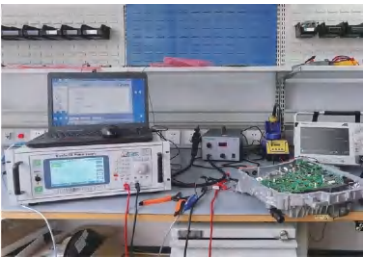
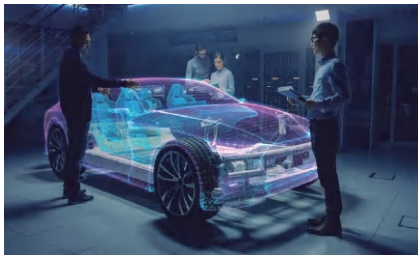
HY-BPSU Series

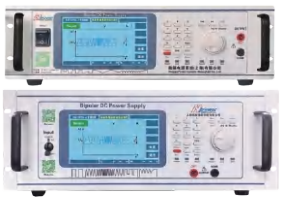
High Speed Power Supply for Automotive Electronice Test

Hangyu Power System (Shanghai) Co., Ltd.

AC&DC Power Source







HY-BPSU Series High Speed Power Supply for Automotive Electronice Test

AC&DC Power Source

Bipolar broadband, high-speed, high current, and high voltage

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-BP 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)
- Any wave editing function, built-in waveform suitable for：ISO16750-2; ISO7637.2;GB28046.2;LV124;LV148;SMTC3800001;VW80000;GS95024-2; GMW3172;ISO/DIS21780。
- Unipolar/bipolar function
- Adopting "new linear technology" to achieve low ripple/low noise
- High speed response speed, voltage response time ⩽ 10 μ S
- 16 bits D/A High precision converter with precise output
- 16 bits A/D High precision converter for more accurate read back

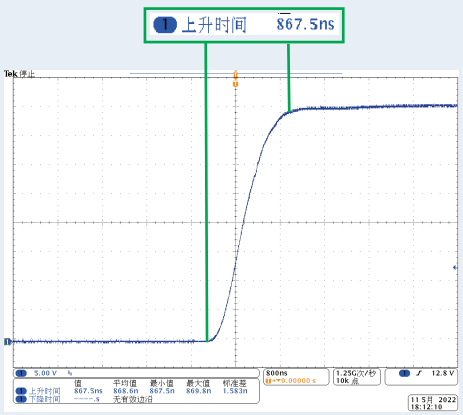
Application Area

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 testingSensors, solenoids, and connections for the power circuit Devices, relays, car fuses, lights, etc.)
- Wireless power supply
- Magnetic drive(Magnetic flux testing, B-H curve testing, etc.)
- Power supply for magnetic field generation(Helmholtz coils, etc.)

Actual Measurement Display



frequency characteristic100kHz-500kHz（CV mode）rise Response time of 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 Selection And purchase

Product Selection Instructions

Product series	Output voltage	Output current	Output broadband
HY-BPSU	40	10	500k

■ Selection examples:

Model: HY-BPSU 40-10-500K

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

Standard communication interface

- RS-485
- RS-232
- Digital I/O

Purchase communication interface
(Users can install it themselves)

- LAN Ethernet communication interface
- GPIB GPIB communication interface
- IA Analog 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-BP Series Product Selection And Parameters

This series of products can choose a wide frequency band for power output:0-50kHz/0-100kHz/0-200kHz/0-300kHz/0-400kHz/0-500kHz

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

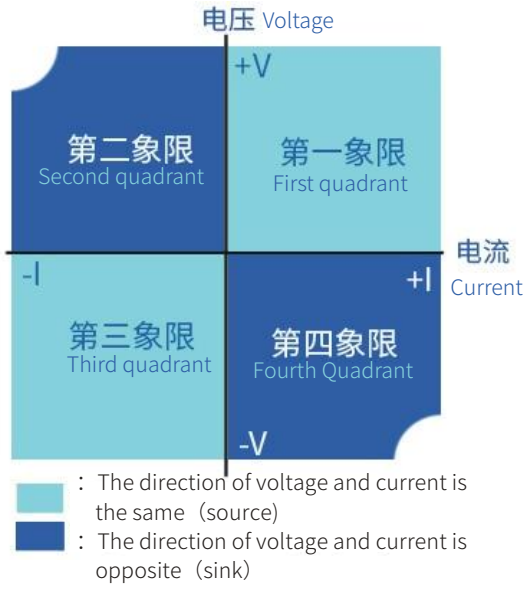
Models	Output voltage	Output current	Output power
HY-BPSU 80-30	±80V	±30A	2.4kW
HY-BPSU 80-37.5	±80V	±37.5A	3kW
HY-BPSU 80-50	±80V	±50A	4kW
HY-BPSU 80-75	±80V	±75A	6kW
HY-BPSU 80-100	±80V	±100A	8kW
HY-BPSU 80-125	±80V	±125A	10kW

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



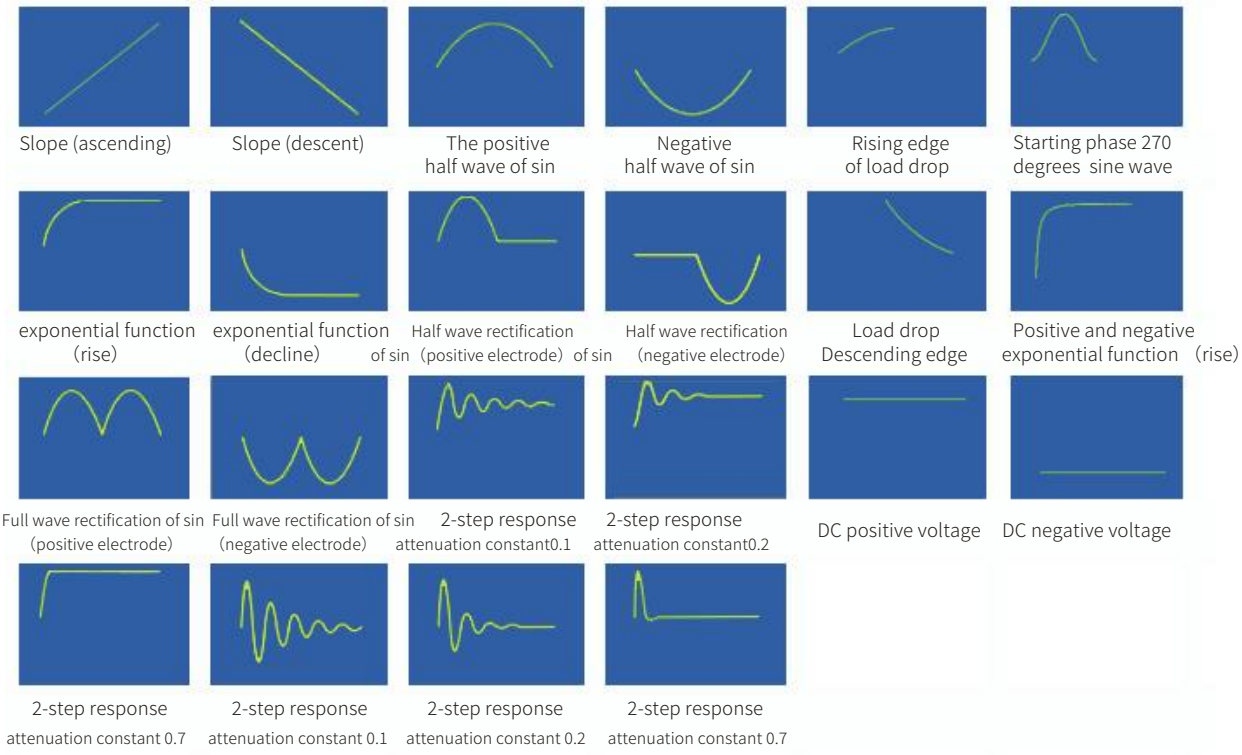
Any Wave Editing Function

The HY-BPSU series is capable of achieving sine wave, square wave, and triangular wave Based on this, there are 22 built-in waveform elements. Implement any of 22 waveforms Edit, save, and recall. And can set amplitude, frequency, and initial Phase, sweep frequency, square wave. Moreover, the timing function can be applied to various waves Set 22 programs from 1 Step to 200 Step.

