APM Technologies

AUTOMOTIVE ELECTRONICS TEST SOLUTIONS

- ELECTRIC VEHICLE POWER-CONVERTER TEST
- ELECTRIC VEHICLE-MOUNTED OBC AND DC/DC TEST
- AUTOMOBILE GENERATOR LOAD PERFORMANCE TEST
- AUTOMOTIVE ON-BOARD MOTOR TEST
- FUSE BREAK TIME TEST

HIGH EFFICIENCY & HIGH PRECISION & HIGH STABILITY

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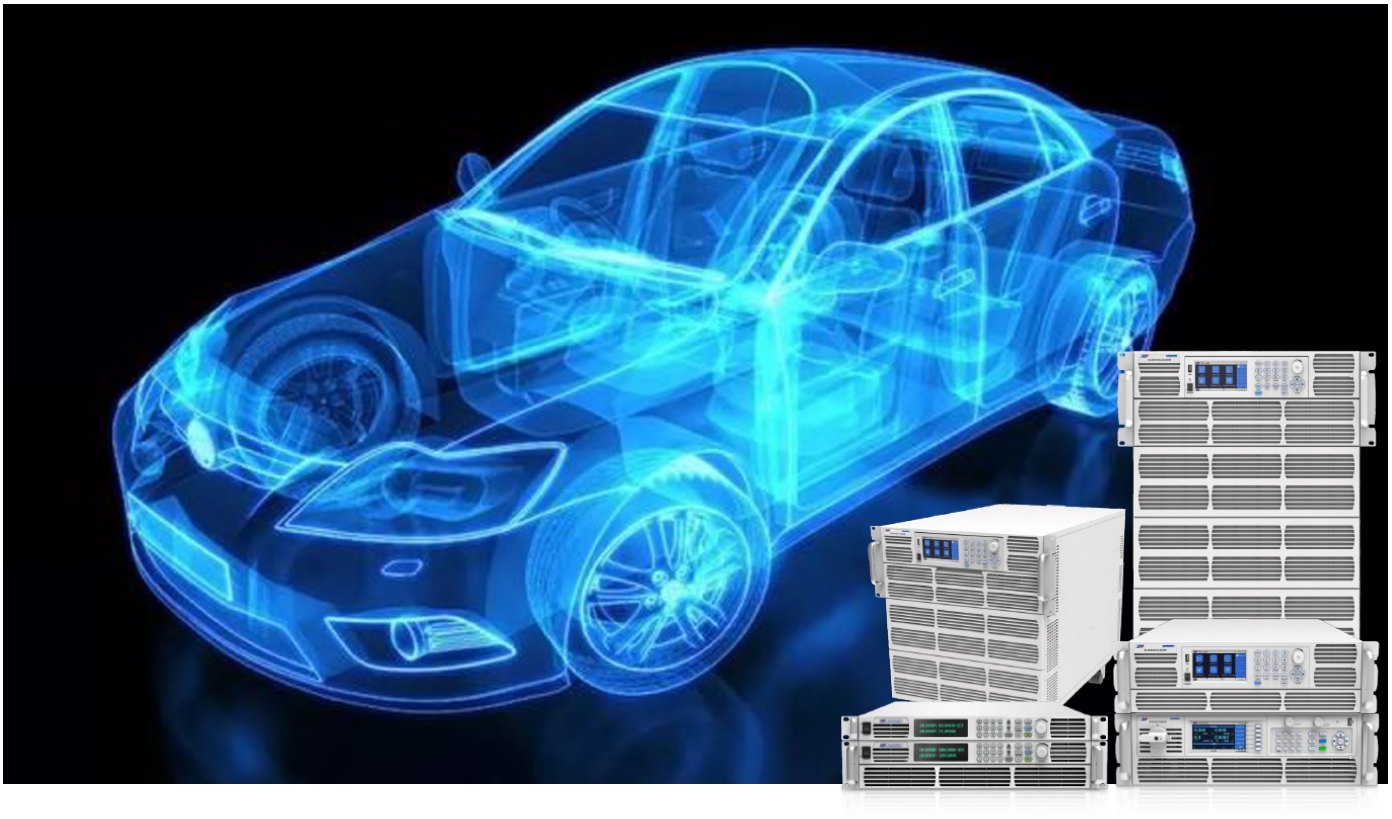
Automotive Electronics Test Solutions



