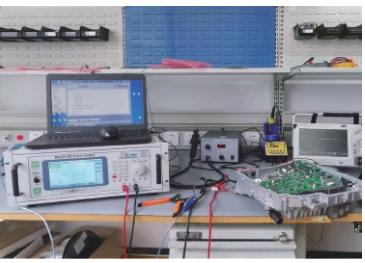
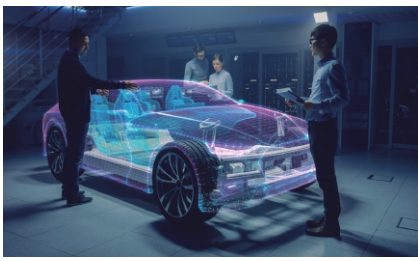
HY-BPSU Series

Automotive Electronics Test High Speed Power Supply

Hangyu Power System (Shanghai) Co., Ltd.





Military Quality Power Supply Expert

HY-BPSU Series Automotive Electronics Test High Speed Power Supply

Bipolar, Wide band, High speed, High current, High voltage

BPSU

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The HY-BPSU series of automotive electronic testing high-speed power supplies have undergone comprehensive innovation and upgrading,promote Product accuracy, added constant current function, adjustable internal resistance range of 10m Ω -500m Ω, optional Industrial computer,Greatly improve the efficiency of automotive electronic testing.

In addition, New and old customers who purchase this series of power supplies enjoy cost reduction and efficiency increase in the later stage of the product Services(product expansion, software upgrade).

The HY-BPSU series is a type of device that has no positive or negative pole switching at the output end and can continuously pass through zero points, A bipolar DC regulated power supply with bidirectional variable positive and negative poles. Through four quadrant action, achieve A testing method that can provide both power as a power source and absorb power as a load.

Product Features

- Output voltage: maximum -100V~+100V
- Output current：0~±500A
- Output power：200W~10kW
- Output broadband：DC~20kHz/50kHz/100kHz/150kHz/ 200kHz/300kHz/500kHz (CV mode)
- Timing function
- Adjustable internal resistance (10mΩ-500mΩ)
- Optional industrial control computer operation
- Any wave editing function, built-in waveform suitable for: ISO16750-2；ISO7637.2；GB28046.2；LV124；LV148； SMTC3800001；VW80000；GS95024-2；GMW3172； ISO/DIS21780.
- Adopting "new linear technology" to achieve low ripple/low noise
- High speed response speed, voltage response time ⩽ 10μs
- 16-bit D/A High precision converter with precise output
- 16-bit A/D High precision converter for more accurate read back
- With Sense compensation function, wiring to the load end, to form closed-loop compensation

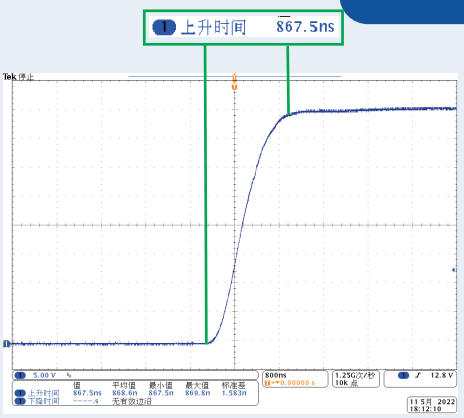
Application Field

This power supply can be applied to vehicle electrical power supply variation experiments, secondary battery charging and discharging Experiments, simulated battery charging and discharging experiments, constant current source for pulse electroplating, ripple superposition experiments Verification, DC motor life test, constant current source for generating magnetic field, motor, large capacity capacitor Characteristic testing of leakage switches, solenoid valves, and coils.

Used as a testing power supply and load simultaneously, with diverse uses.

- Vehicle mounted electrical equipment testing(Car central control box, car generator, steering equipment Motor, onboard radar system,DC motor/DC-DC converter, wiper, etc.)
- Vehicle mounted electrical components testing(Sensor for power supply loop, solenoids,connector, relays, car fuses, car lights, etc.)
- Wireless power supply
- Magnetic body drive(Magnetic flux testing, B-H curve testing, etc.)
- Power supply for magnetic field generation(Helmholtz coils, etc.)

Actual Measurement Display



Frequency characteristics 100kHz-500kHz (CV mode) response time of rising edge and falling edge ⩽10μs

The actual measurement is shown in the figure above (some models).

Measure the accuracy of 20V under full scale conditions, the deviation is less than 0.01, and the accuracy reaches level 0.05.

HY-BPSU Series Product Model Selection And Selection Purchase

Product Selection Instructions

Product Series	Output Voltage	Output Current	Output Broadband
HY-BPSU	40	10	500k

Standard Communication Interface

- RS-485
- RS-232

■ Selection examples:
Model: HY-BPSU 40-10-500K

■ Description: Output voltage ± 40V, output current ± 10A
Output bandwidth DC~500kHz

Optional Communication Interface

- LAN :Ethernet communicationinterface
- CAN :CAN communication interface
- GPIB :GPIB communication interface
- IA :Analog quantity programming and monitoring interface (isolated type)

*Only when the equipment operates continuously at the specified operating temperature for more than 30 minutes can all technical indicators be guaranteed.

HY-BPSU Series Product Selection And Parameters

This series of products optional power output wide band:DC-20kHz/50kHz/100kHz/150kHz/200kHz/300kHz/500kHz(CV mode)
If there is no model in the selection table that meets your needs, it can be proposed separately for special customization.

Output Voltage-20V~+20V Series Power Selection

Models	Output voltage	Output current	Output power
HY-BPSU 20-10	±20V	±10A	200W
HY-BPSU 20-20	±20V	±20A	400W
HY-BPSU 20-30	±20V	±30A	600W
HY-BPSU 20-40	±20V	±40A	800W
HY-BPSU 20-60	±20V	±60A	1.2kW
HY-BPSU 20-90	±20V	±90A	1.8kW

Models	Output voltage	Output current	Output power
HY-BPSU 20-100	±20V	±100A	2kW
HY-BPSU 20-120	±20V	±120A	2.4kW
HY-BPSU 20-150	±20V	±150A	3kW
HY-BPSU 20-200	±20V	±200A	4kW
HY-BPSU 20-500	±20V	±500A	10kW

Output Voltage-30V~+30V Series Power Selection

Models	Output voltage	Output current	Output power
HY-BPSU 30-10	±30V	±10A	300W
HY-BPSU 30-13.4	±30V	±13.4A	400W
HY-BPSU 30-20	±30V	±20A	600W
HY-BPSU 30-26.7	±30V	±26.7A	800W
HY-BPSU 30-40	±30V	±40A	1.2kW

Models	Output voltage	Output current	Output power
HY-BPSU 30-60	±30V	±60A	1.8kW
HY-BPSU 30-100	±30V	±100A	3kW
HY-BPSU 30-134	±30V	±134A	4kW
HY-BPSU 30-200	±30V	±200A	6kW
HY-BPSU 30-267	±30V	±267A	8kW

HY-BPSU series Product Selection

Output Voltage-40V~+40V Series Power Selection

Models	Output voltage	Output current	Output power
HY-BPSU 40-7.5	±40V	±7.5A	300W
HY-BPSU 40-10	±40V	±10A	400W
HY-BPSU 40-15	±40V	±15A	600W
HY-BPSU 40-20	±40V	±20A	800W
HY-BPSU 40-30	±40V	±30A	1.2kW
HY-BPSU 40-45	±40V	±45A	1.8kW
HY-BPSU 40-50	±40V	±50A	2kW

Models	Output voltage	Output current	Output power
HY-BPSU 40-60	±40V	±60A	2.4kW
HY-BPSU 40-75	±40V	±75A	3kW
HY-BPSU 40-100	±40V	±100A	4kW
HY-BPSU 40-150	±40V	±150A	6kW
HY-BPSU 40-200	±40V	±200A	8kW
HY-BPSU 40-250	±40V	±250A	10kW

Output Voltage-60V~+60V Series Power Selection

Models	Output voltage	Output current	Output power
HY-BPSU 60-6.7	±60V	±6.7A	400W
HY-BPSU 60-10	±60V	±10A	600W
HY-BPSU 60-13.4	±60V	±13.4A	800W
HY-BPSU 60-20	±60V	±20A	1.2kW
HY-BPSU 60-30	±60V	±30A	1.8kW
HY-BPSU 60-33.5	±60V	±33.5A	2kW

Models	Output voltage	Output current	Output power
HY-BPSU 60-40	±60V	±40A	2.4kW
HY-BPSU 60-50	±60V	±50A	3kW
HY-BPSU 60-67	±60V	±67A	4kW
HY-BPSU 60-100	±60V	±100A	6kW
HY-BPSU 60-133.3	±60V	±133.4A	8kW
HY-BPSU 60-167	±60V	±167A	10kW

Output Voltage-80V~+80V Series Power Selection

Models	Output voltage	Output current	Output power
HY-BPSU 80-5	±80V	±5A	400W
HY-BPSU 80-7.5	±80V	±7.5A	600W
HY-BPSU 80-10	±80V	±10A	800W
HY-BPSU 80-15	±80V	±15A	1.2kW
HY-BPSU 80-22.5	±80V	±22.5A	1.8kW
HY-BPSU 80-25	±80V	±25A	2kW

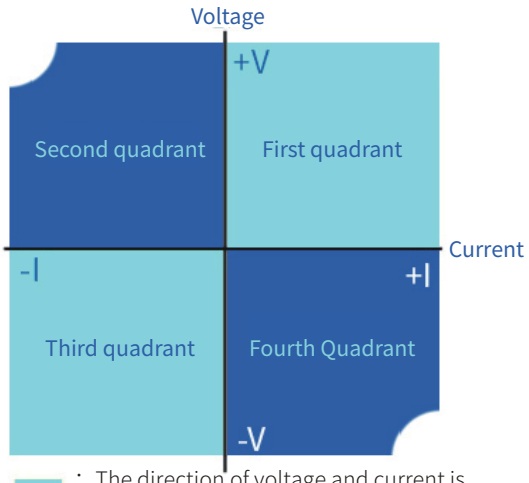
Models	Output voltage	Output current	Output power
HY-BPSU 80-30	±80V	±30A	2.4kW
HY-BPSU 80-37.5	±80V	±37.5A	3kW
HY-BPSU 80-50	±80V	±50A	4kW
HY-BPSU 80-75	±80V	±75A	6kW
HY-BPSU 80-100	±80V	±100A	8kW
HY-BPSU 80-125	±80V	±125A	10kW

Output Voltage-100V~+100V Series Power Selection

Models	Output voltage	Output current	Output power
HY-BPSU 100-4	±100V	±4A	400W
HY-BPSU 100-6	±100V	±6A	600W
HY-BPSU 100-8	±100V	±8A	800W
HY-BPSU 100-12	±100V	±12A	1.2kW
HY-BPSU 100-18	±100V	±18A	1.8kW
HY-BPSU 100-20	±100V	±20A	2kW

Models	Output voltage	Output current	Output power
HY-BPSU 100-24	±100V	±24A	2.4kW
HY-BPSU 100-30	±100V	±30A	3kW
HY-BPSU 100-40	±100V	±40A	4kW
HY-BPSU 100-60	±100V	±60A	6kW
HY-BPSU 100-80	±100V	±80A	8kW
HY-BPSU 100-100	±100V	±100A	10kW

Four Quadrant Action Concept Diagram



: The direction of voltage and current is the same (source)

: The direction of voltage and current is opposite (sink)

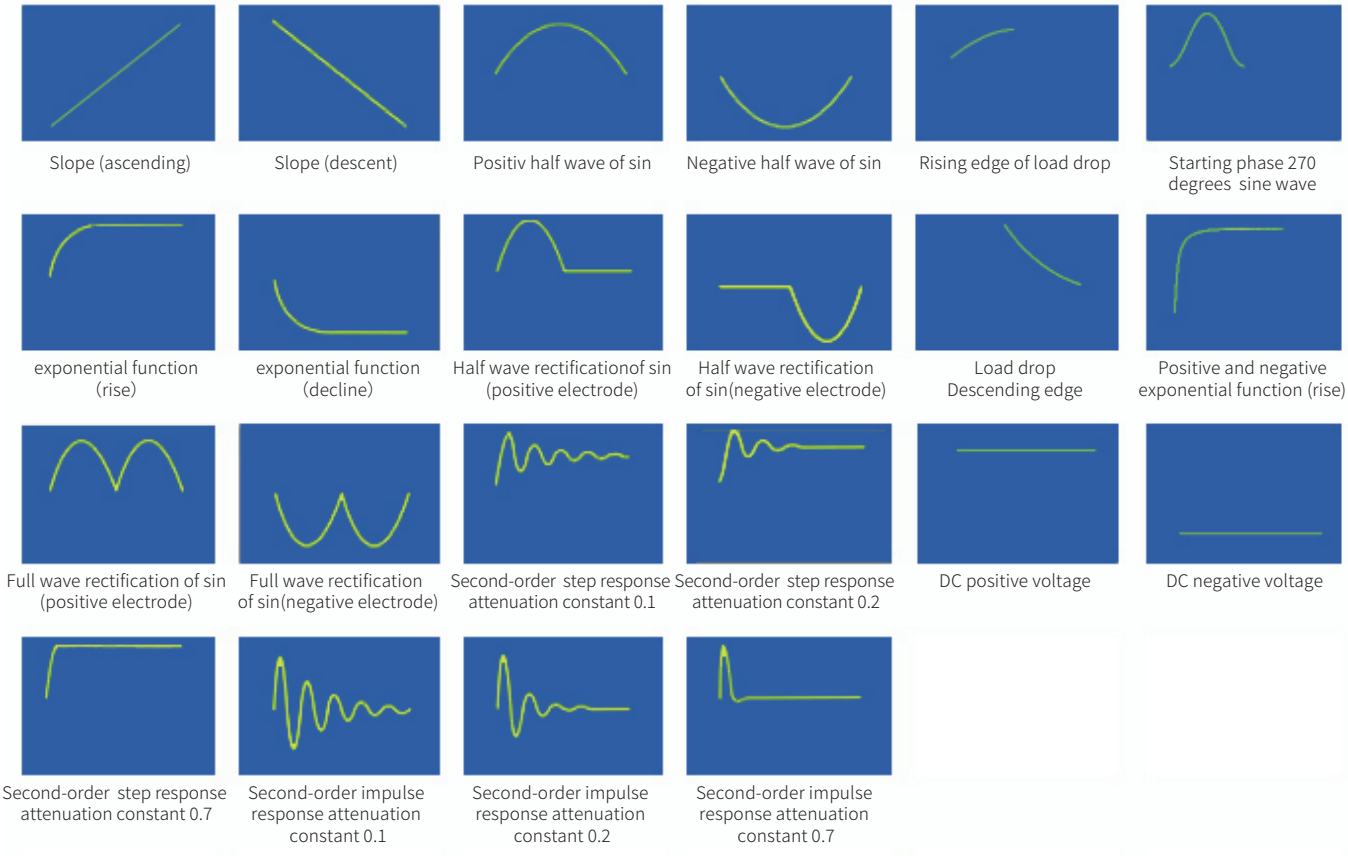
Any Wave Editing Function

HY-BPSU series, in the realization of sinusoidal wave, square wave, triangular wave based on the built-in 22 waveform elements. It can edit, save and call 22 kinds of waveforms arbitrarily. And can set the amplitude, frequency, initial phase, sweep frequency, square wave. Moreover, the timing function can set 22 programs for each waveform from 1 Step to 200 steps.