■ Three basic waveforms

Sinusoidal waveform Triangular waveform Square waveform

■ 22 Arbitrary waveforms



Slope (ascending) | Slope (descent) | The positive 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 rectification of 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) | 2-step response attenuation constant0.1 | 2-step response attenuation constant0.2 | DC positive voltage | DC negative voltage

2-step response attenuation constant 0.7 | 2-step response attenuation constant 0.1 | 2-step response attenuation constant 0.2 | 2-step response attenuation constant 0.7

HY-BPSU Series Test Items

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
  4.6.2 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: ±0,2 V;
— 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 12 V 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 12/24 V 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 Tmin and Tmax, 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.

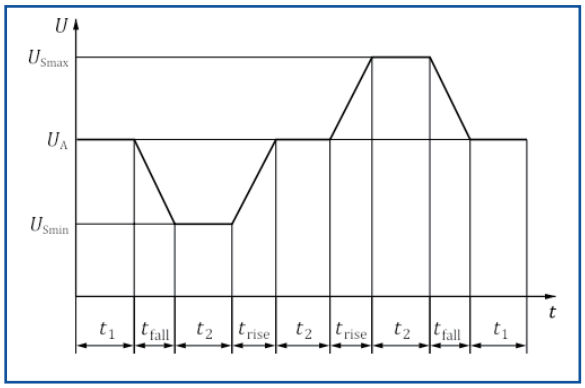
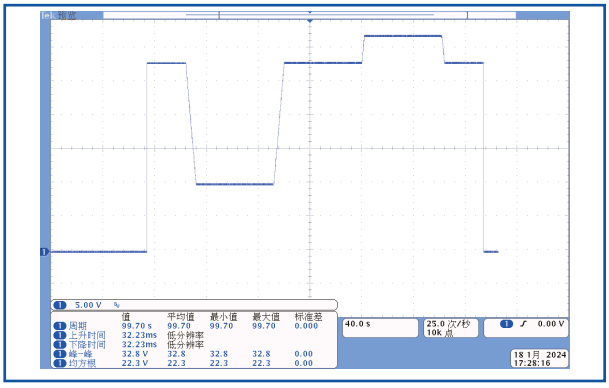


Figure 1 — DC supply voltage test profile



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					
代码	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					
代码	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 (Tmax – 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, Tmax.
■ 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. A simulated use case could be a jump start from a donor vehicle using a 24 V system, but without engine running in the donor vehicle (i.e. without applied charging on the 24 V side). A use case could also be a jump start from a 24 V stand-alone battery pack. This test is only applicable for 12 V systems. .

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.
■ Test shall be performed one time for each temperature value given in Table 5.

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

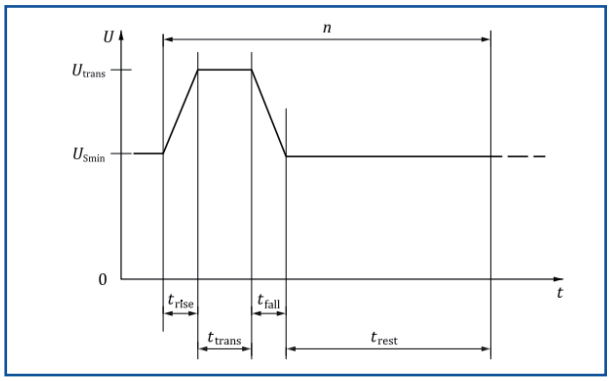
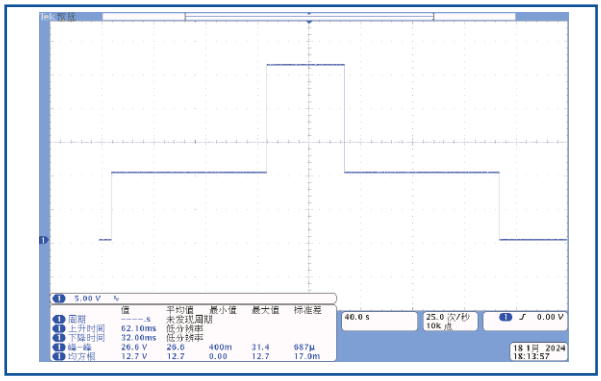


Figure 2 — Jump start transient



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

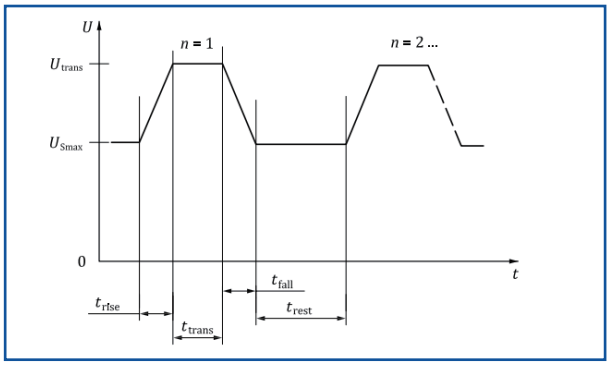
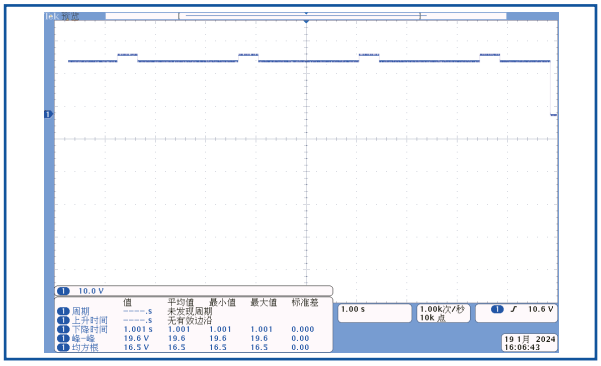


Figure 3 — Test profile for transient overvoltage



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.

■ 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.

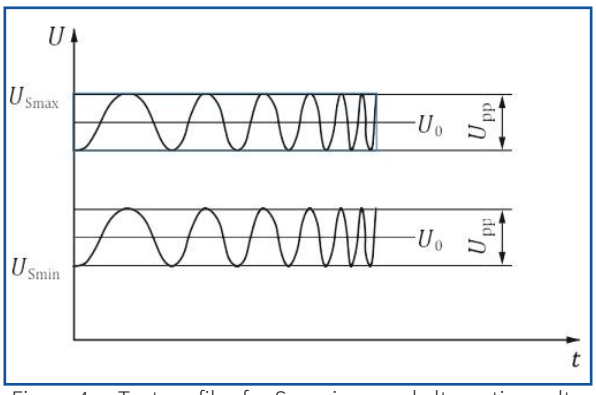
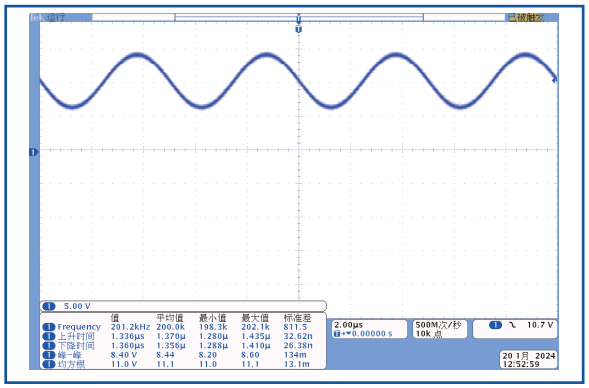


Figure 4 — Test profiles for Superimposed alternating voltage



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

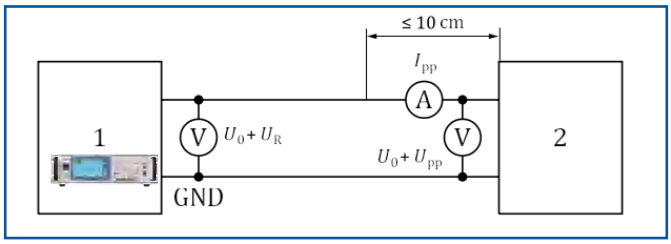


Figure 5 — Test setup for superimposed alternating voltage
1: HY-BP series automotive electronic testing high-speed power supply
2: DUT
UR: AC ripple voltage at power supply
Upp: peak-to-peak AC voltage at DUT
U0: DC level of applied test voltage, in volts
Ipp: peak-to-peak AC current at DUT
Locate voltage 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.