With the development of vehicle intelligence and electrification, the improvement of vehicle's overall performance depends more on the support of vehicle electronic technology. Therefore, the reliability of electronic control equipment plays a leading role in the reliability of the entire vehicle. And testing is the core technology of the entire life-cycle of automotive electronic products, which throughout the design and development, test verification and production testing. Thus, manufacturers need more rapid, reliable and flexible test systems. APM has a wealth of experience and products, which can provide the reliable and professional automotive electronic test solutions to help enterprises shorten the time to market for new designs while maintaining low cost and high efficiency.

Electric Vehicle Power-Converter Test

Recommendation

SP-1U /2U Series
High Performance Programmable DC Power Supply

Voltage Range: 20V-800V
Current Range: 7.5A-200A
Power Range ：600W-4000W, Expandable to 40kW

SP-3U /6U Series
Wide-range High-power Programmable DC Power Supply

Voltage Range: 0-2250V
Voltage Range: 0-1200A
Power Range ：0-36kW, Expandable to 576kW

EL Series
High-density Programmable DC Electronic Load

Voltage Range: 0-200V/600V/1200V
Current Range: 0-2880A
Power Range ：0-27.9kW, expandable to 558kW

Application Range:

Vehicle electronics: car audio, car dashboard, car glass heating wire, car navigation, lighter, car fuse, electronic fuel injection device, idle speed control (ISC), braking systems, airbag devices, etc

Application Advantages:

- Built-in standard automotive electronic test waveforms, such as DIN40839 and ISO16750-2.
- Support List waveform editing function.
- Various communication interfaces, RS485/USB/RS232/CAN/GPIB/LAN.
- With perfect OVP/OCP/OPP/OTP/short circuit protection function.
- Support active series/parallel mode; power expansion can reach 576kW;

  The current sharing function in parallel mode realizes the balance of power supply output power in the system; it can realize high-speed and delay-free synchronous response of master and slave.

Automotive On-Board Motor Test

As the core component of an automobile, the durability of engine against temperature changes is especially critical. The testing motor is placed in a Constant Temperature & Humidity Chamber with a changing temperature of -40°C to 70°C. The data acquisition system is responsible for collecting and saving the current of the motor and the temperature of the Constant Temperature & Humidity Chamber, displaying it on the computer interface synchronously. This is a test item that may last for several months. During the test, if the motor is abnormal, the current exceeds the setting limit, or the Constant Temperature & Humidity Chamber is abnormal and the temperature exceeds the limit, the data acquisition system will immediately send the signal (high level signal) to the power supply. The power will be shut down immediately after receiving this signal to protect the DUT.

Recommendation

SP-1U /2U Series
High Performance Programmable DC Power Supply

Voltage Range: 20V-800V
Current Range: 7.5A-200A
Power Range ：600W-4000W, Expandable to 40kW

Application Range:

On-board motor

Application Advantages:

- Stability of products
- Fast response time

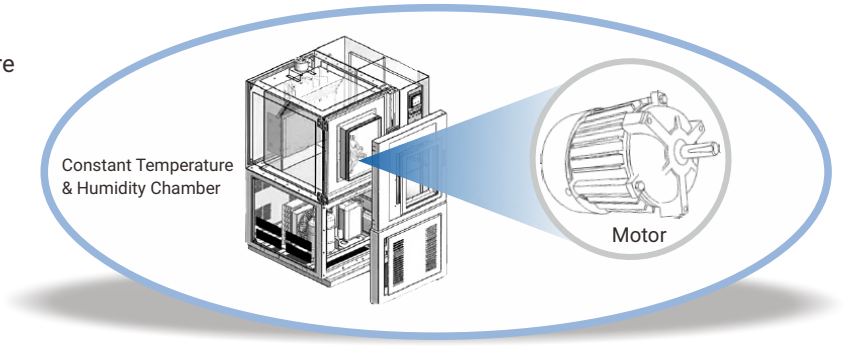
System Structure:

Constant Temperature & Humidity Chamber

Data Collection Systems

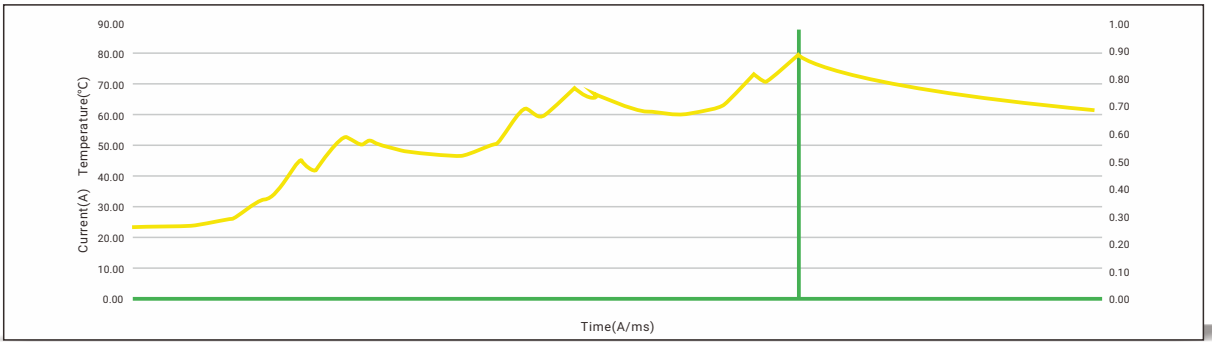
Programmable DC Power Supply

Computer



Test Principle:

During this unattended test, if the temperature humidity chamber has an abnormality, which caused the temperature in the box to rise rapidly (as the yellow curve in the figure below). The data acquisition system will detect the abnormality, and send a signal to the power supply, then the power supply immediately turning off the output (as green line in the figure below) to protect the customer's DUT and equipment, avoids potential losses and risks as well.



Automobile Generator Load Performance Test

The car generator is the main power source of the car, which supplies power to all electrical equipment (except the starter) when the engine is running normally, as well as charging the battery at the same time. During the generator test, it is required that the electronic load can be divided into four different items from idle speed to full speed of the generator, simulating the power generation performance of the generator under various conditions when the car is running. In the whole process, it is necessary to observe the voltage and current data in real time. The traditional load box cannot meet this requirement at all, and the test data is inaccurate, so it is necessary to use a professional electronic load for testing.

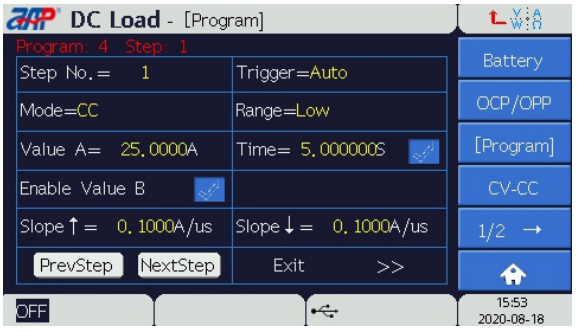
Recommendation

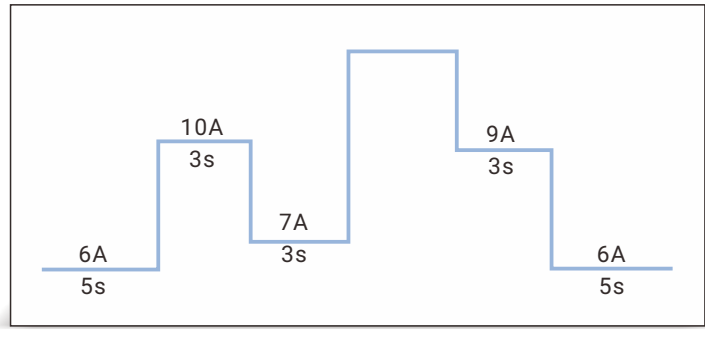
EL Series High-density Programmable DC Electronic Load

