ACTION POWER

Technical Specifications Sheet

HELION SERIES

Multi-Channel Modular Programmable Power Supply System



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01 | PRODUCT OVERVIEW

The Helion Series Multi-Channel Modular Programmable Power Supply System is an innovatively designed power supply system intended to meet the demand for high-precision, multifunctional power solutions in laboratories, R&D centers, and industrial automation test applications. The system incorporates a modular design architecture, allowing users to flexibly configure AC modules and DC modules according to actual application requirements, thereby providing an efficient and flexible power solution. Widely used in the development and application of microinverters, micro energy storage systems, portable energy storage systems, household appliances, and industrial electronics.

02 | KEY FEATURES

- **Adaptive modular design**

  Supports plug-in rapid installation, flexible replacement of AC/DC modules, and automatic identification of power module types.

- **Hybrid multi-channel**

  6 hybrid channels within a 3U form factor, with flexible configuration; Supports testing of common AC/AC, AC/DC, DC/AC, and DC/DC topologies.

- **High-precision output**

  Employs advanced digital control technology to provide high-precision, low-ripple voltage and current output, ensuring accurate test results.

- **Comprehensive communication interfaces**

  Built-in USB and LAN interfaces, with optional RS232/RS485 interfaces; supports SCPI/MODBUS command sets for easy integration into automated test systems, enabling remote control and monitoring.

- **Bidirectional energy flow**

  The AC/DC modules support energy regenerative operation.

- **Web functionality**

  Supports Web-based control and monitoring of the power supply through a standard web browser.

- **Convenient front-panel output**

  All 6 front-panel channels support banana plug connections up to 10 A.

03 | PRODUCT APPEARANCE

● Mainframe



3U Standard-Width Mainframe Diagram

Product Model	Rated Output Power ( )	Input Voltage Range ( )	Number of Channels	Input Type	Form Factor
H-C6-6.6	3.3	L1-N: (200-240)Vac	6	Single-Phase	3U Standard Width
	6.6	L1-L2: (200-440)Vac		Two-Wire	
H-C6-9.9	9.9	200-480V	6	Three-Phase	

AC Module



Helion AC Module Diagram

Product Model	Power (kVA)	Maximum Voltage (V_rms)	Frequency Range (Hz)	Maximum Current (A_rms)	Maximum Voltage (V_DC)	Maximum Current (A_DC)	Name
A1-3.0-450-16	3	450	DC,0.001-5000	16	±630	±16	Grid simulation module
A1-1.6-450-16	1.6	450	DC,0.001-5000	16	±630	±16	Grid simulation module
A2-3.0-450-16	3	450	Source: DC,0.001-5000 Load: DC,0.001-500	16	±630	±16	AC Source Load Module
A2-1.6-450-16	1.6	450	Source: DC,0.001-5000 Load: DC,0.001-500	16	±630	±16	AC Source Load Module

Note：CE certification is valid only within the frequency range of 0-200 Hz.

AC Module



Figure of Helion DC module

Product Model	Power Rating (kW)	Voltag (V)	Current ratin (A)	Maximum Efficiency	Name
D1-3.0-160-50	±3.00	0-160	±50	92%	Bidirectional DC Module
D1-1.6-160-30	±1.65	0-160	±30	90%	Bidirectional DC Module
D1-0.8-160-15	±0.85	0-160	±15	90%	Bidirectional DC Module
D1-3.0-100-60	±3.00	0-100	±60	92%	Bidirectional DC Module
D1-1.6-100-45	±1.65	0-100	±45	90%	Bidirectional DC Module
D1-0.8-100-30	±0.85	0-100	±30	90%	Bidirectional DC Module
D2-3.0-160-50	3.00	0-160	50	92%	PV Simulation Module
D2-1.6-160-30	1.65	0-160	30	90%	PV Simulation Module
D2-0.8-160-15	0.85	0-160	15	90%	PV Simulation Module
D2-3.0-100-60	3.00	0-100	60	92%	PV Simulation Module
D2-1.6-100-45	1.65	0-100	45	90%	PV Simulation Module
D2-0.8-100-30	0.85	0-100	30	90%	PV Simulation Module

Note：CE certification is valid only within the frequency range of 0-200 Hz.

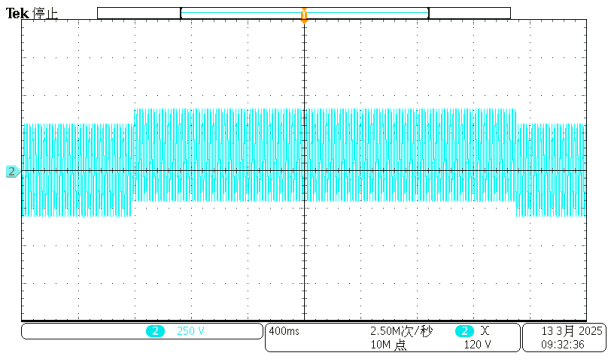
04 | AC MODULE ADVANTAGES AND FUNCTIONS

Flexible AC Output Configuration

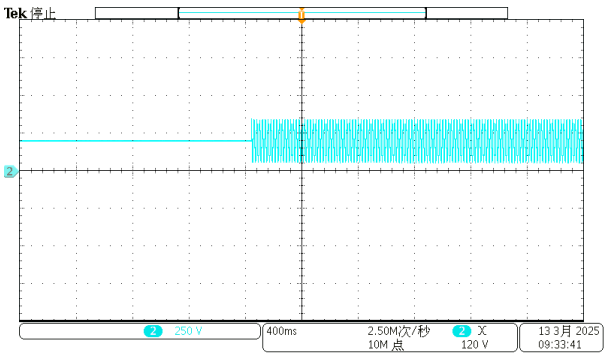
Independent single-phase AC output modules offer a high degree of modularity, flexibility, and scalability. They can be paralleled for capacity expansion, or the N lines (neutral lines) of two or three modules can be shorted to create diverse power system architectures, including split-phase and three-phase configurations, providing new solutions for power electronics testing in different regions worldwide.

Multiple Output Modes

Helion Series AC Module products support three output modes: AC, DC, and AC+DC, with full rated output power available in all modes.