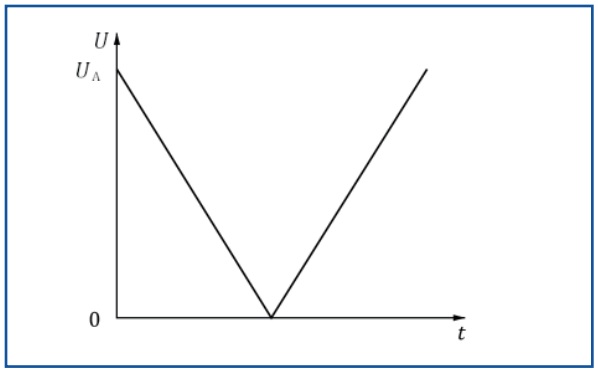
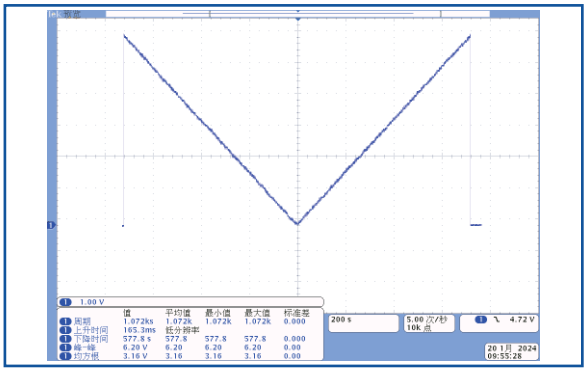


Figure 6 — Test profile for Slow decrease and increase of supply voltage



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.

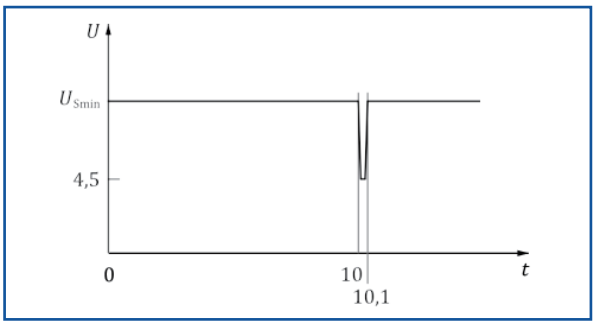


Figure 7 — Short voltage drop for systems with 12 V nominal voltage

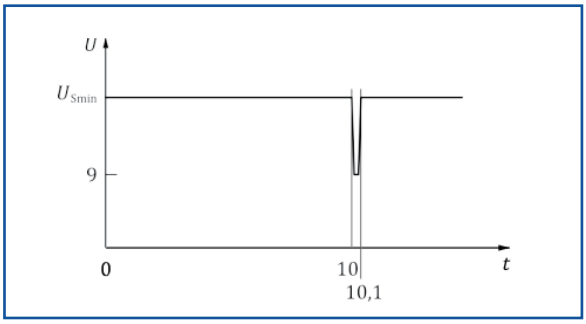
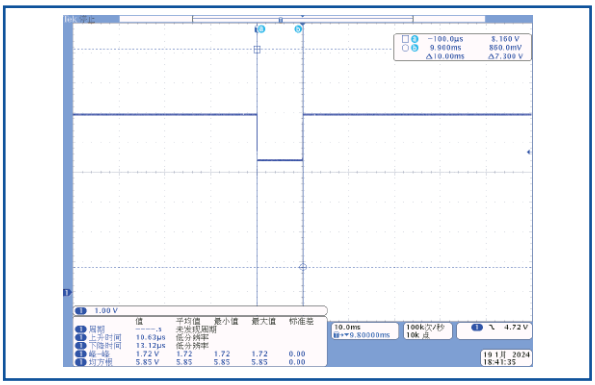


Figure 8 — Short voltage drop for systems with 24 V nominal voltage



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 001 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.

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. After the transition time performance of the switch has been verified, the DUT shall be tested with the full setup as shown in Figure 9.

■ While the supply line is interrupted by a switch, inductive voltage peaks shall be avoided, e.g. by connecting a low resistance parallel load, if agreed between the customer and the supplier.

■ The following test condition shall be met:— open switch resistance: ⩾ 10 MΩ.

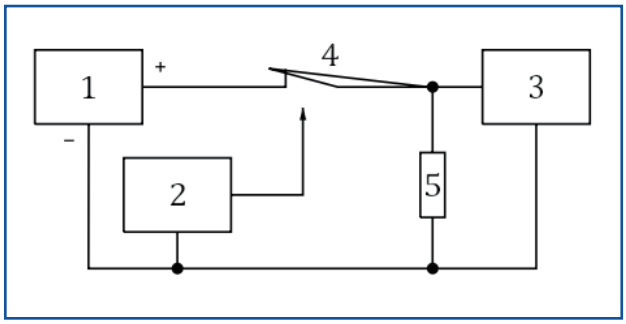


Figure 9 — Test set up for micro interruption with 12/24 V nominal voltage (UN)

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 001 Pin Interrupt Simulator

HY-PIS 001 Pin Interrupt Simulator

The wire harness interruption (micro interruption) simulator is specifically designed for wiring harnesses in power and signal lines Interrupt testing, simulating the interruption, insertion, and removal of power and signal lines. Widely used in automotive electronics Occasions for interrupt testing of sub wiring harnesses。

Compliant with standards

- BMW QV65013
- GMW3172
- MBN LV124 (2013)
- MBN LV148
- Renault 36-00-808/--M
- Nissan 28401 NDS02

Tests that can be met

- E-10 Brief Voltage Drop
- E-13 Dropout Pin
- E-14 Dropout Connector
- E48-09 Short interruptions

Machine Parameters

- Working power supply:220V±10% AC 50/60Hz
- The minimum interruption time for both power and signal lines can reach 1 µ S
- Switching time of both power and signal lines<200 ns

Power Cord Switch

- Power switch: 2-way switch: - DC+power cord- DC grounding wire
- EUT voltage:±80V
- EUT Maximum current:50A、100A、200A Optional
- S2 discharge resistor: open circuit、0Ω、0.1Ω、1Ω、100Ω
- Switching time:＜200ns
- Drop duration:1µs
- Rising/falling edge:＜ 1µs@1Ω，1µs@100Ω

Signal Line Switch

- Number of channels: 16
- EUT voltage:±50V/3A
- Switching method: automatic switching
- Test mode: single channel test, multi channel simultaneous test
- Switching time:＜200ns
- Drop duration:1µs
- Rising/falling edge:＜1µs@1Ω,1µs@1kΩ

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 001 pin interrupt simulator, introduced on P12）

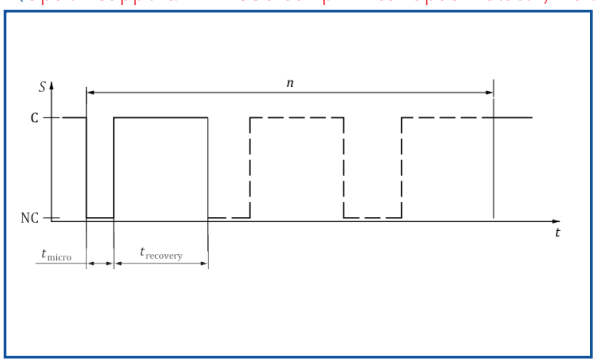
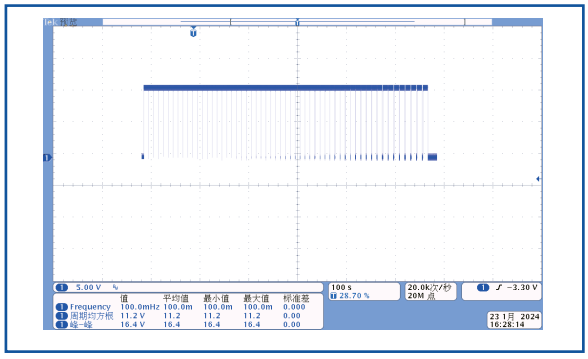


Figure 10 — Micro interruption for variable interruption with 12/24 V nominal voltage (UN)



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	nnumber 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 001 pin interrupt simulator, introduced on P12）

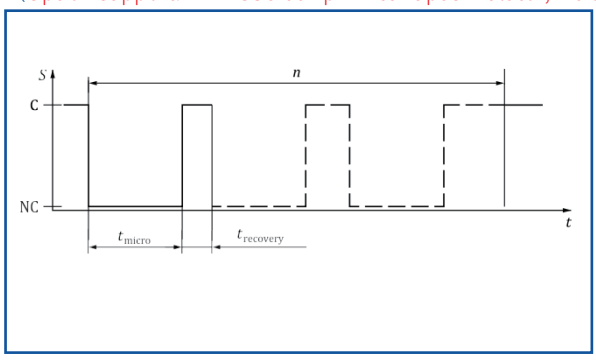
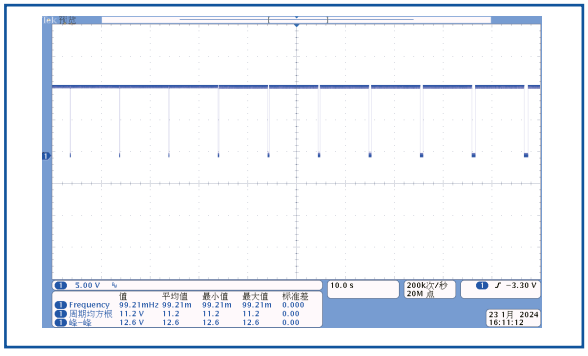


Figure 11 — Micro interruption for variable recovery with 12/24 V nominal voltage (UN)



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, USmin, to 0,95USmin. Hold this voltage for at least 5s.

