

Introduction To Connectors And Integrated Cable Products





Directory

- 1. The Connector Introduction**
- 2. Vehicle-end Jumper Integration Introduction**
- 3. Existing Resource Capacity**

1. The Connector Introduction

➤ Connectors used by various systems in the vehicle

Vehicle Power/Control/
Network connectors

Air Conditioning
Connector

Networking/Control
Connector



Traction System/
Motor Connectors

Braking Device/
Sensor Connectors

Auxiliary Power Supply
Connector

Electric Coupler
Connector

➤ Connector classification

**By function
classify**

**By location
classify**

Power connectors
Transmit energy

Control connectors
Transmission logic
levels

Network connectors
Transmit signal
information

**Waterproof
connectors**
Exterior applications

Non-waterproof connectors
In-vehicle and in-cabinet
applications



➤ **Dosage is high**

Electrical connectors are used in all systems of the vehicle.

➤ **What you'll need**

It can realize the fast connection between the various systems and is an essential component for modular production.

➤ **Special Important**

It is the connecting joint of each system unit, which affects the smooth and safe operation of the train.

1. The Connector Introduction

➤ The main connection form of rail transit connectors



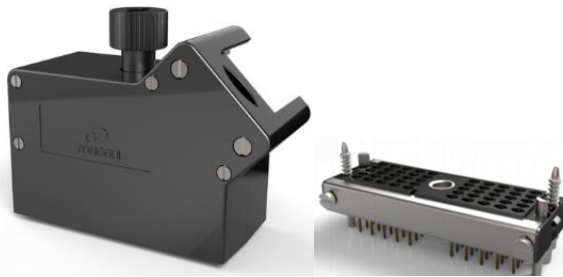
Snap-on quick connection



Push-pull locking connection



Screw connection



Screw connection



Threaded connection



Handle-locking connection

1. The Connector Introduction

➤ Vehicle-end connector - DC1500V/AC380V busbar (650A)

Rated voltage: 2000V;

Rated current: 650A;

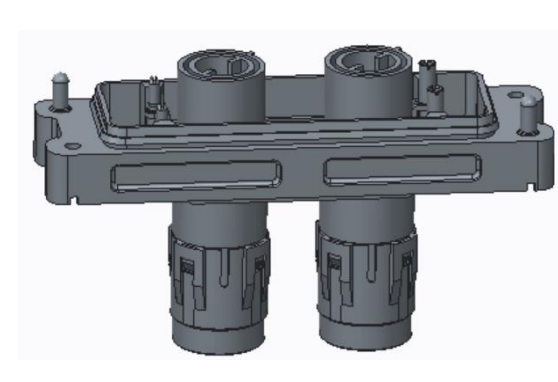
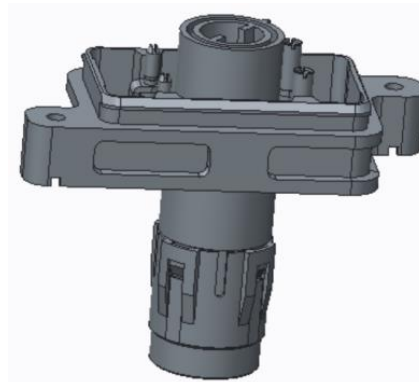
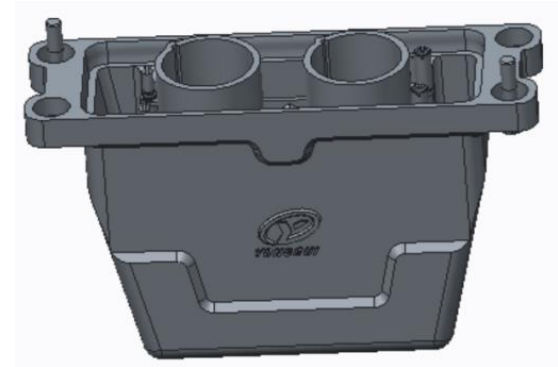
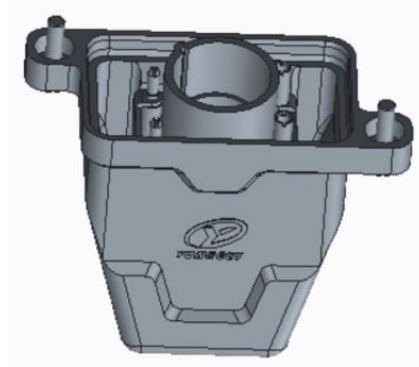
Insulation resistance: $\geq 10000\text{M}\Omega$;

Withstand voltage: AC10000V 50Hz 1Min
without breakdown or flashover;

Mechanical life: ≥ 500 times;

Protection level: IP67 or above;

Compatible cable: $25\text{mm}^2 \sim 185\text{mm}^2$.