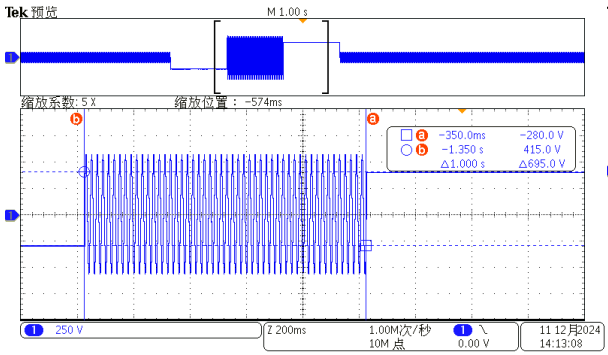
AC+DC: 220V/50Hz with 100Vdc superimposed, 0° triggering



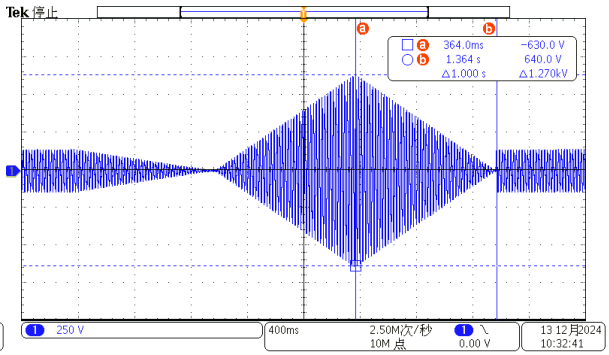
DC+AC: DC 200V with AC 100V superimposed

Extensive Programming Functions

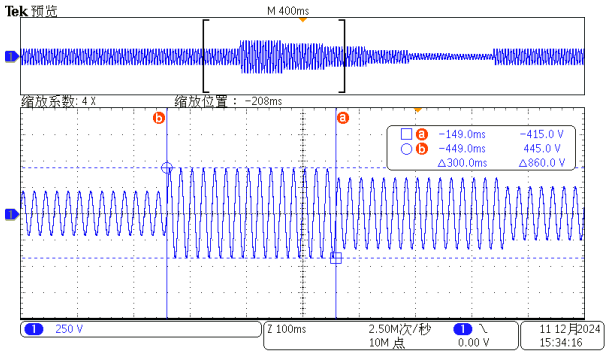
Helion Series AC Module products support multiple programming functions, including List, Wave, Step, Pulse, and Advanced. They also support simulation programming of Harmonics and interharmonics, as well as 100 sets of user-defined waveform programming.



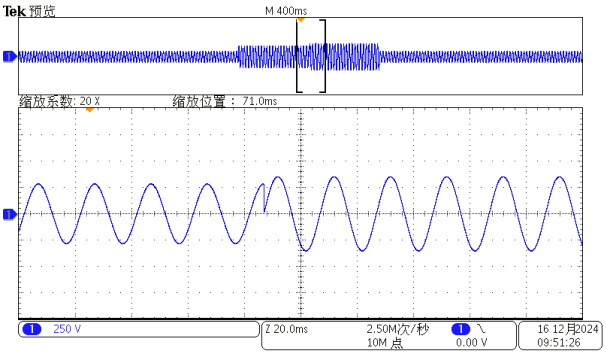
List programmed waveform



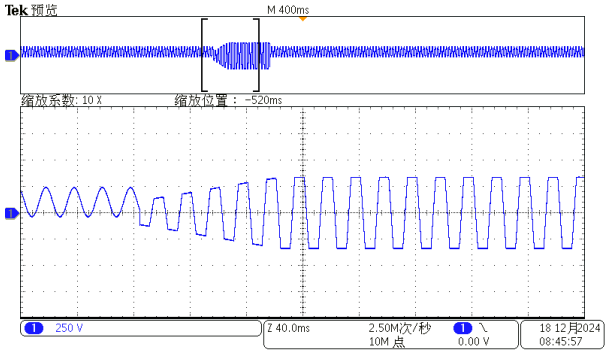
Wave programmed waveform



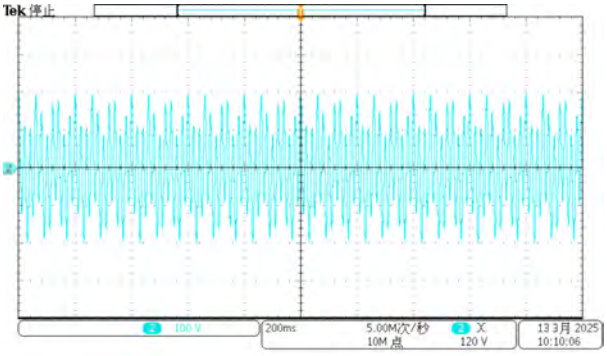
Step programmed waveform



Pulse programmed waveform



Advanced custom waveform



Interharmonic sweep frequency

Comprehensive Standard Waveform Library

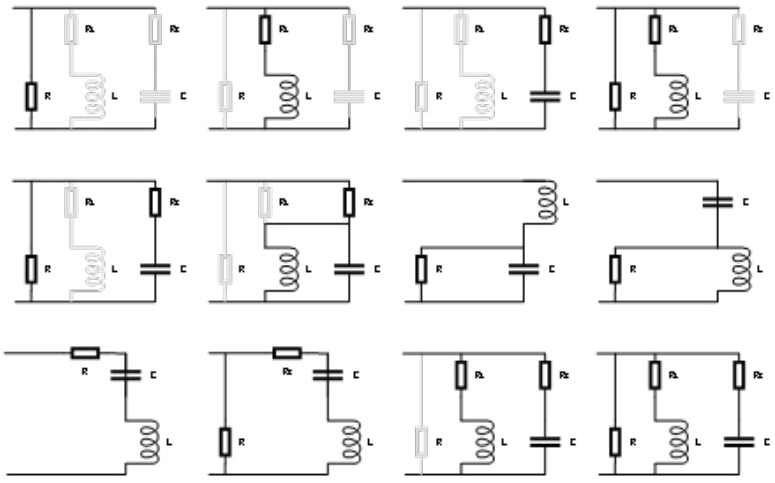
Helion Series AC Module products are capable of testing to distributed energy standards including UL1741SA, IEEE1547, IEC62116, and NB/T32004, as well as the switching power supply-related standard T/CPSS1007-2020.

