

Product

IT6000B Regenerative Power System

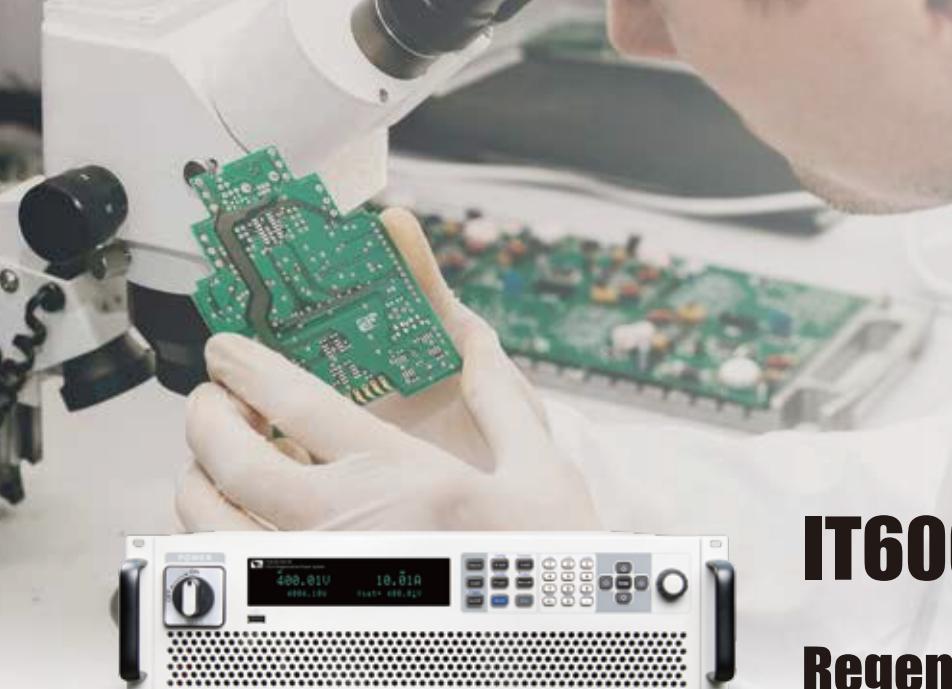


IT6000B Regenerative Power System

APPLICATIONS

- High power battery
- High speed testing
- Automotive electronics
- Aerospace
- Green energy
- Industrial manufacturing

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IT6000 Series Regenerative Power System

From the perspective of improving customer experience, ITECH launches a new incorporated product--IT6000B series. IT6000B integrates bidirectional power supply and regenerative electronic load into one 3U unit. It is also a very powerful one. Only a button is needed to switch between the bidirectional power supply and the regenerative electronic load. It can be used not only as a stand-alone powerful bidirectional power supply, as a source to provide power; but also as an independent regenerative electronic load, to absorb the consumed energy and feedback cleanly to the grid. IT6000B offers standard two-quadrants functionality.

IT6000B provides 7 voltage ranges, up to 2250V, supports master-slave parallel with current distribution up to 1152kW. Built-in waveform generator supports generating arbitrary waveforms, and imports LIST files for waveforms via USB interface. IT6000B is the combination of reliability, high efficient setting, safe and multiple measurement functions.

IT6000B is a family of bi-directional, regenerative power system with excellent performance, extensively used in aspects of high power battery, automotive electronics, green energy, high speed testing etc.

Features

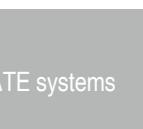
- Bi-directional device – power supply and electronic load in one
- One button switch between source and sink on panel
- Stand-alone power up to 144kW, expandable in parallel up to 1.152MW
- Voltage output ratings: 0-2250V
- Current output ratings: 0-2040A
- High power density design provides 18kW in 3U space
- Bi-directional energy transmission, seamless switching across two quadrants
- Support CC/CV loop speed and priority setting
- Built-in voltage curves comply with DIN 40839, ISO-16750-2/ISO21848 automotive standards
- High efficient energy recovery
- Support solar panel I-V curves simulation
- Built-in waveform generator, support generating arbitrary waveforms
- Adjustable output impedance
- Complete protection, support OVP, ±OCP, ±OPP, OTP, voltage transient drop protection and anti-islanding protection
- Built-in USB/CAN/LAN/digital IO interface, Optional GPIB/Analog&RS232
- Support data saving and the shortest interval of sampling is 10μs
- Battery simulation function

