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IT-N2100

Solar Array Simulator

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IT-N2100 Series
Solar Array Simulator

IT-N2100 series solar array simulator is a high performance DC power supply with fast change of IV curve. It can simulate the IV output characteristics of various solar panels under different environments (temperature, light, shadow decay, aging). It can be applied for the tests of solar micro-inverter, power optimizer, satellite power system, sail power array and so on. IT-N2100 has low ripple, low noise and fast MPPT, supports multi-channel synchronous control and high voltage topology.

FEATURE

- Precise simulation of the IV characteristics output of silicon, GaAs and other types of solar PV panels
- Built-in solar array simulation software, supporting multi-channel control*
- High-speed current dynamic response to support fast MPPT for microinverters
- Up to 1500V DC output common-mode withstand voltage, supporting series testing of the DUT
- Fixed mode, adjustable output impedance,can simulate CC, CV, CP output
- Ultra-low current ripple, high precision sampling, programming and measurement
- Simulate I-V curve under different temperature and light
- Built-in EN50530, Sandia, NB/T32004, CGC/GF004, CGC/GF035 regulations dynamic model test, and generate reports
- Graphical operation interface, real-time display of MPPT status of PV inverter
- Dynamic list sequence programming: 100 steps x 20 data sets
- Real-time data and curve recording for further analysis
- Simulation of dynamic and static I-V curves of solar panels under cloud shadow
- Table mode supports I-V curve fitting with 4096 points
- Quickly generate I-V by setting Voc, Isc, Vmp, Imp by four-point method
- Comprehensive curve protection: OVP, OCP, OPP, OTP
- Small size: 2U half rack for single channel
- 4.3" HD LCD, easy to operate
- Front and rear panel output, adaptable to bench top and system integration for various applications
- Standard communication interface LAN, USB, digital I/O, support SCPI

* For multiple IT-N2100 rack installations, follow the manual's layout for cooling consideration

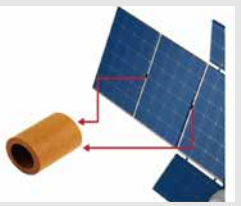
Applications


Micro-inverters


Power Optimizer


Home Energy Storage

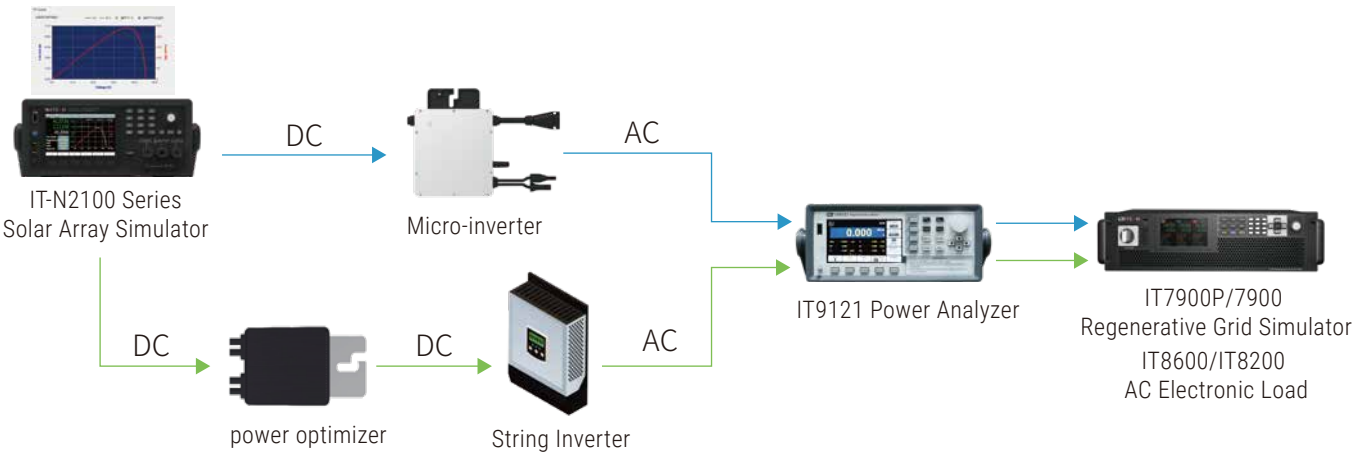

MPPT shutdown module


Aviation Power Systems

Model	Voltage	Current	Power
IT-N2121*	80V	25A	800W
IT-N2131*	80V	25A	1500W
IT-N2123	150V	10A	800W
IT-N2133	150V	10A	1500W