The host software includes selected IEC 61000-4 standards and supports one-click recall, meeting the integration and development requirements of most automated test systems; Specific test items: IEC 61000-4-11, 4-13, 4-14, 4-27, and 4-28 AC standards; Supports IEC 61000-4-17 and 4-29 DC standards; Includes 30 built-in DST waveforms, which can be recalled with one click for Harmonics injection testing in accordance with relevant standards.

RLC Network Simulation Function (AC Source/Load Module)

The output of the AC Source/Load Module supports regenerative linear load testing.

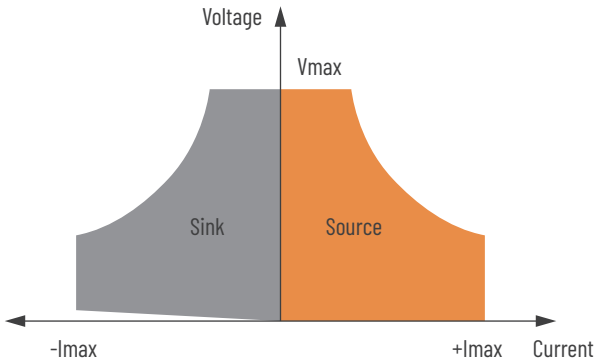
The AC Source/Load Module includes up to 12 built-in RLC network models, with adjustable parameters for flexible simulation of linear load characteristics, enabling comprehensive verification of DUT performance under different load modes.



05 | DC MODULE ADVANTAGES AND FUNCTIONS

● Automatic Source/Load (Bidirectional DC Module)

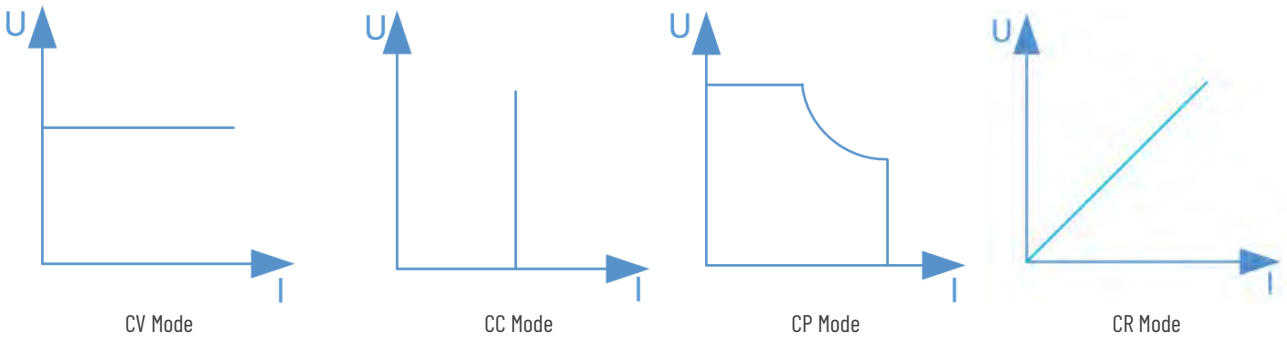
Automatic "Source"/"Load": All Helion Series DC Module products support both bidirectional DC source and regenerative load functions, with two-quadrant operation and online automatic, smooth, fast, and seamless switching between source and load modes. This automatic "source"/"load" transition is delay-free and effectively prevents voltage or current overshoot.



Automatic Power Control: Helion Series DC Module products provide constant-power characteristics under both source and load conditions, allowing high current output at low voltage and low current output at high voltage.

● Four Output Modes

Helion Series DC Module products provide four operating modes: constant voltage (CV), constant current (CC), constant power (CP), and constant resistance (CR) (Bidirectional DC Module only). The CC, CV, and CP modes can automatically switch according to the formula P=UI; that is, when voltage, current, or power at the output reaches its preset limit first, the power supply operates in the corresponding mode.



● Function Programming

In addition to conventional List, Wave, Step, and Advanced programming functions, the Helion Series DC Module also supports function editing, sine wave, pulse wave, triangular wave, and custom waveform programming to meet user-specific requirements in product R&D testing, regulatory compliance and certification, production line testing, and quality inspection.

Programming data can be saved and exported to another unit for operation, reducing user workload.

● SAS Mode

The SAS solar array simulator function can accurately simulate the output I-V characteristic curves of solar panels. It includes built-in SAS models compliant with standards such as EN50530, Sandia, CGC/GF004, and CGC/GF035, and is used for static and dynamic MPPT testing of photovoltaic inverters. The built-in SAS function supports only basic curve operations. For standards-related MPPT efficiency testing, it must be used in conjunction with the "Programmable Power Supply Virtual Terminal" software to provide complete test functions for the photovoltaic industry.

Its high-precision measurement and control system enables more accurate evaluation of the maximum tracking efficiency of solar inverters. Parameters such as Voc and Isc can be configured to simulate I-V curves. It supports simulation of various PV module types and provides shading and custom curve editing functions. Up to 4096 built-in curve points enable precise I-V curve simulation. Log and report generation functions are also provided to record the curve variation process.

● Battery Simulation (Programmable Bidirectional DC Module)

Supports simulation of the output characteristics and charge/discharge characteristics of various battery packs, including lithium manganate, lithium cobalt oxide, lithium iron phosphate, nickel-metal hydride, ternary lithium, lithium titanate, and lead-acid batteries; Configurable parameters include the number of series and parallel connections, temperature, SOC, internal resistance, and single-cell capacity; Provides 1st-, 2nd-, and 3rd-order RC battery models with user-definable battery parameters, enabling comprehensive simulation of battery pack characteristics.

● Curve Import/Export

After a valid USB storage device is connected, press the "USB" button to switch to the data import interface.