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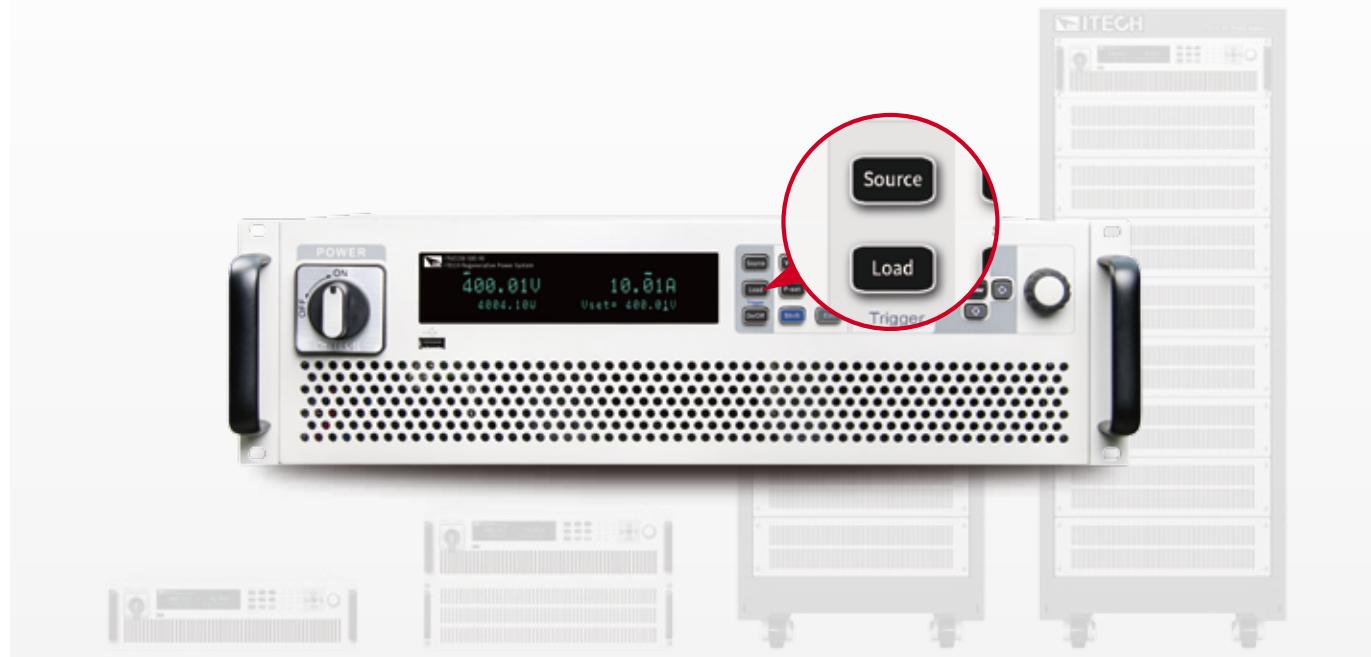
IT6000B Regenerative Power System

Application

01 Renewable Energy		Solar Charger		Micro Inverter		Battery Pack		PV Inverter		
02 Automotive		Automotive Motors		Car Charger		Automotive Electronics		Bidirectional DC/DC Converter		
03 High-speed testing		Telecom		Power semiconductor components		Military electronics		LED products		Avionics
04 High-power testing		UPS		Electric motor/generator		Consumer products		Electro plating/welding		ATE systems

One button switch between source and load

IT6000B innovatively incorporates two devices in one: a bidirectional power supply and a regenerative electronic load. The devices offer the functional button on panel for easy two-quadrants operation, either as a bidirectional programmable DC power supply or as a DC electronic load with recovery function. It reduces the space , cost and efforts on DUT for separate units.

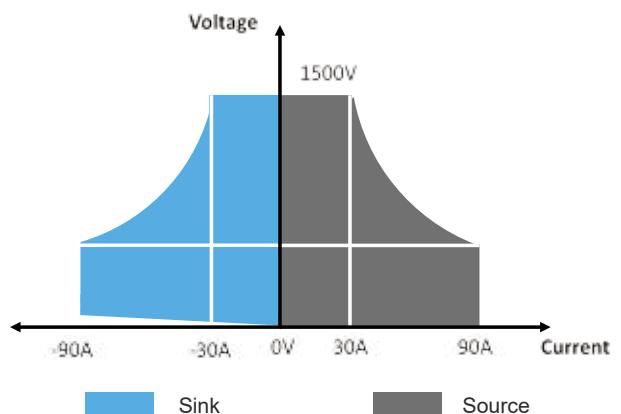


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IT6000B Regenerative Power System

Bi-directional energy, seamless switching

The IT6000B Series combines bi-directional power supply and regenerative load function in one. Unlike traditional power supplies and E-loads, for which there will be short transitions and incontinuity in the middle of positive and negative current switching, IT6000B is a standard high-speed bidirectional power supply. It can switch seamlessly between source and sink mode fast and continuously, which avoids voltage or current overshoot effectively. It can be applied to battery test, cell packaging equipment test, battery protection board test, etc.



