ACTION POWER

High Power DC Source & Load

ABS, APS, AFL series

12V to 2000V, 300kW to 10MW

Programmable Bidirectional DC Power Supply

cnaction.com

HIGH POWER CAPACITY
WITH PARALLEL OPERATION

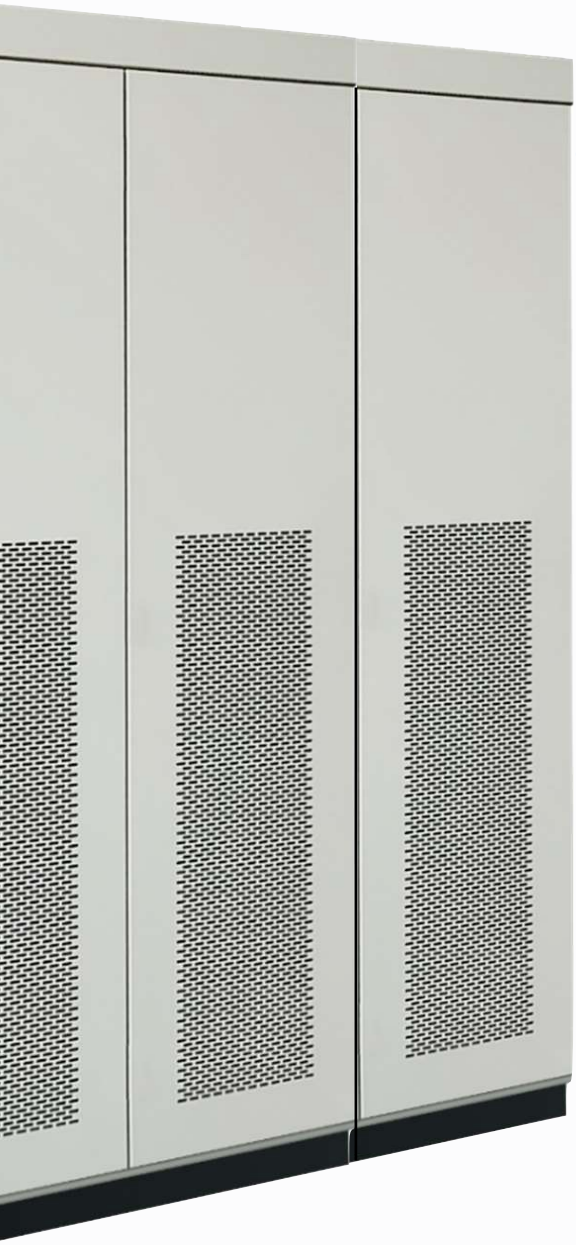
단일 용량 구성을 300kW 에서부터 1MW 까지 가능하며, 병렬연결구성으로 최대 10MW 까지 용량 확장이 가능

2000V
MAXIMUM DC OUTPUT VOLTAGE

10MW
MAXIMUM DC OUTPUT POWER

MULTI-OUTPUT MODE

여러대의 단일용량 DC POWER SUPPLY 판넬을 각각 사용하여 다출력 모드로 사용하거나, 또는 Master/Slave 연결하여 병렬 모드로 유연하게 사용 가능



SIMULATION FUNCTION
WITH HIGH PERFORMANCE

배터리 시뮬레이션 및 PV 시뮬레이션 기능을 제공하며, 특히 1ms 이내의 빠른 응답속도로 정확하고 실시간으로 시뮬레이션 가능

BATTERY SIMULATION

PV SIMULATION

ELEC-TRONIC LOAD

그리드 회생형 DC 전자로드 기능을 제공하며, Fuel cell stack 이나 Fuel cell engine system 등의 시험에 응용 가능

Ratings, types and voltages

ABS series Battery Simulator

Model	Power [kW]	Output Voltage [V]	Output Current [A]	Size (WHD) [mm]	Weight [kg]
ABS-30-1210	±300	12-1200	±1000	2010x1955x1200	2,640
ABS-40-1210	±400	12-1200	±1000	2010x1955x1200	2,850
ABS-50-1212	±500	12-1200	±1250	2010x1955x1200	3,020
ABS-60-1212	±600	12-1200	±1250	2410x1955x1200	3,500
ABS-E30-2004	±300	20-2000	±400	1610x1955x1200	1,900
ABS-E40-2006	±400	20-2000	±600	1610x1955x1200	2,430
ABS-E50-2007	±500	20-2000	±700	2010x1955x1200	2,670
ABS-E60-2008	±600	20-2000	±800	3410x1955x1200	3,500
ABS-E75-2010	±750	20-2000	±1000	3410x1955x1200	4,390
ABS-E100-2014	±1000	20-2000	±1400	3410x1955x1200	4,940