■ Three basic waveforms

Sinusoidal wave | Triangular wave | Square wave

■ 22 Arbitrary waveforms



Slope (ascending) | Slope (descent) | Positiv half wave of sin | Negative half wave of sin | Rising edge of load drop | Starting phase 270 degrees sine wave

exponential function (rise) | exponential function (decline) | Half wave rectificationof sin (positive electrode) | Half wave rectification of sin(negative electrode) | Load drop Descending edge | Positive and negative exponential function (rise)

Full wave rectification of sin (positive electrode) | Full wave rectification of sin(negative electrode) | Second-order step response attenuation constant 0.1 | Second-order step response attenuation constant 0.2 | DC positive voltage | DC negative voltage

Second-order step response attenuation constant 0.7 | Second-order impulse response attenuation constant 0.1 | Second-order impulse response attenuation constant 0.2 | Second-order impulse response attenuation constant 0.7

HY-BPSU Series Test Items

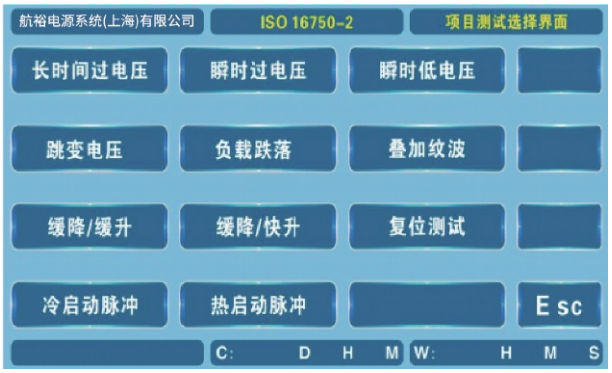
BPSU

05

Automotive Electrical Performance Testing Project

HY-BPSU series power supply programming function comes with multiple testing items,including the following:

- Long term overvoltage
- Instantaneous overvoltage
- Instantaneous low voltage
- Jumping voltage start
- Load drop
- Generator superimposed ripple voltage
- Slow decrease/slow increase of working voltage
- Slow decrease/rapid increase of power supply
- Reset test
- Pulse voltage during engine start
- Reference grounding and power supply



Test Mode Selection Interface

The HY-BPSU series is a specialized solution designed for this standard. After the release of this standard update, Hangyu Power has also made a series of updates and improvements based on the latest standards to better meet user needs. At present, the HY-BPSU series can cover the following testing projects:

4.2 Direct current (DC) supply voltage
4.3 Overvoltage
  4.3.1 Long term overvoltage
  4.3.2 Transient overvoltage
4.4 Superimposed alternating voltage
4.5 Slow decrease and increase of supply voltage
4.6 Discontinuities in supply voltage
  4.6.1 Drops or interrupts in supply voltage
  4.6.1.1 Momentary drop in supply voltage
  4.6.1.2 Micro interruption in supply voltage
  4.6.2 Reset behaviour at voltage drop
  4.6.3 Starting profile
  4.6.4 Load dump
4.7 Reversed voltage
4.8 Ground reference and supply offset
4.9 Open circuit tests
  4.9.1 Single line interruption
  4.9.2 Multiple line interruption
4.10 Short circuit/overload protection

ISO16750-2 Testing Requirements

4.1 General

- If not otherwise specified, the following tolerances shall apply:

— Frequency and time: ±5%;
— Voltages: ±0.2V;
— Currents: ±2%;
— Inductance: ±10%;
— Resistance: ±10%.

- All voltage curves are shown without load.
- If not otherwise specified, measure all voltages at the relevant terminals of the DUT.
- For devices and units operating on secondary feed (e.g. 5 V sensor being supplied from 12V supplied DUT), special considerations shall apply to voltage supply range, and specific tests shall be adjusted with consideration to the actual vehicle installation. Which tests that are applicable and what considerations that apply shall be agreed between the customer and the supplier.

NOTE:For a device or unit working on secondary feed, the electrical testing is sometimes carried out together with the 12/24V supplied DUT providing the secondary feed.

1.1、ISO16750-2/4.2 Direct current (DC) supply voltage

Purpose：The purpose of this test is to verify equipment functionality at minimum and maximum supply voltage.

Test method：■ Set the supply voltage as specified in Table 3 or Table 4 to all relevant inputs (connections) of the DUT.

■ Use the test profile as described in Figure 1 and Table 2.

■ The test profile shall be run with the DUT in operating mode 3.3, with the DUT in operating mode 3.4 (i.e. to test both minimum and maximum load conditions), and at both T_{min} and T_{max}, as defined in ISO 16750-1. If agreed between the customer and the supplier, one of the operating modes 3.3 or 3.4 may be chosen for the test.

■ The test profile shall also be run once at room temperature at normal loading conditions, operating mode 3.2 as defined in ISO 16750-1.

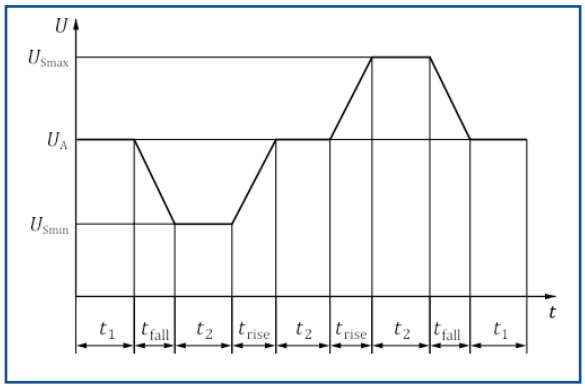
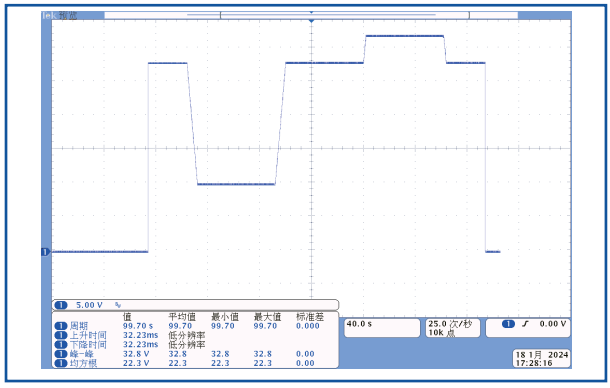


Figure 1 — DC supply voltage test profile



Measured Drawing

Table 2 — Test parameters for DC supply voltage	
U_A	The power supply voltage of the operating generator.
U_{Smax}	See Table 3 or Table 4
U_{Smin}	See Table 3 or Table 4
t_1	30s
t_2	60s
t_{fall}	1 V/s
t_{rise}	1 V/s

Table 3 — Supply voltage for system devices with 12 V nominal voltage					
Code	A	B	C	D	Z
Minimum supply voltage,Usmin	6V	8V	9V	10.5V	As agreed
Maximum supply voltage,Usmax	16V	16V	16V	16V	

Table 4 — Supply voltage for system devices with 24 V nominal voltage					
Code	E	F	G	H	Z
Minimum supply voltage,Usmin	10V	16V	22V	18V	As agreed
Maximum supply voltage,Usmax	32V	32V	32V	32V	

1.2、ISO16750-2/4.3 Overvoltage

4.3.1 Long term overvoltage

4.3.1.1 Test at a temperature of (T_{max} – 20) °C for alternator failure

Purpose：This test simulates the condition where the alternator regulator fails, so that the output voltage of the alternator rises above normal values.This test is relevant for both 12 V and 24 V systems.

Test method：■ Heat the DUT in a hot air oven to a temperature that is 20 K below the maximum operating temperature, T_{max}.

■ For 12 V systems, apply a voltage of 18 V for 60 min to all relevant inputs (connections) of the DUT.

■ For 24 V systems, apply a voltage of 36 V for 60 min to all relevant inputs (connections) of the DUT.

■ The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.

4.3.1.2 Test at room temperature and Tmin for jump start

Purpose：This test simulates a jump start from a 24 V system to a 12 V system vehicle. This test is only applicable for 12 V systems. The test shall be done both in room temperature conditions and at T_{min}.

Test method：Ensure that the DUT has stabilized at temperature given in Table 5. Apply a voltage of 26 V for (60 ± 6) s to all relevant inputs (connections) of the DUT as described in Figure 2 and Table 5.

Starting test values: table below

Table 5 — Jump start test values

Parameter	Temperature	t_{rise}	t_{fall}	t_{trans}	t_{rest}	U_{smin}	U_{trans}	n
12V system	RT	⩽10ms	⩽10ms	60s	120s	10.8V	26V	1
	T_{min}	⩽10ms	⩽10ms	60s	120s	10.8V	26V	1

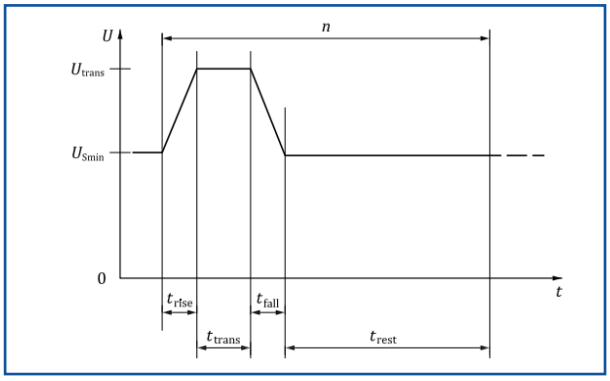
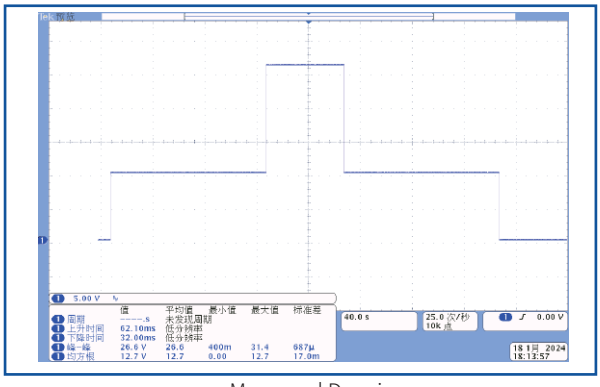


Figure 2 — Jump start transient



Measured Drawing

4.3.2 Transient overvoltage

Purpose：This test simulates when a DUT is affected by switching loads or loads injecting current in the electrical distribution system. This test is relevant for both 12 V and 24 V systems.

Test method：Apply the test pulse five times as specified in Figure 3 and Table 6 simultaneously to all relevant inputs (connections) of the DUT. The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.

Table 6 — Transient overvoltage test values

Parameter	t_{rise}	t_{fall}	t_{rest}	t_{trans}	U_{trans}	n
12V system	1ms	1ms	1s	400ms	18V	5
24V system	2ms	2ms	1s	400ms	36V	5

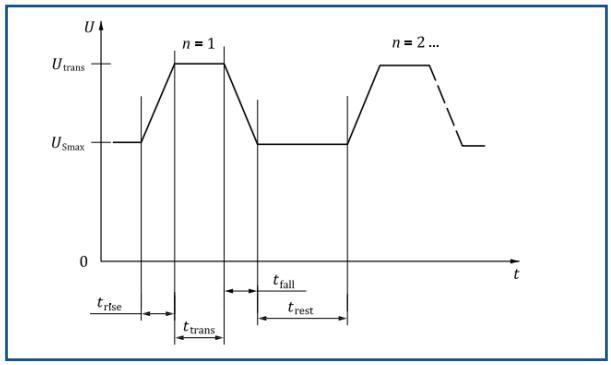
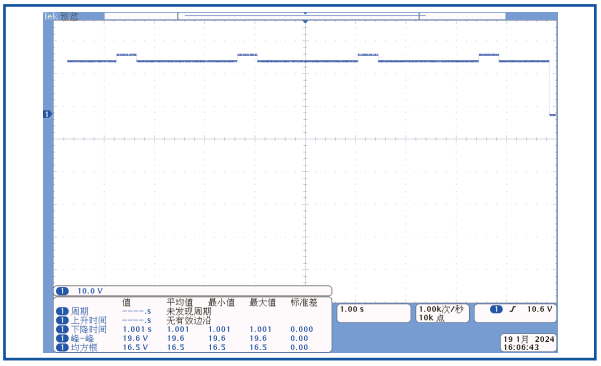


Figure 3 — Test profile for transient overvoltage



12V System Measured Drawing

1.3、ISO16750-2/4.4 Superimposed alternating voltage

Purpose: ■ This test is intended to check immunity of a component to ripples in the on-board system, caused, for example, by an alternator or a DC/DC converter.