Single-pin
connector

Two-pin
connector

1. The Connector Introduction

➤ Vehicle-end connector - DC1500V/AC380V/DC110V busbar (350A)

Rated voltage: 2000V;

Rated current: 350A;

Insulation resistance: $\geq 10000M\Omega$;

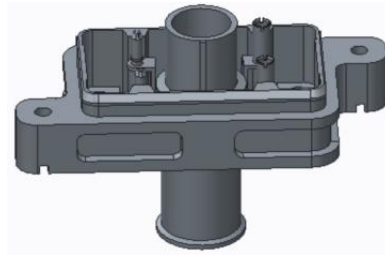
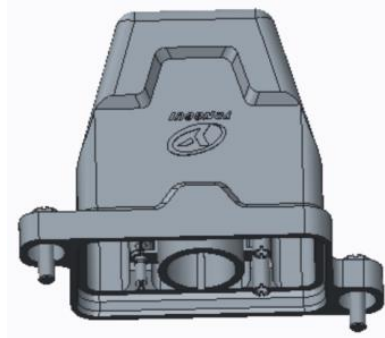
Withstand voltage: AC6000V 50Hz

1min without breakdown or flashover;

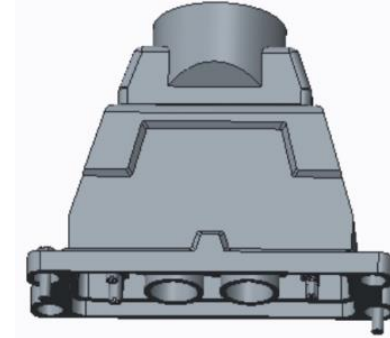
Mechanical life: ≥ 500 times;

Protection level: IP67 or above;

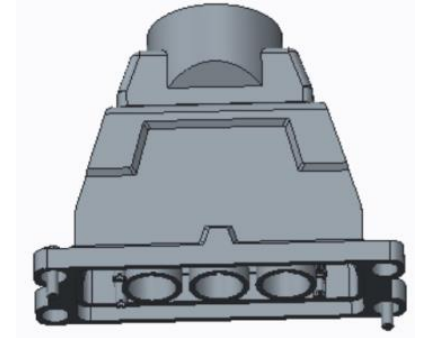
Compatible cable: $16mm^2 \sim 120mm^2$.



Single-pin connector



Two-pin connector



Three-pin connector

➤ Vehicle-end connectors – control connectors, modular combination (integral module)

Rated voltage: 250V;

Rated current: 10A;

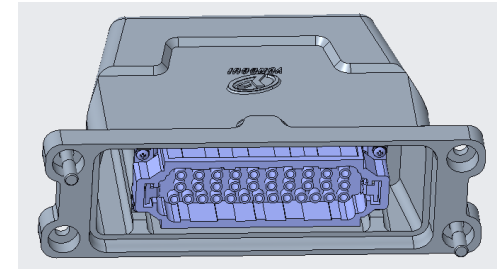
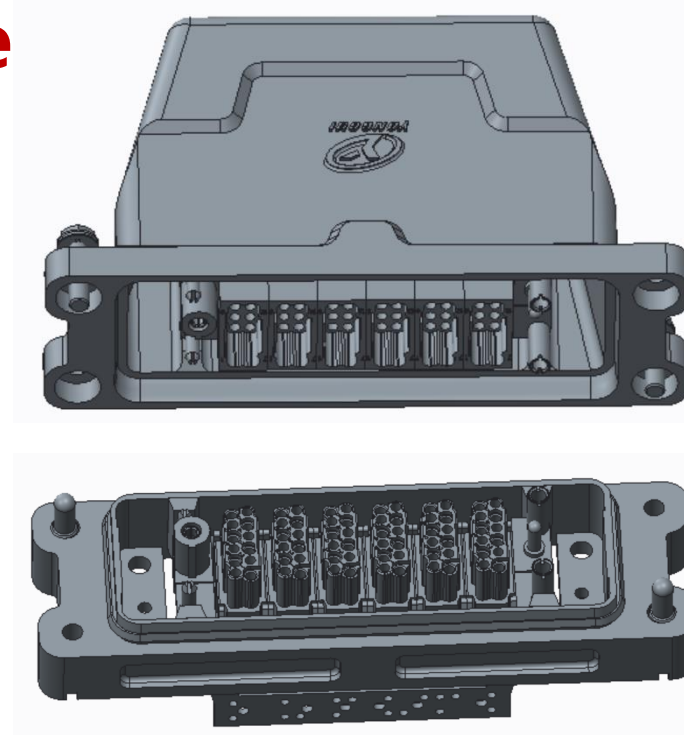
Insulation resistance: $\geq 10000\text{M}\Omega$;

Withstand voltage: AC2000V 50Hz 1min
without breakdown or flashover;

Mechanical life: ≥ 500 times;

Protection level: IP67 or above;

Compatible cable: $0.5\text{mm}^2 \sim 2.5\text{mm}^2$.



**Control
connector**

1. The Connector Introduction

➤ Vehicle-end connectors – network/signal/PIS connector

Rated voltage: 50V;

Rated current: 10A (4 cores) / 5A (8 cores);

