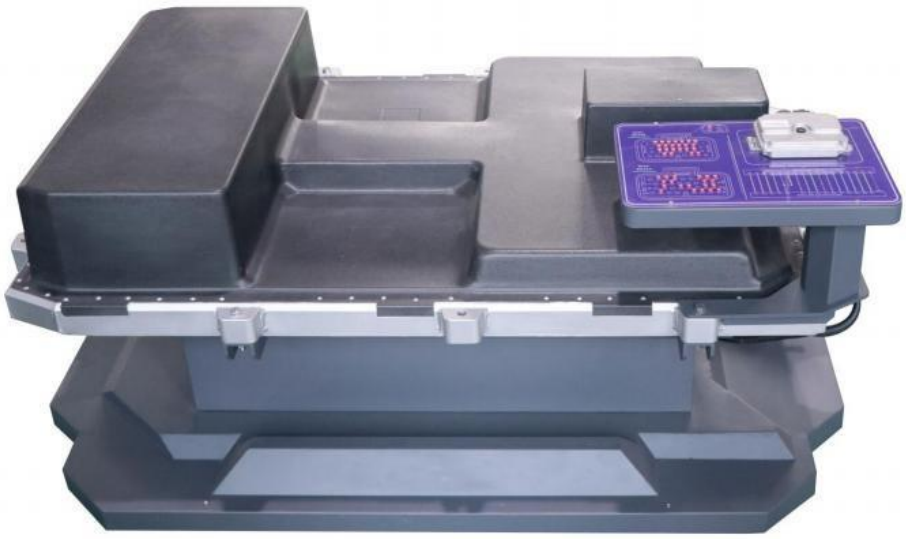
I. Product Overview

The whole set of equipment is made from the original BYD EV after disassembly and development. It is composed of five systems: BYD Qin EV power battery training platform, new BYD Qin EV motor drive training platform, BYD Qin EV steering system training platform, BYD Qin EV air conditioning system training platform, BYD Qin EV electrical appliance platform, which supports detecting of the original vehicle static and dynamic data flow, fault code reading and clearing, simulate fault setting, clearing recovery and other practical training exercises in real-time. It is a special equipment for teaching, learning, research, repair, operation, control and inspection of new energy vehicle skills training and training institutions for the professional disciplines of automotive teaching.

Equipment 1: BYD Qin EV Power Battery Training Platform

1. Product introduction

The training platform for the EV power battery management system includes ternary lithium power battery pack assembly, high-voltage connecting wiring harness and test panel, which is convenient for students to recognize and analyze the power battery pack. The high-voltage power-on logic of the power battery pack can be analyzed by connecting the drive motor training platform.



2. Product model/specification

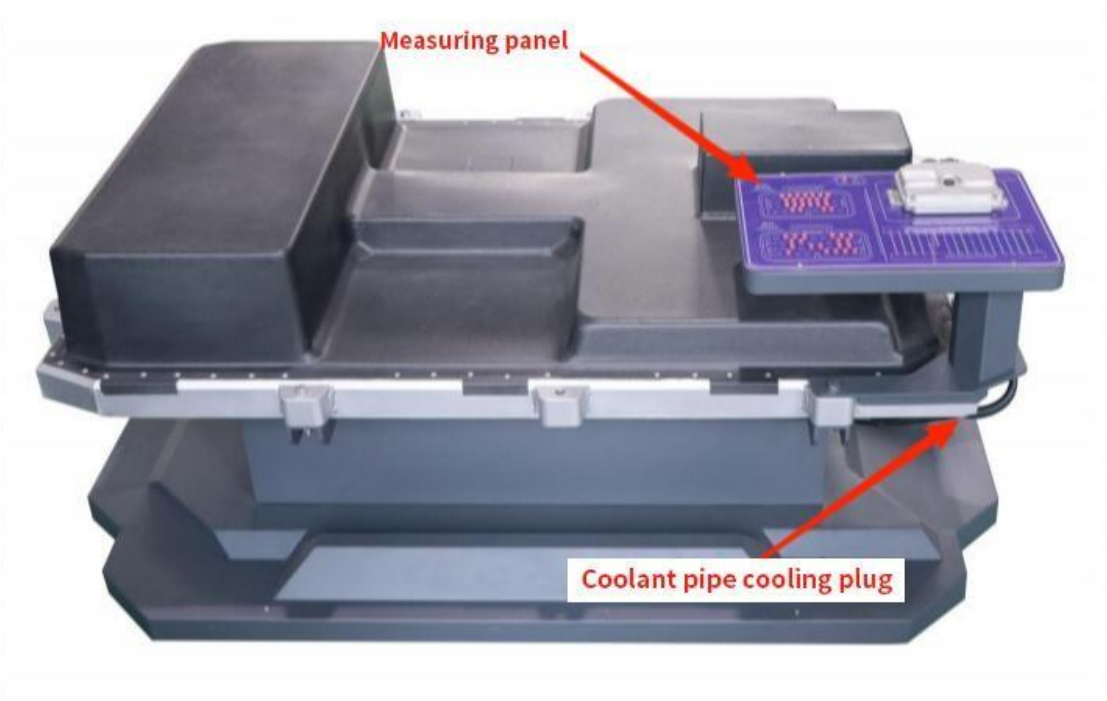
1) Model: iE-Qin-001
2) Specification: 1950×1310×1040MM
3) Storage temperature: -40℃ ~ + 50℃

