显得特别明显。它不用为每个层面设计和敷设独立的电缆，整个大楼仅需要一母线供电，将插接箱插入母线槽系统即可为每层楼供电，这显然比使用电缆更安全、更简便、更可靠。

CONVENIENT, SAFE AND RELIABIE

In the high buildings,the technical and economic advantages of busbar duct systems are particularly evident. There is no need to design and lay independent cables for each floor. The entire building only needs a single busbar for power supply. By inserting the plug-in box into the busbar duct system, each floor can be powered, which is obviously safer, simpler, and more reliable than using cables.





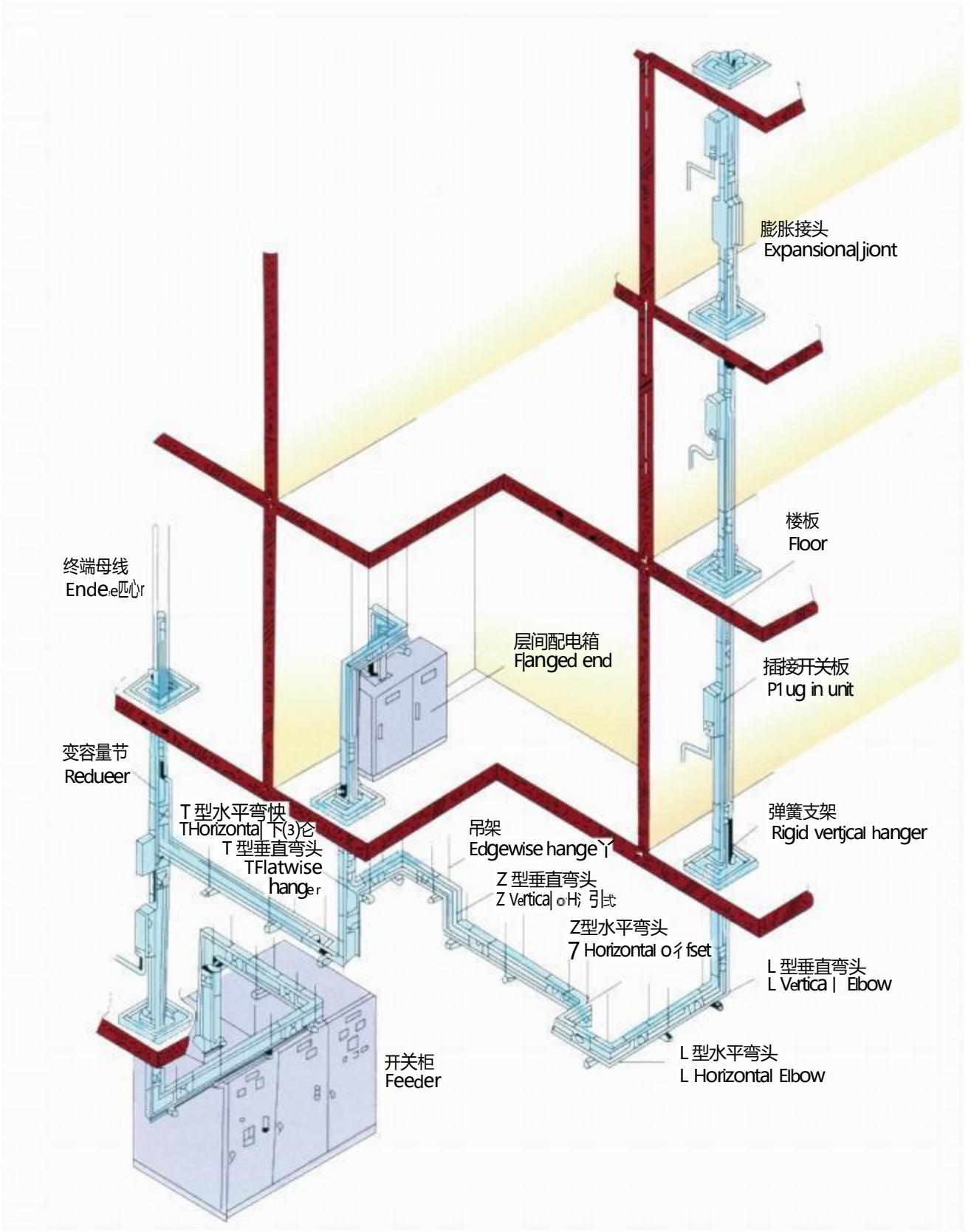
右图为传统的电缆供电方法，每层楼面都需要单独放线，需要很多电缆。

左图为母线供电方法，只要使用单一的中心母线槽系统，即可为每层楼面供电。

Right Drawing shows the traditional method f0r supplying power The cable must be separately laid on each floor. So a large quantity of cables are needed

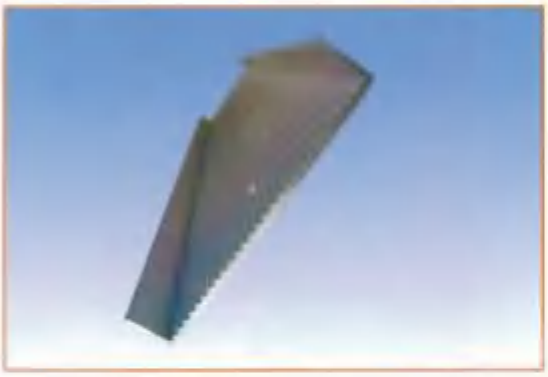
Lef Drawing shows the method for supplying power through the bus. Only after a single central bus channel system is adopted can the power be suppiled f0r each floor through it

母线槽安装示意图 Layout Of Bus Duct Installation



2. 母线槽外壳

盖板、侧板均采用热挤压铝镁合金型材,通过时效后,增强了其外壳的刚性。外壳表面处理可采用电泳处理、氧化处理或静电喷塑,提高外壳的抗腐蚀性。LCMC型母线槽外壳的结构形式改变了传统的母线槽外壳平板式,我公司对母线槽外壳进行了优化设计,使其外部结构如同散热器结构形式,增大了外壳的外表面30%以上,有效提高了外表的散热性能;加强了导体对外壳传导热的快速散发,从而降低温升、减小了热阻抗,提高了导体的导电性能。(结构形式获专利)



2, enclosure of bus-bar trunking

The cover plate and the side plate are made of magnesium-aluminum alloy profiles, which can raise the rigidness of the enclosure. The surface of the enclosure may be treated by electro-phoresis, oxidation or electro-static plastic spraying, which can increase corrosiveness resistance. The structure of the enclosure of the LCMC8 types adopts the structure of a heat spreader by optimal design, which increases 30% of the outer surface of the enclosure and increases the heat dissipation performance, fastens the heat dissipation of the conductor to the enclosure, so as to reduces the temperature rise and thermal impedance, and raises conductivity of the conductors

3.母线槽外壳的组装

母线槽外壳的组装采用德国进口金属无孔铆接设备,强度高,密闭效果好,提高了外壳的防护等级,最高可达到IP65;母线槽盖板与侧板组装后整体性好,电气连续性能优,其足够大的截面超过相线的100%,完全可作为PE安全保护导体使用。当系统出现高容量短路故障时,外壳具备最短的接地途径,使系统直接与大地相通。

3, assembly of the busbar trunking enclosure

The assembly of the bus-bar trunking enclosure adopts metal riveting devices imported from Germany, in this way, the enclosure shall be of high strength and good seal, its protection grade can reach IP 65; after the covering plate and the side plate are erected, the integrity is good and the electric continuity performance is excellent. its enough section surpasses 100% of the phase conductor, and can be used as PE safe protection conductor. In case a short-circuit fault occurs in the system, the enclosure has the shortest earthing path, which can make the system directly connect with the earth.

4.插接箱:

插接箱具有机械联锁闭合机构,通电时,插接箱不能插拔,连接牢固,操作机构灵活可靠。PE插脚电气连续性好,插接箱内的裸露带电部位均在PC透明绝缘罩内,安全可靠。

4. tap-off box:

The tap-off box has mechanical interlock device, when the equipment is energizing, the tap-off box can not be inserted or withdrawn. The connections are firm and the operating mechanism is reliable. The electric continuity performance of the PE plug-in point is good; the bare live parts in the tap-off box are all in the PC transparent cover, which are safe and reliable

5.结构性能 structures and performances

5.1 外壳

铝合金外壳高强型母线槽是采用模制挤压铝镁合金外壳组成。外壳为轻质全封闭、不通风型无磁性环保材料,具有良好的抗锈蚀性和极好的散热性、接地连续性,且母线槽运行时无磁滞涡流损耗。

铝合金外壳高强型母线槽是采用H型和C型结构,使每片外壳都具有很大的抗弯性,从而加大母线槽的抗挠度性。母线槽侧板外部工艺采用瓦楞散热器型结构。导体包覆绝缘之后直接整条并列固定在外壳中间,以增强母线槽系统的抗电动性能。

铝合金外壳采用覆盖氧化膜工艺或静电喷塑工艺,以增强母线槽的耐划痕、耐盐雾及抗腐蚀性能。

5.1. enclosure

The enclosure of the high strength bus-bar trunking is made of magnesium-aluminum alloy by mold extruding. The enclosure is completely enclosed, non-ventilated and is made of light and non-magnetic materials, which

have such good properties as anti-rust, heat dissipation, earthing continuity, besides, when the bus-bar trunking is in operation, there will be no magnetic hysteresis or eddy current consumption. The aluminum alloy enclosure of the bus-bar trunking adopts the structure of H and C types, which can make each piece of enclosure have strong ability to resist bending, which also increases the stiffness of the bus-bar trunking. The outside of the side plate of the bus-bar trunking adopts the structure of tile heat spreader. The conductors, after clad with insulating materials, will be fixed side by side within the enclosure, which will increase the resistance to motorized performance

The aluminum alloy enclosure shall be covered by oxidation film or electrostatic spraying plastics, which will increase the performance to resisting scratches, salt-mist and corrosion.

5.2 导体

导体为紧凑结构(三相四线型或三相五线型)“三明治”结构。

导体为优质铜导体,导体的纯度及各项技术要求完全符合GB/T5585-2005标准规定。

5.2 conducto

The conductors are of compact structures(3-phase 4-wire or 3-phase 5-wire type)sandwich structures.

The conductors are made of copper with excellent quality or aluminum clad with copper, the purity of the conductors and each technical requirement are in conformity with the stipulations of GB/t5585-2005

5.3镀层

母线槽导体全长表面或接触连接部位作镀锡或镀银处理,以使其具有良好的导电性,并可防止导体表面生成氧化膜影响导体搭接处的电性能效果。

5.3 coating

The surface, contacting or connecting parts of the conductors of the bus-bar trunking are treated by tin or silver coating, which can make them have good conductivity and can prevent the oxidation film on the surface of the conductor from reducing the conductivity of the connecting parts

5.4 绝缘

母线槽绝缘材料采用高效绝缘材料-聚酯薄膜套,确保提高其介电性能和绝缘性能,使用安全可靠。

5. 4. insulation

The insulating materials of the bus-bar trunking adopt polyester film, which can ensure to increase the dielectric and insulating performance, and make the system safe and reliable

LCMC 散热器型密集式母线槽系统
HEAT SPREADER-TYPE COMPACT BUS-BAR TRUNKING SYSTEM

5.5 接头器

每节母线槽端头均配置一套接头器及接头外盖板，接头器采用高强单臂双头螺栓设计，接头器两侧绝缘隔板外侧配有一付刚性垫板，并设置弹性锰钢蝶形垫圈，具有较高的弹性伸缩，每个接头能承受5mm的导体伸缩膨胀量。相同规格接头器具备互换性。接头器为独立可拆卸，且便于安装和维护。

5.5 joints

A complete set of joints and joint covering plates are provided for each and of every seetion of bus-bar trunking,the joints use high strength single-arm double-head serews,there are a pair of rigid backing plates outside the insulating partition plate on both sides of the joint, besides there is spring manganese steel gasket of butterfly type, which has high elasticity , each joint can withstand 5mm expansion. The joints of the same specification are interchangeable.The joints can be dismantled,which is easy for installation and maintenance.

5.6 插接口

母线槽系统馈电采用插接口设置，馈出式插接口密度间距最小为600mm。

安全防护等级为IP65 (标准IEC-529 8.2.5.2)。为防污物、防尘和防止误操作，每套插口均有设置开合锁定装置，安全、方便；不用的插接口可用铅印封锁，确保安全。

5. 6. female connector

The bus-bar trunking has female connectors; the minimum spacing of female connectors is 600mm

The safe protection grade is IP 65(iec-529.2.5.2). There are locking devices installed in each set of female connectors to prevent dirt, dust or faulty operation, the female connector not used can be sealed by lead to ensure safety.