■ It specifies a conducted voltage test method and procedure for determining the immunity of electronic components. The method is applied to all DUT power supply lines simultaneously. For a DUT with redundant supplies, any combination of exposures shall be agreed between the customer and the supplier.The severity level 1, 2, 3 and 4 shall be chosen in accordance with the application, see Table 8.

■ This test is relevant for both 12 V and 24 V systems.

Test method:Figure 4 is showing a rough overview of the test voltage profile for min. and max. applied superimposed alternating voltage, a more precise description of the voltage profile can be found in 4.4.2.2 and 4.4.2.3.

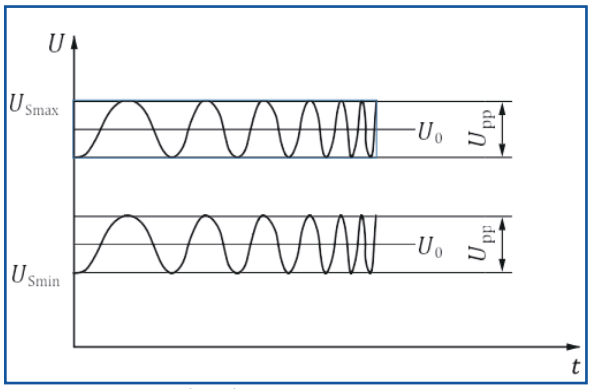
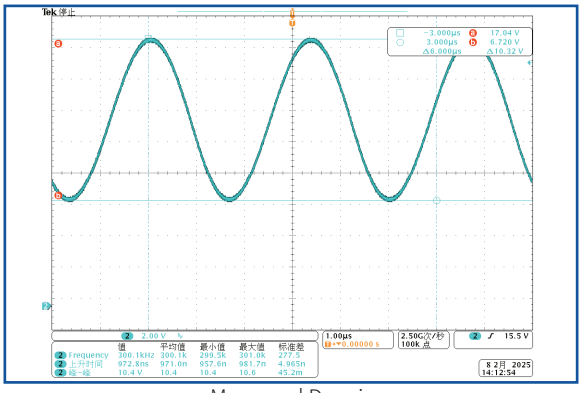


Figure 4 — Test profiles for Superimposed alternating voltage



Measured Drawing

Table 7 — Test parameters for superimposed alternating voltage		
U_N	12V system	24V system
Operating mode	3.2	3.2
Frequency range	f_1: 10Hz - 30kHz; f_2: 30kHz - 200kHz	f_1: 10Hz - 30kHz; f_2: 30kHz - 200kHz
DC level of applied test voltage	U_0= U_{Smax} - U_{pp}/2; U_0= U_{Smin} + U_{pp}/2	U_0= U_{Smax} - U_{pp}/2; U_0= U_{Smin} + U_{pp}/2
Dwell time	⩾ 2s	⩾ 2s
Frequency step	logarithmic 2%	logarithmic 2%
Voltage ripple limit: U_{pp}	f_1: Severity level 1-3; f_2: Severity level 4	f_1:Severity level 1-3; f_2: Severity level 4
Current limit: I_{pp}	f_1: 15 A; f_2: 10 A	f_1: 15 A; f_2: 10 A
Number of cycles	1 test sequence for each test combination	1 test sequence for each test combination

Table 8 — Severity level for test Superimposed alternating voltage			
Severity level Upp	Frequency range	Upp for 12 V	Upp for 24 V
1、DUT supplied by alternator without battery(emergency run)	10Hz - 30kHz	6V ± 0.2V	10V ± 0.2V
2、DUT supplied by alternator	10Hz - 30kHz	3V ± 0.2V	3V ± 0.2V
3、DUT supplied by DC/DC converter	10Hz - 30kHz	2V ± 0.1V	2V ± 0.1V
4、DUT supplied by DC/DC converter	30kHz - 200kHz	1V ± 0.1V	1V ± 0.1V

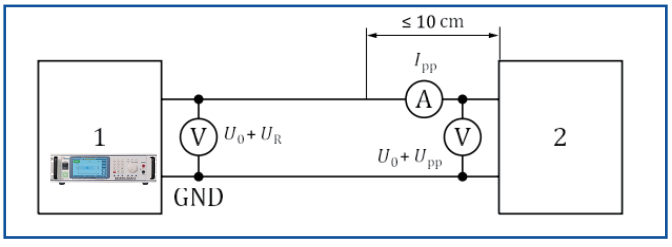


Figure 5 — Test setup for superimposed alternating voltage
1: HY-BP series automotive electronic testing high-speed power supply
2: DUT
U_R: AC ripple voltage at power supply
U_{pp}: Peak-to-peak AC voltage at DUT
U_0: DC level of applied test voltage, in volts
I_{pp}: Peak-to-peak AC current at DUT
Locate voltage meter and ampere meter within 10 cm from the DUT.

1.4、ISO16750-2/4.5 Slow decrease and increase of supply voltage

Purpose: This test simulates a gradual discharge and recharge of the battery. This test is relevant for both 12 V and 24 V systems.

Test method:■ Apply the following test simultaneously to all relevant inputs (connections) of the DUT.

■ Decrease the supply voltage from UA to 0 V, then increase it from 0 V to UA, as described in Figure 6, applying a change rate of (0.5 ± 0.1) V/min, either linear, or in equal steps of not more than 25 mV.

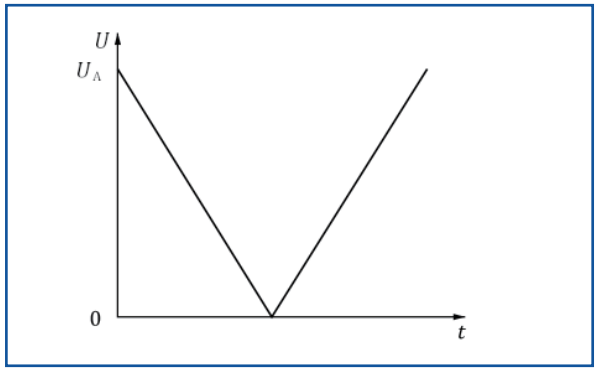
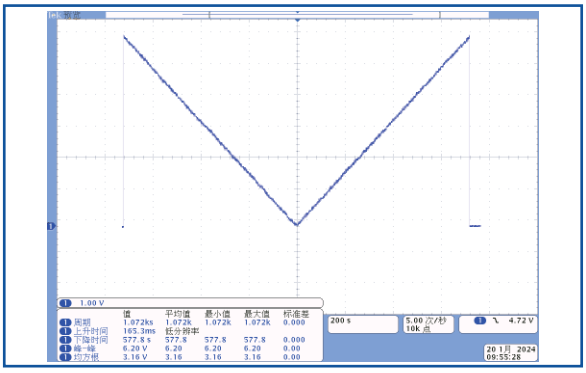


Figure 6 — Test profile for Slow decrease and increase of supply voltage



Measured Drawing

1.5.1、ISO16750-2/4.6 Discontinuities in supply voltage

4.6.1.1 Momentary drop in supply voltage

Purpose: This test simulates the effect when a conventional fuse element melts in a parallel circuit.This test is relevant for both 12 V and 24 V systems.

Test method: Apply the test pulse (see Figure 7 and Figure 8) simultaneously to all relevant inputs (connections) of the DUT.

The rise time and fall time shall be not more than 10 ms.

The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.

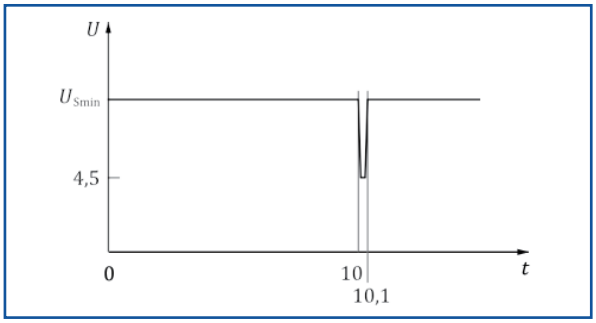


Figure 7 — Short voltage drop for systems with 12 V nominal voltage

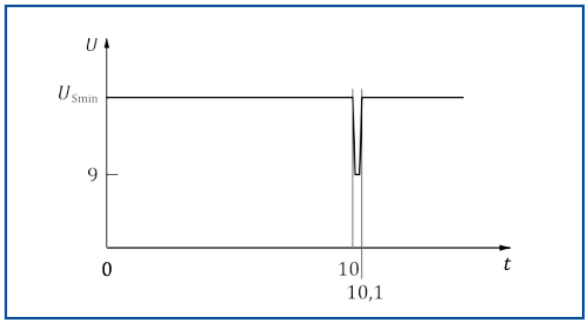
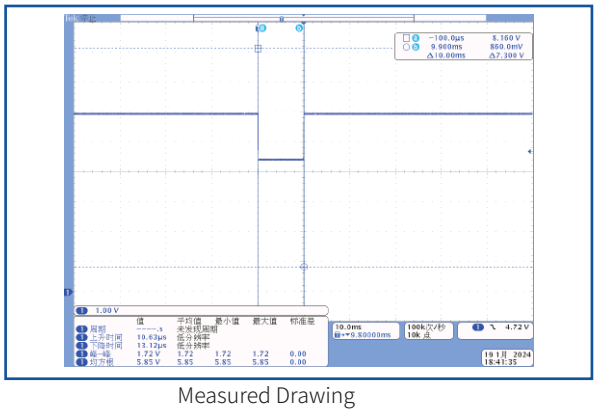
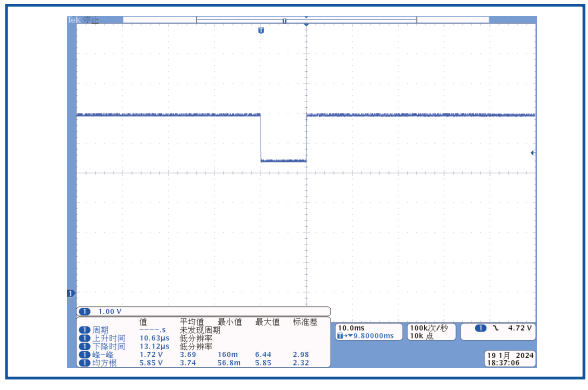


Figure 8 — Short voltage drop for systems with 24 V nominal voltage



Measured Drawing



Measured Drawing

1.5.2、ISO16750-2/4.6Discontinuities in supply voltage

4.6.1.2 Micro interruption in supply voltage (This test requires the optional HY-PISSU pin interrupt simulator to be used in conjunction with the HY-BPSU series automotive electronic testing high-speed power supply.)

Purpose: This test simulates the effect of micro interruption events in supply voltage caused by short circuits or open circuits of the supply lines, for instance by contact faults, defect relays, relay-contact bounce or by switching from the main power supply to a redundant power supply.This test is relevant for both 12 V and 24 V systems.

Test method: ■ To verify the switch reaction time, two reference measurements shall be performed and documented with the test setup given in Figure 9. In the first reference measurement, the DUT is replaced with a 1 kΩ resistor, and in the second measurement, the DUT is replaced with a 10 Ω resistor. The reference measurements enable the reaction time of the switch to be verified as acceptable before the full test is performed. The resistors used shall, therefore, have low inductance. Acceptable reaction time for the switch shall be ⩽ 10 µs.

■ Apply the test simultaneously to all power supply inputs (connections) of the DUT. Both test case 1 (see Figure 10 and Table 9 in 4.6.1.2.2.2) and test case 2 (see Figure 11 and Table 10 in 4.6.1.2.2.3) shall be performed.

■ Test condition — open switch resistance: ⩾ 10 MΩ.

■ The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.

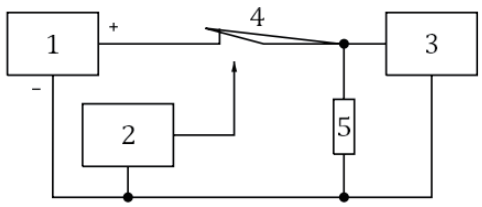


Figure 9 — Test set up for micro interruption with 12/24 V nominal voltage (UN)
1: Power supply
2: Programmable control circuit to open the switch connection
3: DUT
4: Normally closed switch
5: Optional low resistance parallel load

HY-PISSU Series Pin Interrupt Simulator

HY-PISSU 80-50、HY-PISSU 80-100

The HY-PISSU wire harness interruption simulator is a product developed and produced by Hangyu Power Supply to meet the requirements of wire harness interruption testing for power lines and signal lines. It simulates the interruption, plugging and unplugging of power lines and signal lines. It is a testing device specifically designed to meet the standards of vehicle manufacturers. It can meet the test requirements for E10, E13, E14 in LV 124 and for E48-09 of the LV 148 in LV 148. At the same time, it can also meet the test requirement of GM 3172 that the switching time is less than 200ns.

