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Ideal Power Solution

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BPS Series Bidirectional DC Power Supplies

- Wide range AC input: 342 ~ 528 V
- Power factor: > 0.99, THD < 3%
- Bidirectional energy flow, power supply and load integrated into one chassis with seamless switching for easy configuration.
- Single unit power: 15kW, expandable to 450 kW (support 30 units in parallel)
- Output DC voltage: 0-2250 V (multiple models optional)
- Automatic conversion of CV, CC, CP working modes.
- Multiple protection functions (OVP, OCP, OPP, OTP)
- IPS high resolution touch screen display, simple and convenient operation.
- Temperature control stepless speed regulation fan, low power consumption and low noise
- Optional communication interfaces: USB / RS232 / RS485 / CAN and others.
- Optional isolated analog interface.
- Built-in function generator.
- Built-in discharging circuit for safer operation.

Overview

The BPS series energy-fed programmable DC power supply is built on a bidirectional topology architecture design with a conversion efficiency up to 94.5%.

This series power supply adopts the latest high-bandwidth FPGA control and SiC power components with the highest output voltage up to 2250 Vdc, and the relevant technical performance and index can reach the international first-class product.

The power components of this power supplies adopt more than 5 times design redundancy to ensure the power supplies' own loss and heat generation in harsh environments and increase the reliability of continuous use.

The heat dissipation adopts temperature-controlled stepless speed regulating fan for active heat dissipation, and the air duct optimized by computer-aided design gives perfect heat dissipation, low wind resistance, low power consumption, and low noise.

This series bidirectional DC power supplies have multiple working modes of constant voltage, constant current, constant resistance and constant power, and power supplies of the same model support up to 30 units multi-unit parallel connection to realize output power expansion to meet the testing needs of different industries, together with complete protection functions and humanized design, this series bidirectional power supplies can meet the needs of different customers.

Many functions of this machine are equipped as standard, and subsequent software function upgrades are free.

Features

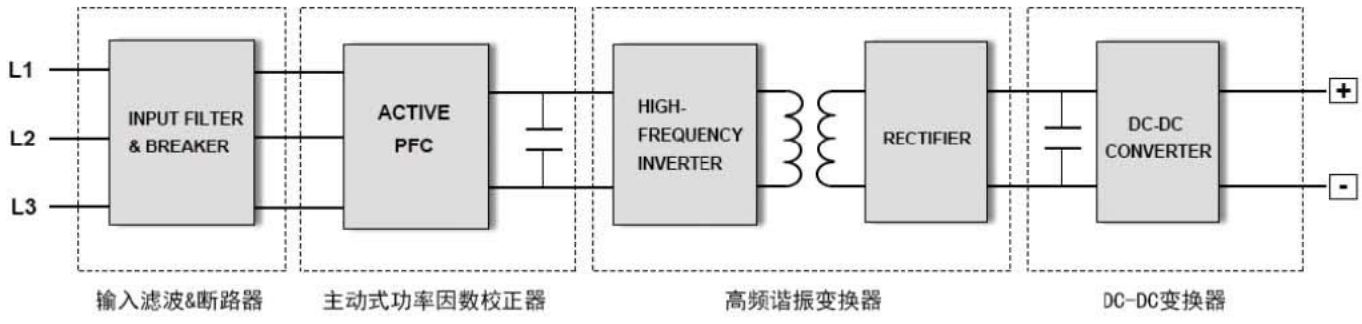
- Standard 19-inch 3U chassis, supports 19-inch standard rack installation.
- Using high-resolution true color IPS touch screen, with voltage and current adjustment knob and friendly HMI interface for simple operation
- Wide-range AC input voltage: 342 ~ 528V, suitable for various inputs.
- High input power factor and low THD, under rated conditions, power factor exceeds 0.99, THD<3%
- Single unit output power up to 15 KW with 3 times wide range output, ≤94.5% overall efficiency with high efficient energy feedback.
- The DC output voltage ranges from 0 to 2250Vdc.
- Three working modes of CV, CC, CP and can automatically switch among three modes to meet various needs
- Bidirectional flow ability, power supply + load integrated into one machine, easy configuration and automatic seamless switching conversion.
- With multiple protection functions (OVP, OCP, OPP, OTP)
- Front inlet and rear outlet ventilation duct design and temperature control speed active regulation fan for heat dissipation, low power consumption and low noise.
- Automatic sensing remote compensation function.
- Built-in function generator, follow-up software function free upgrade
- Built-in bleeder circuit, quickly released to safe voltage
- Optional RS232 / 485, LAN, USB communication interfaces.
- Optional isolated analog signal interface.