5.7 母线槽（温升要求）满足下表要求

5.7 bus-bar trunking(temperature rise) satisfies the requirements of the following table:

序号 No	项 目 Items	内 容 contents
1	额定负荷状态下母排温升 Bus-bar temp,rise under rated load condition	≤60k
2	额定负荷状态下外壳温升 Enclosure temp. rise under rated load condition	≤30k
3	额定负荷状态下接头处温升 Joint temp.rise under rated load condition	≤60k

5.8插接箱(支接单元）

母线插接箱可根据用户要求,配备各种三极或四极各种品牌断路器及手柄、分励脱扣等附件。插接箱具备联锁功能,可避免在带电情况下打开箱门,从而保证了操作人员的安全。

插接箱的插脚均做镀银处理以保证系统可靠的电气连续性,壳体带有导向脚可防错向安装。

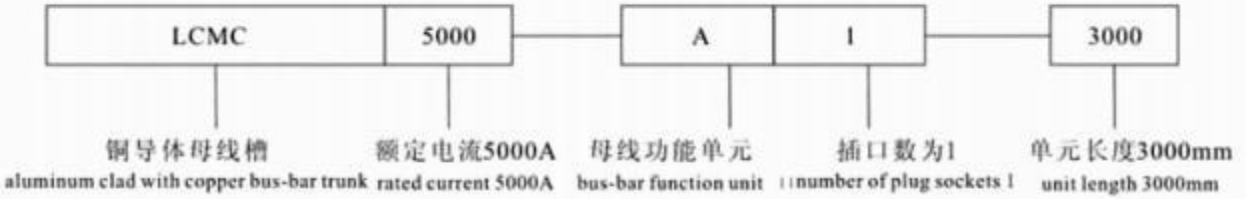
5.8 tap-off box(branch connecting unit

The bus-bar tap-off box can be equipped with all kinds of famous brand breakers with 3-pole or 4-pole and with such accessories as levers, shunt releases

LCMC散热型密集式母线槽系统
HEAT SPREADER-TYPE COMPACT BUS-BAR TRUNKING SYSTEM

额定工作电流 A priced machining curren A		250	400	630	800	1000	1250	1600	2000	2500	3150	3500	4000	5000	6300
电阻值 R_{80} × 10-6Ω/m Electromechanical value		114 0 .	89 00 .	70 40 .	46 00 .	46 50 .	33 00 .	23 60 .	21 00 .	20 50 .	12 10 .	11 30 .	9 6 .	7 00 .	6 40 .
电压降 V/m Electric shooting		0 051 .	0 089 .	0 100 .	0 080 .	0 103 .	0 091 .	0 071 .	0 091 .	0 106 .	0 082 .	0 081 .	0 081 .	0 078 .	0 071 .
短路强度（KA） Short road strength	T=0 1s 峰值 peak value	40	70	70	70	105	105	105	105	105	176	176	176	176	176
	T=1s 有效值 Effective value	20	30	30	30	50	50	50	50	50	80	80	80	80	80

型号说明 Description of types:



LCMC散热器型密集式母线槽系统
LCMC HEAT SPREADER-TYPE COMPACT BUS-BAR TRUNKING SYSTEM

功能单元代号参照表：
Functional unit code reference table

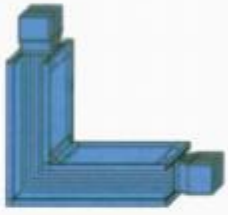
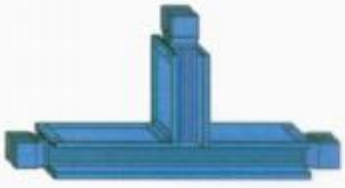
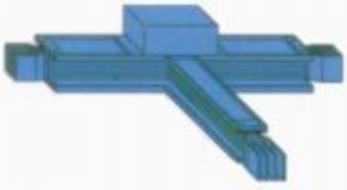
代号 Code	A	S	LS	LC	TS	TC	ZS	ZC	SS	SC	BR	p	SH	Z	X	ZD
单元名称	普通母线	始端母线	L型水平接头	L型垂直接头	L型水平接头	T型垂直接头	Z型水平接头	Z型垂直接头	+型水平接头	+型垂直接头	变容接头	膨胀接头	始端箱	终端箱	插接箱	中间分段箱

单元名称：name of unit
始端母线：entry bus-bar
L型垂直接头：L vertical joint
T型垂直接头：T vertical joint
Z型垂直接头：Z vertical joint
+型垂直接头：+ vertical joint
膨胀接头：expansion joint
终端箱：entry box
中间分段箱：middle sectional box

普通母线：common bus-bar
L型水平接头：L horizontal joint
L型水平接头：L horizontal joint
Z型水平接头：Z horizontal joint
+型水平接头：+ horizontal joint
变容接头：variable-capacitance joint
终端箱：entry box
插接箱：tap-off box

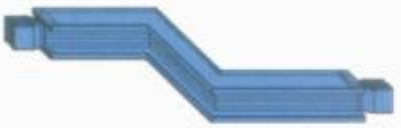
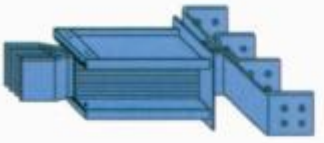
LCMC散热器型密集式母线槽系统

LCMC HEAT SPREADER-TYPE COMPACT BUS-BAR TRUNKING SYSTEM

带一插口母线(A_1) bus-bar with one plug socket (A_1)	普通母线(A) common bus-bar (A)
	
135° L型垂直接头(LC) 135° L vertical joint (LC)	90° L型垂直接头(LC) 90° L vertical joint (LC)
	
135° L型水平接头(LS) 135° L horizontal joint (LS)	90° L型水平接头(LS) 90° L horizontal joint (LS)
	
T型垂直接头(TC) T vertical joint (TC)	T型水平接头(TS) T horizontal joint (TS)
	

LCMC散热器型密集式母线槽系统

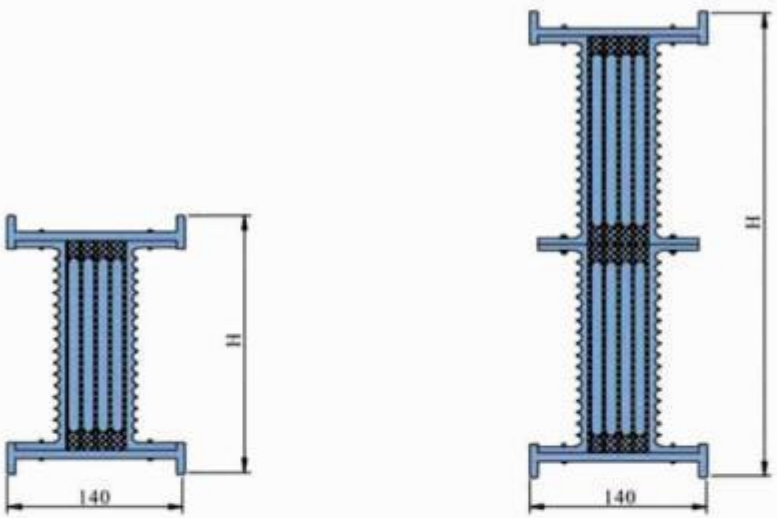
LCMC HEAT SPREADER-TYPE COMPACT BUS-BAR TRUNKING SYSTEM

+型水平接头(SS) + horizontal joint (SS)	+型垂直接头(SC) + vertical joint (SC)
	
母线伸缩节 bus-bar reducer	变容接头(BR) variable-capacitance joint
	
Z型水平接头(ZS) Z horizontal joint (ZS)	Z型垂直接头(ZC) Z vertical joint (ZC)
	
始端母线 entry bus-bar	始端进线箱 entry incoming box
	

LCMC散热器型密集式母线槽系统

LCMC HEAT SPREADER-TYPE COMPACT BUS-BAR TRUNKING SYSTEM

规格及重量 Specification and weight



额定电流 A priced current A	三相四线制 3-phase 4-wire system		三相五线制 3-phase 5-wire system	
	H	重量 weight(kg/m)	H	重量 weight(kg/m)
250	70	7 30	70	8 0
400	70	10 20	70	11 0
630	85	12 5	85	13 5
800	100	14 5	100	15 8
1000	120	19 6	120	21 2
1250	150	25 4	150	27 7
1600	180	31 5	180	34 5
2000	200	37 38	200	4 0
2500	260	48 46	260	53 5
3150	332	59 7	332	65 0
3500	380	62 80	380	69 20
4000	422	78 0	422	86 50
5000	520	99 0	520	109 5
6300	560	129 9	560	143 6

LCMC散热器型密集式母线槽系统

LCMC HEAT SPREADER-TYPE COMPACT BUS-BAR TRUNKING SYSTEM

插接箱外型参考尺寸 Outer reference dimensions of tap-off box:

型 号 type	用 途 usage	额定电流 Rated current (A)	外型参考尺寸 outer reference dimensions L×W × L
X-1	从母线槽引出电源分路，该箱内无开关。Leading the power branch current from the bus-bar trunk, there is no-switch in the box	100	220×273×430
		250	
		630	
X-2	箱内装有各种塑壳式空气开关，能对所连接的分路作过载和短路保护，并能根据用户需要选择整定值。All kinds of molded case air-break switches are installed, which can protect the branch current against overload and short-circuit,the set value can depend on the userls requircments.	100	285×273×550
		250	335×273 × 700
		63	435×273 × 1030
		100	295 × 305×550
		250	345 × 305 × 715
		630	445 × 305 × 1015
X-3	适用于多回路供配电用，有多种线路方案。suitable for power supply and distribution of multi-circuits, there are many wire schemes.	100	285×273×550
		250	335×273 × 700
		630	435×273 × 1030
X-4	装有各种塑壳式空气开关，适用于要求高分断能力的交流电路中，并能根据用户需要选择整定值。All kinds of molded case air-break switches are installed, suitable for the AC circuits of high-breaking capacity,the set value can depend on the userls requirements.	100	265×272 × 612
		250	315×272 × 792
		630	415×272 × 1012

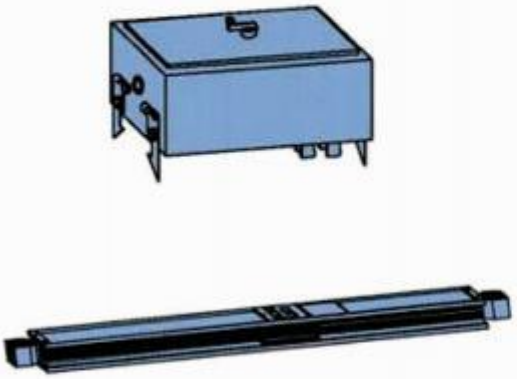
注：具体外型尺寸按用户选型元器件适当调整。

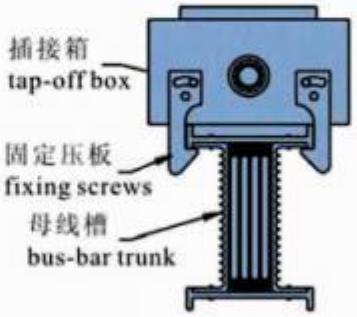
Note: the detail outer dimensions can be adjusted according to the elements and components used.

LCMC 散热器型密集式母线槽系统

LCMC HEAT SPREADER-TYPE COMPACT BUS-BAR TRUNKING SYSTEM

安装形式 Installing forms





插接箱安装型 Installing of the tap-off box

LCMC 型插接箱根据左图型式安装，先要按母线槽的相序标志与插接箱相序标志吻合对应后才可插入母线槽，不得带负荷插拔，插入后将固定压板自动锁紧，保持外壳电气接地连续性。

The LCMC tap-off box shall be installed according to the left drawing. The tap-off box can only be plugged in after the phase wire of the bus-bar trunk fits the wire of the tap-off box, the tap-off box can not be plugged in or withdrawn with load, after the tap-off box is plugged in, the strap will automatically lock, which will maintain the continuity of electric grounding of the enclosure.

垂直（竖井）安装示意图

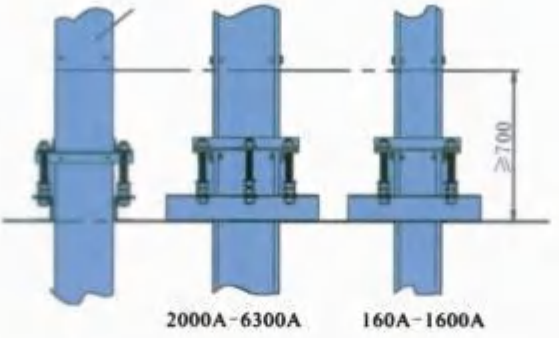
Vertical (shaft) installing drawing:

母线槽垂直安装为确保安全使用运行，高层建筑的每一楼层面或垂直安装高度大于4m时都必须增设弹簧支架，以支撑每层的母线槽自身荷载，以及垂直微调。

To ensure safe running, the spring bracket shall beused on each floor of high-rise building or when the installing height is over 4 m, to support the bus-bar trunk and for vertically micro-adjusting.