Voltage Range: 0-200V/600V/1200V
Current Range: 0-2880A
Power Range : 0-27.9kW, expandable to 558kW

Application Advantages:

- A variety of working modes, such as CC, CV can simulate the different speed of the generator, more convenient to assist engineers to obtain perfect test results.
- Program function, can directly edit the current and voltage waveform on the panel, and simulate the current state of the motor at different speeds. As the diagram below:





Fuse Break Time Test

When the circuit is faulty or abnormal, the current will continue to rise. If there is no protection device in the circuit, the continuous heating of the rising current may burn the circuit or even cause a fire. As an important part of the circuit protection, the fuse should be able to cut off the current to protect the circuit safety. Therefore, it is important to choose the right power supply and load for the fuse test, not only to improve efficiency, but also to ensure the accuracy of the test.

Recommendation

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Current Range: 0-2880A
Power Range ：0-27.9kW, expandable to 558kW

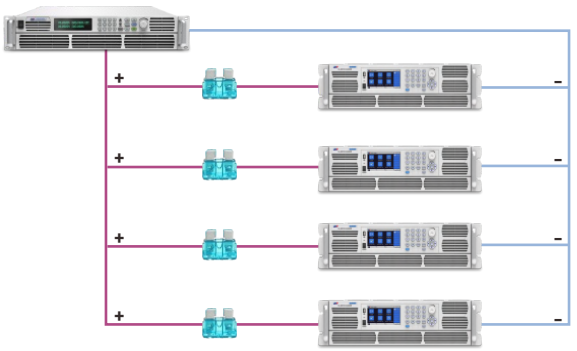
Application Range:

Circuit breakers, power fuses, electrical instrument fuses, automotive fuses.

Application Advantages:

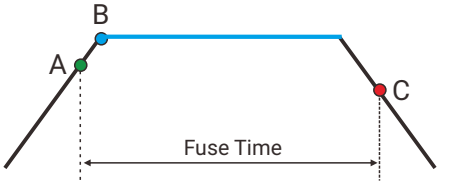
- The requirements for the DC power supply will be reduced, the power supply has no need to work in super low voltage mode, and the output will be more stable.
- The test loop current can be controlled through the CC mode of the load, making it easier and faster to set up.
- One power supply can be used with multiple loads and fuse tests to improve test efficiency.

Test Framework:



Setup Instructions:

A is the starting counting current, which can be one of any point in the current rising phase; B is the test current for fuse break; C is the ending counting current, which can be one of any point in the current falling phase. In order to ensure the accuracy of the test, we recommend to ensure the following setting relationship when setting parameters: IB≥IA≥IC.



Electric Vehicle-mounted OBC and DC/DC Test Solutions

As the scale of the electric vehicle market continues to expand and the number of ownership increases dramatically, many industrial development challenges arise, one of the most prominent problems being the reliability and safety of the charging and power supply systems.Electric vehicles currently use two main contact charging methods: AC and DC charging. AC charging specifications include 110V/12A, 110V/16A, 220V/12A, 220V/16A, 220V/80A, etc. AC charging chargers are placed on electric vehicles, although the charging time is more time-consuming, but the power supply from the grid is quite convenient. The specifications for DC charging include 600V/200A, 850V/200A, and 750V/250A. The charger for DC charging is usually placed on the charging post equipment. DC charging has high charging voltage and high charging current, which can provide fast charging and reduce charging time. At this stage, due to the limitation of DC charging device which is still difficult to be applied on a large scale and high cost, AC charging method will still be one of the main charging methods for electric vehicles at present and for a period of time in the future, Vehicle-mounted OBC and DC-DC are the standard for many models.

