ACTIONPOWER

Perfect DC Source & Load

PRO series

12V to 2000V, 100kW to 5MW

Programmable Bidirectional DC Power Supply

actionpowertest.com

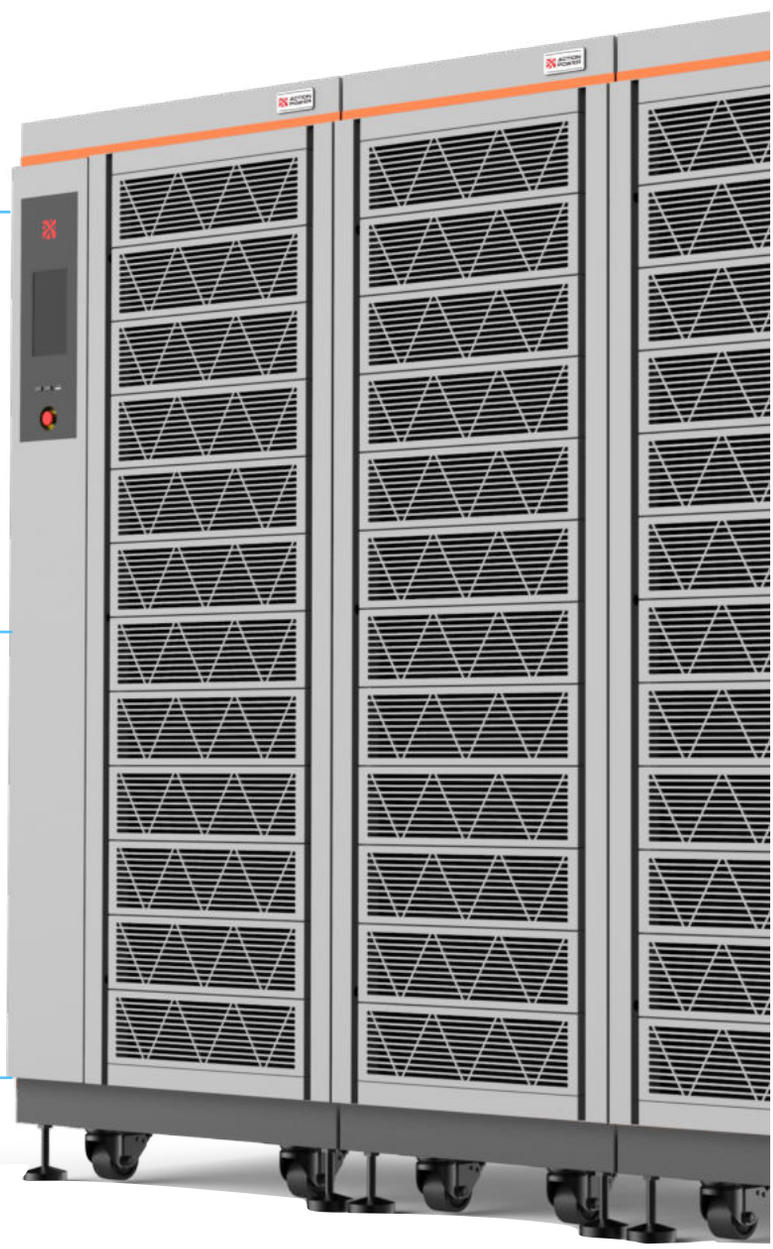
HIGH POWER CAPACITY
WITH PARALLEL OPERATION

With 100kW - 750kW of unit capacity, the total capacity can be expanded up to 5MW by series-parallel connections.