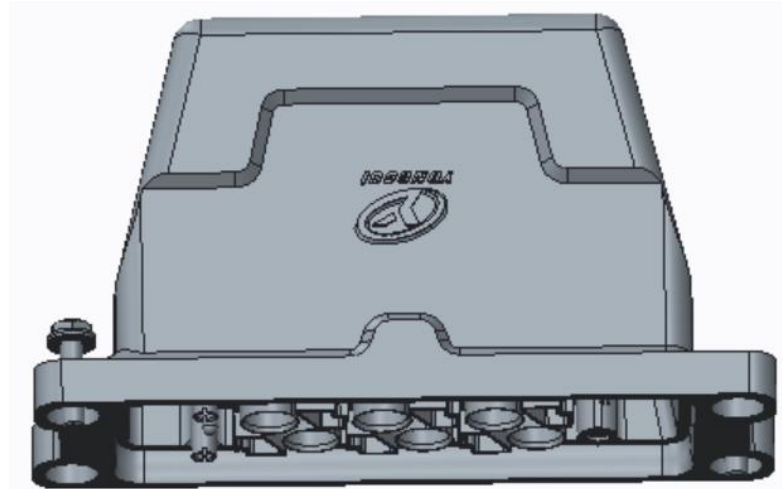
Insulation resistance: $\geq 10000\text{M}\Omega$;

Withstand voltage: AC800V (4 cores) / 500V (8 cores) 50Hz 1min without breakdown or flashover;

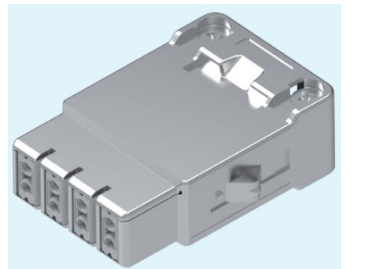
Mechanical life: ≥ 500 times;

Protection level: IP67 or above;

Compatible cable: $0.14\text{mm}^2 \sim 1.5\text{mm}^2$



Communication connector



➤ Vehicle-end connectors – circular

High/medium voltage series:

1~4 cores;

Control series: 5~85 cores;

Network series: 1~4 modules.



➤ Other series of connectors outside the car

External power supply

350A
400A
450A
530A



Motor series

200A
240A
300A
730A



Electric hook series

Urban rail: 32 cores, 40
cores, 50 cores, 70
cores
EMU: 75 cores, 98
cores, 140 cores, 196
cores



Heavy connect series

18 cores, 24
cores, 27
cores, 35 cores
and 37 cores



1. The Connector Introduction

➤ The overall trend of connector development



2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

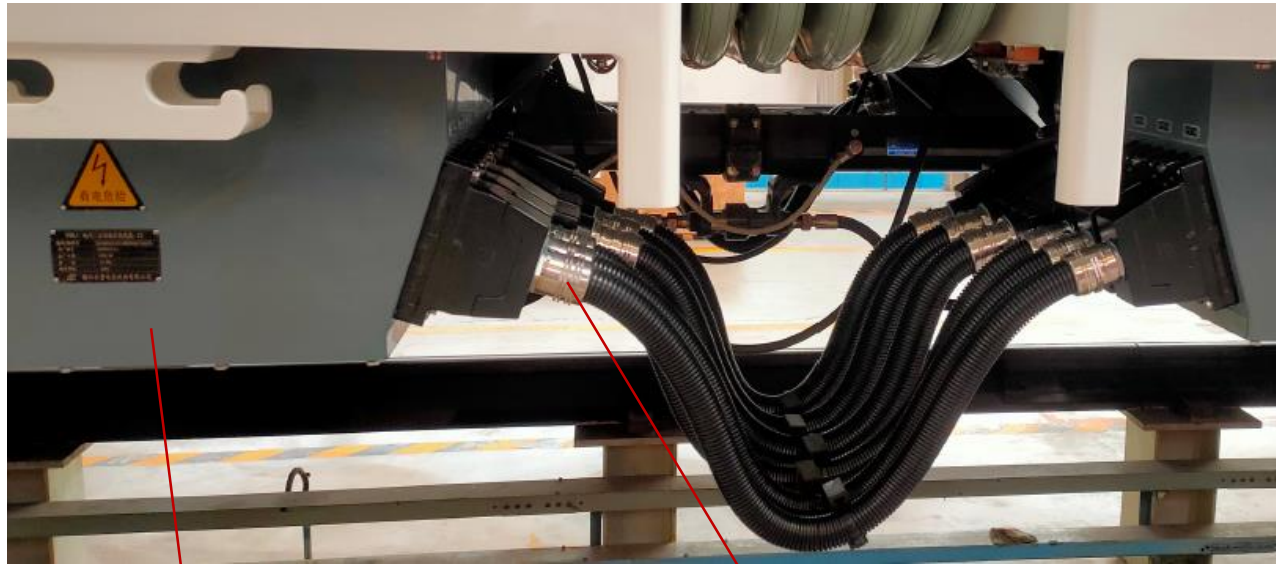
➤ **Product features**

The vehicle-end jumper integration is used to realize the power and signal transmission between adjacent vehicles, and meets the needs of vehicle decoding and coupling through the plugging and disconnection functions of connectors.