LCMC散热器型密集式母线槽系统
LCMC HEAT SPREADER-TYPE COMPACT BUS-BAR TRUNKING SYSTEM

接头盖板 covering plate for the joint



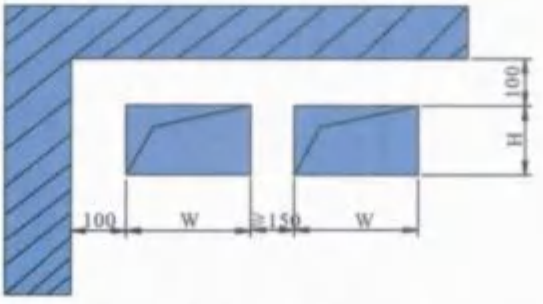
母线槽垂直竖井安装 Bus-bar vertical shaft installation

LCMC 母线竖井安装预留孔及沿墙安装方式示意图：
The provided holes of LCMC bus-bar vertical shaft installation and the drawing of along-wall installation

当相邻母线槽在同一高度都有插接箱时，为保证插拔插接箱方便，母线槽间应留有适当距离。

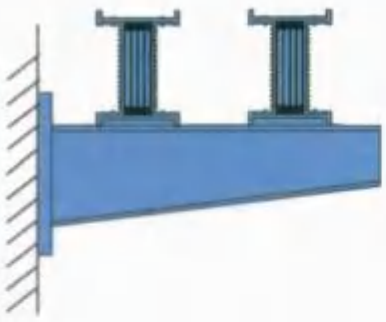
母线水平安装时，可采用吊装或沿墙壁用支架支撑母线槽进行安装敷设，且保证母线槽距侧墙面的尺寸，使插接箱能顺利插入母线。

When the adjacent bus-bar trunks have tap-off boxes at the same height, appropriate distance shall be kept between bus-bar trunks so as to ensure the convenience of withdrawing and plugging in of the tap-off boxes When the bus-bar is horizontally installed, the installation can be conducted by hoisting or installing the bus-bar along the wall by brackets supporting the bus-bar trunk, appropriate distance shall be kept between bus-bar trunk and the wall so as to ensure the tap-off box to be plugged into the bus-bar.

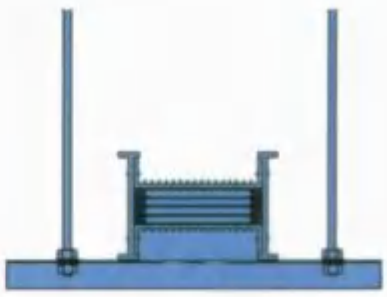


母线槽垂直竖井安装预留孔

provided holes of bus-bar vertical shaft installation



母线槽水平托臂安装
Installation of bus-bar trunk horizontal bracket



母线槽水平吊架安装
Installation of bus-bar trunk horizontal hanger

安装验收 Acceptance check of installation

母线槽安装完工后,必须全线检查各个连接点及外壳接地线是否牢靠和遗漏,按电气规范要求,进行全面性能检查。

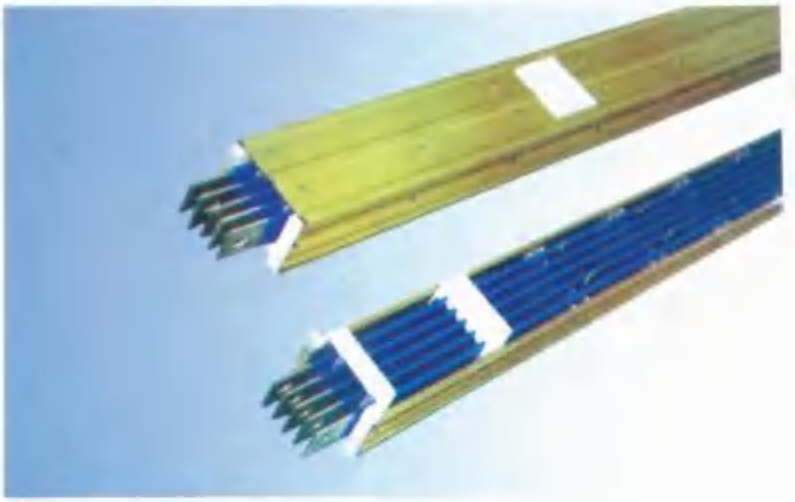
母线槽水平安装或垂直安装后,要求母线槽的水平直线度及垂直度不得超过±5/1000

母线槽全线安装完毕,供电端及分支引线全部切断,不与电器设备相连,常温常态下用1000V兆欧表测量其相与相,相与地的绝缘电阻≥20MΩ,若温度在30℃以上,相对湿度在90%以上时,其绝缘电阻不小于0.5MΩ,经过烘烤后绝缘电阻且能显著上升,绝缘耐压每分钟2000V测压无闪烙现象,则可连接通电试运行。

After the bus-bar trunks are installed, examine whether each connecting point and the enclosure grounding is firm and reliable. Conduct all-round check according to the requirements of electric specifications After the bus-bar trunk is vertically or horizontally installed, straightness and perpendicularity of the bus bar trunk shall not surpass +5/1000.

After all bus-bar trunks are installed, disconnect the power supply side and the branch lead wires with the electric appliance, in normaltemperature and normal state, measure the insulation resistance of phase to phase and phase to earth.> 20 MQ with a 1000vmagneto-ohmmeter, if relative temperature is above 300C, relative humidity is above 90%, its insulation resistance is not less than 0. SMS, after the bus-bar trunk is treated, the insulation resistance rises obviously, the insulation withstand voltage 2000V/minyte ithout flashover, then running-in test can be conducted.

KFM
母线槽系统
BUS DUST SYSTEM



●KFM型母线槽的设计特点: KFM bus bar rabbet design characteristic

◆单螺栓夹紧端子

母线槽设计采用了选进的单螺栓夹紧端子,为母线槽单元连接元件,由于它的特殊构造,可以防止 安装时的错误操作, 同时只要旋紧一个螺栓,就能 可靠地、迅速地将两个母线槽单元连接起来。

◆高防护等级插孔

母线槽在插孔处设计了安全防护挡板,只有当防护挡板拉开时,插接箱才能插入,插孔平时不用时可将防护拉开时,手接箱才能插入,插孔平时不用 时可将防护板拉闭并加铅封锁死,防止了在插口处灰尘和异物的进入,从而提高了母线槽的防护性能防止误操作,使母线的安全性得到了极大的提高。

◆外壳(防护壳)级次数

母线槽设计5个电流等级,只采用了3个级次的外壳,这样当系统按相邻等级变换容量时母线槽无需要更换外壳,如400A变630A时,外壳尺寸相同,因此大大方便了安装。

◆传输电能大

母线槽设计为分离空气(绝缘式,改善了母线槽的散热性,降低了阻抗,达到了母线槽最佳经济输电。

◆成套性好

母线槽设计了各种功能的连接单元,可满足所有输配电工程的需要。

◆ The bus bar rabbel design has used the advanced single bolt clamp post, for the bus bar rabbet unit connection part, as a result of its special structure, may prevent installs when misoperation, so long as sin ultaneously lightens a bolt, can connect reliably, rapidly two bus bar rabbet units

◆ high protection rank jack

The bus bar rabbet has designed the safe apron in the jack place, only then when the apron pulls open, peg grafts the box to guard plat Pulled shuts and the leading blockade dies, has prevented in the bus bar rabbet protection performance, prevented the misoperation, caused the generatrix.The security obtained the enormous enbancement ou ter covering(protecting crust)level number

◆ The bus bar rabbet designs5 electric current ranks, has only used3 level outer coverings, when like this system according to neighbori ng rank transformation capacity the bus bar rabbet does not need ou-tside the replacenent Shell, when 400A changes 60A, the outer cov ering size is same, therefore has facilitated the installment greatly

◆ Othe transmission electrical energy is big

The bus bar rabbet design for separates the air insulation type, im proved the bus bar rabbet best economical electric transmisson.

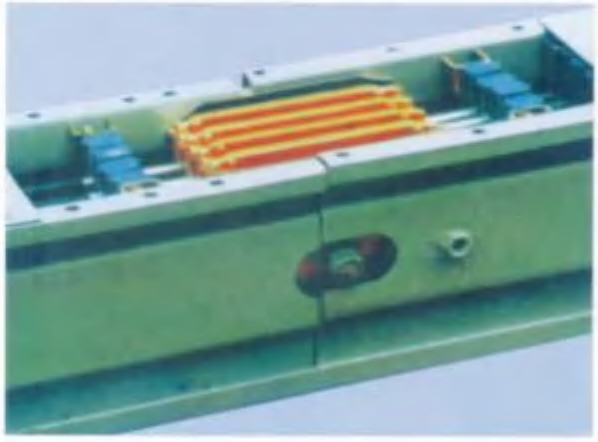
◆ The complete set is good .

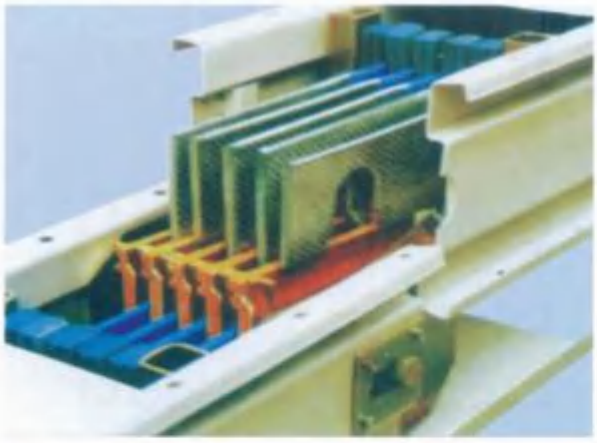
The bus bar rabbet has designed each kind of function connection ele-ment, may satisfy all loses the power distribution projice the need.

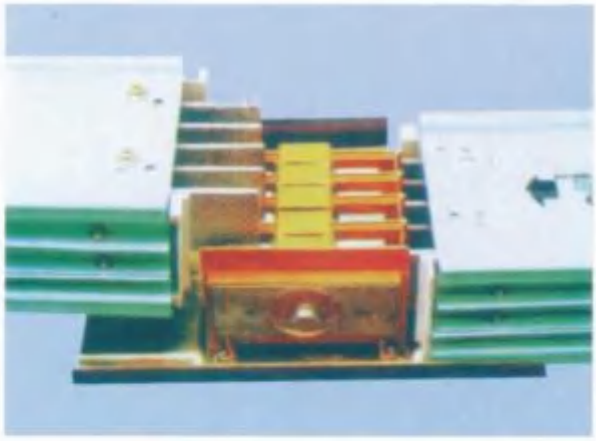
快速连接 Rapid Connection

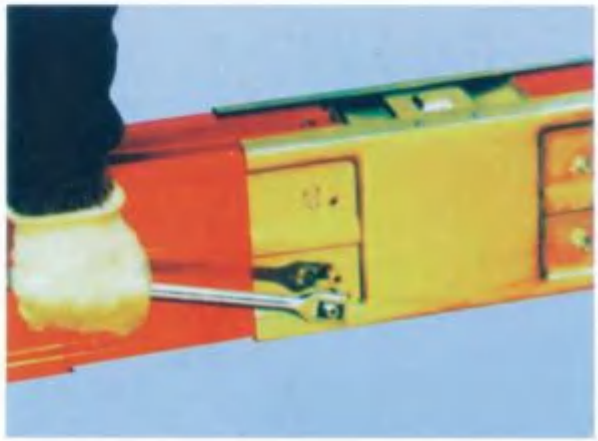
密集型母线槽系螺栓连接法,任何人都能轻而易举地进行连接操作,但扭紧接头螺栓是母线连接的保证630A以下母线力矩必须达到8kg,800A以上力矩必须达到12kg,坚固后的检验要求用0.01mm塞尺检查。

A dense bus channel link is a kind of bolt connection. Anyone can carry out this connection poeration easily but the tightness is the ensurity of connection of the buses. The bus moment less than 630A, must reash 8kg, and the bus moment 800A, must reach 12kg. The tightened inspection requires with 0.0lmm, feeler