Technical features:
- It can be controlled by the upper computer software
- Interrupt waveform time can be freely edited
- High integration dual-module combination
- The signal line module can adapt to high-speed communication
- The minimum drop time can be set to 1µs
- It can be used in conjunction with a (0-80V) DC power supply to achieve the testing purpose

Application fields:
- Electrical performance test of on-board electronics
- Simultaneously meet the test requirements of 12V/24V/48V systems, etc

Meet the standard:
- LV 124 (2013)
- LV 148
- MBN 10615
- MBN LV 124-1
- Nissan 28401
- NDS 02 OEM LV 124
- LV 124 (2013-02)
- Volkswagen VW 80000
- GMW 3172
- DC-10842 Fiat 9.90110
- PF-9326 Cummins 14269 (982022-026) Daimler Chrysler DC-10615
- Hyundai/Kia ES 95400-10, Rev. D Hyundai ES 39110-00
- PSA B21 7110 Renault 36.00.808/--L
- Great Wall GWT A D01-01:2020-09
- Great Wall BMW: GS 95003-2
- Tianji Auto Q/DK TE 4601-2019
- BMW GS 95003-2
- GS 95024-2-1
- GS 95026
- QV 65013 (2010-06)
- Chrysler CS-11979
- Iveco 16-2103 Rev.15 (2010)

Power line switch parameters:
- Power switch: 2-way switch: -DC + power line; -DC - Ground wire
- EUT voltage: ±80V
- Maximum current of EUT: 50A/100A optional (HY-PISSU 80-50, HY-PISSU 80-100)
- Current direction: Unidirectional
- Switching time: < 200ns
- Interruption time: 1µs to 60s
- S2 Discharge resistors: open circuit, 0Ω, 0.1Ω, 1Ω, 100Ω
- Rising edge/Falling edge: Achieve a rising/falling edge of 200ns in the open-circuit state

Signal line switch parameters:
- Number of channels: 16 independent channels can be switched among each other
- EUT power supply: ±50V DC/5A
- Switching method: Automatic switching
- Test mode: Supports single-channel and multi-channel simultaneous tests
- Interruption time: 1µs to 60s
- Rising/falling edge: The 100Ω load rising/falling edge simultaneously meets < 200ns
- Safety: Short-circuit protection function

General parameters:
- Working power supply: 220V/1A
- Upper computer interface: RS-485/232, LAN
- Instrument weight: about 5kg
- Dimensions: 19-inch rack-mounted 2U model 430(W)*500(D)*88(H)mm
- Temperature performance: Operating temperature: 0-50°C
- Storage temperature: -20°C to 50°C
- Working humidity: 20% - 90%RH, no dew formation
- Storage humidity: 10% - 95%RH, no dew formation

1.5.3、ISO16750-2/4.6 Discontinuities in supply voltage

4.6.1.2.2.2 Test case 1 - variable interruption time

(Option support: HY-PISSU pin interrupt simulator, introduced on P10)

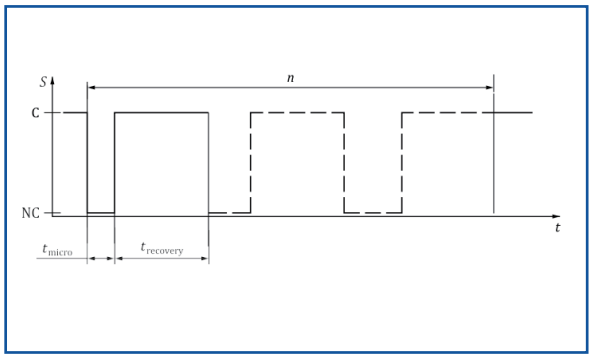
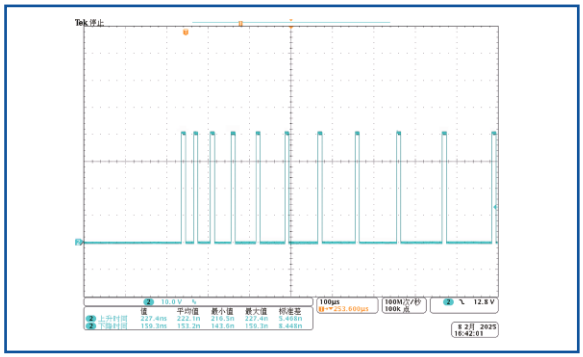


Figure 10 — Micro interruption for variable interruption with 12/24 V nominal voltage (UN)



Measured Drawing

Table 9 — Micro interruption test value for variable interruption duration time exposure with 12 V and 24 V nominal voltage (UN)			
t_{micro} micro interruption duration	increased in steps of t_{micro}	$t_{recovery}$ recovery time between voltage interrupts	n number of complete test sequences
10µs-100µs	10µs	⩾ 5 s The test voltage UB shall be held at least until the DUT has achieved 100 % serviceability. (all systems rebooted without error)	1
100µs-1ms	100µs		
1ms-10ms	1ms		
10ms-100ms	10ms		
100ms-2s	100ms		

4.6.1.2.2.3 Test case 2 - variable recovery time

(Option support: HY-PISSU pin interrupt simulator, introduced on P10)

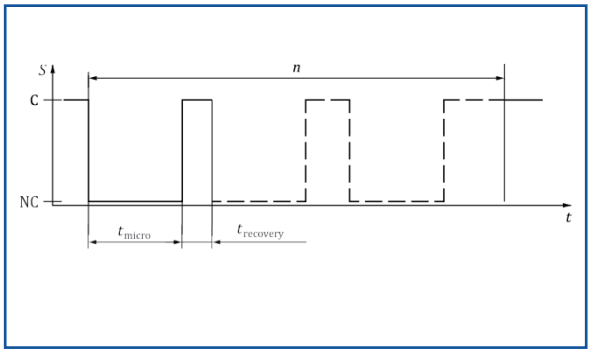
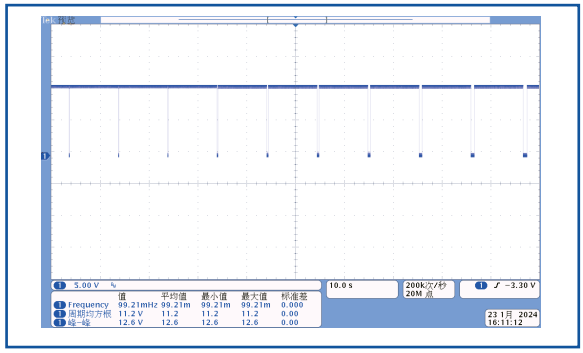


Figure 11 — Micro interruption for variable recovery with 12/24 V nominal voltage (UN)



Measured Drawing

Table 10 — Micro interruption test value for variable recovery duration time exposure with 12 V and 24 V nominal voltage (UN)			
t_{micro} micro interruption duration	$t_{recovery}$ recovery time between voltage interrupts	increased in steps of $t_{recovery}$	n number of complete test sequences
⩾ 100ms The test voltage UB shall be at least interrupted until the DUT has achieved reset condition.	100µs-1ms	100µs	1
	1ms-10ms	1ms	
	10ms-100ms	10ms	
	100ms-1s	100ms	
	1s-10s	1s	

1.5.4、ISO16750-2/4.6 Discontinuities in supply voltage

4.6.2 Reset behaviour at voltage drop

Purpose：■ This test verifies the reset behaviour of the DUT at different voltage drops. This test is applicable to equipment with reset function, e.g. equipment containing microcontroller(s).

■ This test is relevant for both 12 V and 24 V systems.

Test method：■ Apply the test pulse simultaneously in Figure 12 to all relevant inputs (connections) of the DUT and check the reset behaviour of the DUT.

■ Decrease the supply voltage by 5 % from the minimum supply voltage, U_{Smin}, to 0.95U_{Smin}. Hold this voltage for at least 5s.Raise the voltage to U_{Smin}. Hold U_{Smin} for at least 10 s and perform a functional test. Then decrease the voltage to 0.9U_{Smin}.Continue with steps of 5 % of U_{Smin}, as shown in Figure 12, until the lower value has reached 0 V. Then raise the voltage to USmin again.

■ The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.

■ If the DUT has internal capacitor buffer on the voltage supply lines that may sustain the internal voltages of the DUT during a voltage drop, monitoring of the DUT internal supply voltage is recommended to be done during the test to assure that the DUT supply voltage level has dropped to the test level defined by each step in Figure 12. If voltage monitoring cannot be done in the actual test set-up for reasons of test feasibility (e.g. sealed DUT), the internal voltage drop followability shall be shown in some other way, e.g. simulations, lab measurements, calculations, engineering judgement.

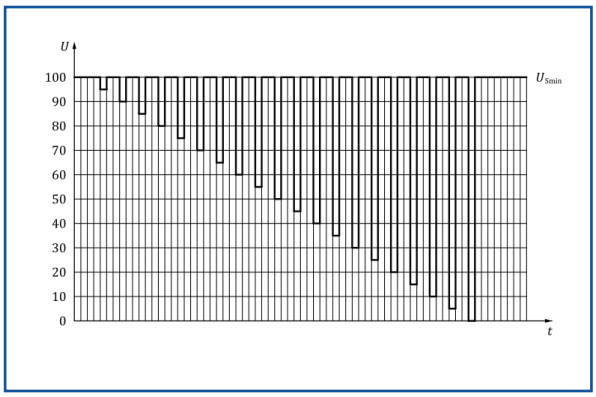
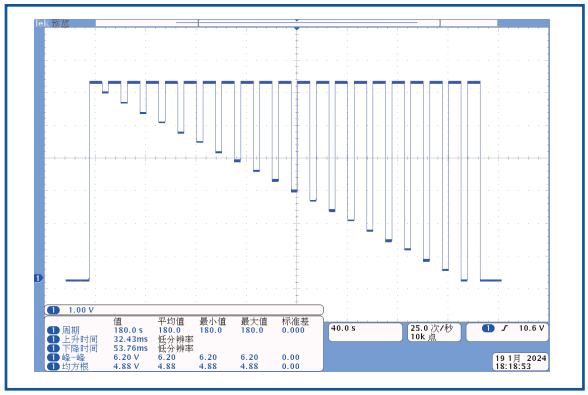


Figure 12 — Test profile for reset behaviour at voltage drop



Measured Drawing

4.6.3 Starting profile

Purpose：This test verifies the behaviour of a DUT during and after cranking. This test is relevant for both 12 V and 24 V systems.

Test method：■ Apply the starting profile 10 times, as specified in Figure 13 and Table 11 or Table 12, simultaneously to all relevant inputs(connections) of the DUT. Recovery period between each starting cycle shall be ⩾ 2 s, until the DUT becomes 100 % operational. One or more profiles as described in Table 11 or Table 12shall be chosen in accordance with the application.

■ The operating mode of the DUT shall be 3.2, as defined in ISO 16750-1.

■ If the DUT is supplied by two or more redundant supplies, and if agreed between the customer and the supplier, the test voltage with starting profile shall be applied to one of the redundant supply lines at a time. The other supply or supplies shall then be kept at U_{Smin} as defined in ISO 16750-1.

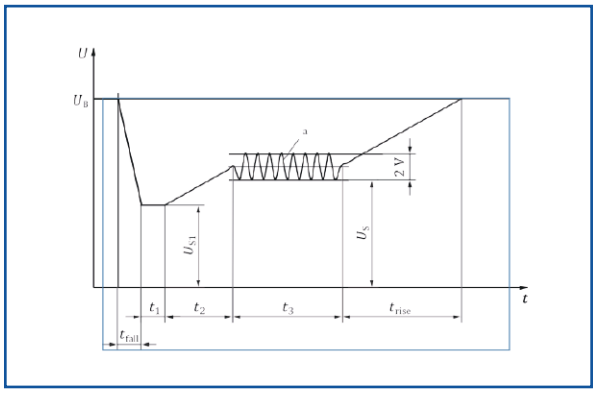
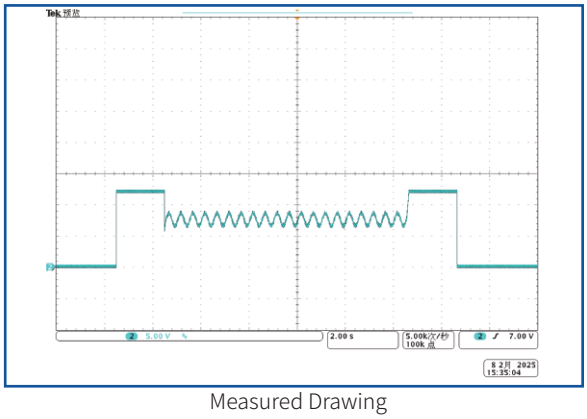


Figure 13 — Starting profile



Measured Drawing

1.5.5、ISO16750-2/4.6 Discontinuities in supply voltage

4.6.4 Load dump (This test requires the optional HY-7637-P5ASU/P5BSU equipment to be used in conjunction with the HY-BPSU series automotive electronic testing high-speed power supply.)

Purpose: This test is a simulation of load dump transient occurring in the event of a discharged battery being disconnected while the alternator is generating charging current with other loads remaining on the alternator circuit at this moment.This test is relevant for both 12 V and 24 V systems.

Test method: ■ The test pulse generator shall be capable of producing the load dump test pulse according to 4.6.4.2.2 and 4.6.4.2.3, for more information about the load dump pulse, see ISO 7637-2:2011, Annex D. Load dump generator performance and tolerances shall be verified according to test method given in Annex A, or equivalent test method. In Annex B, some more information is given on the origin of the load dump pulse.

——————HY-7637-P5ASU/P5BSU——————

HY-7637-P5ASU/P5BSU Load Dump

Front Panel

Rear Panel

The HY-7637-P5ASU/P5BSULoad Dump is specifically designed for automotive electronic immunity tests. This test simulates the transient phenomenon of load throw-off, that is, the transient generated when the battery is disconnected (in a low power state) while the alternator is generating charging current and there are still other loads on the alternator circuit. The product fully complies with the requirements of the P5 pulse in the latest standards of ISO7637-2, ISO16750-2 and GB/T 21437.2.

Note: The device does not have a built-in DC power supply for EUT use inside. It only has a coupling and decoupling network, so the DUT power supply must be connected from the outside. It is stipulated that the DC power supply voltage required for the DUT should be ⩽ 30V and the current ⩽30A.