Applications

- Electric Vehicles and Energy Storage Microgrid power conversion test.
- Automotive Electronics Standard Test.
- PV array I-V curve test.
- Feeder network energy-saving aging test.
- Battery characteristic simulation / charge and discharge test.
- Charging pile test.
- Motor and drive test / Dynamometer bench.
- Fuel cell test.
- Power grid and other industries high voltage test.
- Military and R&D test.

Key technology introduction

Circuit topology

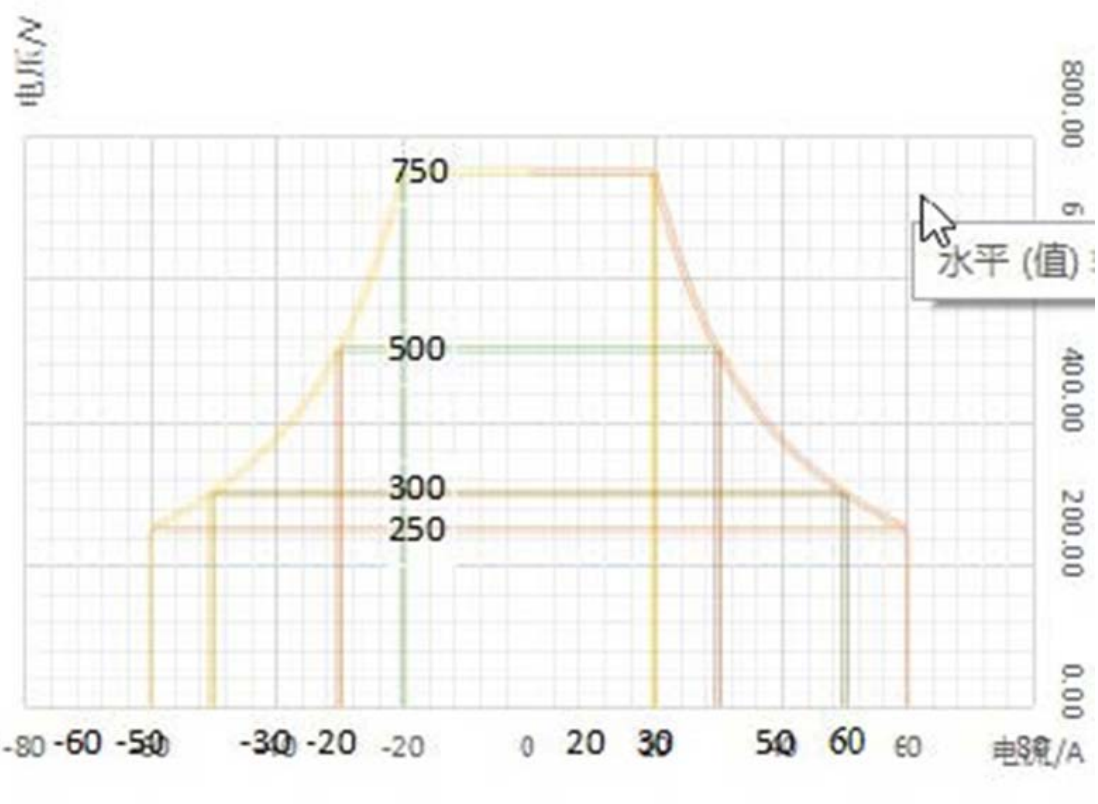


Featured functions

Wide range constant power output

(0~750V/60A/15KW, the schematic diagram is shown as below)

DC: Output or feedback rated power within the voltage range of 0V ~ 2250V, a single product can meet a wide range of application requirements.