Press "Export" to export the static curve data stored on the device to an external USB storage device; The screen will display "Exporting data...". If the operation is successful, "Data exported successfully!" will be displayed. After a successful export, the display will refresh the file list.

Press "Import" to import the currently selected file from the external USB storage device into the device. The screen will display the parameters contained in the file; The screen will display "Importing data...". If the operation is successful, "Data imported successfully!" will be displayed.

● Digital Paralleling System for Capacity Expansion Without Compromising Accuracy

Helion Series DC Module products are equipped with a fiber-optic Digital paralleling system. Even after paralleling, the system still maintains the same accuracy specifications as a standalone unit.

Helion Series DC Module products support parallel redundant operation. During operation, if some submodules enter protection other than output protection, the remaining DC modules can continue operating and actively redistribute current to ensure normal test execution.

06 | TECHNICAL SPECIFICATIONS

Mainframe Technical Specifications

Model		H-C6-9.9	H-C6-6.6
AC Input	Connection	3ph+PE (L1/L2/L3+PE)	2ph+PE (L1/L2+PE or L/N+PE)
	Rated Voltage	(200-480) Vac	L1-N: (200-240) Vac L1-L2: (200-440) Vac
	Rated Frequency	50/60Hz	
	Frequency Range	47Hz ~ 63Hz	
	Power Factor 01	0.99	
Channel Parameters	Internal Energy Circulation	Total unit loss shall not exceed the mainframe power distribution capacity	
	Non-Internal Energy Circulation	Total output power of the unit shall not exceed the power distribution capacity of the mainframe system	
	Channel Number	6	
	Channel Power	Max 3kW	
Insulation			
Insulation Resistance	Input-PE	500 Vdc, greater than 30 MΩ (25°C, 70% RH)	
Withstand Voltage	Input-PE	2210VAC	
Interfaces			
Interfaces	Control Interfaces	LAN: RJ45 connector USB: Type-A USB 2.0\Type-C、 Type B TF card slot, HDMI	
Standards			
Safety		IEC/EN 61010-1:2010	
EMC		IEC/EN 61326-1,classA	
Ambient			
Temperature	Operation 02	0°C ~ 50°C	
	Storage	-20°C ~ 70°C	
Humidity	Operation	≤ 80%. Not condensing	
	Storage	≤ 90%. Not condensing	
Altitude		≤2000m	
Others			
Dimensions		W435×H132×D750mm (without handle)	
Weight (without modules)		16.7kg	14.11kg

Note

01 Under rated input voltage and rated output power conditions;
02 Power Derating applies when the operating temperature exceeds 40°C. For detailed derating requirements, refer to the user manual.

AC Module Specifications

Grid simulation module Technical Specifications

Parameter	A1-3.0-450-16	1-1.6-450-16
Basic Information		
Output Mode	AC,AC+DC,DC	
Rated DC Voltage	630V	
Rated AC Voltage	450V	
DC Current Range	0 ~ 16A	
AC Current Range	0 ~ 16A	
Rated Power	3000VA	1650VA
Max Efficiency	94%	90%
AC Voltage		
Setting Range	0 ~ 472.5V @ 0.001Hz ~ 200Hz 0 ~ 300V @ 200Hz ~ 2000Hz 0~200V @ 2000Hz ~ 3000Hz 0 ~ 100V @ 3000Hz ~ 5000Hz	
Setting Accuracy 01	±(0.01%+0.05%F.S.) @ 15Hz ~ 400Hz ±(0.1%+0.2%F.S.) @ 400Hz ~ 3000Hz ±(0.2%+0.2%F.S.) @ 3000Hz ~ 5000Hz	
Setting Resolution	50mV	
DC Component 02	±20mV	
Harmonic Distortion 03	≤0.25% @ 50/60Hz ≤0.5% @ 15Hz ~ 400Hz ≤1% @ 400Hz ~ 1500Hz ≤3% @ 1500Hz ~ 5000Hz	
Line Regulation (±10%Uac)	±0.01% F.S	
Load Regulation	±0.025% F.S	
Voltage Slew Rate	>3V/μs	
Remote Sense Compensation	Max±2%F.S.±1V	
Frequency		
Setting Range	0.001Hz ~ 5000Hz	
Setting Accuracy	±0.01% @ 15Hz ~ 200Hz ±0.05% @ 200Hz ~ 1600Hz ±0.1% @ 600Hz ~ 5000Hz	
Setting Resolution 04	0.001Hz	

Harmonics	
Order	100th order @ 40Hz-70Hz fundamental frequency 25th order @ 70Hz-400Hz fundamental frequency 10th order @ 400Hz-1000Hz fundamental frequency
Total Harmonic Distortion (THD)	40% rated amplitude
Amplitude Error	±5% of setting value or 0.1% of fundamental value (up to 10th order @ 40-70Hz fundamental frequency)
Phase Angle Range	0° ~ 359.9°
DC Voltage	
Rated Voltage	±630V
Setting Range	-650V ~ 650V
Setting Accuracy 05	±(0.01%+0.05%F.S.)
Setting Resolution	50mV
Line Regulation (±10%Uac)	±0.01%F.S
Load Regulation	±0.05%F.S
Voltage Slew Rate	>3V/μs
Ripple Peak-to-Peak Value (20MHz) 06	2Vpp
Ripple RMS Value (300KHz) 06	200mVrms
Remote Sense Compensation	±2%F.S.±1V
AC Voltage Measurement	
Range	0 ~ 707Vrms
Resolution	10mV
Accuracy	±(0.01%+0.05% F.S) @ 15Hz ~ 400Hz ±(0.1%+0.1% F.S) @ 400Hz ~ 3000Hz ±(0.3%+0.3% F.S) @ 3000Hz ~ 5000Hz
AC Current Measurement	
Range	0 ~ ±18Arms
Resolution	5mA
Accuracy	±(0.1%+0.1% F.S) @ 15Hz ~ 200Hz ±(0.25%+0.25% F.S) @ 200Hz ~ 1000Hz
Peak Current Measurement	
Range	0 ~ ±60Apk
Resolution	15mA
Accuracy	±1% F.S.