The standards are as follows:

- ISO 16750-2
- ISO 7637
- SAE J1113-11
- GB/T 21437.2
- GMW3100
- 36-00-808/-K
- MES-PW-67600
- 28401NDS02
- ES-XWT-1A278-AC

The product features are as follows:

- 10.1-inch color touch screen operation
- Utilizes imported program-controlled high-voltage power supply with stable performance
- Capable of generating amplitude-limited load dump pulses
- Built-in adjustable source impedance
- Meet the testing requirements of more customers
- Built-in RJ45 and RS232 interfaces enable remote printing of reports
- The pulse duration can reach up to 1200ms(with an internal resistance of 2Ω)
- Built-in 60V/30A coupling

Pulse5a is suitable for 12V, 24V and 42V systems	
Output Voltage (Us)	12V system: 40V~110V 24V/42V system: 100V~210V
Voltage Step	1V
Voltage Accuracy	±5%
Output Impedance (Ri)	12V system: 0.5~10Ω 24V/42V system: 0.9~10Ω
Pulse Width (Td)	12V system: 40~1200ms 24V/42V system: 100~1200ms
Rise Time (Tr)	5~10ms adjustable
Time Interval	12V system: 30~9999s (40V~110V) 24V/42V system: 60~9999s (180V~210V)
Number of Tests	1~9999C

Pulse5b is suitable for 12V, 24V and 42V systems	
Output Voltage (Us)	12V system: 40V~110V 24V/42V system: 100V~210V
Clamping Voltage	20~Us
Voltage Step	1V
Voltage Accuracy	±5%
Output Impedance (Ri)	12V system: 0.5~10Ω 24V/42V system: 0.9~10Ω
Pulse Width (Td)	12V system: 40~1200ms 24V/42V system: 100~1200ms
Rise Time (Tr)	5~10ms adjustable
Time Interval	12V system: 30~9999s (40V~110V) 24V/42V system: 60~9999s (110V~210V)
Number of Tests	1~9999C

1.5.6、ISO16750-2/4.6 Discontinuities in supply voltage

4.6.4.2.2 Test A – without centralized load dump suppression（Option support：HY-7637-P5ASU/P5BSU）

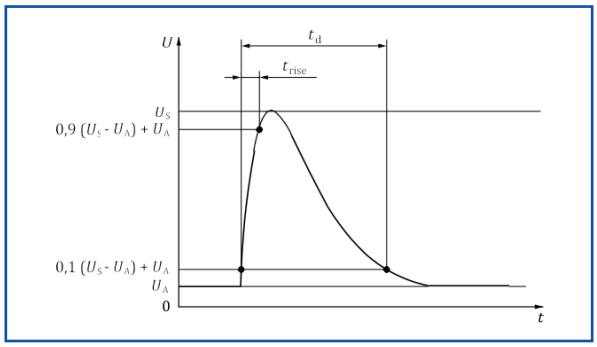
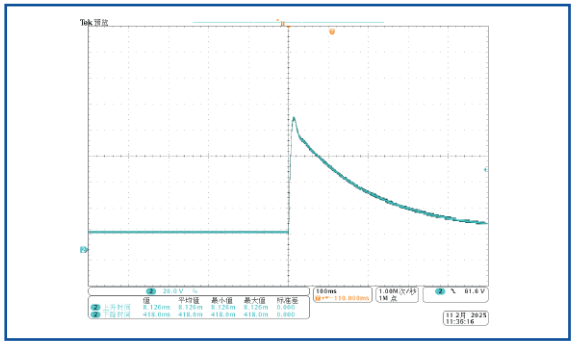


Figure 14 — Test without centralized load dump suppression



Measured Drawing

Table 13 — Pulse for test A in systems with 12 V and 24 V nominal voltage			
Parameter	12V system	24V system	Minimum test requirements
supply voltage, U_S[a] (V)	79 ⩽ U_S ⩽ 101	151 ⩽ U_S ⩽ 202	10 pulses at 1 min intervals
R_i[a] (Ω)	0.5 ⩽ R_i ⩽ 4	1 ⩽ R_i ⩽ 8	
duration of pulse, t_d (ms)	40 ⩽ t_d ⩽ 400	100 ⩽ t_d ⩽ 350	
rising slope,t_{rise} (ms)	10^{0}_{5}	10^{0}_{5}	
a: If not otherwise agreed, use the upper voltage level with the upper value for internal resistance or use the lower voltage level with the lower value for internal resistance.			

4.6.4.2.3 Test B – with centralized load dump suppression（Option support：HY-7637-P5ASU/P5BSU）

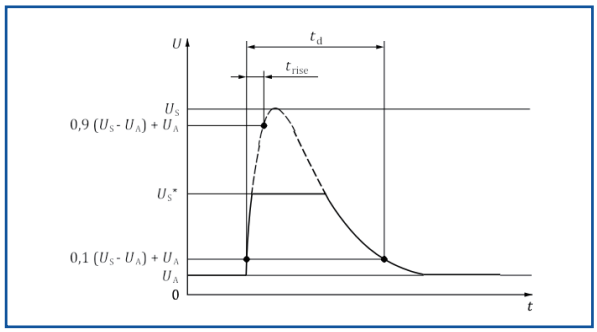
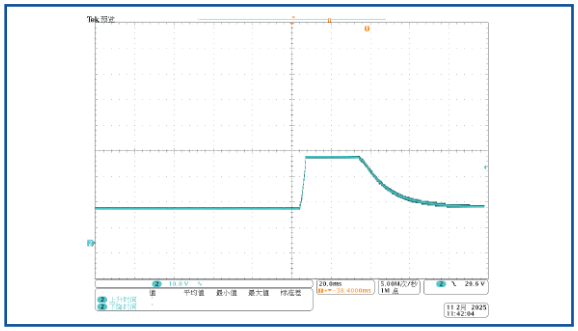


Figure 15 — Test with centralized load dump suppression



Measured Drawing

Table 14 — Pulse for test B in systems with 12 V and 24 V nominal voltage			
Parameter	12V system	24V system	Minimum test requirements
supply voltage, U_S[a] (V)	79 ⩽ U_S ⩽ 101	151 ⩽ U_S ⩽ 202	5 pulses at 1 min intervals
supply voltage with load dump suppression, U_S[a] (V)	Severity 1:27 V ; Severity 2:30 V Severity 3:32 V; Severity 4:35 V	As specified by customer (typical value 58 V)	
R_i[a] (Ω)	0.5 ⩽ R_i ⩽ 4	1 ⩽ R_i ⩽ 8	
duration of pulse, t_d (ms)	40 ⩽ t_d ⩽ 400	100 ⩽ t_d ⩽ 350	
rising slope,t_{rise} (ms)	10^{0}_{5}	10^{0}_{5}	
a: If not otherwise agreed, use the upper voltage level with the upper value for internal resistance or use the lower voltage level with the lower value for internal resistance.			

1.6、ISO16750-2/4.7 Reversed voltage

Purpose: ■ This test checks the ability of a DUT to withstand the connection of a reversed battery in case of using an auxiliary starting device.

■ This test is relevant for 12 V systems (test case 1 or test case 2) and 24 V systems (only test case 2).This test is not applicable for:

— Alternators;

— Terminals with clamping diodes without external reverse polarity protection device.

Test method: ■ Connect and fuse the DUT as in the real vehicle, but without alternator and battery. Choose the applicable voltages from the following cases and apply them simultaneously to all relevant power terminals with reversed polarity.

4.7.2.2 Test case 1:

■ This test case applies if the DUT is used in a vehicle with a 12 V nominal voltage system where the alternator circuit is not fused and the rectifier diodes withstand a reversed voltage for 60 s. Apply a test voltage of -4 V simultaneously to all relevant inputs (connections) of the DUT for a duration of (60 ± 6) s (see Figure 16 and Table 15).

■ This test case is not applicable for systems with 24 V nominal voltage.

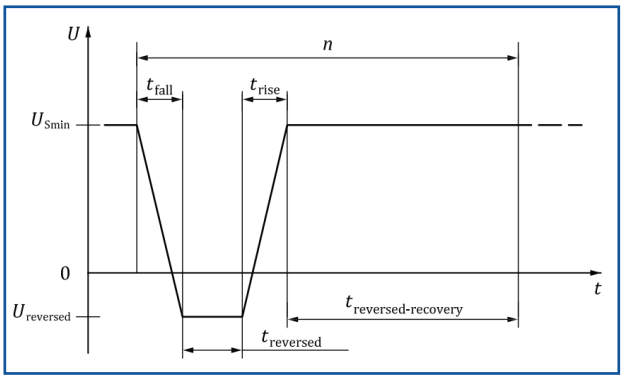
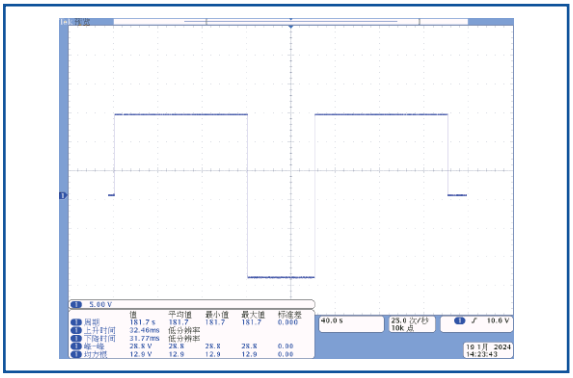


Figure 16 — Reversed voltage test case 1



Measured Drawing

Table 15 — Reversed voltage test case 1 values							
Parameter	t_{fall} fall time	t_{rise} rise time	$t_{treversed}$ reversed voltage duration	$t_{reversed-recovery}$ recovery between reversed voltage events	U_{smin} minimum supply voltage	$U_{reversed}$ reversed test voltage	n number of reversed voltage events in sequence
12V system	⩽10ms	⩽10ms	60s	120s	10.5V	-4V	1

4.7.2.3 Test case 2:

■ In all other cases, apply the test voltage $U_{reversed}$ (see Figure 17 and Table 16) simultaneously to all relevant inputs (connections) of the DUT for a duration of (60 ± 6) s.

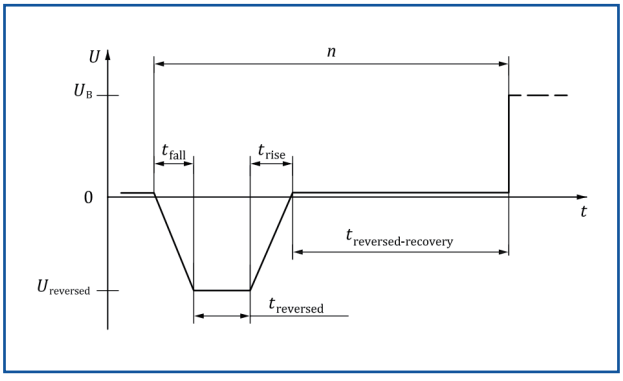


Figure 17 — Reversed voltage test case 2

Table 16 — Reversed voltage test case 2 values							
Parameter	t_{fall} fall time	t_{rise} rise time	$t_{treversed}$ reversed voltage duration	$t_{reversed-recovery}$ recovery between reversed voltage events	U_B supply voltage	$U_{reversed}$ reversed test voltage	n number of reversed voltage events in sequence
12V system	⩽10ms	⩽1000ms	60s	120s	12V	-14V	1
24V system	⩽10ms	⩽1000ms	60s	120s	24V	-26V	1

1.7、ISO16750-2/4.8 Ground reference and supply offset

Purpose: ■ This test shall be agreed between the customer and the supplier.
■ This test serves to verify reliable operation of a component if two or more power supply paths exist (note that this is not necessarily the same as redundant power supply feeds to a DUT). For instance, a component can have a power ground and a signal ground that are outputs on different circuits (e.g. for a DUT with two ground connections and two supply connections given in Figure 18).
■ This test is relevant for both 12 V and 24 V systems.

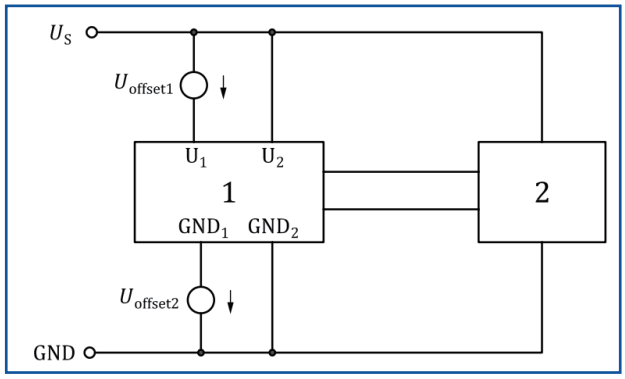


Figure 18 — Example of ground reference and supply offset on a DUT with two ground/supply paths

Us: Supply voltage for 12/24 V system as defined in ISO 16750-1
U1、U2: Supply lines to DUT
GND1、GND2: Ground lines to DUT
$U_{offset1}$: Offset voltage on supply line, in volts
$U_{offset2}$: Offset voltage on ground line, in volts
1: DUT
2: Additional components in the vehicle
NOTE1: Supply offset voltage is applied to all power supply pins of the DUT separately.
NOTE2: GND offset voltage is applied to every GND pin of the DUT separately. If GND pins are directly connected to each other within the DUT, the GND offset voltage is applied to those GND pins simultaneously (e.g. for DUT with only two ground connections that are both internally tied together, ±1 V variation of Uoffset2 is not relevant).

Table 17 — List of test variations for one supply and one GND pin

Test	Test case	U_S	$U_{offset1}$	$U_{offset2}$
1	1V GND offset, no US offset	$U_B+(U_A-U_B)/2$	0V	1V
2	1V GND offset, 1V US offset	$U_B+(U_A-U_B)/2$	1V	1V
3	1V GND offset, -1V US offset	$U_B+(U_A-U_B)/2$	-1V	1V
4	-1V GND offset, no US offset	$U_B+(U_A-U_B)/2$	0V	-1V
5	-1V GND offset, 1V US offset	$U_B+(U_A-U_B)/2$	1V	-1V
6	-1V GND offset, -1V US offset	$U_B+(U_A-U_B)/2$	-1V	-1V
7	no GND offset, 1V US offset	$U_B+(U_A-U_B)/2$	1V	0V
8	no GND offset, -1V US offset	$U_B+(U_A-U_B)/2$	-1V	0V

Test method: ■ All inputs and outputs shall be connected to representative loads or networks to simulate the in-vehicle configuration. Apply US to the DUT and confirm normal operation.
■ The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.
■ The offset shall be applied to each ground/supply line separately (see Figure 18), and test shall be repeated for each possible ground/supply line combination. For overview of the test coverage, creating a test matrix showing the possible combinations can be advisable. Example of such a test matrix is given in Table 17.
■ For all DUTs, the offset voltage shall be (1.0 ± 0.1) V.
a) Apply US to the DUT.
b) Subject ground/supply line to the offset voltage relative to the DUT ground/supply line.
c) Perform a functional test under this condition.
d) Repeat step a) to c) for each new ground/supply line combination.
Repeat the test with reverse offset voltage.

