

BYD ATTO 3 ELECTRIC VEHICLE TRAINING EQUIPMENT

Model: MEQ01a



Image shown is for illustration purpose only. Actual product may differ due to product customization & enhancement

MEQ01a consists of integrated EV training modules as follow:

1. MEQ01a01 EV Body and Electrical System Training Module
2. MEQ01a02 Electric Power Steering System Training Module
3. MEQ01a03 Electric Vehicle Powertrain and Electronic Control System Training Module
4. MEQ01a04 Battery Management System Training Module
5. MEQ01a05 Air Conditioning System Training Module

Accessories included:

1. EV Car Insulated Tools Set
2. OBD Scanner
3. 4K HD Conference Camera
4. Multifunctional Oscilloscope & Multimeter
5. Workstation & Personal Protective Equipment (PPE)
6. 75" All-in-One-Touch Screen Multi-function 4K UHD Interactive Whiteboard IWB TV
7. OPS Computer
8. 1000V Digital Insulation Resistance Tester
9. Instruction Manual (English version)
10. Courseware (English version)

MEQ01a01 EV Body and Electrical System Training Module



Product composition

1. The system includes a pure electric vehicle original body anatomy model and a vehicle body electrical detection training bench.
2. An intelligent fault simulation system is used to detect electrical components and line electrical signals on the original vehicle body, allowing for the teaching and training of the pure electric vehicle's low-voltage electrical system.

Function description

1. Connected via CAN-BUS with other electric vehicle modules, it forms a complete electric vehicle system. This system includes all necessary components to effectively teach and train students and engineers on the functioning of electric vehicle systems.
2. Additionally, it ensures the integrity of the high voltage interlock signal lines, and when the vehicle is scanned with a diagnostic tool in full vehicle mode, no fault codes are present.
3. A complete vehicle electrical system that enables practical measurement, fault detection, and troubleshooting for each independent component.
4. Ability to perform fault simulation and measurement of all body electronic system signals on the original vehicle.
5. The vehicle body is partially dissected symmetrically, with all sections treated and sprayed in different colors to represent the functions of the bodywork positions.
6. The body comes with a professional detection teaching board, which interfaces with the vehicle body electrical system through a dedicated aviation plug to transmit signals.
7. Designed to be used in conjunction with the ATTO 3 training and assessment system, and can also be used with a digital training platform that integrates theory with practice.

Special Configuration

1. Comes with a smart key system that enables the driver to remotely unlock the doors, power up, and start the vehicle. The smart entry system includes features such as an electronic key, NFC key, cloud services, and Bluetooth key functions, which are controlled through various communication methods and key formats.
2. The smartphone Bluetooth key system is capable of:
 - i. Using smartphone Bluetooth for vehicle locking, air conditioning control, and other functions;
 - ii. Unlocking vehicle doors without the need to take out the smartphone;
 - iii. Smartphone remote driving feature.

Teaching and training programs

1. Understand the structure of a pure electric vehicle body and other electrical equipment systems, including the wiper system, lighting system, electric window system, rearview mirror electric adjustment, door lock motor system, smart key system, 12V auxiliary battery, etc., their physical components, and actual circuit wiring diagrams;

2. Learn about the operation and changes of certain electrical system components when the circuit is connected;
3. Master the structure and working principles of the low-voltage electrical system;
4. Learn to measure the signal parameters of various circuits when a fault occurs.

Product specifications

1. Vehicle body size: 4680mm × 1765mm × 1350mm
2. Training bench size: 1800mm × 1300mm × 1700mm
3. Working voltage: DC 12V
4. Operating temperature: -20°C to 50°C

Complementary Vehicle Body Electrical System Course Resources

The course resource pack includes teaching projects and tasks covering the following content:

1. Project One: Vehicle Body Electrical System Maintenance - Includes troubleshooting of the lighting system, door locks, windows, and wiper system.
2. Project Two: Smart Key System Maintenance - Involves troubleshooting of smart entry and start system control strategies, door handle antennas, and high-frequency reception modules.
3. Project Three: Intelligent Assistance System Maintenance - Includes troubleshooting of millimeter-wave radar, automatic parking control systems, and wireless charging systems.