2000V
MAXIMUM DC OUTPUT VOLTAGE

5MW
MAXIMUM DC OUTPUT POWER

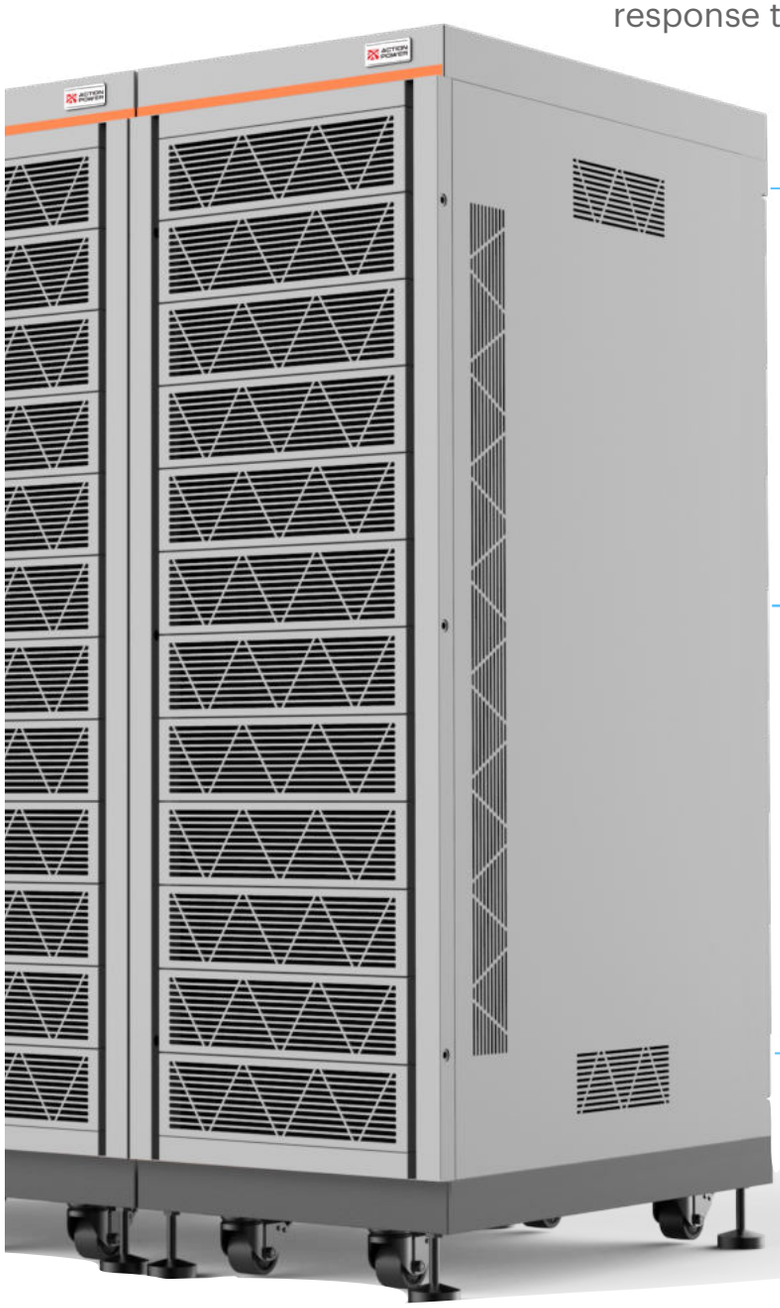
MULTI-
OUTPUT MODE



Multiple DC power supply cabinets can individually operate in single mode to configure multi-channel output, or in Master/ Slave mode to configure single-channel output with combined capacity.

SIMULATION FUNCTION
WITH HIGH PERFORMANCE

PRO series provide real-time battery and PV simulation function with fast response time of less than 1 ms



BATTERY
SIMULATION

PV
SIMULATION

ELEC-
TRONIC
LOAD

PRO series provide grid-regenerative DC electronic load function, which is applicable for testing fuel cell stack or fuel cell engine system, etc.

Ratings, types and voltages

PRO series Battery Simulator

Model	Power [kW]	Output Voltage [V]	Output Current [A]	Size (WDH) [mm]	Weight [kg]
PRO-D10-2002	±100	20-2000	±200	800x1000x1950	600
PRO-D20-2004	±200	20-2000	±400	800x1000x1950	800
PRO-D30-2001	±300	20-2000	±600	1400x1000x1950	1,310
PRO-D40-2001	±400	20-2000	±800	1400x1000x1950	1,510
PRO-D50-2001	±500	20-2000	±1000	1400x1000x1950	1,710
PRO-D60-2001	±600	20-2000	±1200	2000x1000x1950	2,220
PRO-D70-2001	±700	20-2000	±1400	2000x1000x1950	2,420
PRO-D75-2001	±750	20-2000	±1500	2000x1000x1950	2,520
PRO-D10-1203	±100	12-1200	±300	800x1000x1950	600
PRO-D20-1206	±200	12-1200	±600	800x1000x1950	800
PRO-D30-1209	±300	12-1200	±900	1400x1000x1950	1,310
PRO-D40-1212	±400	12-1200	±1200	1400x1000x1950	1,510
PRO-D50-1215	±500	12-1200	±1500	1400x1000x1950	1,710
PRO-D60-1218	±600	12-1200	±1800	2000x1000x1950	2,220
PRO-D70-1221	±700	12-1200	±2100	2000x1000x1950	2,420
PRO-D10-0706	±100	10-700	±600	800x1000x1950	600
PRO-D20-0712	±200	10-700	±1200	800x1000x1950	800
PRO-D30-0718	±300	10-700	±1800	1400x1000x1950	1,310
PRO-D40-0724	±400	10-700	±2400	1400x1000x1950	1,510
PRO-D50-0730	±500	10-700	±3000	1400x1000x1950	1,710
PRO-D60-0736	±600	10-700	±3600	2000x1000x1950	2,220
PRO-D70-0742	±700	10-700	±4200	2000x1000x1950	2,420
PRO-D75-0745	±750	10-700	±4500	2000x1000x1950	2,520

