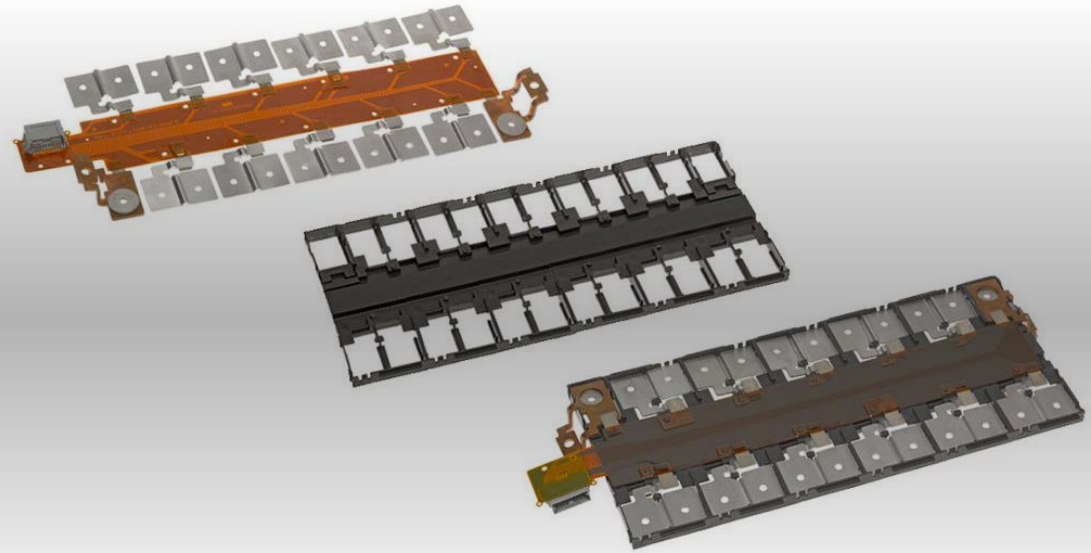


A one-stop solution for all Cell Contact System projects

CCS Introduction



Contents

1. Company Introduction
2. Product and Equipment Showcase
3. Product R&D
4. Product Quality Assurance
5. Production Capacity

Company Introduction

PCBONLINE E-ecosystem was founded by GLOBAL SUCCESS GROUP in Shenzhen in 2017.

With the booming of the new energy industry, the business trend of the PCB industry is moving from single project to integrated customization, and CCS is a typical representative. Our CCS production division in Guangdong has been producing CCS products since 2017, and we also have a first-class R&D team for CCS integrated modules, which can participate in assisting automakers, battery PACK enterprises or pack manufacturers in the preliminary development and simultaneous validation of CCS modules.

At present, the CCS Division has a plant area of 12,000 m², with 380 employees and 52 R&D personnel.

The production capacity of the battery temperature acquisition FPC module is 250,000 sets per month,

The capacity of storage and power battery connecting copper busbar and aluminum busbar is 2,000,000 pcs per month,

The capacity of storage and power battery CCS module is 200,000 sets per month,

The capacity of the laminated busbar is 100,000 per month.



Development History

2010

FACTORY FOUNDATION

Established and put into production, with a workshop of 8,000 m² and a production capacity of 6,000 m²/month.

2013

SMT FACTORY

SMT Division was established, with an annual output value of over RMB 40 million.

2015

ISO9001/14001

We passed ISO9001/14001 system certification; and supplied Lenovo and Coolpad; the annual output value was RMB 60 million.

2016

AUTOMOTIVE ELECTRONICS

We started automobile products with a production capacity of 15,000 m²/month; supplied to Meizu/Lenovo/ZTE/Japan Star Power, with an annual output value of RMB8000 million

2018

IATF16949

we cut into the combination of Rigid-flexible board and trial production of battery collection module FPC, with an annual output value of 100 million.

We applied for high-tech enterprises and passed IATF16949 system certification; the annual output value exceeded RMB 110 million.

2020

CCS ONE-STOP

we mass-produced battery acquisition module FPC & CCS and busbar with an annual output of RMB1 100 million.

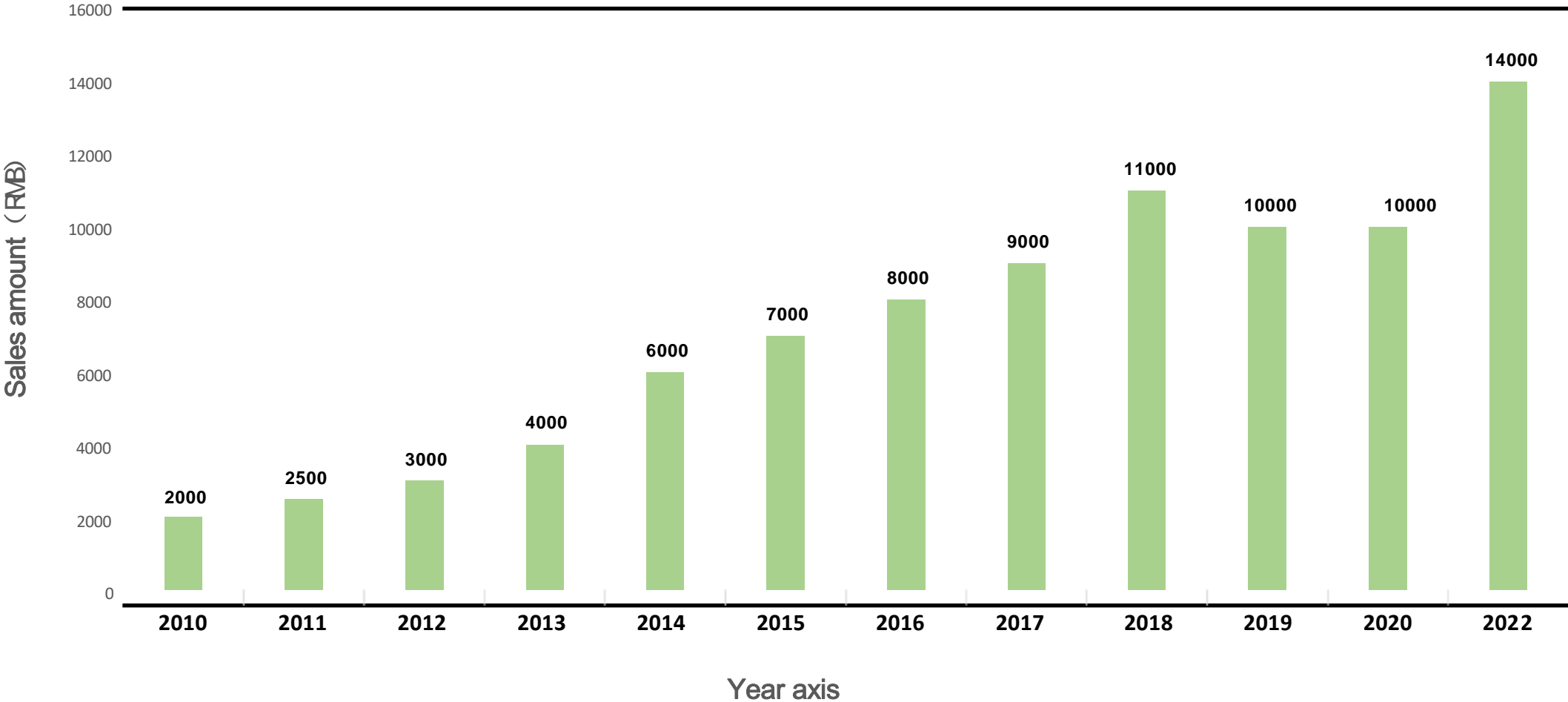
2022

CCS MASS PRODUCTION

we cut into the new energy module small batch of copper and aluminum rows, CCS and busbar, and the annual output value were RMB 140 million.