2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

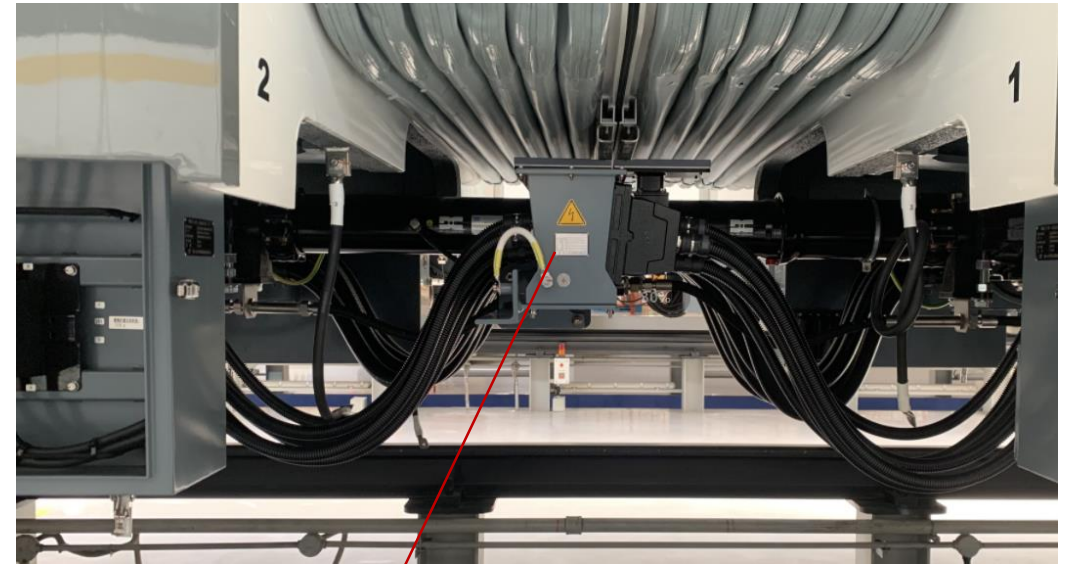
➤ Product Range (Metro Cars)

Vehicle-end jumper integration includes vehicle-end junction boxes, coupler junction boxes (sometimes available), vehicle-end connectors, and jumper cables.



**Car-end
junction box**

**Vehicle-end connectors
and jumper cables**



**Coupler
junction box**

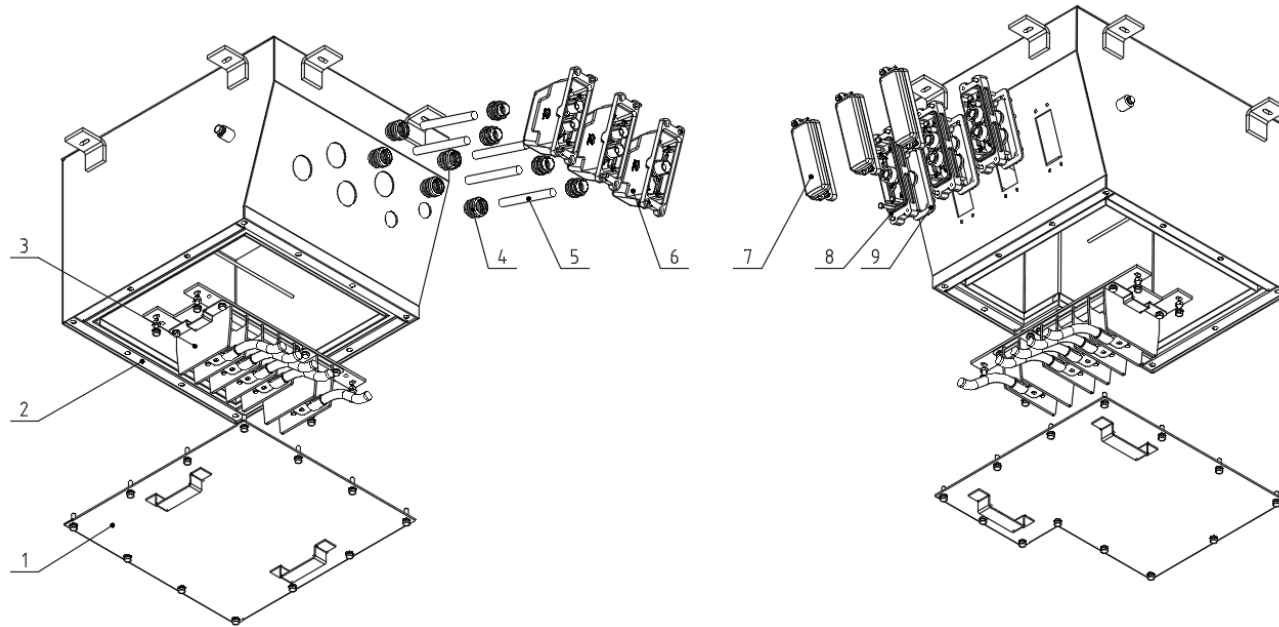
2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

➤ Structure introduction (end box)

The end box body is welded from carbon steel, stainless steel or aluminum alloy. The high-voltage box is equipped with a bus terminal bar, which is used for high-voltage and medium-voltage bus breakpoint shunting. The low-voltage box is equipped with a bus bar and a terminal row of the control line, which is used for the distribution of the low-voltage bus and the breakpoint of the control line.