Frequency Measurement		
Range	0.001Hz ~ 5000Hz	
Resolution	0.001Hz	
Accuracy	±0.01%	
Phase Measurement		
Range	0 ~ 360°	
Resolution	0.1° @ 15Hz～100Hz 1° @ 100Hz～5000Hz	
Accuracy	±1° @ 15Hz ~ 100Hz ±2° @ 100Hz ~ 1000Hz ±5° @ 1000Hz ~ 5000Hz	
Crest Factor Measurement		
Range 07	1.414 ~ 6.000	
Resolution	0.01	
Accuracy 08	±2.0% F.S.	
Active Power Measurement		
Range	0 ~ ±3600W	0 ~ ±1980W
Resolution	1W	
Accuracy 09	±0.2% F.S. @ 15Hz ~ 200Hz	
Apparent Power Measurement		
Range	0 ~ ±3600W	0 ~ ±1980W
Resolution	1W	
Accuracy 09	±0.2% F.S. @ 15Hz ~ 200Hz	
Power Factor Measurement		
Range	-1.000 ~ 1.000	
Resolution	0.01	
Accuracy	±1%F.S.	
Harmonic Measurement		
Fundamental Frequency Range	10Hz ~ 1000Hz	
Harmonic Analysis Upper Limit	2nd to 100th order, and ≤10 kHz	
DC Voltage Measurement		
Range	±1000V	

Resolution	50mV
Accuracy	±(0.01%+0.05% F.S.)
DC Current Meters	
Range	-18A ~ 18A
Resolution	5mA
Accuracy	±(0.1%+0.2% F.S.)
Programming	
Mode	LIST, WAVE, STEP, PULSE, Advanced, Harmonics, Interharmonics, 30 DST Groups
Min Programming Time	100μs
Waveform Step	300 steps
Waveform Types	Sine, triangle, square, pulse, clipped wave, half-wave, custom waveforms, and 100+ additional waveform types
Sync or Trigger Source	Internal, External
Data Source	Edit, Import, Export
Inner Standards	
AC IEC61000	4-11、4-13、4-14、4-17、4-27、4-28、4-29
Output Protection	
Over RMS Current Protection	Setting range: 0 to 110% F.S.; output is disconnected upon overcurrent
Overpower Protection	Setting range: 0 to 110% F.S.; output shuts off upon overpower
Overload Protection	Setting range: 0 to 110% F.S.; output shuts off upon overload
DC Overvoltage Protection	Setting range: 0 to 110% F.S.; output shuts off upon overvoltage
AC Overvoltage Protection	Setting range: 0 to 110% F.S.; output shuts off upon overvoltage
Under-Frequency Protection	Setting range: 0.001 Hz to 5000.000 Hz; output shuts off upon over-/under-frequency
Interfaces	
Power Interface	Plug-in connector
Control Interface	Remote Sense Connector; ANYPORT; Parallel operation port; Indicator
Standard	
Safety	IEC/EN 61010-1:2010
EMC	IEC/EN 61326-1, classA
Environmental	
Operating Temperature ⑩	0°C to 50°C (Power Derating above 40°C)

	Storage Temperature	-20°C ~ 70°C
	Operating Humidity	≤ 80%. Not condensing
	Storage Humidity	≤ 90%. Not condensing
	Altitude	≤2000m
	Cooling	Forced-Air Cooling (airflow directed toward the rear panel)
	Dimensions and Weight	
	Dimensions	W127×D665×H50mm (without handle)
	Weight	≤4.8kg

Note

01. In the parameter table, all F.S. values related to AC output voltage refer to the AC rated voltage;
02. The DC component is tested at rated output voltage and 50 Hz under no-load conditions;
03. Tested with the output voltage set to the rated maximum output voltage, using a purely resistive load at rated output power;
04. Resolution is 0.001 Hz or 0.01% of the current setting, whichever is greater;
05. In the parameter table, all occurrences of F.S. for parameters related to DC output voltage refer to the rated DC output voltage;
06. Output ripple voltage is measured with the DC output voltage set to the rated output voltage and at no load;
07. Crest factor refers to the ratio of peak current to RMS current. The typical value for a standard sine wave is 1.414, and the maximum allowable value is 6; however, the peak current shall not exceed the Maximum Current of a Single Unit. This does not indicate the crest factor under rated conditions;
08. In the parameter table, all occurrences of F.S. for parameters related to output peak current refer to the maximum peak output current;
09. In the parameter table, F.S. for parameters related to output power refers to Rated Output Power;
10. Power Derating applies above 40°C. For detailed derating requirements, refer to the User manual.

*** CE certification is valid only within the frequency range of 0–200 Hz.**

AC Source/Load Module Technical Specifications

Parameter	A2-3.0-450-16	A2-1.6-450-16
Basic Information		
Output Mode	AC,AC+DC,DC	
Rated DC Voltage	630V	
Rated AC Voltage	450V	
DC Current Range	0 ~ 16A	
AC Current Range	0 ~ 16A	
Rated Power	3000VA	1650VA
Max Efficiency	94%	90%
AC Voltage		
Setting Range	0 ~ 472.5V @ 0.001Hz ~ 200Hz 0 ~ 300V @ 200Hz ~ 2000Hz 0~200V @ 2000Hz ~ 3000Hz 0 ~ 100V @ 3000Hz ~ 5000Hz	
Setting Accuracy [01]	±(0.01%+0.05%F.S.) @ 15Hz ~ 400Hz ±(0.1%+0.2%F.S.) @ 400Hz ~ 3000Hz ±(0.2%+0.2%F.S.) @ 3000Hz ~ 5000Hz	
Setting Resolution	50mV	
DC Component [02]	±20mV	
Harmonic Distortion [03]	≤0.25% @ 50/60Hz ≤0.5% @ 15Hz ~ 400Hz ≤1% @ 400Hz ~ 1500Hz ≤3% @ 1500Hz ~ 5000Hz	
Line Regulation (±10%Uac)	±0.01% F.S	
Load Regulation	±0.025% F.S	
Voltage Slew Rate	>3V/μs	
Remote Sense Compensation	Max±2%F.S.±1V	
AC Current		
RMS Setting Range	0 ~ 16.8A @ 15Hz ~ 500Hz	
Peak Setting Range	0 ~ 40A	
Setting Accuracy [11]	±(0.1%+0.3%F.S.) @ 15Hz ~ 500Hz	
Setting Resolution	5mA	
Crest Factor	1.414 ~ 6.000	