Technical data

PRO series	Specification
AC Input	
Voltage, Phases	380V±15%, 3ph+PE
Frequency	47Hz to 63Hz
Power Factor	0.96 @ full load
Efficiency	94.2%
DC Output Voltage	
Setting resolution	±0.01V
Accuracy	±0.1% F.S.
Ripple	1.5Vrms
Voltage slew rate	1000V/ms
Voltage rise time	≤2ms
DC Output Current	
Setting resolution	0.01A
Accuracy	±0.1% F.S.
Rise time	≤1ms (10%~90% rated current)
Switching time	≤2ms (-90% to +90% rated current)
DC Output Power	
Set resolution	0.001kW
Accuracy	±(0.1% Setting +0.1%F.S.)
Battery Simulation	
Battery type	Simulate various battery types including lithium manganese oxide, lithium cobalt oxide, lithium iron phosphate, nickel-metal hydride, ternary lithium, lithium titanate, and lead-acid batteries. Customizable battery types with open 1-stage, 2-stage, and 3-stage RC battery models.
Parameter	Series Count, Parallel Count, Initial SOC (State of Charge), Initial Temperature, Internal Resistance, Cell Capacity, and other parameters
Data input	Import of CSV user-defined model is supported
Update rate	200μs

Technical data

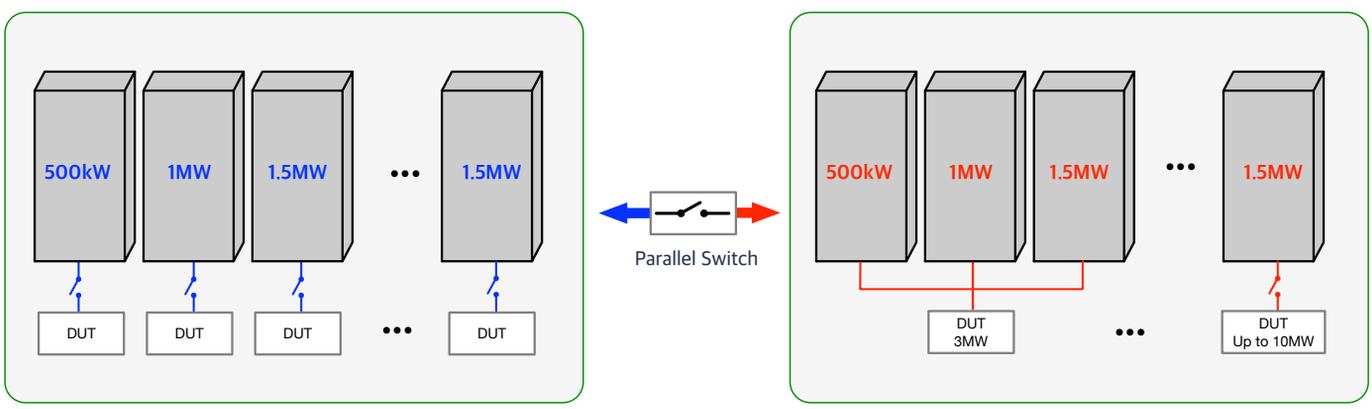
PRO series	Specification
I-V Curve	
Open-Circuit V oltage Setting Range	Full Voltage Range Adjustable
Short-Circuit Current Setting Range	0A～Ie
Simulated Fill Factor Range	0.3 - 0.95
Photovoltaic Panel Type Selection	c-si, Thin-film, Customization
I-V Curve Update Rate	Typical Time: 1 ms, with Online Curve Switching Function
I-V Curve Standard	Sandia, EN50530, Simple
I-V Curve Function	Static Curve; Curve Scanning; Static Sequence; Static MPPT; Dynamic MPPT; Weather Simulation; Shadow Masking; Curve Programming; Custom Curves, etc.
Curve Setting	Custom IV Curve settings can be configured using parameters such as Voc (Open-Circuit Voltage), Isc (Short-Circuit Current), FF (Fill Factor), and Pm (Maximum Power).
	Dynamic operating mode accounts for environmental factors such as temperature changes and irradiance, and can continuously output IV Built-in EN50530/Sandia Dynamic I-V Curve Testing Programs under different environmental conditions.
	Built-in EN50530/Sandia Dynamic I-V Curve Testing Programs
Resistor Parameters	
Range	0.5-3000 Ω
Accuracy	± (0.1%Setting+0.2% F.S.)
Resolution	0.01 Ω
Programmable	
Mode	List, Wave, Step, Advanced
Step	200
Cycle Range	0~9,999,999
Time Range	0ms-999s
Minimum Programming Time Step	100 μs
Edit Mode	Add, Delete, Import, Export
Running Mode	Load, End, Trigger