■ Raise the voltage to USmin. Hold USmin for at least 10 s and perform a functional test. Then decrease the voltage to 0,9USmin.

■ Continue with steps of 5 % of USmin, 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.

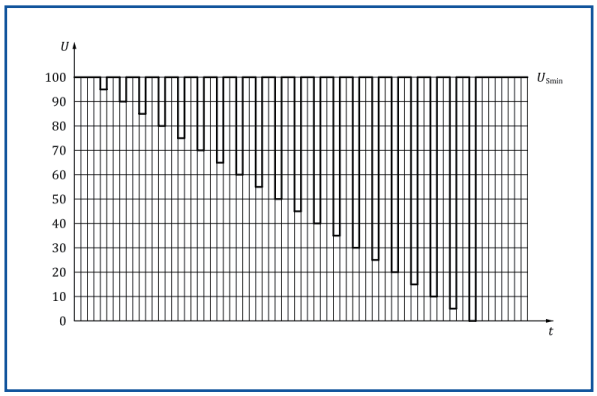
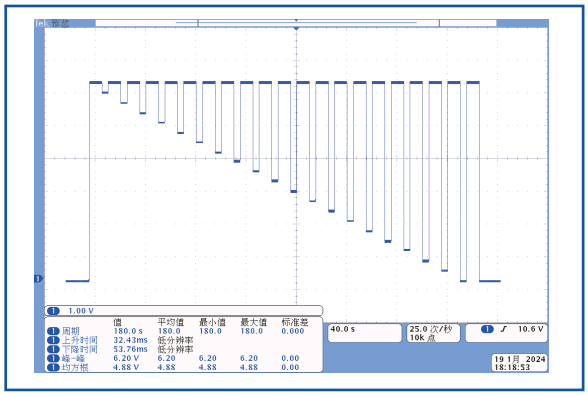


Figure 12 — Test profile for reset behaviour at voltage drop



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 USmin as defined in ISO 16750-1.

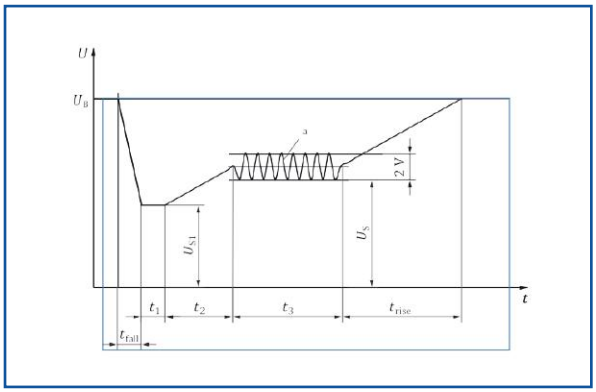
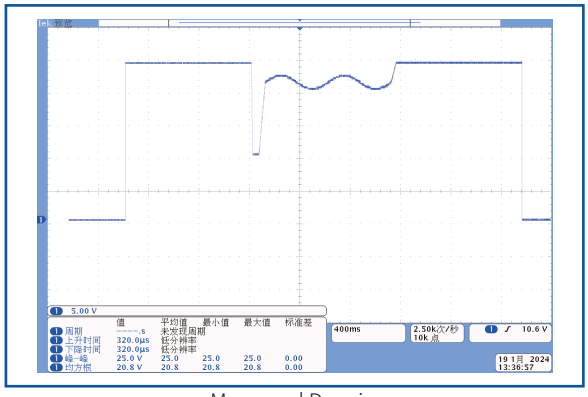


Figure 13 — Starting profile



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. The severity level for test B (1, 2, 3 or 4) shall be agreed between the customer and the supplier. 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 / HY-7637-P5BSU——————

HY-7637-P5ASU

HY-7637-P5BSU

This test can purchase an all-in-one machine, which is the most complete solution for automotive electrical performance testing system. It consists of three parts: transient conduction immunity, electrical performance testing, and safety regulation testing. The unified control is achieved by the new interface upper computer software, with excellent indicators, powerful functions, and professional testing. It can cover most of the automotive electronic performance testing items and requirements specified in international standards and host factory standards, For many in car electronic testing manufacturers, it is an intelligent operation testing platform that realizes one-stop procurement and testing.

HY-7637-P5ASU parameter		
	12V system	24V system
Output voltage (Us)	10.0V-210.0V	10.0V-210.0V
Output resistance	0.5Ω-8Ω	1Ω-8Ω
Pulse width	40ms、100ms、200ms、350ms、400ms	100ms、200ms、350ms、400ms
Rise time	10ms	
Interval time	60ms-999ms	
Pulse count	1-60000	
Size	（W）495mm*（D）550mm*（H）285mm	
Weight	约38kg	

HY-7637-P5ASU parameter	
Suppression voltage (Us)	10.0V-210.0V
Size	(W) 495mm* (D) 550mm* (H) 133mm
Weight	约11kg

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）

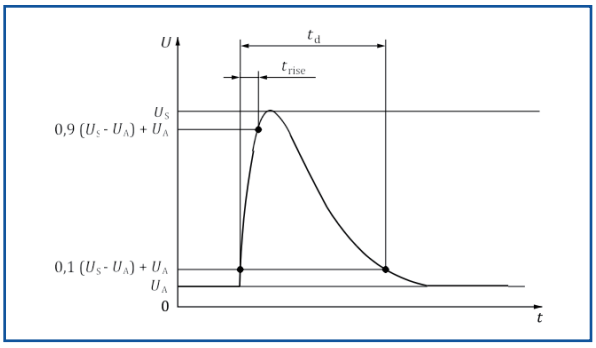


Figure 14 — Test without centralized load dump suppression

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,$t_{ri'se}$ (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）

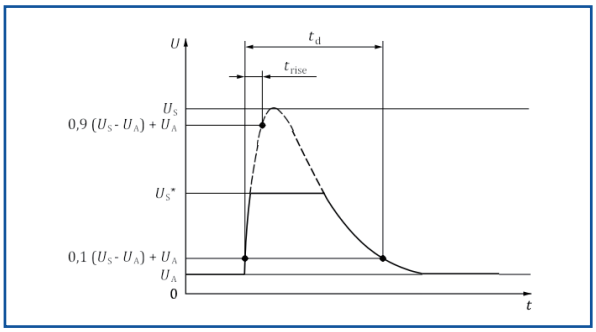
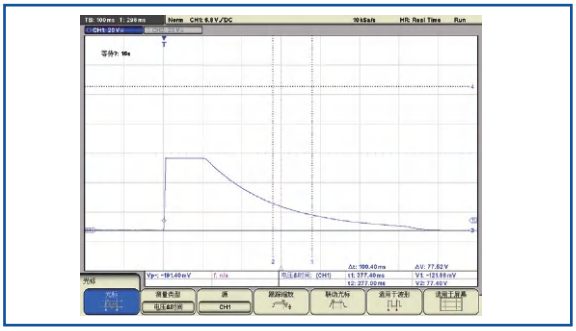


Figure 15 — Test with centralized load dump suppression



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,$t_{ri'se}$ (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.
■ Operating mode is not applicable during this test.

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.

