清能电气
QING NENG ELECTRIC

Laminated Busbar

Qingneng Electric

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1 Introduction

01：Background

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Background

With the growth of electricity demand and the pursuit of power system efficiency, laminated busbars, as a high-performance electrical connection element, have been widely used in various industries. Their design and manufacturing levels have also been significantly improved, such as the use of high-performance insulation materials and compact designs, which have increased current-carrying capacity and space utilization.

Premium Insulation

High-performance insulation materials are applied to improve the system's withstand voltage level, ensuring the safe operation of the system.

Modular Design

Modular design makes the product easier to install, avoids installation errors, and improves system integration efficiency.

Compact Structure

Compact structure significantly improves space utilization and reduces entire system cost.

Advantage

- Reduce system cost
- Improve current carrying capacity
- Reduce inductance and impedance
- Increase capacitance
- Easy to install
- Improve space utilization

Comparison

Traditional Connector

Copper plates/wires as conductors and outer plastic (PVC, heat shrink tubing, rubber, etc.) as insulation material, only ensures the circuit conduction.

- Tend to age
- High impedance & inductance
- Complex wiring
- Low space utilization

VS

Laminated Busbar

High-quality copper conductors and high-performance insulating materials such as PET/PI, with exposed parts electroplated, effectively ensuring the safety of the system.

- High reliability
- Low impedance & inductance
- Less wiring errors
- Compact structure

Showcase

New Energy Busbar

Power Storage Busbar

Frequency Conversion Busbar

Power Quality Busbar

Showcase

PDU Busbar

CCS Busbar

Railway Busbar

Telecommunication Busbar

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2 Parameter

01：Basic　　02：Conductor

03：Plating　　04：Insulation

Basic

Item	Characteristics
Conductor	Cu(T2Y2)/Al(1060-H24/1060-H12)
Withstand Voltage (VAC/VDC)	300～12000 (2Ui+2000)
Current (A)	100～4000
Connection	Riveting/PEM Welding
Electroplating	Sn/Ni/Ag
Flame Retardant Grade	UL94/V-0
Insulation Resistance (MΩ)	20～+∞/1000VDC
Temperature Raise (K)	≤40
Design Standards	IEC 60077 IEC61800
Ambient Temperature (℃)	-40～+105
Partial Discharge(pC)	<10

Conductor

	Cu	Al
Density (kg/m^3)	8950	2710
Melting Point(K)	1355	932
Resistivity (μΩ·mm)	17.8	26.5
Thermal Conductivity (W/(m·K))	401	237
Specific Heat Capacity (J/(kg·K))	386	900
Expansion Coefficient (ppm/K)	17.5	23.2
Mohs Hardness	3.0	2.75

Notes:
1. Thickness of Cu: 0.5~8.0mm
2. Thickness of Al: 1.0~5.0mm

Plating

	Sn	Ni	Ag
Density (kg/m^3)	7300	8902	10500
Melting Point(K)	505	1726	1235
Resistivity (μΩ·mm)	113	68.5	16.1
Thermal Conductivity (W/(m·K))	66.8	90.5	430
Specific Heat Capacity (J/(kg·K))	227	440	235
Expansion Coefficient (ppm/K)	22	13.4	18.9
Mohs Hardness	1.5	4	2.5

Notes:
1. Min. Thickness: 5μm
2. Al with Ag plating: N/A

Insulation

	PET (105℃)	PET (130℃)	PI	FR4	GPO3	PP
RTI(C)	105	130	>200	130	155	125
CTI(V)	400	400	180	200	600	600
Dielectric Constant	3.5	3.5	3.2	≤5.5	408	2.3
Thermal Conductivity (W/(m·K))	0.15	0.15	0.15	0.3	0.3	0.15
Water Absorption (%)	0.6	0.15	2.7	≤0.3	≤0.5	0.06
Thickness (mm)	0.25	0.25	0.1	0.5-6	1-8	0.5
Dielectric Strength (kV/mm)	137.8	137.8	/	14	12	57.4

Notes:
1. Edge=2*T (T stands for total thickness of conductor)
2. Min. Edge: 5mm

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3 Application

01：Manufacture　　02：New Energy

03：Railway　　04：Others

Manufacture

01

Frequency Conversion

Intelligent and automated electrical solutions for industrial production, improving efficiency, reducing energy consumption, and ensuring safe production.