Technical data

PRO series	Specification
Measurement	
Voltage accuracy	±0.1% F.S.
Voltage resolution	0.01V
Current accuracy	±0.1% F.S.
Current resolution	0.01A
Power accuracy	±(0.1% Reading +0.1% F.S.)
Power resolution	0.01kW
Others	
Protection	Input under-voltage/over-voltage/over-frequency/phase loss protection Output over-voltage/over-current/over-power/over-temperature protection
Interface	USB, LAN, RS485, CAN
Multi-function Interface	“Anyport”, see the user manual for more details
Control and Display	Local touchscreen control, remote host control; display voltage, current, frequency, power.
Cooling Mode	Air cooling
Noise	≤70dB
Operation Temperature	-10°C～50°C
Humidity	10% ~ 90% RAH
Altitude	≤2000m

High Power Scalable Design

PRO series supports large-scale parallel expansion and stable power supply, which enables capacity expansion up to 5MW by connecting in parallel in 750MW increments from 50kW minimum through high-speed optical fiber communication method. In particular, parallel connected panels can be used in multi-output mode by separating outputs according to user needs, enabling multiple test equipment to be tested at the same time, maximizing user convenience and saving costs.

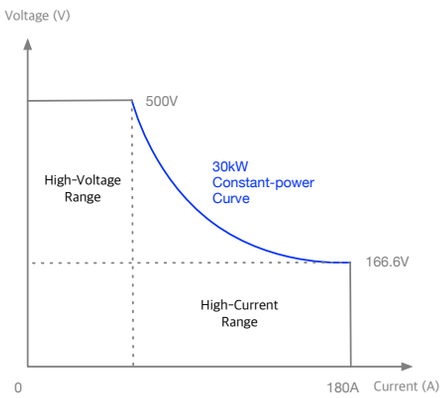


Multi-Output Mode

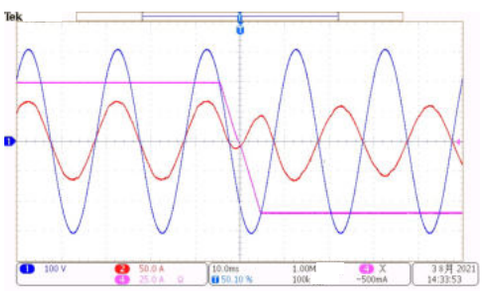
Parallel Mode

	2000V	1200V	700V
	100kW-200kW 200A-400A	100kW-200kW 300A-600A	100kW-200kW 600A-1200A
	300kW-500kW 600A-1000A	300kW-500kW 900A-1500A	300kW-500kW 1800A-3000A
	600kW-750kW 1200A-1500A	600kW-700kW 1800A-2100A	600kW-750kW 3600A-4500A

Auto ranging



The auto ranging function automatically controls voltage and current through the programmable DC power supply to maintain the rated output over a wide operating range. That is the higher voltage is available at lower current, and vice versa, allowing the DUT to be tested under different voltage/current conditions with a single DC power supply.



In addition, it supports smooth and ultra-fast automatic switching with the bidirectional Automatic “source” & “load” function. The overshoot of voltage or current can be effectively controlled without any delay in the transition between the two states of source and load.

CV/CC Priority Setting Function

CV (constant voltage) priority / CC (constant current) priority mode can be selected and set.