APS series PV Simulator

Model	Power [kW]	Output Voltage [V]	Output Current [A]	Size (WHD) [mm]	Weight [kg]
APS-30-1206	±300	12-1200	±600	1610x1955x1200	2,030
APS-40-1208	±400	12-1200	±800	2010x1955x1200	2,470
APS-50-1210	±500	12-1200	±1000	2010x1955x1200	2,850
APS-60-1212	±600	12-1200	±1200	2410x1955x1200	3,500
APS-75-1215	±750	12-1200	±1500	3410x1955x1200	4,530
APS-100-1220	±1000	12-1200	±2000	3410x1955x1200	4,960
APS-30-2004	±300	20-1200	±400	1610x1955x1200	1,900
APS-40-2006	±400	20-1200	±600	1610x1955x1200	2,430
APS-50-2007	±500	20-1200	±700	2010x1955x1200	2,670
APS-60-2008	±600	20-1200	±800	3410x1955x1200	3,500
APS-75-2010	±750	20-1200	±1000	3410x1955x1200	4,390
APS-100-2014	±1000	20-1200	±1400	3410x1955x1200	4,940

Ratings, types and voltages

AFL series Feedback DC Electronic Load

Model	Power [kW]	Voltage ragen [V]	Rated current [A]	Min.full current voltage [V @ A]	Size (WHD) [mm]	Weight [kg]
AFL-15-1210	150	12-1200	1000	60V@1000A	1610x1955x1200	1,670
AFL-20-1210	200	12-1200	1000	60V@1000A	1610x1955x1200	1,680
AFL-25-1210	250	12-1200	1000	60V@1000A	1610x1955x1200	1,890
AFL-30-1210	300	12-1200	1000	60V@1000A	1610x1955x1200	1,890

ABS series 300kW

Technical data

ABS series	Specification
AC input	
Voltage, Phases	380V±15%, 3ph+PE
Frequency	47Hz to 63Hz
Power Factor	0.99 @ full load
Efficiency	Model of 300kW and above : >94%, others: >90%
Harmonic current	≤3%
DC output voltage	
Accuracy	±0.1% F.S.
Resolution	0.01V
Ripple(RMS)	0.1% F.S. (resistive load)
Slew rate	200V/ms
DC output current	
Accuracy	±0.1% F.S.
Resolution	0.01A
Ripple(RMS)	0.1% F.S. (resistive load)
Slew rate	500A/ms
Rise time	≤2ms (10%~90% rated current)
Switching time	≤4ms (switching from -09% to +90%)
Peak time	60s (1200V type)
Measurement	
Voltage accuracy	±0.1% F.S.
Voltage resolution	0.001V
Current accuracy	±0.1% F.S.
Current resolution	0.001A
Power accuracy	±0.2% F.S.
Power resolution	1W
Protective functions	
OVP	Over-voltage protection, adjustable 0 - 110% $U_{Nominal}$ (±1% F.S.)
OCP	Over-current protection, Adjustable 0V- ±110% $I_{Nominal}$ (±1% F.S.)
OPP	Over-power protection, range 0V ~ ±110% $P_{Nominal}$ (±1% F.S.)
OTP	Overt-temperature protection

Technical data

ABS series	Specification
Battery simulation	
Battery type	Different battery types such as lithium manganate, lithium cobaltate, lithium iron phosphate, nickel-hydrogen, ternary lithium, lithium titanate, and lead-acid batteries can be simulated User-defined battery types and open first, second and third-order RC battery models are supported
Parameter	Number of batteries in series connection, number of batteries in parallel connection, initial SOC, initial temperature, internal resistance, cell capacity and other parameters
Interface	Import of CSV user-defined model is supported
Real-time performance	1ms command refresh rate
Interface	
Ethernet, CAN, RS232, RS485, ModBus TCP	
Device configuration	
Parallel operation	Up to 10MW with energy-matrix bus
Insulation and withstanding voltage	
10MΩ/DC500V；3600VAC(5000VDC)/1min	
Environmental conditions	
Operating temperature	-10 to 40°C
Storage temperature	-20 to 70°C
Relative humidity	10 to 90% RAH
Altitude	≤2000m without derating, Above 2000m please contact ACTION POWER
Cooling method	
Air-cooled	Dry clean air
Option	
Discharging resistor cabinet	Under abnormal operating conditions of the system, energy will be safely dissipated through the bleeder resistor cabinet to protect the DUT
Capacitance compensation	Voltage drop caused by cable impedance and the voltage ripple of the DUT

