
Application of Built-in International Standard Voltage Curve of DC Power Supply in Automotive Electronic Industry

- Application of ITECH IT6500 Series DC Power Supply in Automotive Electronic Industry

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Introduction

The complex output of the automotive power supply system, frequent fluctuations of the power voltage output caused by high-current motors, electromagnetic valves and other components and frequent high-voltage pulsation or drop result in challenges for stabling operation of automotive electronic products. The laboratory test is necessary to simulate the transient voltage of the actual power supply system in order to identify the reliability risks of automotive electronic products as soon as possible.

Built-in International Test Standard Voltage Curve of IT6500 Series DC Power Supply

To facilitate the test of related products of the automotive electronics industry, the unified test standards have been developed. The International Organization for Standardization provides a series of test templates of transient voltage waveform to simulate the voltage waveform under various conditions. For example, the German DIN40839 standard voltage curve for the automotive power network and the international standard ISO-16750-2 pulse waveform are two popular unified test standards in the automotive electronics industry at present. ITECH has been dedicated to the study on testing instruments for tests of related products in the automotive electronic field and developed high-power DC power supply series products, IT6500 DC power supply series, which can simulate the German DIN40839 standard voltage curve for the automotive power network and the international standard ISO-16750-2 pulse waveform.

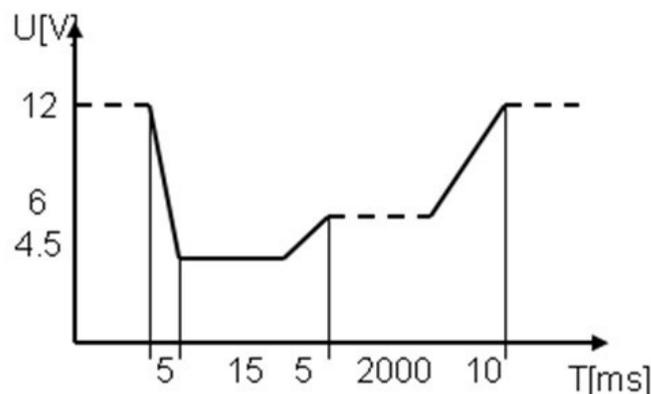
German DIN40839 Standard Voltage Curve for Automatic Power Network

DIN40839 is a standard voltage curve for the automotive power network, which was developed by Germany, leader of the global automotive electronics industry, and can be used in related tests of the industry. After release, the manufacturers of the global automotive electronics industry start to apply the standard voltage curve for the automotive power network in related tests.

For example, the voltage provided by the engine will drop instantaneously in the automotive engine start test. In this case, if the automotive battery fails to withstand

such a voltage drop, the automobile will stop working. As the voltage drops rapidly, it is difficult to truly simulate the voltage waveform in the automotive engine start. If the IT6500 series DC power supply of ITECH is used, this problem can be solved due to the built-in German DIN40839 standard voltage curve for the automotive power network. Engineers can also set this curve in the IT6500 DC power supply and use the List mode of the IT6500 DC power supply to edit and modify the waveform according to the actual needs, so as to meet the experimental requirements.

The waveform generated by using the IT6500 series DC power supply to simulate the electrical test of the automotive engine start is shown below:



Waveform of ITECH IT6500 Series DC Power Supply with Built-in DIN40839

When this waveform is used by engineers in related tests, the rise and drop slope can be adjusted, and the voltage rise speed is very high, i.e. the voltage can rise from 0V to 20V within 2ms. Meanwhile, in order to facilitate tests, the analog interfaces and master-slave series/parallel modes of the IT6500 series DC power supply can be fully utilized.

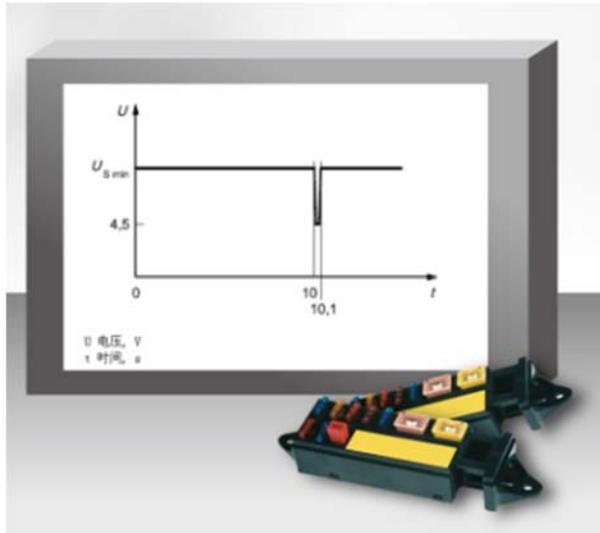
International Standard ISO-16750-2 Pulse Waveform

The International Organization for Standardization provides a series of templates for transient voltage waveform tests in the automotive electronics industry to simulate the voltage waveform under various conditions. The ISO-16750-2 is one of the templates. As for the applications and effects in specific tests, in general, the waveform included in the ISO-16750-2 file can be used in the immunity test of automotive electrical and electronic equipment. The specific applications are shown below.