Suppression of Overshoot with CC Priority Mode

With the PRO series power supply, the CC priority mode can effectively respond to load variations. This mode suppresses momentary current spikes when the load suddenly changes its resistance, thus ensuring stable protection for sensitive loads.

Configuring the power supply in CC priority mode allows for voltage adjustment according to load changes, maintaining a stable current. This effectively protects sensitive loads such as high-power laser diodes and minimizes the risk of damage due to overshoot.

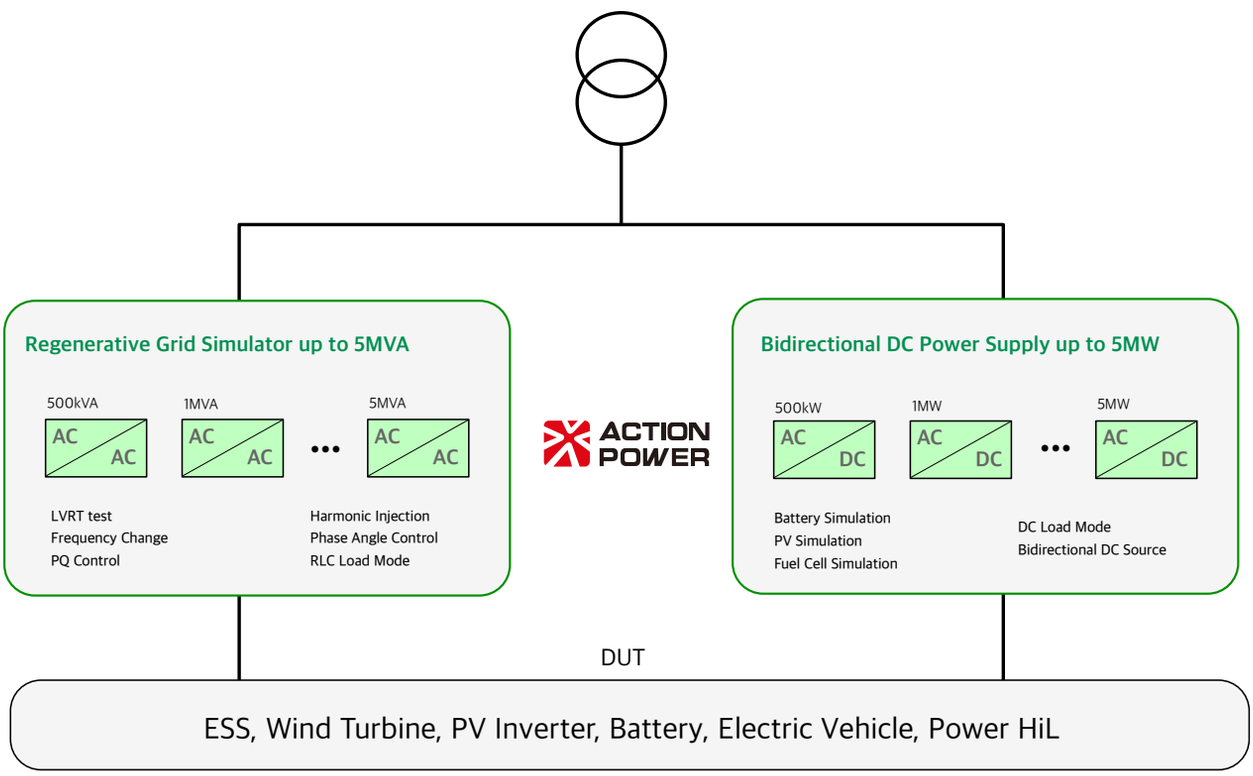
Current Overshoot in CV Priority Mode

In CV priority mode, the power supply prioritizes maintaining a constant output voltage. However, sudden load variations can cause momentary current spikes, posing a risk of damage to sensitive loads.

Therefore, configuring the PRO series power supply in CC priority mode enhances load stability and prevents damage caused by overshoot.

Application

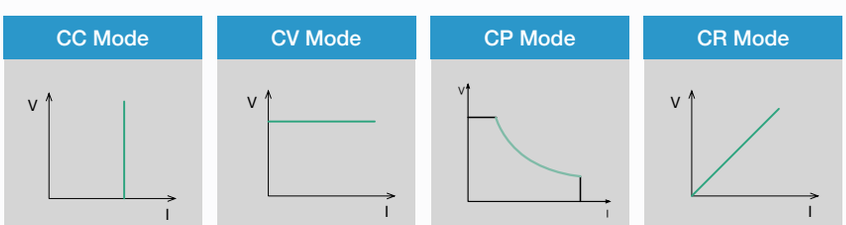
ActionPower's high-capacity bi-directional DC power supplies are innovative products that are used in a variety of applications based on unique technology and optimal performance. ActionPower products can act as regenerative electronic load while providing bi-directional DC power, which is applicable of long-term reliability test applications such as electric vehicle DC charging stations, automotive battery charge and discharge tests, fuel cell discharge tests, ESS charge and discharge tests, and other applications requiring very fast response time, such as simulating electric vehicle driving patterns.