Technical data

APS series	Specification
AC input	
Voltage, Phases	380V±15%, 3ph+PE
Frequency	47Hz to 63Hz
Power Factor	0.99 @ full load
Efficiency	Model of 300kW and above : >94%, others: >90%
Harmonic current	≤3%
DC output voltage	
Accuracy	±0.1% F.S.
Resolution	0.01V
Ripple(RMS)	0.1% F.S. (resistive load)
Slew rate	200V/ms
DC output current	
Accuracy	±0.1% F.S.
Resolution	0.01A
Ripple(RMS)	0.2% F.S. (resistive load)
Rise time	≤2.5ms (10%~90% rated current)
Switching time	≤5ms (switching from -09% to +90%)
Measurement	
Voltage accuracy	±0.1% F.S.
Voltage resolution	0.001V
Current accuracy	±0.1% F.S.
Current resolution	0.001A
Power accuracy	±0.2% F.S.
Power resolution	1W
Protective functions	
OVP	Over-voltage protection, adjustable 0 - 110% $U_{Nominal}$ (±1% F.S.)
OCP	Over-current protection, Adjustable 0V- ±110% $I_{Nominal}$ (±1% F.S.)
OPP	Over-power protection, range 0V ~ ±110% $P_{Nominal}$ (±1% F.S.)
OTP	Overt-temperature protection

Technical data

APS series	Specification
PV Simulation	
Output mode	CV, CC, CP, programming and PV standard (EN50530\Sandia) dynamic & static MPPT tracking, PV array
Programming steps	200 steps
Rise time range	1ms~99999s
Flat top time range	1ms~99999s
Min. Programming step	1ms
I-V Curve	
Open-circuit voltage setting ragge	12~1200V or 20~2000V
Short-circuit current setting ragge	1A~Ie
Simulation fill factor range	0.3~0.95
Photovoltaic panel type	c-si, Thin-film, user-defined
I-V curve update rate	100ms with online curve switching function
I-V curve editing	EN 50530, Sandia, and simple with user-defined curves; static MPPT curves; dynamic MPPT curves; shadow barrier; curve programming
Number of points on a single curve	4096 points
Curve setting	1) IV curves can be user-defined using parameters such as Voc, Isc, FF and Pm; 2) The I-V curve database is provided, with the number of curves ≥ 100; 3) IV curves in different situations can be continuously output in the dynamic operating mode with the environmental impacts such as temperature change and irradiance 4) The dynamic I-V curve test program under EN50530 is built-in;
Interface	
Ethernet, CAN, RS232, RS485, ModBus TCP	
Device configuration	
Parallel operation	Up to 10MW with energy-matrix bus
Insulation and withstanding voltage	
10MΩ/DC500V ; 3600VAC(5000VDC)/1min	
Environmental conditions	
Operating temperature	-10 to 40°C
Storage temperature	-20 to 70°C
Relative humidity	10 to 90% RAH
Altitude	≤2000m without derating, Above 2000m please contact ACTION POWER
Cooling method	
Air-cooled	Dry clean air

Technical data

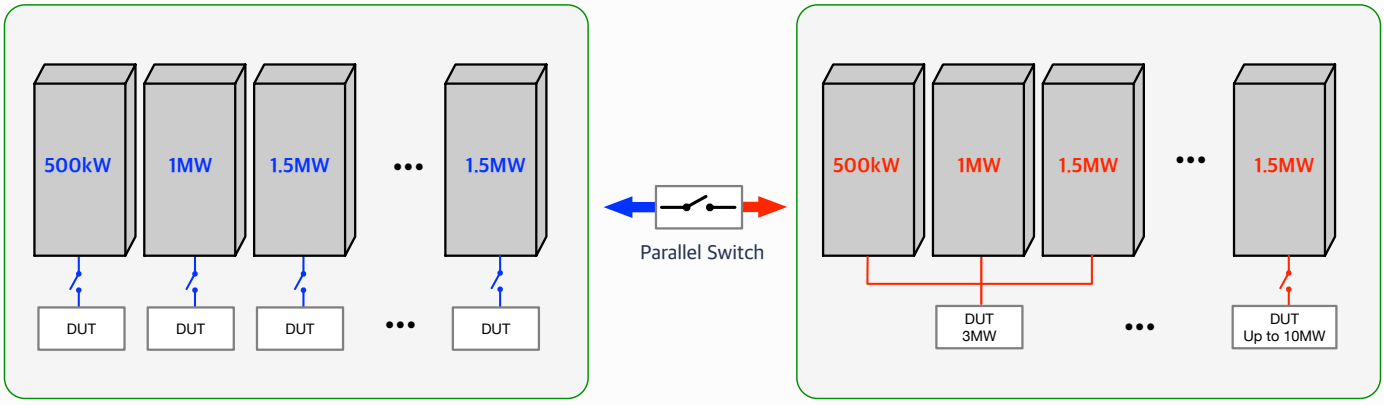
AFL series	Specification
AC input	
Voltage, Phases	380V±15%, 3ph+PE
Frequency	47Hz to 63Hz
Power Factor	0.99 @ full load
Efficiency	>94%
Harmonic current	≤3%
DC output voltage	
Accuracy	±0.1% F.S.
Resolution	0.01V
DC output current	
Accuracy	±0.1% F.S.
Resolution	0.01A
Ripple(RMS)	0.1% F.S. (resistive load)
Rise time	≤5ms (10%~90% rated current)
Resistance	
Power setting resolution	1W
Resistance setting range	-2 to +2Ω
Resistance setting resolution	1mΩ
Measurement	
Voltage accuracy	±0.1% F.S.
Voltage resolution	0.001V
Current accuracy	±0.1% F.S.
Current resolution	0.001A
Power accuracy	±0.2% F.S.
Power resolution	1W
Protective functions	
OVP	Over-voltage protection, adjustable 0 - 110% $U_{Nominal}$ (±1% F.S.)
OCP	Over-current protection, Adjustable 0V- ±110% $I_{Nominal}$ (±1% F.S.)
OPP	Over-power protection, range 0V ~ ±110% $P_{Nominal}$ (±1% F.S.)
OTP	Overt-temperature protection

