爱科赛博
ACTIONPOWER

PRO

Bidirectional DC
Programmable Power Supply
MODEL PRD

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XI'AN ACTIONPOWER ELECTRIC CO.,LTD.

Product Overview

The PRD series bi-directional programmable DC power supply is a power supply with source and load function, automatic two-quadrant operation and the ability to absorb energy from unit under test(UUT) and feedback to the grid. It is widely used in PV inverters, energy storage system, solar panel simulation and energy storage battery/capacitor simulation in PV/storage inverter system. Also suitable for electric vehicles on-board charger, DC/AC motor drivers, bi-directional DC converter simulation battery testing and other applications.

Built-in independent high-precision voltage and current measurement system, sophisticated programming concept. The dynamic characteristics, which are as fast as microseconds, take DC product testing to a whole new level and allow the simulation of abnormal field conditions in the laboratory.

Selection
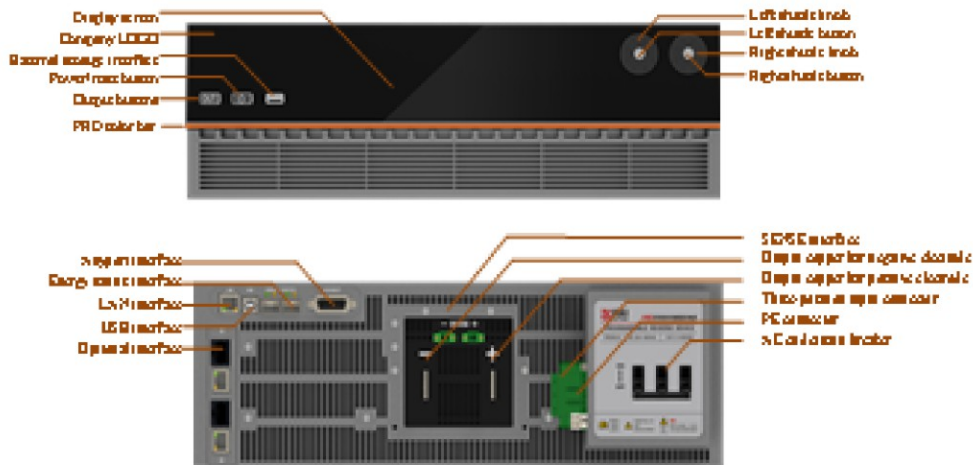
Power	Model	Voltage	Current
30kW	PRD0224	200V	±240A
	PRD0324	360V	±240A
	PRD0518	500V	±180A
	PRD0618	600V	±180A
	PRD0808	800V	±80A
	PRD1008	1000V	±80A
	PRD1506	1500V	±60A
	PRD2006	2000V	±60A

Selection ✿

Power	Model	Voltage	Current
20kW	PRD4V66E	40V	±667A
	PRD6V66E	60V	±667A
	PRD8V66E	80V	±667A
	PRD0216E	200V	±240A
	PRD0316E	360V	±240A
	PRD0512E	500V	±180A
	PRD0612E	600V	±180A
	PRD0805E	800V	±80A
	PRD1005E	1000V	±80A
	PRD1504E	1500V	±60A
	PRD2004E	2000V	±60A
15kW	PRD4V50E	40V	±667A
	PRD6V50E	60V	±667A
	PRD8V50E	80V	±667A
	PRD0212E	200V	±160A
	PRD0312E	360V	±160A
	PRD0509E	500V	±120A
	PRD0609E	600V	±120A
	PRD0804E	800V	±54A
	PRD1004E	1000V	±54A
	PRD1503E	1500V	±45A
	PRD2003E	2000V	±45A

Advantages

High dynamics: dynamic response times in the hundred-us level

PRD model delivers dynamic performances about 100 microsecond level. Bringing DC product testing to a totally progressive level. In addition, it capable to generate abnormal conditions in the laboratory.
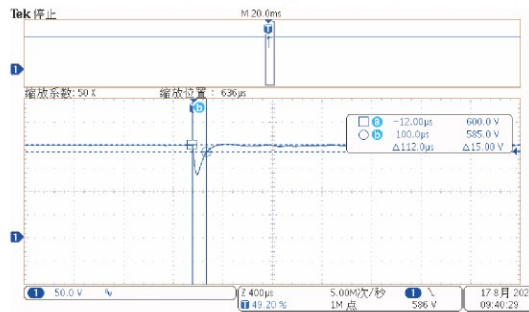
Transient full load, response time is 112μs

High accuracy

Up to 6½ digit measurement system; voltage and current accuracy are up to mV/mA level

PRD model has a built-in independent high precision voltage and current measurement system, with performance comparable to a 6½ digit multi-meters, saving the cost for a high precision DC voltmeter, high precision ammeter, power meter and impedance meter. The device data can be used as a basis for product performance judgement, and when used as a PV inverter tester, the high accuracy measurement system can more accurately measure the tracking efficiency of the product under test.

PRD measuring voltage vs. 6½ digit voltmeter

Digital matrix parallel system, expansion without loss of accuracy

PRD model is equipped with a matrix, high-speed fiber-optic digital parallel system that can combine up to 100 units into a complete system, creating a total power up to 3000 kW. After parallel connection, the performance of the system still equivalent to the standards of a single machine.

PRD model is equipped with parallel redundancy, so that if some of the slaves are protected on the non-output or AC side during operation, the remaining PRDs can continue to operate and actively distribute the current to ensure the normal conduct of the test.

Advantages ✿

▪ Automatic sourcing and load

Automatic "source" and "load": The full range of PRDs are equipped with bi-directional DC source and feed-back load functions, two-quadrant operation, automatic smooth and fast online switching, i.e. automatic "source" and "load" conversion. "load" conversion function, no delay in the transition between the two states, effectively avoiding voltage or current overshoot.
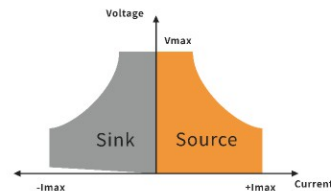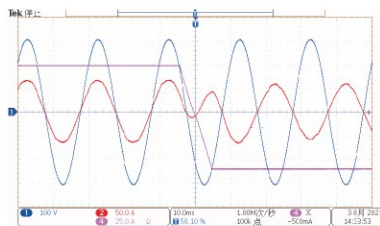

Automatic power: Regardless of "source" or "load" conditions, the full range of PRD has a constant power characteristic capable of high current output at low voltage or low current output at high voltage.

Ultra-high power ratio: Some PRD models can provide up to 4 times the power ratio, i.e. the rated power can be output at 1/4 of the maximum voltage, which is reflected in a wide voltage output range and a wide current output range.

▪ Function Generation

The full range of PRD can superimpose sine, triangle, pulse and square waves on the DC output; the frequency resolution of the expected waveform output waveform is 0.01, up to 10kHz; the DC component value of the expected output waveform, with a resolution of 0.001; to meet the test article for DC voltage ripple adaptability testing.
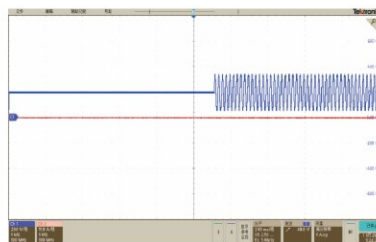
DC200V superimposed on AC100V sine wave

▪ High power density: 3U/30kW

PRD model has the highest power density and feed-back efficiency compared to similar products, with up to 30kW of power in a 3U volume and a light weight of 35kg. A single standard 42U cabinet can be configured with 300kW capacity, and the matrix parallel system can be easily expanded to 3MW capacity, which greatly reduces the test fields and meets the transportation, load-bearing and power distribution requirements of standard commercial office buildings.
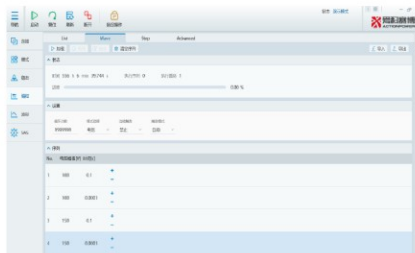
Product Features

▪ Programmable Function

In addition to the traditional List, Wave, Step and Advanced programming functions, PRD model also supports function editing, sine wave, pulse wave, triangle wave and custom wave programming functions to meet the individual needs of product development and testing, regulatory testing and certification, production line testing and quality control.
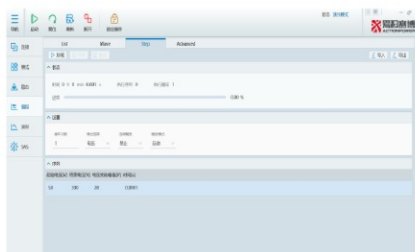
The programming data can be saved and exported to another machine for operation, reducing the user's workload.
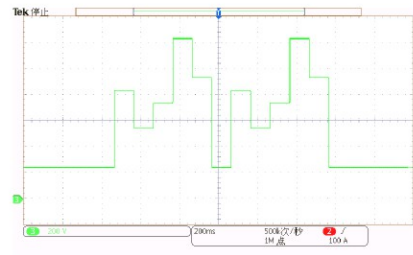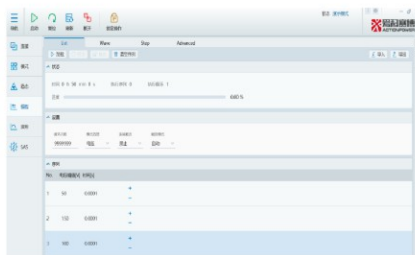
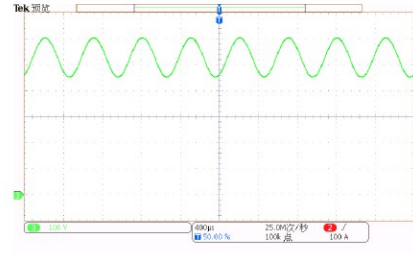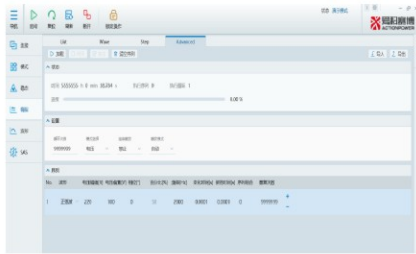List programming interface Programming waveform example

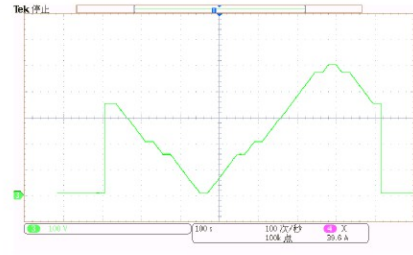Wave programming interface Programming waveform example

Step programming interface Programming waveform example

Product Features

Superimposed 2000Hz sine wave programming interface Programming waveform example
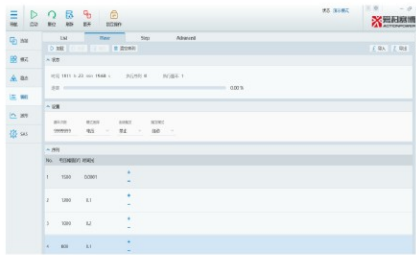
VW80300 EHV-03 High Voltage Cycle Programming Interface Programming Waveform Example

- **Four output modes**

The PRD has four modes of constant voltage (CV), constant current (CC), constant power (CP) and constant resistance (CR) indication, of which the CC, CV and CP modes can be switched automatically according to the formula P=UI, i.e. the PRD will work in this mode when any of the voltage, current or power parameters at the output reaches the limit value first.

CV Mode   CC Mode   CP Mode   CR Mode
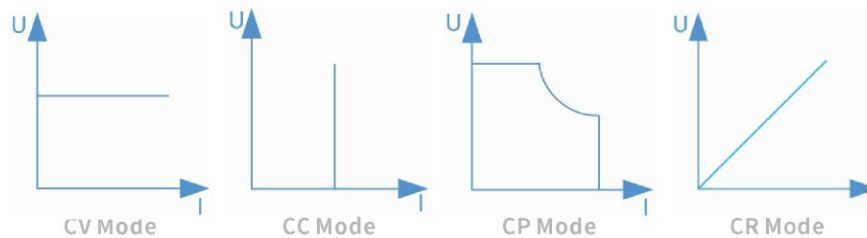
Product Features

■ **SAS mode**

The SAS solar cell simulator function can accurately simulate the output I-V characteristic curve of solar panels, with built-in SAS models from EN50530, Sandia, CGC/GF004, CGC/GF035 and other standards, for testing static and dynamic MPPT of PV inverters. For MPPT efficiency, the "Programmable Power Supply Virtual Terminal" software is required for complete testing of the PV industry.

Its high precision measurement and control system enables more accurate testing of the maximum tracking efficiency of solar inverters. The I-V curve can be simulated by setting parameters such as Voc and Isc. It supports the simulation of a wide range of panel types, with shading masking and custom curve editing functions. Built-in curves up to 4096 points to accurately simulate I-V curves. Log and report generation to record curve changes.

Static Curve
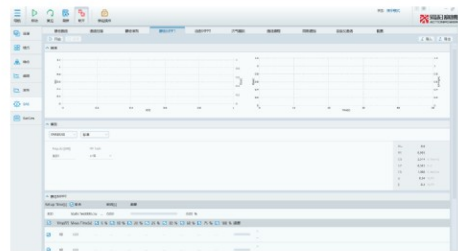
Curve Programming
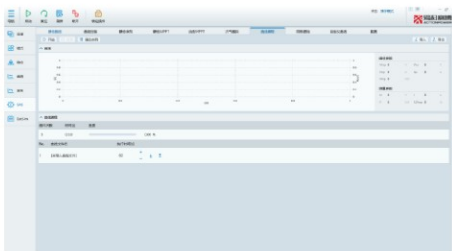
Static MPPT

Dynamic MPPT

Weather Simulation

Shading of photovoltaic panels

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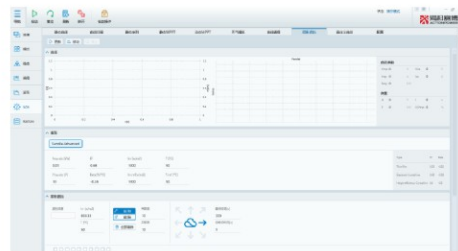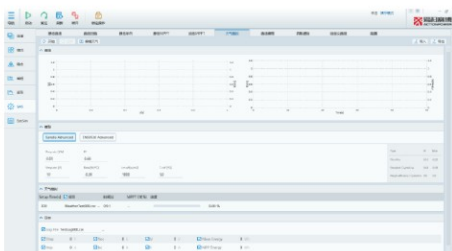
Product Features �

■ **Battery simulation**

It can simulate the output characteristics, charge and discharge characteristics of various battery packs such as LiMn2O4, LiCoO2, LiFePO4, NiMH, Ternary Li, LiTiO2 and PbO2 batteries; it can set parameters such as the number of series and parallel connections, temperature, SOC, internal resistance and single cell capacity; it is open to 1st, 2nd and 3rd order RC battery models and can customize battery parameters; thus, comprehensively simulating the characteristics of battery packs.
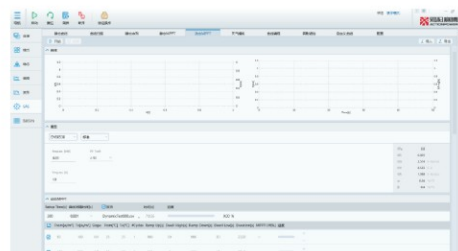

Battery simulation status screen
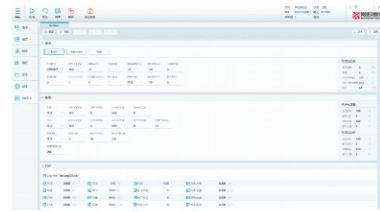
Battery Simulation Parameter Setting Interface

■ **Curve import and export**

Once a valid USB storage device is plugged in, clicking on the "USB" button will switch to the data import screen.

Press "Export" to export the static curve data from the device to an external USB memory device; the screen will display "Data export in progress..." If the operation is successful, "Data export successful!" will be displayed. ." will be displayed. If the export is successful, the display will be refreshed with a list of files.

Pressing "Import" will import the file from the currently selected external USB memory device into the device and the parameters in the file will be displayed on the screen; "Data import in progress..." will be displayed on the screen If the operation is successful, the display will show "Data imported successfully.

Product Features

■ **Waveform display**

The unique waveform reproduction function, which comes with its own display in the absence of an oscilloscope, provides an overview of the output status and solves the problem of temporarily viewing the output waveform.

■ **Large aspect ratio touch screen**

The PRD features an 8.8" screen, high resolution LCD touch display screen for user to operate and control.

Dimensions

PRD models conform to a standard 19" chassis configuration and can be used in standard cabinet systems or desktop applications.
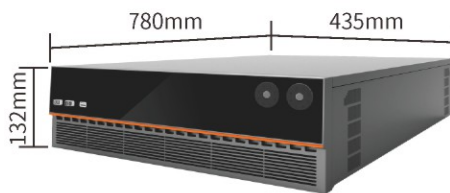
26U cabinet   42U cabinet

Cabinet models available: PRD-26U, PRD-42U

Cabinet	Dimensions (W * D * H) (mm)	Range of applications
26U	600×800×1338	For 2-5 power supplies in parallel
42U	600×800×2050	For 5-8 power supplies in parallel

Specification

Indicators	Technical parameters				
Output Voltage	40V/60V/80V	200V/360V	500V/600V	800V/1000V	1500V/2000V
AC input					
Voltage Range	304Vac~480Vac/380V±20%				
Frequency	47Hz to 63Hz				
Wiring mode	3ph+PE				
Inrush current	<50A				
Efficiency up to	93.5%	94%	95%	94%	95%
Power Factor	0.99				
Protective functions					
OVP	Overvoltage protection, adjustable 0 - 110% UNominal (±1% F.S.)				
OCP	Overcurrent protection, Adjustable 0V- ±110% INominal (±1% F.S.)				
OPP	Over-power protection, range 0V ~ ±110% PNominal (±1% F.S.)				
OT	Overtemperature protection				
Voltage					
Programming accuracy	± 0.02%F.S.				
Programming resolution	± 1mV	± 10mV			
Display accuracy	± 0.02%F.S.				
Line regulation CV	± 0.01% F.S. (208V-480V AC±10% input voltage, constant load and constant temperature)				
Load regulation CV	± 0.01% F.S. (0-100% load, constant input voltage and constant temperature)				
Ripple (rms) CV	<25mV	<60mV	<200mV	<200mV	<400mV
Ripple and noise p-p CV	<300mVpp	<480mVpp	<1000mVpp	<1200mVpp	<2400mVpp
Remote compensation	Max.Voltage±1V	Max.Voltage and 2%F.S.±1V			
Rise time 10%-90% CV	1ms	500μs			
Fall time 90%-10% CV	1ms	500μs			
Voltage swing rate	150V/ms	200V/ms	1500V/ms	600V/ms	5000V/ms
Recovery time	Recovery to steady state within 2.5ms ± 0.75%F.S. (25%-50% or 50% -25%)load	Recovery to steady state within 500μs ±0.75% F.S. (50% -100% or 100% -50% load)			
Discharge time	≤20s	≤20s	≤30s	≤20s	≤30s

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Specification ✳

Indicators	Technical parameters				
Output Voltage	40V/60V/80V	200V/360V	500V/600V	800V/1000V	1500V/2000V
Current					
Programming accuracy	± 0.15% F.S.	± 0.02% F.S.			
Programming resolution	± 100mA	± 10mA			
Display accuracy	± 0.15% F.S.	± 0.02% F.S.			
Display resolution	± 10mA	± 1mA			
Line regulation CC	± 0.01% F.S. (208V-480V AC±10% input voltage, constant load and constant temperature)				
Load regulation CC	± 0.05% F.S. (0-100% load, constant input voltage and constant temperature)				
Rise time 10% - 90% CC	1ms	500μs			
Full time 90% - 10% CC	1ms	500μs			
Power					
Programming accuracy	± 30W	± 3W	±0.01% F.S.	± 3W	±0.01% F.S.
Programming resolution	± 10W	± 1W			
Display accuracy	± 30W	± 3W			
Display resolution	± 10W	± 1W			
Resistance					
Range	0.003-100Ω	0.05-100Ω	0.5-3000Ω	0.05-100Ω	0.5-3000Ω
Programming accuracy	1mΩ	0.01Ω	0.1Ω	0.01Ω	0.1Ω
Programming resolution	1mΩ	0.01Ω	0.1Ω	0.01Ω	0.1Ω

Specification

Indicators	Technical parameters				
Output Voltage	40V/60V/80V	200V/360V	500V/600V	800V/1000V	1500V/2000V
SAS					
Short-circuit current setting range	0A~Ie				
Simulated fill factor range	0.3~0.95				
Photovoltaic panel type selection	C-Si, Thin-film, Custom				
I-V curve update rate	Typical time 1ms, with online curve switching function				
IV curve criteria	EN50530, Sandia, simple				
IV curve function	Static curves; curve scanning; static sequences; static MPPT; dynamic MPPT; weather simulation; Shading of photovoltaic panels; curve programming; custom curves etc.				
Curve setting	1)IV curves can be customized with parameters such as Voc, Isc, FF and Pm;				
	2)Dynamic working mode takes into account environmental influences such as temperaturechanges and irradiance, and can continuously output IV curves for different environments;				
	3)Built-in EN50530/Sandia dynamic I-V curve test program；				
Battery simulation					
Battery type	Simulate different battery types such as lithium manganate, lithium Cobaltate, lithium iron phosphate, Nickel-metal hydride, Ternary lithium, lithium titanate and lead-acid batteries; Customize battery types, freely set 1st, 2nd and 3rd order RC battery models;				
Setting parameters	Parameters such as number of series connections, number of parallel connections,				
	initial SOC, initial temperature, internal resistance, single unit capacity				
Interface	Support for CSV custom model import				
Real-time	200μs command update rate				
Programming					
Programming mode	List, Wave, Step, Advanced				
Programming steps	200				
Cycle range	0~9999999 times				
Minimum programming time	100μs				
Mode of operation	Load, end, trigger				

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Specification ✳

Indicators	Technical parameters				
Output Voltage	40V/60V/80V	200V/360V	500V/600V	800V/1000V	1500V/2000V
Interfaces/Any port					
Functions and definitions	See "Any port interface specification"				
Isolation	707VDC				
Interfaces					
Rear panel	Type-B USB, LAN, Share Bus, Magic-BUS, Magic-BOX				
	DC terminal, AC supply, Remote sensing, Analog interface				
Front panel	Type-A USB, ON/OFF Button, Out Button, Touch screen, Rotary knob				
Environment					
Operating temperature	0 to 50 (°C) (power derating over 35°C)				
Storage temperature	-20 to 70(°C)				
Humidity	≤ 80%. Not condensing				
Height	Output current derating 2%/100m above 2000m or Ta derating 1°C/100m				
Insulation					
Negative - PE	±500 V DC	±1500VDC			
Positive - PE	+ 500 V DC	+ 1500VDC	+ 2000VDC	+ 1500VDC	+ 2000VDC
AC Input - PE	2.5 kV AC				
Other					
Size	W435mm x H132mm x D781mm				
Weight	40kg	35kg			

Note:

The above accuracy test conditions are: 25°C ± 5°C;

Ripple voltage/Ripple(peak)@20MHz bandwide;

Ripple voltage/Ripple (rms) @ 300kHz LF;

Voltage swing rate / Slew rate (Without load).

The product of Chinese wisdom
Go to the world arena

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