High energy regenerative efficiency

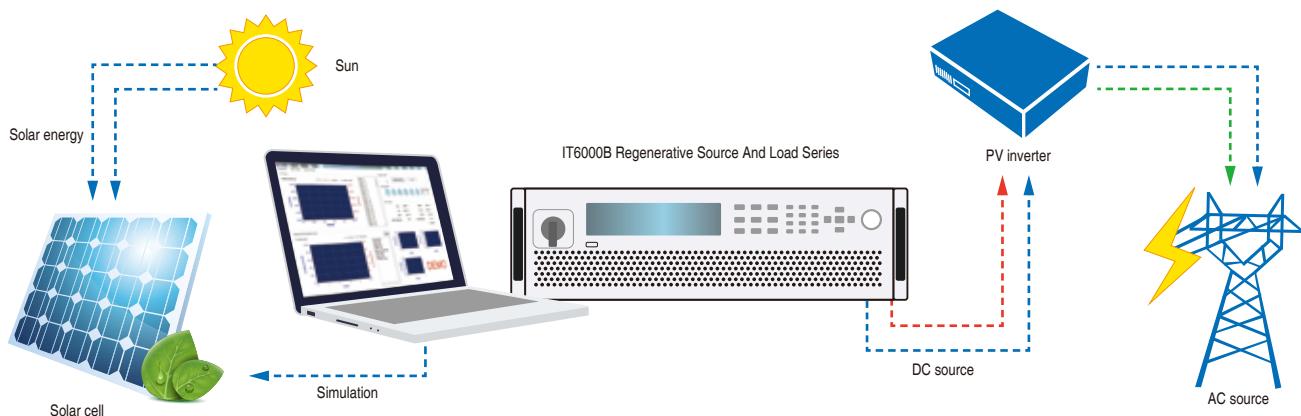
The IT6000B series has a unique function of energy regenerative that can regenerate electrical energy and then directly use it in the plant instead of consuming it in the form of heat. Its regeneration efficiency can reach up to 95%, which not only greatly reduces the user's electricity cost, but also avoids the use of air conditioning or expensive cooling systems.

Most of the conventional electronic loads are energy-consuming loads. In addition to the high cost of electricity, large amounts of carbon dioxide, sulfur dioxide, nitrogen oxides and other greenhouse gases or harmful gases are generated during power generation, which is harmful to the environment. IT6000B can avoid any of these by its regenerative function.



The application for solar array simulation

IT6000B optional SAS1000 solar array simulation software, users can easily use the software to output, measure, display the maximum power and track status of photovoltaic inverter in real time and record value. With the built-in EN50530, Sandia, NB/T32004, CGC/GF004, CGC/GF035 regulatory testing procedures, it is simple for users to simulate I-V curves, test the static and dynamic MPPT performance of PV inverters and generate reports. Solar simulation power supply also provides the shadow and table mode, users can enter up to 4096 points array to edit any shielded IV curve and achieve dynamic shadow effect. Or users can store 100 I-V curves under different irradiation and temperature, set operating time and order to test the long-term MPPT of photovoltaic inverters under different climatic conditions.



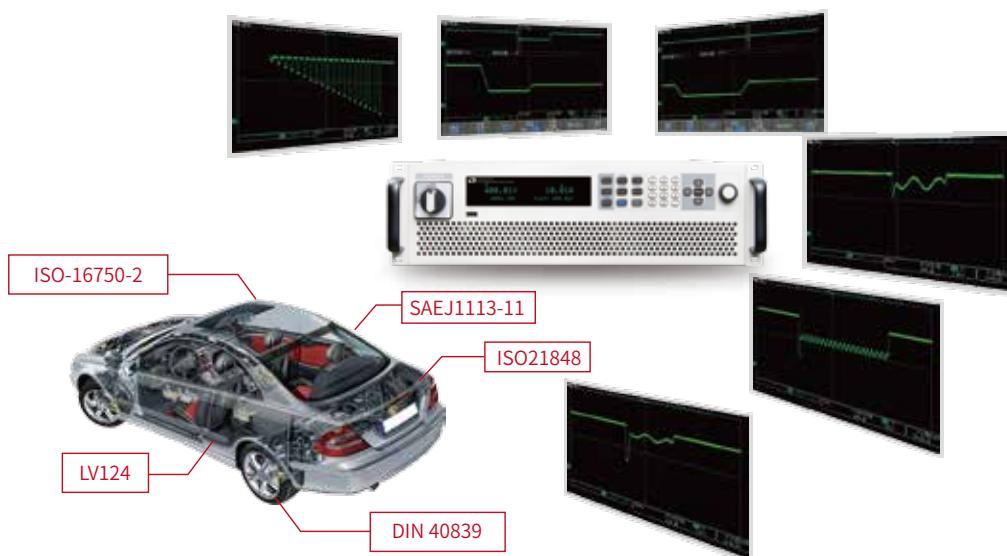
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Built-in voltage curves for a variety of standard automotive voltage curves

Automotive electronics may often experience power transients during vehicle start-up and operation. To ensure that the device under test can withstand these actual transients, the tester must simulate worst-case power transient conditions during the test. According to the relevant standards of the industry, the IT6000B has built-in voltage curves for DIN40839, ISO-16750-2, SAEJ1113-11, LV124 and ISO21848 standard automotive voltage curves. Users can easily recall various waveforms directly, such as voltage drop waveform during vehicle starting up, pulse waveform and other related automotive electronics waveforms for performance tests. Available voltage grades in 12V, 24V and 48V.