Technical data

AFL series	Specification
Parameters	
Programming steps	200 steps
Rise time range	1ms~99999s
Flat top time range	1ms~99999s
Min. Programming step	1ms
Setting parameter	current, power, voltage, resistance, rise tiem, hold time and triger pulse output
Interface	
Ethernet, CAN, RS232, RS485, ModBus TCP	
Device configuration	
Parallel operation	Up to 10MW with energy-matrix bus
Insulation and withstanding voltage	
10MΩ/DC500V ; 3600VAC(5000VDC)/1min	
Environmental conditions	
Operating temperature	0 to 40°C
Storage temperature	-20 to 70°C
Relative humidity	10 to 90% RAH
Altitude	≤2000m without derating, Above 2000m please contact ACTION POWER
Cooling method	
Air-cooled	Dry clean air
Option	
Trigger signal	Trigger input / output
Insulation resistance to ground	Monitoring of ground insulation impedance to protect equipment safety, which can be enabled or disabled by users.
Discharging resistor cabinet	Under abnormal operating conditions of the system, energy will be safely dissipated through the bleeder resistor cabinet to protect the DUT
Capacitance compensation	Voltage drop caused by cable impedance and the voltage ripple of the DUT

High Power Scalable Design

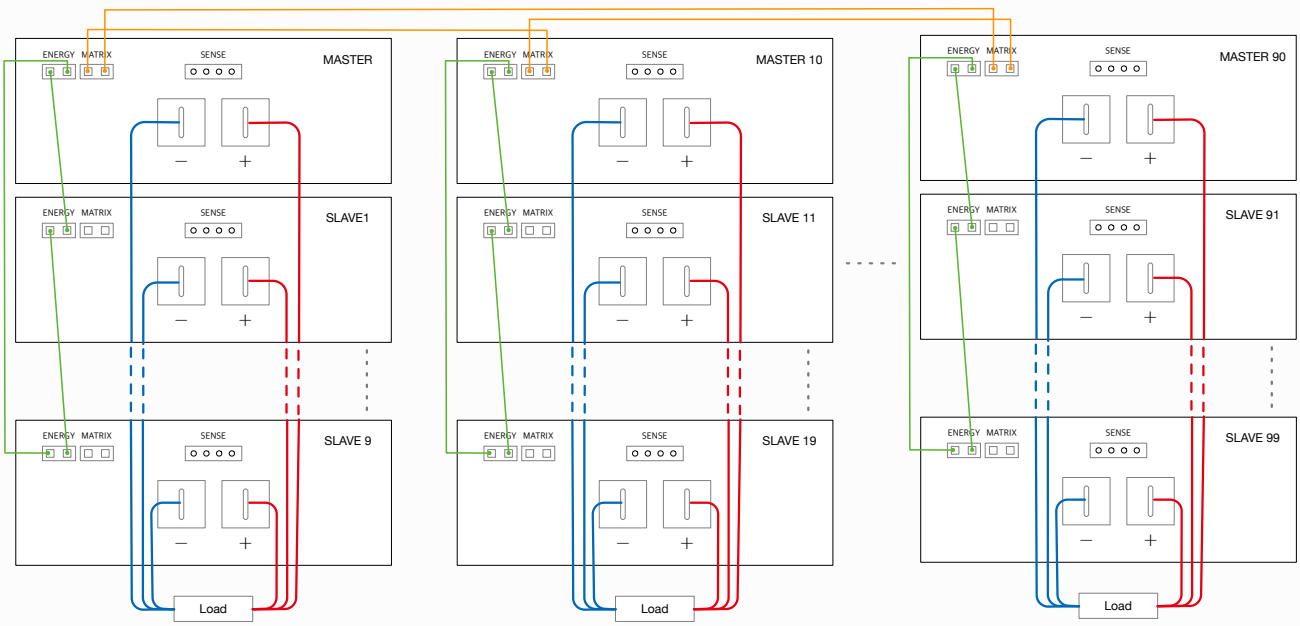
ABS, APS, AFL 시리즈는 대용량 병렬 확장 및 안정적인 전원 공급을 위해 DMPS(Digital Matrix Parallel System) 방식을 적용하였으며, 이는 고속 광섬유 통신방식으로 최소 300kW 부터 1MW 단위로 병렬연결하여 최대 10MW 까지 용량 확장이 가능합니다. 특히, 병렬 연결된 판넬은 사용자 필요에 따라 출력을 분리하여 다출력모드 (multi-output mode) 로 사용이 가능하여 동시에 여러 시험장비를 테스트 할 수 있어 사용자의 편의성을 극대화 하고, 많은 비용을 절감할 수 있습니다.