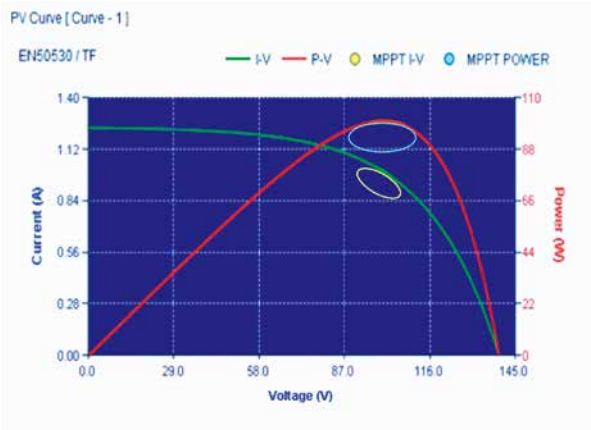
*can be extended to 85V output

Test Solution- Micro-inverter, power optimizer

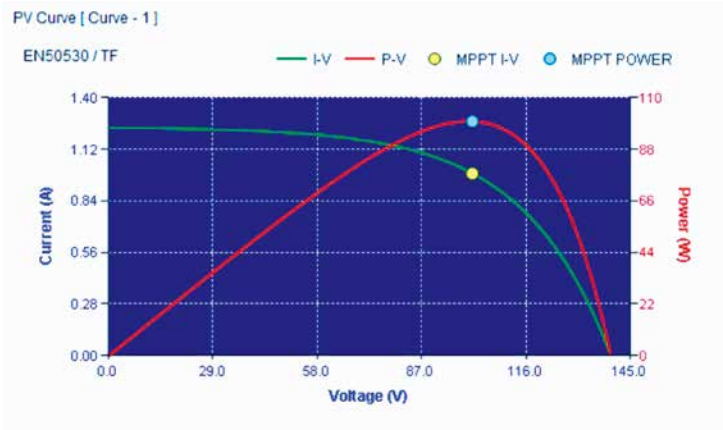


High response speed

The IT-N2100 series photovoltaic simulator has a current loop speed of up to 500kHz and supports 250Hz MPPT speed.
Its IV curve consists of up to 4096 data points which closely matches the real output of the photovoltaic array. The real output of the photovoltaic panel strictly follows its IV curve.
When the MPPT tracking frequency increases, if the response speed of the simulator (power supply) is too slow, it will not be able to track the IV curve, and the reliability of the test results is under doubt. Under the condition of high MPPT tracking frequency of the IT-N2100 series PV simulator, the output still accurately conforms to the preset IV curve.



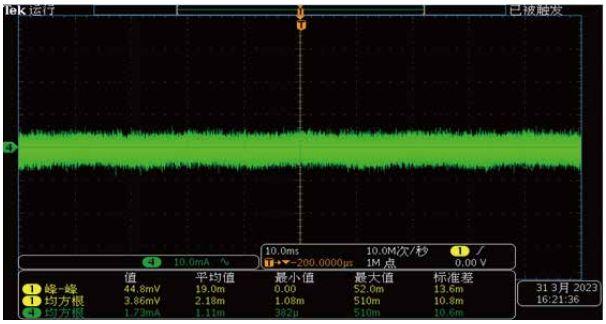
Fail to track



Track well

Low noise of output current

The high fundamental frequency noise of the PV simulator affects the MPPT and current sampling precision of the inverter. The low current noise and pure signal of the IT-N2100 series ensure the accuracy of the test.



