

ET System LAB/SLV1

Bi-directional DC Source

Battery Simulator

- From 30 kW to 2 MW
- Seamless transition between charging and discharging modes
- Output voltage up to 2000V, higher voltage can be customized
- Program accuracy up to 0.1%
- Current rise time (10%~90%) < 1ms
- 4 operating modes: CV, CC, CP and CR
- Regenerative DC electronic load function (-LD option)
- Hardware & software for PV Simulation (-PV option)
- Low voltage operation mode(-ZV option)
- Standard support 4 master-slave control(-MS option)
- TFT touch screen based on Windows system, can run full functional software as PC
- Emergency stop button in the front panel
- Indicator lights for operating status
- Remote sense
- Output contactor
- Switchable insulation monitoring
- Mod-bus/SCPI protocols
- CE conformity
- Customized voltage, current and power ranges



Overview

The ET System LAB/SLV1 series is IGBT PWM switching DC power supply, which contains multi output power levels from 30kW to 500kW for single system, up to 4 individual systems can be paralleled to up to 2MW system.

Output power level of customized system goes up to 4MW and above. LAB/SLV1 series uses bi-directional design, which makes it possible to be used as DC power source or regenerative DC load. CV/CC/CP/CR operation modes are available for both sourcing and sinking.

With touch panel on the front panel, user can control the power source with GUI software. System status indicators and emergency stop button are also installed on the front panel. Programming interfaces including RS485 and LAN interfaces are standard, and optional RS232, CAN, analog interfaces are available for automated test applications.

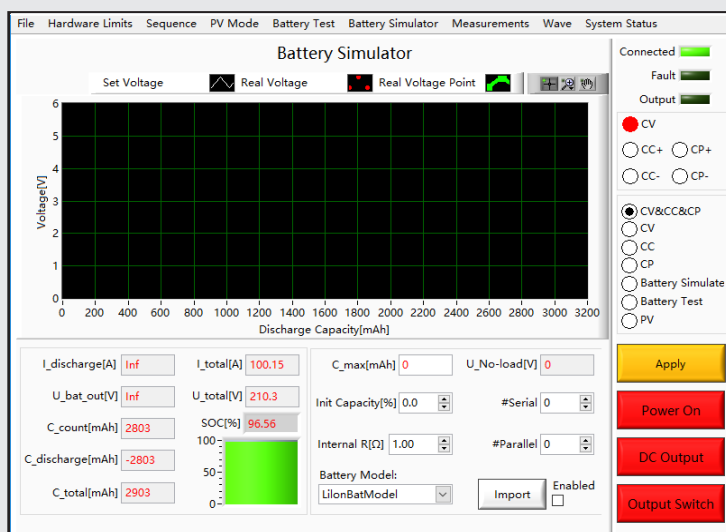
Battery Simulation

As an advanced battery simulator, bidirectional DC power supply of ET System LAB/SLV1 series can not only cover the full range of battery charge and discharge voltage and current, reproduce the accuracy of the charge and discharge curve, but also simulate all the features of the electrochemical storage elements in any charge or discharge activity.

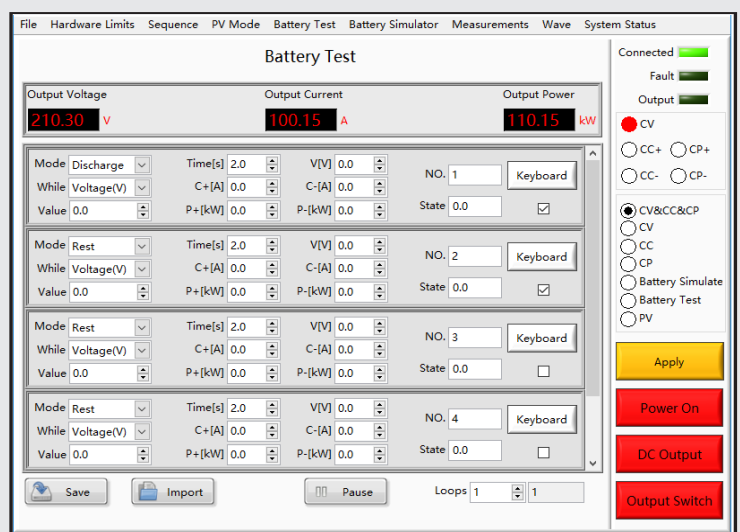
LAB/SLV1 series provides battery simulation software, which can simulate different types of batteries, lithium-ion batteries, lead-acid batteries, nickel-cadmium batteries, nickel-metal hydride batteries, etc., supporting multiple parameter settings, including: battery capacity, the number of cells in series and parallel, the state of charge, etc.