Company Output

Annual sales



Main Customers

CATL

DENSO
Crafting the Core



WEICHA

Hoverbird

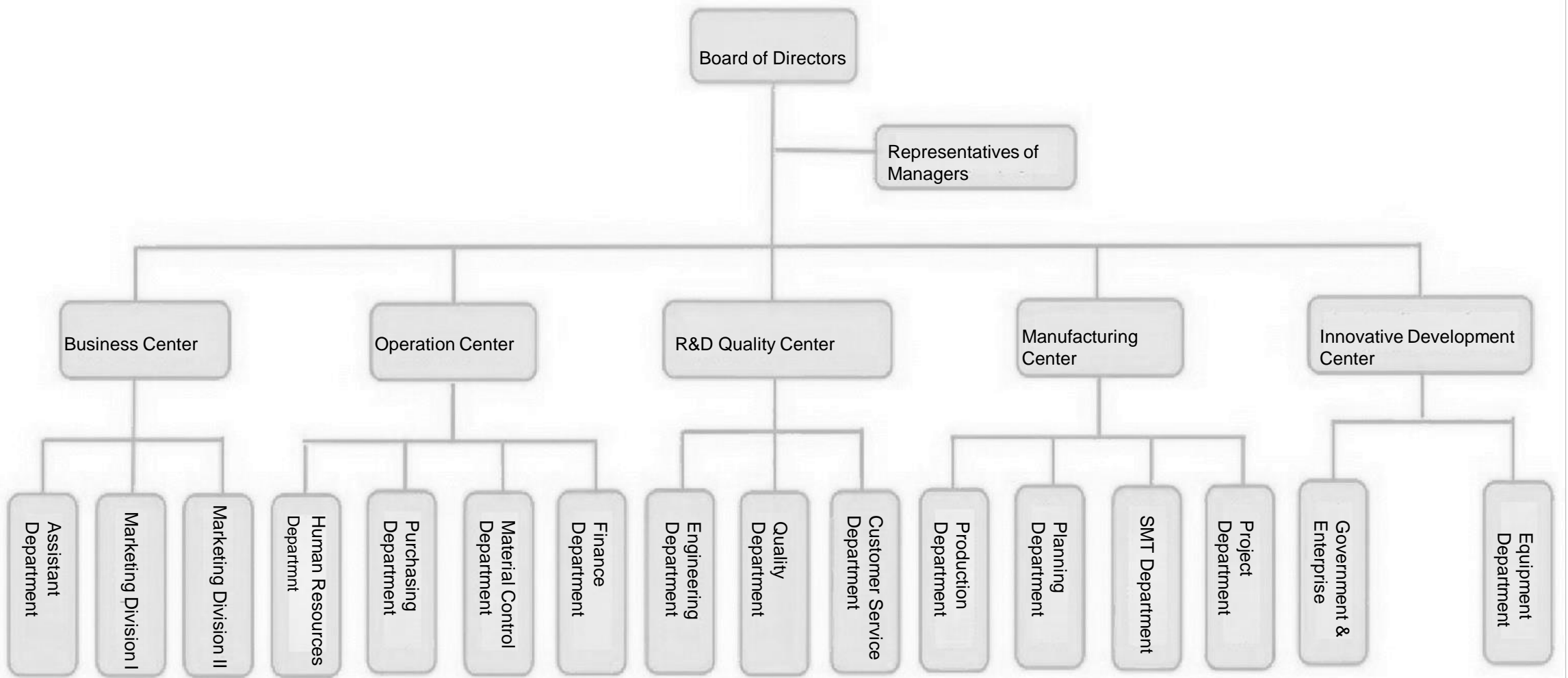


GEELY

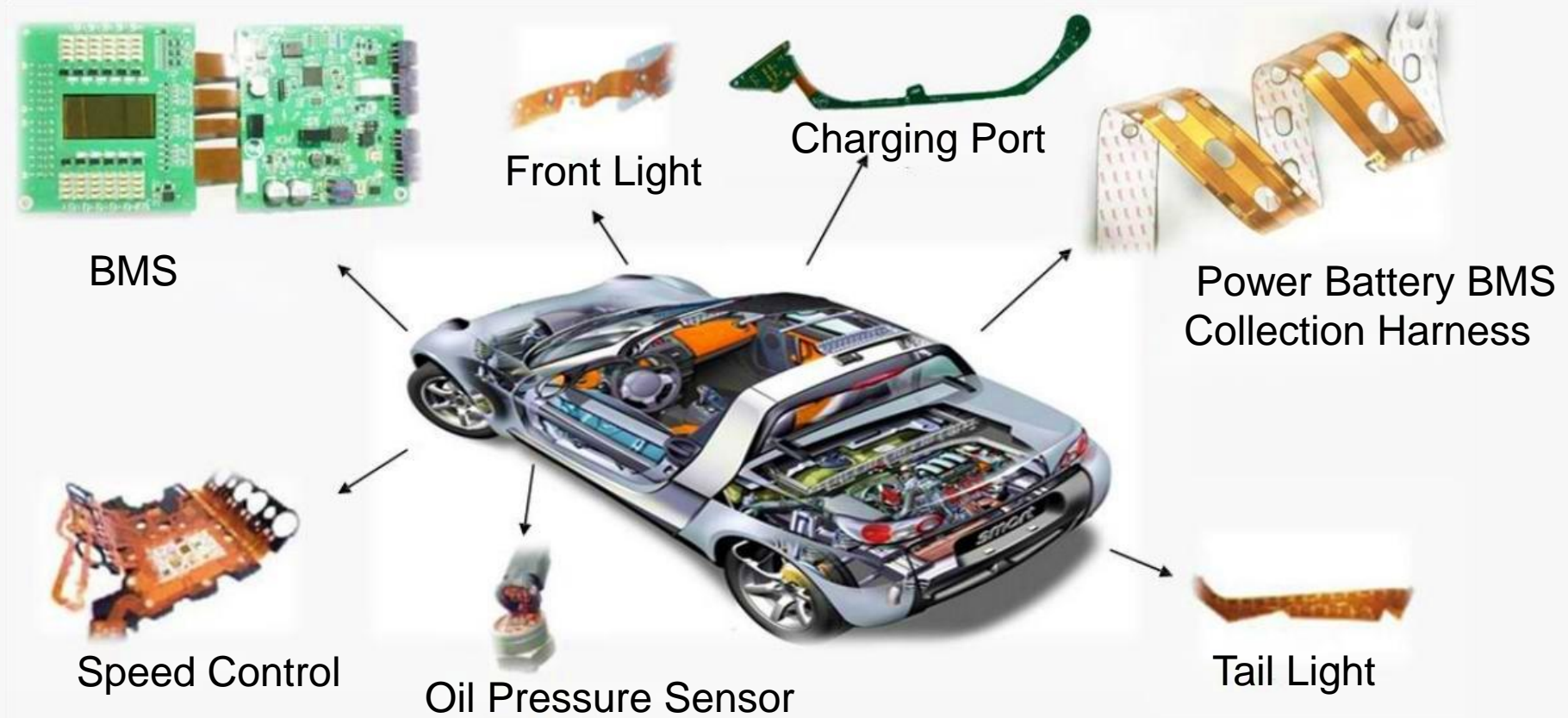


PCBONLINE®

Organizational structure



Automotive Applications



Application in Battery Pack Product Field



Application in Battery Pack Product Field

New Energy Vehicle

Case Application: Motor Drive Module

Technical Parameters :

Insulation voltage: **>3000VAC**

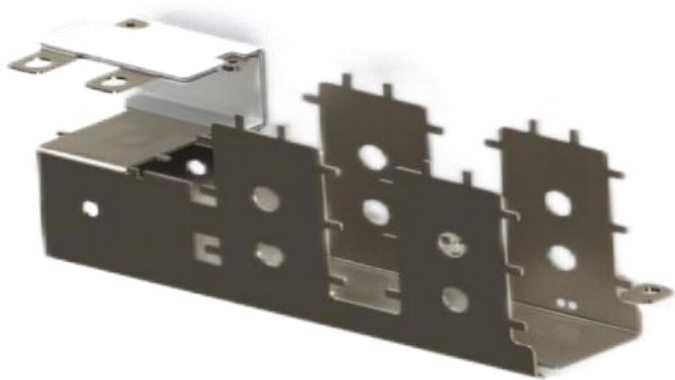
Electrode contact resistance: **$\leq 0.03\text{m}\Omega$**

Insulation material working temperature: **>105°C**

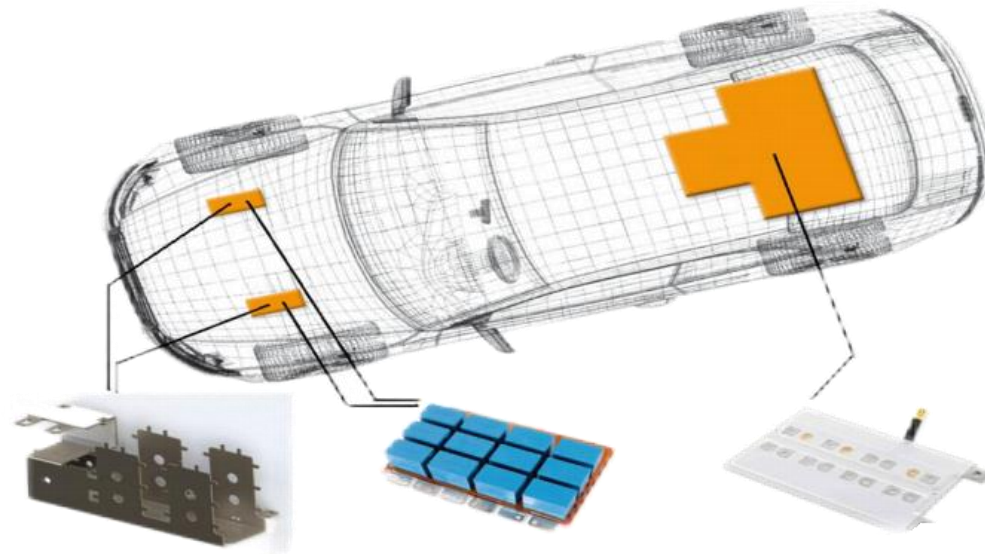
Inductance: **$\leq 20\text{nH}$**

Layer: **2 layers**

Automotive industry has high performance requirements on stray inductance, anti-vibration and others, when **the hybrid car** motor controller **power $\geq 20\text{KVA}$** will use laminated busbar; **pure electric bus** motor controller **power $> 200\text{KVA}$** , the power is larger, and generally use laminated busbar.