CC&CV Priority

IT6000B has CC/CV priority function which is the newest concept in the industry. It can meet different application requests such as fast speed or no overshoot and make the test more flexible. Users can choose CC/CV loop response time and loop working mode to decide the output to be voltage high speed mode or current no overshoot mode. This unique function makes it suitable for the application of high power integrated circuit test, charging and discharging test, military and transient simulation test of automotive electronics etc.



CV priority

Starting up: surge current over range,
high speed voltage



CC priority

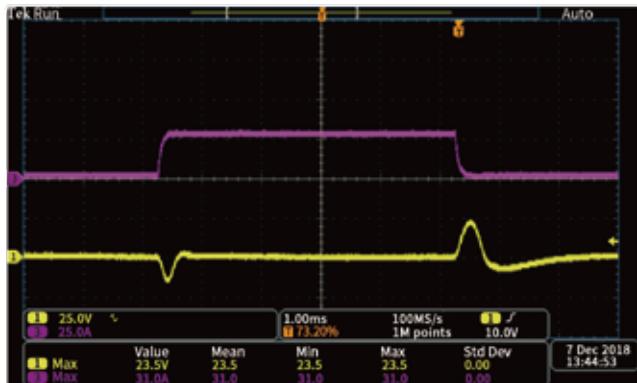
Battery charging and discharging:
seamless switching, no overshoot

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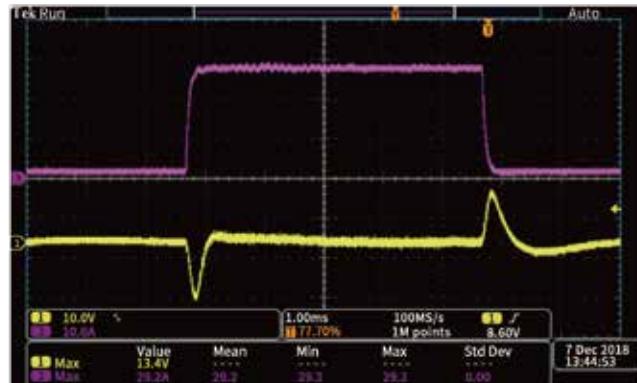
Patented parallel technology

- IT6000B has adopted ITECH patented parallel technology
- All the function and performance will be the same as standalone unit
- No need to calibrate after paralleling
- Fiber transmission, good for anti-interference
- Digital paralleling, fully insulated, good for protecting DUT



Standalone unit
IT6006B-500-30 500V 30A 6000W
Setting: voltage 100V current 28A
Load current: 30A

* Yellow- output voltage
Purple- output current



2 units IT6006B-500-30
Setting: voltage 100V current 56A
Load current: 60A



The diagrams above show that the dynamic waveforms are the same after the IT6000B units are paralleled. Master and slave can keep high speed response without delay simultaneously.

Fall

Rise

Dynamic waveform

- Falling speed is almost the same after paralleling
- Rising speed is even faster than standalone unit
- Dynamic waveform keeps the same after paralleling