Frequency	
Setting Range	0.001Hz ~ 5000Hz
Setting Accuracy	±0.01% @ 15Hz ~ 200Hz ±0.05% @ 200Hz ~ 1600Hz ±0.1% @ 600Hz ~ 5000Hz
Setting Resolution 11	0.001Hz
Harmonics	
Order	100th order @ 40Hz-70Hz fundamental frequency 25th order @ 70Hz-400Hz fundamental frequency 10th order @ 400Hz-1000Hz fundamental frequency
Total Harmonic Distortion (THD)	40% rated amplitude
Amplitude Error	±5% of setting value or 0.1% of fundamental value (up to 10th order @ 40-70Hz fundamental frequency)
Phase Angle Range	0° ~ 359.9°
RLC Load	
Resistance Range	0.001Ω-10000Ω
Inductance Range	1mH-50000mH
Capacitance Range	1uF-50000uF
DC Voltage	
Rated Voltage	±630V
Setting Range	-650V ~ 650V
Setting Accuracy 05	±(0.01%+0.05%F.S.)
Setting Resolution	50mV
Line Regulation (±10%Uac)	±0.01%F.S
Load Regulation	±0.05%F.S
Voltage Slew Rate	>3V/μs
Ripple Peak-to-Peak Value (20MHz) 06	2Vpp
Ripple RMS Value (300KHz) 06	200mVrms
Remote Sense Compensation	±2%F.S.±1V
DC Current	
Setting Range	±16.8A
Setting Accuracy	±(0.1%+0.3%F.S.)
Setting Resolution	5mA

AC Voltmeter		
Range	0 ~ 707Vrms	
Resolution	50mV	
Accuracy	±(0.01%+0.05% F.S) @ 15Hz ~ 400Hz ±(0.1%+0.1% F.S) @ 400Hz ~ 3000Hz ±(0.3%+0.3% F.S) @ 3000Hz ~ 5000Hz	
AC Current Measurement		
Range	0 ~ ±18Arms	
Resolution	5mA	
Accuracy	±(0.1%+0.3% F.S) @ 15Hz ~ 500Hz	
Peak Current Measurement		
Range	0 ~ ±60Apk	
Resolution	15mA	
Accuracy	±1% F.S.	
Frequency Measurement		
Range	0.001Hz ~ 5000Hz	
Resolution	0.001Hz	
Accuracy	±0.01%	
Phase Measurement		
Range	0 ~ 360°	
Resolution	0.1° @ 15Hz ~ 100Hz 1° @ 100Hz ~ 5000Hz	
Accuracy	±1° @ 15Hz ~ 100Hz ±2° @ 100Hz ~ 1000Hz ±5° @ 1000Hz ~ 5000Hz	
Crest Factor Measurement		
Range 07	1.414 ~ 6.000	
Resolution	0.01	
Accuracy 08	±2.0% F.S.	
Active Power Measurement		
Range	0 ~ ±3600W	0 ~ ±1980W
Resolution	1W	
Accuracy 09	±0.2% F.S. @ 15Hz ~ 200Hz	

Apparent Power Measurement		
Range	0 ~ ±3600W	0 ~ ±1980W
Resolution	1W	
Accuracy	±0.2% F.S. @ 15Hz ~ 200Hz	
Power Factor Measurement		
Range	-1.000 ~ 1.000	
Resolution	0.01	
Accuracy	±1%F.S.	
Harmonic Measurement		
Fundamental Frequency Range	10Hz ~ 1000Hz	
Harmonic Analysis Upper Limit	2nd to 100th order, and ≤10 kHz	
DC Voltage Measurement		
Range	±1000V	
Resolution	50mV	
Accuracy	±(0.01%+0.05% F.S.)	
DC Current Measurement / DC Current Meters		
Range	-18A ~ 18A	
Resolution	5mA	
Accuracy	±(0.1%+0.2% F.S.)	
Programming Settings /Programming		
Mode	LIST, WAVE, STEP, PULSE, Advanced, Harmonics, Interharmonics, 30 DST Groups	
Min Programming Time	100μs	
Waveform Step	300 steps	
Waveform Types	Sine, triangle, square, pulse, clipped wave, half-wave, custom waveforms, and 100+ additional waveform types	
Sync or Trigger Source	Internal, External	
Data Source	Edit, Import, Export	
Inner Standards		
AC IEC61000	4-11、4-13、4-14、4-17、4-27、4-28、4-29	
Output Protection		
Over RMS Current Protection	Setting range: 0 to 110% F.S.; output is disconnected upon overcurrent	
Overpower Protection	Setting range: 0 to 110% F.S.; output shuts off upon overpower	

Overload Protection	Setting range: 0 ~ 110% F.S.; output shuts off upon overload
DC Overvoltage Protection	Setting range: 0 ~ 110% F.S.; output shuts off upon overvoltage
AC Overvoltage Protection	Setting range: 0 ~ 110% F.S.; output shuts off upon overvoltage
Under-Frequency Protection	Setting range: 0.001 Hz ~ 5000.000 Hz; output shuts off upon over-/under-frequency
Interfaces	
Power Interface	Plug-in connector
Control Interface	Remote Sense Connector; ANYPORT; Parallel operation port; Indicator
Standard	
Safety	IEC/EN 61010-1:2010
EMC	IEC/EN 61326-1, classA
Environmental	
Operating Temperature ⑩	0°C ~ 50°C (Power Derating above 40°C)
Storage Temperature	-20°C ~ 70°C
Operating Humidity	≤ 80%. Not condensing
Storage Humidity	≤ 90%. Not condensing
Altitude	≤2000m
Cooling	Forced-Air Cooling (airflow directed toward the rear panel)
Dimensions and Weight	
Dimensions	W127×D665×H50mm (without handle)
Weight	≤4.8kg

