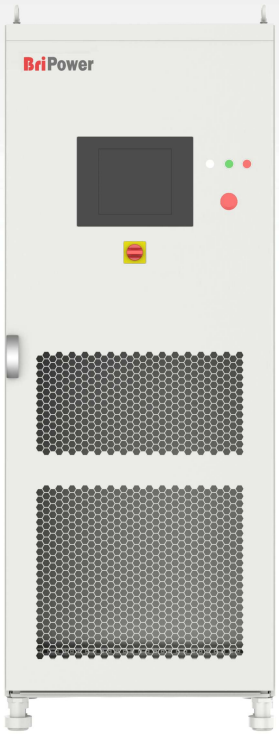
ESD SERIES HIGH-POWER DC POWER SUPPLY



The ESD Series is an IGBT-based, PWM switching DC power supply, offering fully configurable output power, voltage, and current ranges.

Delivering up to 10MW and 50kV, the ESD Series meets the needs of highpower applications and, the bidirectional -R option enables battery simulation for new energy testing. The Dual DSP+FPGA design enables both high precision and rapid response. It provides a fine control resolution of 0.1ms for precise output adjustment, coupled with fast dynamic performance.

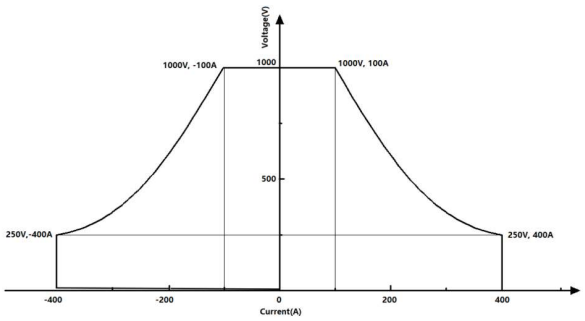
The ESD Series ensures high reliability through multi-level monitoring and protection for key components, communication, and the over all system.

Features

- Configurable power, voltage and current ranges
- Maximum output power: 10 MW
- Maximum output voltage: 50 KV
- Master-slave parallel for power expansion
- Operating Modes: Constant Current (CC), Constant Voltage (CV), Constant Power (CP), and Constant Resistance (CR)
- Voltage and current sequences programmable via GUI
- Built-in soft-start function effectively suppresses inrush current during startup
- Configurable as a bidirectional DC power supply (-R option), operating in two quadrants for new energy testing (e.g.battery simulation)
- Configurable for fast dynamic response: Current rise time (0%-90%) < 1 ms
- Configurable as an energy regenerative DC load function (-LD option)
- PV simulation (-PV option)
- Low-voltage operation mode (-ZV option): Capable of full current output down to 0.4 V
- Optional air cooling or water cooling for heat dissipation
- Configurable output insulation monitoring function(-INS option)
- Standard interfaces: LAN and RS485
- Optional interfaces: CAN, Analog Input/Output
- Communication protocols: Modbus/SCPI
- Output terminal equipped with output switch
- Remote sensing function

Automatic wide range output

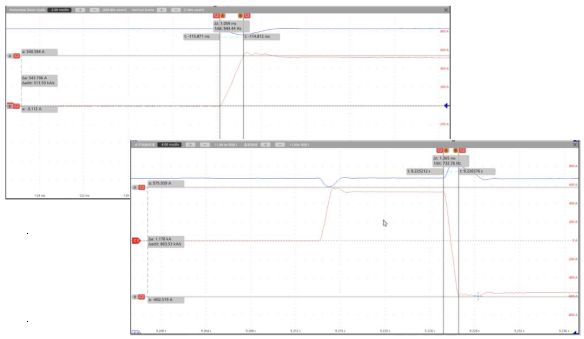
ESD series DC power supply has an automatic wide-range output function. Under the condition of rated output power, the output range of voltage/current can be adjusted, such as: high-voltage small current or lowvoltage large current (also applicable in sink power mode). The same type of power supply can cover a wider range of power applications. ESD standard models provide x1/x3/x4 current. For customized power/voltage/ current, please consult the factory.