Max. ripple of IT-N2133(1.5kW) is about 10mA

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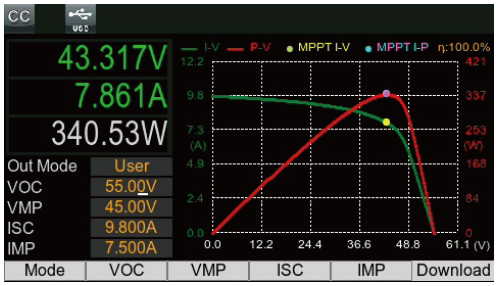
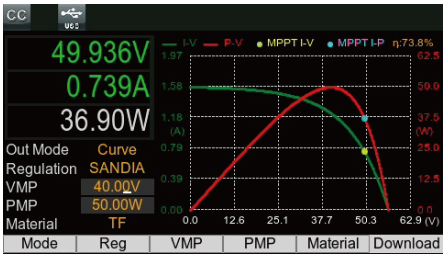
5 PV modes

IT-N2100 series has 5 built-in PV modes. You can operate it on the front panel. With the built-in IV curves models of multiple regulations, four-point method, table tracing point method, fixed mode or list programming, it can simulate the output of solar array IV curve, big screen graphical display, and real-time view of MPPT status of micro-inverter, power optimizer and other DUTs. In addition, you can import model files via a USB. When multiple channels operations are required, you can use PV software, very convenient.

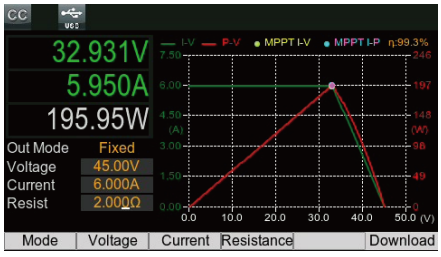


User-defined mode

List mode



Curve mode



Fixed mode

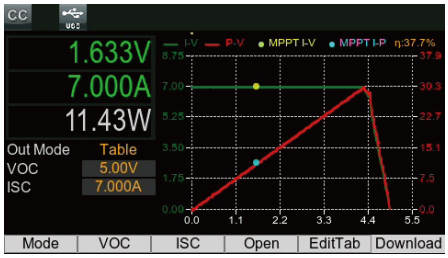


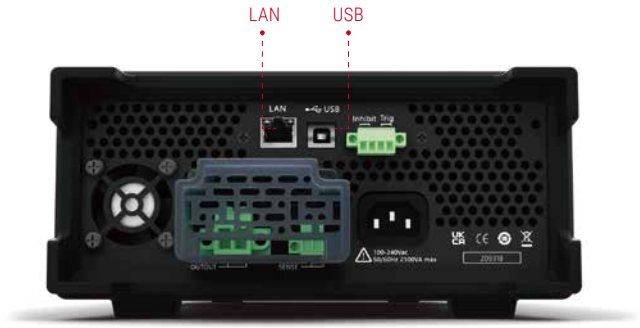
Table mode

Trend graphs to view data and waveforms in real time

IT-N2100 series can record the voltage, current and power curve of the DUT as soon as it is powered on. It can also save test data to a USB in real time, supporting file formats of .csv and .Tdms for further data analysis.

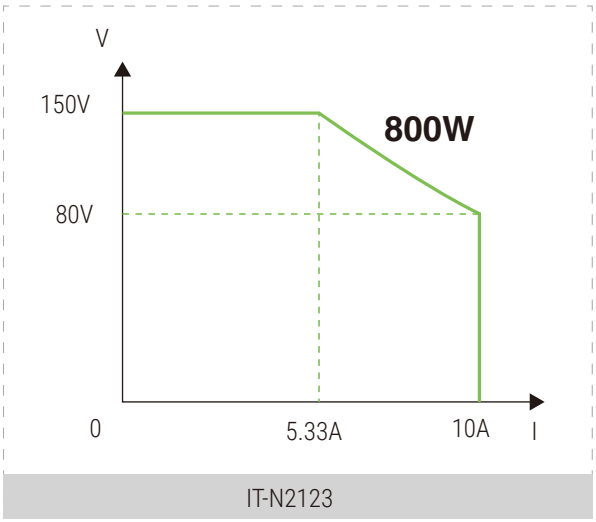
Communication interfaces

IT-N2100 series power supply supports SCPI protocol. Its standard USB and LAN interfaces are used for communication with PC software, system construction and remote control. The USB interface on the front panel can be used for file import, export and firmware update.