Each project comes with:

1. PPT presentations: One for each project, with no less than 50 pages each. They should clearly display key knowledge points with a combination of text and graphics, use concise language, and have a visually hierarchical design to enhance teaching effectiveness.
2. Training work orders: Four for Project One, three each for Projects Two and Three, each with no less than 10 pages to ensure detailed steps and guidance. A total of no less than 40 pages is provided to guide students in understanding structures, mastering operational skills, and recording training data for student performance assessment. The work order content complements micro-lessons/videos.
3. Micro-lessons/videos: Corresponding to the training work orders, four for Project One, and three each for Projects Two and Three, each video being no less than 6 minutes long. The micro-courses and video resources should feature the BYD Atto 3 model.
4. Video signals should be stable, with a signal-to-noise ratio reaching or exceeding 55dB, without any image defects like noise or color deviation. The audio signal-to-noise ratio should reach or exceed 48dB to ensure precise synchronization of sound and image without AC hum or other background noise. These teaching projects and tasks aim to cultivate students' abilities to repair and diagnose electric vehicle body electrical systems and handle intelligent system faults effectively.

Smart Teaching Apps with Android Panel Display

- This module is equipped with COBRA Smart Teaching Apps with a touch screen Android panel display featuring a wealth of educational content such as operation guidance and spare parts location diagrams to facilitate student's understanding and recognition of various spare parts.

MEQ01a02 Electric Power Steering System Training Module



Product Composition:

1. This training device includes the following parts: the Electric Power Steering System's Electronic Control Unit (ECU), motor, electronic power steering mechanism, torque and steering angle sensors, steering column, steering wheel, left and right front suspension systems, wheel components, yuanbao beam, and steering angle disk.
2. In addition, the system is also equipped with a testing panel and an intelligent fault setting system for convenient testing and fault diagnosis.

Function Description:

1. Connected via CAN-BUS with other electric vehicle modules, it forms a complete electric vehicle system. This system includes all necessary components to effectively teach and train students and engineers on the functioning of electric vehicle systems.
2. Additionally, it ensures the integrity of the high voltage interlock signal lines, and when the vehicle is scanned with a diagnostic tool in full vehicle mode, no fault codes are present.
3. The training device mounts all components of the BYD ATTO 3 model's Electric Power Steering System (EPS) on an aluminum frame stand, with a logical layout and clearly visible parts for ease of study and practical testing.
4. The device has full operational capabilities, able to replicate all steering functions of the original vehicle, including adaptive steering assistance that adjusts with vehicle speed.
5. The control panel's circuit diagram is equipped with bidirectional test terminals, allowing direct data extraction from each pin in the steering system according to the circuit diagram.
6. The device can perform comprehensive diagnostics of the steering system by connecting to the original vehicle's diagnostic port.
7. This training device can be used independently or in conjunction with other BYD ATTO 3 series training and assessment systems.

Product Specifications:

1. Training bench size: 2000mm × 1300mm × 1400mm
2. Working voltage: DC 12V
3. Operating temperature: -20°C to 50°C

Course Resource Package, focused on the maintenance teaching of chassis electronic control systems, includes the following practical training tasks:

1. Data collection of the chassis electronic control system;

2. Fault diagnosis and repair of the steering system;
3. Fault detection and maintenance of the braking system;
4. Troubleshooting and handling of the electronic parking system.