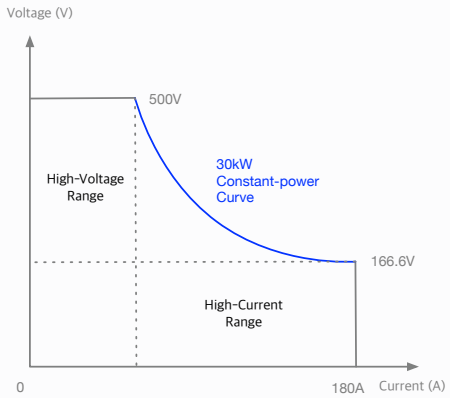
Multi-Output Mode

Parallel Mode

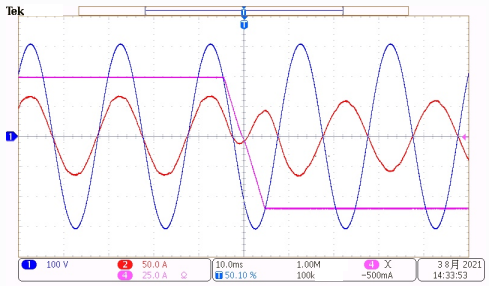
Output Expansion up to 10MW with Master / Slave Control



Auto ranging



Auto ranging 기능은 프로그래밍 가능한 DC 전원을 통하여 넓은 출력 범위의 전압과 전류를 자동으로 제공하여 넓은 동작 범위에서 정격 출력을 유지할 수 있습니다. 이는 필요한 전류가 낮아질수록 사용 가능한 전압이 높아지고, 낮은 전압에서는 더 높은 전류가 가능하여, 하나의 DC power supply 로 다양한 전압/전류 조건에서 DUT를 테스트할 수 있습니다.



또한, A 시리즈는 양방향 Automatic “source” & “load” 기능을 통해 부드럽고 아주 빠른 자동 전환 기능을 지원합니다. Source 와 load 의 두 상태 간 전환에 있어서 지연현상 없이 전압 또는 전류의 overshoot을 효과적으로 제어가 가능합니다.

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 ABS 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.