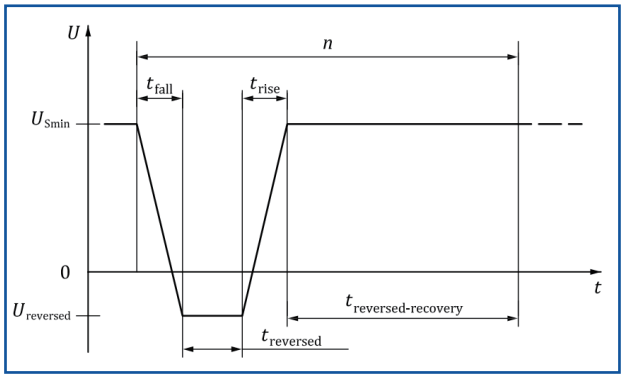
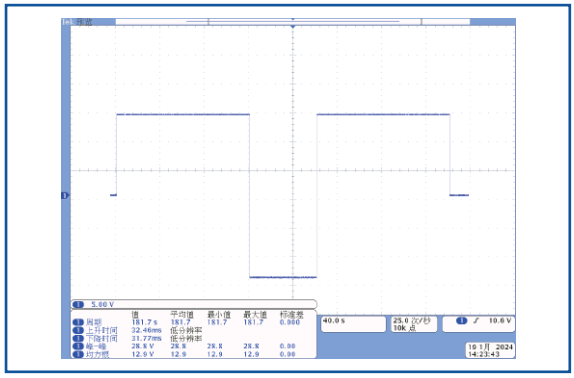


Figure 16 — Reversed voltage test case 1



Measured Drawing

Table 15 — Reversed voltage test case 1 values							
Parameter	t_{fall} fall time	t_{rise} rise time	$t_{reversed}$ 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 Ureversed (see Figure 17 and Table 16) simultaneously to all relevant inputs (connections) of the DUT for a duration of (60 ± 6) s.

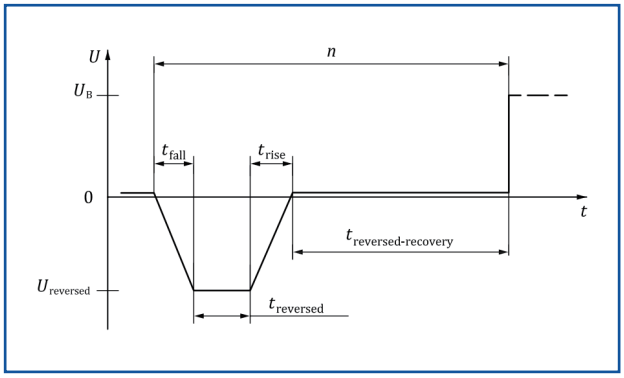


Figure 17 — Reversed voltage test case 2

Table 16 — Reversed voltage test case 2 values							
Parameter	t_{fall} fall time	t_{rise} rise time	$t_{reversed}$ 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.

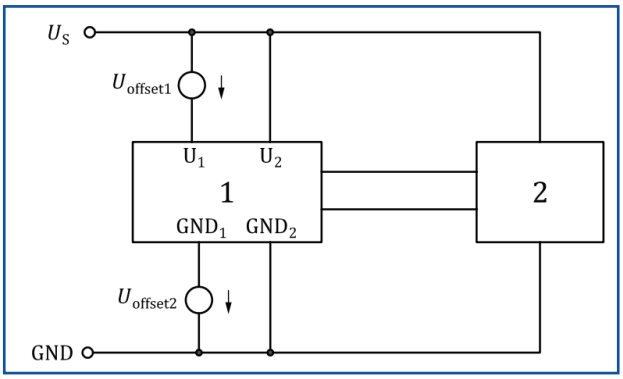


Figure 18 — Example of ground reference and supply offset on a DUT with two ground/supply paths

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	Us	$U_{offset1}$	$U_{offset2}$
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 (Option support: HY-PIS 001 pin interrupt simulator, introduced on P12)

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.

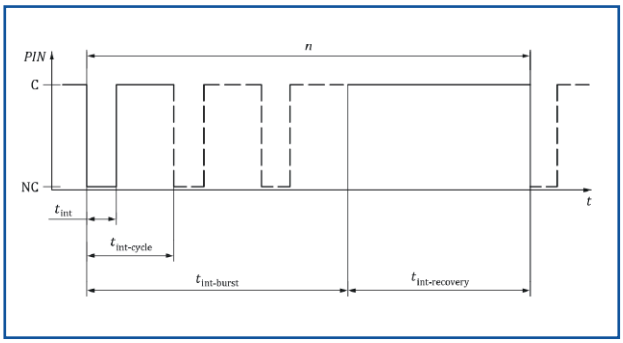
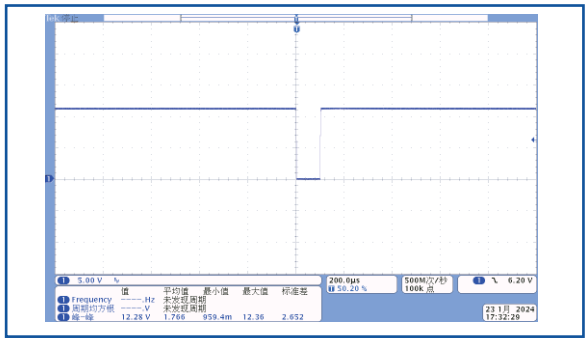


Figure 19 — Interruption pattern of short-term open circuit events



Measured Drawing

表18-中断模式测试值

Parameter	t_{int} short-term open circuit time	$t_{tint-cycle}$ short-term open circuit repetition time	$t_{int-burst}$ 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 (Option support: HY-PISSU 001 pin interrupt simulator, introduced on P12)