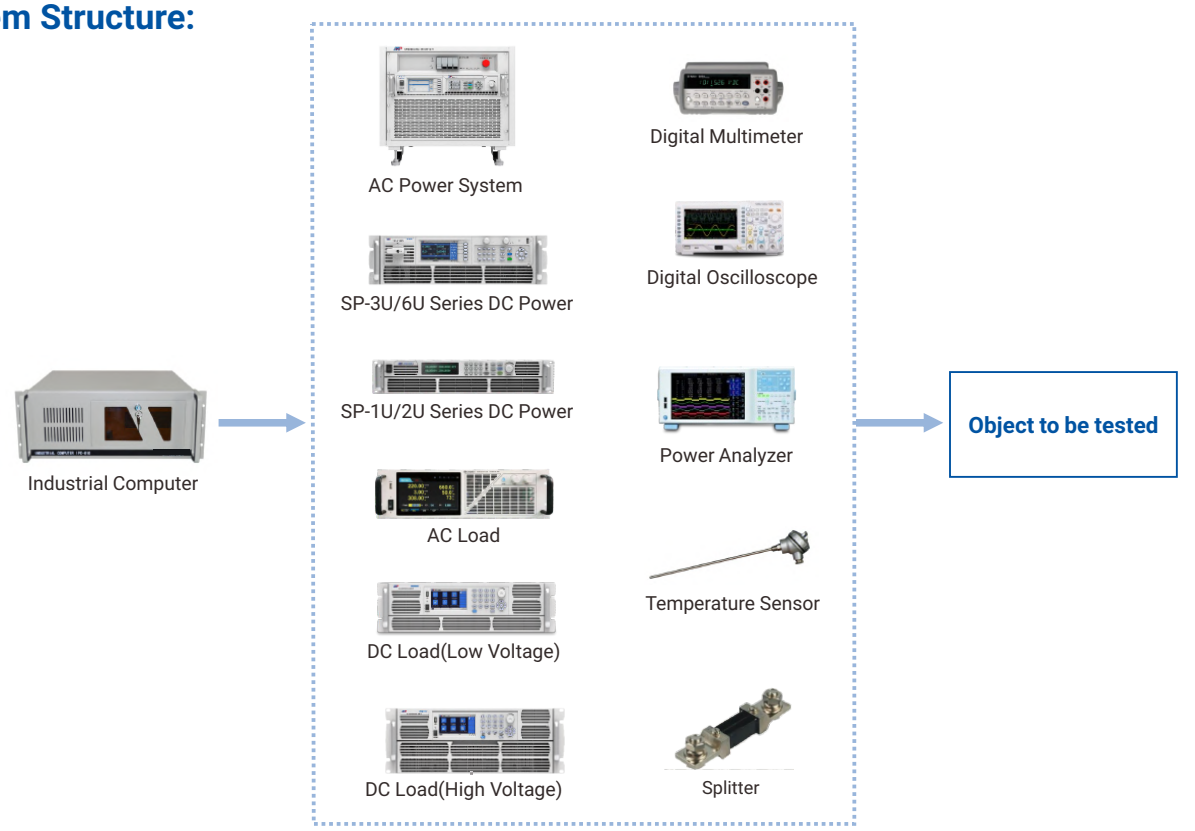
As a key vehicle power electronic components, Vehicle-mounted OBC and DC-DC must not only have high safety, such as connecting with the grid to prevent the electrical risk of the product in case of failure, must have high reliability, the product should be reliable and stable operation during the whole life cycle, and reduce the impact of harmonics on the power quality of the grid.

Relying on a comprehensive source carrier product line with oscilloscopes, power analyzers and other equipment, APM's car charger test system can provide laboratory-level functional testing requirements.

Test Project:

- Input and output characteristics testing
- Power supply line regulation rate test
- Input voltage frequency limit test
- Load regulation test
- Output voltage range test
- Over Input voltage/ under voltage protection test
- Over Output voltage/ under voltage protection test
- Short circuit protection test
- Reverse connection protection test
- Circuit break protection
- Peak current/power-on input inrush current test

System Structure:



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