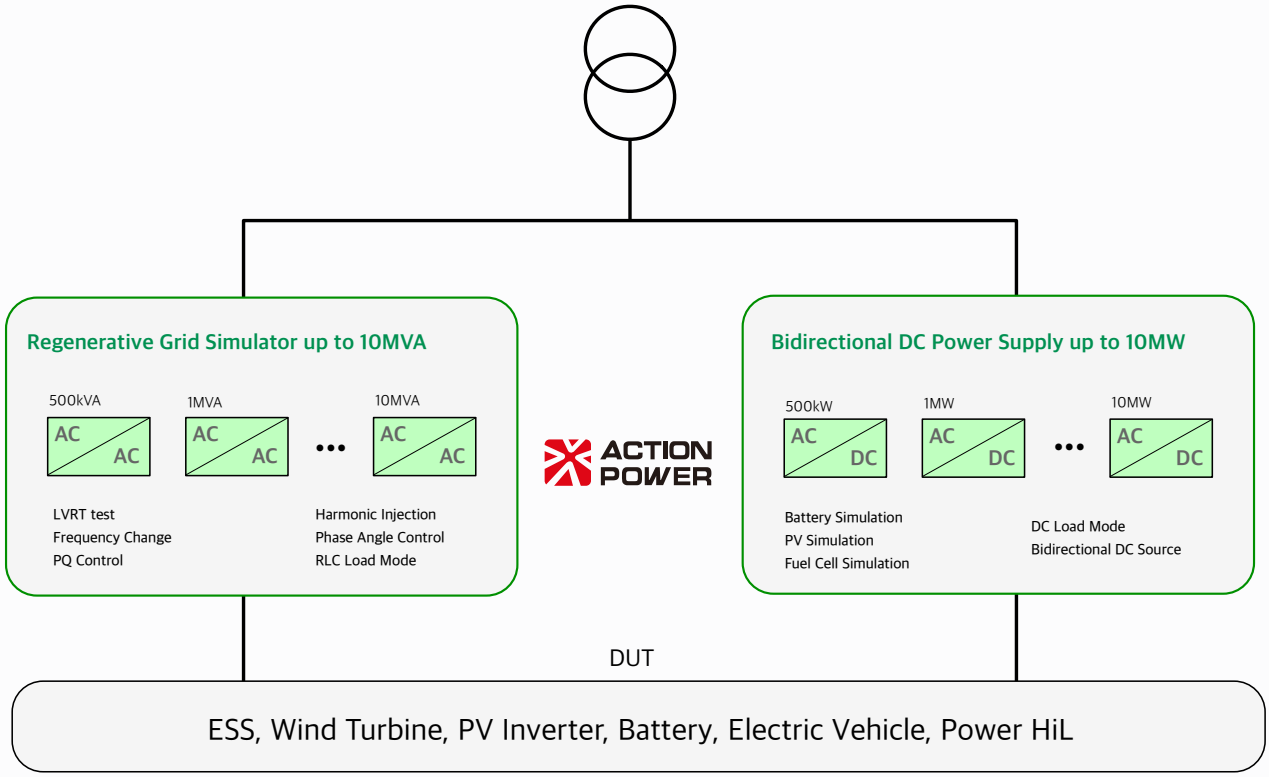
Current Overshoot in CV Priority Mode

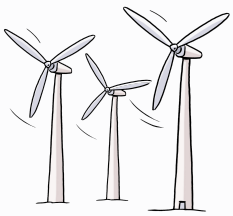
In CV priority mode, the power supply prioritizes maintaining a constant output voltage. However, sudden load variations can cause momentary current spikes, posing a risk of damage to sensitive loads.

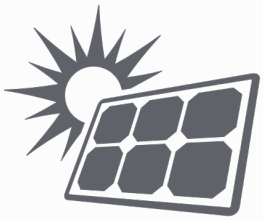
Therefore, configuring the ABS series power supply in CC priority mode enhances load stability and prevents damage caused by overshoot.

Application

Action Power 의 대용량 양방향 DC power supply 는 독자적인 기술과 최적의 성능으로 다양한 응용 분야에 사용되는 혁신적인 제품입니다. Action Power 제품은 양방향 DC 전원공급을 하면서 회생형 전자 부하로서의 역할이 가능하고, 이는 전기차 DC 충전 스테이션, 자동차 배터리 충방전 시험, 연료전지 방전 시험, ESS 충방전 시험 등 다양한 전원 공급원을 포함한 장기 신뢰성 테스트 응용 분야에 적용됩니다. 특히 전기자동차 주행 패턴 모사와 같은 아주 빠른 응답속도가 필요한 분야에 독보적인 성능을 자랑합니다.