KFM 分离绝缘母线 KFM Separating And Insulating Bus

外形尺寸及重量
Dimension and Weight

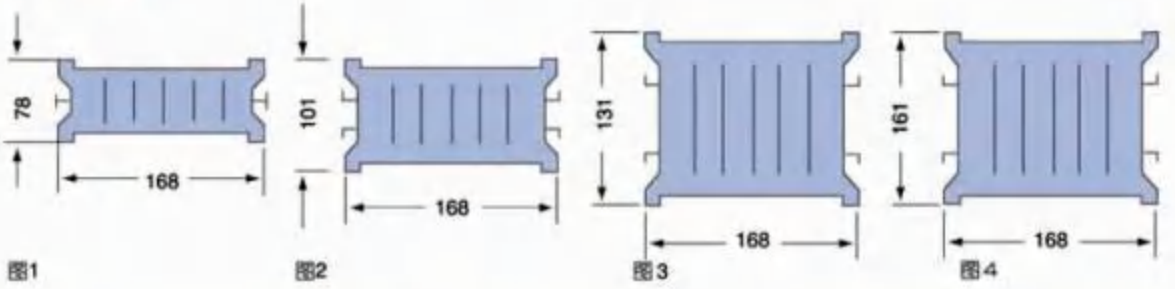


图1 图2 图3 图4

电流(A) Current(A)	三相五线 Kg/m 3 phasw 5 wires	三相四线 Kg/m 3 phasw 4 wires	图号 (Drawing)
250	17.168	15.618	1
400	19.315	16.850	2
630	23.745	20.465	2
800	28.714	24.615	3
1000	34.604	29.125	3
1250	41.815	33.803	4
1600	46.865	40.925	4

外形尺寸及重量
Dimension and Weight

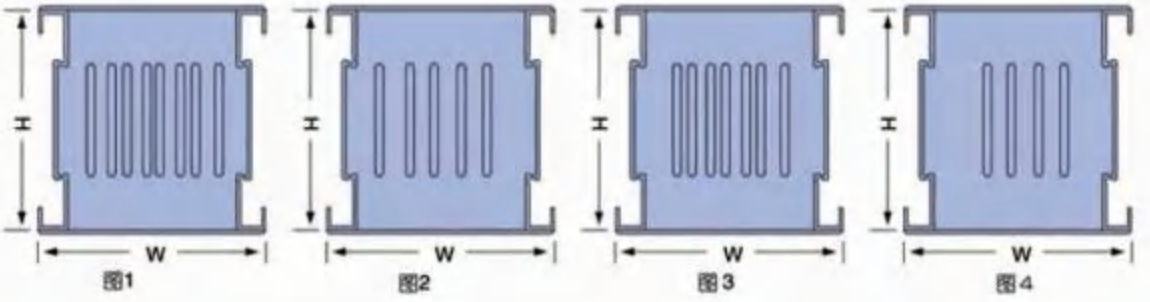


图1 图2 图3 图4

	三相四线 3 phasws 4 wires		三相五线 3 phasws 5 wires	
电流(A)Current(A)	外形 W×H	重量(kg/m)	外形 W×H	重量(kg/m)
1250	190×180(图1)	42.92	205×180(图3)(Dwawing3)	46.80
1600	190×180(图1)(Dwawing1)	48.26	205×180(图3)(Dwawing3)	52.16
2000	190×180(图1)(Dwawing1)	53.60	205×180(图3)(Dwawing3)	57.50
2500	240×180(图2)(Dwawing2)	68.58	255×180(图4)(Dwawing4)	72.48
3150	240×180(图2)(Dwawing2)	78.55	255×180(图4)(Dwawing4)	82.45
4000	240×180(图2)(Dwawing2)	85.54	255×180(图4)(Dwawing4)	89.44

KFM-2A 空气绝缘母线槽
KFM-2A Air Insulation Busbar Channel

e Extra Safe and Reliable

a. An air separating insulation technique is adopted. The safe net distance and creepage distance between phases are far larger than those of standard

b. The hi-strength epoxy resin is adopted for the internal insulting parts to raise the anti-dynamic standing capacity and anti-thermal standing capacity of the bus duct.

■主要技术参数 Main technical parameters

●产品符合IEC439-2、GB725122006

母线糟能保证在?定电流及110%的额定电压下长期正常工作。

母线槽在周围空气温度为20：5.相对湿度为50-70%的常态下,其每节的绝缘电阻不低于20MΩ

母线槽能承受2500V工频耐压,历时1min无击穿和闪络现象。

母线槽在长期通额定电流时,其导电部位的温升不超过表(1)所列的数值。

插接箱与母线槽的插拔次数不少于200次。

防护等级达IP42

额定电流与每相母排规格对照见表2。

The products conform to the standards of IEC 439-2 and GB7251.2-1997.

e The bus duct can normally work for a long time under the rated current and 1%o of rated voltage.

o Under the normal conditions ambient: 20C#5 C, relative humidity: 50 70%, the insulating resistance of each section 20MQ

The bus duct can bear 2500V industrial frequency voltage endurance without puncture or flashover phenomena for one munute

o When the bus duct works under the rated current for a long time, the temp. rise of the conductive parts will not exceed the values desribed in Table(1).

o The plug-in times between the plug-in box and bus duct 200 times

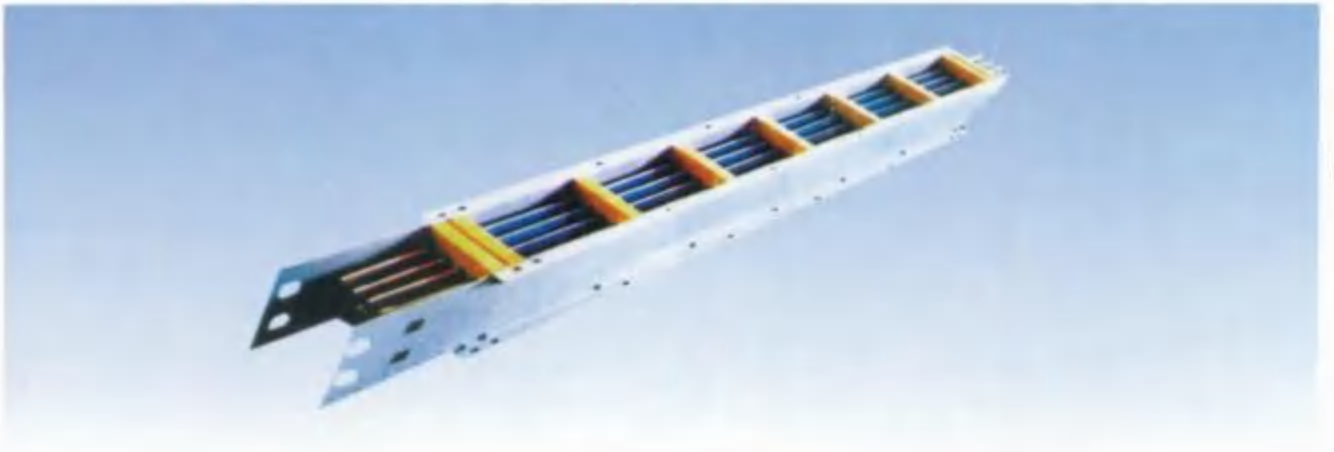
o The protecting grade comes up to IP30

o About the contrast between the rated current and the specification of bus bar in each phase, please see table (2)

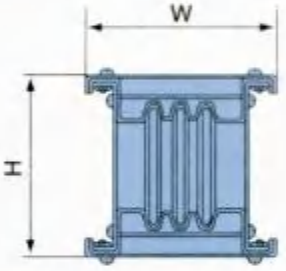
Table (1)

部件名称 Name	最大允许温升(K) Max.Temperature Rise Aliowance (K)
连接端子 connecting Terminal	60K
金属外壳 Metal shell	30K
绝缘件表面 surface of Insulating part	40K

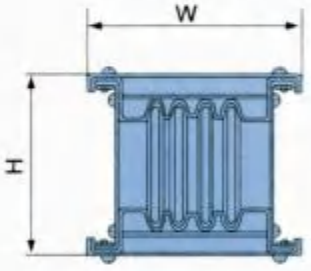
KFM-2A 空气绝缘母线槽 KFM-2A Air Insulation Bus-bars



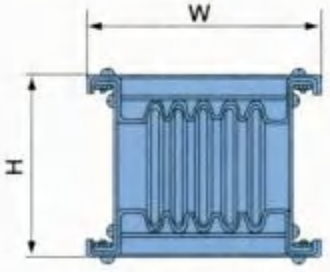
母线结构,电流及尺寸表
The wire of bus structures currents and sizes



三线制 three-wire system



四线制 four-wire system



五线制 five-wire system

KFM-2A 铝质母线 KFM-2A ALUMINUM BUSES

额定电流 Rated Current (A)	三线制 three-wire system		四线制 four-wire system		五线制 five-wire system	
	W (mm)	H (mm)	W (mm)	H (mm)	W (mm)	H (mm)
100	160	100	180	100	200	100
250	160	100	180	100	200	100
400	160	110	180	110	200	110
630	160	120	180	120	200	120
800	160	130	180	130	200	130
1000	160	150	180	150	200	150
1250	160	180	180	180	200	180
1600	160	220	180	220	200	220

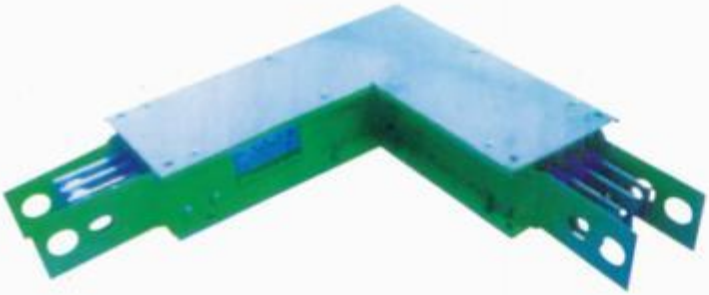
KFM-2A 铜质母线 KFM-2A COPPER BUSES

额定电流 Rated Current (A)	三线制 three-wire system		四线制 four-wire system		五线制 five-wire system	
	W (mm)	H (mm)	W (mm)	H (mm)	W (mm)	H (mm)
100	160	100	180	100	200	100
250	160	100	180	100	200	100
400	160	110	180	110	200	110
630	160	120	180	120	200	120
800	160	130	180	130	200	130
1000	160	150	180	150	200	150
1250	160	180	180	180	200	180
1600	160	220	180	220	200	220
2000	160	220	180	220	200	220
2500	160	255	180	255	200	255
3150	160	440	180	440	200	440

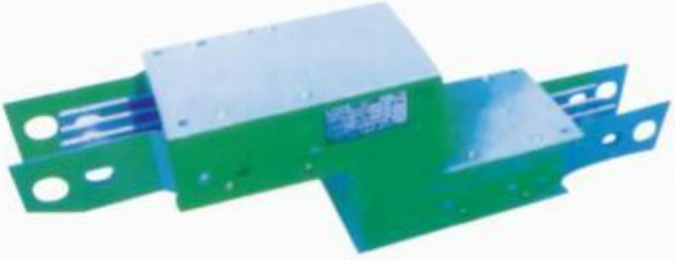
KFM-2A 分离绝缘封闭母线　KFM-2A Air Insulation Seal Bus

SH 始端箱
Origin box

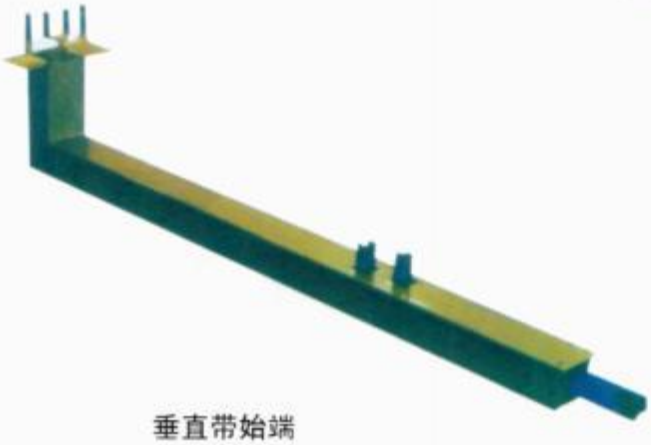
LC 垂直弯通
Uertical bending



LS 水平弯通
horizontal bend



ZC Z 型垂直弯通
Elbow Type Z bending



垂直带始端
The vertical way with original end

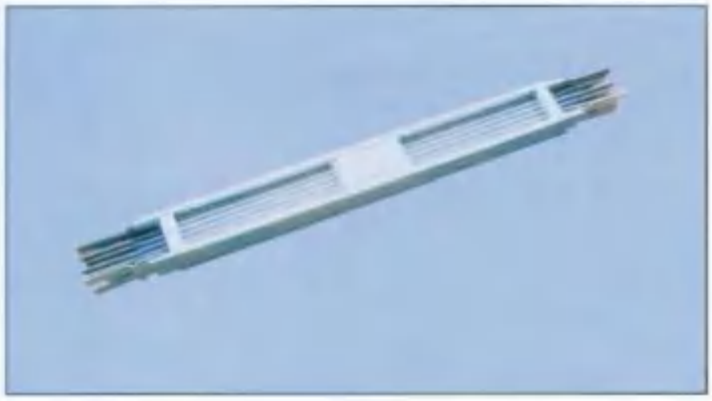
CCX
母线槽系统
BUS DUST SYSTEM

●产品特点及应用:

CHARACTERISTICS AND APPLICATION:

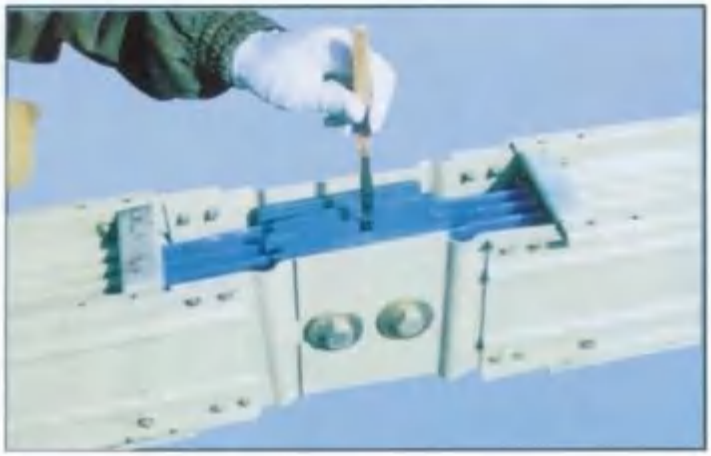
CCX高强封闭式母线在空气型和密集型母线的基础上,对外型结构的设计进行了改进。采用成型机成型,使其具有很好的支撑强度,解决了大跨度无法支撑吊装的困惑

The design for the shell structure of CFW-2A high intensity seal bus channel has been improved on the base of air type and concentrated type and the shall is shaped through forming machine. So it hras the large support strength And this can solve the puzzle of erection difficulty due to the long span



密集型母线槽系螺栓连接法,任何人都能轻而易举地进行连接操作。但扭紧接头螺栓是母线连接的保证,80A以下母线力矩必须达到8kg,800A以上力矩必须达到12kg,紧固后的检验要求用0.01m塞尺检查。

a dense bus tank of peg graft is a kind of bolt connection Anyone can carry out this connection operation easily, but tight ness of swage-bolt is the ensurity of connection of the buses. The bus less than 630A, must reached 8kg, and the bus thats over 800A, must reached 12kg. The tightened inspection require 0.0lmm feeler

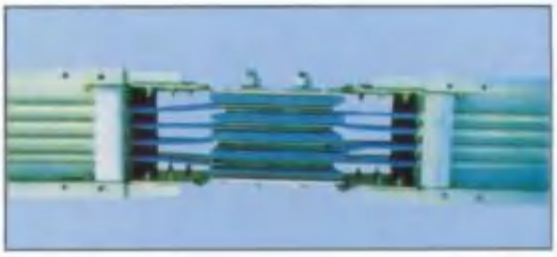


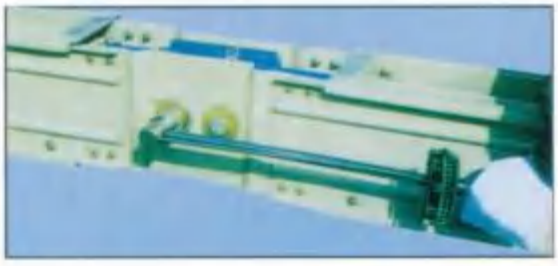
本母线之特优功能,可在一米长度安排二个插口,如二面插口即达四个插口而不影响母线支撑强度。通过插接箱电流分支一插就可免遭电缆剥皮连接不安全之苦恼。如你的产品,设备更换,将母线重新组合安排,母线插口分支始终可达到你所需的位置。故使用母线配线可令您终身满意。

SOCKET BUS

The best function of Socket Bus is that two sockets can be arranged during one mete bus Adding the two sockets to the two ends of the bus, there are 4 sockets, which don't effect the sustance intensity of Buses

Connection through the branch electric current of connection Channel can be avoid the troubie of not safe connection by peeling the skin of buses If you change your products and equipments, you'll arrange only again and the socket branch of the bus socket always meet your requiments. Using the bus Is your best choice





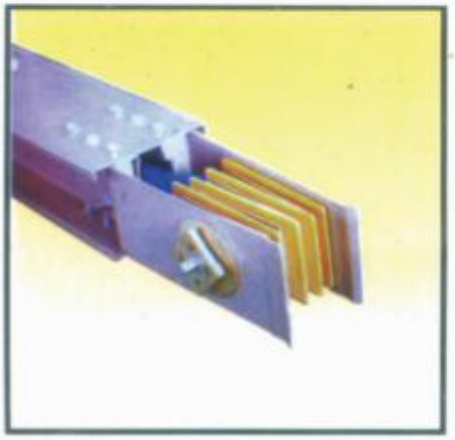
CMC
母线槽系统
BUS DUST SYSTEM

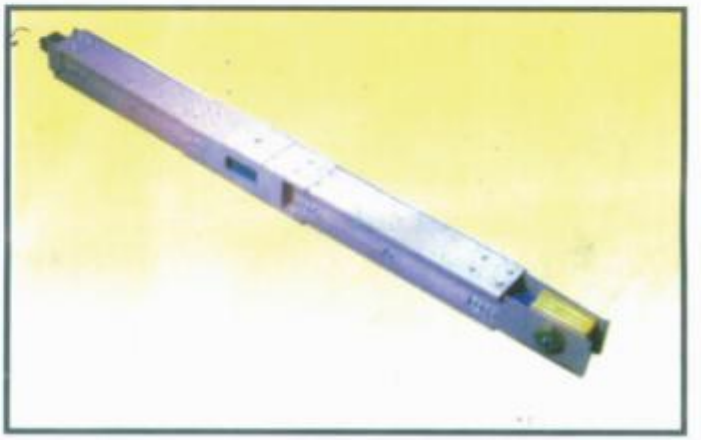
CMC型密集式绝缘母线槽系统是在同类产品的基础上进行两次改进后的新型密集母线槽,具有体积小、结构紧凑、强度高,最适用于高层建筑、多层工业厂房、产品工艺多变车间和变配电室等场所作为电力供电配电之用。

CMC intensive insulated busbar is improved twice on the basis of similar products with compact structure, small volume, high strength Most suitable for high-rise buildings, muti-floor industrial workshop, product craft workshop and electric control room etc

CMC型密集式绝缘母线槽采用高性能的连接端子,电气性能稳定,使用安全,施工、维修方便,装换快捷,其技术性能符合国家专类标准GB7251.2-2006,JB/T9662-1998和国际电工标准规定,外壳防护等级符合国家标准GB4208,IP40 and electrical standard EC439-2, 的要求(?特殊场所可达到IP54)。

CMC intensive insulated busbar use high performance terminals, its electrical performance is stable, use safety, construction and maintenance is convenient, changing fast, its technical performance accords with national standard speciality JBT/T9662-1999 enclosure protection grade accords with national standards GB4208 and IP40 requirements(special place can achieve IP54





技术参数

1.CMC母线槽频率为50~60Hz，额定电流160~5000A。

额定电压1000V以下的三相四线三相五线制供配电设备。

2.母线槽能承受50Hz，3750V试验电压历时1min无击穿或闪络现象。

3.母线长期通过额定工作电流时，任何导电体温升不超过60K。

4.母线槽电流等级性能表。

Technical parameters:

1. Rated frequency of CMC busduce is 50 or 60 Hz,rated current is 160~5000A.,the rated insulation voltage of ower supply and distribution equipment of three-phase four-wire system or three-phase five-wire system below 1000V.

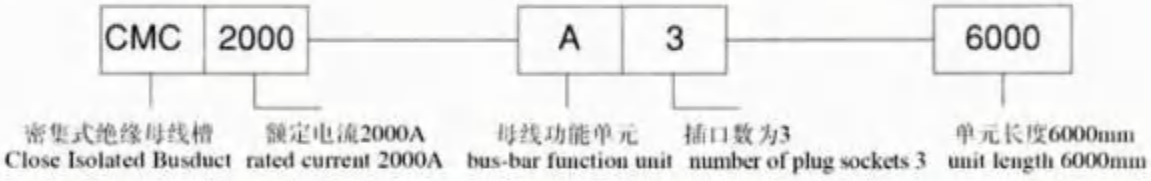
2.The bus-bar trunk can withstand 50Hz 3750V testing voltage for 1 minute without breakdowns or flashovers.

3.The temperature rise of any conductors shall not be over 60K when the rated current goes through the bus-bar for a long time.

4.The current grade performance table of bus-bar trunking:

额定工作电流 rated working current	(A)	160	250	400	630	800	1000	1250	1600	2000	2500	3150	4000	5000
电阻值 resistance	R×10⁻³Ω/m	16.3	11.4	8.9	7.041	6.89	4.66	33.01	2.36	2.17	1.44	1.21	0.98	0.66
电压降 voltage drop	V/m	0.091	0.053	0.092	0.102	0.110	0.118	0.097	0.075	0.093	0.116	0.112	0.085	0.098
短路强度(KA) short-circuit strength(KA) t=1S	峰值	20	70	70	70	70	135	135	135	176	176	176	176	176
	有效值	12	20	30	30	30	60	60	60	80	80	80	80	80

型号说明 Description of types

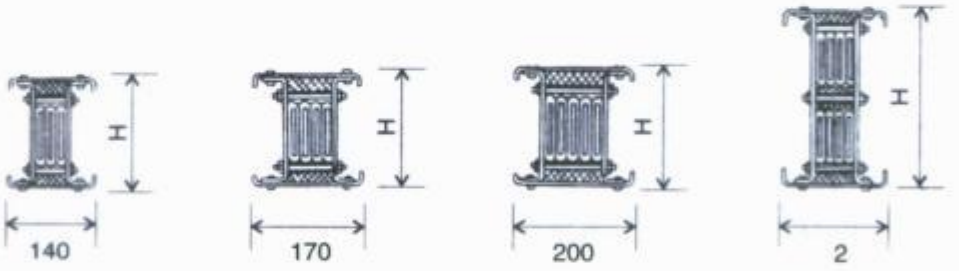


新旧代号参照表 new code and old code reference table

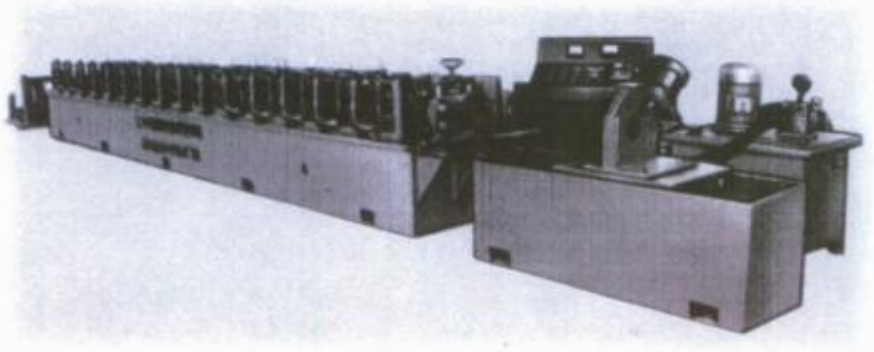
旧代号 old code	A	B	E	F	G	H	J	K	L	M	N	P	Q	R	X	
新代号 new code	A	S	LS	LC	TS	TC	ZS	ZC	SS	SC	BY	P	SH	Z	X	ZD
单元名称 name of unit	common bus-bar 普通母线	entry bus-bar 始端母线	L horizontal joint L型水平接头	L vertical joint L型垂直接头	T horizontal joint T型水平接头	T vertical joint T型垂直接头	Z horizontal joint Z型水平接头	Z vertical joint Z型垂直接头	+ horizontal joint +型水平接头	+ vertical joint +型垂直接头	variable-capacitance joint 变容接头	expansion joint 膨胀接头	entry box 始端箱	entry cover 终端盖	tap-off box 插接箱	middle sectional box 中间分段箱

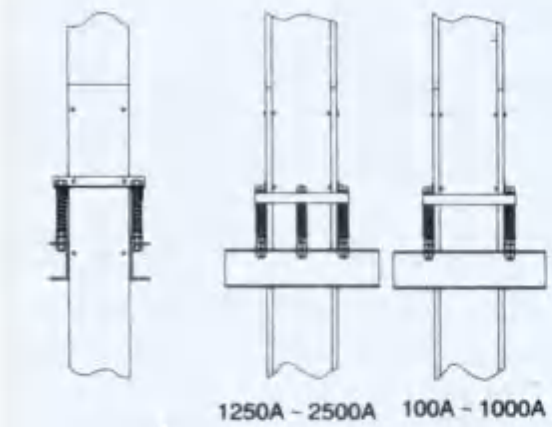
CMC母线槽系统 CMC Busway System

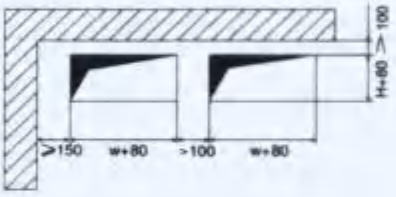
规格及重量 Specification and weight

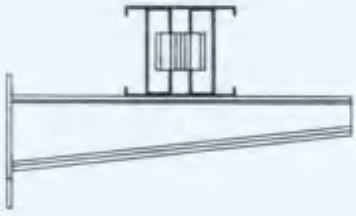


额定電流（A）	三相三线制 3-phase3-wire system		三相四线制 3-phase4-wire system		三相五线制 3-phase5-wire system	
	H	重量 weight	H	重量 weight	H	重量 weight
160	85	15	85	17	85	18
250	110	16	110	18	110	19
400	100	18	100	22	100	23
630	110	20	110	23	110	24
800	120	22	120	25	120	27
1000	140	26	140	31	140	34
1250	170	28	170	39	170	42
1600	210	33	210	51	210	57
2000	240	56	240	63	240	69
2500	300	67	300	88	300	96
3150	380	84	380	98	380	118
3500	400	87	400	102	400	124
4000	440	94	440	126	440	134
5000	560		560		560	









垂直（竖井）安装示意图

Vertical(shaft)installing drawing:

母线槽垂直安装为确保安全使用运行，高层建筑的每一楼层面或垂直安装高度大于4m时都必须增设弹簧支架，以支撑每层的母线槽自身荷载，以及垂直微调。

To ensure safe running,the spring bracket shall be-used on each floor of high-rise building or when the installing height is over 4m,to support the bus-bar trunk and for vertically micro-adjusting.