Motor Drive Module



Battery Management Module

Application in Battery Pack Product Field

New Energy-PV Power Generation

Case

Application equipment: photovoltaic inverter

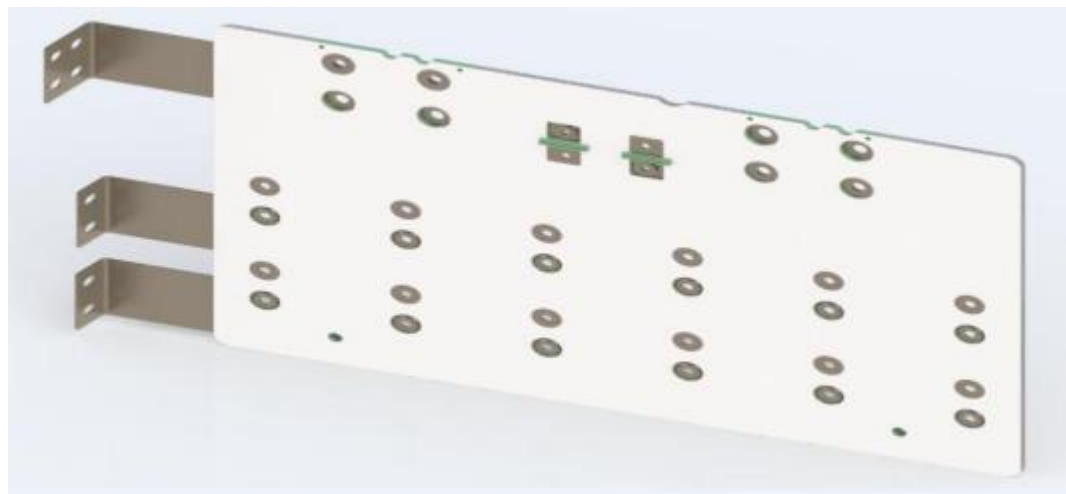
Technical parameter

Rated voltage: 1000V DC

Rated current: 1200A

Creepage distance/electrical clearance: 10mm/10mm

Layer: 3 layers



When the overall power of photovoltaic inverter is $\geq 250\text{KVA}$, or the power of a single power module is $\geq 100\text{KVA}$, the performance of PV inverter will be greatly improved by using laminated busbars.

Photovoltaic plant



Laminated Busbar



Power module



High-power PV inverter

Application in Battery Pack Product Field

New Energy-Wind Power Generation

Case

Application equipment: wind power inverter

Technical parameter

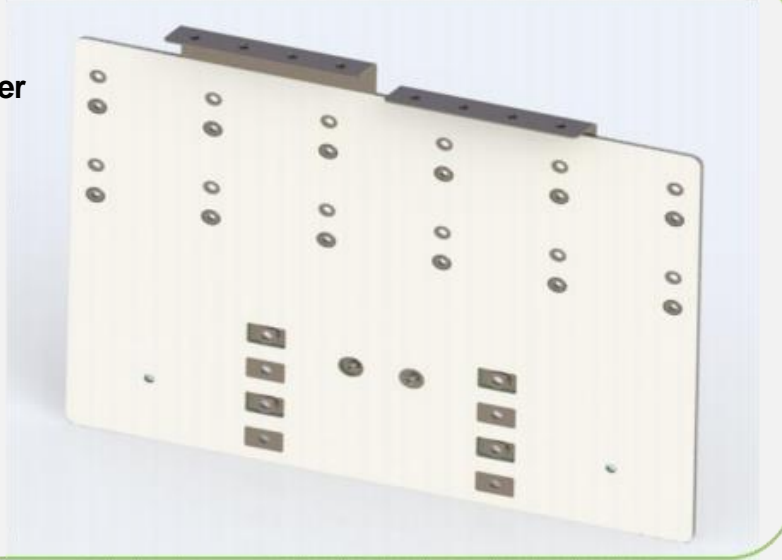
Rated voltage: 1700V DC

Rated current: 1000A A.

Electrical clearance: 14mm

Creep distance: 20mm

Layer: 2 Layers



Wind power converters generally have 1-4 power modules per phase (three phases in total), and each block has a busbar. When the power of the whole machine is $\geq 800\text{KVA}$, or the power of a single power module is $> 200\text{KVA}$, the performance of wind power converters will be greatly improved by using laminated busbars.



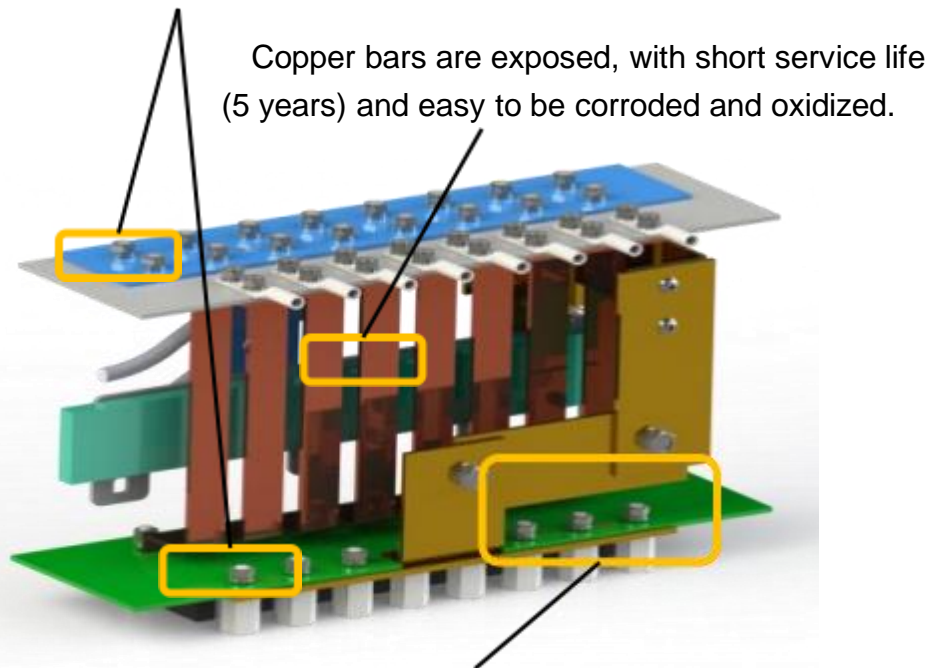
Laminated busbar

Wind power converter

Application in Battery Pack Product Field

Communication Field-Power Distribution

◆A large number of fixing and connecting parts, which are not conducive to installation and maintenance.



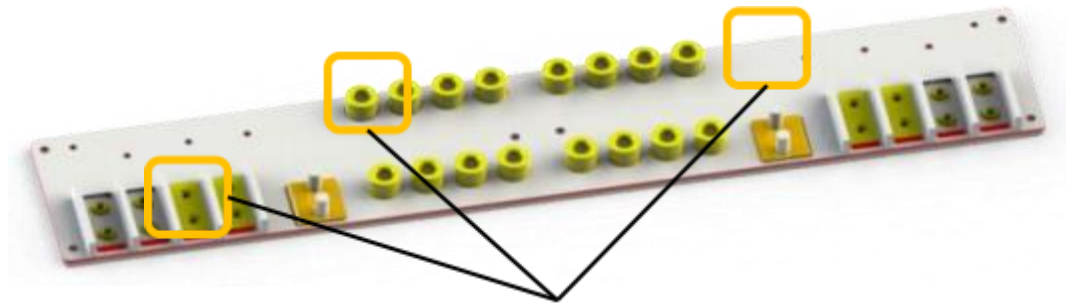
Low PCB withstanding voltage ($\leq 220\text{V}$) and limited current-carrying capacity ($\leq 200\text{A}$).

Before Optimization

Case

Application equipment: technical requirements for communications equipment

Riveted copper column bear thrust: $\geq 200\text{ N}$




Integrated design, the structure is compact and easy to install
All-copper conductive, and has high current-carrying capacity (up to 3000A);

The conductor surface is plated, the outer insulation film of the busbar is sealed, the voltage resistance is up to 10kV, and the service life is long (20 years).

After Optimization


Product Showcase

◆ FPC Acquisition Module for Pouch Cell Product Showcase

TYPE	PHOTO	FEATURE
<p>FPC acquisition module for pouch cell</p>		<p>FPC is highly integrated, comes with overcurrent insurance, replaces the original wiring harness products, balanced management of a single battery, lightweight, consistent, stable performance, and easy to automate the assembly of use.</p>

Product Showcase

◆ Energy Storage Battery PCB Acquisition Module and CCS Acquisition Module

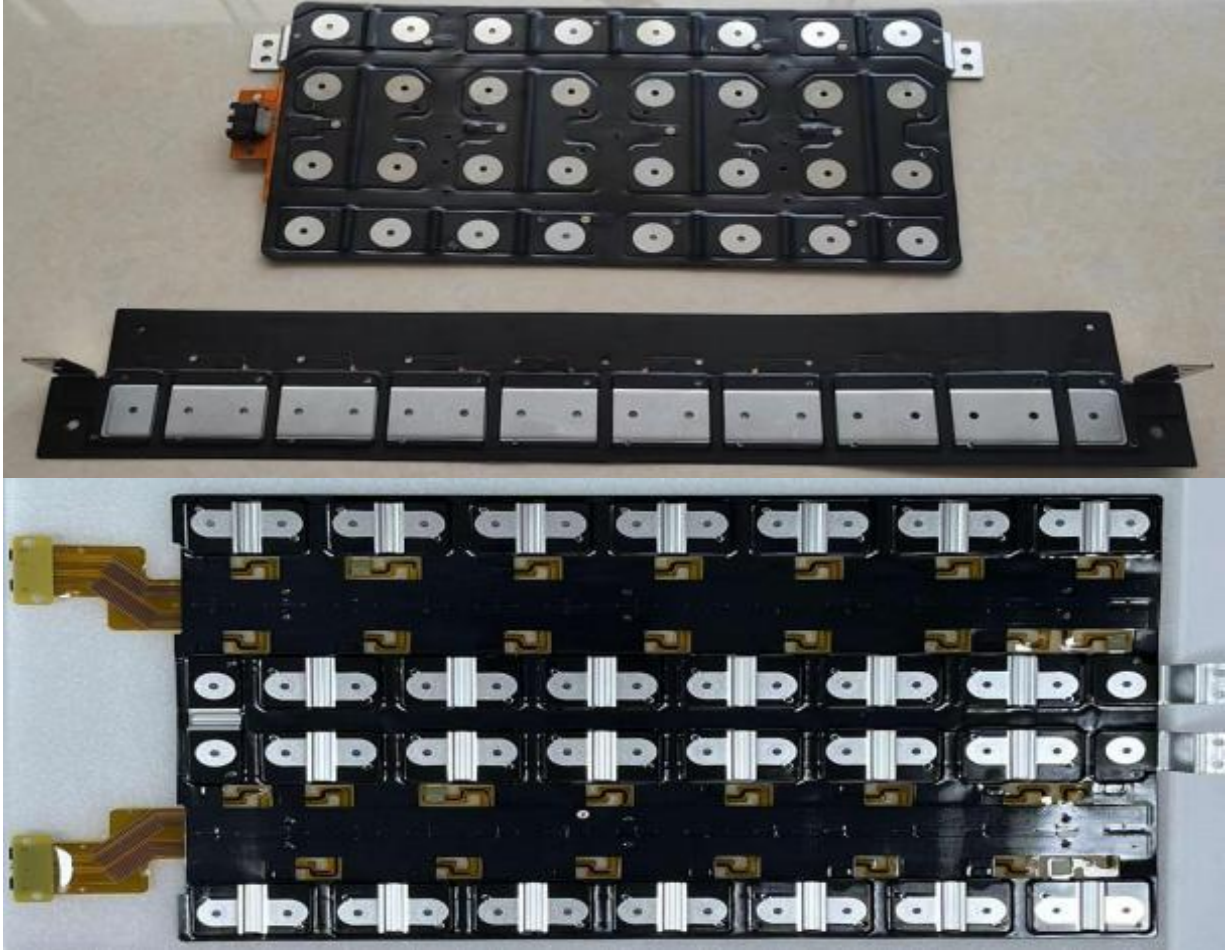
TYPE	PHOTO	FEATURE
<p>Energy storage battery FPC and hot pressing CCS acquisition module</p>		<p>The FPC and PCB solution of CCS is highly integrated and comes with overcurrent insurance, replacing the original wiring harness products to manage the equalization of a single battery, with light weight, strong consistency, stable performance, and easy to use for automated assembly.</p>