3. Main Product Parameters

3.1. Main parameters

1) Battery type: Ternary lithium battery
2) High voltage power bus power supply: DC408.8V
3) Battery energy: 53.1K-WH
4) Full charge and discharge times: ≥2000 times

3.2. Structure principle and components



1) The equipment frame adopts sheet metal process. The measuring panel adopts 8mm aluminum-plastic plate, which will never fade thanks to the UV spraying process, and the equipment operation panel is in line with the design concept of ergonomics and convenient for students to operate. It is protected against fire, water, moisture and corrosion. The self-locking caster helps with steering, which is flexible,

safe, reliable, robust and durable.

2) The power battery training platform is equipped with detection terminals. Students can analyze the circuit signal characteristics of each system through the multimeter and the oscilloscope.

3) The battery system consists of a power battery module, battery information collector, series cable, base, sealing cover and battery sampling cable.

4) The training platform is equipped with a power main switch and other installation protection devices.

5) The BMS has passive equalization function and switch control protection (cell disconnection, short circuit, over voltage, under voltage, over current, over temperature), and CAN communication with charger. It controls the work of vehicle charger and estimates SOC (state of charge), etc.

6) Cooling water pipe plug shall be connected to the cooling line.

Equipment 2: BYD Qin EV Motor Drive Training Platform

1. Product introduction

The motor drive training platform includes permanent magnet synchronous drive motor assembly, power transmission shaft, steering knuckle assembly, electronic parking system, cooling system, brake pedal, accelerator pedal, gearshift mechanism, and instrument cluster and hence can realize the drive motor acceleration, deceleration, braking, parking and other functions through the gearshift transmission mechanism. The signal characteristics of the relevant circuit of the drive motor can be measured through the test panel, fully demonstrating the composition structure and working process of the motor control system; this training platform is easy to operate, safe and reliable, and can achieve the best practical training effect for students.