This test requires the use of multiple Hangyu power supplies for collaborative testing, depending on the standard testing requirements.

1.8、ISO16750-2/4.9 Open circuit tests

4.9.1 Single line interruption（This test requires the option to configure the HY-PISSU pin interrupt simulator, introduced on P10）

Purpose：■ This test simulates an open contact condition, for instance, if a single wire or electrical connection to a DUT has an interruption. The kind of interruption can be static or dynamic (loose contact). Static interruption is simulated by test method 1, dynamic interruption is simulated by test method 2. This test is applicable for both power, ground, signal and load circuits for the DUT. Both test method 1 and test method 2 shall be performed.

■ This test is relevant for both 12 V and 24 V systems.

■ This is not a test for connectors.

Test method 1：■ Connect and operate the DUT as intended. Open one circuit of the DUT/system interface, then restore the connection. Observe the device behaviour during and after the interruption.

■ The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.

■ Perform this test for load-circuits in addition with the conditions for:

— Outputs active;

— Outputs inactive.

■ Repeat for each circuit of the DUT/system interface. The following test conditions shall be met:

— Interruption time: (10 ± 1) s;

— Open circuit resistance: ⩾ 10 MΩ;

— Maximum interrupt transition time ⩽ 10 ms.

Test method 2：■ Connect and operate the DUT as intended. A sequence of short-term open circuit events, followed with restore of the connection (see Figure 19 and Table 18), shall be applied to the DUT/system interface.

■ Observe the device behaviour during and after the interruption pattern.

■ The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.

■ Repeat for each circuit of the DUT/system interface. The following test conditions shall be met:

— Open circuit resistance: ⩾ 10 MΩ;

— Maximum interrupt transition time ⩽ 10 µs.

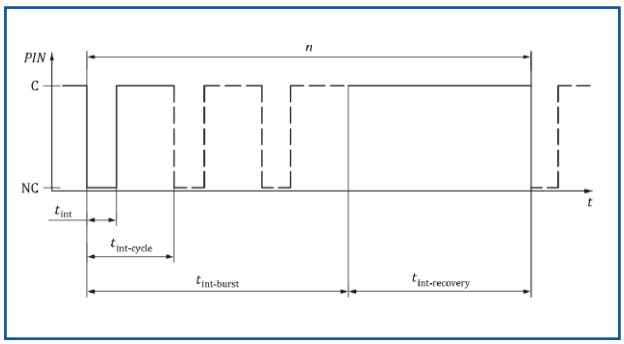
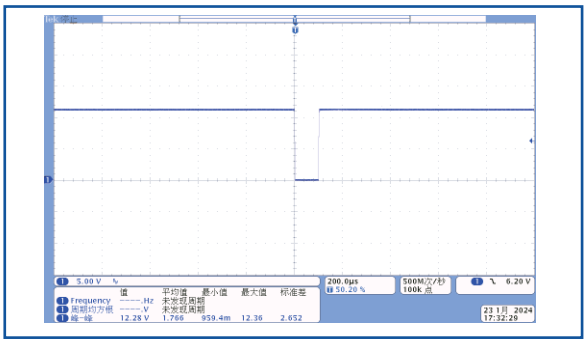


Figure 19 — Interruption pattern of short-term open circuit events



Measured Drawing

Table 18 — Interruption pattern test values					
Parameter	t_{int} short-term open circuit time	$t_{tint-cycle}$ short-term open circuit repetition time	$t_{tint-burst}$ burst duration of open circuit pattern	$t_{tint-recovery}$ recovery time between interruption pattern	n number of complete interr-uption pattern sequences
Value	100µs	1ms	10s	10s	2

4.9.2 Multiple line interruption（This test requires the option to configure the HY-PISSU pin interrupt simulator, used in conjunction with HY-BPSU Series Automotive Electronics Test High Speed Power Supply.）

Purpose：■ The purpose of this test to ensure functional status as defined in the specification of the DUT when the DUT is subjected to a rapid multiple line interruption, for instance if the whole connector to the DUT is unplugged.

■ This test is relevant for both 12 V and 24 V systems.

■ This is not a test for connectors.

Test method：■ Disconnect the DUT, then restore the connection. Observe the device behaviour during and after the interruption.

■ The test shall be run once with the DUT in operating mode 2.1, and once with the DUT in operating mode 3.4 (i.e. to test both sleep mode and maximum load conditions), as defined in ISO 16750-1.

■ The following test conditions shall be met:

— Interruption time: (10 ± 1) s;

— Open circuit resistance: ⩾ 10 MΩ.

■ For multi-connector devices, each possible connection shall be tested.

1.9、ISO16750-2/4.10 Short circuit/overload protection

Purpose: ■ These tests simulate short circuits and overload to the inputs and outputs of a device.
■ This test is relevant for both 12 V and 24 V systems.

4.10.2 Short circuit in signal lines and load circuits (This test requires the option to configure the HY-PISSU pin interrupt simulator, introduced on P10)

Test method 1: ■ Connect all relevant inputs and outputs (both signal lines and load circuits) of the DUT in sequence for duration of 60 s ± 10 % to U_{Smax} (see Table 3 and Table 4) and to ground, as described below in steps a) through f). All other inputs and outputs remain open unless otherwise agreed between the customer and the supplier. Steps a) through f) performed for all signal lines/load circuits of the DUT constitutes one complete test set.

a) Connect DUT signal line/load circuit to be tested to $U_{Smax.}$
b) Hold short circuit condition for a duration of 60 s ± 10 %.
c) Observe behaviour of DUT during and after holding time in b).
d) Connect DUT signal line/load circuit to be tested to ground.
e) Hold short circuit condition for a duration of 60 s ± 10 %.
f) Observe behaviour of DUT during and after holding time in e).

■ Repeat steps a) through f) for all signal lines and load circuit inputs/outputs of the DUT.
■ Complete test set as described above shall be performed one time for each of the conditions given below:
— Connected supply voltage and ground terminals:
— Outputs active;
— Outputs inactive;
— Disconnected positive supply voltage terminals (this addresses effects of inverse current by, for example,removal of the DUTs cable harness fuse, while short to positive supply is present on signal lines and load circuit).
■ The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.

4.10.3 Overloading of load circuits

Test method 2: ■ Connect the DUT to the power supply. The load circuits shall be in operation.
■ Each load circuit shall be tested individually for:
— 100 % of the current capacity (nominal load);
— 150 % of the current capacity (overload).
■ For test duration, the specifications of the appropriate part of the ISO 8820 series (operating time rating) shall be used, considering the upper tolerance plus 10 %. If protection other than fuses is used (e.g. electronic protection), the test duration shall be agreed between the customer and the supplier.
■ This test is applicable only for systems/components with load circuits.
■ The operating mode of the DUT shall be 3.4, as defined in ISO 16750-1.

HY-BPSU Series Technical Parameter

20V Series Technical Parameters

Models		HY-BPSU 20-10	HY-BPSU 20-20	HY-BPSU 20-30	HY-BPSU 20-40	HY-BPSU 20-60	HY-BPSU 20-90	HY-BPSU 20-100
Rated output voltage		±20V	±20V	±20V	±20V	±20V	±20V	±20V
Rated output current		±10A	±20A	±30A	±40A	±60A	±90A	±100A
Rated output power		200W	400W	600W	800W	1200W	1800W	2000W
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±20V						
	Temperature coefficient	±100ppm/°C (range)						
AC voltage	Setting range	0~10Vpp						
Accuracy:CV Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC current	Setting range	0~±10A	0~±20A	0~±30A	0~±40A	0~±60A	0~±90A	0~±100A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy:CC Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5%range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60 V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

20V-30V Series Technical Parameters

Models		HY-BPSU 20-120	HY-BPSU 20-150	HY-BPSU 20-200	HY-BPSU 20-500	HY-BPSU 30-10	HY-BPSU 30-13.4	HY-BPSU 30-20
Rated output voltage		±20V	±20V	±20V	±20V	±30V	±30V	±30V
Rated output current		±120A	±150A	±200A	±500A	±10A	±13.4A	±20A
Rated output power		2400W	3000W	4000W	10kW	300W	400W	600W
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±20V				0~±30V		
	Temperature coefficient	±100ppm/°C (range)				±100ppm/°C (range)		
AC voltage	Setting range	0~10Vpp				0~10Vpp		
Accuracy:CV Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC current	Setting range	0~±120A	0~±150A	0~±200A	0~±500A	0~±10A	0~±13.4A	0~±20A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy:CC Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60 V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

HY-BPSU Series Technical Parameter

30V Series Technical Parameters

Models		HY-BPSU 30-26.7	HY-BPSU 30-40	HY-BPSU 30-60	HY-BPSU 30-100	HY-BPSU 30-134	HY-BPSU 30-200	HY-BPSU 30-267
Rated output voltage		±30V	±30V	±30V	±30V	±30V	±30V	±30V
Rated output current		±26.7A	±40A	±60A	±100A	±134A	±200A	±267A
Rated output power		800W	1200W	1800W	3000W	4000W	6000W	8000W
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±30V						
	Temperature coefficient	±100ppm/°C (range)						
AC voltage	Setting range	0~10Vpp						
Accuracy:CV Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC current	Setting range	0~±26.7A	0~±40A	0~±60A	0~±100A	0~±134A	0~±200A	0~±267A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy:CC Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60 V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

40V Series Technical Parameters

Models		HY-BPSU 40-7.5	HY-BPSU 40-10	HY-BPSU 40-15	HY-BPSU 40-20	HY-BPSU 40-30	HY-BPSU 40-45	HY-BPSU 40-50
Rated output voltage		±40V	±40V	±40V	±40V	±40V	±40V	±40V
Rated output current		±7.5A	±10A	±15A	±20A	±30A	±45A	±50A
Rated output power		300W	400W	600W	800W	1200W	1800W	2000W
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±40V						
	Temperature coefficient	±100ppm/°C (range)						
AC voltage	Setting range	0~10Vpp						
Accuracy：CV Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC current	Setting range	0~±7.5A	0~±10A	0~±15A	0~±20A	0~±30A	0~±45A	0~±50A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy：CC Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60 V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

HY-BPSU Series Technical Parameter

40V-60V Series Technical Parameters

Models		HY-BPSU 40-60	HY-BPSU 40-75	HY-BPSU 40-100	HY-BPSU 40-150	HY-BPSU 40-200	HY-BPSU 40-250	HY-BPSU 60-6.7
Rated output voltage		±40V	±40V	±40V	±40V	±40V	±40V	±60V
Rated output current		±60A	±75A	±100A	±150A	±200A	±250A	±6.7A
Rated output power		2400W	3000W	4000W	6000W	8000W	10kW	400W
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±40V						0~±60V
	Temperature coefficient	±100ppm/°C (range)						
AC voltage	Setting range	0~10Vpp						0~10Vpp
Accuracy:CV Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						±(0.05% reading+ 0.1% range) T=(18°C~28°C)
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC current	Setting range	0~±60A	0~±75A	0~±100A	0~±150A	0~±200A	0~±250A	0~±6.7A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy:CC Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						±(0.05% reading+ 0.1% range) T=(18°C~28°C)
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60 V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

60V Series Technical Parameters

Models		HY-BPSU 60-10	HY-BPSU 60-13.4	HY-BPSU 60-20	HY-BPSU 60-30	HY-BPSU 60-33.5	HY-BPSU 60-40	HY-BPSU 60-50
Rated output voltage		±60V	±60V	±60V	±60V	±60V	±60V	±60V
Rated output current		±10A	±13.4A	±20A	±30A	±33.5A	±40A	±50A
Rated output power		600W	800W	1200W	1800W	2000W	2400W	3000W
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±60V						
	Temperature coefficient	±100ppm/°C (range)						
AC voltage	Setting range	0~10Vpp						
Accuracy:CV Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC current	Setting range	0~±10A	0~±13.4A	0~±20A	0~±30A	0~±33.5A	0~±40A	0~±50A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy:CC Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60 V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

HY-BPSU Series Technical Parameter

60V-80V Series Technical Parameters

Models		HY-BPSU 60-67	HY-BPSU 60-100	HY-BPSU 60-133.4	HY-BPSU 60-167	HY-BPSU 80-5	HY-BPSU 80-7.5	HY-BPSU 80-10
Rated output voltage		±60V	±60V	±60V	±60V	±80V	±80V	±80V
Rated output current		±67A	±100A	±133.4A	±167A	±5A	±7.5A	±10A
Rated output power		4000W	6000W	8000W	10kW	400W	600W	800W
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±60V				0~±80V		
	Temperature coefficient	±100ppm/°C (range)				±100ppm/°C (range)		
AC voltage	Setting range	0~10Vpp				0~10Vpp		
Accuracy:CV Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC current	Setting range	0~±67A	0~±100A	0~±133.4A	0~±167A	0~±5A	0~±7.5A	0~±10A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy:CC Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

80V Series Technical Parameters

Models		HY-BPSU 80-15	HY-BPSU 80-22.5	HY-BPSU 80-25	HY-BPSU 80-30	HY-BPSU 80-37.5	HY-BPSU 80-50	HY-BPSU 80-75
Rated output voltage		±80V	±80V	±80V	±80V	±80V	±80V	±80V
Rated output current		±15A	±22.5A	±25A	±30A	±37.5A	±50A	±75A
Rated output power		1200W	1800W	2000W	2400W	3000W	4000W	6000W
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±80V						
	Temperature coefficient	±100ppm/°C (range)						
AC voltage	Setting range	0~10Vpp						
Accuracy：CV Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC current	Setting range	0~±15A	0~±22.5A	0~±25A	0~±30A	0~±37.5A	0~±50A	0~±75A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy：CC Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