Product Showcase

◆ New Energy Vehicle Battery CCS Acquisition Module (Hot Press Solution)

TYPE	PHOTO	FEATURE
------	-------	---------

New energy vehicle battery hot pressure CCS acquisition module



It is the thinnest CCS product with certain flexibility, which can effectively save module space. The product has good wrapping property and simple manufacturing process, and the product has been tested in mass production for a long time.

Product Showcase

◆ New Energy Storage Battery CCS Acquisition Module (Tray and Isolation Plate Solution)

TYPE	PHOTO	FEATURE
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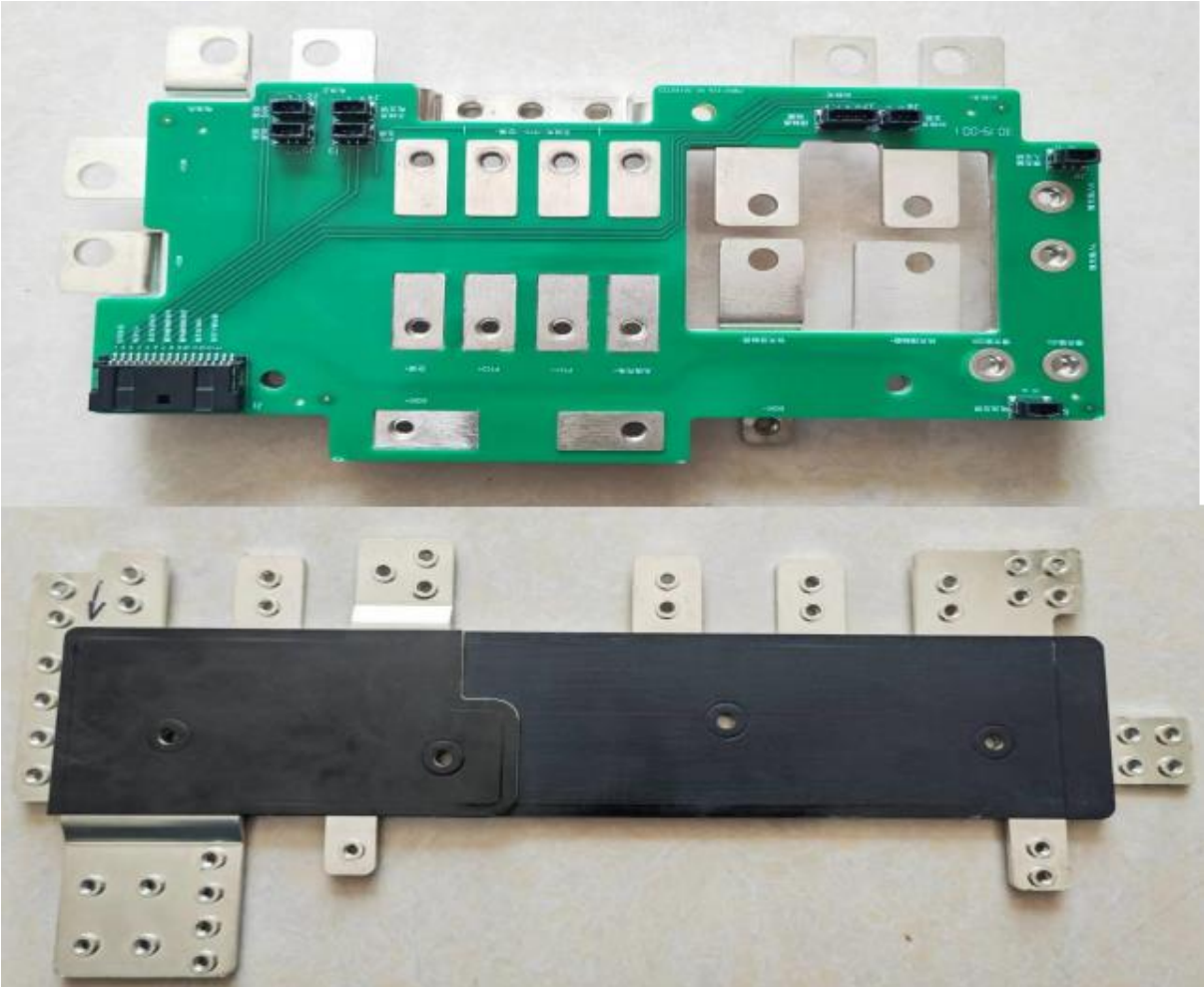
Energy storage and automotive battery blister tray hot rivet and isolation plate holder CCS acquisition module



It is the thinnest CCS product with certain flexibility, which can effectively save module space. The product has good wrapping property and simple manufacturing process, and the product has been tested in mass production for a long time.

Product Showcase

◆ Product Showcase Multi-layer Laminated Busbar Showcase

TYPE	PHOTO	FEATURE
Composite multilayer laminated busbar		<p>Multiple interfaces and outputs for different ways of power distribution Integrated design can integrate PCB and Busbar</p> <p>Copper conductor, the conductivity in the same space is several times that of cable</p> <p>Edge sealing treatment, surface and interlayer lamination, withstanding voltage up to 10kV</p> <p>Up to 4 or more current paths on a single level, providing multi-potential, multi-loop power distribution</p>

Product Showcase

◆ Sheet Metal and Machining Products Display



Machined Parts



Connecting Aluminum Busbar



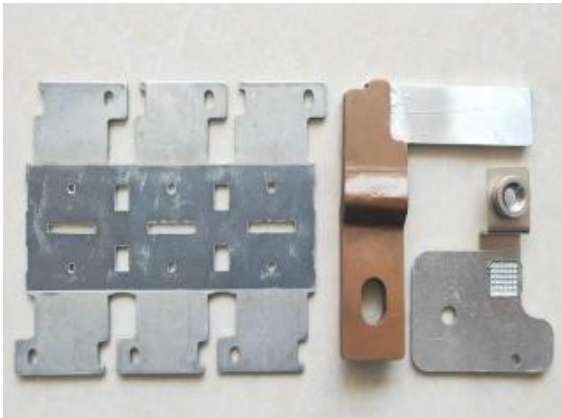
Copper-Aluminum/Aluminum-Aluminum bonded Busbar



Output and Input Aluminum Busbar



Nickel and Soft Copper Composite Busbar



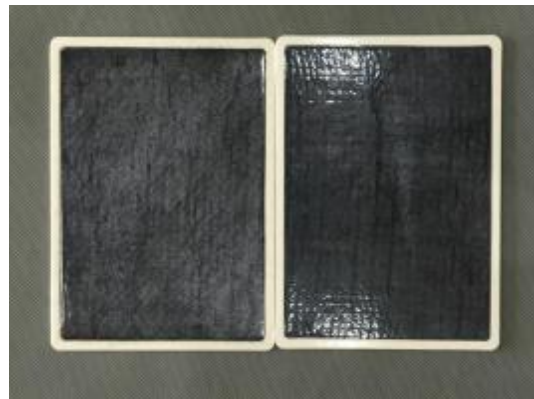
Nickel-Aluminum Composite Busbar

Product Showcase

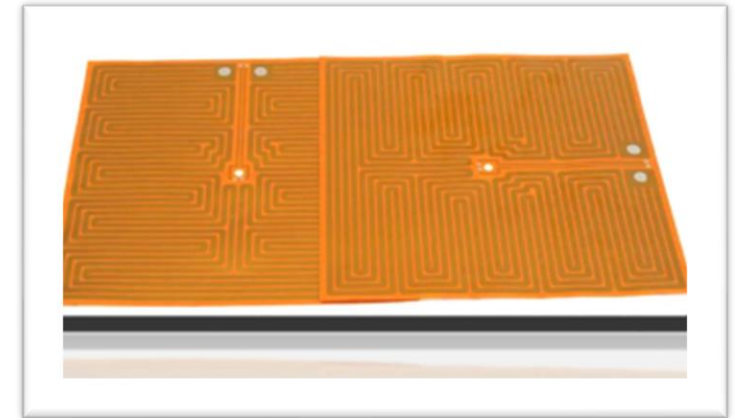
- ◆ Display of Auxiliary Thermal Insulation Products for Injection Molding Parts
- ◆ Product Category Introduction III Structure Part