Battery Test

The ET System LAB/SLV1 can also perform as a charger or discharger of battery, usually it is used to test cycle life, capacity, performance of charge & discharge. LAB/SLV1 supports multiple parameter settings, including: charge/discharge type, value of charge/discharge mode, terminating condition of charge/discharge, the value of termination condition and rest time, etc.



Battery Simulation



Battery Test

Re-regenerative DC Load

LAB/SLV1 series with -LD option can be used as regenerative DC electronic load. DC load simulation includes CC, CV, CP and CR modes. DC load simulation can be used for fuel cell and battery testing. It can be calibrated for source mode or load mode. The voltage and current accuracy will be out of specification if it works in un-calibrated mode. For example, if it is calibrated for source mode, while used as load, the accuracy will **NOT** be as good as the output specification.

Low Voltage Operation Mode

DC electronic load with -ZV option in LAB/SLV1 series can be used to measure internal impedance of fuel cell. Users select the constant current operation mode and set the DC current test point, adopting the current interrupt method to quickly interrupt the current, measuring the ratio of the changed voltage and current, as a result the magnitude of the impedance can be determined. LAB/SLV1-ZV can produce large current that meets the requirements under the input condition close to 0.4V, which can completely evaluate the electrical characteristics (such as VI) of the fuel cell.

PV Inverter Test

Simulation of PV arrays can be done with LAB/SLV1-PV. The equipment can be used to simulate IV curves of various solar panels, under various temperature and irradiance condition, and to test the MPPT characteristics according to EN 50530:2010.

I-V Curve Setting

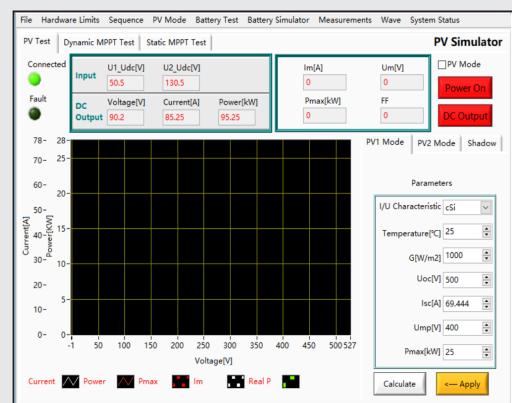
I-V curves are created by entering simple parametric data. Each curve consists of 1024 data points. Irradiation level or temperature can be modified to test the behavior of a grid tied inverter under realistic conditions for cloud shadowing and panel temperature rise. There are three methods for setting I-V curve, such as PV1, PV2 and Shadow.

Dynamic MPPT Test

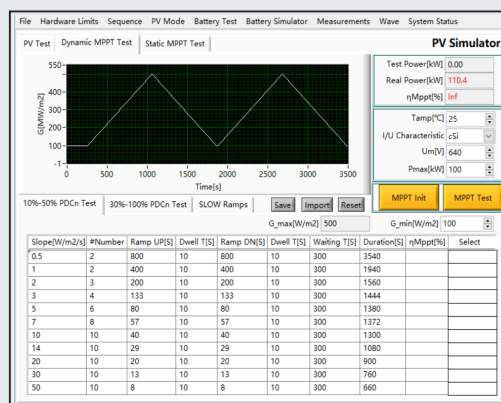
Multiple IV curves can be stored and performed in sequence, and time for each step can be modified individually.