2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

➤ Structure introduction (end box)

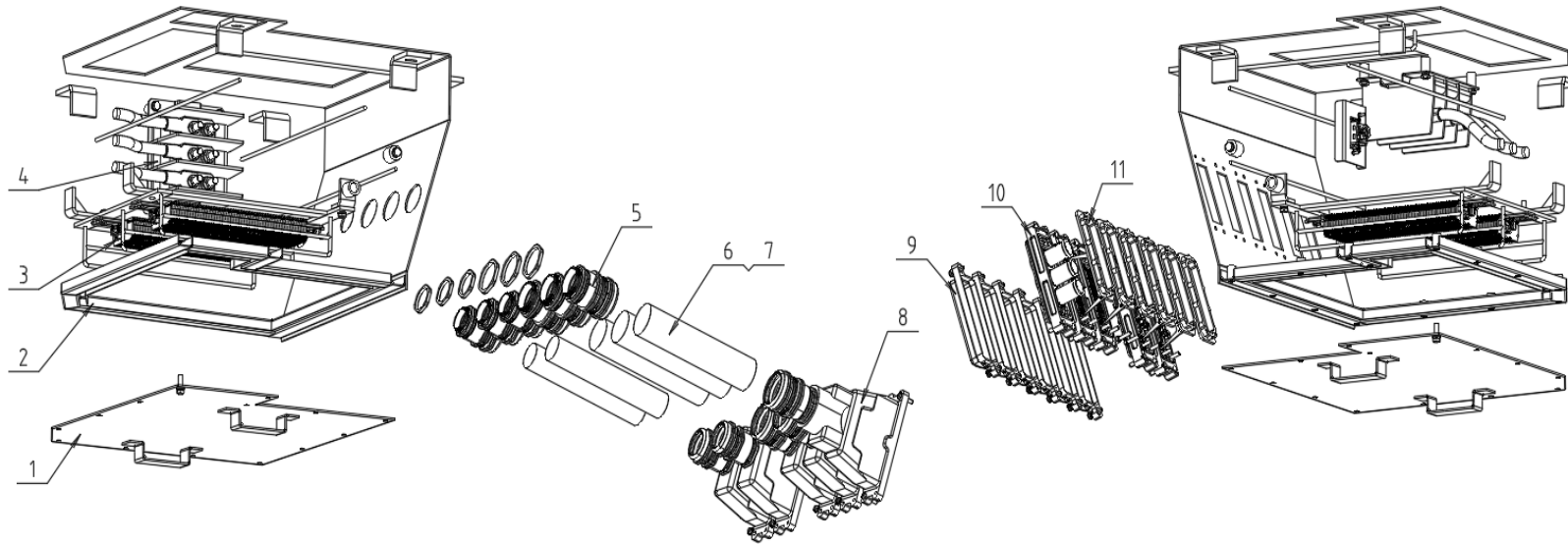


1—box cover 2—box body 3—bus terminal strip 4—metal cable waterproof joint 5—cable
6—connector plug 7—connector protective cover 8—connector socket 9—connector mount

**Vehicle-end high-voltage
jumper integration**

2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

➤ Structure introduction (end box)



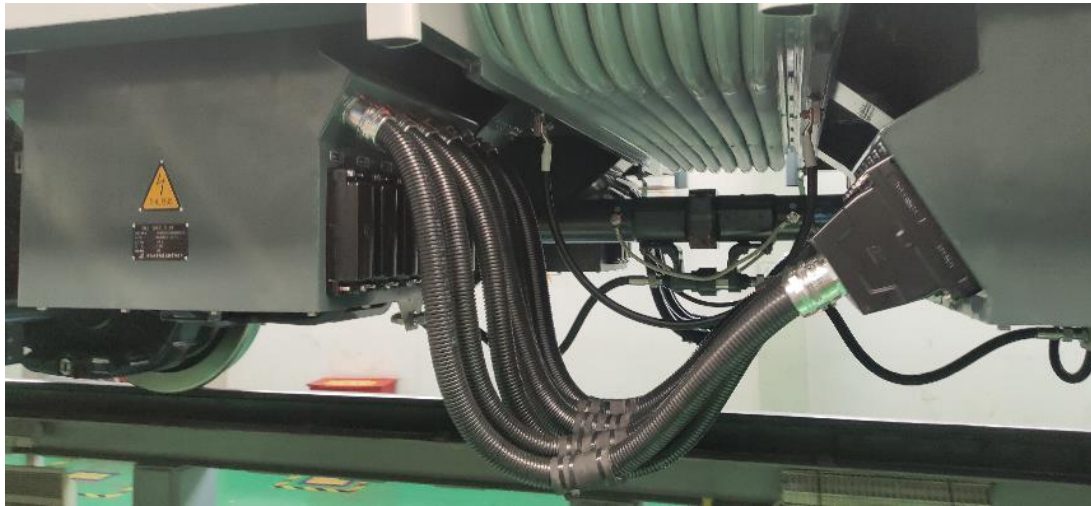
1—box cover 2—box body 3—control line terminal strip 4—busbar terminal strip 5—hose joint 6—corrugated hose 7—cable 8—connector plug 9—connector protective cover 10—connector socket 11—connector mount

Vehicle-end under-pressure
jumper integration

2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

➤ Structure introduction (vehicle end connector and jumper cable)

The vehicle-end connector and jumper structure is divided into two forms: plug cable assembly (left) and plug pair (right).



Vehicle-end under-pressure
jumper integration

2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

➤ Structure introduction (vehicle end connector and jumper cable)

Plug cable assembly jumper structure, the connector is single-ended detachable form, single-head single-seat, when the train is unassembled, after the connector plug is removed from the socket, it can be collected and fixed on the empty seat of the car box or mounting frame.