Hot Pressing Molding and Injection Molding Parts



Aerogel Thermal Insulation Cotton



Heating Film

Equipment Showcase

◆ Main Equipment (1-Circuit Board)



Automatic Laminator



Full-Automatic LDI Exposure Machine



Full-Automatic VCP Line



Cosmic DES Line



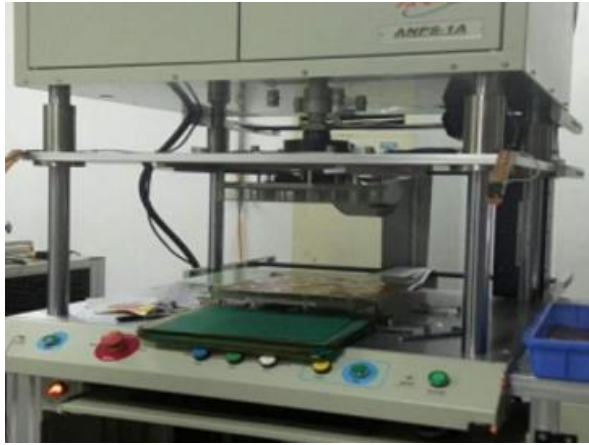
Auto-Reinforcing Adhesive Tape Machine



Full-Automatic Punching Lathe

Equipment Showcase

◆ Main Equipment (2-Circuit Board)



Low Resistance Four-Wire Tester



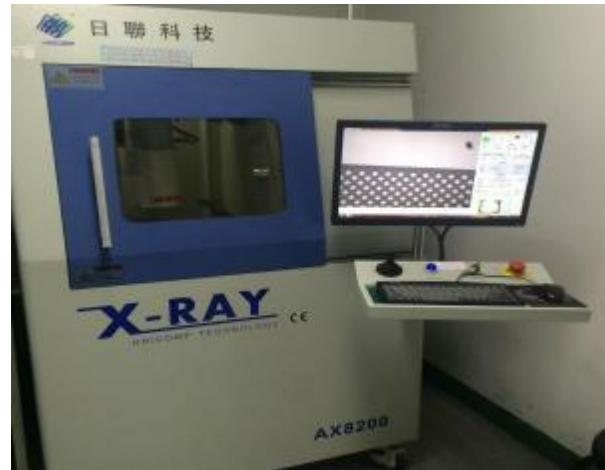
Circuit AOI



Full-Automatic Steel Sheet Machine



SMT Online SPI



X-RAY Tester



SMT Parallel Loader

Equipment Showcase

◆ SMT Main Equipment (3-SMT)



Automatic Solder Paste Printing Machine



JUKI-SMT Machine



Reflow Soldering



AOI Machine



X-RAY Machine

Equipment showcase

◆ Main Equipment (4-Metals)



Nickel/Steel High-Speed Precision
Automatic Punching Machine



Copper-Aluminum Busbar Large-Tonnage
Precision Automatic Punching Machine

Equipment Showcase

◆ Key Equipment (5-Metals)



Magnetic Polishing Machine



Automatic Riveting Machine



High Polymer Welding Machine

Equipment Showcase

◆ Key Equipment (6 --CCS)



CCS Hot Riveting Press Machine



CCS Multilayer Hot Pressing Line



CCS Nickel Sheet Laser Welder

Equipment Showcase

◆ Key equipment (7 --CCS)