02

Power Quality

We provide comprehensive power quality monitoring, analysis, and management solutions to ensure the stable operation of power systems.

New Energy

WIND POWER

Achieves optimal electromagnetic compatibility, and greatly reduces power loss during transmission.

E-VEHICLE

We provide professional electrical solutions for new energy vehicles and charging facilities to promote green travel.

SOLAR POWER

Efficient/reliable electrical solutions for the photovoltaic energy industry, contributing to the development of clean energy.

POWER STORAGE

We optimize the circuit structure to minimize installation difficulty and error probability, gaining a compact system layout with improved space utilization.

Railway

Urban Light Rail

Intercity Train

Magnetic Train

Others

Telecommunications

Provide highly reliable and efficient power supply and distribution system solutions for communication networks, and IT infrastructure.

Data Center

Multi-layered, compact structural design effectively suppresses electromagnetic interference and reasonably reduces the space occupied by wiring.

Power Transmission

Whether in new construction projects or renovation and expansion projects of existing projects, its superior electrical performance makes it the first choice for customers.

Environmental Protection

Large-scale environmental protection equipment uses laminated busbars, which not only reduces system costs but also improves its reliability and safety.

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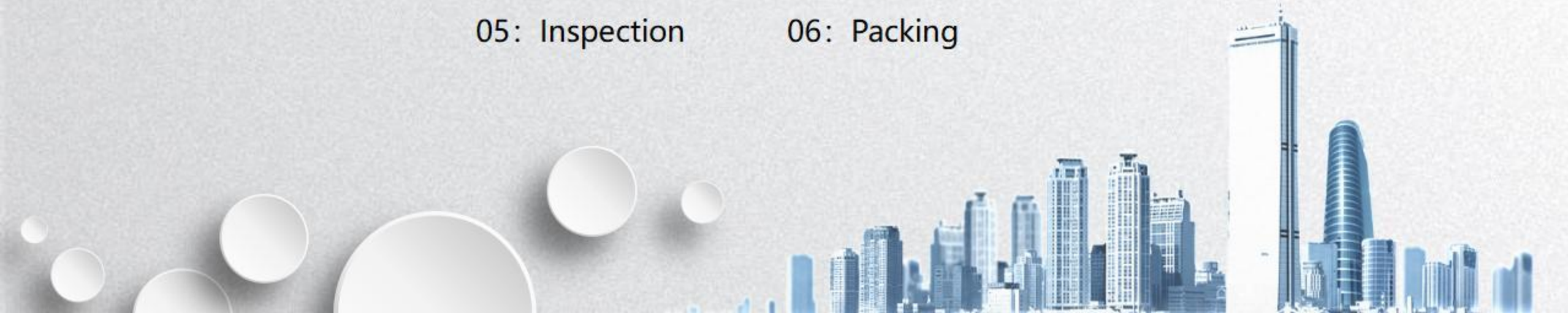
4 Production

01: Design
02: Shaping
03: Insulation
04: Lamination
05: Inspection
06: Packing

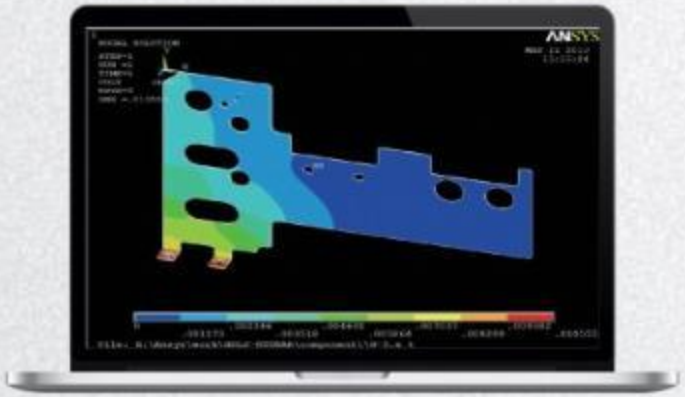


Design

In the production process of laminated busbars, design is the most crucial element. Qingneng's strong R&D capabilities and excellent design team ensure that the products achieve the lowest production costs and the most rational space layout while meeting electrical performance and safety requirements.