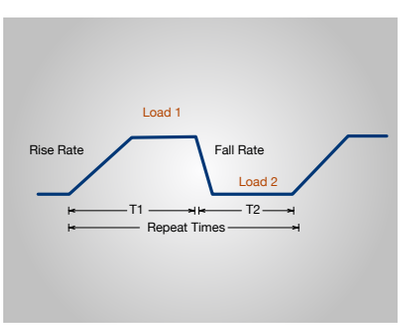
Powerful Software

Provides Diverse Simulation Modes

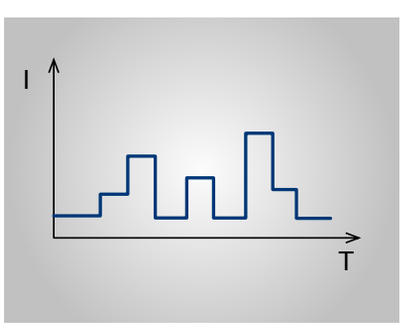
Basic Mode



Dynamic Mode



Programmable Sequences



KEY FEATURES

- Battery Simulation

LiMn204, LiCoO2, LiFePO4, NiMH, Ternary LI, LiTiO2 and PbO2 batteries

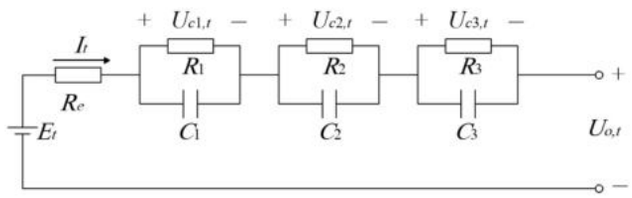
- PV Simulation

Static curves, Curve programming, Static MPPT, Dynamic MPPT, Weather Simulation, Shading of photovoltaic panels

- Electronic Load Function
- Programming waveform

Comprehensive Battery Simulation

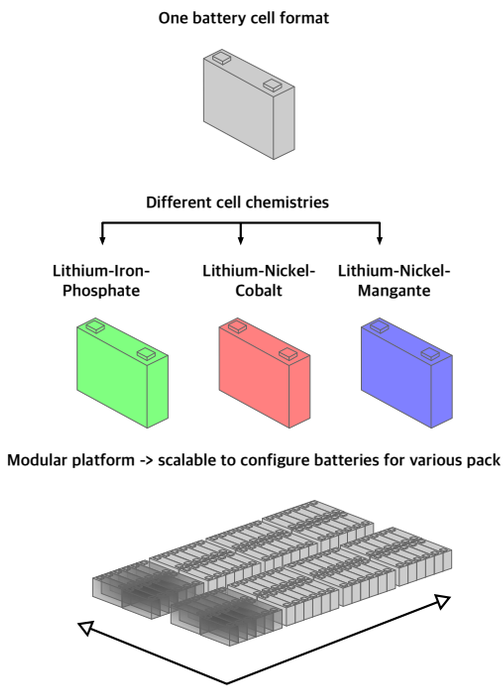
The product can simulate the output and charge/discharge characteristics of various battery packs such as lithium manganate, lithium cobalt, lithium iron phosphate, nickel-hydrogen, ternary lithium, lithium titanate and lead-acid batteries, and can set the parameters such as serial/parallel quantity, temperature, SOC, internal resistance and single battery capacity to simulate the output characteristics of the whole battery pack. The power supply opens first, second and third-order RC battery models and supports user-defined battery parameters and import of CSV user-defined model; the power supply has high real-time performance and the command refresh rate is as high as 1kHz, so as to comprehensively simulate the characteristics of the battery pack.