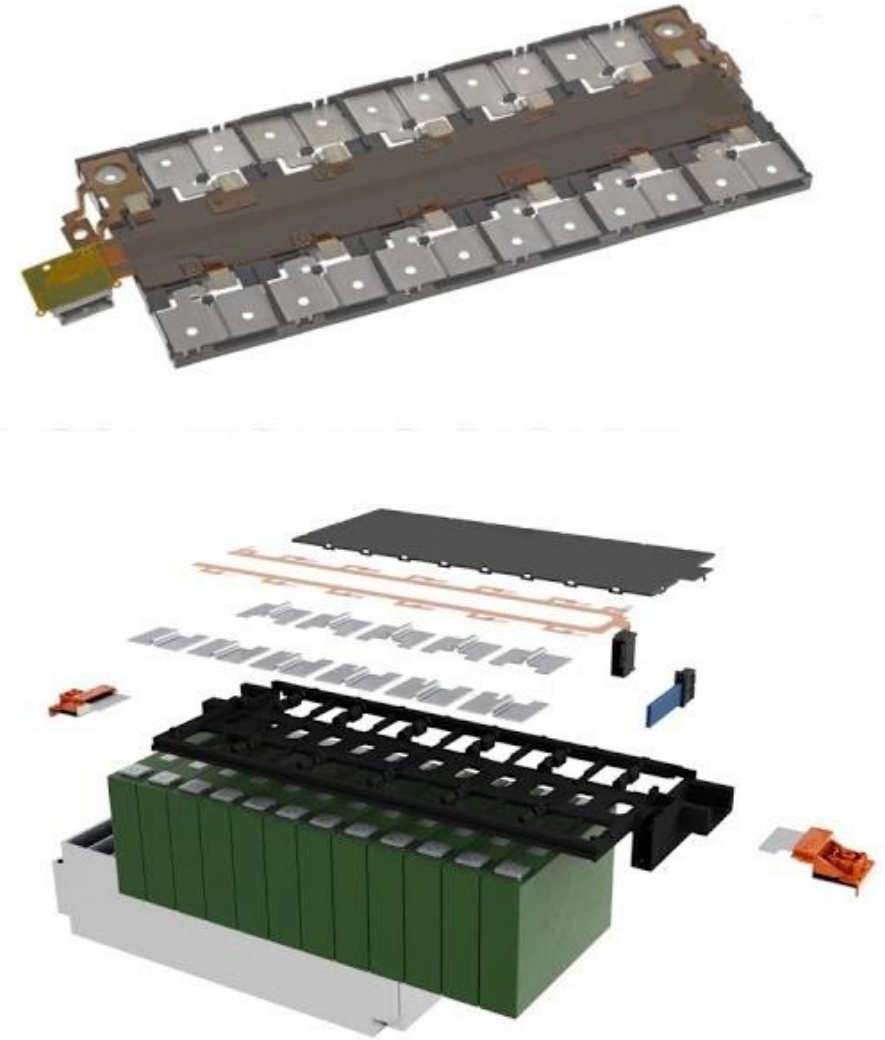


CCS Hot Riveting Press Machine



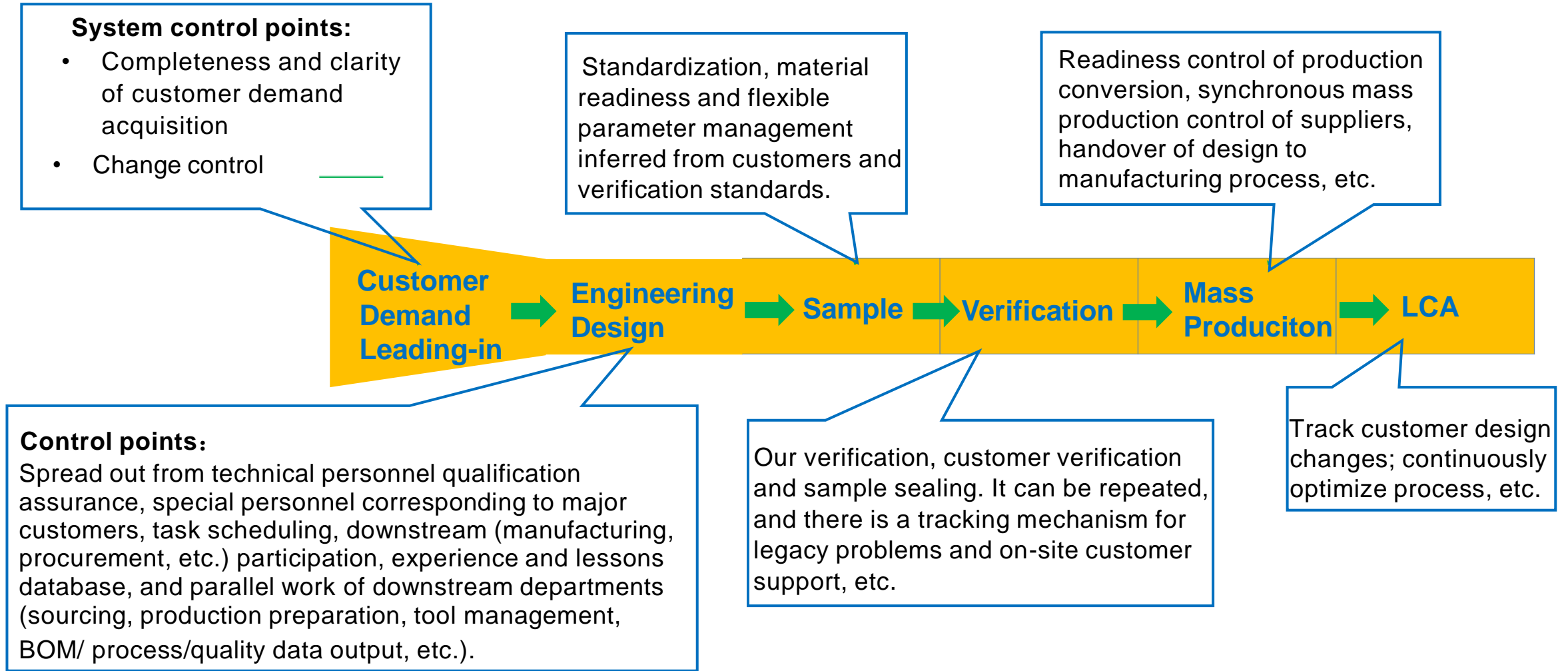
CCS Hot Pressing Line

3. Product R&D



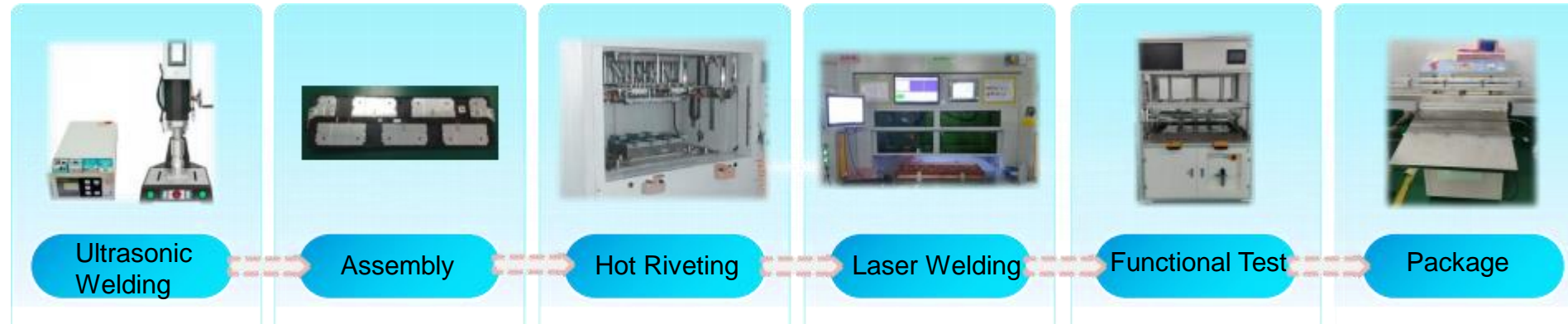
Product Design and R&D

◆ Operational Framework of R&D Design System

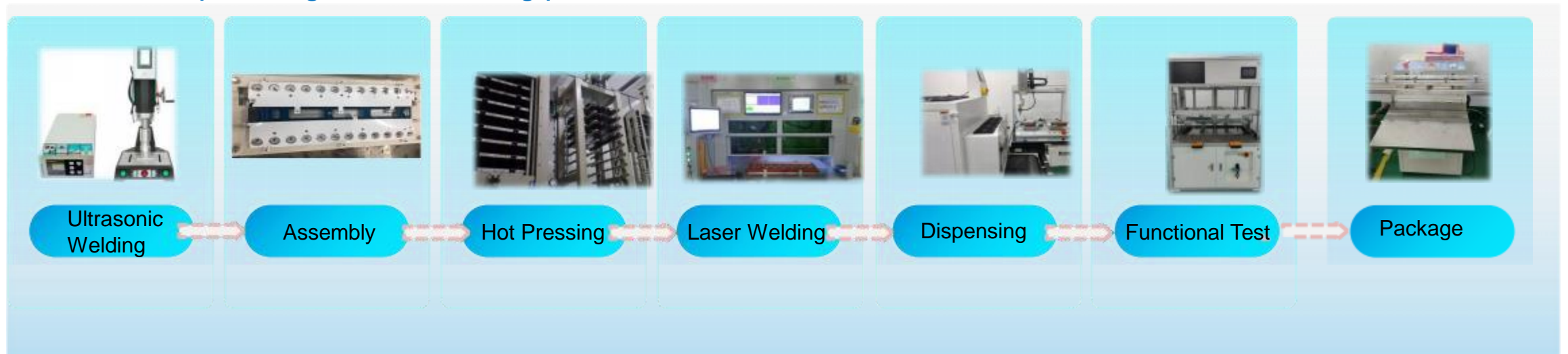


Product Design and R&D

◆ CCS Hot Riveting Manufacturing Process Flow

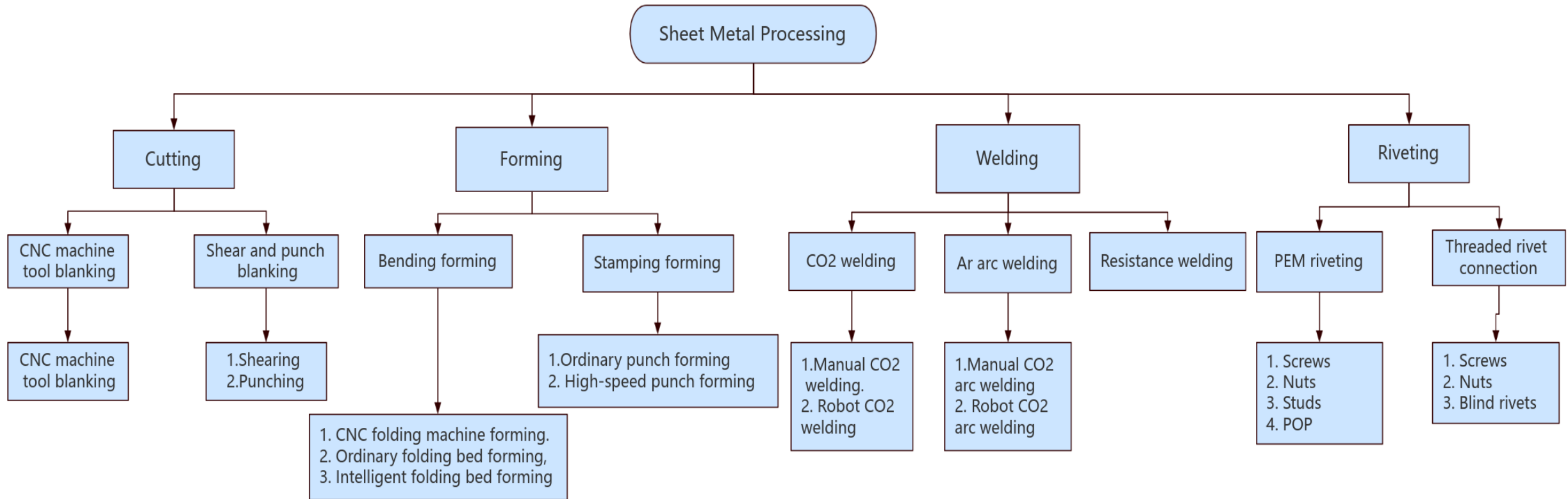


◆ CCS Hot pressing manufacturing process flow



Product Design and R&D

◆ Sheet Metal Processing Process

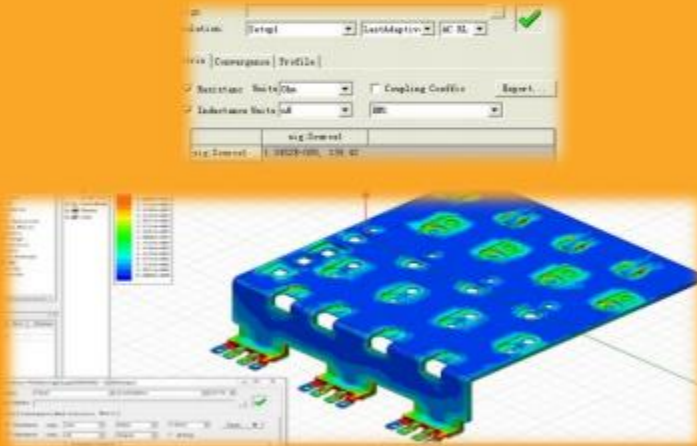


Product Design and R&D

◆ Busbar Design Ability

Inductor Design

Low inductance design
Inductance simulation/testing



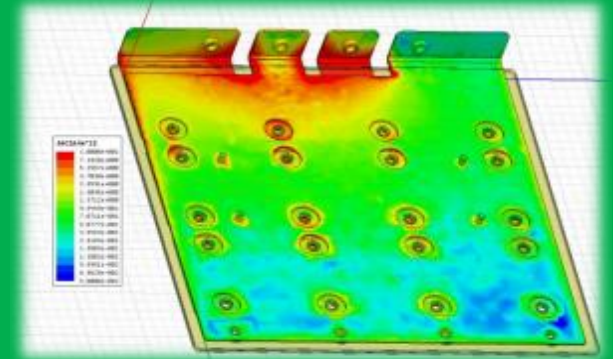
PD Design

High partial discharge busbar design
Partial discharge test



Temperature Rise Design

Busbar current-carrying test
Thermal simulation/testing

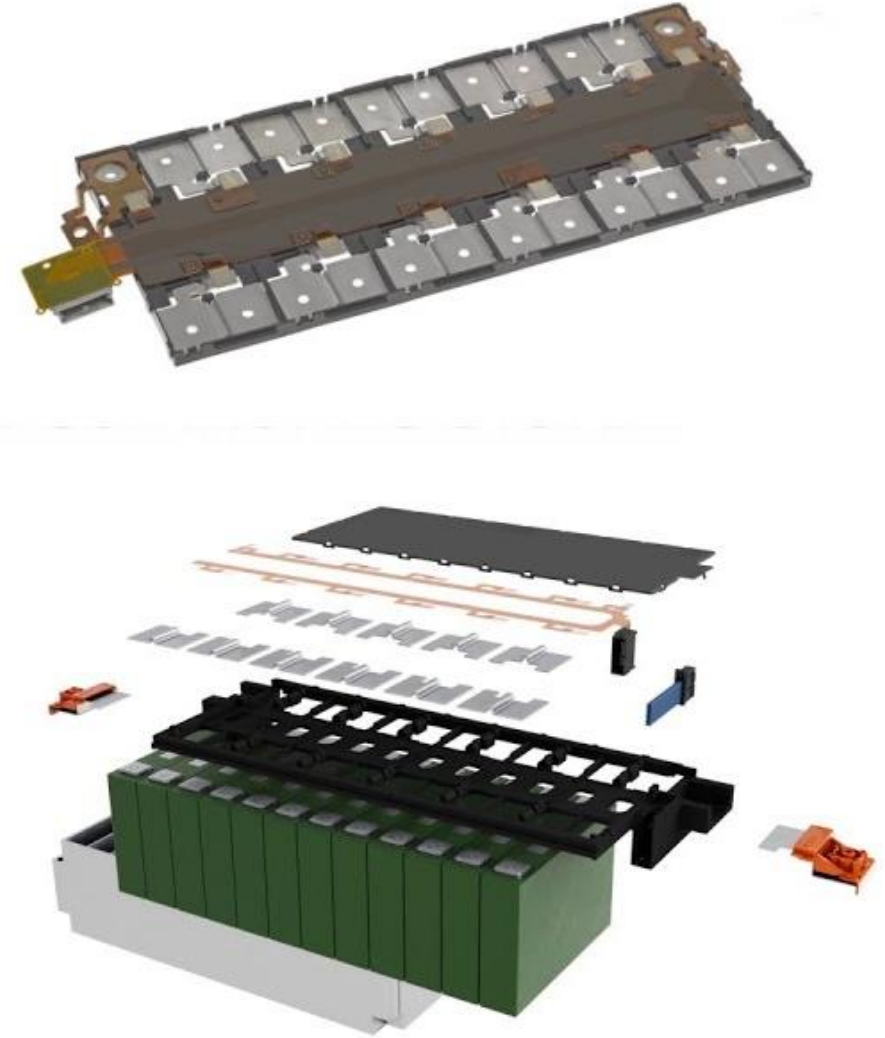


Product Design and R&D

◆ Busbar Product Processing Capacity

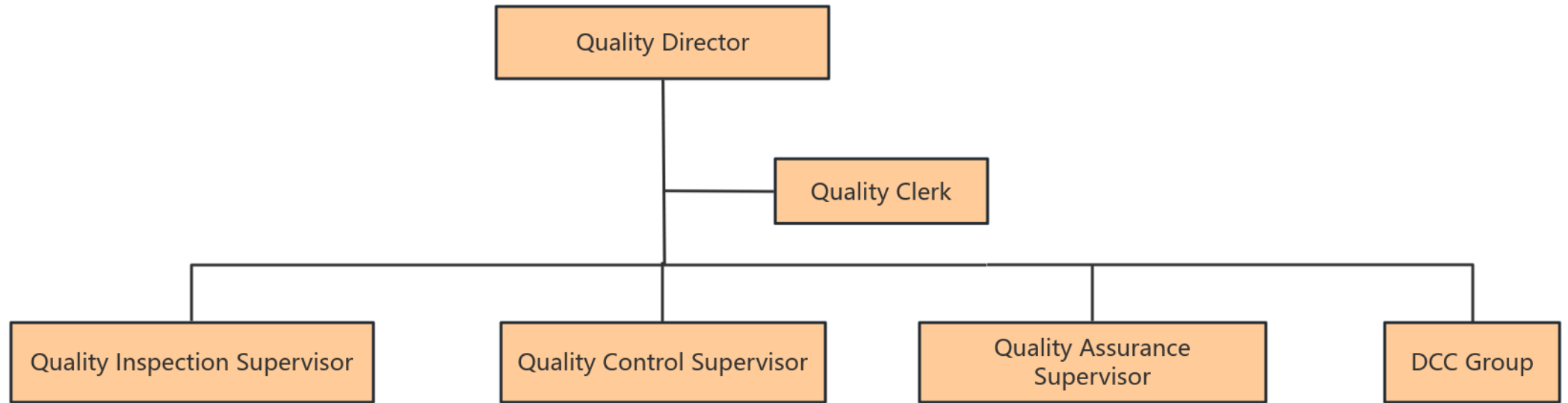
Maximum Layer	6	Working voltage	0~20KV
Copper thickness	8mm	Working current	0-3000A
Maximum size	900mm*1600mm	Working temperature	-55 ~125 °C
Surface treatment	Tin/gold/silver/passivation, etc.	Partial discharge	< 10PC
Peel strength	> 1.0 N/mm	UL certification	Can be provided