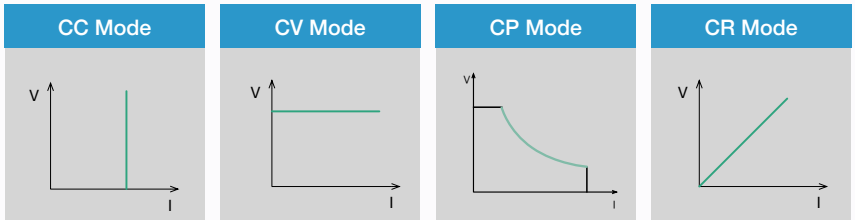




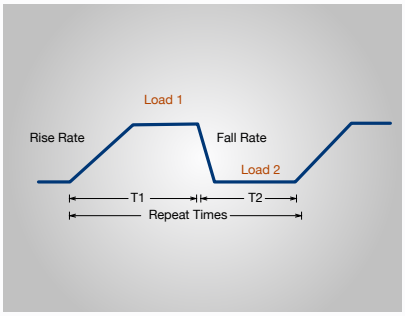
Powerful Software

다양한 시뮬레이션 모드 제공

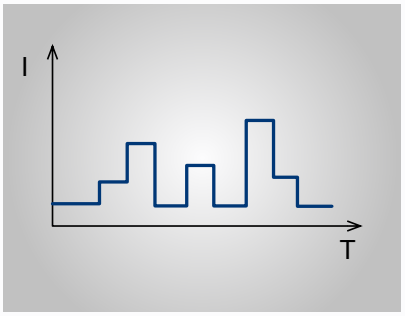
Basic Mode



Dynamic Mode



Programmable Sequences



KEY FEATURES

- Battery Simulation

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

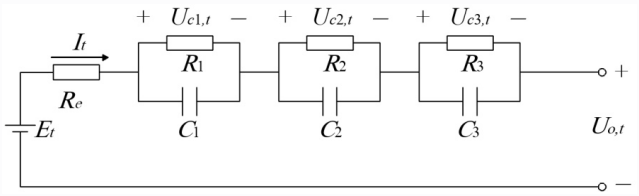
- PV Simulation

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

- Electronic Load Function
- Programming waveform

Comprehensive Battery Simulation

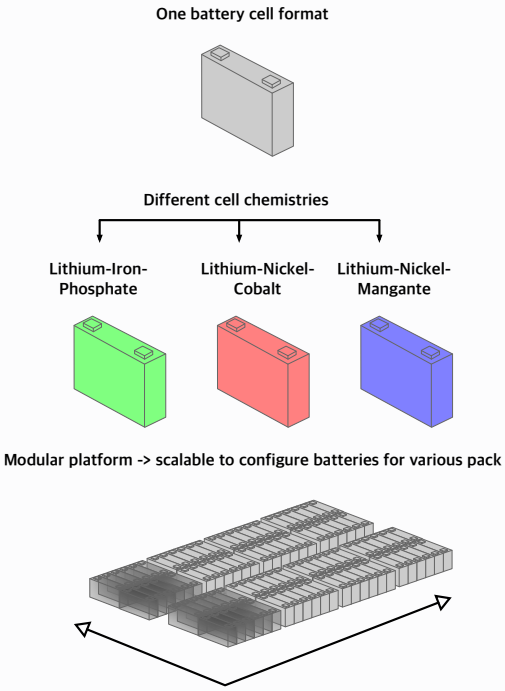
It can simulate the output and charge/discharge characteristics of various battery packs such as lithium manganate, lithium cobaltate, lithium iron phosphate, nickel-hydrogen, ternary lithium, lithium titanate and lead-acid batteries, and can set the parameters such as serial/parallel quantity, temperature, 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.

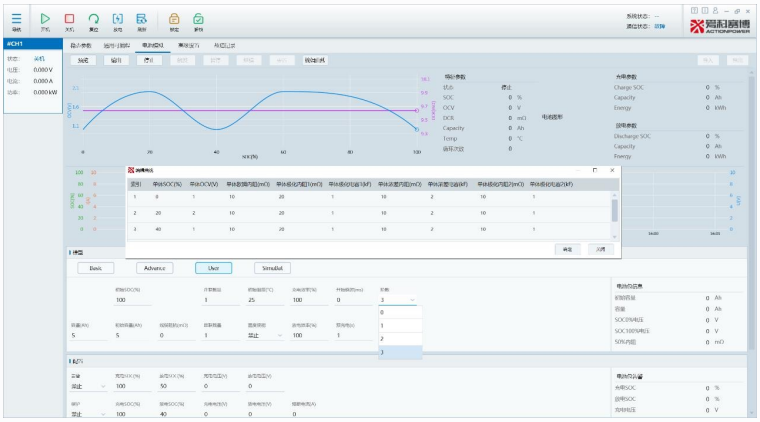


RCR Equivalent Circuit Model

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





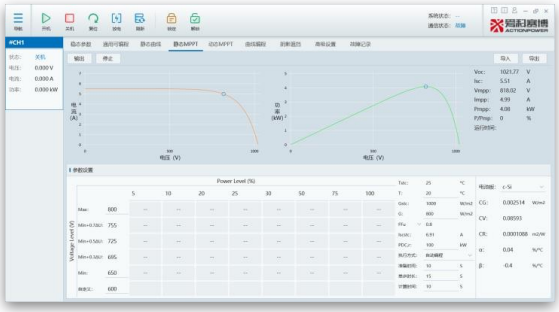
Battery Simulation Interface

KEY FEATURES

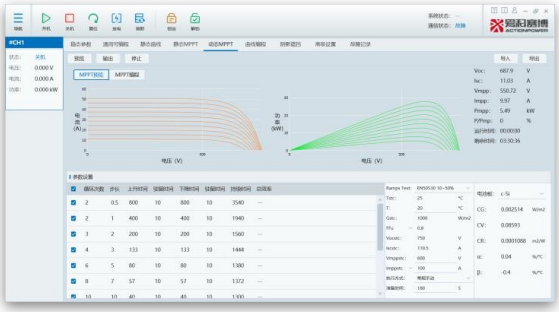
- DC Output Voltage : 12-2000Vdc
- Parallel Connection : up to 10MW
- Battery Simulation
  LiMn204, LiCoO2, LiFePO4, NiMH, Ternary LI, LiTiO2 and PbO2
- High Dynamic : <2ms (10~90%)
- Voltage Slew Rate : 200V/ms
- ESS, UPS, EVE, etc. testing