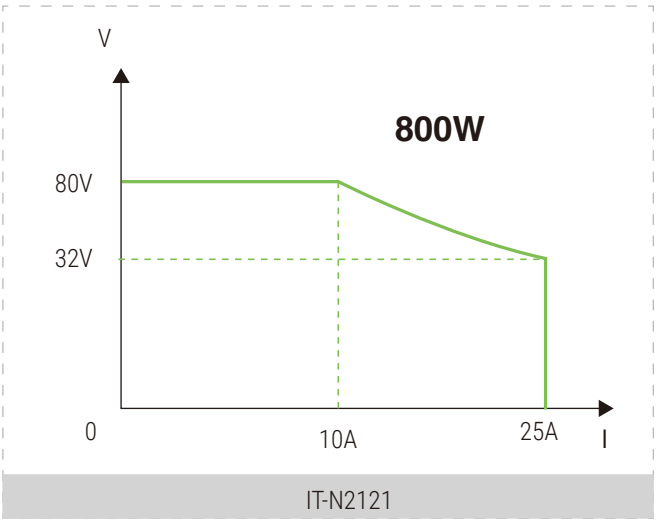


Wide range output

IT-N2100 series not only has excellent stability and precision, its 800W model can also output in a wide range. This maximizes the output range of voltage and current, which is especially suitable for simulating the output of photovoltaic IV curves.



IT-N2123

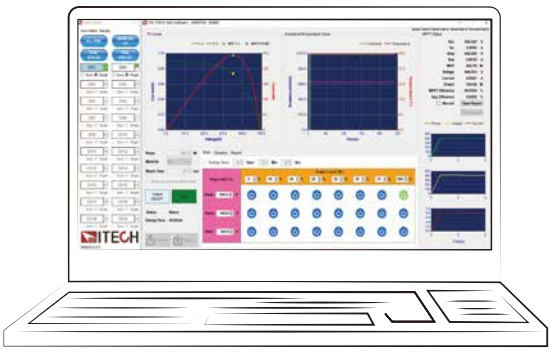


IT-N2121

Built-in solar array simulation software

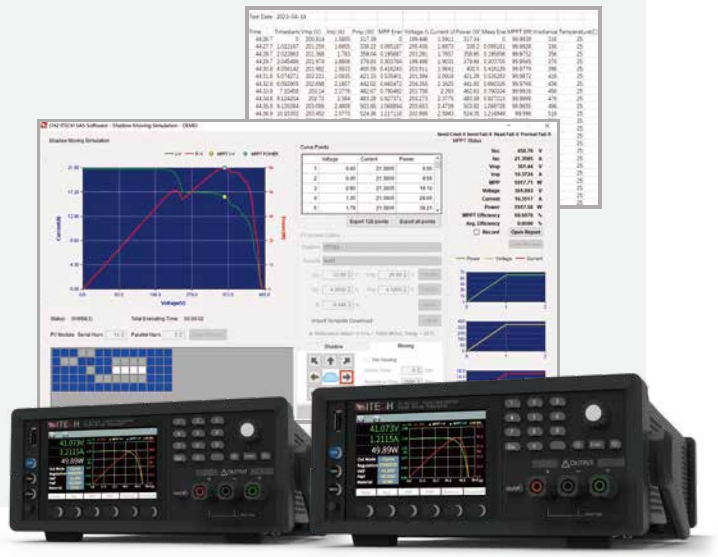
PV software supports synchronous control of 20 channels of solar array simulators, suitable for the testing of micro-inverters, power optimizers.

Users can use this software to simulate the output of solar panel monolithic or solar array, build or load various complex weather conditions and international norms defined typical test pattern.