HY-BPSU Series Technical Parameter

80V-100V Series Technical Parameters

Models		HY-BPSU 80-100	HY-BPSU 80-125	HY-BPSU 100-4	HY-BPSU 100-6	HY-BPSU 100-8	HY-BPSU 100-12	HY-BPSU 100-18
Rated output voltage		±80V	±80V	±100V	±100V	±100V	±100V	±100V
Rated output current		±100A	±125A	±4A	±6A	±8A	±12A	±18A
Rated output power		8000W	10kW	400W	600W	800W	1200W	1800W
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±80V		0~±100V				
	Temperature coefficient	±100ppm/°C (range)		±100ppm/°C (range)				
AC voltage	Setting range	0~10Vpp		0~10Vpp				
Accuracy：CV Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC current	Setting range	0~±100A	0~±125A	0~±4A	0~±6A	0~±8A	0~±12A	0~±18A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy：CC Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

100V Series Technical Parameters

Models		HY-BPSU 100-20	HY-BPSU 100-24	HY-BPSU 100-30	HY-BPSU 100-40	HY-BPSU 100-60	HY-BPSU 100-80	HY-BPSU 100-100
Rated output voltage		±100V	±100V	±100V	±100V	±100V	±100V	±100V
Rated output current		±20A	±24A	±30A	±40A	±60A	±80A	±100A
Rated output power		2000W	2400W	3000W	4000W	6000W	8000W	10kW
AC frequency	Setting range	CV mode can choose:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz						
	Setting resolution	0.01Hz						
	Setting accuracy	±100ppm, T=(18°C~28°C)						
	Sweep frequency	Linear, logarithmic						
	Sweep time	100μs-1000s (resolution ratio 100μs)						
AC waveform	Type	Sinusoidal wave, square wave, triangular wave, arbitrary waveform (22 types)						
	Start phase	0~359°						
	Square wave DUTY	0.1%~99.9% (F＜100Hz) , 1%~99% (100Hz≤F＜1kHz) , 10%~90% (1kHz≤F＜10kHz) , 50% fixed (10kHz＜F)						
CV Mode								
DC voltage	Setting range	0~±100V						
	Temperature coefficient	±100ppm/°C (range)						
AC voltage	Setting range	0~10Vpp						
Accuracy:CV Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
	AC DC+AC	± (0.5% reading+1% range) (5Hz-10kHz) ,T=(18°C~28°C) ± (1% reading+1% range) (10kHz-50kHz) ,T=(18°C~28°C) ± (2% reading+1% range) (50kHz-100kHz) ,T=(18°C~28°C) ± (3% reading+1% range) (100kHz~200kHz) ,T=(18°C~28°C) ± (4% reading+1% range) (200kHz~300kHz) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
	AC、DC+AC	± (3% reading+0.5% range) (5Hz-10kHz) ,T=(18°C~28°C)						
CC Mode								
DC Current	Setting range	0~±20A	0~±24A	0~±30A	0~±40A	0~±60A	0~±80A	0~±100A
	Temperature coefficient	±100ppm/°C (range)						
Accuracy:CC Mode								
Voltage measurement	DC	± (0.05% reading+0.1% range) ,T=(18°C~28°C)						
Current measurement	DC	± (0.5% reading+0.5% range) ,T=(18°C~28°C)						
Resolution								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current setting	DC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						
Voltage reading back	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current reading back	DC、AC、DC+AC	0.001A (I≤60 A), 0.01A (60A＜I≤500A)						

HY-BPSU Series Technical Parameter

Protection Function

OVP Over voltage protection	10-110%, beyond the limit output immediately off
OCP Over current protection	0-105%, beyond the limit output immediately off
OTP Over temperature protection	Beyond the limit output immediately off

Ambient Condition

Environment	Indoor use; Installation overvoltage level: II; Pollution level: P2; Class II equipment
Operating ambient temperature	0°C to 50°C
Storage ambient temperature	-20°C to 65°C,
Working ambient humidity	20%-90% RH, no dew formation, continuous operation
Storage ambient humidity	10% - 95% RH, no dew formation
Altitude Above Sea Level	Above 2000 meters above sea level, every 100 meters up, the power will be reduced by 2%, or reduce the maximum working ambient temperature by 1°C per 100 meters; When not in operation, the altitude can reach 12,000 meters
Cooling	Forced air cooling, intelligent speed regulating fan, front/side air inlet, rear air outlet
Noise	⩽ 65dB(A), use 1 m to weighted measurement

Control Panel

Monitor	7-inch LCD display, touch screen
Control function	Number button input, multi-stage adjustment knob (outer circle coarse adjustment/inner circle fine adjustment)Output ON/OFF switch, Lock keyboard and touch lock, Reset restart Status indicator light (Shift/Local/Remote/Alarm/Lock/Output)

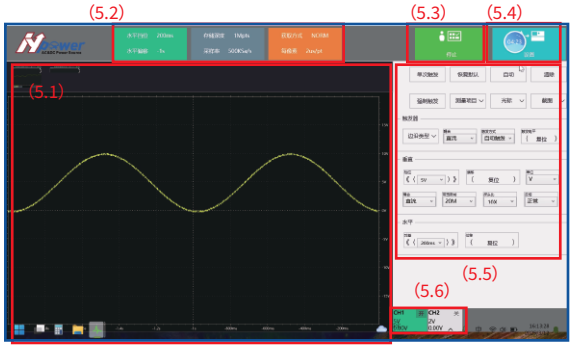
Input Power Supply

Frequency	47 Hz - 63 Hz
Connection	Single phase two wire+ground wire, 220 V ± 15%/three-phase four wire+ground wire, 380 V ± 15%

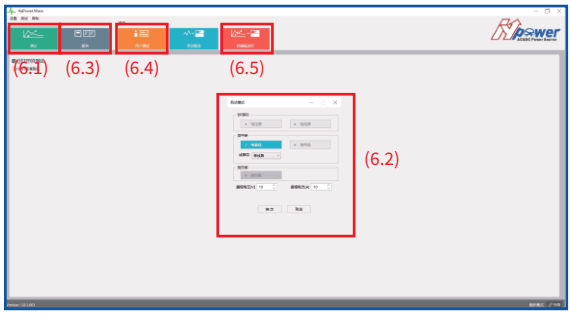
Upper Computer Description

- Configure the upper computer software to save development cost and time
- The built-in test standards can be viewed, including ISO16750-2, ISO21780, VW80000, GEELY, Mercedes-Benz, and other vehicle manufacturers' electrical performance standards
- The oscilloscope function can be opened on the upper computer to display the content of the oscilloscope connected to the power supply in real time (as shown in Figure 5)
- With arbitrary wave programming function, users can arbitrarily edit waveform, storage, call according to their own test situation.(As shown in Figure 7)

(Figure 1: Main Interface and Communication Connection)



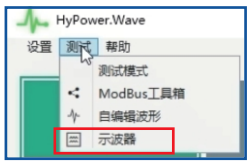
(Figure 5: Oscilloscope Interface)



(Figure 6: Test Mode Switching)

(Figure 7: Waveform Self-Editing Interface)

(Figure 2: Settings Menu)



(Figure 3: Test Menu)

(Figure 4: Help Menu)

(1.1) Communication Configuration: Click to open the communication configuration window (1.2);
(1.2) Communication configuration window: Serial port number, baud rate, etc. can be set here. It needs to be synchronized with the power communication settings;
(1.3) Power connection status: Online/Offline;
(1.4) Settings (as shown in Figure 2): Include system, communication, and oscilloscope configuration. System settings can modify the language of the upper computer and file export format;
Test (as shown in Figure 3): Multiple test interfaces can be opened. For oscilloscope details, please refer to Figure 5;
Help (as shown in Figure 4): Simulation can achieve offline operation of the upper computer.

(5.1) Oscilloscope display area, which shows the current output waveform of the power supply in real time;
(5.2) Oscilloscope information (horizontal, storage, sampling, etc.);
(5.3) Oscilloscope operation status: running/stop;
(5.4) Oscilloscope communication address, type and other settings;
(5.5) Oscilloscope function and display setting items;
(5.6) Channel switch and main channel selection.

(6.1) Test: Click "Test", then click "Open Standard Test" and select the required test standard;
(6.2) Test Mode: Switchable between constant voltage source, constant current source, pin interrupt, and load dump test modes;
(6.3) Report: After the test waveform program ends, click "Save" and view it here;
(6.4) User Test: Click to retrieve saved programming files;
(6.5) Self-Edit Waveform: Click "Self-Edit Waveform" to customize the test waveform program (as shown in Figure 7).

(7.1) Click to select various waveforms and perform waveform self-editing operations. The selected waveform will be displayed at 7.4;
(7.2) The waveforms selected at 7.1 will appear in the list at 7.2 in sequence. You can select or deselect waveforms, delete or copy waveforms, and move the order of waveforms up and down;
(7.3) You can set the number of loops for the content of the list at 7.2;
(7.4) It shows all the waveform contents that have been added to the editing. You can drag the waveform box below to view the waveforms;
(7.5) Test mode: The current test mode can be switched;
(7.6) The numerical parameters of the selected waveform in the list can be set;
(7.7) If the "DUT Power" is not lit and the output operation is started directly, the power supply will start outputting the set waveform directly from the standby state. If the "DUT Power" is lit, the power supply will output the voltage value in the parameters here to the load, and then click "Run", the power supply will start outputting the set waveform from this value. After the output ends, the power supply will continue to output the "Post-test Voltage" to the load;
(7.8) After clicking "Run", you can check the progress through the progress bar at the top and stop it at any time. After the running cycle ends, you can choose to export the report (including the schematic diagram and setting data);
(7.9) You can save the self-edited content here as an engineering file on your computer. Next time, you can directly call it by clicking "Open";
(7.10) Clicking "Clear" will immediately clear all self-edited content.

HY-BPSU Series Upper Computer Testing Project

The Upper Computer Software Is Equipped With A Variety Of International Test Standards And Automobile Enterprise Test Standards

ISO16750-2 test items (ISO is an international standard, with a maximum voltage of 36V and a maximum sweep frequency of 200kHz)

No.	Test Items	Remark
4.2	Direct current (DC) supply voltage	Verify device functionality at minimum and maximum supply voltages for 12V and 24V system devices
4.3	Overvoltage	Including long time overvoltage, jump start test at room temperature and transient overvoltage
4.4	Superimposed alternating voltage	Residual alternating current on an analog DC power supply
4.5	Slow decrease and increase of supply voltage	Simulate the gradual discharge and charging of a battery
4.6	Discontinuities in supply voltage	
4.6.1	Drops or interrupts in supply voltage	Simulates the effect of a conventional fuse element when melted in another circuit
4.6.2	Reset behaviour at voltage drop	Verify reset behavior at different voltage drops (generally applicable to devices with reset capabilities, such as devices containing microcontrollers)
4.6.3	Starting profile	It's cold start.
4.6.4	Load dump	Need to configure the HY-7637-P5ASU/P5BSU throw load device
4.7	Reversed voltage	Checks the ability of a DUT to withstand the connection of a reversed battery in case of using an auxiliary starting device.
4.8	Ground reference and supply offset	Up to three power supplies are required to achieve the test together, with bipolar sources providing ±1V or multiple combinations
4.9	Open circuit tests	Need to configure HY-PISSU
4.9.1	Single line interruption	Open circuit - Single line interrupt, requires select configuration PISSU
4.9.2	Multiple line interruption	Open circuit - multiline interrupt, requires select configuration PISSU
4.10	Short circuit/overload protection	

GB/T21437.2/ISO7637.2(Power line transient anti-interference type test - select configuration need to add 7600 controller)

No.	Test Items
Pulse1、Pulse2a	(Need to select configuration equipment HY-7610SU) 80V/100A
Pulse3a、Pulse3b	(Need to select configuration equipment HY-7630SU) 60V,30A
Pulse2b, Pulse4	No need to select configuration
Pulse5a、Pulse5b	(Need to select configuration the HY-7637-P5ASU/P5BSU)The internal resistance of the throw load is adjustable

LV124 Electrical testing (maximum voltage up to 26V, sweep frequency up to 30kHz) LV: german car manufacturers AUDI, BMW, Daimler, Porsche, and Volkswagen dominate this series of standards.

No.	Test Items
E01	Long term overvoltage
E02	Transient overvoltages
E03	Transient undervoltage
E04	Start pulse
E05	Load drop
E06	Ripple voltage
E07	Slow decrease and slow increase of power supply voltage
E08	Slow decrease and rapid increase of power supply voltage

No.	Test Items
E09	Reset behavior
E10	Brief interruptions,requires select configuration HY-PISSU
E11	Start pulses
E12	Voltage curve with vehicle electrical system control
E13	Pin interruption,requires select configuration HY-PISSU
E14	Connector interruption,requires select configuration HY-PISSU
E15	Reversed polarity
E16	Ground offset,requires two power supplies together

LV148 Electrical testing (maximum voltage up to 70V, sweep frequency up to 200kHz) is a revision of the LV124 standard, which includes additional electrical performance tests for 48V electrical systems.