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

（Option support: HY-PISSU 001 pin interrupt simulator, introduced on P12）

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 USmax (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 USmax.
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
Output current		±10A	±20A	±30A	±40A	±60A	±90A	±100A
Rated output power		200W	400W	600W	800W	1200W	1800W	2000W
AC Frequency	Setting range	CV Optional in mode:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode:0.01Hz~5.00kHz						
	Set 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	Sine 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% regular (10kHz＜F)						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±20V						
	Setting range (single pole)	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 (bipolar)	0~±10A	0~±20A	0~±30A	0~±40A	0~±60A	0~±90A	0~±100A
	Setting range (single pole)	0~±10A	0~±20A	0~±30A	0~±40A	0~±60A	0~±90A	0~±100A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~20App	0~40App	0~60App	0~80App	0~120App	0~180App	0~200App
Accuracy:CC 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-5kHz) ,T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC、AC、DC+AC	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
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 Optional in mode：0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode：0.01Hz~5.00kHz						
	Set 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	Sine 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%固定（10kHz＜F）						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±20V				0~±30V		
	Setting range (single pole)	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 (bipolar)	0~±120A	0~±150A	0~±200A	0~±500A	0~±10A	0~±13.4A	0~±20A
	Setting range (single pole)	0~±120A	0~±150A	0~±200A	0~±500A	0~±10A	0~±13.4A	0~±20A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~240App	0~300App	0~400App	0~1000App	0~20App	0~26.8App	0~40App
Accuracy：CC 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-5kHz) ,T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC、AC、DC+AC	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
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 Optional in mode:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode:0.01Hz~5.00kHz						
	Set 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	Sine 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%固定 (10kHz＜F)						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±30V						
	Setting range (single pole)	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 (bipolar)	0~±26.7A	0~±40A	0~±60A	0~±100A	0~±134A	0~±200A	0~±267A
	Setting range (single pole)	0~±26.7A	0~±40A	0~±60A	0~±100A	0~±134A	0~±200A	0~±267A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~53.4App	0~80App	0~120App	0~200App	0~268App	0~400App	0~534App
Accuracy:CC 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-5kHz), T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC、AC、DC+AC	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
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 Optional in mode:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode:0.01Hz~5.00kHz						
	Set 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	Sine 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%固定 (10kHz＜F)						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±40V						
	Setting range (single pole)	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 (bipolar)	0~±7.5A	0~±10A	0~±15A	0~±20A	0~±30A	0~±45A	0~±50A
	Setting range (single pole)	0~±7.5A	0~±10A	0~±15A	0~±20A	0~±30A	0~±45A	0~±50A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~15App	0~20App	0~30App	0~40App	0~60App	0~90App	0~100App
Accuracy:CC 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-5kHz) ,T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC、AC、DC+AC	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
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 Optional in mode:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode:0.01Hz~5.00kHz						
	Set 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	Sine 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%固定 (10kHz＜F)						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±40V						0~±60V
	Setting range (single pole)	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 (bipolar)	0~±60A	0~±75A	0~±100A	0~±150A	0~±200A	0~±250A	0~±6.7A
	Setting range (single pole)	0~±60A	0~±75A	0~±100A	0~±150A	0~±200A	0~±250A	0~±6.7A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~120App	0~150App	0~200App	0~300App	0~400App	0~500App	0~13.4App
Accuracy:CC Mode								
Voltage measurement	DC	± (0.05% reading+0.05% range) ,T=(18°C~28°C)						±(0.05%读数+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-5kHz) ,T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC、AC、DC+AC	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
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 Optional in mode：0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode：0.01Hz~5.00kHz						
	Set 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	Sine 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%固定 (10kHz＜F)						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±60V						
	Setting range (single pole)	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 (bipolar)	0~±10A	0~±13.4A	0~±20A	0~±30A	0~±33.5A	0~±40A	0~±50A
	Setting range (single pole)	0~±10A	0~±13.4A	0~±20A	0~±30A	0~±33.5A	0~±40A	0~±50A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~20App	0~26.8App	0~40App	0~60App	0~67App	0~80App	0~100App
Accuracy：CC 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-5kHz) ,T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V)						
Current setting	DC、AC、DC+AC	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
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 Optional in mode:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode:0.01Hz~5.00kHz						
	Set 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	Sine 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%固定 (10kHz＜F)						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±60V				0~±80V		
	Setting range (single pole)	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 (bipolar)	0~±67A	0~±100A	0~±133.4A	0~±167A	0~±5A	0~±7.5A	0~±10A
	Setting range (single pole)	0~±67A	0~±100A	0~±133.4A	0~±167A	0~±5A	0~±7.5A	0~±10A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~134App	0~200App	0~266.8App	0~334App	0~10App	0~15App	0~20App
Accuracy:CC 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-5kHz) ,T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current setting	DC、AC、DC+AC	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
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 Optional in mode：0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode：0.01Hz~5.00kHz						
	Set 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	Sine 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%固定（10kHz＜F）						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±80V						
	Setting range (single pole)	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 (bipolar)	0~±15A	0~±22.5A	0~±25A	0~±30A	0~±37.5A	0~±50A	0~±75A
	Setting range (single pole)	0~±15A	0~±22.5A	0~±25A	0~±30A	0~±37.5A	0~±50A	0~±75A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~30App	0~45App	0~50App	0~60App	0~75App	0~100App	0~150App
Accuracy：CC 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-5kHz) ,T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current setting	DC、AC、DC+AC	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
Output current		±100A	±125A	±4A	±6A	±8A	±12A	±18A
Rated output power		8000W	10kW	400W	600W	800W	1200W	1800W
AC Frequency	Setting range	CV Optional in mode:0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode:0.01Hz~5.00kHz						
	Set 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	Sine 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%固定 (10kHz＜F)						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±80V		0~±100V				
	Setting range (single pole)	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 (bipolar)	0~±100A	0~±125A	0~±4A	0~±6A	0~±8A	0~±12A	0~±18A
	Setting range (single pole)	0~±100A	0~±125A	0~±4A	0~±6A	0~±8A	0~±12A	0~±18A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~200App	0~250App	0~8App	0~12App	0~16App	0~24App	0~36App
Accuracy:CC 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-5kHz) ,T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current setting	DC、AC、DC+AC	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
Output current		±20A	±24A	±30A	±40A	±60A	±80A	±100A
Rated output power		2000W	2400W	3000W	4000W	6000W	8000W	10kW
AC Frequency	Setting range	CV Optional in mode：0~50.00kHz\0~100.00kHz\0~200.00kHz\0~300.00kHz\0~400.00kHz\0~500.00kHz CC Optional in mode：0.01Hz~5.00kHz						
	Set 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	Sine 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%固定 (10kHz＜F)						
CV Mode								
DC Voltage	Setting range (bipolar)	0~±100V						
	Setting range (single pole)	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 (bipolar)	0~±20A	0~±24A	0~±30A	0~±40A	0~±60A	0~±80A	0~±100A
	Setting range (single pole)	0~±20A	0~±24A	0~±30A	0~±40A	0~±60A	0~±80A	0~±100A
	Temperature coefficient	±100ppm/°C (range)						
AC Current	Setting range	0~40App	0~48App	0~60App	0~80App	0~120App	0~160App	0~200App
Accuracy：CC 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-5kHz) ,T=(18°C~28°C)						
Resolution Ratio								
Voltage setting	DC、AC、DC+AC	0.001V (U≤60V), 0.01V (60V＜U≤100V)						
Current setting	DC、AC、DC+AC	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 setting range	10 - 110%, Immediate shutdown of output beyond limit
OCP Over current protection setting range	0 - 105%, Immediate shutdown of output beyond limit
OTP Over temperature protection	Immediate shutdown of output beyond limit

Ambient Condition

Environment	Indoor use; Installation overvoltage level: II; Pollution level: P2; Class II equipment
Ambient temperature	0°C to 50°C
Storage environment temperature	-20°C to 65°C,
Working environment humidity	20%-90% RH, No condensation, continuous operation
Storage environment humidity	10% - 95% RH, No condensation
Altitude	Above an altitude of 2000 meters, the power decreases by 2% for every 100 meters increase, or the maximum working environment temperature decreases by 1 °C for every 100 meters; When not in operation, it can reach an altitude of 12000 meters
Burial	Forced air cooling, intelligent variable speed fan, front/side air inlet, rear air outlet
Noise	⩽ 65dB(A), Weighted measurement with 1 m

Control Panel

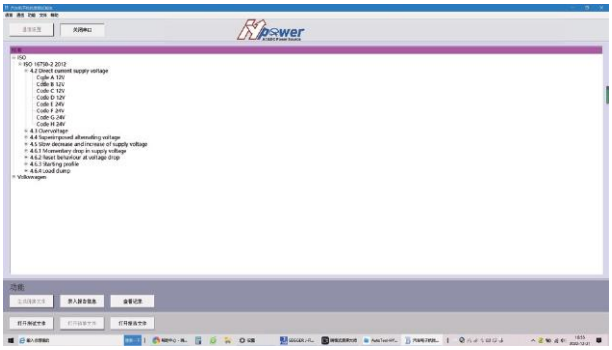
Monitor	7-inch LCD display, touch screen
Control function	Number button input, multi-level shuttle knob adjustment (outer circle coarse adjustment/inner circle fine adjustment)Output ON/OFF switch, Lock keyboard and touch lock, Reset restart Status indicator light (Shift/Local/Remote/Alarm/Lock/Output)

Input Power Supply

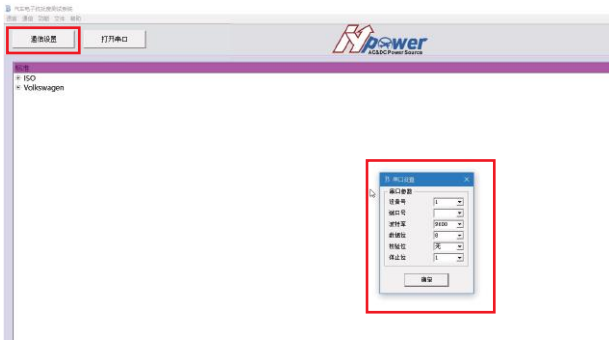
Frequency	47 Hz - 63 Hz
Connection	Single phase two wire+ground wire, 220 V ± 15%/three-phase four wire+ground wire, 380 V ± 15%

Upper Computer Description

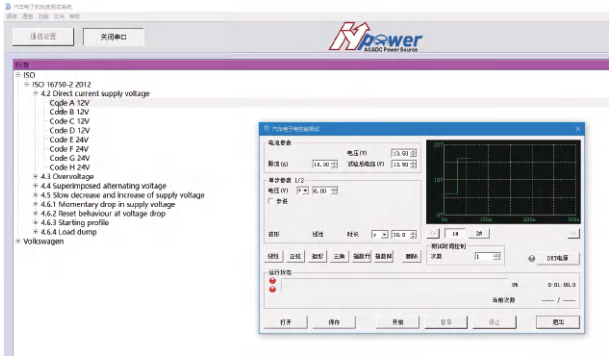
- Equipped with upper computer software, saving development costs and time
- Simple and easy to operate, you can view all corresponding test standard items, double-click to open the settings page
- Scan the QR code on the right side, watch the operation demonstration, including connection communication and instructions for using the upper computer



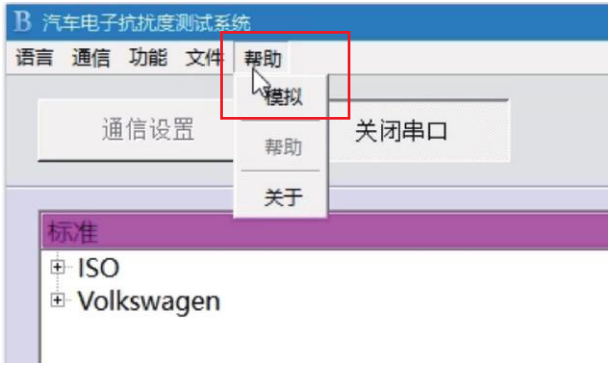
ISO 16750-2 Standard testing items



Click on "Communication Settings" to open the serial port settings and connect to communication