IT-N2100 Multi-channel PV simulator

- Edit and test IV and PV curves in real time
- Continuous display of the maximum power point tracking (MPPT) status of the PV inverter
- Software supports generating, uploading and downloading IV and PV files and storing up to 100 files
- Automatically generate reports in standard format
- Shaded IV curve output simulation (up to 4096 data points)
- Simulate static shading curves and dynamic shading curves with the moving shading feature
- Use actual solar panel data from over 100 manufacturer specifications analog array



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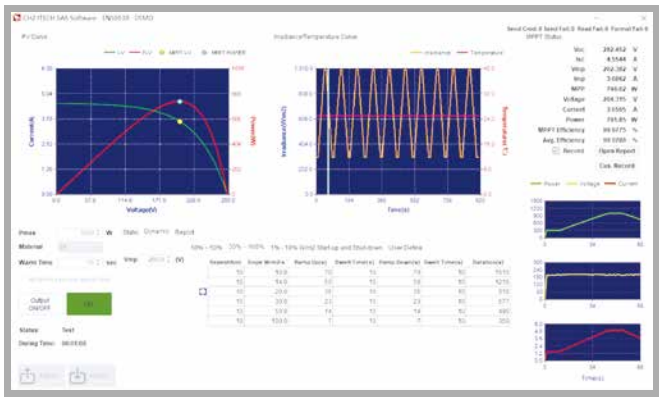
Various regulations testing and report generating

Users can operate either through the built-in software of IT-N2100 or remotely through the PC software. It can test multiple dynamic curves according to the IV and PV curve models stipulated by SANDIA, European standard EN50530 and Chinese standards NB/T32004, CGC/GF004, CGC/GF035, so as to realize the simulation output of solar arrays. Users can select testing standards such as Sandia or EN50530 through the software, and the test reports are generated automatically . The MPPT efficiency of the PV inverter captured in the test will be reflected in the test report.

Among them, the minimum IV curve update rate supported by the software is 50 milliseconds. Users can also customize the test parameters related to solar panels and light temperature conditions in Sandia or EN50530 standards.



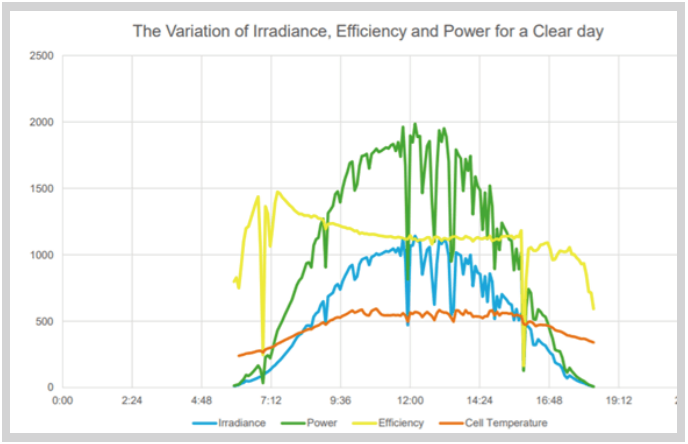
c-Si Dynamic MPPT-Test 10% => 50%

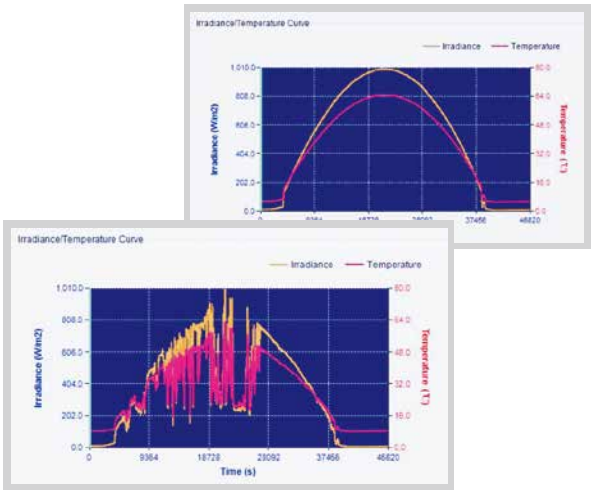
From-to W/m²	Delta W/m²		Pmp	Vmp		Waiting time setting s	
100-500	400		1000	500		300	
# W/m²	Slope W/m²	Ramp UP s	Dwell time s	Ramp DN s	Dwell time s	Duration s	MPPT Efficiency (%)
2	0.5	800	10	800	10	3540	99.9678
2	1	400	10	400	10	1940	99.9553
3	2	200	10	200	10	1560	99.9661
4	3	133	10	133	10	1447	99.9590
6	5	80	10	80	10	1300	99.9643
8	7	57	10	57	10	1374	99.9534
10	10	40	10	40	10	1700	99.9656
10	14	29	10	29	10	1071	99.9646
10	20	20	10	20	10	900	99.9545
10	30	13	10	13	10	767	99.9540
10	50	8	10	8	10	660	99.9689
					Total	15939	s
						4:25:39	h
MPPT Avg Efficiency(%)		99.9621					