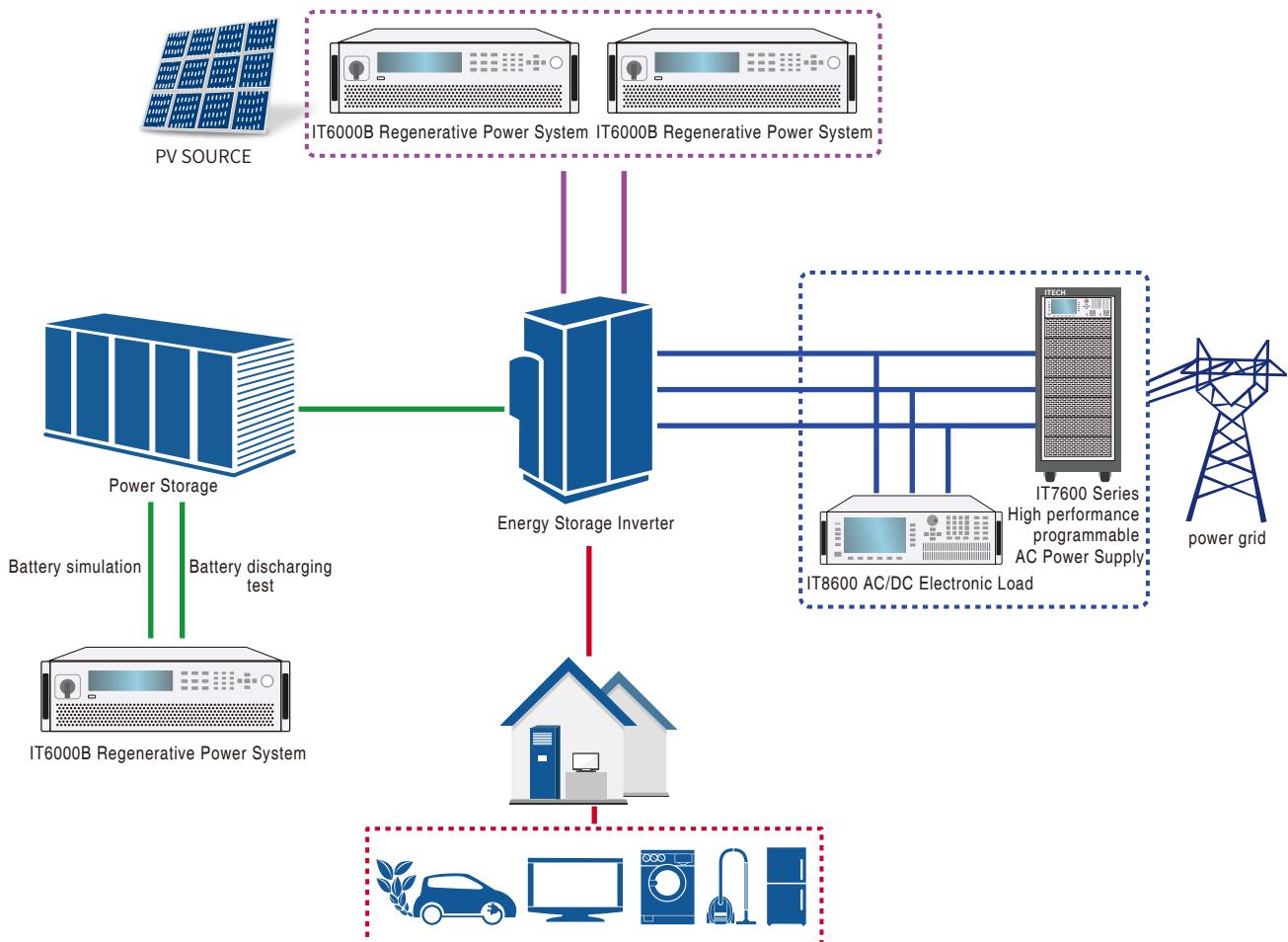
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Application-Photovoltaic energy storage integrated machine

Photovoltaic energy storage integrated machine is a device of DC-AC converter used in combined power generating of photovoltaic and energy storage system. It can coordinate the output of photovoltaic and energy storage batteries, stabilize the power fluctuation of the batteries and output qualified AC power by the technology of energy storage converting.

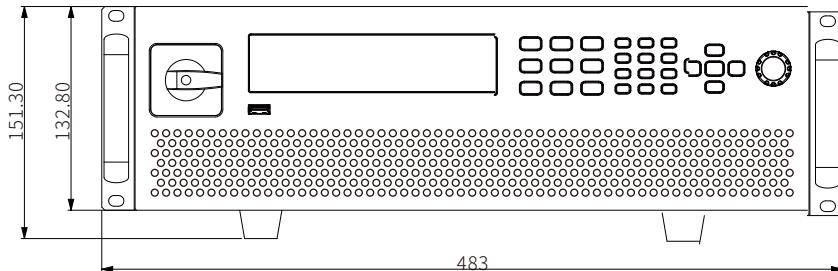
- IT6000B can precisely simulate I-V curve of solar panel.
- IT6000B can simulate batteries by its battery simulation function.
- IT7600+IT8600 can simulate the input of power grid.
- Three testing ways can be done by simulation of various power units: Battery input, AC input, PV input to converter.
- The independent load mode of IT6000B can proceed discharging test of batteries.



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3U/18kW Standalone unit dimension(mm)



Specification

Model	Current	Power	Model	Current	Power	Model	Current	Power			
80V*	IT6005B-80-120	120A	5kW	500V	IT6006B-500-30	30A	6kW	500V*	IT6006B-500-40	40A	6kW
	IT6010B-80-240	240A	10kW		IT6012B-500-60	60A	12kW		IT6012B-500-80	80A	12kW
	IT6015B-80-360	360A	15kW		IT6018B-500-90	90A	18kW		IT6018B-500-120	120A	18kW
	IT6030B-80-720	720A	30kW		IT6036B-500-180	180A	36kW		IT6036B-500-240	240A	36kW
	IT6045B-80-1080	1080A	45kW		IT6054B-500-270	270A	54kW		IT6054B-500-360	360A	54kW
	IT6060B-80-1440	1440A	60kW		IT6072B-500-360	360A	72kW		IT6072B-500-480	480A	72kW
	IT6075B-80-1800	1800A	75kW		IT6090B-500-450	450A	90kW		IT6090B-500-600	600A	90kW
					IT6108B-500-540	540A	108kW		IT6108B-500-720	720A	108kW
					IT6126B-500-630	630A	126kW		IT6126B-500-840	840A	126kW
					IT6144B-500-720	720A	144kW		IT6144B-500-960	960A	144kW