Note

⑴ In the parameter table, all F.S. values related to AC output voltage refer to the AC rated voltage;

⑵ The DC component is tested at rated output voltage and 50 Hz under no-load conditions;

⑶ Tested with the output voltage set to the rated maximum output voltage, using a purely resistive load at rated output power;

⑷ Resolution is 0.001 Hz or 0.01% of the current setting, whichever is greater;

⑸ In the parameter table, all occurrences of F.S. for parameters related to DC output voltage refer to the rated DC output voltage;

⑹ Output ripple voltage is measured with the DC output voltage set to the rated output voltage and at no load;

⑺ Crest factor refers to the ratio of peak current to RMS current. The typical value for a standard sine wave is 1.414, and the maximum allowable value is 6; however, the peak current shall not exceed the Maximum Current of a Single Unit. This does not indicate the crest factor under rated conditions;

⑻ In the parameter table, all occurrences of F.S. for parameters related to output peak current refer to the maximum peak output current;

⑼ In the parameter table, F.S. for parameters related to output power refers to Rated Output Power;

⑽ Power Derating applies above 40°C. For detailed derating requirements, refer to the User manual.

⑾ In the parameter table, all F.S. values associated with AC refer to the maximum peak current of the corresponding model; testing is conducted under operating conditions above 10% F.S. current.

*** CE certification is valid only within the frequency range of 0-200 Hz.**

DC Module Technical Specifications

Bidirectional DC Module Technical Specifications

Parameter	Bidirectional DC Module	
	160V Output Specifications	100V Output Specifications
Voltage Regulation		
Setting Range	0V ~ 163.2V	0V ~ 102V
Setting Accuracy 01	≤±(0.02%+30mV)	≤±(0.02%+20mV)
Setting Resolution	10mV	
Line Regulation (±10%Uac)	±0.01%F.S.	
Load Regulation (0~100%Load)	±0.02%F.S.	
Transient Recovery Time (10~90% Load Step) 02	0.8ms	
Rise Time (Full Load) 03	10ms	
Rise Time (No Load) 03	5ms	
Fall Time (Full Load) 03	5ms	
Fall Time (Without Load) 03	10ms	
Ripple Peak-to-Peak Value (20MHz) 04	200mVpp	
Ripple RMS Value (300kHz) 04	40mVrms	
Remote Sense Compensation	≤6.0V	
Current Regulation		
Setting Range	3 kW rating: 0 ~ ±51 A 1.65 kW rating: 0 ~ ±30.6 A 0.85 kW rating: 0 ~ ±15.3 A	3 kW rating: 0 ~ ±61.2 A 1.65 kW rating: 0 ~ ±45.9 A 0.85 kW rating: 0 ~ ±30.6 A
Setting Accuracy 05	3 kW rating: ±(0.02% + 10 mA) 1.65 kW rating: ±(0.02% + 10 mA) 0.85 kW rating: ±(0.02% + 5 mA)	±(0.02%+10mA)
Setting Resolution	10mA	
Line Regulation (±10%Uac)	±0.02%F.S.	
Fall Time (Without Load)	±0.02%F.S.	
Load Regulation (ΔU=90%Uo)	5ms	
Rise Time (10%~90% rating) 03	5ms	
Power Regulation		
Setting Range	3 kW model: 0 ~ ±3150 W 1.65 kW model: 0 ~ ±1732.5 W 0.85 kW model: 0 ~ ±892.5 W	3 kW model: 0 ~ ±3150 W 1.65 kW model: 0 ~ ±1732.5 W 0.85 kW model: 0 ~ ±892.5 W

Setting Accuracy	3 kW model: ±0.2% F.S. 1.65 kW model: ±0.4% F.S. 0.85 kW model: ±0.6% F.S.	
Setting Resolution	0.15W	
Resistance Regulation		
Setting Range	0 ~ 3000Ω	
Setting Accuracy	5mΩ	
Setting Resolution	10mΩ	
Voltage Meters		
Range	0 ~ 192V	0 ~ 120V
Resolution	10mV	
Accuracy	≤±(0.02%+30mV)	≤±(0.02%+20mV)
Current Meters		
Range	3 kW model: 0 ~ ±60 A 1.65 kW Model: 0 ~ ±36 A 0.85 kW Model: 0 ~ ±18 A	3 kW Model: 0 ~ ±72 A 1.65 kW Model: 0 ~ ±54 A 0.85 kW Model: 0 ~ ±36 A
Resolution	10mV	
Accuracy	3 kW rating: ±(0.02% + 10 mA) 1.65 kW rating: ±(0.02% + 10 mA) 0.85 kW rating: ±(0.02% + 5 mA)	±(0.02%+10mA)
Power Meters		
Range	3 kW Model: 0 to ±3600 W 1.65 kW Model: 0 to ±1980 W 0.85 kW Model: 0 to ±1020 W	
Resolution	0.15W	
Accuracy	3 kW model: ±0.2% F.S. 1.65 kW model: ±0.4% F.S. 0.85 kW model: ±0.6% F.S	
Programming		
Digital Programming	Used with the system	
Analog Programming	Supports voltage and current programming	
Output Protection		
Overcurrent Protection	Setting range: 0 ~ 110% F.S.; output is disconnected upon overcurrent	
Overpower Protection	Setting range: 0 ~ 110% F.S.; output is disconnected in the event of overpower	

Overvoltage Protection	Setting range: 0 ~ 110% F.S.; output is disconnected in the event of overvoltage
Overtemperature Protection	Output is disconnected in the event of internal overtemperature
Interfaces	
Power Interface	Power Busbar, M5 Screw; with Protective Cover
Control Interface	Remote Sense Connector; ANYPORT; Parallel operation port; Indicator
Standard	
Safety	IEC/EN 61010 ~ 1:2010
EMC	IEC/EN 61326-1, classA
Environmental	
Operating Temperature [10]	0°C ~ 50°C
Storage Temperature	-20°C ~ 70°C
Operating Humidity	≤ 80%. Not condensing
Storage Humidity	≤ 90%. Not condensing
Altitude	≤2000m
Cooling	Forced-Air Cooling (airflow directed toward the rear panel)
Dimensions and Weight	
Dimensions	W127×D665×H50mm (without handle)
Weight	≤4.9kg

Note

[01] In the parameter table, F.S. for parameters related to output voltage and current refers to the rated output voltage and current;

[02] 10–90% Load Step, recovery to within ±0.75% F.S. of steady state;

[03] Voltage and current rise/fall time refers to the actual output transition time when the set value changes from 10% to 90% or from 90% to 10% of the rated output; OUT output ON/OFF is not included;

[04] Ripple Parameters indicate the worst-case value over the 10% to 100% rated output voltage range and across the full resistive load range;

[05] The data in the parameter table were measured under resistive load conditions;

[06] The data in the parameter table were measured with the setting value within 1 Ω;

[07] Power Derating applies above 40°C. For specific derating criteria, refer to the Datasheet.