Real dynamic simulation

The high-speed and flexible dynamic simulation of IT-N2100 series PV simulators truly meets the dynamic test requirements of EN50530 and other standards. It can continuously simulate dynamic changes of up to 65,000 time points with a resolution of 1 second.

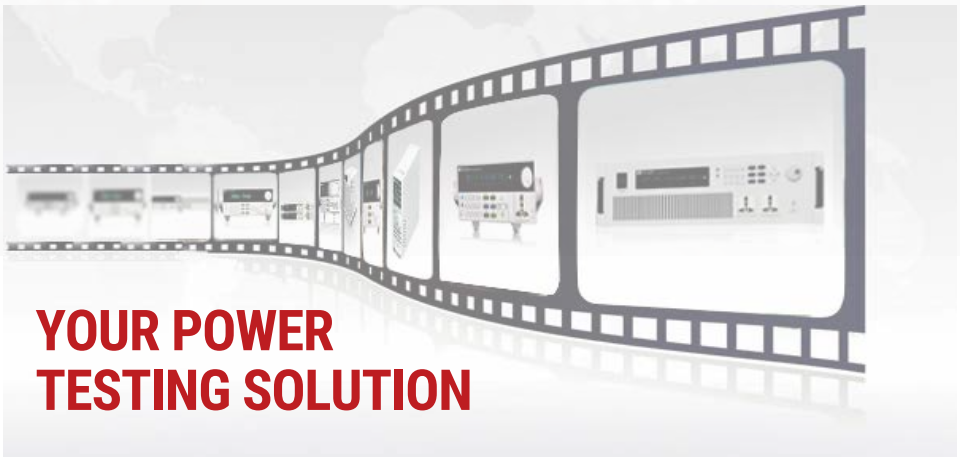
Users can use actual irradiance level and temperature data from various sites around the world. Real conditions such as irradiation and temperature can be imported into the software from an Excel file. These public data can be acquired from the websites of certain national laboratories.