CMC母线竖井安装预留孔，及沿墙安装方式示意图:

The provided holes of CMC bus-bar vertical shaft installation and the drawing of along-wal installation:

当相邻母线槽在同一高度都有插接箱时，为保证插拔插接箱方便，母线槽间应留有适当距离。

母线水平安装时，可采用吊装或沿墙壁用支架支撑母线槽进行安装敷设，且保证母线槽距侧墙面的尺寸，使插接箱能顺利插入母线。

When the adjacent bus-bar trunks have tap-off boxes at the same height,appropriate distance shall be kept between bus-bar trunks so as to ensure the convenience of withdrawing and plugging in of the tap-off boxes. When the bus-bar is horizontally installed, the installation can be conducted by hoisting or installing the bus-bar along the wall by brackets supporting the bus-bar trunk, appropriate distance shall be kept between bus-bar trunk and the wall so as to ensure the tap-off box to be plugged into the bus-bar.

安装验收Acceptance check of installation

母线槽安装完工后，必须全线检查各个连接点及外壳接地线是否牢靠和遗漏,按电气规范要求，进行全面性能检查。

母线槽水平安装或垂直竖井安装后，要求母线槽的水平直线度及垂直度不得超过±5/1000.

母线槽全线安装完毕，供电端及分支引线全部切断，不与电器设备相连，常温常态下，用1000V兆欧表测量其相与相、相与地的绝缘电阻≥20MΩ，若温度在30℃以上，相对湿度在90%以上时，其绝缘电阻不小于0.5 MΩ，经过烘烤后绝缘电阻且能显著上升，绝缘耐压每分钟2000V测压无闪络现象，则可连接通电试运行。

After the bus-bar trunks are installed, examine whether each connecting point and the enclosure grounding is firm and reliable. Conduct all-round check according to the requirements of electric specifications.

After the bus-bar trunks is vertically or horizontally installed, straightness and perpendicularity of the bus-bar trunk shall not surpass ±5/1000.

After all bus-bar trunks are installed, disconnect the power supply side and the branch lead wires with the electric appliance, in normal temperature and normal state, measure the insulation resistance of phase to phase and phase to earth≥20MΩ with a 1000V magneto-ohmmeter,if relative temperature is above 30?,relative humidity is above 90%,its insulation resistance is not less than 0.5 MΩ,after the bus-bar trunk is treated,the insulation resistance rises obviously, the insulation withstand voltage 2000V/minyte without flashover,then running-in test can be conducted.

FMC系列空气绝缘型风电母线槽
FMC series of air-insulated wind power busway

一、适用范围：

HM-FMC系列风电母线槽是我公司针对风电系列专门开发的新型空气加强绝缘母线槽，它适用于三相三线、三相四线制、频率50～60Hz，额定电压690V，额定工作电流250A～2500A的供电系统，专门用于风电塔架内，也可作为其它供电系统中负载的连接。

二、结构特点及技术参数

1、母线基本结构：

2、结构特点：

1)适合于各种环境

该系列母线槽外壳采用模制铝合金封闭外壳，辅以具有40年以上耐候性能的环氧树脂粉末静电喷涂，使其具有优异的抗腐蚀性，同时其重量轻，散热性能优良，被广泛使用于各种环境。

2)安装极为方便

母线槽导体采用铝矩形导体，且外壳也为模制铝合金，整体重量轻，加之母线与母线间采用专用连接器进行连接，所以安装快捷方便。

3)极为安全可靠

(1)采用分离空气绝缘形式，其相间的安全净距和爬地距离远远大于标准要求；

(2)连接螺栓采用耐低温合金钢材料，使其适用于各种不同温度的环境；

一、 Application scope

HM-FMC series of air-insulated wind power busbar is the one that our company specially develops. It is one kind of reinforced air-insulated busbar and it is suitable for the three-phase, three-wire system, and the power supply system of frequency of 50-60 Hz, rated voltage of 690V and rated operation current of 250A-2500A. It is specially applied in the wind power tower, and also can be used as loads connect in the other power supply system.

二、 Structural characteristics and technical parameters

1.Basic structure of busbar

2.Structural characteristics

1) Suitable for a variety of environment

This series of busbar use moulded aluminum alloy closed shell, with electrostatic spray of epoxy resin powder of over 40 years weathering performance, which leads to its excellent corrosion resistance. Besides, because of its light weight and excellent heat dissipation, it has been widely used in various environment.

2) Convenient installation

As the busway conductor is rectangular, the shell is made of moulded aluminum alloy, the overall weight is quite light, and there is a special connector connected between busbar and busbar, so it is quite convenient in installation.

3) Safe and reliable

(1) Because of air insulation, the safety distance and the creepage distance between busbar is much larger than the standard requirements;

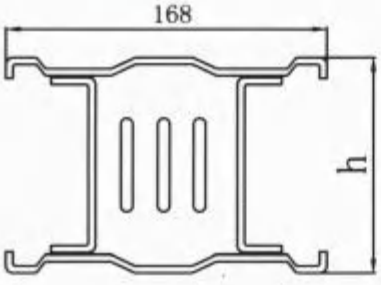
(2) As the joint bolts are made of low-temperature alloy steel material, the busbar then can be used in a variety of different temperature environment;

(3)接头采用特殊构造，可以防止安装时误操作，且连接器外配套醒目的警示标记和温升警告标记，可确保用户使用安全。
(4)外壳连接紧密，接触电阻低，整体接地系统杜绝可能情况下人身伤害事故发生的可能，保证母线槽具有可靠、安全的接地性能，较小的电抗值和较强的抗谐波能力。
4)布线灵活，互换性好
该系列母线结构紧凑，占用空间小，加工采用统一的模制铝合金外壳，使其具有良好的互换性，即使是不同电流等级变容量使用，其下面尺寸也完全一致。

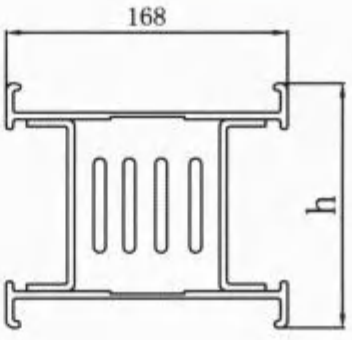
(3) Out of joints' special structure, installation misoperation can be prevented. With the eye-catching mark and the temperature rise warning tag together around the connectors, security can be guaranteed.
(4) As of shells' closely connected and the low contact resistance, the overall grounding system can prevent possible personal injuries and make the busbar have a reliable and safe grounding performance, a smaller reactance values and a stronger anti-harmonic ability.
4) Flexible busbar placing , and good interchangeability
With compact structure, small space occupation, and the adoption of unified moulded aluminum alloy shell, the busway can be in good interchangeability, even if different current levels accompanies, the dimensions below are still the same.



3、母线槽外形参考尺寸及理论重量表



Ⅰ型



Ⅱ型

表Table(3)

额定电流（A）Rated current (A)	重量 Weight（kg）		外形尺寸Dimensions （h）	
	三相三线（Ⅰ型）Three-phase, three-wire	三相四线（Ⅱ型）Three-phase, four-wire	Ⅰ型	Ⅱ型
250	7.54	11.26	70	85
400	8.25	12.14	80	95
630	9.15	13.28	95	110
800	10.35	14.80	115	130
1000	10.94	15.57	125	140
1250	13.04	18.23	160	175
1600	15.13	20.89	195	210
2000	17.52	23.94	185	200
2500	20.52	27.75	215	230

三、母线槽在风电塔架的安装

安装前每段母线单元需进行绝缘性能现场检测，绝缘电阻≥20Mn，同时检查电缆转接箱内母线槽始端接头连接的可靠性，重点检查母线接头螺栓的坚固性。

母线槽现场安装与塔架吊装同时进行，具体步骤如下：

1、按风电塔架的吊装顺序(通常为三段：下塔架、中塔架、上塔架)，分别将母线槽在塔架内先行安装好，安装时应注意，用母线槽在塔架法兰处的预留定位段要保证(见下图)，以满足后续塔架内母线槽的安装。(我公司将有专业技术人员现场指导)。

2、各段塔架内的母线槽安装位置需沿着统一的轴线进行，以满足塔架间母线槽连接的其轴怀性，该轴线需在安装前在塔架内统一设置相应的标识，安装时可拉线操作。(我公司将有专业技术人员现场指导)。

3、每段塔架内的母线槽安装完成后需复测该段的绝缘电阻，确保安装过程中未有损伤。

4、将各塔架内母线槽设备与塔架同时吊装，由下至上依次吊装到位，注意吊装过程中母线的同轴性，同时坚固安装好塔架。

5、当三段塔架均已安装就位后，将塔架间预留安装填充段母线槽填入其中，并通过专用连接器安装就位。

6、完成塔架内母线槽全段的安装后，再次复测整段母线槽的绝缘电阻，并进行耐压测试以达到使用标准。

7、现场将上下两端的预支电缆压好按头，(孔径尺寸必须与转接箱内预留孔尺寸配合)并与电缆转接箱连接坚固好，即完成该塔架母线槽安装。

8、母线在安装完毕未投入使用前必须做好防雨、防潮措施。

三、Busbar's installation in the wind power tower

Before installation, insulation capability of each bus unit must be inspected (insulation resistance≥20); meanwhile, the reliability of joints in the wire-cable hut should also be checked; the inspection of the solidity of bolt joints must be paid great attention to. The installation of the busbar and the hoisting of the tower should be carried together, details as follows:

1、According to the hoisting sequence of the wind power tower(normally in three parts: the lower part of the tower, the mid part of the tower and the upper part of the tower), busbar should be well installed in the tower. During installation process, it is for sure that the space reserved at the tower flange (see the chart below) can meet the needs of the following busway to be installed. (Our company will send professional technicians to give the site guidance.)

2、The busbar installation in each part of the tower should be carried out along the unified axis, in order to make sure that the inner busbar in the tower can be connected to each other quite well. The corresponding mark for the axis should be set in the tower before installation and then the cable installation can be available. (Our company will send professional technicians to give the site guidance.)

3、The insulated resistance must be re-examined after busbar installation in each part of the tower in order to identify no damage during installation.

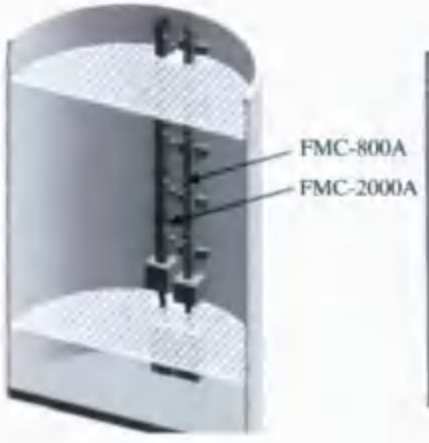
4、Hoist the busbar equipment and the tower together, from the lower part to the upper part, making sure the busway are connected to each other along the same axis in the tower, and then fix the tower firmly.

5、After the three parts of the tower are all well installed, extra busbar should be installed at the reserved place and fixed well with the special linkers.