Fast current rising

ESD Series has excellent dynamic performance of current rising, which makes it ideal for battery test and battery simulation. Two versions are provided, and current rise time of each version is different (below waveforms are take ESD 200-600-600-R-BSS for example).

Current Rise Time (0~90%)	<3ms (std), <1ms (BSS Option), <10ms (HPD Option)
Current Rise Time (-90~90%)	<5ms (std), <2ms (BSS Option) , <20ms (HPD Option)
Voltage Regulation Time(0-100% Load change)	<3ms (std), <1.5ms (BSS Option), <10ms (HPD Option)



Bi-Directional (Re-generative) (-R option)

With the -R option, the unit can operate in source and sink mode. It has the capability to return the energy fully back to the grid.

Re-generative DC Load (-LD option) [1]

ESD series with -LD option can be used as regenerative DC electronic load. DC load simulation includes constant current, constant resistance, constant voltage, and constant power modes.

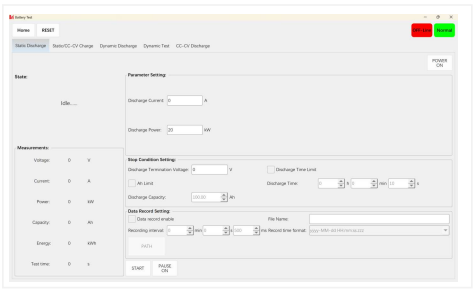
Low Voltage Operation Mode (-ZV option)

ESD series DC electronic load with -ZV option can produce large current that meets the requirements under the input condition close to 0.4V, which can evaluate the electrical characteristics of the fuel cell (such as VI), etc.

1. The -LD option must be used in combination with the -R option.

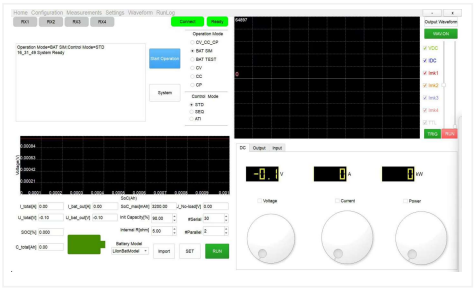
Battery Test

ESD series DC power supply can be used for characterization of power battery packs. It is used to test the charging and discharging performance, temperature rise characteristics, and cycle life of the power battery pack. Through the GUI software, different charging and discharging profiles can be programmed, and test results are displayed in real time.



Battery Simulation (-BSS option)

ESD Series DC power supplies provides GUI software to simulate the charging and discharging characteristics of the power battery pack/package and it provides battery simulation software, which can simulate different types of batteries, lithium-ion batteries, etc., supporting multiple parameter settings, including: battery capacity, the number of cells in series and parallel, the state of charge, etc.



PV Simulation (-PV Option)

With -PV option, ESD series power supplies can be used to simulate IV curves of various solar panels, under various temperature and irradiance condition, and conduct static and dynamic MPPT tests according to EN 50530:2010. MPP update rate: 200Hz. Irradiance levels: 0 ~1500W/m². Temperature: -10~+100°C. Temperature coefficient: +1%~-1%/°C.



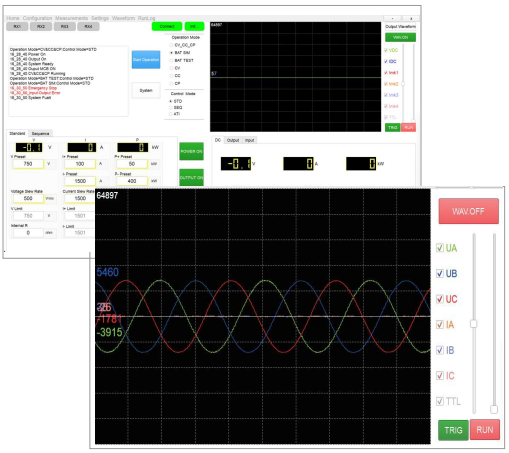
Isolated dual channels output (-2X option)

The output consists of two isolated channels, which operate as independent channels. The dual channels support parallel connection, series connection, or function as a three-port bidirectional DC source.