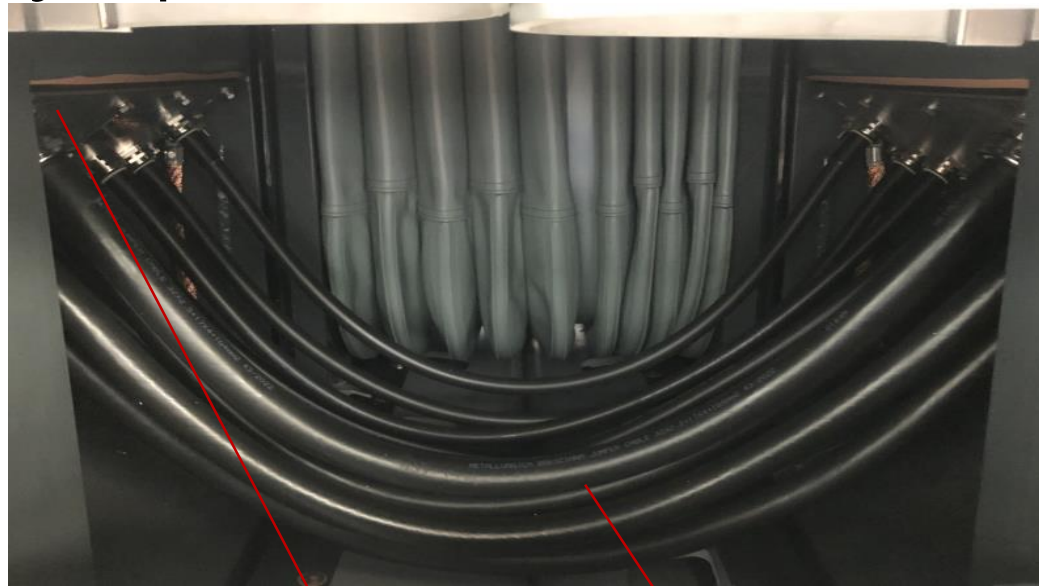
Plug to jumper structure, the connector is double-ended detachable, double-head double-seater, when the train is unprogrammed, the connector plug needs to be stored separately after removing it from the socket.

Compared with the jumper form of the two structures, the plug cable assembly and the vehicle end box structure are integrated, and the maintenance is relatively complicated; the plug pair can be separated from the vehicle end box as a whole, which is more convenient for maintenance and maintenance, and if the jumper line fails, the emergency treatment can be directly replaced with spare parts.

2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

➤ Product Range (EMU Vehicles)

Vehicle-end jumper integration includes flange plates, vehicle-end connectors, and jumper cables.



Flange
plate

Vehicle-end connectors
and jumper cables

2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

➤ Introduction to the structure

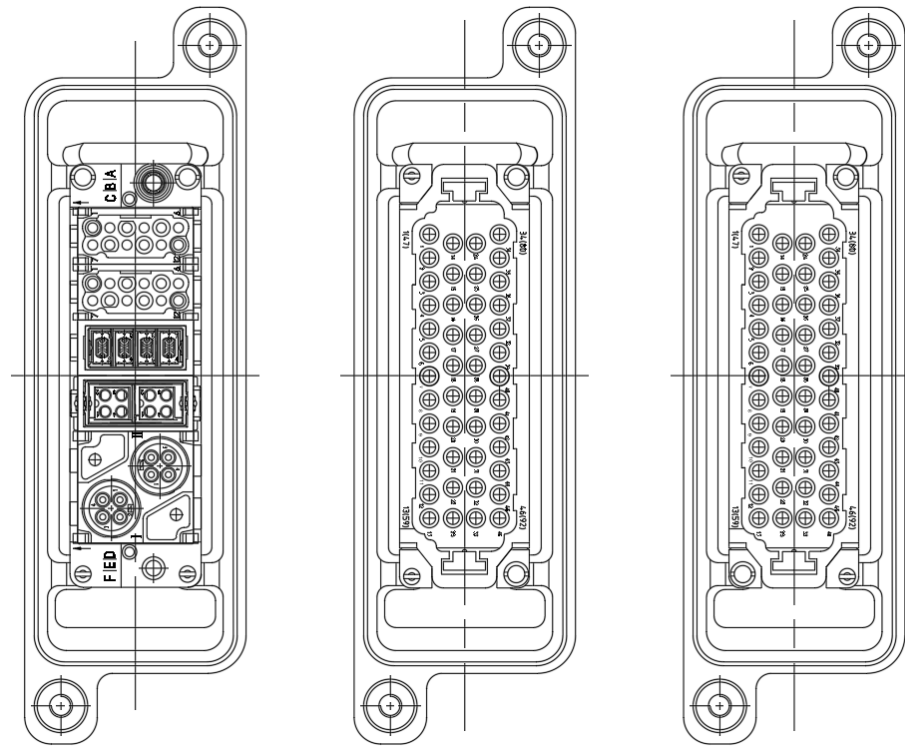
The main feature of the scheme is that the jumper wire is directly connected to the inside of the terminal box of the car body, so as to realize the connection of the two vehicles, the high-voltage wiring harness is broken with a terminal in the terminal box, and the low-voltage wiring harness is connected with a connector in the terminal box.