(I) Influence of transient voltage drop on automotive electronic equipment

Engineers can use the built-in international standard ISO-16750-2 pulse waveform of the IT6500 series DC power supply to test the transient voltage drop. Using this pulse waveform, the transient voltage drop caused by fusion of conventional fuse elements

in another circuit can be simulated to test the automotive electronic equipment based on the complete simulation conditions. The figure below shows the waveform generated when the IT6500 series DC power supply is used in the test.

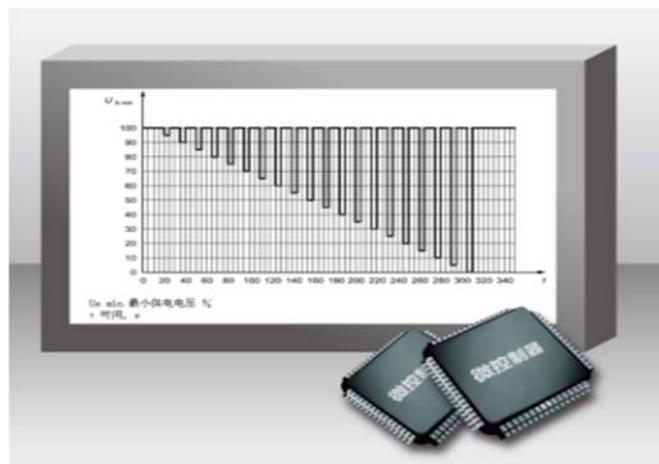


Built-in ISO-16750-2 Waveform of ITECH IT6500 Series DC Power Supply (1)

Seen from the waveform figure, the voltage drops and returns to the original value instantaneously within a very short time, i.e. from 10s to 10.1s. Therefore, the actual situation is truly simulated, and the test requirements of the influence of the transient voltage drop on automotive electronic equipment can be fully met.

(II) Influence of different voltage sags on automotive electronic equipment with resetting function

In this test, engineers can use the IT6500 series DC power supply to simulate different voltage sag curves to check the resetting performance of automotive electronic equipment under different voltage sags. The waveform is shown below:



Built-in ISO-16750-2 Waveform of ITECH IT6500 Series DC Power Supply (2)

As shown above, the voltage waveform simulated by the IT6500 series DC power

supply in the test is a regular gradient curve. The power supply voltage drops at a rate of about 5%, rises to the original value after 5s. The voltage is kept for 10s at least for the function test. This cycle is repeated, thereby fully testing the resetting function of the tested equipment.

(III) Features of Electronic Equipment during and after Start-up of Automobile

The actual transient voltage is not a completely linear waveform during start-up of automobile. The international standard ISO-16750-2 pulse waveform contains the AC voltage waveform curve with the superimposed frequency to more truly simulate the DC voltage with ripples under the DC power supply during start-up of automobile, to test the features of automotive electronic equipment during and after start-up under the simulated conditions. Using the IT6500 series DC power supply, this purpose can be realized. The figure below shows the waveform generated by using the IT6500 series DC power supply in the test.



Built-in ISO-16750-2 Waveform of ITECH IT6500 Series DC Power Supply (3)

The voltage curve within the time period t_8 in the above figure is the AC voltage waveform curve with the superimposed frequency of 2Hz. Using this curve, the influence of the DC voltage with ripples on the performance of automotive electronic equipment under the DC power supply in start-up of the automobile can be truly simulated.

Conclusion

The safety and comfort are integrated in the automobile; therefore, it is essential to test automotive electronic equipment. With the built-in German standard DIN40839 voltage curve for the automotive power network and the international standard ISO-16750-2 pulse waveform, the IT6500 series DC power supply of ITECH is the preferred power testing instrument in the automotive electronics industry. In addition,



due to high voltage and the widest range of voltage and current applications among similar products, the IT6500 series DC power supply of ITECH can be widely applied in electronic equipment tests of the automotive electronics industry and other electronics industries. For example, the built-in standard communication interfaces and analog interfaces can meet the needs of different kinds of communication and industrial control. Therefore, the IT6500 series DC power supply is applicable to various tests. It is a good choice for engineers in equipment selection.