Model	Current	Power	Model	Current	Power	Model	Current	Power			
800V	IT6006B-800-20	20A	6kW	1500V	IT6018B-1500-30	30A	18kW	1500V*	IT6018B-1500-40	40A	18kW
	IT6012B-800-40	40A	12kW		IT6036B-1500-60	60A	36kW		IT6036B-1500-80	80A	36kW
	IT6018B-800-60	60A	18kW		IT6054B-1500-90	90A	54kW		IT6054B-1500-120	120A	54kW
	IT6036B-800-120	120A	36kW		IT6072B-1500-120	120A	72kW		IT6072B-1500-160	160A	72kW
	IT6054B-800-180	180A	54kW		IT6090B-1500-150	150A	90kW		IT6090B-1500-200	200A	90kW
	IT6072B-800-240	240A	72kW		IT6108B-1500-180	180A	108kW		IT6108B-1500-240	240A	108kW
	IT6090B-800-300	300A	90kW		IT6126B-1500-210	210A	126kW		IT6126B-1500-280	280A	126kW
	IT6108B-800-360	360A	108kW		IT6144B-1500-240	240A	144kW		IT6144B-1500-320	320A	144kW
	IT6126B-800-420	420A	126kW								
	IT6144B-800-480	480A	144kW								

Model	Current	Power	Model	Current	Power	Model	Current	Power			
2250V	IT6018B-2250-20	20A	18kW	2250V	IT6072B-2250-80	80A	72kW	2250V	IT6126B-2250-140	140A	126kW
	IT6036B-2250-40	40A	36kW		IT6090B-2250-100	100A	90kW		IT6144B-2250-160	160A	144kW
	IT6054B-2250-60	60A	54kW		IT6108B-2250-120	120A	108kW				

* Some voltage levels are coming soon

* This information is subject to change without notice

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IT6000B Regenerative Power System

Specification

	IT6006B-500-30	IT6006B-800-20	IT6012B-500-60
	Power Supply Parameters		Power Supply Parameters
Rated Value Range (0 °C -40 °C)	Output Voltage	0~500V	0~800V
	Output Current	-30~30A	-20~20A
	Output Power	-6000~6000W	-6000~6000W
	Output Resistance	0~1Ω	0~1Ω
Line Regulation ±(% of Output+Offset)	Voltage	≤0.01%FS	≤0.01%FS
	Current	≤0.05%FS	≤0.05%FS
Load Regulation ±(% of Output+Offset)	Voltage	≤0.02%FS	≤0.02%FS
	Current	≤0.05%FS	≤0.05%FS
Readback Resolution	Voltage	0.01V	0.01V
	Current	0.001A	0.001A
	Power	0.001kW	0.001kW
	Resistance	0.01mΩ	0.1mΩ
Readback Accuracy (Within 12 months -25 °C ±5 °C) ±(% of Output+Offset)	Voltage	≤0.02% + 0.02%FS	≤0.02% + 0.02%FS
	Current	≤0.1% + 0.1%FS	≤0.1% + 0.1%FS
	Power	≤0.5% + 0.5%FS	≤0.5% + 0.5%FS
	Resistance	≤1% + 1%FS	≤1% + 1%FS
Ripple (20Hz -20MHz)	Voltage	≤200mVpp(MAX: ≤500mVpp)	≤320mVpp(MAX: ≤800mVpp)
	Current	≤0.1%FS RMS	≤0.1%FS RMS
Rise time (no load)	Voltage	≤15ms	≤15ms
Rise time(full load)	Voltage	≤30ms	≤30ms
Fall time (no load)	Voltage	≤30ms	≤30ms
Fall time (full load)	Voltage	≤15ms	≤15ms
Dynamic Response Time	Voltage	≤2ms	≤2ms
Efficiency	~92%	~92%	~92%
	Load Parameters		Load Parameters
Rated Value Range (0 °C -40 °C)	Input Voltage	0~500V	0~800V
	Input Current	0~30A	0~20A
	Input Power	0~6000W	0~6000W
	Input Resistance	0~16667Ω	0~40000Ω
	Min operating voltage	0.99V at 30A	0.66V at 20A
Readback Resolution	Voltage	0.01V	0.01V
	Current	0.001A	0.001A
	Power	0.1W	0.1W
	Resistance	0.1Ω	0.1Ω
Readback Accuracy (Within 12 months -25 °C ±5 °C) ±(% of Output+Offset)	Voltage	≤0.1% + 500mV	≤0.1% + 800mV
	Current	≤0.1% + 30mA	≤0.1% + 20mA
	Power	≤1%FS	≤1%FS
	Resistance	≤2%Rmax, 0~10%Rmax; ≤5%Rmax, 10%~Rmax;	≤2%Rmax, 0~10%Rmax; ≤5%Rmax, 10%~Rmax;
Ripple (20Hz -20MHz)	Voltage	≤500mVpp	≤800mVpp
	Current	≤30mArms	≤20mArms
Dynamic Response Time	Rise Speed Rate	30A/ms	20A/ms
	Fall Speed Rate	30A/ms	20A/ms
	Dynamic Frequency	500Hz	500Hz
	Minimum Rise Time	≤1ms	≤1ms
Output Parameter	Output Voltage Range	198V~264V (Decrease 50%) 342V~528V (3P4W)	198V~264V (Decrease 50%) 342V~528V (3P4W)
	Output Frequency Range	47Hz~63Hz	47Hz~63Hz
	Max. Output Current	14A	14A
	Power Factor	≥0.99	≥0.99
	THDI	< 3%	< 3%
	Island Protection	Active Anti-islanding Protection	Active Anti-islanding Protection
Efficiency	~92%	~92%	~92%
Dimension (mm)	483W*801.61D*151.3H	483W*801.61D*151.3H	483W*801.61D*151.3H
Net weight	28KG	28KG	34KG