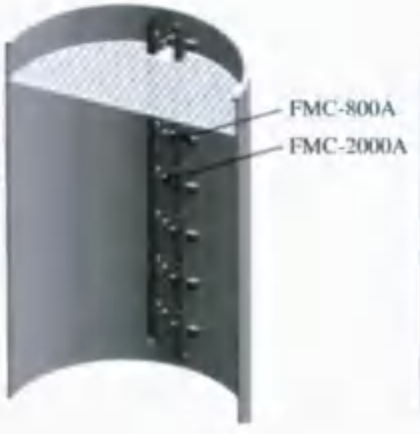
6、After the busbar installation in the whole tower , the whole insulated resistance must be checked again and carried through the voltage withstand test in order to achieve using standard.

7、Press the both ends of the cable well (aperture size must match the size of the reserved pore in the adapter box) and connect it with the wire-cable hut firmly. Then up to now, the installation of all the busbar in the whole tower has been finished.

8、Water-resistent, moisture-proof measures must be taken well before the busbar put into use.



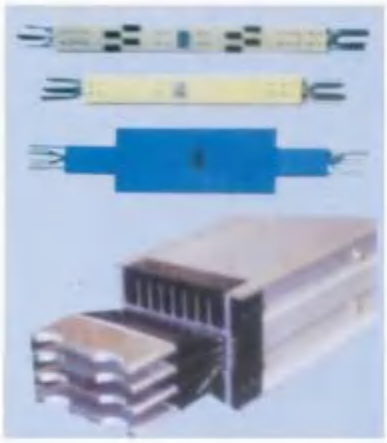
下塔架内母线槽安装
Busbar installation in the lower part of the tower



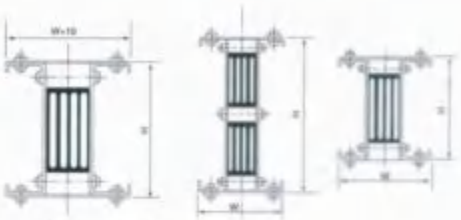
中塔架内母线槽安装
Busbar installation in the mid part of the tower

上塔架内母线槽安装
Busbar installation in the upper part of the tower

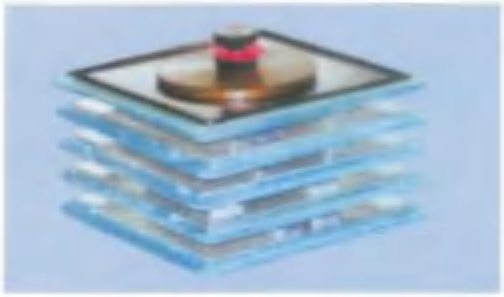
MCL密集型母线槽



MCL Dense Bus Tanks



带插孔母线
Plug in opening busbar
普通母线
Common busbar
膨胀节
Expansion Unit



MCL 母线槽是我厂在吸收消化日本母线技术的基础上研制开发的第一代母线产品

MCL busbar trough is the first fimes producte of busbar according to Japans redearch of busbar

母线结构及电流等级表 The chart of bus structure and voltaic grade
MCL 铝质母线　　MCL aluminum buses

额定电流 Rated Current	三线制 three-wire system			四线制 four-wire system			五线制 five-wire system		
	W (mm)	H (mm)	重量 weight kg/m	W (mm)	H (mm)	重量 weight kg/m	W (mm)	H (mm)	重量 weight kg/m
250	125	100	9	140	100	11	160	100	12
400	125	120	11	140	120	13	160	120	14
630	125	120	13	140	120	15	160	120	16
800	125	170	16	140	170	19	160	170	21
1000	125	170	18	140	170	23	160	170	26
1250	125	230	23	140	230	28	160	230	33
1600	125	230	29	140	230	31	160	230	36

适用范围：

MCL母线槽适用于三相四线制、三相五线制，频率50-60Hz，额定电压到660V，额定工作电流250~5000A的供配内系统，导体采用铝合金导体，外壳采用钢制一次性拉挤辊轧成型材，强度高、成本低，防护等级可达IP54。

Applicable scope:

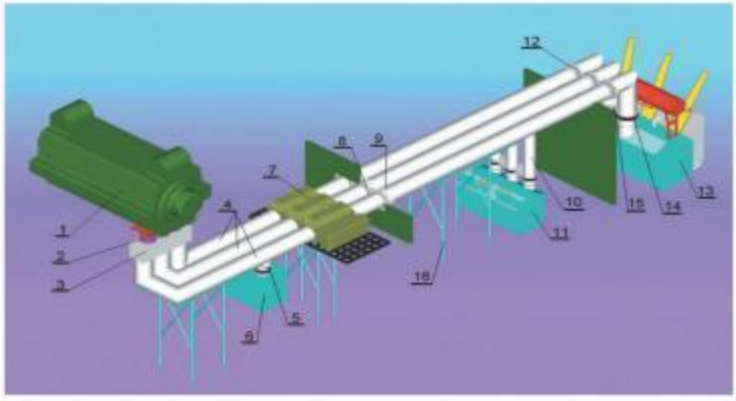
MCL bus-bar applicable three-phase four-wire or three-phase five-wire,frequency 50-60Hz, rated voltage below 660V, rated current is 250-5000A of the power supply system, conductor by using aluminium conductor, steel one-time pultrusion roll forming materials, high strength, low cost,protection grade reaches IP54.

母线的分支插接箱 The branch of the bus bar in jects the case

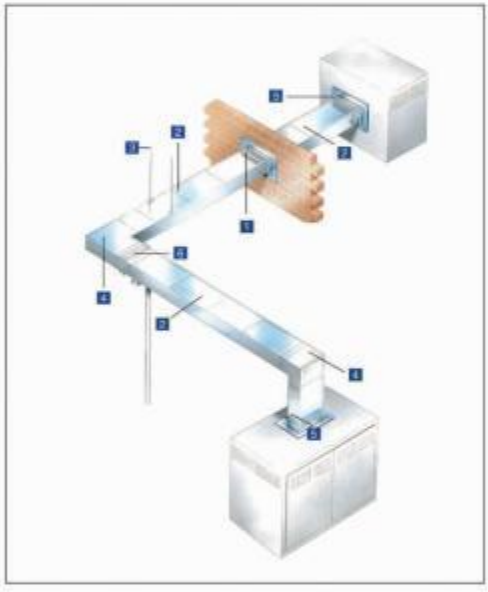
- 经济型开门操作
- 门外操作
- 电动远程操作
- 电流规格:100A、250A、400A、630A
- 开关的配置可根据用户选择

- Economical type door coupling rotary operating mechanisms
- operating operation
- Remote motor operation
- Current level:100A,250A,400A,630A
- switch selection according to customer

布置及型号
Arrangement & Model



1. 发电机 Generator
2. 电流互感器 Current Transformer
3. 出线箱 Generator Termination Enclosure
4. 主回路封母 Main Run IPB
5. PT分支封母 PT Tap-off Run IPB
6. PT&LA柜 PT&LA Cubicle
7. 断路器或隔离开关 GCB or Isolator
8. 穿墙结构 Wall Seal Assembly
9. 外壳伸缩节 Enclosure Expansion Joint
10. 厂用分支封母 Auxiliary Transformer Tap-off Run IPB
11. 厂用变压器 Auxiliary Transformer
12. 可拆结构 Removable Section Splice
13. 主变压器 Set-up Transformer
14. 与主变连接结构 Transformer Interface
15. 短路板 Bonding Plates
16. 支持结构 Supporting Structure



1 穿墙结构 Wall Seal Assembly
2 直线段 Straight Section
3 吊杆 Steeve
4 弯头 Elbow
5 设备连接结构 Termination Assembly
6 伸缩结构 Expansion Joint

□ FM— □ / □ — □ / □

特征代号 Character Code
- I 微正压 Dry Air Systems
- II 速饱和电抗器 Saturable Reactor
- III 微正压、速饱和电抗器并存 Slight Positive Pressure and Saturable Reactor

冷却方式 Cooling Method
- Z 自然冷却 Natural Air Cooled
- Q 强迫冷却 Force Cooled
- J 局部冷却 Partial Air Cooled

额定电流(A) Rated Current

额定电压(kV) Rated Voltage

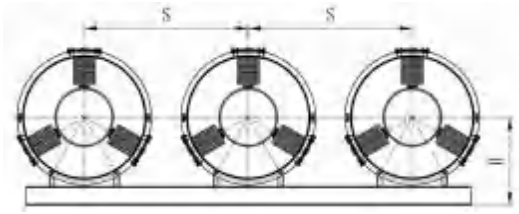
金属封闭母线 Metal-Enclosed Bus

类型 Type
- QL 全连式离相 Continuous Enclosure Type Isolated-Phase Bus Duct
- BL 不连式离相 Noncontinuous Enclosure Type Isolated-Phase Bus Duct
- BG 不隔相共箱 Non-segregated Phase Enclosure Bus Duct
- GG 隔相共箱 Segregated Phase Enclosure Bus Duct

离相封闭母线

简要说明:

- 用于发电机与主变压器之间的连接,主回路及厂用回路
- 可提供的电流等级 1000A 到 35000A 电压等级 10.5KV 到 35KV
- 加强导体外壳环流的屏蔽作用,基本消除母线附近的钢构发热
- 大大降低短路电动力



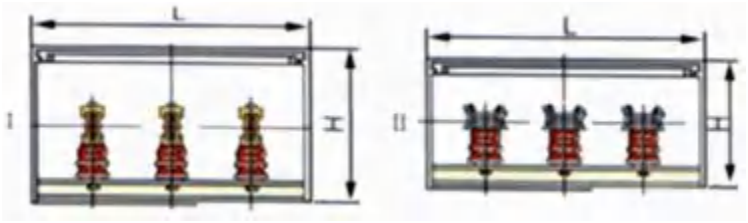
技术参数:

额定电压(KV)	绝缘水平(KV)	额定电流(A)	外形尺寸(mm)				毛重(kg)
			外壳	导体	相间距(S)	H	
6-10	42/75	4000	Φ450	Φ150	≥650	480	50
15-20	68/125	6000	Φ600	Φ150	≥850	580	110
		6000	Φ650	Φ200	≥900	600	120
		8000	Φ750	Φ300	≥1000	650	120
		9000	Φ800	Φ350	≥1050	670	135
		10000	Φ850	Φ400	≥1100	700	140
20-24	75/150	12500	Φ1050	Φ500	≥1300	770	180
		14000	Φ1050	Φ500	≥1300	770	180
		16000	Φ1150	Φ600	≥1400	830	190
		18000	Φ1200	Φ650	≥1450	880	200
		23000	Φ1450	Φ900	≥1700	970	270
		26000	Φ1500	Φ950	≥1750	1000	300
27	100/185	28000	Φ1572	Φ940	≥1900	1050	330

共箱封闭母线

简要说明:

- 用于厂用回路、变电站、小水电发电机与变压器之间的连接
- 可提供矩形、槽形或管形导体
- 可提供的电流等级达 6300A ,电压等级达 35KV
- 具有铝(或弱磁钢板)外壳的保护 ,维护工作量小
- 采用双重绝缘 ,显著提高安全性能



共箱封闭母线技术参数:

额定电压(KV) Rated Voltage	3.15	6.3	10.5	35
绝缘等级(KV) Insulation Grade	25/40	32/60	42/75	100/185
额定电流(A) Rated current	外形尺寸(L×H)(mm × mm) outerside dimension			
1000	I 750×400 " 850×350	I 900×560 " 1060×460	I 900×560 " 1060×460	I 1600×960 " 1750×890
1600	I 750×400 " 850×350	I 900×560 " 1060×460	I 900×560 " 1060×460	I 1600×960 " 1750×890
2000	I 750×400 " 850×350	I 900×560 " 1060×460	I 900×560 " 1060×460	I 1600×960 " 1750×890
2500	I 750×400 " 850×350	I 900×560 " 1060×460	I 900×560 " 1060×460	I 1600×960 " 1750×890
3000	I 750×400 " 850×350	I 900×560 " 1060×460	I 900×560 " 1060×460	I 1600×960 " 1750×890
3500	I 750×440	I 900×560	I 900×560	I 1600×960
4000	I 750×440	I 900×560	I 900×560	I 1600×960
4500	I 900×480	I 900×560	I 900×560	I 1600×960
5000/6300	5000A 及以上的共箱封闭母线导体采用圆管或槽型导体 ,外壳尺寸根据实际确定			

注: I 型为母线导体竖放; "型为母线导体平放
4000A 以上的共箱母线导体也可以采用圆管或槽型导体

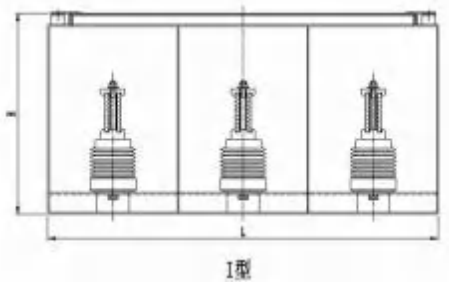
隔相封闭母线

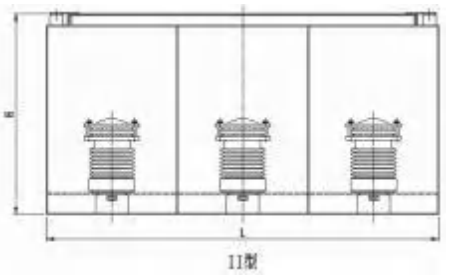
简要说明:

- 可提供的电流等级达 4500A
- 独特的三相间隔离,形成比共箱母线小的外部磁场
- 避免了相间短路。

segregated phase Bus Duct

- suitable for the amPere tating uP to 4500A and the voltage uP to 35kV
- Each Phase conductor is isolated makes the outer magnetic field less than non-segregated bus duct
- It can avoids occurring short circuit of Phase to Phase





技术参数:

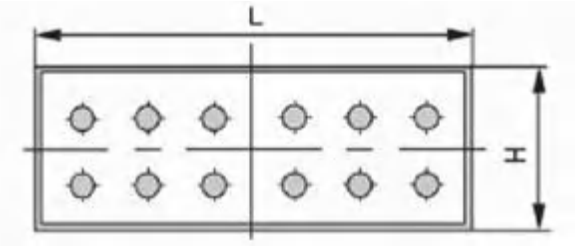
额定电压(KV) Rated Voltage	3.15	6.3	10.5
绝缘等级(KV) Insulation Grade	25/40	32/60	42/75
额定电流(A) Rated current	外形尺寸(L×H)(mm × mm) outerside dimension		
1000	I 900×480 " 1100×420	I 1100×560 " 1300×460	I 1200×560 " 1400×460
1600	I 900×480 " 1100×420	I 1100×560 " 1300×460	I 1200×560 " 1400×460
2000	I 900×480 " 1100×420	I 1100×560 " 1300×460	I 1200×560 " 1400×460
2500	I 900×480 " 1100×420	I 1100×560 " 1300×460	I 1200×560 " 1400×460
3000	I 900×480 " 1100×420	I 1100×560 " 1300×460	I 1200×560 " 1400×460
3500	I 900×480	I 1100×560	I 1200×560
4000	I 900×480	I 1100×560	I 1200×560
4500	I 900×480	I 1100×560	I 1200×560

注: Ⅰ型为母线导体竖放; Ⅱ型为母线导体平放

电缆母线 cable Enclosed Bus Duct

◆导体由电缆组成,安装方便,维护量小

The conductor, consisted of cables, is with convenient mounting and less maintenance.



◆技术参数:

额定电压(KV) Rated Voltage	绝缘等级(KV) Insulation Grade	额定电流(A) Rated current	L(mm)	H(mm)	备注 Notes
10	35/75	1000	500	300	电缆可由需方提供,现场安装,从而减少安装接头。when installing at site,the cable can be provided by user so that the jointer quantity can be decreased
		2000	700	300	
		3000	700	400	
		4000	700	500	

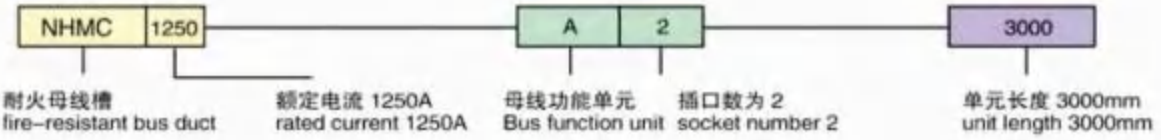
NHMC 耐火母线槽系统
F.R.C—4A Busbar Duct system

本产品采用耐高温云母带绝缘材料保证导电母排电气绝缘性能，外壳表面处理采用两层防火涂料进行底喷和面喷，此种防火涂料通过高温火焰幅射后，能生成一层 30—50mm 厚的泡沫状保护层，对母线槽围进行保护，起到隔热作用，保证外壳不直接烧坏。从而确保母线槽系统在发生火灾后正常工作。

本产品在正常条件下电气性能完全等同于普通其它型号母线槽，订货参照 F.R.C—4A 防火母线槽的技术参数和流等级。安装结构形式与其它母线槽相同，请予参照选型。

This product is adopted the high - temperature resistant mica insulation material to ensure the electric insulation performance of the electric conductive venter plate.The surface treatmnet of the shell is bottom and surface sprayed with double coatsfire proof paint which can form a s-pumescence protectiou coat after the high temperature blaze radiation.to protect the bus ductand indulate heat and to ensure that the shell will not burnt directly,then the bus duct system can work normally after fire - happens.
Under normal conditions,the electric performance of the product is equal to other ordinary types of bus duct;please placeorder according to t-he technology parameters and current grade of the F.R.C - 4A fire - resistant bus duct.The installation type is same as KFM bus duct,pleases select accordingly.

型号说明:



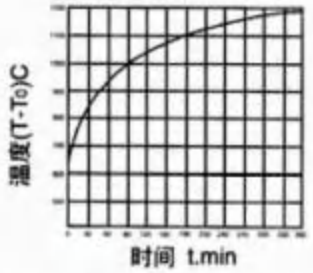
技术性能:

1. 本厂生产的 F.R.C—4A 型耐火绝缘母线槽符合 IEC439—2 国际标准，及 JB8511—1996 空气绝缘母线槽部颁标准和 GB/T9978*88 建筑构件耐火试验标准的规定。
2. F.R.C–4A 型耐火绝缘母线槽使用额定电压为 660V 以下，频率为 50Hz 或 60Hz。
3. F.R.C–4A 型耐火绝缘母线槽电能在着火 30min 内，试验电压为 1000V，绝缘电阻在 10MΩ 以上，在着火 60min 时，绝缘电阻在 0.5Ω 试验电压在 1000V 以上。
4. F.R.C–4A 型耐火绝缘母线槽采用双排螺检连接，性能极为稳定，安装方便，外壳防护等级符合 IP40 所规定的要求。
5. 耐火试验升温曲线图。

1. The F.R.C-4A five- resistant insulation bus duct is complied with IEC439-2 International standard,JB8511-1996 air insulation bus duct stan-dard,and with the specification of the T9978-88 buildings structure fire - resistant test standard.
2. The rated voltage for this kind of bus duct:below 660V,frequency:50Hz or 60Hz.
3. For this bud duct,after ignition in 30min,the test voltage is 1000V,insulation resistance is above 10MΩ,and in 60min,themsulation resistance is 0.5MΩ,the test voltage is above 1000V.
4. The bus duct which is connected by double row belts with stable function and easy installation,the protection grade of theshell is tally with the require - ment of IP40.
5. The temperature graph of five - resistant:

5. The temperature graph of five - resistant:

（时间－温度标准曲线）



6. 短路容量 Short Circuit Capacity:

母线额定电流 A Bus Rated Electric Current	1 秒热稳定电流有效值(KA) Effective Value of the thermal steady current in 1 second	动稳定电流有效值(KA) The Effective Value of the stir steady current		
		0.1 秒	1 秒	3 秒
100–250	12	29	25	11
250–400	20	40	40	23
400–800	25	45	45	26
800–1000	30	70	70	55
1000–1600	35	75	75	60
1600–3000	44	100	100	100
3000–4000	85	175	175	175
4000–5000	110	200	200	200

图1表示时间、温度相互关系的代表数如下表示:
Picture 1 Shows The Reiations Between Time And Temperature The Numbers Show As Follows:

t.min	5	10	15	30	60	90	120	180	240
T–T。C	556	659	718	821	925	986	1029	1090	1133

高强密集型铜铝复合母线槽系统
High strength Compact Enclosed compound Busbar Channel

产品综述:

■ 适用范围:

系列高强密集型母线槽适用于额定电 1000V 以下、额定工作电流 250A~5000A、频率 50~60HZ 的输配电系统。该系列产品已全部通过“CQC”质量认证中心的严格认证。

■ 高强密集型母线槽结构性能:

1)体积小、结构紧凑,外壳采用冷轧薄钢一次冷轧成瓦楞型波纹槽结构,整体组装后形成高强型管状结构,可大大增强母线槽系统的强度(6M 直线居中施加 70Kq 压力,挠度小于 15mm);且母线导体通长固定于外壳瓦楞槽中,也增强了系统的动热稳定性。可彻底解决施工现场大跨距安装的难题。

2)散热性能优越、载流量大,抗短路电流高。瓦楞型盖板展开面积大,具有较好“散热片”效果,每根母排均与外壳直接紧贴,有利于热量的直接散发和各相间的均匀散热。

3)可配置成三相四线(盖板为四根瓦楞槽),三相五线(盖板为五根瓦楞槽)。其五线制外壳很具特色,独特的 PE 小槽使 PE 线直接卡制与母线槽外壳,直接达到 PE 与外壳的电气连通,最大限度的保障操作者的安全。

4)采用标准配置的单臂锁紧接头器,连接可靠方便。

5)可方便地设置馈电插口,上下两面均可同时设置,且不降低其抗弯强度。馈电插接口的安全防护等级达 IP5X(符合标准 IEC529)。每套插口均设有特制的开合锁定装置,可防污物、防尘和防止误操作,其材料为 ABS 高效工程模塑料。

■ 高强密集型母线槽绝缘配置:

1)独特的结构设计,让母排在包裹绝缘介质后分相卡制于外壳瓦楞中,使母线系统拥有介质绝缘和空气绝缘的双重绝缘,集空气型母线和密集型母线绝缘优点于一身。

2)母线介质绝缘采用高效绝缘材料一聚酯薄膜(美国杜邦 MVIar),该材料具有较好的耐高温性(在高温中无有毒气体释出)、较高的介电性能,绝缘等级为“B”级。也可采用高档绝缘材料 “塑料王” —聚四氟乙烯定向薄膜(SFM-3),该材料耐温等级很高(-180℃ ~+250℃),单层耐压 6000V,绝缘等级 “C”级,绝缘老化寿命 50 年以上,为现行实用绝缘材料中性能最佳产品。

3) 母排在包裹绝缘材料后,与上下盖板接触部分采用 U 型橡胶垫作缓冲保护,以防止因母线绝缘材料于外壳之间的长期硬性接触,造成母线绝缘材料的震动性磨损。该材料为高级弹性体 PVC,长期耐温达 130℃,达国家 B 级绝缘标准。

■ 高强密集型母线槽技术参数:

1)采用高强密封结构设计,一般防护等级为 IP40,特殊要求可达 IP54。外壳防护已通过国家权威部门检测并认定。

2)母线系统可承受 3750V 的工频耐压,1mIn 无击穿闪络。

3) 母线系统在以额定电流正常工作时,温升不高于:接头处 60K、外壳 30K、槽内 40K。

Series – 630A – 3/5 – 3000

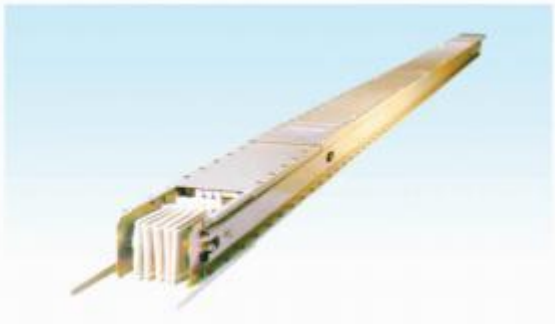
- 单元长度(mm)
- 三相五线制
- 额定电流(A)
- 高强密集型铜铝复合母线槽

BMC-3F 空气型铜铝复合母线槽系统
BMC-3F Air Enclosed Compact Enclosed Compound Busbar Channel

BMC-3F 空气型铜铝复合母线槽的设计和特点:

Series – 630A – 3/5 – 3000

- 单元长度(mm)
- 三相五线制
- 额定电流(A)
- 空气绝缘铜铝复合母线槽



■ 高防护等级插孔

母线槽在插孔处设计了安全防护挡板,只有当防护挡板拉开时,插接箱才能插入,插孔平时不用进可将防护板拉闭并加铅封锁死,防止了在插口处灰尘和异物的进入,从而提高了母线槽的防护性能,防止误操作,使母线的安全性得到了极大的提高。

■ 外壳(防护壳)级次数

母线槽设计 5 个电流等级,只采用了3 个级次的外壳,这样当系统按相邻等级变换容量时母线槽无需更换外壳,如 400A 变 630A 时,外壳尺寸相同,因此大大方便了安装。

■ 传输电能大

母线槽设计为分离空气绝缘式,改善了母线槽的散热性,降低了阻抗,达到了母线槽最佳经济输电。

■ 成套性好

母线槽设计了各种功能的连接单元,可满足所有配电工程的需要。

真诚沟通 合作顺利……

Sincere Communication, Cooperation ……

奥凯电气

江苏奥凯电气有限公司

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