Static MPPT Test

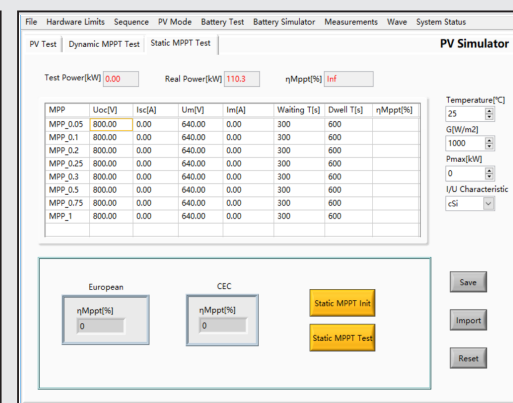
According to EN 50530:2010, the measurement of the static MPPT efficiency must be performed with test specifications as defined in Table 1 in the third section of fourth chapter. These parameters can be set to the actual values required.



I-V Curves Settings



Dynamic MPPT Test



Static MPPT Test

Model Configuration

<u>LAB/SLV1</u>	<u>AAA</u>	<u>-BBB</u>	<u>-CCC</u>	<u>-DDD</u>	<u>/EEE</u>
Series Models	Power, kW	Voltage, V	Current, A	Option	Input configuration

Options

-232	RS232 program interface
-CAN	CAN-bus program interface
-ATI	Analog control interface
-LD	Regenerative DC load function
-ZV	Low voltage operation mode
-PV	Hardware and software for PV Simulation
-MS	Master-Slave interface

AC Input Configuration

3 x 208 V (L-L) $\pm 10\%$

3 x 230 V (L-L) $\pm 10\%$

3 x 380 V (L-L) $\pm 10\%$

3 x 400 V (L-L) $\pm 10\%$

3 x 480 V (L-L) $\pm 10\%$

Specification

Input Voltage	L-L: 380V, 3P+N+PE, 47-63 Hz
Efficiency	$\geq 90\%$
Power Factor	≥ 0.95
Voltage Programming Accuracy	0.1 % F.S.
Current Programming Accuracy	0.3 % F.S.
Power Programming Accuracy	0.3 % F.S.
Voltage Programming Resolution	0.05 V (~800V), 0.1 V (800~1500V)
Current Programming Resolution	0.05 A (~800A), 0.1 A (800~1600A), 0.2 A (1600~3200A)
Power Programming Resolution	0.02 kW (~100 kW), 0.1 kW (100~500 kW)
Measurement Accuracy DC Voltage	0.1 % F.S.
Measurement Accuracy DC Current	0.3 % F.S.
Ripple & Noise	<0.1 % rms
Line Regulation	0.1 % F.S.
Load Regulation	0.1 % F.S.
Stability	0.1 % F.S.
Over Current	120%, 60s
Current Rise Time (10%~90%)	< 1 ms
Current Rise Time (-90%~90%)	< 2 ms
Regulation Time (0-100% Load change)	< 1.5 ms
OVP	0~110% U_{max}
OCP	0~120% I_{max}
Protection Type	IP 20
Isolation between Line to Chassis	20M Ω , 1kV
Output to Chassis	20M Ω , 1kV
Sens Voltage Rise	2 % F.S.
Temperature	Operating: 0~40°C Storage: -20~85°C
Cooling	Forced Air Cooling
Protection	OVP, OCP, OTP
Regulatory	CE Conformity
Operating Humidity	20-90%RH (None Condensing)
Standard Interface	LAN and RS485
Optional Interface	CAN, RS232 and ATI

Note: 1. Specifications are subject to change without notice.

2. Specifications are warranted over an ambient temperature range of $25^{\circ} \pm 5^{\circ}$ C.

3. Customized power/voltage/current output is available.

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