Bidirectional energy flow

The programmable bidirectional power supply combines a power supply and an energy regenerable load. It has the characteristics of these two devices at the same time. It can not only work as a power supply,

but also can be used as a load. The two modes can achieve seamless switching without time delay.

Color TFT touch screen and dual-knob control

Embedded with a 4.3-inch color IPS touch screen, the setting value and status can be viewed on the LCD display, single-finger control of touch screen can realize the operation of all functions, and the dual-knob design makes the operation more convenient and accurate.

Automatic multi-unit parallel operation, master-slave mode operation

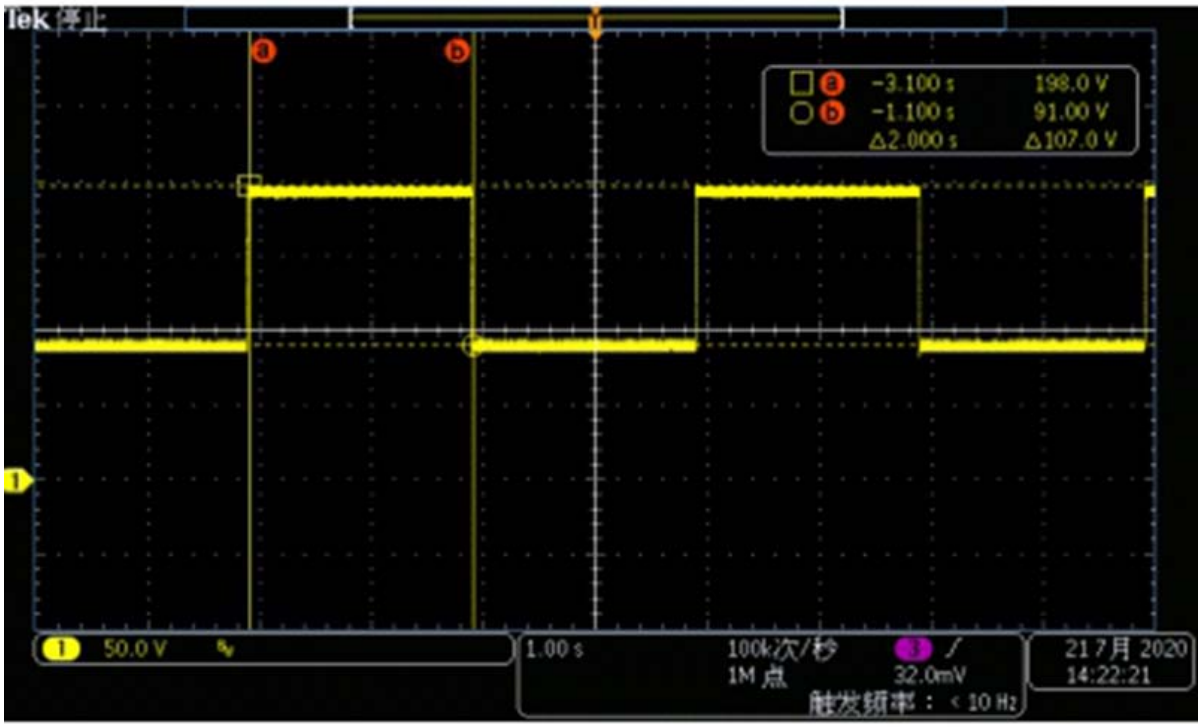
With digital master-slave bus, it can realize parallel operation of up to 30 units, automatic parallel operation with automatic selection of master-slave mode, under multi-unit parallel connection mode, the host unit realize the control of all units in parallel, and display the total voltage, total current and total power. And the host unit can be controlled manually or remotely.

High efficiency, high power factor (as shown in the efficiency curve below)

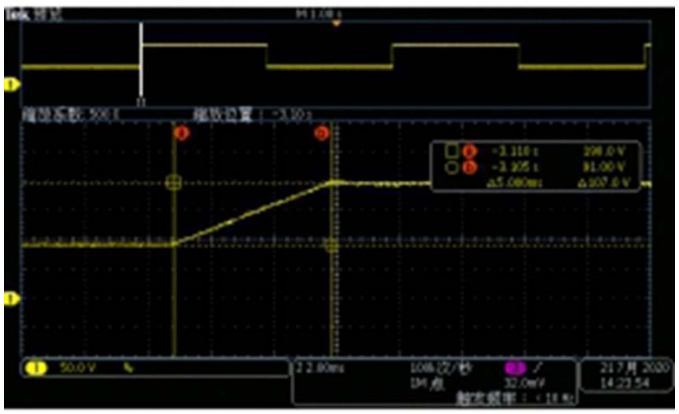
The highest efficiency can reach up to 94.5%, and the power factor under rated conditions is >0.99.