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IT6000B Regenerative Power System

Specification

	IT6012B-800-40	IT6018B-500-90	IT6018B-800-60
	Power Supply Parameters		Power Supply Parameters
Rated Value Range (0 °C -40 °C)	Output Voltage	0~800V	0~500V
	Output Current	-40~40A	-90~90A
	Output Power	-12000~12000W	-18000~18000W
	Output Resistance	0~1Ω	0~1Ω
Line Regulation ±(% of Output+Offset)	Voltage	≤0.01%FS	≤0.01%FS
	Current	≤0.05%FS	≤0.05%FS
Load Regulation ±(% of Output+Offset)	Voltage	≤0.02%S	≤0.02%FS
	Current	≤0.05%FS	≤0.05%FS
Readback Resolution	Voltage	0.01V	0.01V
	Current	0.001A	0.001A
	Power	0.001kW	0.001kW
	Resistance	0.01mΩ	0.01mΩ
Readback Accuracy (Within 12 months -25 °C ±5 °C) ±(% of Output+Offset)	Voltage	≤0.02% + 0.02%FS	≤0.02% + 0.02%FS
	Current	≤0.1% + 0.1%FS	≤0.1% + 0.1%FS
	Power	≤0.5% + 0.5%FS	≤0.5% + 0.5%FS
	Resistance	≤1% + 1%FS	≤1% + 1%FS
Ripple (20Hz -20MHz)	Voltage	≤200mVpp(MAX: ≤500mVpp)	≤200mVpp(MAX:500mVpp)
	Current	≤0.1%FS RMS	≤0.1%FS RMS
Rise time (no load)	Voltage	≤15ms	≤15ms
Rise time(full load)	Voltage	≤30ms	≤30ms
Fall time (no load)	Voltage	≤30ms	≤30ms
Fall time (full load)	Voltage	≤15ms	≤15ms
Dynamic Response Time	Voltage	≤2ms	≤2ms
Efficiency	~92%	~92%	~92%
	Load Parameters		Load Parameters
Rated Value Range (0 °C -40 °C)	Input Voltage	0~800V	0~800V
	Input Current	0~40A	0~60A
	Input Power	0~12000W	0~18000W
	Input Resistance	0~20000Ω	0~13333Ω
	Min operating voltage	1.32V at 40A	2.97V at 90A
Readback Resolution	Voltage	0.01V	0.01V
	Current	0.001A	0.001A
	Power	0.1W	0.1W
	Resistance	0.1Ω	0.1Ω
Readback Accuracy (Within 12 months -25 °C ±5 °C) ±(% of Output+Offset)	Voltage	≤0.1% + 800mV	≤0.1% + 500mV
	Current	≤0.1% + 40mA	≤0.1% + 90mA
	Power	≤1%FS	≤1%FS
	Resistance	≤2%Rmax,0~10%Rmax; ≤5%Rmax,10%~Rmax;	≤2%Rmax,0~10%Rmax; ≤5%Rmax,10%~Rmax;
Ripple (20Hz -20MHz)	Voltage	≤800mVpp	≤500mVpp
	Current	≤40mA rms	≤90mA rms
Dynamic Response Time	Rise Speed Rate	40A/ms	90A/ms
	Fall Speed Rate	40A/ms	90A/ms
	Dynamic Frequency	500Hz	500Hz
	Minimum Rise Time	≤1ms	≤1ms
Output Parameter	Output Voltage Range	198V~264V (Decrease 50%) 342V~528V (3P4W)	198V~264V (Decrease 50%) 342V~528V (3P4W)
	Output Frequency Range	47Hz~63Hz	47Hz~63Hz
	Max. Output Current	19A	24A
	Power Factor	≥0.99	≥0.99
	THDI	<3%	<3%
	Island Protection	Active Anti-islanding Protection	Active Anti-islanding Protection
Efficiency	~92%	~92%	~92%
Dimension (mm)	483W*801.61D*151.3H	483W*801.61D*151.3H	483W*801.61D*151.3H
Net weight	34KG	40KG	40KG