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DC Module Technical Specifications

Bidirectional DC Module Technical Specifications

Parameter	PV Simulation Module	
	160V Output Specifications	100V Output Specifications
Voltage Regulation		
Setting Range	0V ~ 163.2V	0V ~ 102V
Setting Accuracy 01	≤±(0.02%+30mV)	≤±(0.02%+20mV)
Setting Resolution	10mV	
Line Regulation (±10%Uac)	±0.01%F.S.	
Load Regulation (0~100%Load)	±0.02%F.S.	
Transient Recovery Time (10~90% Load Step) 02	0.8ms	
Rise Time (Full Load) 03	10ms	
Rise Time (No Load) 03	5ms	
Fall Time (Full Load) 03	5ms	
Fall Time (Without Load) 03	10ms	
Ripple Peak-to-Peak Value (20MHz) 04	200mVpp	
Ripple RMS Value (300kHz) 04	40mVrms	
Remote Sense Compensation	≤6.0V	
Current Regulation		
Setting Range	3 kW model: 0 ~ 51 A 1.65 kW model: 0 ~ 30.6 A 0.85 kW rating: 0 ~ 15.3 A	3 kW rating: 0 ~ 61.2 A 1.65 kW rating: 0 ~ 45.9 A 0.85 kW rating: 0 ~ 30.6 A
Setting Accuracy 05	3 kW rating: ±(0.02% + 10 mA) 1.65 kW rating: ±(0.02% + 10 mA) 0.85 kW rating: ±(0.02% + 5 mA)	±(0.05%+10mA)
Setting Resolution	10mA	
Line Regulation (±10%Uac)	±0.02%F.S.	
Load Regulation (ΔU=90%Uo)	±0.02%F.S.	
Rise Time (10%~90% rating) 03	5ms	
Fall Time (90%~-10%rating) 03	5ms	
Power Regulation		
Setting Range	3 kW rating: 0 ~ 3150 W 1.65 kW rating: 0 ~ 1732.5 W 0.85 kW rating: 0 ~ 892.5 W	3 kW rating: 0 ~ 3150 W 1.65 kW rating: 0 ~ 1732.5 W 0.85 kW rating: 0 ~ 892.5 W

Setting Accuracy	3 kW model: ±0.2% F.S. 1.65 kW model: ±0.4% F.S. 0.85 kW model: ±0.6% F.S.	
Setting Resolution	0.15W	
Resistance Regulation		
Setting Range	0 ~ 3000Ω	
Setting Accuracy	5mΩ	
Setting Resolution	10mΩ	
Voltage Meters		
Range	0 ~ 192V	0 ~ 120V
Resolution	10mV	
Accuracy	≤±(0.02%+30mV)	≤±(0.02%+20mV)
Current Meters		
Range	3 kW model: 0 ~ 60 A 1.65 kW Model: 0 ~ 36 A 0.85 kW Model: 0 ~ 18 A	3 kW Model: 0 ~ 72 A 1.65 kW Model: 0 ~ 54 A 0.85 kW Model: 0 ~ 36 A
Resolution	10mV	
Accuracy	3 kW rating: (0.02% + 10 mA) 1.65 kW rating: (0.02% + 10 mA) 0.85 kW model: (0.02%+5 mA)	±(0.02%+10mA)
Power Meters		
Range	3 kW Model: 0 ~ 3600 W 1.65 kW Model: 0 ~ 980 W 0.85 kW Model: 0 ~ 1020 W	
Resolution	0.15W	
Accuracy	3 kW model: ±0.2% F.S. 1.65 kW model: ±0.4% F.S. 0.85 kW model: ±0.6% F.S	
Programming		
Digital Programming	Used with the system	
Analog Programming	Supports voltage and current programming	
Output Protection		
Overcurrent Protection	Setting range: 0 ~ 110% F.S.; output is disconnected upon overcurrent	
Overpower Protection	Setting range: 0 ~ 110% F.S.; output is disconnected in the event of overpower	

Overvoltage Protection	Setting range: 0 ~ 110% F.S.; output is disconnected in the event of overvoltage
Overtemperature Protection	Output is disconnected in the event of internal overtemperature
Interfaces	
Power Interface	Power Busbar, M5 Screw; with Protective Cover
Control Interface	Remote Sense Connector; ANYPORT; Parallel operation port; Indicator
Standard	
Safety	IEC/EN 61010 ~ 1:2010
EMC	IEC/EN 61326-1, classA
Environmental	
Operating Temperature 10	0°C ~ 50°C
Storage Temperature	-20°C ~ 70°C
Operating Humidity	≤ 80%. Not condensing
Storage Humidity	≤ 90%. Not condensing
Altitude	≤2000m
Cooling	Forced-Air Cooling (airflow directed toward the rear panel)
Dimensions and Weight	
Dimensions	W127×D665×H50mm (without handle)
Weight	≤4.9kg

Note

01 In the parameter table, F.S. for parameters related to output voltage and current refers to the rated output voltage and current;

02 10–90% Load Step, recovery to within ±0.75% F.S. of steady state;

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04 Ripple Parameters indicate the worst-case value over the 10% to 100% rated output voltage range and across the full resistive load range;

05 The data in the parameter table were measured under resistive load conditions;

06 The data in the parameter table were measured with the setting value within 1 Ω;

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