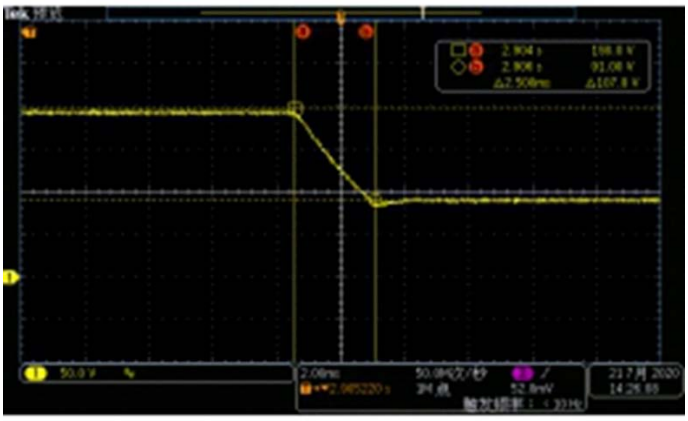
Built-in function generator

Built-in a function generator that can send out typical waveforms, it can achieve single or combined output of triangle / rectangular / trapezoidal / sine / step waveforms, and can expand test waveforms based on LV123, ISO 7637, ISO16750 and other related standards.



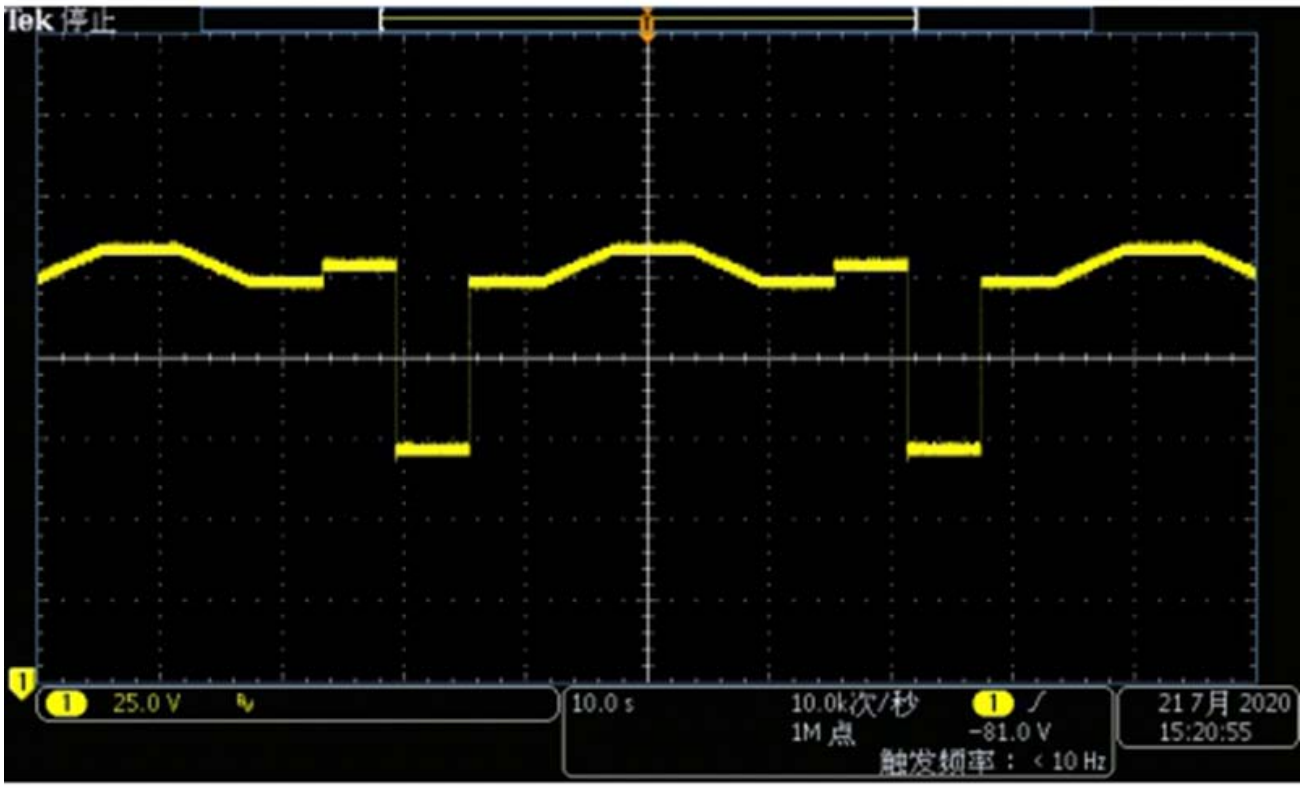
LV123 full-function working range test waveform