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IT6000B Regenerative Power System

Specification

		IT6018B-1500-30	IT6018B-2250-20
		Power Supply Parameters	
Rated Value Range (0 °C -40 °C)	Output Voltage	0~1500V	0~2250V
	Output Current	-30~30A	-20~20A
	Output Power	-18000~18000W	-18000~18000W
	Output Resistance	0~1Ω	0~281.25Ω
Line Regulation ±(% of Output+Offset)	Voltage	≤0.01%FS	≤0.01%FS
	Current	≤0.05%FS	≤0.05%FS
Load Regulation ±(% of Output+Offset)	Voltage	≤0.02%FS	≤0.02%FS
	Current	≤0.05%FS	≤0.05%FS
Readback Resolution	Voltage	0.1V	0.1V
	Current	0.001A	0.01A
	Power	0.001kW	0.001kW
Readback Accuracy (Within 12 months -25 °C ±5 °C) ±(% of Output+Offset)	Resistance	0.1mΩ	0.1mΩ
	Voltage	≤0.02% + 0.02%FS	≤0.02% + 0.02%FS
	Current	≤0.1% + 0.1%FS	≤0.1% + 0.1%FS
	Power	≤0.5% + 0.5%FS	≤0.5% + 0.5%FS
Ripple (20Hz -20MHz)	Resistance	≤1% + 1%FS	≤1% + 1%FS
	Voltage	≤600mVpp(MAX: ≤1500mVpp)	≤900mVpp(MAX: ≤2250mVpp)
Rise time (no load)	Current	≤0.1%FS RMS	≤0.1%FS RMS
	Voltage	≤15ms	≤15ms
Rise time(full load)	Voltage	≤30ms	≤30ms
	Voltage	≤30ms	≤30ms
Fall time (no load)	Voltage	≤15ms	≤15ms
	Voltage	≤2ms	≤2ms
Dynamic Response Time	Voltage	≤2ms	≤2ms
	Efficiency	~92%	~92%
		Load Parameters	
Rated Value Range (0 °C -40 °C)	Input Voltage	0~1500V	0~2250V
	Input Current	0~30A	0~20A
	Input Power	0~18000W	0~18000W
	Input Resistance	0~50000Ω	0~112500Ω
	Min operating voltage	9V at 30A	6V at 20A
Readback Resolution	Voltage	0.1V	0.1V
	Current	0.001A	0.001A
	Power	0.1W	0.1W
	Resistance	0.1Ω	0.1Ω
Readback Accuracy (Within 12 months -25 °C ±5 °C) ±(% of Output+Offset)	Voltage	≤0.1% + 1500mV	≤0.1% + 2250mV
	Current	≤0.1% + 30mA	≤0.1% + 20mA
	Power	≤1%FS	≤1%FS
	Resistance	≤2%Rmax,0~10%Rmax; ≤5%Rmax,10%~Rmax;	≤2%Rmax,0~10%Rmax; ≤5%Rmax,10% ~ Rmax;
Ripple (20Hz -20MHz)	Voltage	≤1500mVpp	≤2250mVpp
	Current	≤30mA rms	≤20mA rms
Dynamic Response Time	Rise Speed Rate	30A/ms	20A/ms
	Fall Speed Rate	30A/ms	20A/ms
	Dynamic Frequency	500Hz	500Hz
Output Parameter	Minimum Rise Time	≤1ms	≤1ms
	Output Voltage Range	198V~264V (Decrease 50%)	198V~264V (Decrease 50%)
	Output Frequency Range	342V~528V (3P4W)	342V~528V (3P4W)
	Max. Output Current	47Hz~63Hz	47Hz~63Hz
	Power Factor	24A	24A
	THDI	≥0.99	≥0.99
	Island Protection	<3%	<3%
Efficiency		Active Anti-islanding Protection	Active Anti-islanding Protection
Dimension (mm)		483W*801.61D*151.3H	483W*801.61D*151.3H
Net weight		40KG	40KG

* Some voltage levels are coming soon

* This information is subject to change without notice



YOUR POWER TESTING SOLUTION

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