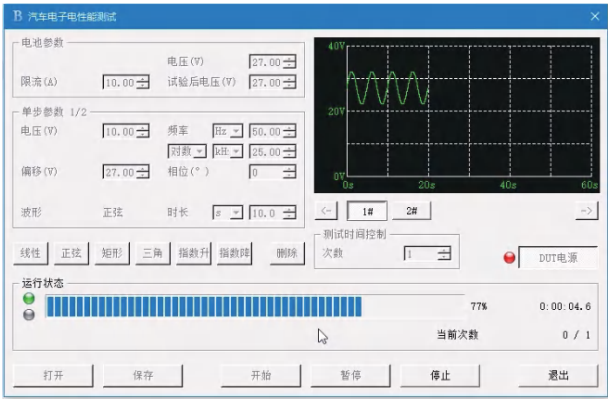
Each test item can adjust the test content according to needs



When not online, simulation mode can be used

- With arbitrary wave programming function, users can freely edit waveforms, store, and call according to their own testing situation.

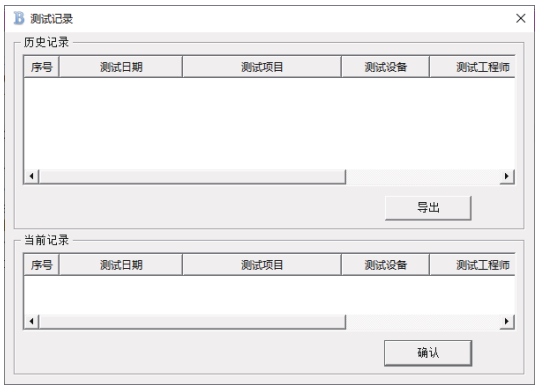
The specific operation method can be scanned by QR code to watch the operation demonstration



After starting operation, the running status can be displayed

HY-BPSU Series Upper Computer Testing Project

Test completed or click 'Stop' to pop up 'Test Report' After completing the report on the page, "export the report" to the computer for saving;



Test record page, where you can view the records: click to enter the test Trial record page to view the current and historical records of the test.

The Upper Computer Software Is Equipped With Various International Testing Standards And Vehicle Enterprise Testing Standards

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

Serial Number	Test Items
4.2	Direct current (DC) supply voltage
4.3	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
4.6.2	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

VS-00.00-T-11019-A1-2015 (Maximum voltage up to 24V, sweep frequency up to 20kHz)

Serial Number	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

Serial Number	Test Items
6.6	Voltage fluctuation
6.7	Reinitialize
6.8	Power supply voltage interruption
6.9	Grounding loss
7.0	Fault current

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。

Serial Number	Test Items
E01	Long term overvoltage
E02	Transient overvoltages
E03	Transient undervoltage
E04	Start pulse
E05	Load drop
E06	Superimposed AC voltage
E07	Slow decrease and slow increase of power supply voltage
E08	Slow decrease and rapid increase of power supply voltage

Serial Number	Test Items
E09	Reset
E10	Short interruption requires optional HY-PSI 001
E11	Start pulse
E12	Voltage curve with electrical system control
E13	Interrupt pin requires optional configuration HY-PSI 001
E14	Interruption plug requires optional configuration HY-PSI 001
E15	Reversed polarity
E16	Ground offset requires two power supplies together

LV148Electrical 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。

Serial Number	Test Items
E48-02	Transient overvoltage, load dump
E48-03	Transient pulses within a lower operating range with functional limitations
E48-04	Restore
E48-05	Superimposed AC voltage
E48-06	Slow decrease and slow increase in power supply voltage
E48-08	Reset behavior .
E48-09	Short interruption
E48-10	Turning pulse .

Serial Number	Test Items
E48-11	Loss of grounding BN48
E48-12	Ground offset
E48-15	Operate within an unrestricted range of functionality
E48-16	Operate within the upper limit of limited functionality
E48-17	Operate within a lower range with limited functionality
E48-18	Overvoltage range
E48-19	Undervoltage range

GMW3172-2018 General electric testing (maximum voltage up to 26V, sweep frequency up to 25kHz)

Serial Number	Test Items
9.2.1	parasitical current
9.2.2	power interruption
9.2.3	Functional development in progress
9.2.4	Superimposed sinusoidal alternating voltage
9.2.5	Superimposed pulse voltage
9.2.9	Open circuit - single line interruption requires optional configuration HY-PSI 001
9.2.10	Open circuit - multi line interruption requires optional configuration HY-PSI 001

Serial Number	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	Separate digital input voltage
9.2.16	Insulation resistance safety test
9.2.17	Crank pulse capability and durability
9.2.18	Switched battery cables require optional configuration HY-PSI 001
9.2.19	Battery line transient requires optional configuration HY-PSI 001

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

Serial Number	Test Items
10.1 Test-01	Standard voltage range
10.2 Test-02	Upper and lower transient voltage range
10.3 Test-03	Temporary overvoltage
10.4 Test-04	Power component load dump control test
10.5 Test-05	Boot configuration
10.6 Test-06	Long term overvoltage
10.7 Test-07	Overvoltage of consumer components that may provide electrical energy
10.8 Test-08	Reduction and increase of power supply voltage

Serial Number	Test Items
10.9 Test-09	Voltage fluctuation
10.10 Test-10	Reinitialize
10.11 Test-11	Power supply voltage interruption
10.12 Test-12	Grounding 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 between signal line and load circuit
10.16 Test-16	quiescent current

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SMTC3800001-2014（V4）SAIC group electrical testing (maximum voltage up to 26V, sweep frequency up to 30kHz)

Serial Number	Test Items
5.1	Long term overvoltage
5.2	Transient overvoltage
5.3	Instantaneous low voltage
5.4	Jump voltage start
5.5	Load drop
5.6	Generator superimposed ripple voltage
5.7	Slow decrease/increase in working voltage
5.8	Slow decrease/rapid increase in power supply

Serial Number	Test Items
5.9	RESET TEST
5.1 0	Pulse voltage at engine start
5.1 1	Pin interruption requires optional configuration HY-PSI 001
5.1 2	Connector interruption requires optional configuration HY-PSI 001
5.1 3	Reverse polarity test
5.14	Ground offset (two power supplies tested together, with a bipolar source providing ± 1V)
5.1 5	Short circuit protection between signal lines and driving circuits
5.1 6	Insulation impedance test (safety regulation test)
5.1 8	Quiescent current Test

VW80000-2017 Volkswagen Electric testing (maximum voltage up to 27V, sweep frequency up to 200kHz)

Serial Number	Test Items
8.1	Long term overvoltage
8.2	Transient overvoltages
8.3	Transient undervoltage
8.4	Quick start
8.5	Throw load
8.6	Ripple
8.7	Slow rise and fall of power supply voltage
8.8	Slow drop and rapid rise of power supply voltage
8.9	Reset characteristics
8.10	Short interruption requires optional HY-PSI 001 power cord
8.11	Start pulse

Serial Number	Test Items
8.12	Voltage curve with on-board electrical system control
8.13	Pin interruption requires optional HY-PSI 001 signal wire
8.14	Connector interruption requires optional configuration HY-PSI 001
8.15	Reverse polarity test
8.16	Ground offset requires two power supplies to be tested together, with a bipolar source providing ± 1V
8.18	Insulation resistance safety test
8.19	Quiescent current
8.20	Dielectric strength safety test
8.23	Equalizing the current of multiple power supply voltages
8.24	On/Off Durability test

Q&WMJ073013A-2019 Weima Electric test (maximum voltage up to 18V, sweep frequency up to 25kHz)

Serial Number	Test Items
6.2.2	Long term overvoltage
6.2.3	Transient overvoltage
6.2.4	Instantaneous low pressure
6.2.5	Power supply voltage transient
6.2.6	Jump voltage start
6.2.7	Superimposed ripple voltage
6.2.8	Power supply voltage decrease/increase
6.2.9	RESET TEST
6.2.10	Open circuit - single line interruption Optional required HY-PSI 001