2. Vehicle-end Jumper Integration Introduction 永贵连接 连接专家

➤ Introduction to the structure

The communication connector adopts a modular combination structure;
The control connector adopts a 46-core integral module structure.



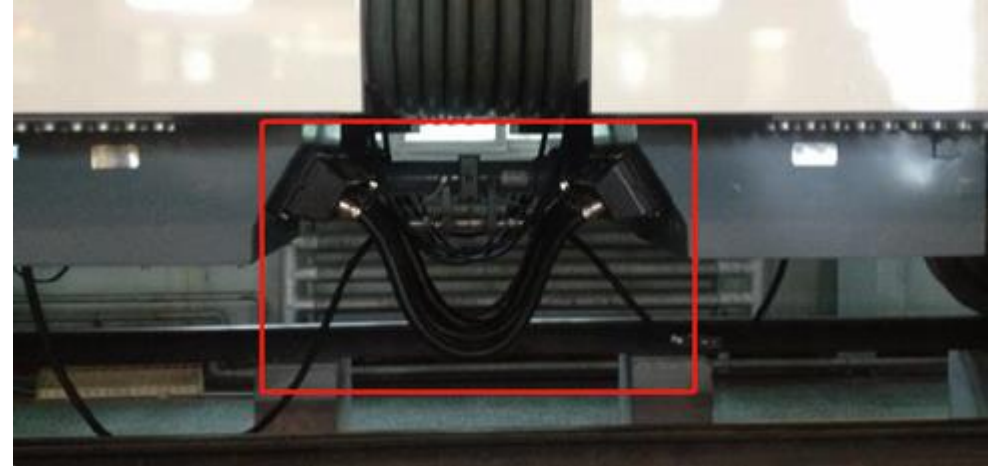
3. Existing resource capacity

➤ Jumper cable length design capability

Jumper cables are usually U-shaped when mounted on the vehicle end. The lowest point of the cable is a certain distance from the rail surface.

During the operation of the vehicle, the jumper cable is in a periodic swing state, as shown in the figure, when the vehicle turns, the cable on the inside of the turn is in a compressed state, and the cable on the outside of the turn is in a stretched state.

Therefore, it is necessary to verify that the jumper cable is not broken or exceeds the vehicle limit under the extreme operating conditions.



3. Existing resource capacity

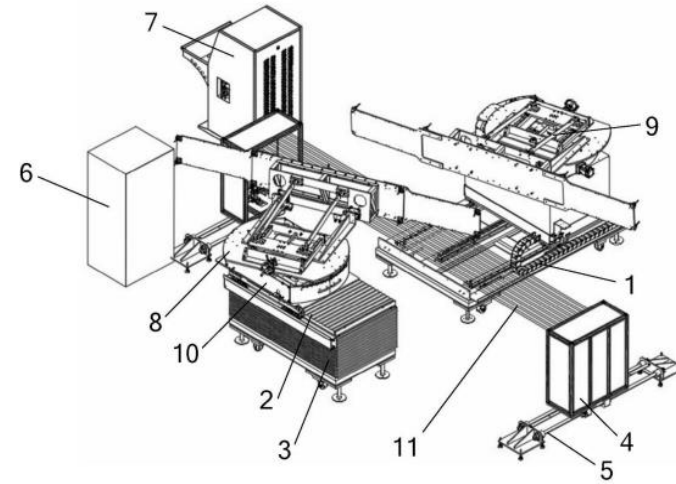
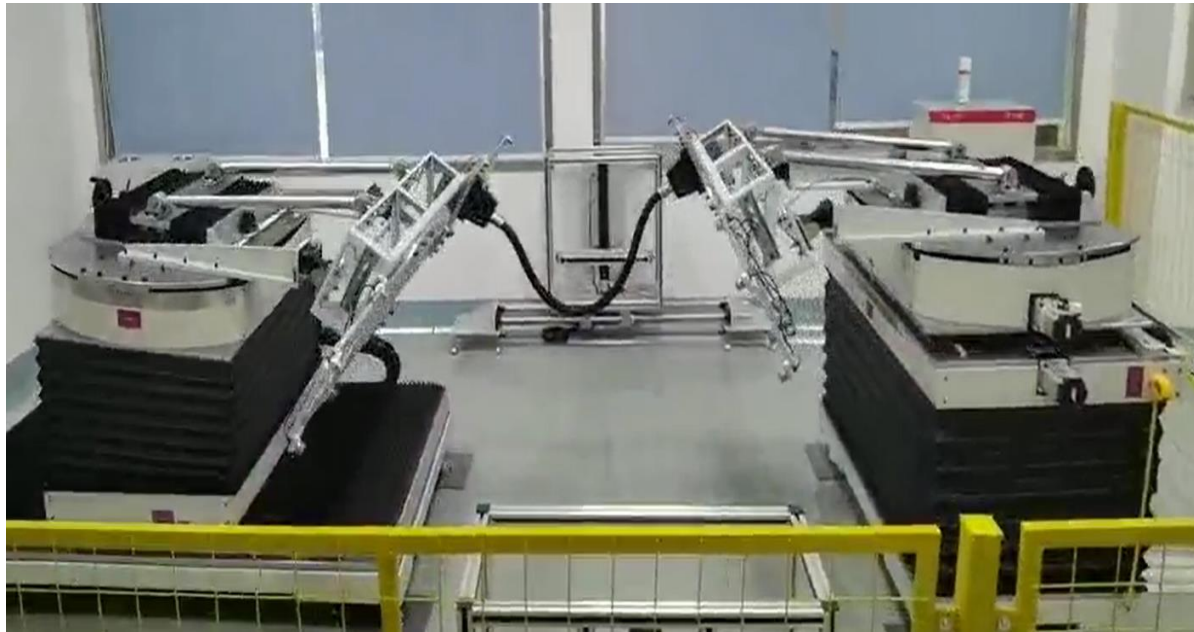
➤ Jumper cable length design capability