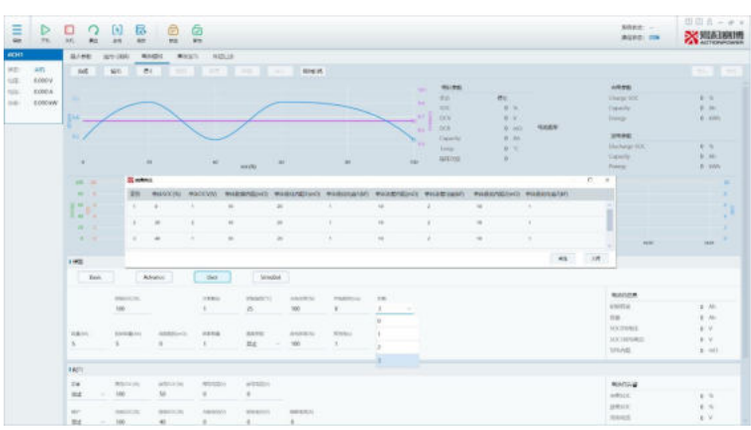


RCR Equivalent Circuit Model

Architecture	400 V
Nominal battery capacity	33.2 kWh
Usable battery capacity	27.2 kWh
Pack layout	96s1p (8 serially connected 12s1p modules)
Number of Li-ion cells	96
Rated cell voltage	3.7 V
Capacity per cell	94 Ah
Cell chemistry	NCM333

User-defined battery parameters





Battery Simulation Interface

KEY FEATURES

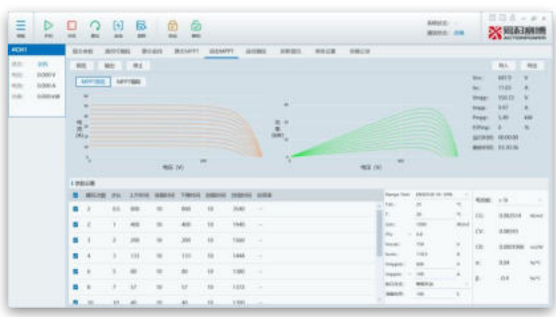
- DC Output Voltage : 12-2000Vdc
- Parallel Connection : up to 5MW
- Battery Simulation

  LiMn204, LiCoO2, LiFePO4, NiMH, Ternary LI, LiTiO2 and PbO2
- High Dynamic : <2ms (10~90%)
- Voltage Slew Rate : 1000V/ms
- ESS, UPS, EVE, etc. testing

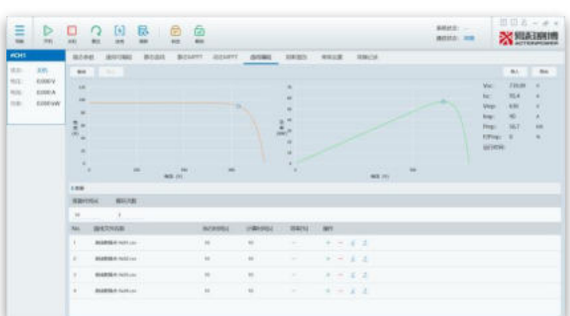
PV Simulation

When applied as the PV simulator, the product is a DC power supply featuring high precision, high dynamics and high-speed switching. With the complete I-V curve simulation function, it can simulate the output characteristics of various VP panels, and provide various kinds of user- defined curves, static and dynamic I-V curves and shadow occlusion simulations. The programming function can simulate different waveform outputs through three programming modes like Step, List and Wave, in order to fulfill the test requirements of various industries. The power supply can not only provide standard power supply environment for electrical equipment, but also receive the energy from load and feed ti back to the grid, with feedback efficiency of above 94%, to save energy and improve the test environment.