3D Modeling

Match the installation and usage environment of the customer's system for the most reasonable structural layout.



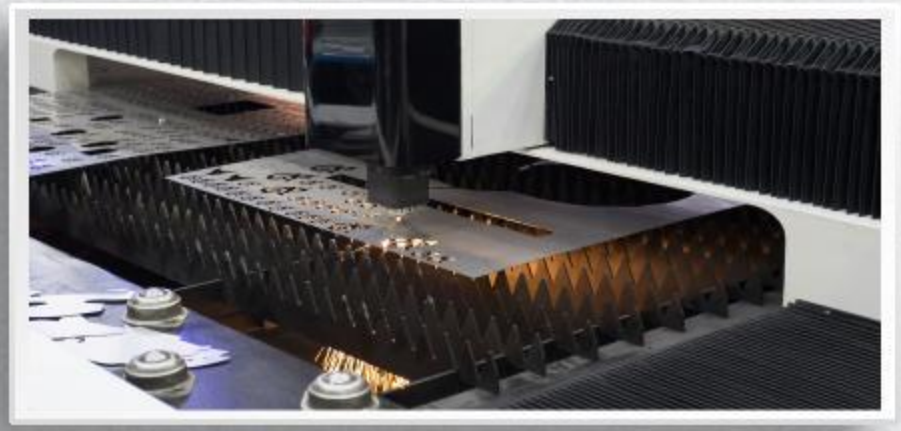
Simulation Test

Simulation yields electric field cloud maps, current density, local electric field intensity, and temperature field cloud distribution.

Engineering Drawing

The 3D structure is converted into 2D machining drawings, providing accurate production basis and inspection standards.

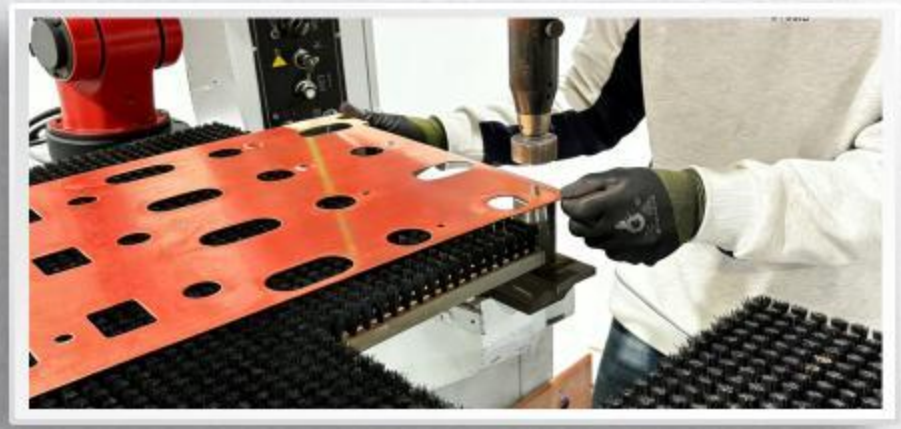
Shaping



Laser Cutting

Polishing & Deburring

Bending



Riveting & Welding

Insulation

Insulating Paper Cutting

Cut insulating paper to the correct size to ensure electrical insulation performance while making the product more aesthetically pleasing.

Epoxy resin Cutting

In scenarios where increased creepage distance is required, adding epoxy resin pads can improve insulation performance.

Screen Printing

Print corresponding wiring markings according to the circuit design to make installation more convenient.

Lamination

Thermal Lamination

Multi-layer Assembly

Surface Cleaning

Inspection

- Continuity Test
- Withstand Voltage Test
- Partial Discharge Test

Packing

Inner Package

Multi-Protection

Individual items are packaged using plastic film and foam sealing, with multiple products separated by foam plastic. The outer packaging uses multi-layer corrugated environmentally friendly cardboard boxes and fumigation-free wooden pallets, meeting export standards.

Product Warehousing

Clear Marks

All products are individually labeled, with each package clearly and in detail labeled according to the customer's order, making it easy for the customer to identify the required products during on-site installation.

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The End

Contact

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