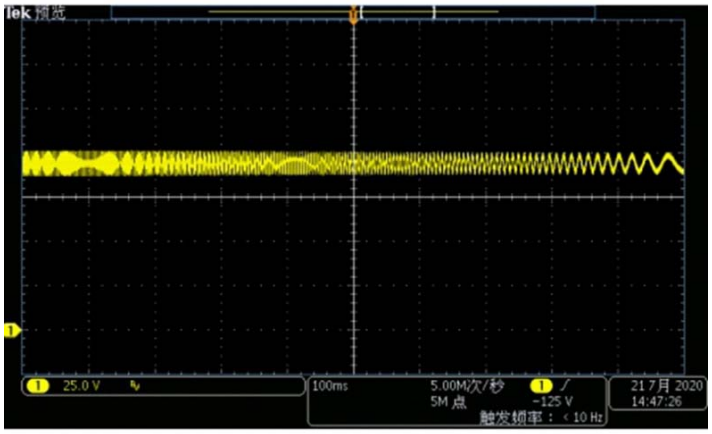


Rising edge

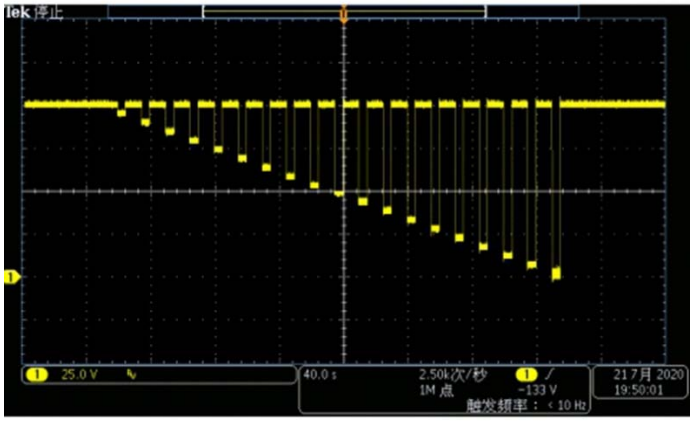
Falling edge



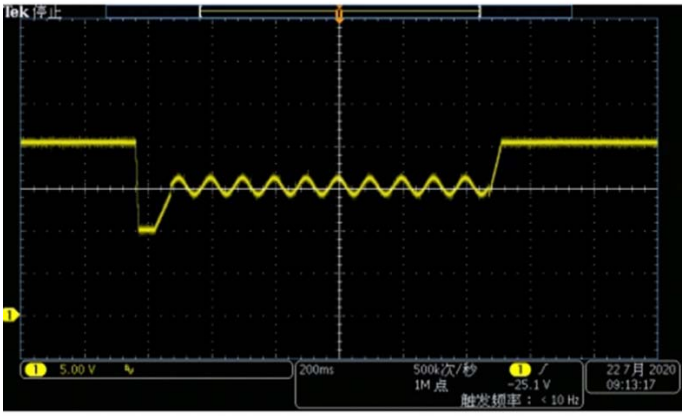
LV123 working range upper limit test waveform