To support these practical training tasks, the course resources are configured as follows:

1. PPT Courseware: Provides a detailed set of courseware, no less than 50 pages, which uses a combination of graphics and text to clearly display key knowledge points with refined language. The design of the courseware should also focus on the sense of visual hierarchy to enhance teaching effectiveness.
2. Practical Training Worksheets: Provides four worksheets, each no less than 10 pages, totaling no less than 40 pages. These worksheets are designed to guide students to understand structures, master operational skills, and record practical training data for evaluating students' practical effects. The content of the worksheets complements micro-classes/videos.
3. Micro-classes/Videos: A total of four, each not less than 6 minutes, with a total duration of no less than 24 minutes. The micro-course and video resources should showcase the BYD Atto 3 model. The video signal should be stable, with a signal-to-noise ratio reaching or exceeding 55dB, without image defects such as clutter, color bias, etc. The audio signal-to-noise ratio should reach or exceed 48dB, ensuring that the sound is precisely synchronized with the picture without AC hum or other background noise.

Smart Teaching Apps with Android Panel Display

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MEQ01a03 Electric Vehicle Powertrain and Electronic Control System Training Module



Product Composition

This training module integrates the following key components, constructing a complete 8-in-1 electric powertrain:

1. Drive Motor Controller (MCU)
2. High-performance Permanent Magnet Synchronous Drive Motor, Maximum Power 150KW, Maximum torque 310 N.m.
3. High-efficiency Single-speed Transmission
4. Multifunctional Bi-directional On-board Charger (OBC)
5. Power Battery Converter (DC-DC)
6. High Voltage Power Distribution Unit (PDU)
7. Central Vehicle Controller (VCU) resembling the central nervous system
8. Core functions of the Battery Management System (BMS)
9. Additionally, the module integrates a leakage sensor, multimode DC and AC charging port, efficient cooling system, multifunctional testing panel, sturdy support stand, and an advanced intelligent fault simulation system.

Function Description

1. Connected via CAN-BUS with other electric vehicle modules, it forms a complete electric vehicle system. This system includes all necessary components to effectively teach and train students and engineers on the functioning of electric vehicle systems.
2. High voltage cables are used for power transmission, connecting the high voltage battery, motor controller, motor, PTC heater, and compressor. This configuration is crucial for the proper operation of the electric vehicle, ensuring efficient power distribution and operation of key components.
3. Additionally, it ensures the integrity of the high voltage interlock signal lines, and when the vehicle is scanned with a diagnostic tool in full vehicle mode, no fault codes are present.
4. The motor used in this module is consistent with the original motor of the BYD ATTO 3, with a rated power of 80KW, a peak power of up to 160KW, a maximum torque of 310N·m, supporting a top speed of 150KM/h. The motor is connected to the main controller via a thick 25mm² cable, ensuring efficient and stable current transmission.

5. The 8-in-1 powertrain is encapsulated by a transparent acrylic plate, not only offering good sealing, corrosion resistance, and anti-aging features, but also facilitating a clear display of the internal electronic components and connections.
6. The training stand is equipped with a startup, electronic parking, discharge switch, throttle pedal, brake pedal, and gear shifting module, as well as the original vehicle's dashboard, simulating a real vehicle operating environment.
7. An independent cooling circulation system consists of an electronic water pump, motor radiator, water tank, and electronic fans, powered by a 12V DC source, maintaining an appropriate operating temperature for the electric powertrain.
8. It is equipped with an electric vacuum pump of the original vehicle model, powered by a 12V DC source to enhance the stability and response speed of the braking system.
9. The entire stand is made of aluminum profiles, strong in structure while also being aesthetically pleasing.
10. The intelligent fault simulation system facilitates student practice in fault diagnosis and is compatible with other BYD ATTO 3 training modules

Teaching and Training Projects

1. Learn the structure, working principles, and motor specifications of the 8-in-1 electric powertrain.
2. Understand the role of key parameters such as power transmission process, motor speed, and electronic control system fault indicators.
3. Simulate and demonstrate the actual operating state of electric vehicles.
4. Master the detection process of the charging system and the ability to troubleshoot common faults.