PV Simulation

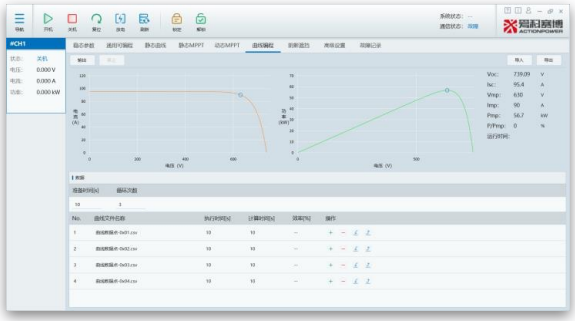
APS VP simulator is a DC power supply featuring high precision, high dynamics and high-speed switching. With the complete I-V curve simulation function, it can simulate the output characteristics of various VP panels, and provide various kinds of user- defined curves, static and dynamic I-V curves and shadow occlusion simulations. The programming function can simulate different waveform outputs through three programming modes like Step, List and Wave, ni order ot 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

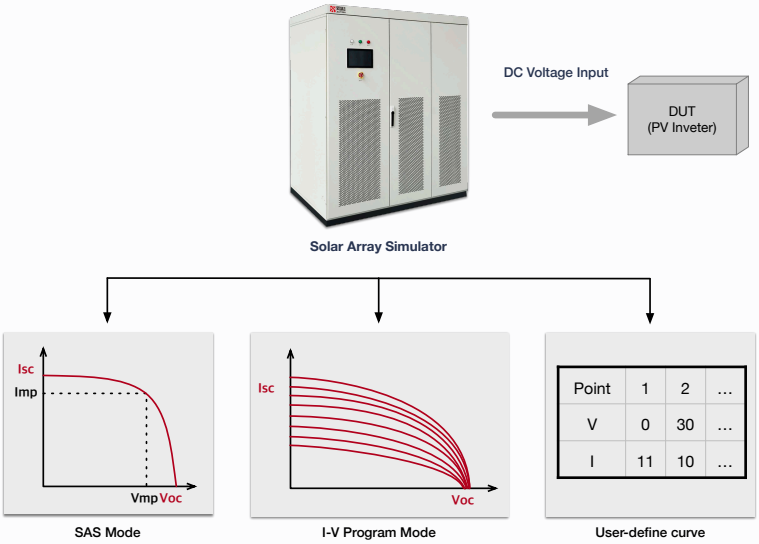


Dynamic MPPT Interface



Curve Programming Interface

Shadow I-V Interface

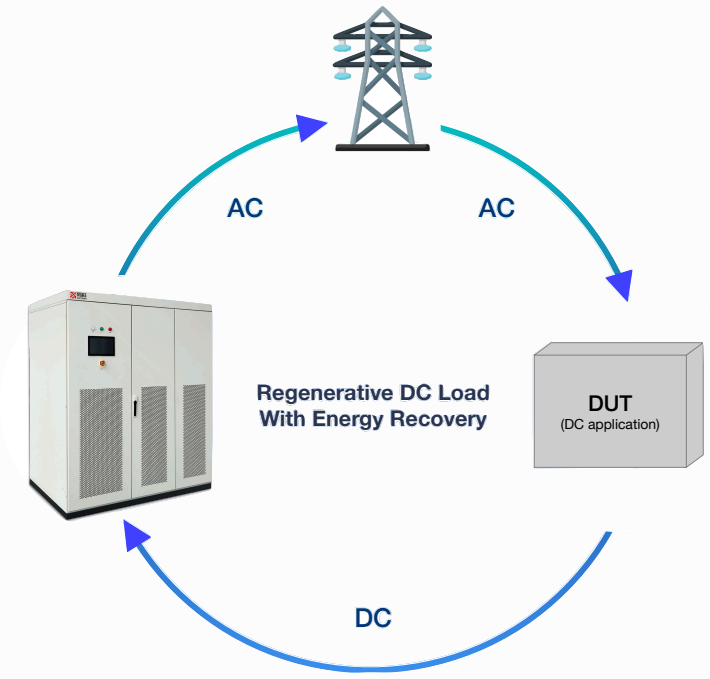


KEY FEATURES

- DC Output Voltage : 12-2000Vdc
- Parallel Connection : up to 10MW
- Complete I-V Curve Simulation
- High Dynamics : <2.5ms (10~90%)
- Voltage Slew Rate : 200V/ms
- Fast I-V Curve Switching : <100ms
- Shadow I-V curve simulation
- Built-in dynamic MPPT test profile Sandia, EN50530, CGC/GF004

Electronic Load

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

KEY FEATURES

- DC Output Voltage : 12-2000Vdc
- Parallel Connection : up to 10MW
- High Dynamics : <5ms (10~90%)
- Voltage Slew Rate : 200V/ms
- Output slow start
- Low Harmonic Current: <3% F.S.
- Anti-revers function
- Online insulation impedance monitoring
- Discharging resistor
- Capacitance compensation

ACTION POWER

For more information , please contact
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