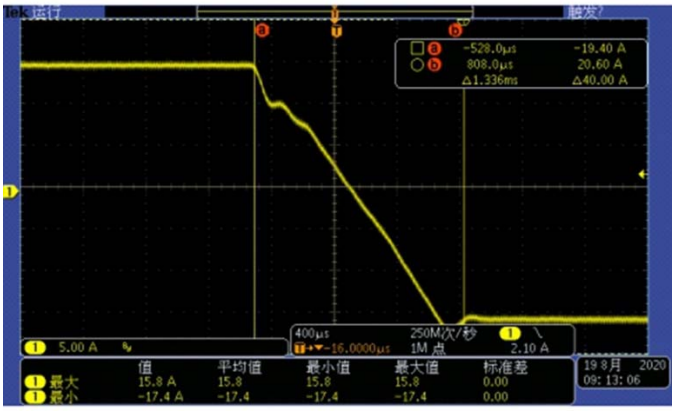
LV123 voltage ripple test waveform (ripple frequency range: 1HZ ~ 2KHZ)



ISO-16750-2-4.6.2 Voltage descent reset test waveform

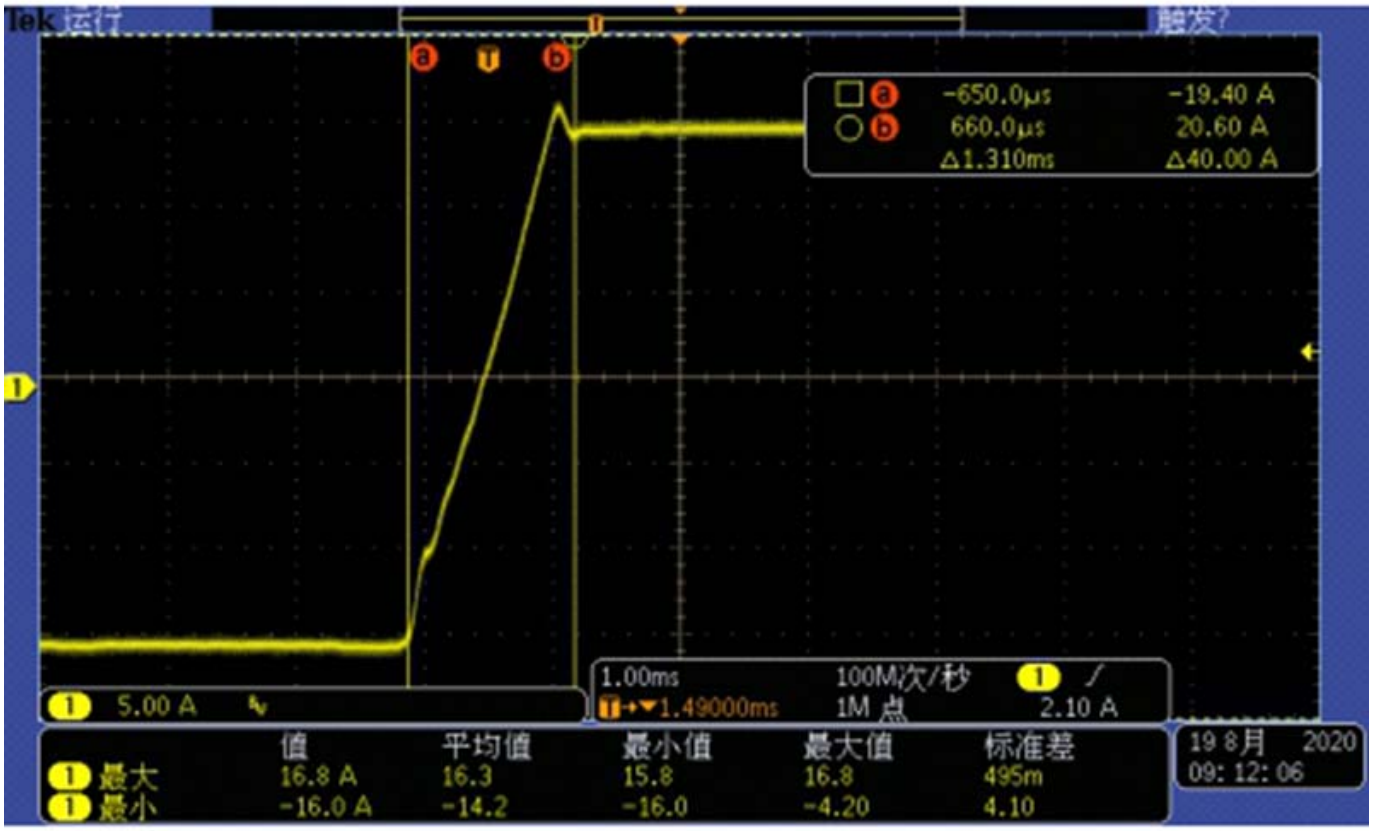


16750-2-4.6.3 Start-up state waveform



Single module forward 15A to reverse 15A

switching waveform (switching time <1.4mS)



Single module reverse 15A to forward 15A switching waveform (switching time <1.4mS)

Two-in-one bidirectional DC power supply with regenerable electronic load

Designed with bidirectional topology power supply architecture, it provides two quadrants with positive voltage/positive current and positive voltage/negative current operating ranges. It can be used as DC power supply or as a DC load for loading operation, and it could feedback absorbed energy to the grid, the conversion efficiency can be up to 94.5%.

This two-in-one bidirectional DC power supply also has the function as an energy feedback load and can be operated in constant voltage, constant current, and constant power working modes. Compared with traditional power supplies and loads, it has the advantages of small size, low energy loss, low heat dissipation and comprehensive testing functions.

With the popularization of electric vehicles, OBC on-board chargers run towards V2G (Vehicle to Grid), V2L (Vehicle to Load) and V2H (Vehicle to Home) through two-way charging and discharging with the grid management. The bidirectional DC power supply also provides a pure electronic load mode, with constant voltage (CV) / constant current (CC) / constant power (CP) modes, which can be used to simulate the charging behavior of the battery during the development and testing of on-board chargers. Only one device can meet the charging and discharging test of the bidirectional charger, unlike the traditional method, which requires a DC power supply and an electronic load.

Electric vehicle and energy storage microgrid power conversion test application

The rise of new energy PV / EV / Fuel Cell / Battery has become a market trend to replace traditional energy sources (coal, oil, etc.). However, a large number of grid connection requirements for electric vehicle operation and energy storage batteries will promote distributed energy storage microgrids commercialization more rapidly, along with the power conversion device moving towards bidirectional design, high efficiency, high voltage conversion and high-power density, combined with the rapid