		IT-N2121	IT-N2123	IT-N2131	IT-N2133
Rated values	Voltage	0～80V	0～150V	0～80V	0～150V
	Current	0～25A	0～10A	0～25A	0～10A
	Power	0～800W	0～800W	0～1500W	0～1500W
	Resistance	0～9.999Ω	/	0～9.999Ω	/
Line regulation	Voltage	≤0.01%+2mV	≤0.01%+2mV	≤0.01%+2mV	≤0.01%+2mV
±（%of Output+Offset）	Current	≤0.01%+1.5mA	≤0.01%+1mA	≤0.01%+1.5mA	≤0.01%+1mA
Load regulation	Voltage	≤0.01%+2mV	≤0.01%+3mV	≤0.01%+2mV	≤0.01%+3mV
±（%of Output+Offset）	Current	≤0.01%+1mA	≤0.01%+1mA	≤0.01%+1mA	≤0.01%+1mA
Setup resolution	Voltage	10mV	10mV	10mV	10mV
	Current	1mA	1mA	1mA	1mA
Readback resolution	Voltage	1mV	1mV	1mV	1mV
	Current	1mA	1mA	1mA	1mA
Setup accuracy	Voltage	≤0.03%+20mV	≤0.03%+30mV	≤0.03%+20mV	≤0.03%+30mV
	Current	≤0.05%+10mA	≤0.05%+5mA	≤0.05%+10mA	≤0.05%+5mA
Readback accuracy	Voltage	≤0.03%+15mV	≤0.03%+20mV	≤0.03%+15mV	≤0.03%+20mV
	Current	≤0.05%+8mA	≤0.05%+5mA	≤0.05%+8mA	≤0.05%+5mA
Ripple（20hz-20Mhz）	Peak value	≤300mVp-p/≤40mVrms	≤300mVp-p/≤40mVrms	≤300mVp-p/≤40mVrms	≤300mVp-p/≤40mVrms
Ripple（20hz-300Khz）	Voltage(RMS)	40mVrms	40mVrms	40mVrms	40mVrms
	Current(RMS)	≤8mArms	≤5mArms	≤10mArms	≤5mArms
Setup temperature coefficient	Voltage	≤0.003%+1mV	≤0.003%+1.5mV	≤0.003%+1mV	≤0.003%+1.5mV
±（% of Output+Offset）/℃	Current	≤0.015%+0.27mA	≤0.015%+0.35mA	≤0.015%+0.27mA	≤0.015%+0.35mA
Readback temperature coefficient	Voltage	≤0.002%+0.8mV	≤0.002%+1mV	≤0.002%+0.8mV	≤0.002%+1mV
±（% of Output+Offset）/℃	Current	≤0.012%+0.27mA	≤0.012%+0.35mA	≤0.012%+0.27mA	≤0.012%+0.35mA
Rising time (no load)	Voltage	≤20ms	≤20ms	≤20ms	≤20ms
Rising time (full load)	Voltage	≤20ms	≤20ms	≤20ms	≤20ms
Falling time (no load)	Voltage	≤20ms	≤20ms	≤20ms	≤20ms
Falling time (full load)	Voltage	≤20ms	≤20ms	≤20ms	≤20ms
Dynamic response	Voltage	150us	150us	400us	300us
AC input	Voltage	220V/110V	220V/110V	220V/110V	220V/110V
	Frequency	50/60Hz	50/60Hz	50/60Hz	50/60Hz
Setup Stability-30min	Voltage	≤0.01%+1mV	≤0.01%+1mV	≤0.01%+1mV	≤0.01%+1mV
(%of Output +Offset)	Current	≤0.02%+1.5mA	≤0.02%+1.5mA	≤0.02%+1.5mA	≤0.02%+1.5mA
Setup Stability-8h	Voltage	≤0.015%+1.2mV	≤0.015%+1.2mV	≤0.015%+1.2mV	≤0.015%+1.2mV
(%of Output +Offset)	Current	≤0.02%+2mA	≤0.02%+2mA	≤0.02%+2mA	≤0.02%+2mA
Readback Stability-30min	Voltage	≤0.01%+1mV	≤0.01%+1mV	≤0.01%+1mV	≤0.01%+1mV
(%of Output +Offset)	Current	≤0.02%+1.5mA	≤0.02%+1.5mA	≤0.02%+1.5mA	≤0.02%+1.5mA
Readback Stability-8h	Voltage	≤0.015%+1.2mV	≤0.015%+1.2mV	≤0.015%+1.2mV	≤0.015%+1.2mV
(%of Output +Offset)	Current	≤0.02%+2mA	≤0.02%+2mA	≤0.02%+2mA	≤0.02%+2mA
Efficiency		60% (Typical)	72% (Typical)	60% (Typical)	72% (Typical)
Sense		≤2V			
Programming response		≤15ms			
Power factor		≥0.98			
Max.input current		11A			
Protection		OVP/OCP			
Communication interface		LAN/USB			
Isolation(output to ground)		1500Vdc			
Isolation(input to ground)		1500Vac			
Working temperature		0～40℃			
Fuse specification		T15A			
Protection level		IP20			
Safety regulations		IEC 61010			
Cooling		fan			
Dimension (rack mounted) mm		450 mm（D）x 214 mm（W）x 88.2 mm(H)			
Dimension (overall) mm		529.5 mm（D）x 255 mm（W）x 108.2 mm(H)			
Weight(net)		9kg			

*All specifications are subject to change without notice.



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