Conductor material	T2 Copper, 1060Aluminium	ROSH certification	Can be provided
Insulation material	PET/NOMEX, etc.	Reliability report	Can be provided

4. Product Quality Assurance



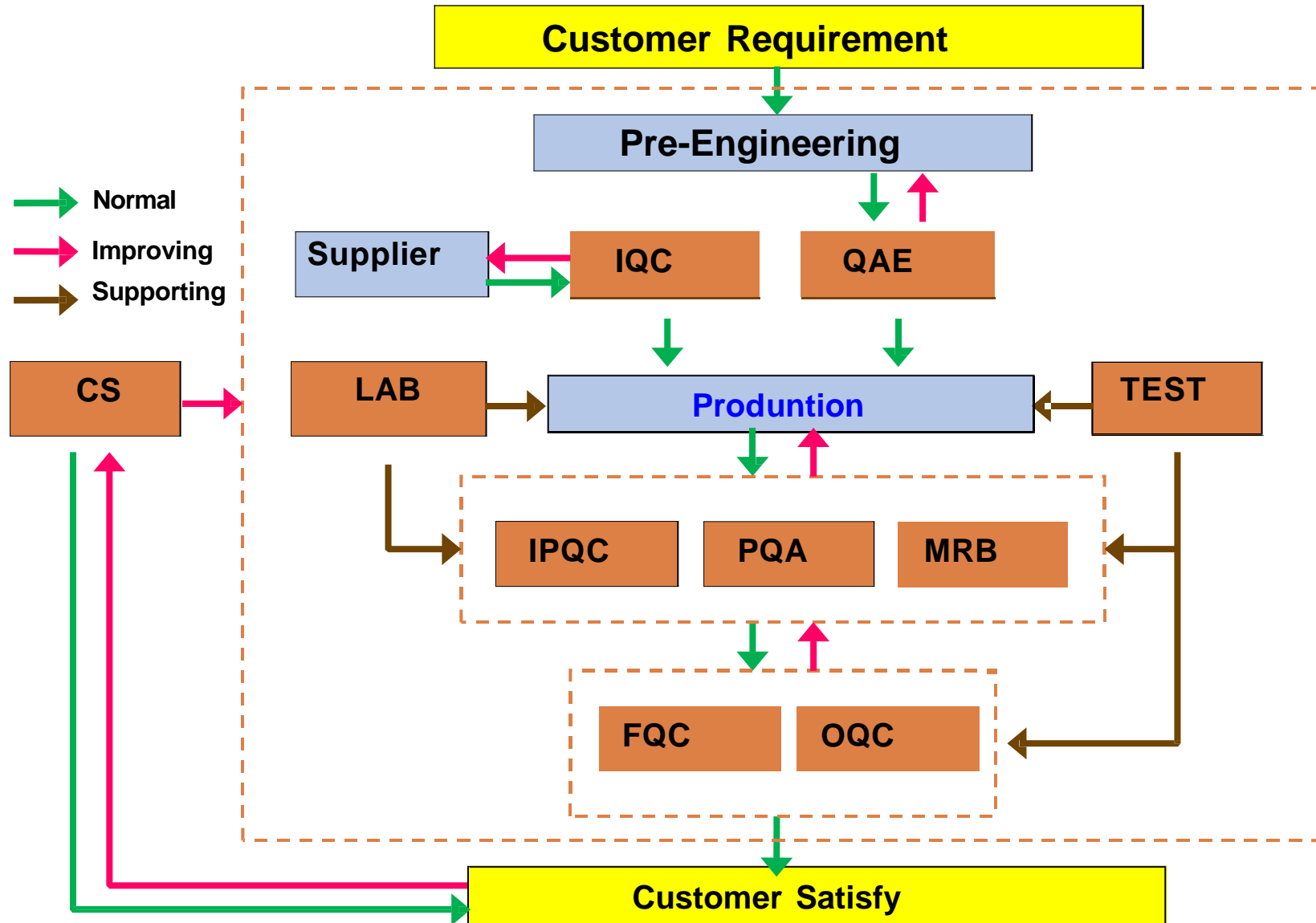
Quality Assurance

◆ Organizational Structure of Quality Department



Quality Assurance

◆ Function of Quality Management Organization



Quality Assurance

◆ Reliability Test Capability



Open-Short Circuit Tester



Impedance Tester



OGP Tester



Shrapnel Life Testing Machine



Shrapnel Feel and Stroke Tester



Environmental Tester

Quality Assurance

◆ Reliability Test Capability



Safety Tester



Digital Eddy Current Conductivity Gauge



Fuse Fuse Tester



Drawing Force Tester

Power Battery Panel

- Voltage withstand/insulation resistance test
- Current carrying and temperature rise test
- Pressure cooker test
- Fuse fuse test
- Metal materials conductivity test
- Drawing force test
- Peeling force test

Commonality Test

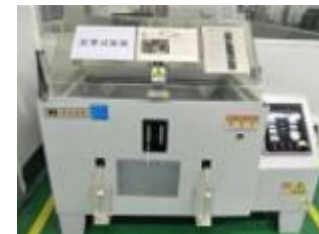
- Temperature and humidity loop test
- Salt spray test
- Thermal shock
- Low temperature test
- Ionic contamination tester
- EDX/SEM
- Spectral analysis system
- Fourier transform infrared spectrum
- size measurement
- ROHS hazardous substances detection