development of battery application trends, thus prompting the demand for bidirectional DC power supply test equipment.

Battery simulator

The bidirectional DC power supply can be combined with battery simulation software to become a battery simulator, which can simulate the operation under different battery power (SOC) conditions or specific battery characteristics V-I curve for battery charging or discharging simulation testing of the DUT (power conversion device), it is suitable for product testing such as on-board chargers, energy storage devices or motor drives.

Motor and drive test

The bidirectional DC power supply can allow continuous and seamless conversion between the two quadrants of the source and the load without changing the output characteristics or causing damage. It is suitable for many bidirectional DC-DC / DC-AC battery charging and discharging tests requiring fast charge-discharge conversion time. For the transient response ability of the current direction change, it has a high-speed transient response time, and the output voltage can be stabilized within 2ms.

When testing the acceleration and braking behavior of the motor driver on road conditions, the conversion between the battery system and the power system will result in the supply and recharging of electric energy. The dual-quadrant high-speed transient response characteristics can simulate the battery, convert according to the actual motor power demand and supply a stable voltage, and allow the current recharging when braking.

Automotive electronic standard test

The power supply has a built-in waveform generator, which can be expanded to achieve standard waveforms such as ISO 16750-2, ISO 7637, LV123 and LV 148. With the host computer software, one-key

operation output test can be realized.

Photovoltaic inverter test

With optional MPPT function, the bidirectional power supply can simulate photovoltaic array (solar cell I-V curve), used for photovoltaic inverter MPPT point tracking test and aging test.

The I-V curve can be automatically generated by setting the corresponding parameters, and support parallel expansion of the same model models.