Graphical User Interface

GUI software is installed in front touch panel, which uses Windows OS. The software provides following functions:

- Output settings and limits
- Sequence output settings
- Display measurements: voltage, current, power, etc.
- Capture, display and save output voltage and current waveforms
- Display power source faults



General Specification (customized unit specification will be shown in the proposal)

Input	
AC input Voltage	3P+N+PE, 380VLL±10%(std)
Frequency	47~63Hz
Efficiency	≥90%
Power Factor	0.95
THDi	≤3%
Output	
Output Modes	CV,CC,CP and CR
Power Level	Up to 500kW in single controller, customized to 4MW and above
Voltage Ranges	Up to 2000V
Current Ranges	Please refer to the Standard Models Specification
Load Regulation	0.1%FS
Line Regulation	0.1%FS
Voltage Ripple	0.1%FS; 0.05%FS@2000V; 0.2%FS (HPD Option)
Stability	0.1%FS
Current Rise Time (0~90%)	<3ms (Std),<1ms (BSS Option),<10ms (HPD Option)
Current Rise Time (-90~90%)	<5ms (Std),<2ms (BSS Option),<20ms (HPD Option)
Voltage Regulation Time (0-100% Load change)	<3ms (Std),<1.5ms(BSS Option),<10ms (HPD Option)
Power Accuracy	0.3%FS
Voltage Accuracy	0.1%FS
Current Accuracy	0.1%FS
Power Resolution	0.02KW (~100KW), 0.1KW (100KW~500KW)
Voltage Resolution	0.05V (~800V), 0.1V (800V~2000V)
Current Resolution	0.05A (~800A), 0.1A (800A~1600A), 0.2A (1600A~3200A)
Over Current	120%, 60 seconds

Measurements	
Measurement accuracy Power	0.3%FS
Measurement accuracy Voltage	0.1%FS
Measurement accuracy Current	0.1%FS
Others	
Standard Interface	LAN/RS485
Optional Interface	CAN/ATI/RS232
Protection	OVP, OCP, OPP, OTP
CE Conformity	EN 62040-1, EN 62040-2
Cooling	Air Cooling
Temperature	Operating: 0~40°C Storage: -20~85°C
Operating Humidity	20-90%RH (None Condensing)

Note: Other Power/Voltage Level can be offered. Please consult factory
Total weight < 1400KG, the cabinet bottom is wheel structure; otherwise, it is channel steel structure

Options

-232	RS232 program interface
-LD	Regenerative DC load function
-R	Regenerative mode
-ATI	Analog control interface (0~5V)
-BSS	Hardware and software for Battery simulation
-CAN	CAN-bus program interface
-PV	Hardware and software for PV simulation
-ZV	Low Voltage Operation Mode
-W	Use water-cooling
-INS	Output terminal insulation monitoring function
-CH(X)	x channels output
-HPD	High power device, Please consult factory
-2X	Isolated dual channels output

AC Input Configuration[2]

Please specify the input voltage (L-L)

/380, Input Voltage 380VLL±10%, 3P+N+PE/3P+PE

/400, Input Voltage 400VLL±10%, 3P+N+PE/3P+PE

/480, Input Voltage 480VLL±10%, 3P+N+PE/3P+PE

2. Other AC input is available, please consult factory.

Model Configuration

ESD AAA-BBB-CCC-DDD/EEE

AAA: Power, kW

BBB: Voltage range, V

CCC: Current range, A

DDD: Option

EEE: Input configuration