Length simulation

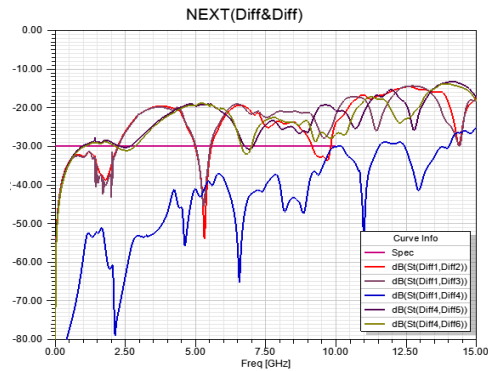
3. Existing resource capacity

➤ Jumper fatigue life study



3. Existing resource capacity

➤ Simulation capabilities



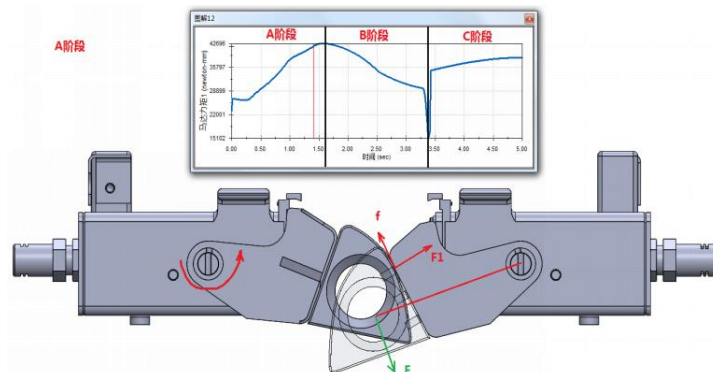
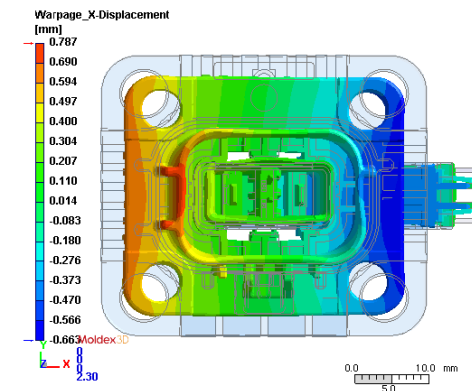
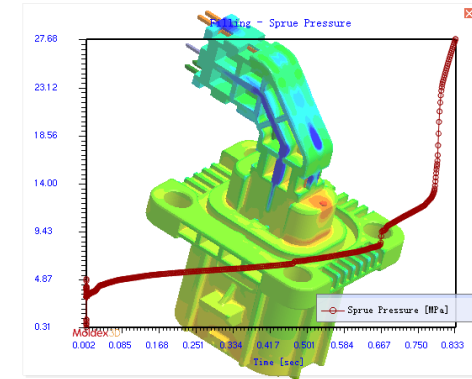
专职工程分析人员
5名



软件配置
ANSYS、Moldex3D、ABAQUS、
Hypermesh等



涵盖范围
信号完整性、结构与应力
焦耳热、模流等



- Full-time engineering analysts: 5
- Software configuration: ANSYS, Moldex3D, ABAQUS, Hypermesh, etc
- Coverage: Signal integrity, structural and stress Joule heating, mold flow, and more

3. Existing resource capacity

➤ Testing capabilities



Corporate headquarters

Area: more than 800 square meters

Instruments: more than 100 sets

Scope covered: electrical, mechanical, environmental, physical and chemical

Sichuan base

Area: more than 1,500 square meters

Instruments: more than 160 sets

Scope covered: electrical, mechanical, environmental, physical and chemical



3. Existing resource capacity

► Testing capabilities

试验室认证



国家CNAS认可

Laboratory Accreditation Certificate of China National Accreditation Service for Conformity Assessment



试验室认证



用户认可认证

Supplier Laboratory Accreditation Certificate

3. Existing resource capacity

➤ Process assurance capability

Assurance Department: Industrial Automation Department

Coverage: Automated Tooling And Testing Equipmen & Automated Production Line Planning And Construction



- 保证部门
工业自动化部
- 覆盖范围
自动化工装及检测设备
- 覆盖范围
自动化产线规划和建设



3. Existing resource capacity

➤ Manufacturing capabilities



-  **标准厂房面积**
12万余平方米（浙江+四川）
-  **设备台/套数**
500余台
-  **涵盖范围**
机加、注塑、压铸、焊接等



Standard plant area: more than 120,000 square meters (Zhejiang + Sichuan)

Number of equipment: more than 500 sets

Scope covered: machining, injection molding, die casting, welding, etc

Thank you for watching!