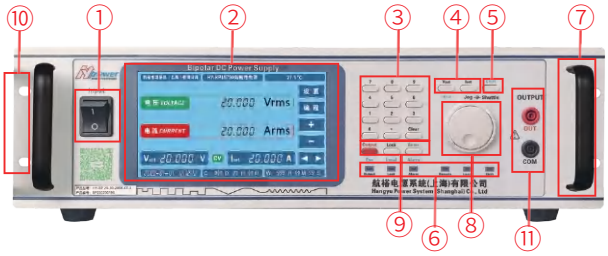
Serial Number	Test Items
6.2.11	Open circuit - multi wire interruption optional required HY-PSI 001
6.2.12	Ground offset tested together with two power supplies, with a bipolar source providing ± 1V
6.2.13	Two or three power sources are tested together for power offset, and the bipolar source provides ± 1V
6.2.14	Reverse polarity test
6.2.17	Quiescent current
6.2.18	Insulation impedance
6.2.19	Ground path inductance sensitivity
6.2.21	Discrete digital input threshold voltage
6.2.24	Power line transient

GB/T21437.2/ISO7637.2（Transient anti-interference type test of power line - optional 7600 controller needs to be added）

Serial Number	Test Items
Pulse1、Pulse2a	(Optional equipment required HY-7610) 60V,50A/ 80V,100A
Pulse3a、Pulse3b	(Optional equipment required HY-7630) 60V,30A
Pulse2b, Pulse4	No option required
Pulse5a、Pulse5b	(Requires optional load shedding equipment HY-7637-5a,5b) Adjustable internal resistance for load shedding

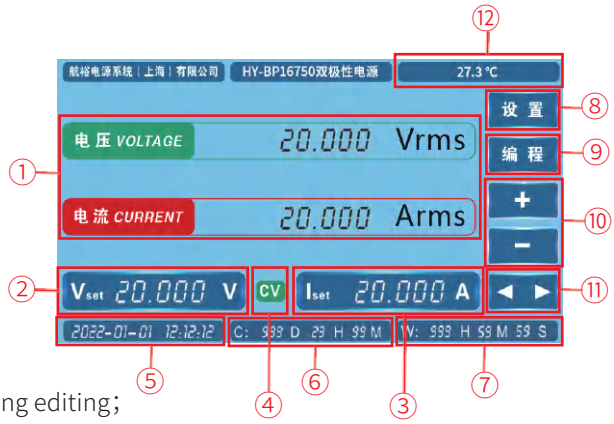
7-Inch Large LCD Display Screen

1、Control Panel Description



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 setting key ;
⑤、 Shift function reuse key;
⑥、 Status indicator light;
⑦、 Chassis handle ;
⑧、 Multi stage shuttle 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).

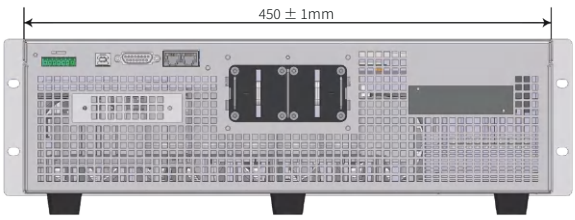
2、Display Screen Description

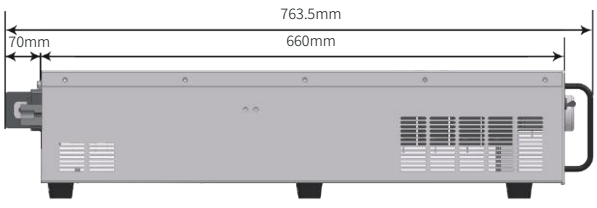


①、Display of voltage/current measurement values;
②、Voltage setting value display;
③、Current setting value display;
④、CV\CC display;
⑤、Current time display;
⑥、Accumulated working time display;
⑦、Current working hours;
⑧、Set menu button for setting system parameters;
⑨、Programming button, click to enter 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

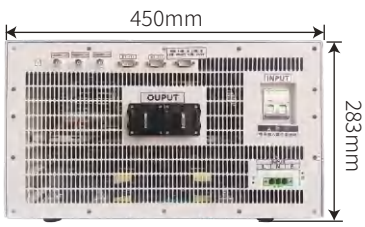


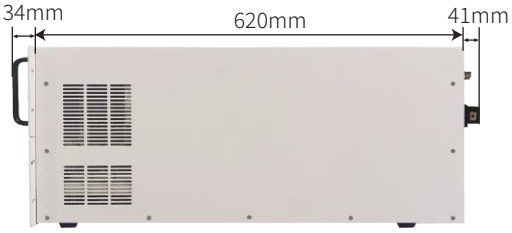


HY-BPSU Series Model Size

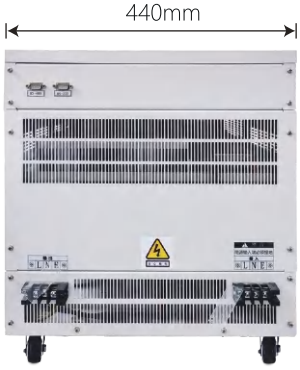
4U 433(W)*560(D)*177(H)mm

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





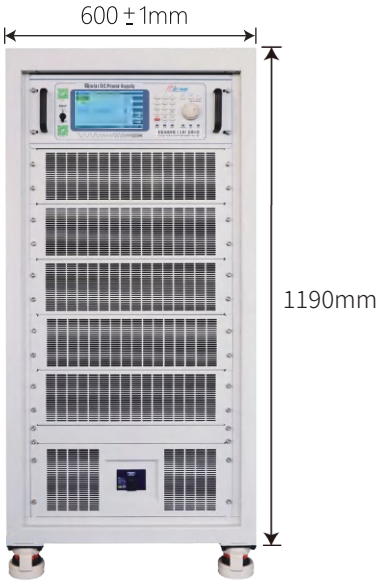
10U 440(W)*600(D)*445(H)mm

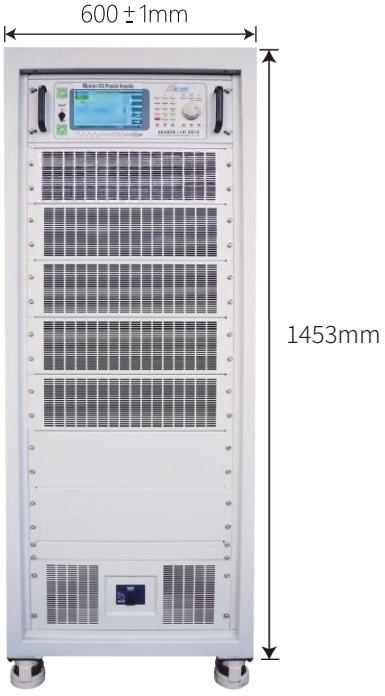


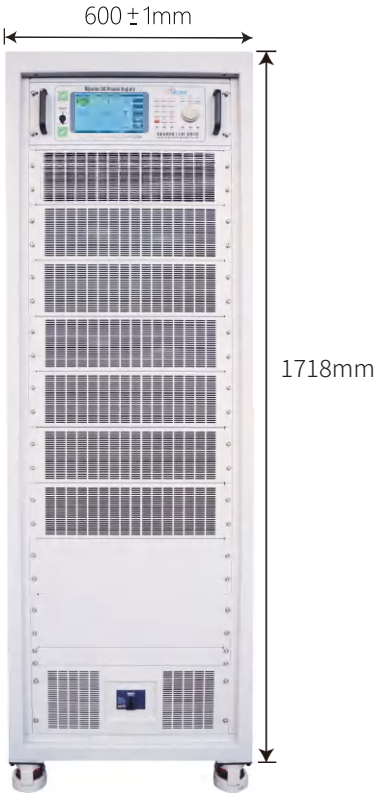
HY-BPSU Series Model Size

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



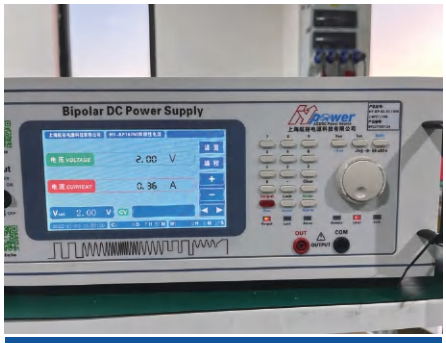




Customer Cases (Partial)

China FAW

Valeo



BYD

Zhejiang Tiancheng

Shanghai Zhefu Intelligent

Beijing Minmo Zhixing

BMW

NIO

Xiaomi Motors

Tianhua Lighting

Rothwell

Inovance

Official WeChat：hypower-cn

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Hangyu Power Automotive Electronic Testing Solution Manual, Version 05.00, February 2024

Authorized dealer: