Kewell

D2000-IV SERIES

BI-DIRECTIONAL PROGRAMMABLE DC POWER SUPPLY

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KEWELL TECHNOLOGY CO., LTD.

www.Kewelltest.com

CONTENTS

1 Summary

The D2000-IV Series is a series of intelligent DC power supplies boasting high precision, fast dynamic response, and high efficiency. The third-generation wide bandgap semiconductor material, SiC, allows the series to be highly modularized and standardized, providing industry-leading performance and experience.

The D2000-IV Series supports simulation of battery types such as monocrystalline, polysilicon, and thin film cell, with temperature, irradiance, runtime and other parameters open for users to set up. The series has five built-in standards for testing, i.e., EN50530, Sandia, NB/T32004, CGC/GF004, and CGC/GF035, meeting the requirements of research institutes and colleges for testing inverters and energy storage systems.

2 Product Highlights

2.1 Ultra-high Power Density

- Max. power density of a single cabinet reaches 176kW/m³ and above, up by 112% from the industrial frequency solutions
- The 300kW cabinet is lighter than 900kg, down by 61.9% from the industrial frequency solutions

2.2 Modularized Design

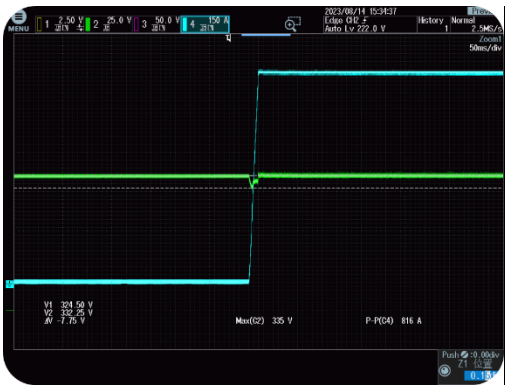
The D2000-IV series supports easy replacement of faulty modules so that it won't be necessary to return the complete equipment to factory for repair and maintenance. Just remove the faulty module(s) and the equipment will function normally, minimizing the impact on test efficiency.

2.3 Electrically Operated Switch

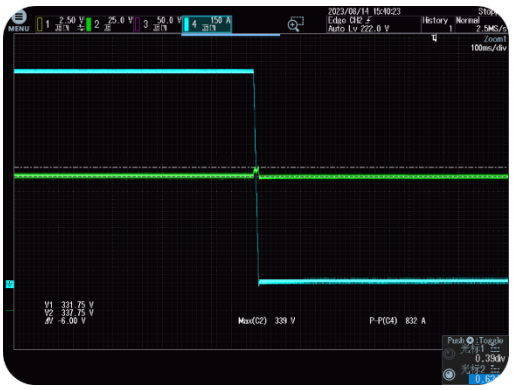
The D2000 Series has one-button power up function, safe and convenient without needing to manually switching on the circuit breaker.

2.4 Great Output Performance

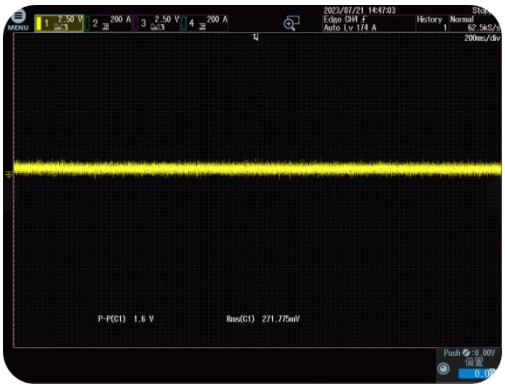
DCDC with SiC design combined with interleaved BUCK topology multiplies the switching frequency, thus realizing the DC voltage with great dynamic performance, voltage drop<10V under the condition of 0-90%I @10ms.



0-90%I@10ms, drop<10V



90%-0 I@10ms, overshoot<10V



Voltage ripple of 0.1%F.S.

Voltage slew rate of 300V/ms

2.5 Ultra-high Efficiency

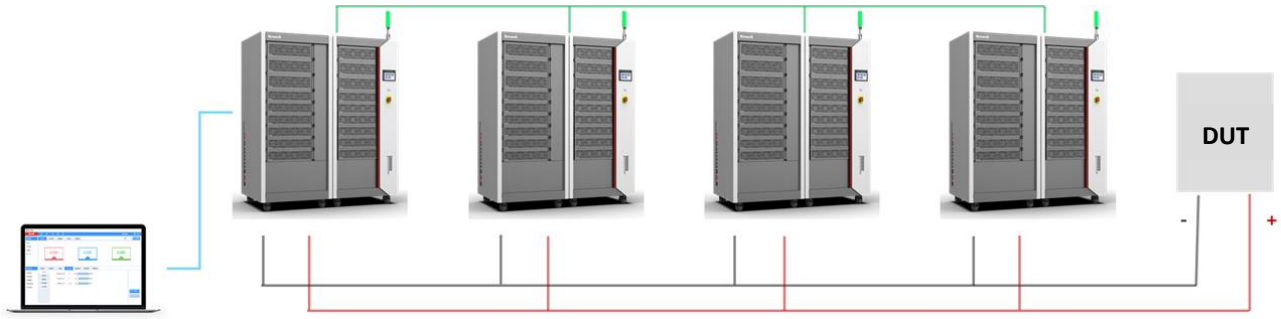
The D2000 Series boasts efficiency up to 95.5%, 3.5% higher than that of the industrial frequency solutions, on which basis it reduces annual carbon dioxide emissions by 30,150kg.

Product Type	Type of Test	Efficiency	Test Period	Carbon Emissions (kg)
Industrial frequency	Ageing	92%	8H*30D*12M	68913
D2000-IV series	Ageing	95.5%	8H*30D*12M	38763

Note: Taking 300kW for example, the test is performed on an ageing platform.

2.6 Flexible Parallel Connections

The D2000 series reaches the max. power of 600kW in one cabinet. The devices can be paralleled for higher power.

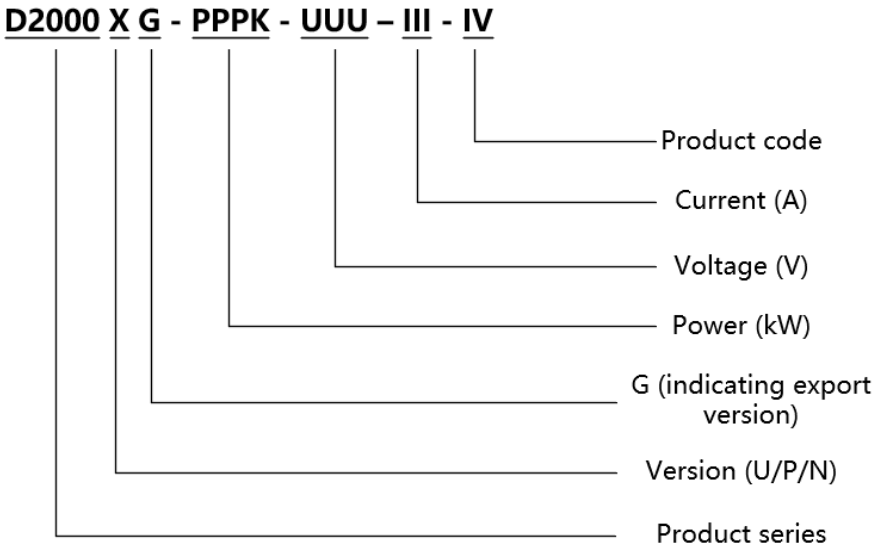


2.7 New Upgraded Casters

Move the cabinet easily and smoothly with the 360° casters.

3 Product Specifications

3.1 Model Description



3.2 Product Portfolio

- Normal

Model	Rated Power [kW]	Voltage Range [V]	Rated Current [A]	Dimensions (W*D*H) [mm]	Weight [kg]
D2000NG-100K-2000-150-IV	100	20-2000	150	850*1000*1500	530
D2000NG-200K-2000-300-IV	200	20-2000	300	850*1000*1500	700
D2000NG-300K-2000-450-IV	300	20-2000	450	850*1000*2000	900
D2000NG-400K-2000-600-IV	400	20-2000	600	1650*1000*2000	1460
D2000NG-500K-2000-750-IV	500	20-2000	750	1650*1000*2000	1630

- Pro

Model	Rated Power [kW]	Voltage Range [V]	Rated Current [A]	Dimensions (W*D*H) [mm]	Weight [kg]
D2000PG-100K-1200-300-IV	100	12-1200	300	640*900*1600	400
D2000PG-200K-1200-450-IV	200	12-1200	450	640*900*1600	550
D2000PG-100K-2000-150-IV	100	20-2000	150	850*1000*1500	530
D2000PG-200K-2000-300-IV	200	20-2000	300	850*1000*1500	700
D2000PG-300K-2000-450-IV	300	20-2000	450	850*1000*2000	900
D2000PG-400K-2000-600-IV	400	20-2000	600	1650*1000*2000	1460
D2000PG-500K-2000-750-IV	500	20-2000	750	1650*1000*2000	1630
D2000PG-600K-2000-900-IV	600	20-2000	900	1650*·1000*2000	1800

- Ultra

Model	Rated Power [kW]	Voltage Range [V]	Rated Current [A]	Dimensions (W*D*H) [mm]	Weight [kg]
D2000UG-100K-2000-150-IV	100	20-2000	150	850*1000*1500	530
D2000UG-200K-2000-300-IV	200	20-2000	300	850*1000*1500	700
D2000UG-300K-2000-450-IV	300	20-2000	450	850*1000*2000	900
D2000UG-400K-2000-600-IV	400	20-2000	600	1650*1000*2000	1460
D2000UG-500K-2000-750-IV	500	20-2000	750	1650*1000*2000	1630
D2000UG-600K-2000-900-IV	600	20-2000	900	1650*1000*2000	1800

4 Technical Parameters

D2000-IV Series				
Version		Normal	Pro	Ultra
Output parameters	Voltage accuracy	±0.05%F.S.	±0.05%F.S.	±0.02%F.S.
	Current accuracy	±0.1%F.S.	±0.05%F.S.	±0.02%F.S.
	Response time	1ms	1ms	500us
	Switching time	2ms	2ms	1ms
	Voltage slew rate	100V/ms	200V/ms	300V/ms
	Voltage ripple	≤0.1%·F.S.		
	Current ripple	≤0.1%·F.S.		
	Efficiency	95.5%		
	Grounding resistance	≤0.1Ω		
Input parameters	Rated grid voltage	380/400V, 3L/PE		
	Voltage range	323-440V		
	Grid frequency	47-63Hz		
	iTHD	≤3%		
	Power factor	≥0.99		
IV curve	PV panel type	Monocrystalline, polysilicon, thin film cell		
	I-V curve refresh rate	100ms		
	I-V curve editing	EN50530, Sandia, dynamic/static MPPT curve, time scaling, shading		
	Fill factor range	0.4-0.95		
	Number of curve points	4096 points		
General parameters	Operating temperature	-10 ~ 40℃		
	Dimensions	See product portfolio for details		
Functions	IV simulation	●	●	●
	Bidirectional DC source	●	●	●
	Battery simulation	●	●	●
	Electronic load	-	●	●
	Electrically operated switch	-	●	●
	Manual switch	●	-	-
	Communication interfaces RS485/LAN/CAN	●	●	●

Note: ● come with standard equipment - none

5 Product Features

5.1 IV Simulation

- **IV simulation**

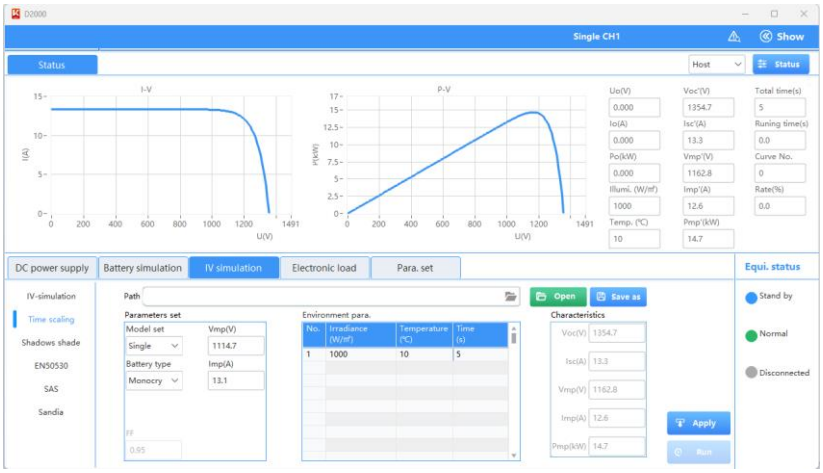
Three modes: single, Double, Multi.

- **Shadows shade**

The output characteristics of solar panels change when they are shaded by clouds, buildings, trees, etc. The I-V simulator simulates the output characteristics of panels under different shading and irradiance conditions. On the shading function interface, you can set the array type, environmental parameters (irradiance and temperature), and shading intensity and area.

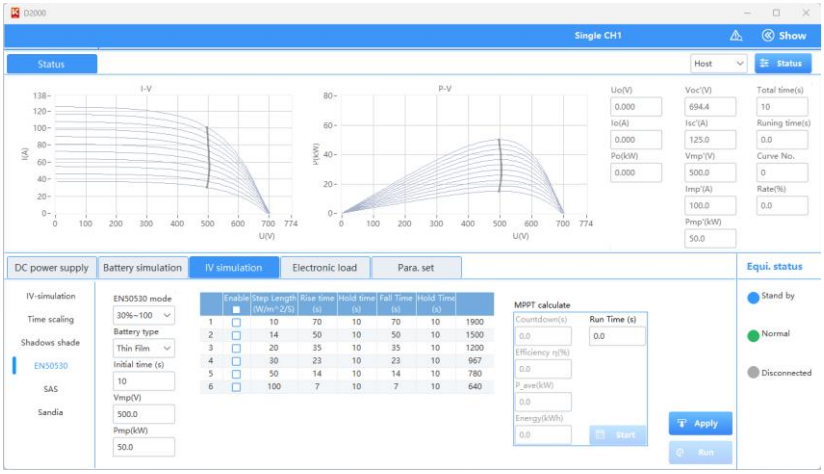
- **Time scaling**

The I-V simulator simulates solar panels operating for a given period of time, one day or longer, in the operating environment. On the time scaling function interface, users can set the characteristic mode, array type, and the irradiance and temperature parameters of different time periods to simulate the real-life operating environment of solar panels. With this function, users can obtain the typical output changes of a time period in a short time, thus shortening the test cycle. As for the operating environment, you can set the irradiance, temperature, runtime, etc.



- **Dynamic MPPT**

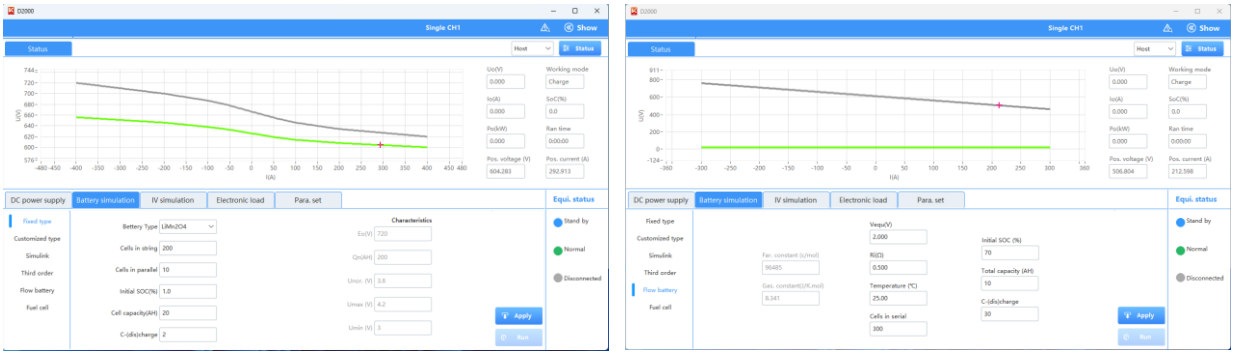
The dynamic testing environment with built-in EN50530 standard tests the dynamic tracking performance of PV inverters down to details. There are three testing environments, namely “10%-50% ”, “30%~100%” and “0.2~10%”, as shown in the figure below.



5.2 Battery Simulation

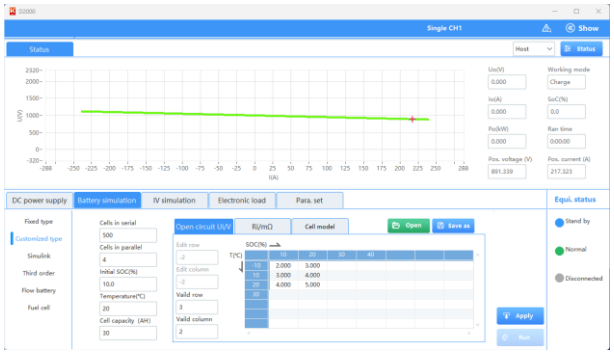
- **Simulation of fixed battery types**

The D2000-IV Series supports output simulation for 7 fixed types of battery including lithium manganese, lithium cobalt oxide, lithium iron phosphate, Ni-MH battery, ternary lithium battery, lithium titanate and lead-acid battery through setting of battery type, cell capacity, number in series, number in parallel, SoC, etc.



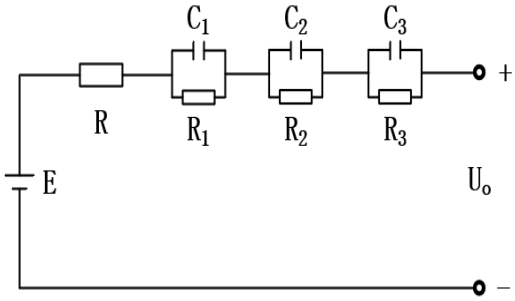
- **Custom battery models**

Users can import the input of the battery cell model through the Ri(T,Soc) and Ui(T,Soc) relationship lists on the interface, and then simulate the output characteristics of the corresponding battery pack by setting relevant parameters like number of cells in serial/parallel connection and initial SoC.



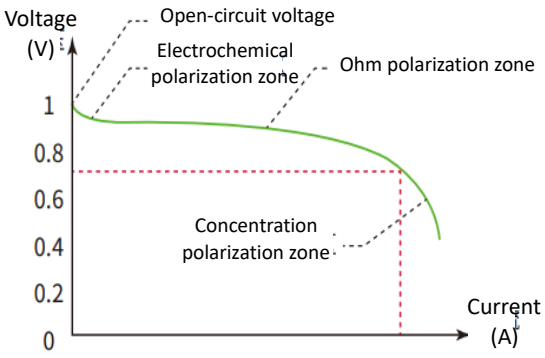
- **First/Second/Third-order Battery Models**

According to the requirements for battery models, users can customize the input voltage Uin, internal resistance, resistance and capacitance of the RC model to simulate the battery behavior of each order of the RC model.



- **Fuel Cell Simulation**

A built-in standard single cell polarization curve (V-I) is provided to facilitate users' configuration of number of cells in serial connection, temperature, current area, limiting current density and other parameters to simulate the output performance of fuel cell stacks.



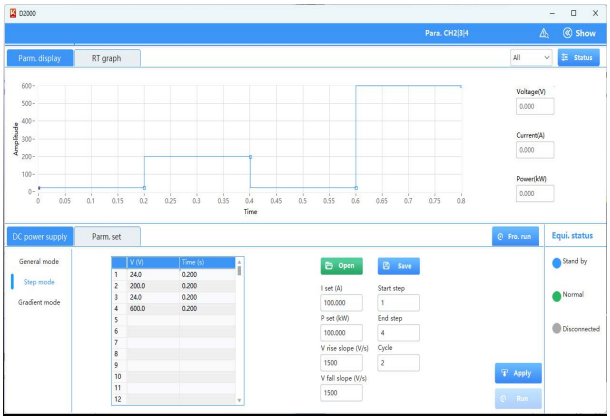
5.3 DC Source

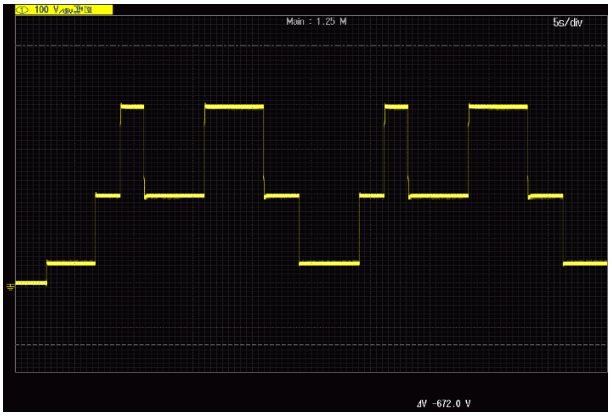
- **General mode**

In general mode, i.e., constant voltage, limited current and limited power mode, users can customize voltage, current, power and other key parameters. Send the parameters and click to run the device for constant voltage output.

- **Step mode**

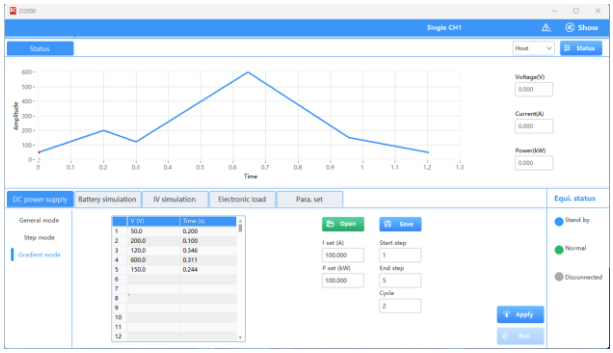
On the step mode interface, i.e., step editing function, users can customize parameters such as voltage, current, power, step time, and number of cycles. Click on "Run" and the device will output with voltage variation according to the set step information.





- **Gradient mode**

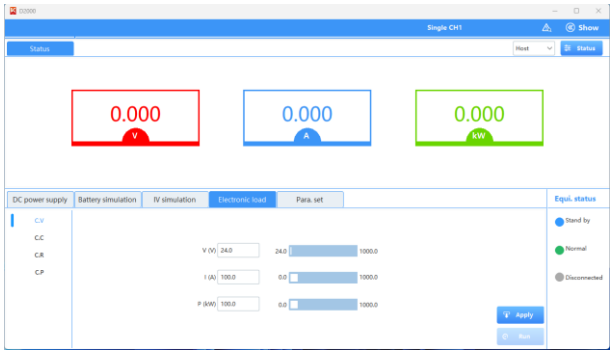
In gradient mode, users can customize the slew rate of voltage output, and set the start voltage, cut-off voltage, gradient time, number of cycles and other parameters. Click “Run” and the device will output with voltage variation according to the set step information.



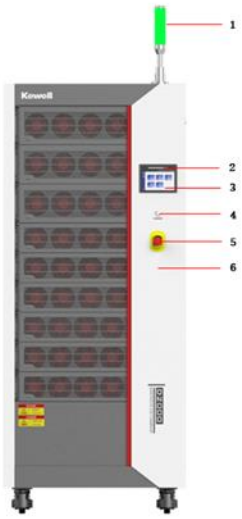
5.4 Electronic Load

- **Static load functions such as CV, CC, CR, and CP**

The D2000-IV series supports static load modes such as CV/CC/CR/CP. Users may select the appropriate load mode according to their test requirements.



6 Appearance



Front view (Ultra/Pro)

Rear view (Ultra/Pro/Normal)

Front view (Normal)

No.	Description
1	Three-color light
2	LED indicator
3	TFT touch screen
4	Electrically operated switch
5	Emergency stop button
6	LAN communication port
7	Terminal block for extended interfaces
8	Communication interfaces
9	DC-side line bank
10	AC breaker and input copper bar
11	Earthing copper bar
12	Manual switch