Fourier Transform Infrared Spectrometer



Temperature and Humidity Chamber



Salt Spray Test



Three-Coordinates Measuring



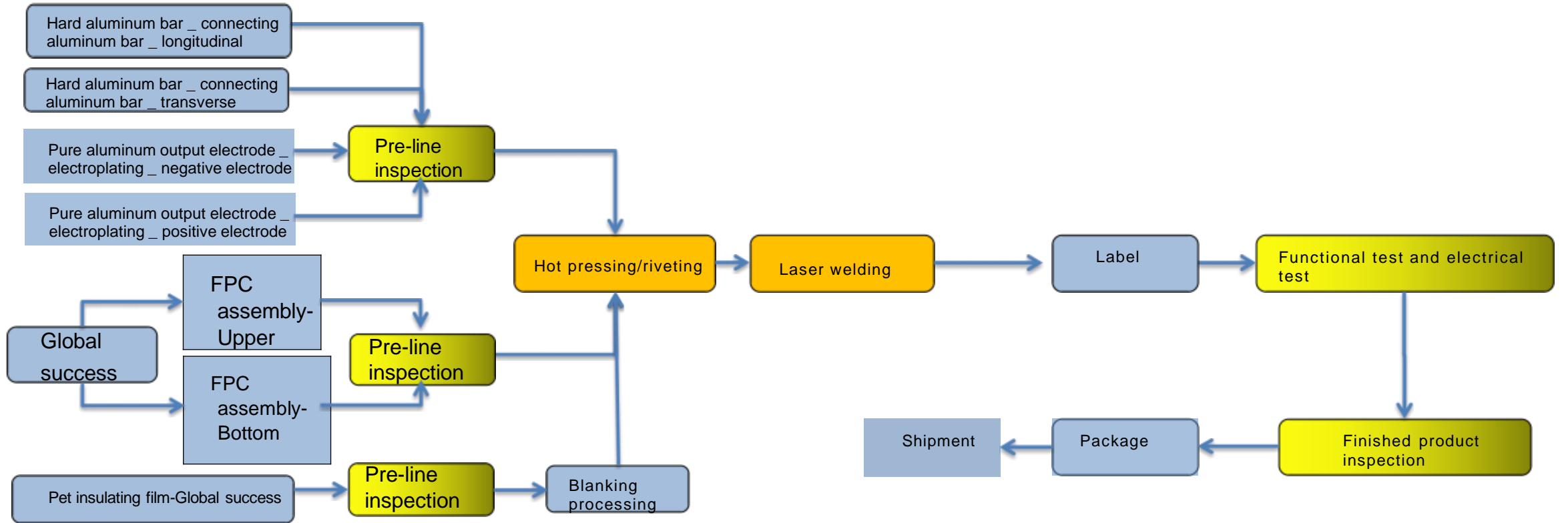
Temperature Rise Tester






Ionic Contamination Tester

Production Capacity

◆ CCS finished product production flow chart



-  Indicates the inspection process.
-  Indicates the key production process
-  Indicates the main flow of busbar production

Production Capacity

◆ Finished product production equipment

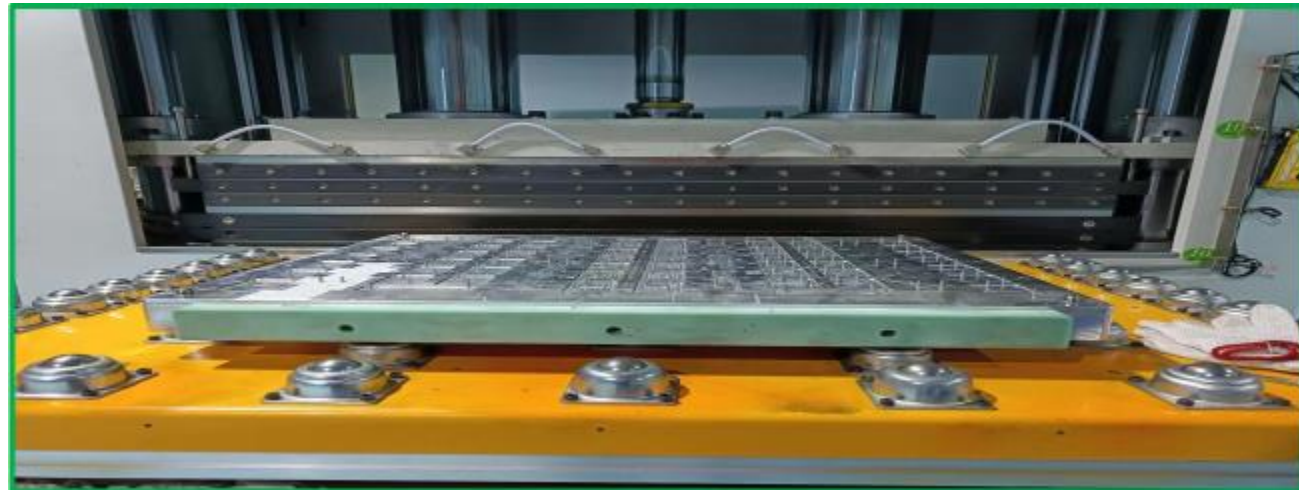
CCS Forming Equipment

Automatic hot pressing/riveting equipment
Hot pressing 20 times/hour



CCS Forming Fixture

The existing hot pressing/hot riveting fixture is 1 to 3-6
Hot pressing size 1.2*0.7. Average: 4



Production Capacity

◆ Equipment - Laser - Test

CCS finished product laser equipment

Automatic laser equipment
Laser 100 pcs/ hour



CCS finished product testing equipment

Automatic function test
Produce 80 pcs/ hour



Production Capacity

◆ 2023-2025 Scale-Equipment-Energy-Personnel-Production Capacity

Description of production capacity from 2022 to 2025

It is estimated that one vehicle will use about 3 pieces;
 In 2023, 600,000 vehicles will be produced;
 In 2024, 1 million vehicles will be produced;
 In 2025, 1.6 million vehicles will be produced.

		Space	Equipment	Engery	Personnel	Month capacity/pcs	Annual production capacity/pcs
Shenzhen	2022	3000m ²	2 lines	1500KVA		80,000	900,000
	2023	4000m	3 lines	1500KVA	88	120,000	1,350,000
	2024	8000m ²	6 lines	1500KVA	150	230,000	2,500,000
		Space	Equipment	Engery	Personnel	Month capacity/pcs	Annual production capacity/pcs
Jiangsu	2023	4000m ²	3 lines	1500KVA	88	120,000	1,350,000
	2024	8000m ²	6 lines	3000KVA	150	230,000	2,500,000
	2025	12000m ²	10 lines	6000KVA	220	350,000	3,800,000
		Space	Equipment	Engery	Personnel	Month capacity/pcs	Annual production capacity/pcs
Total	2023	8000m ²	6 lines	3000KVA	170	240,000	2,500,000
	2024	16000m ²	12 lines	6000KVA	310	450,000	4,800,000
	2025	20000m	16 lines	8000KVA	370	580,000	6,200,000

Environmental Guidelines

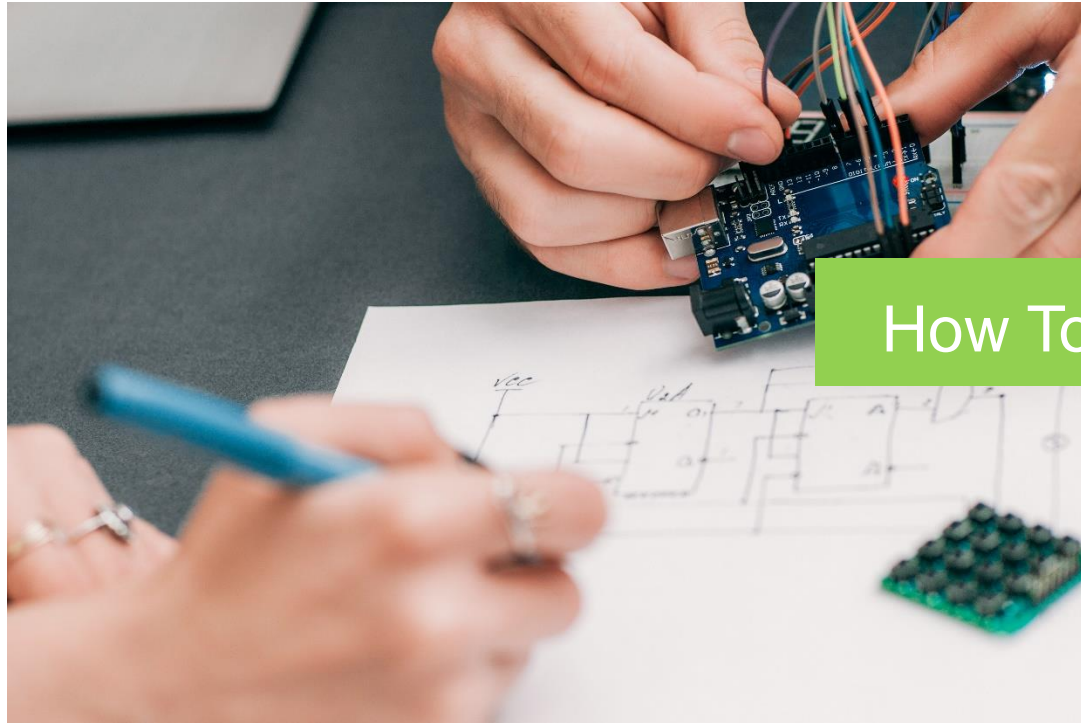


- Abide by environmental laws and regulations, save energy, reduce consumption and waste.
- Clean and safe production, continuous improvements.
- Create a Green Home.

- Protect the Earth's environment
- Contribute to sustainable development



Group Headquarters



How To Find Our Head Office?



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Shenzhen



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THANKS FOR LISTENING!

感谢聆听