No.	Test Items
E48-02	Transient overvoltage, load dump
E48-03	Transient process in the lower operating range with limited function
E48-04	Recuperation
E48-05	Superimposed AC voltage
E48-06	Slow decrease and increase of the supply voltage
E48-08	Reset behavior
E48-09	Short interruption
E48-10	Start pulses

No.	Test Items
E48-11	Loss of grounding BN48
E48-12	Ground offset
E48-15	Operation in the range without functional limitation
E48-16	Operation in the upper range with functional limitation
E48-17	Operation in the lower range with functional limitation
E48-18	Overvoltage range
E48-19	Undervoltage range

GMW3172 General electric testing (maximum voltage up to 26V, sweep frequency up to 25kHz)

No.	Test Items
9.2.1	Parasitic Current
9.2.2	Power Supply Interruptions
9.2.3	Battery Voltage Dropout
9.2.4	Sinusoidal Superimposed Voltage
9.2.5	Pulse Superimposed Voltage
9.2.9	Open Circuit – Single Line Interruption,requires select configuration HY-PISSU
9.2.10	Open Circuit – Multiple Line Interruption,requires select configuration HY-PISSU

No.	Test Items
9.2.11	Ground Offset,requires two power sources to be tested together, with a bipolar source providing ± 1V
9.2.12	Power Offset,requires two (three) power sources to be tested together, with a bipolar source providing ± 1V
9.2.13	Discrete Digital Input Threshold Voltage
9.2.16	Insulation Resistance
9.2.17	Crank Pulse Capability and Durability
9.2.18	Switched Battery Lines,requires select configuration HY-PISSU
9.2.19	Battery Line Transients,requires select configuration HY-PISSU

ISO/DIS21780-48VInternational power supply voltage - Electrical requirements testing (maximum voltage up to 60V, sweep frequency up to 200kHz)

No.	Test Items
10.1 Test-01	Nominal voltage range
10.2 Test-02	Lower and upper transitory voltage ranges
10.3 Test-03	Short term overvoltage
10.4 Test-04	Supply component load dump control test
10.5 Test-05	Starting profile
10.6 Test-06	Long term overvoltage
10.7 Test-07	Overvoltage with consumer components which may supply electrical energy
10.8 Test-08	Decrease and increase of supply voltage

No.	Test Items
10.9 Test-09	Voltage ripples
10.10 Test-10	Reinitialisation
10.11 Test-11	Discontinuities in supply voltage
10.12 Test-12	Ground loss
10.13 Test-13	Fault current
10.14 Test-14	Ground offset,tested together with two power supplies, with a bipolar source providing ± 1V
10.15 Test-15	Short circuit in signal line and load circuit
10.16 Test-16	Quiescent current

VS-00.00-T-11019-A1 （Maximum voltage up to 24V, sweep frequency up to 20kHz）

No.	Test Items
6.1	Standard voltage range
6.2	Upper and lower transient voltage range
6.3	Temporary overvoltage
6.4	Power component load dump control test
6.5	Boot configuration

No.	Test Items
6.6	Voltage fluctuation
6.7	Reinitialize
6.8	Power supply voltage interruption
6.9	Grounding loss
7.0	Fault current

HY-BPSU Series Upper Computer Testing Project

SMTC3800001 SAIC group electrical testing (maximum voltage up to 26V, sweep frequency up to 30kHz)

No.	Test Items
5.1	Long term overvoltage
5.2	Transient overvoltage
5.3	Transient undervoltage
5.4	Jump start
5.5	Load dump
5.6	Superimposed alternating voltage
5.7	Slow decrease/increase of operating voltage
5.8	Slow decrease,quick increase of supply voltage

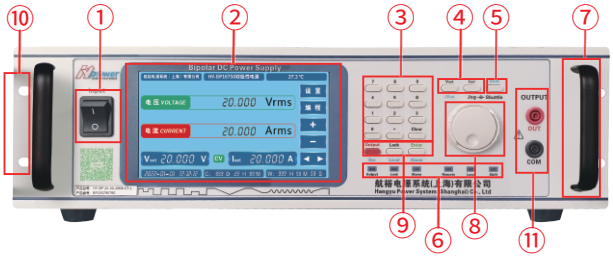
No.	Test Items
5.9	Reset behavior test
5.10	Voltage pulses when starting engine
5.11	Pin interruption,requires select configuration HY-PISSU
5.12	Connector interruption,requires select configuration HY-PISSU
5.13	Reverse polarity
5.14	Ground offset (two power supplies tested together, with a bipolar source providing ± 1V)
5.15	Short circuit in signal circuit and load circuits
5.16	Insulation resistance(safety regulation test)
5.18	Quiescent current

VW80000 Volkswagen Electric testing (maximum voltage up to 27V, sweep frequency up to 200kHz)

No.	Test Items
E-01	Long term overvoltage
E-02	Transient overvoltage
E-03	Transient undervoltage
E-04	Jump start
E-05	Load dump
E-06	Ripple voltage
E-07	Slow decrease and increase of the supply voltage
E-08	Slow decrease, quick increase of the supply voltage
E-09	Reset behavior
E-10	Brief interruptions,requires select configuration HY-PISSU

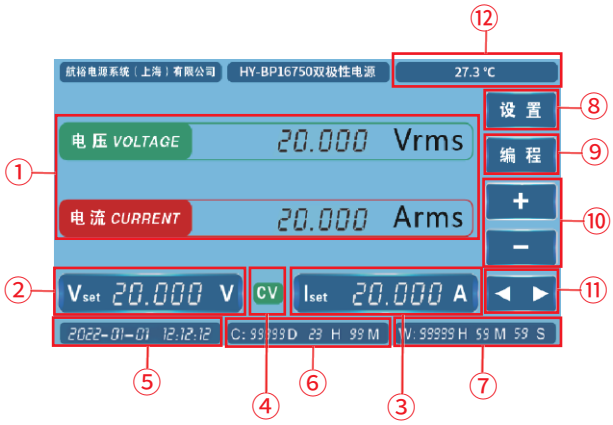
No.	Test Items
E-11	Start pulses
E-12	Voltage curve with vehicle electrical system control
E-13	Pin interruption,requires select configuration HY-PISSU
E-14	Connector interruption,requires select configuration HY-PISSU
E-15	Reverse polarity
E-16	Ground potential difference
E-17	Short circuit in signal cable and load circuits
E-19	Quiescent current
E-22	Overcurrents

Control Panel



① Power input circuit breaker
② 7-inch LCD display window display: voltage setting value，Voltage and current measurement values, function settings menu
③ Function buttons: used for required numerical input and parameter settings
④ Voltage and current setting key
⑤ Shift function reuse key
⑥ Status indicator light
⑦ Chassis handle
⑧ Multi-stage adjustment knob, the inner circle adjusts one word at a time, and the outer circle is divided into ± 8 adjustable segments
⑨ Lock、Enter、Esc、Local、Reset/Alarm、Output ON/OFF
⑩ 19 inch standard rack mounting holes
⑪ Red represents+output terminal, black represents - output terminal (Some models include front output interfaces)

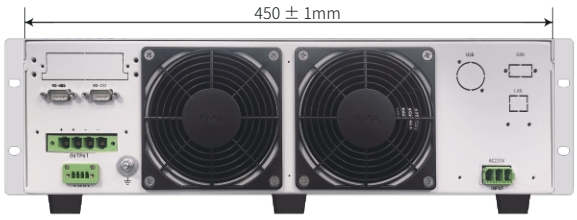
Display Screen

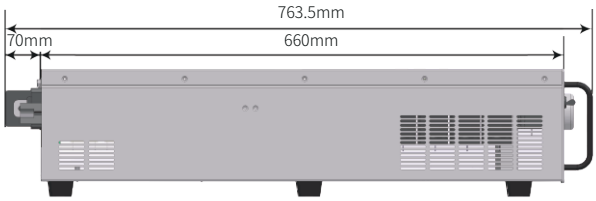


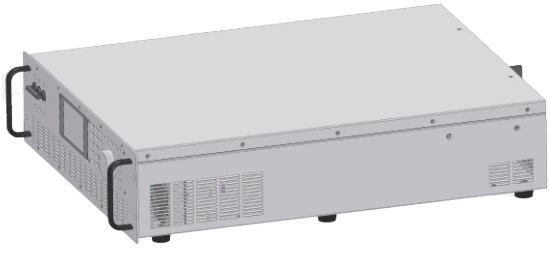
① Display of voltage/current measurement values
② Voltage setting value display
③ Current setting value display
④ CV\CC display
⑤ Current time display
⑥ Accumulated working time display
⑦ Current working hours
⑧ Set menu button for setting system parameters
⑨ Programming button, click to enter the ISO16750-2 testing project interface
⑩ Quickly increase and decrease voltage and current values during editing
⑪ When modifying the set value, you can click the arrow keys to select the number that needs to be modified
⑫ Real time temperature monitoring of the power supply, which can control the fan to dissipate heat for the power supply

Appearance Dimensions

3U 450(W) * 660(D) * 133(H) mm







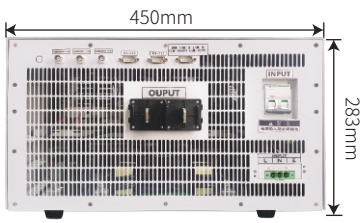
HY-BPSU Series Appearance & Size

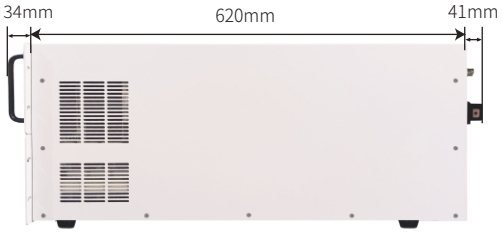
4U 433(W)*560(D)*177(H)mm

BPSU

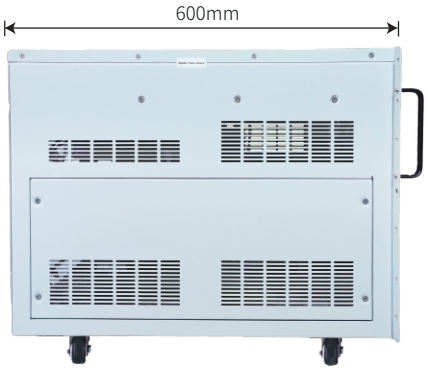
35

6U 450(W)*620(D)*266(H)mm

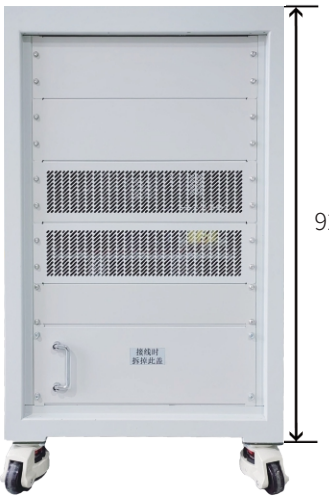




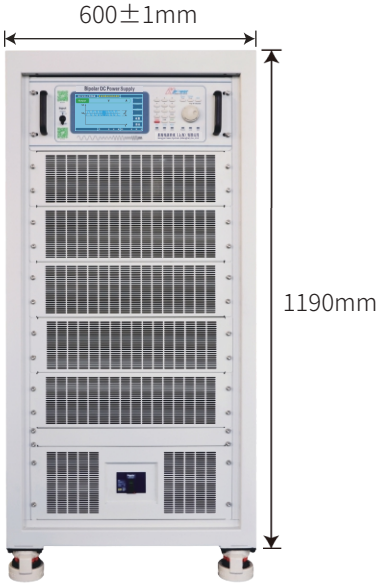
10U 440(W)*600(D)*445(H)mm

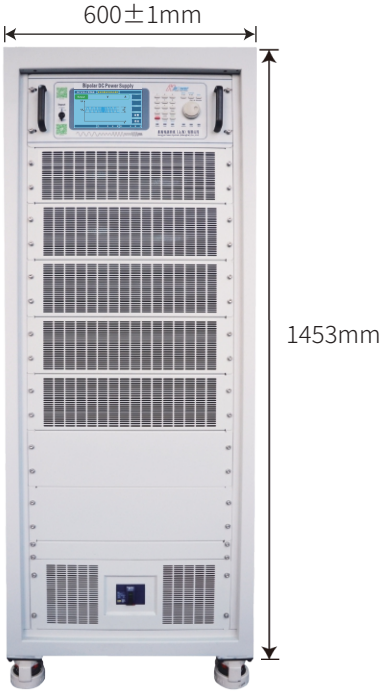


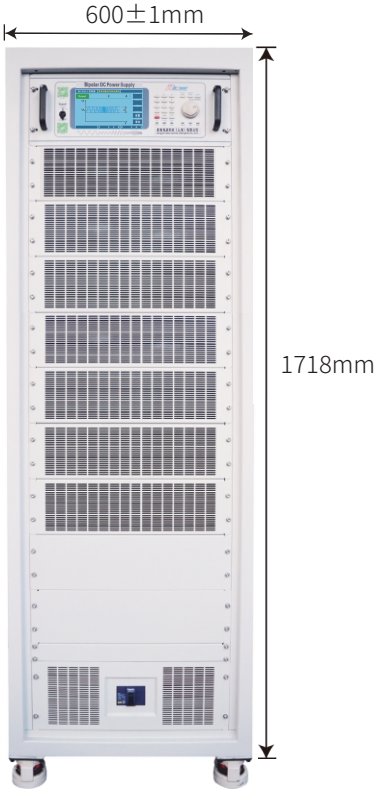
18U 600(W)*800(D)*920(H)mm



24U 600(W)*800(D)*1190(H)mm
30U 600(W)*800(D)*1453(H)mm
36U 600(W)*800(D)*1718(H)mm







Case Presentation (Part)

Customer Cases (Partial)

China FAW

Valeo

BYD

Zhejiang Tiancheng

Shanghai Zhefu Intelligent

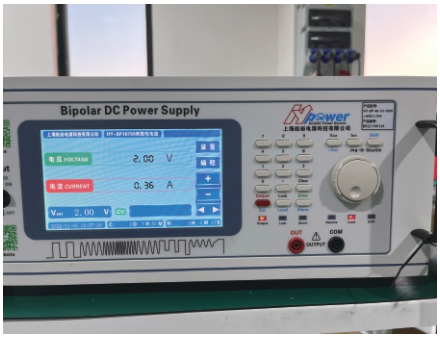
Beijing Haomo Zhixing

BMW

NIO

Xiaomi Auto

Tianhua Lighting



Rothwell

Inovance

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Hangyu Power Supply Automotive Electronic Test Solution Manual, Version 05.31, October 2025

Authorized distributor：