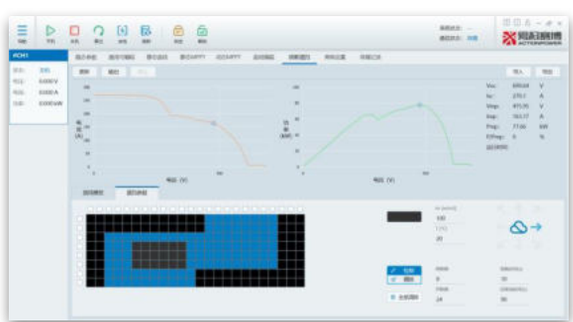
Static MPPT Interface



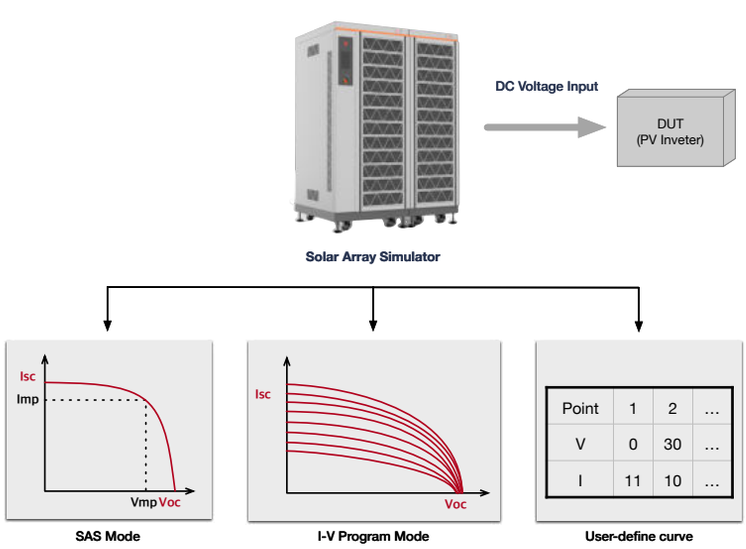
Dynamic MPPT Interface



Curve Programming Interface



Shadow I-V Interface

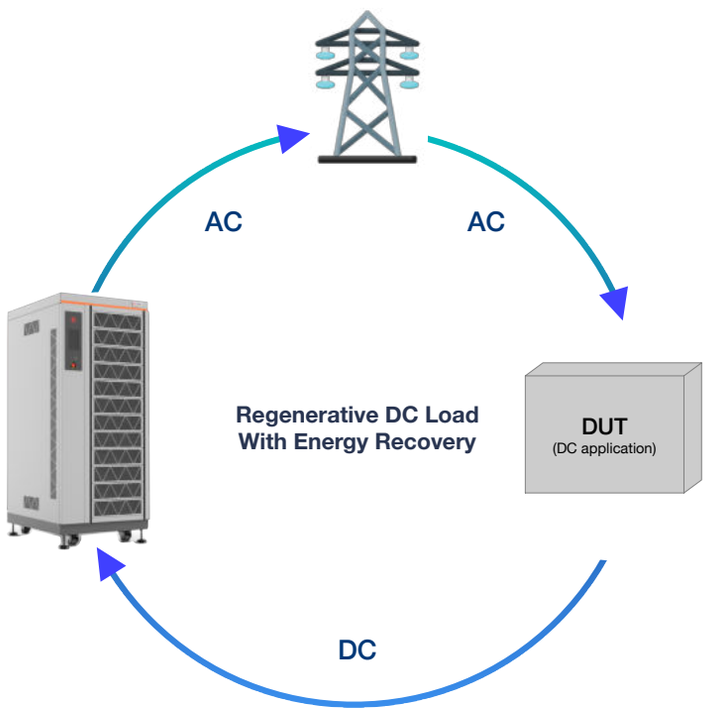


KEY FEATURES

- DC Output Voltage : 12-2000Vdc
- Parallel Connection : up to 5MW
- Complete I-V Curve Simulation
- High Dynamics : <2ms (10~90%)
- Voltage Slew Rate : 1000V/ms
- Fast I-V Curve Switching : <1ms
- Shadow I-V curve simulation
- Built-in dynamic MPPT test profile Sandia, EN50530, CGC/GF004

Electronic Load

The PRO series feedback DC electronic load is different from the traditional consumption load. It feeds back the absorbed electric energy to the power grid after transformation to save energy and improve the test environment. The product adopts full digital control technology, and has characteristics such as step-less adjustment, high accuracy, high dynamic performance and high reliability. It meets the requirements of low voltage and high current test, and can be applied to test scenarios such as fuel cell stack and fuel cell engine system.



The PRO series is regenerative DC electronic loads capable of absorbing current and efficiently feeding it back into the power grid. The PRO series achieves an impressive efficiency of up to 94%. The returned electrical energy can be reused by other equipment within the facility, resulting in savings in overall energy consumption and carbon emissions, reducing the environmental impact.

KEY FEATURES

- DC Output Voltage : 12-2000Vdc
- Parallel Connection : up to 5MW
- High Dynamics : <2ms (10~90%)
- Voltage Slew Rate : 1000V/ms
- Output slow start
- Low Harmonic Current: <3% F.S.
- Anti-revers function
- Online insulation impedance monitoring
- Discharging resistor
- Capacitance compensation

ACTIONPOWER

For more information, please contact
your local ACTIONPOWER representative or visit

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