2. Product model/specification

1) Model: iE-Qin-002

2) Specification： 1950×1310×1100MM

3) Storage temperature: -40°～+50°

3. Main Product Parameters

3.1. Main parameters

1) Motor type: Permanent magnet synchronous motor

2) Rated torque: 160N.M

3) Peak torque: 310N.M

4) Rated power: 80KW

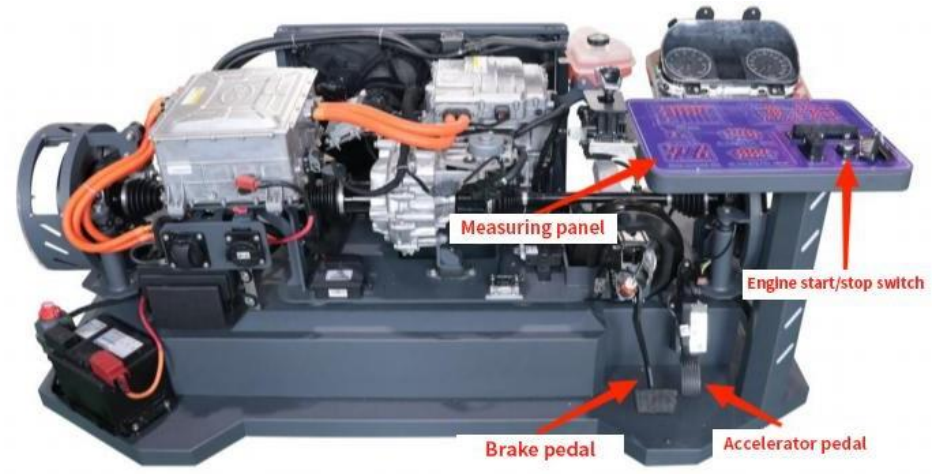
5) Peak power: 160KW

6) Maximum speed: 12000rpm

7) Cooling method: water-cooled

8) Number of settable faults: 10

3.2. Structure principle and components



1) The equipment frame is a mold integral molding panel frame made of sheet metal. The measuring panel adopts 4mm aluminum-plastic plate, which will never fade thanks to the UV spraying process, and the equipment operation panel is in line with the design concept of ergonomics and convenient for students to operate.

2) Main accessories of the equipment include: original electric permanent magnet synchronous drive motor assembly, transmission shaft, steering knuckle assembly, electronic parking system, cooling system, brake pedal, accelerator pedal,

gearshift mechanism, instrument cluster, engine start/stop switch and measuring panel.

3) The drive motor training platform is equipped with detection terminals. Students can analyze the circuit signal characteristics of each system through the multimeter and the oscilloscope.

4) The measuring panel is equipped with a digital voltmeter to display each signal voltage in real time, which is convenient for students to analyze the signal voltage.

5) Students can read the fault code and clear the fault code on the motor
6) control system, and read the dynamic data flow, parameter setting and other diagnostic functions through the special decoder for new energy vehicles.

Equipment 3: BYD Qin EV Steering System Training Platform

1. Product introduction

The equipment uses BYD Qin EV rack and electric power steering (EPS); front axle, front suspension, steering wheel and transmission mechanism, power motor, drive wheel assembly, realistically presenting the connection control relationship between the core components of EV EPS system, installation position and operating parameters.

2. Product model/specification

1) Model: iE-Qin-003

2) Specification: 1950×1290×1440MM

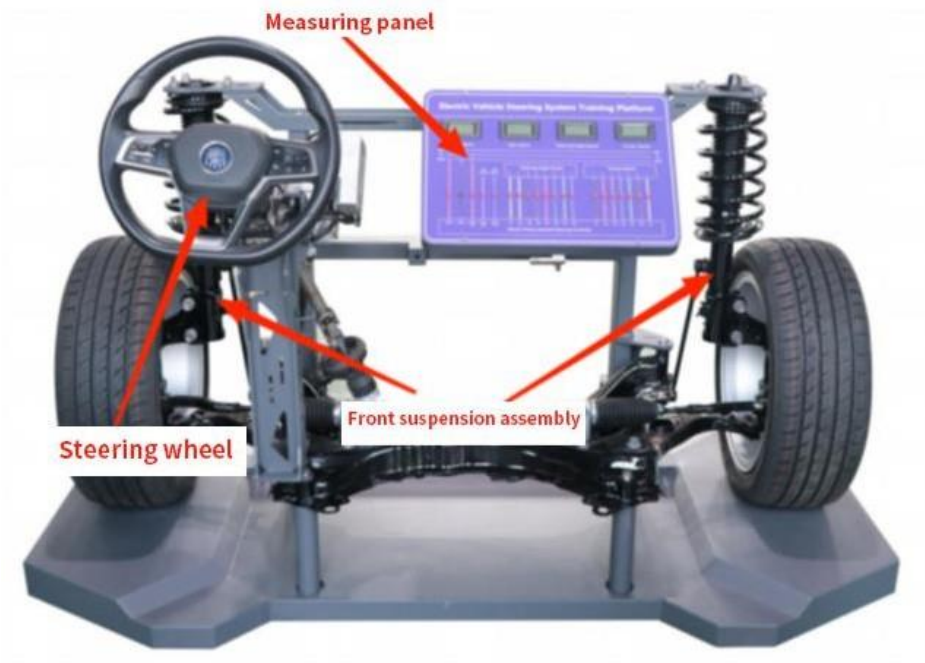
3) Storage temperature: -40℃ ~ + 50℃

3. Main Product Parameters

3.1. Main parameters

1) EPS power supply DC12V

3.2. Structure principle and components



1) The equipment frame adopts a sheet metal process. The measuring panel is made of 2mm bent iron plate, and its sprayed coat will never fade. The equipment operation panel in line with the design concept of ergonomics is convenient for students to operate.

2) The main accessories of the equipment include: the original steering gear, front suspension assembly, steering wheel, measuring panel, etc.

3) The power steering training platform is equipped with detection terminals. Students can analyze the circuit signal characteristics of each system through multimeters and oscilloscopes.

4) The measuring panel is equipped with a digital voltmeter to display each

signal voltage in real-time, which is convenient for students to analyze the signal voltage.

5) Students can read fault codes and clear fault codes, read dynamic data flow, set parameters and other functions on the steering controller through the special decoder for new energy vehicles.

Equipment 4: BYD Qin EV Air Conditioning System Training Platform

1. Product introduction

The equipment is made from the automatic air conditioning and heating system of original BYD Qin EV after disassembly and development. It intuitively presents the connection control relationship between the core components of the air conditioning and heating system of the EV, installation positions and operating parameters.

2. Product model/specification

1) Model:BF-WJT-Qin-004

2) Specification: 1950×1010×1080mm

3) Storage temperature: -40℃～+50℃

3. Main Product Parameters

3.1. Main parameters

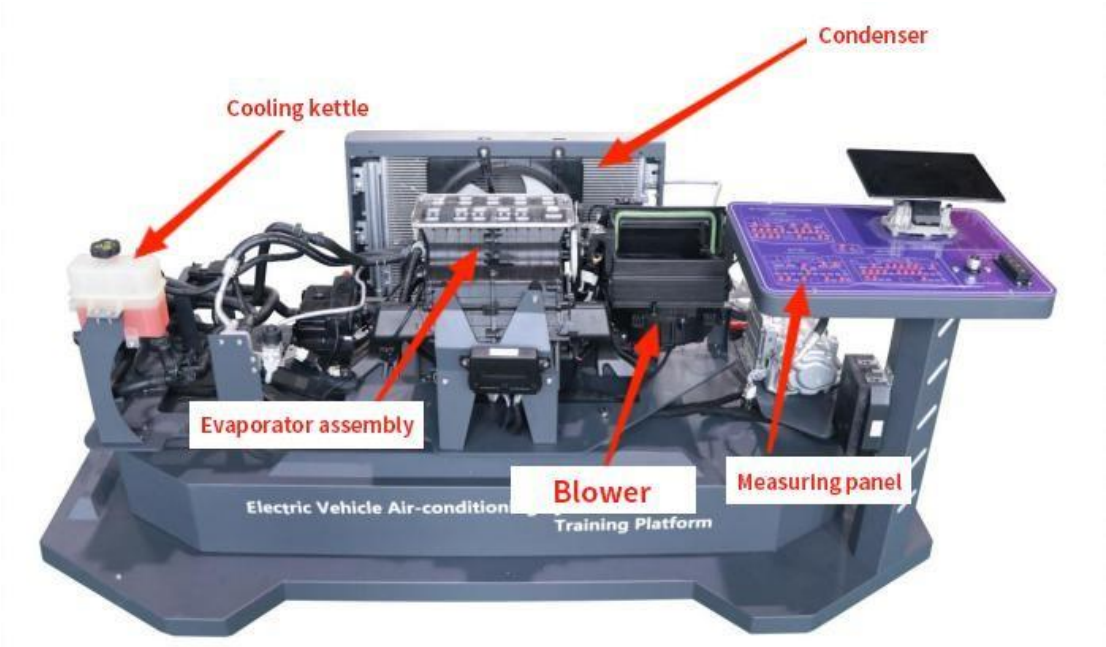
1) Working power supply of air conditioning compressor: DC408.8V

2) Working power supply of heating module: DC408.8V

3) Low voltage control working power supply: DC12V.

4) Working voltage: DC 12V

3.2. Structure principle and components



1) The equipment frame is a mold integral molding panel frame made of sheet metal. The measuring panel adopts 8mm aluminum plastic plate, which will never fade thanks to the UV spraying process, and the equipment operation panel in line with the design concept of ergonomics is convenient for students to operate.

2) Main accessories of the equipment include: the original electric compressor, air conditioning evaporator assembly, PTC, condenser assembly, low-voltage battery, air conditioning operation panel, digital voltmeter, etc.

3) The air-conditioning system training platform is equipped with detection terminals. Students can analyze the circuit signal characteristics of each system through the multimeter and the oscilloscope.

4) The measuring panel is equipped with a digital voltmeter to display each signal voltage in real time, which is convenient for students to analyze the signal voltage.

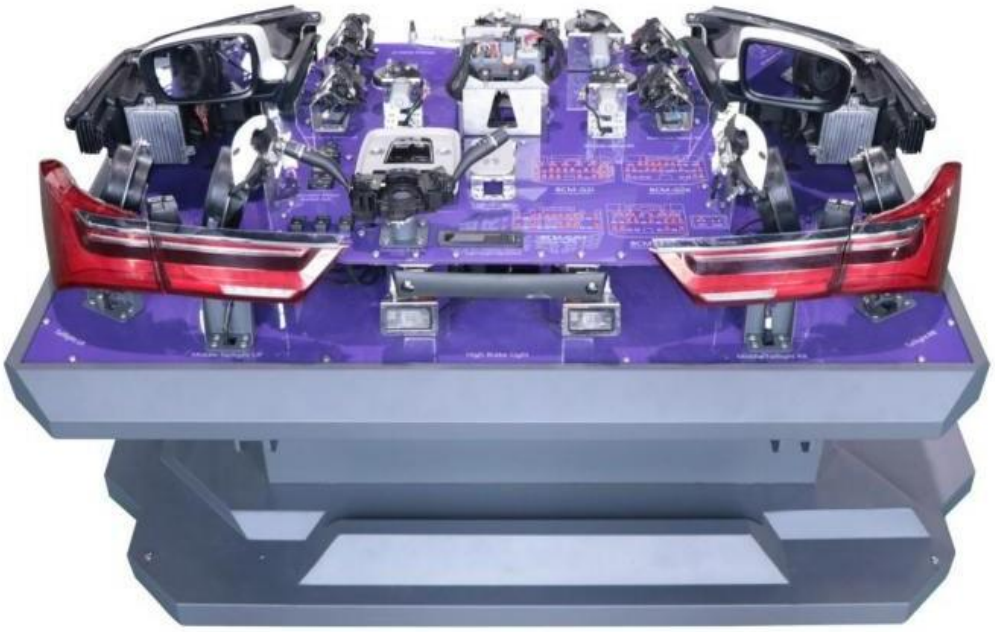
5) Students can read the fault code and clear the fault code, read dynamic data

flow, set parameters and other functions through the special decoder for new energy vehicles.

Equipment 5: BYD Qin EV Electrical Appliance Training Platform

1. Product introduction

This training platform is based on the physical components of the lighting system and comfort system of BYD Qin EV. The bench mainly consists of basic modules of lighting system and comfort system, such as combined lighting, stereo, electric wiper, electric rear-view mirror, latch, and electric glass lifter. Each module has the original vehicle components on it, which can move according to the working principle and complete a complete working cycle. This training platform is suitable for teaching and training of new energy courses in secondary and higher vocational colleges and training institutions. Students can cognize, operate and master the structure and working principle of the EV. The training platform is easy to operate, safe and reliable, so as to achieve the best training effect for students.



2. Product model/specification

1) Model:BF-WJT-Qin-005

2) Specification: 1950×1310×1120mm

3) Storage temperature: -40°～+50

Main Product Parameters

3.1. Main parameters

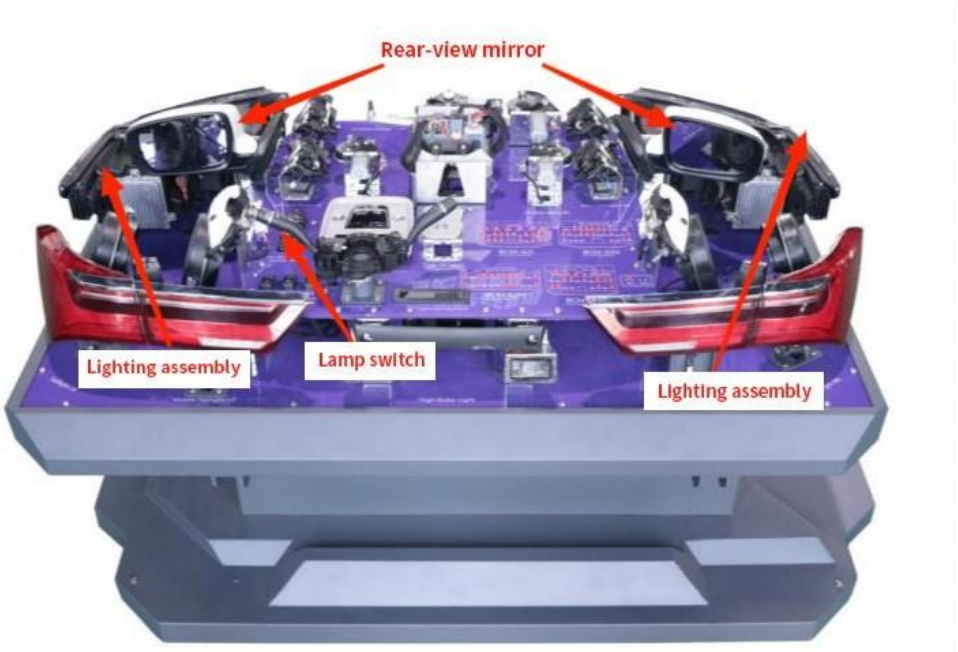
1) Main parameters

2) Working voltage: DC12V

3) Operating ambient temperature: -10℃~50℃

4) Number of settable faults: 10

3.2. Structure principle and components



1) The equipment frame is a mold integral molding panel frame made of sheet metal. The measuring panel adopts 4mm aluminum plastic plate, which will never fade thanks to the UV spraying process, and the equipment operation panel in line with the ergonomic design concept is convenient for students to operate.

2) Main accessories of equipment include: original headlamp assembly, glass lifter, light controller, rearview mirror, reading lamp, etc.

3) The vehicle electrical appliance training platform is equipped with detection terminals. Students can analyze the circuit signal characteristics of each system

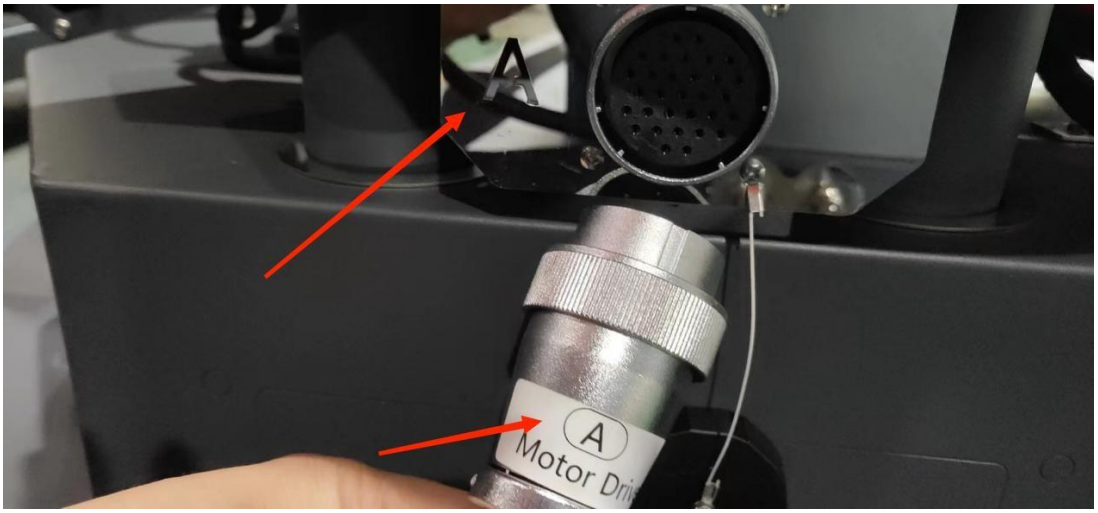
through the multimeter and the oscilloscope.

4) The measuring panel is equipped with a digital voltmeter to display each
5) signal voltage in real time, which is convenient for students to analyze the signal voltage.

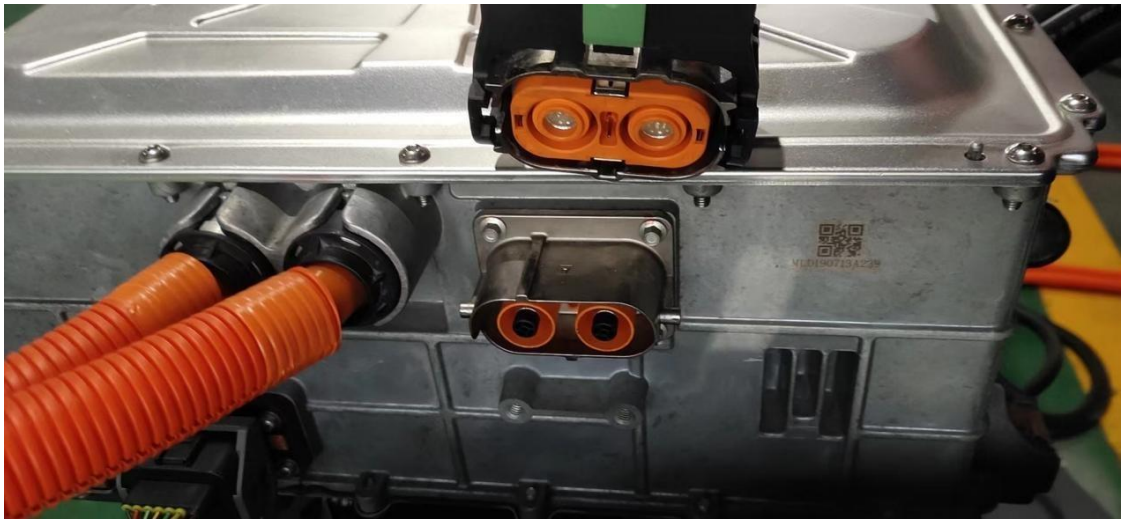
III. Operation Process

1. Put five sets of equipment in order on the flat ground, and lock theself-locking casters of all equipment.

Connect the connecting wires marked with letters or numbers to the letter ornumber sockets on the bench in turn, insert

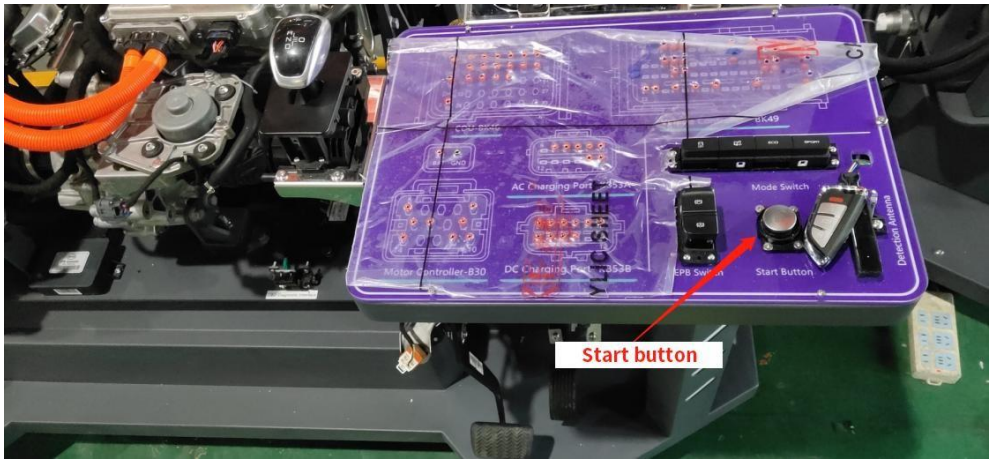


2. them and lock them.



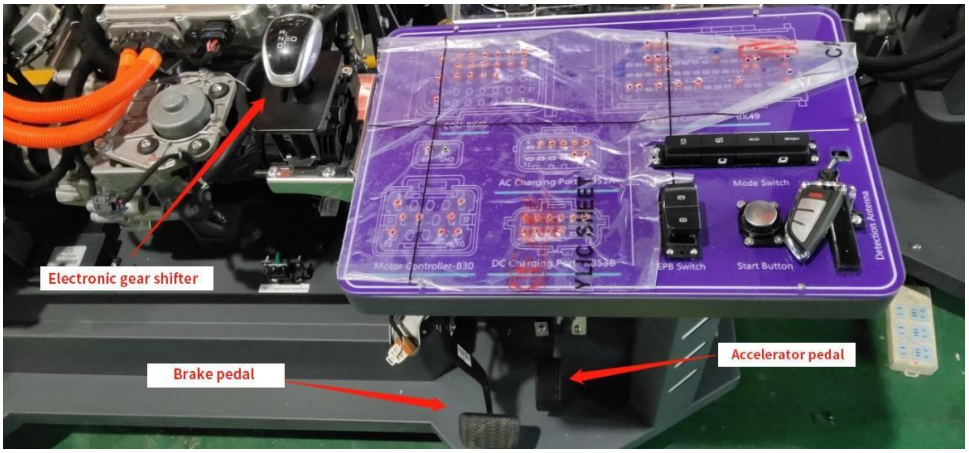
1. Press the knob switch on the negative terminal of the battery on the driving motor training bench after confirming that the connecting wire is correct.

2. Depress the brake pedal and press the start switch on the upper panel of the driving motor training bench, and the combination instrument will be powered on to show OK.



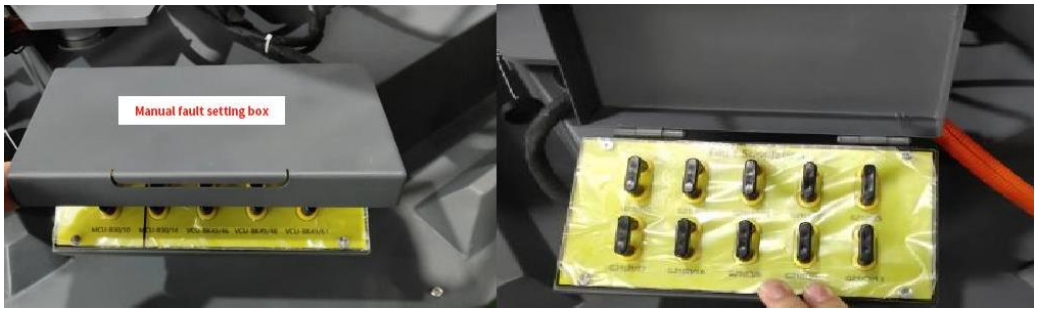
3. After the power-on is completed, control the dynamic simulation training demonstration of the electronic gear shifter;

Note: When using the brake pedal and accelerator pedal, please do not operate violently to prevent the pedal stopper from being damaged and the engine from overspeed.



4. Connect equipment with decoders to read data streams, diagnose fault codes, and clear fault codes, etc.

5. Manual fault setting: There is a manual fault setting box under the equipment, and there are 10 jumpers inside the box. When a jumper is unplugged, the corresponding fault can be set, and the corresponding fault information can be detected at the panel diagnosis socket.



6. When the ignition switch is turned off, connect the power supply with a home-specific charging gun: The charging gun is connected to the slow charging port of the bench, as shown in the figure.

* Note: There must be a grounding wire on the socket when charging; otherwise, charging will be abnormal! ! !

7. Automatically power off after the battery is fully charged.

8. After the training, first disconnect the knob switch on the negative pole of the battery on the driving motor training platform.

9. Unplug and tidy up all the connecting plugs of the equipment. Finally, put all the equipment back in its original place, put it in order, and clean the site.

IV. Common Faults and Troubleshooting Methods

Fault symptom	Cause analysis	Troubleshooting method
The high voltage is not powered on.	The voltage of high-voltage battery is insufficient.	Turn on the low-voltage power to charge the high-voltage battery.
	The voltage of low-voltage battery is lower than 12V.	Charge the low-voltage battery.
	Bus communication is faulty.	Check the voltage of CAN bus.
The start button indicator is not on.	The voltage of low-voltage battery is low.	Charge the low-voltage battery.
The instrument is not on and flashes.	The voltage of low-voltage battery is low.	Charge the low-voltage battery.
There is no communication between benches.	The plug is loose and poorly connected.	Reconnect jumper wires between benches.

V. Maintenance

1. Daily maintenance

1) Keep the site clean and tidy, and the equipment available for training at any time.

2) The level of battery pack should always be kept above 90%. The battery performance will be degraded due to power feeding, which will damage the battery for a long time, and the maintenance cost of replacing the battery is too high.

3) The low-voltage power supply is guaranteed to be above 12V, and it should be charged in time if it is lower than 12V; otherwise, the equipment will not operate normally.

4) Screws of transmission parts shall be fastened regularly, and screw fastening of connecting parts of other vibration parts of the bench shall be strengthened.

2. Operating maintenance

1) Prohibit outdoor training and pay attention to rainy days.

2) Strictly prevent corrosive substances from falling on the battery case.

3) The training should be conducted under the guidance of the teacher, and it is forbidden for students to operate the equipment without the teacher.

3. Parking for a long time

1) Disconnect the low-voltage power supply when the equipment is parked for a long time.

2) Turn off the high-voltage service switch when the equipment is parked for a long time, so as to avoid running out of electricity after long-term storage.

3) Check whether the low-voltage battery has electricity after long-term parking before startup.

4) Before high-voltage power transmission, use a leak detector to test the electric leakage of high-voltage parts.

VI. After-sale Service

1. When the equipment is damaged or malfunctions due to improper operation of the customer, the Company assists in maintenance, but the expenses incurred

shall be borne by the customer.

2. Please contact the project leader or after-sales service if there is any problem with the product in use.