Specifications

General Parameters

Input	Phase	Three-phase
	Voltage	380Vac / 400Vac / 480Vac (-10% / +15%)
	Frequency	45 ~ 65Hz
	Power Factor	> 0.99
Protection	Over Temperature, over voltage, over current, over power and grid failure protection.	
Size	483*133*775 (W*H*D) (mm)	
Power Rating	Single-unit: 10KW / 15KW optional	
Voltage Range	0V ~ 2250V	
Current Range	-360A ~ 360A	

15KW Low-Medium Voltage Models Specifications

Model	BPS15-60-360	BPS15-80-360	BPS15-20-210	BPS15-360-120	BPS15-500-90	BPS15-750-60
Power	15000W	15000W	15000W	15000W	15000W	15000W
Voltage Range	0~60V	0~80V	0~200V	0~360V	0~500V	0~750V
Current Range	-360A~360A	-360A~360A	-210A~210A	-120A~120A	-90A~90A	-60A~60A
Voltage Ripple	≤320mVpp ≤25mVRMS	≤320mVpp ≤25mVRMS	≤300mVpp ≤40mVRMS	≤320mVpp ≤55mVRMS	≤350mVpp ≤70mVRMS	≤800mVpp ≤200mVRMS
Voltage Accuracy	<0.1%UMax	<0.1%UMax	<0.1%UMax	<0.1%UMax	<0.1%UMax	<0.1%UMax

Current Accuracy	<0.2%IMax	<0.2%IMax	<0.2%IMax	<0.2%IMax	<0.2%IMax	<0.2%Imax
Efficiency	≤94.5%	≤94.5%	≤94.5%	≤94.5%	≤94.5%	≤94.5%
15KW High Voltage Models Specifications						
Model	BPS15-1000-40		BPS15-1500-30		BPS15-2250-20	
Power	15000W		15000W		15000W	
Voltage Range	0~1000V		0~1500V		0~2250V	
Current Range	-40A~40A		-30A~30A		-20A~20A	
Voltage Ripple	≤1600mVpp ≤300mVRMS		≤2400mVpp ≤400mVRMS		≤3200mVpp ≤500mVRMS	
Voltage Accuracy	<0.1%UMax		<0.1%UMax		<0.1%UMax	
Current Accuracy	<0.2%IMax		<0.2%IMax		<0.2%IMax	
Efficiency	≤94.5%		≤94.5%		≤94.5%	

Reference Photos

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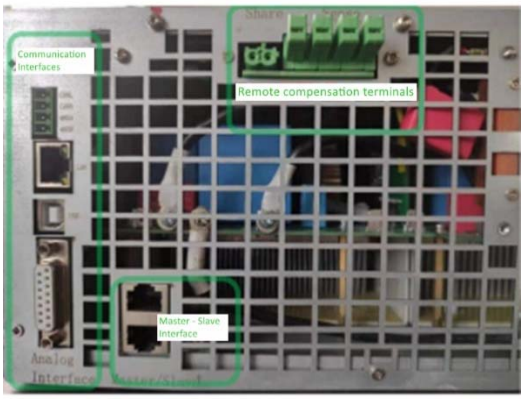

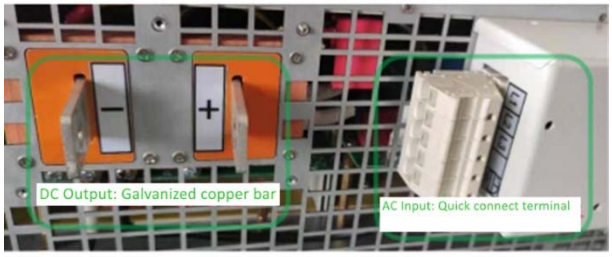

Installation environment

- Ambient temperature: Please have the power source working in safe temperature range (0℃ ~ 45℃) or it would affect life of power source.
- Please install the power source at least 50cm distant from surroundings to have better ventilation.
- Please install the power source away from vibration (less than 0.6G), especially equipment like puncher.
- Keep the power source away from direct sunshine, humidity or place with water globule.
- Keep the power source from corrosive, flammable & explosive gas.
- Keep the power source away from oil stain, dust & metallic dust.