Product Specifications

1. Size: 1320mm×1000mm×1100mm
2. Working voltage: DC 12V
3. Output voltage: DC 653V

The course resource pack for the integrated intelligent front-drive assembly system includes teaching projects and tasks across three main projects:

1. AC slow charging system maintenance, divided into three practical tasks:
 - i. Study of operation procedures and control strategies
 - ii. System data collection
 - iii. CC signal fault repair
2. DC fast charging system maintenance, divided into four practical tasks:
 - i. Study of operation procedures and control strategies
 - ii. System data collection
 - iii. Temperature fault repair
 - iv. Communication fault repair
3. Integrated intelligent front-drive assembly maintenance, divided into five practical tasks:
 - i. Assembly data collection
 - ii. Assembly fault repair
 - iii. Brake switch fault repair
 - iv. Accelerator pedal position sensor repair
 - v. Energy network communication fault repair

Each project is equipped with educational resources, including:

1. PPT presentations: Each project provides at least 50 pages of well-designed slides. Key points should be clearly displayed using a combination of images and text, with concise language and a design that emphasizes visual hierarchy to enhance teaching effectiveness.
2. Practical worksheets: 3 for project one, 4 for project two, and 5 for project three; each worksheet should be no less than 10 pages. These are designed to guide students in understanding structures, mastering operational skills, and recording practical data for evaluating their hands-on performance. The content of the worksheets complements micro-lessons/videos.
3. Micro-lessons/videos: 3 for project one, 4 for project two, and 5 for project three, each with a duration of at least 6 minutes. These should showcase the BYD Atto 3 model. Video signals must be stable, with a signal-to-noise ratio reaching or exceeding 55dB, free of image defects such as noise or color bias. The audio signal-to-noise ratio should reach or exceed 48dB, ensuring precise synchronization between sound and picture, without AC hum or other background noise. These slides and video resources should detailly demonstrate the relevant operational procedures and control strategies, with high-quality images and audio, to aid students in better understanding and mastering the practical training content.

Smart Teaching Apps with Android Panel Display

- This module is equipped with COBRA Smart Teaching Apps with a touch screen Android panel display featuring a wealth of educational content such as operation guidance and spare parts location diagrams to facilitate student's understanding and recognition of various spare parts.

MEQ01a04 Battery Management System Training Module



Product Composition:

The system includes key components such as the BYD blade battery 50.12kwh power battery and its management system, high-voltage connection cables, an integrated testing panel, an intelligent fault-setting system, and a robust support platform.

Function Description:

1. Connected via CAN-BUS with other electric vehicle modules, it forms a complete electric vehicle system. This system includes all necessary components to effectively teach and train students and engineers on the functioning of electric vehicle systems.
2. High voltage cables are used for power transmission, connecting the high voltage battery, motor controller, motor, PTC heater, and compressor. This configuration is crucial for the proper operation of the electric vehicle, ensuring efficient power distribution and operation of key components.
3. Additionally, it ensures the integrity of the high voltage interlock signal lines, and when the vehicle is scanned with a diagnostic tool in full vehicle mode, no fault codes are present.
4. The Battery Management System (BMS) contains crucial elements like the Battery Acquisition and Execution Unit (BASU), Battery Information Controller (BIC), and battery sampling wires. Integrated within the battery pack, the BMS is tasked with managing and monitoring the battery state, including charge/discharge management, contactor control, power state alarms and protection, SOC/SOH calculations of the battery state, data communication, current and total voltage sampling, contactor welding, and leakage detection. The BIC primarily performs the sampling of battery voltage and temperature, as well as ensuring the balance of the batteries.
5. To facilitate teaching, the battery pack is designed with a partially dissected cover, displaying the internal single lithium cells, battery detection modules, and busbars, allowing students to clearly understand the internal structure of the battery pack.
6. High and low voltage and data cables are extended and connected to other electronic control units, forming the vehicle's high-voltage grid and on-board network system.
7. The training bench is not only capable of demonstrating the powering on and off processes of the battery group but also allows for the detection and analysis of the battery management system using tools such as diagnostics, oscilloscopes, and multimeters.
8. It is equipped with an intelligent fault-setting and assessment system, which can be used in conjunction with other training modules and supports integration with a digital training platform that unifies theory and practice.

Teaching and Training Projects:

1. Understand the internal structure and connection methods of the power battery pack.
2. Differentiate and operate the DC+ and DC- main power lines, conduct voltage detection, and disassembly training.
3. Comprehend the location, function, control content, and principles of the battery management system controller.
4. Perform circuit analysis and fault diagnosis of the battery management system.
5. Master the safety principles and methods for high-voltage operations.
6. Learn the logical relationships and operational techniques of electric vehicles in different modes.

Product Specifications:

1. Dimensions: 2300mm x 1370mm x 1100mm
2. Operating voltage: Low voltage part DC 12V
3. Working temperature: -20°C to 50°C

Battery Management System Course Resource Pack

Project One:

Focus on high-voltage operation safety in electric vehicles, involving three key practical training tasks:

1. Gain an in-depth understanding of the structure of high-voltage components;
2. Learn the procedures for high-voltage safety operations;
3. Perform insulation testing on high-voltage components.

Project Two:

Focuses on the maintenance of the power battery pack module, including three practical training tasks:

1. Learn how to read and measure circuit diagrams of power battery packs;
2. Troubleshoot communication failures of the battery subsystem network of the power battery pack;
3. Diagnose and repair power faults in the high-voltage monitoring module.

Each project is equipped with the following course resources:

1. PPT Presentations: One set for each project, with at least 50 pages per set to ensure comprehensive coverage of the course content. Key points should be clearly presented using a combination of text and images, with concise language and a visually layered design to enhance the teaching effect.
2. Practical Training Work Orders: Three for Project One and three for Project Two, each at least 10 pages, to guide students in completing practical training tasks. These work orders are designed to help students understand structures, master operational skills, and record practical training data for student performance assessment, complementing the micro-lessons/videos.
3. Micro-lessons/Videos: Three sets for each of Project One and Project Two, with each video lasting at least 6 minutes and a total duration of no less than 18 minutes for each project. The micro-lessons and video resources should feature the BYD Atto 3 model. The video signal must be stable, with a signal-to-noise ratio that reaches or exceeds 55dB, without image defects such as noise, color bias, etc. The audio signal-to-noise ratio should reach or exceed 48dB, ensuring accurate synchronization of sound and image without AC hum or other background noise.

Smart Teaching Apps with Android Panel Display

This module is equipped with COBRA Smart Teaching Apps with a touch screen Android panel display featuring a wealth of educational content:

1. Battery Data Software:
 - i. An advanced diagnostic tool connected to the battery, capable of real-time monitoring and analyzing critical performance parameters of the power battery.

- ii. The software connects directly to the battery system, displaying various key data such as battery level, temperature, voltage, etc. This data makes battery monitoring clearer, facilitating quick identification and analysis of battery status.
 - iii. The software plays a crucial role in battery fault simulation and teaching, reflecting real-time performance status and immediately displaying fault phenomena when faults are set, greatly enhancing the practicality of fault diagnosis and troubleshooting training.
 - iv. Users can observe changes in battery data during normal vehicle startup and operation, as well as data comparisons before and after charging, to understand the battery charging process and changes in battery performance.
 - v. This real-time data monitoring and analysis provide strong support for battery maintenance and optimization, making it a practical educational tool for teaching and technical training.
2. Spare Parts Location Diagrams:
- i. To facilitate students' understanding and recognition of various spare parts.
3. Operation Guidance:
- i. Illustrated instructions for removing the maintenance switch.
 - ii. Illustrated instructions for the charging method.
 - iii. Video of the safety kit operation process.

MEQ01a05 Air Conditioning System Training Module



Product Composition

1. Equipped with BYD Atto 3's fully automatic car air conditioning system, including a PTC auxiliary heating system.
2. The training panel is painted with a color schematic diagram and equipped with terminals for testing.

Teaching and Practical Training Projects

1. Understand the components of the fully automatic air conditioning system.
2. Learn about the function and working principle of the air conditioning system compressor.
3. Master the main components of the air distribution system and their working principles.
4. Understand and read the display parameters of high and low-pressure values of the air conditioning system.
5. Investigate the working principle of the PTC heater.
6. Learn how to operate and apply the air conditioning control panel.
7. Carry out the refrigerant charging process for the air conditioning system.
8. Perform diagnostics and detection of electrical faults in the air conditioning system.

Function Description

1. Connected via CAN-BUS with other electric vehicle modules, it forms a complete electric vehicle system. This system includes all necessary components to effectively teach and train students and engineers on the functioning of electric vehicle systems.
2. High voltage cables are used for power transmission, connecting the high voltage battery, motor controller, motor, PTC heater, and compressor. This configuration is crucial for the proper operation of the electric vehicle, ensuring efficient power distribution and operation of key components.
3. Additionally, it ensures the integrity of the high voltage interlock signal lines, and when the vehicle is scanned with a diagnostic tool in full vehicle mode, no fault codes are present.
4. The training console is equipped with a functional BYD Atto 3 fully automatic air conditioning system, capable of comprehensively demonstrating the structure and working process of the system.

5. The detection terminals on the training panel allow for direct measurement of the electrical parameters of each circuit component in the air conditioning system, such as resistance, voltage, current, and frequency signals.
6. The training console also comes with pressure gauges and thermometers, which can display the pressure of the air conditioning pipes and the temperature parameters of the air outlets in real-time.
7. The training equipment includes an intelligent fault setting assessment system, which can be used with other training modules, and is also suitable for integration with digital training platforms that combine theory with practice.

Product Specifications

1. Dimensions: 1400mm×1200mm×1000mm
2. Working voltage: DC 12V

Air Conditioning System Course Resource Pack

1. For the teaching content of Project One on air conditioning system maintenance, the course includes three main practical tasks:
2. Air Conditioning System Data Collection: Collect key performance data of the air conditioning system through practical operation.
3. Air Conditioning No-Cooling Fault Maintenance: Diagnose and repair specific problems causing the air conditioning system's lack of cooling.
4. Air Conditioning No-Heating Fault Maintenance: Address faults occurring in the heating function of the air conditioning system.

To support these practical tasks, the course is equipped with the following teaching resources:

1. PPT Slides: To aid in theoretical learning, at least 50 pages of PPT slides are provided to thoroughly demonstrate the working principles of the air conditioning system and the fault diagnosis process. The slides use a combination of graphics and text to clearly show key knowledge points with refined language. The design of the slides should focus on visual hierarchy to enhance the teaching effect.
2. Practical Worksheets: There are 3 sets of worksheets, each with no less than 10 pages, totaling no less than 30 pages. These worksheets provide detailed guidance for students to carry out practical operations, ensuring the systematic nature of the learning process and the accuracy of hands-on practices. The worksheets are designed to guide students in understanding the structure, mastering operational skills, and recording practical data for assessing the effectiveness of students' hands-on work. The content of the worksheets complements micro-lessons/videos.
3. Micro-Lessons/Videos: There are 3 instructional videos, each lasting no less than 6 minutes, with a total length of no less than 18 minutes, to strengthen students' understanding of air conditioning system maintenance knowledge and skill acquisition. The micro-lessons and video resources should feature the BYD Atto 3 model. The video signal must be stable, with a signal-to-noise ratio reaching or exceeding 55dB, and the image should not have any defects such as noise, color bias, etc. The audio signal-to-noise ratio should reach or exceed 48dB, ensuring precise synchronization of sound and image, without alternating current noise or other background interference.

Smart Teaching Apps with Android Panel Display

- This module is equipped with COBRA Smart Teaching Apps with a touch screen Android panel display featuring a wealth of educational content such as operation guidance and spare parts location diagrams to facilitate student's understanding and recognition of various spare parts.