

IT8500+ Programmable DC Electronic Load



IT8500+ series single channel programmable electronic load with high density, high resolution and high accuracy supports dynamic test function, automatic test function, etc., which is suited for applications in areas such as LED driver testing, switching power testing, battery performance testing, etc. IT8500+ also provides standard SCPI protocol to build intelligent test platform that is ideal for multiple industries.

Applications

Battery test, lithium protection board test, power supply test, charger test, ATE, component test, etc.

Feature

- Four operating modes: CV, CC, CR, CP
- Battery test function, automatic test function, OPP test, OCP test function and CR-LED function
- Dynamic mode up to 10kHz
- Voltage measurement resolution up to 0.1mV / 0.1mA
- Remote sense
- Short circuit function
- Current monitoring function
- Power-off memory function
- 100 groups memory capacity
- Optional USB / RS232 / RS485 interface

* IT8513B+, IT8514B+, IT8514C+, and IT8516C+ are built-in RS232 and USB interface.

Model	Voltage	Current	Power	Size
IT8511A+	150V	30A	150W	1/2 2U
IT8511B+	500V	10A	150W	1/2 2U
IT8512A+	150V	30A	300W	1/2 2U
IT8512B+	500V	15A	300W	1/2 2U
IT8512C+	120V	60A	300W	1/2 2U
IT8512H+	800V	5A	300W	1/2 2U
IT8513A+	150V	60A	400W	1/2 2U
IT8513B+	500V	30A	600W	2U
IT8513C+	120V	120A	600W	2U
IT8514B+	500V	60A	1500W	2U
IT8514C+	120V	240A	1500W	2U
IT8516C+	120V	240A	3000W	4U

Optional interface

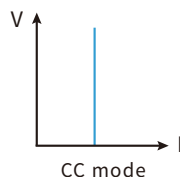
IT-E121	RS232 communication cable
IT-E122	USB communication cable

Automatic Test Function

IT8500+ supports two automatic test editing modes. One is special automatic test editing mode that can save up to 10 groups of test files, and the other is compatible with the IT8500 automatic test editing mode that can save up to 50 groups of test files, both of which can be called and tested at any time. Test operation is simple, the button can be completely locked to prevent accidental touch on the keyboard from affecting normal testing.

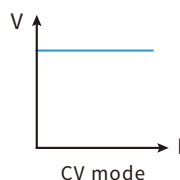
Constant Current (CC)

In CC mode, the electronic load will sink a constant current regardless of the changes of input voltage.



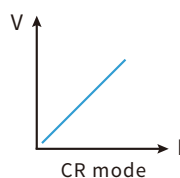
Constant Voltage (CV)

In CV mode, the electronic load will attempt to sink enough current to control the source voltage to the programmed value.



Constant Resistance (CR)

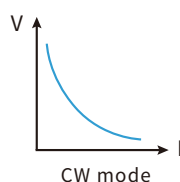
In CR mode, the module will sink a current linearly proportional to the input voltage in accordance with the programmed resistance.



Constant Power (CW)

In CP mode, the electronic load will dissipate power in accordance with the programmed value.

If input voltage increase, input current will decrease.

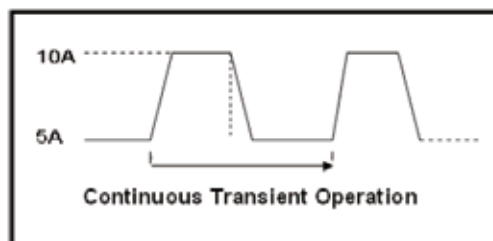


Transient Mode

Transient operation enables the module to periodically switch between two load levels, as might be required for testing power supplies. Transient operation can be turned on and off from the front panel (shift + numeric key "2"). Before you turn on the operation, you should set the parameters associated with the transient operation. The parameters include: A level, B level, frequency, duty cycle and transient testing modes. There are three different transient testing modes: continuous, pulse, and toggle.

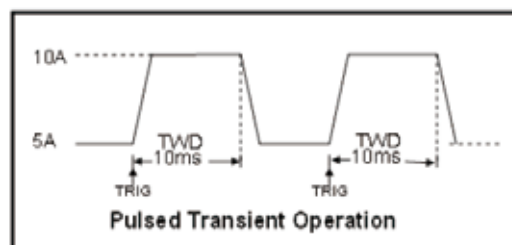
Continuous Mode

In continuous mode, the electronic load generates a repetitive pulse stream that toggles between two load levels. Load could switch the state between two value settings, A/B.



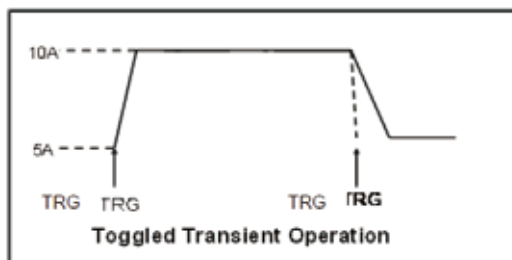
Pulse Mode

In pulse mode, the electronic load generates a transient pulse of programmable width when pulse transient operation is in effect. The load will automatically switch to A level after maintaining A width time. Then it will switch to B level. The load will not switch to A level again until the instrument receives the pulse signal.



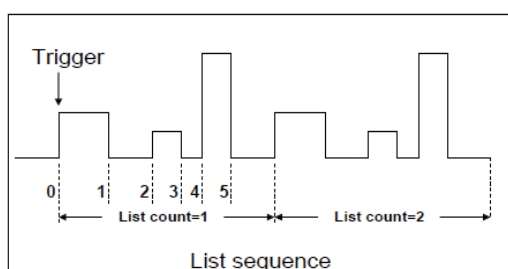
Toggle Mode

In toggle mode, the electronic load will switch between A level and B level when receiving a trigger signal after the transient operation is enabled. The following picture shows the current waveform in toggle transient operation.



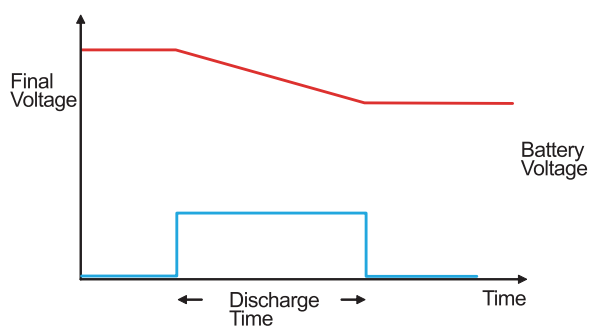
List Mode

List mode allows you to generate a complex current sequence. Moreover, the mode change can be synchronized with an internal or external signal, to accomplish dynamic and precise test which can save cost for users. Users can edit step value, pulse width and slope sequence and meet a complex test request. A list file includes following parameters: file name step counts (range 2-84), time width of single step (0.00005s-3600s), step value and slope. The edited list file can be recalled easily. The DC load provides 7 nonvolatile registers to save list files setting for recall later. In the list mode, the load starts to run the list file once receiving a trigger signal, continue to run until end of the operation or receiving another trigger.



Battery Mode

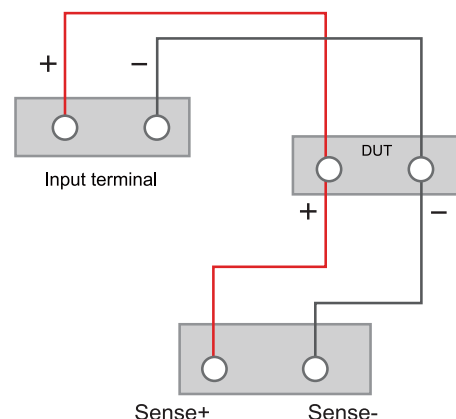
Battery discharge test of IT8500+ series can be achieved under CC mode. There are three cut-off conditions for IT8500+ include cut-off voltage, cut-off capacity and cut-off time, when any of the three conditions are met, discharge test will be stopped, the load will be automatically switched to OFF. Moreover, the battery voltage, discharge time and discharged capacity can be observed during the test.



Battery discharge function

Remote Sense

When working in CC, CV, CP and CR mode, if the electronic load consumes a very large current, it will cause a voltage drop in the leads between the connected device and terminals of the electronic load. In order to ensure testing accuracy, the electronic load provides a pair of remote sensing terminals in the rear panel where users can sense the output terminal voltage of the connected device. Users should set the electronic load in REMOTE SENSE mode before using this function. By eliminating the effect of the voltage drop in the load leads, remote sensing provides greater accuracy by allowing the electronic load to regulate directly at the source's output terminals.



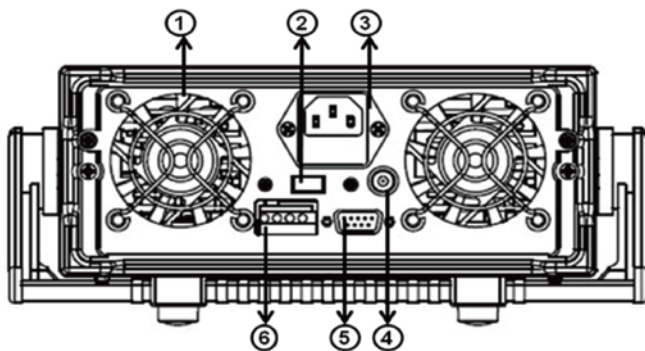


IT8500+ Specifications

		IT8511A+		IT8511B+		IT8512A+	
Rated (0~40 °C)	Voltage	0~150V		0~500V		0~150V	
	Current	0~3A	0~30A	0~3A	0~10A	0~3A	0~30A
	Power	150W		150W		300W	
CV mode	MOV	0.25V at 3A	3V at 30A	1.2V at 3A	4V at 10A	0.14V at 3A	1.4V at 30A
	Range	0.1~18V	0.1~150V	0.1~50V	0.1~500V	0.1~18V	0.1~150V
	Resolution	1mV	10mV	1mV	10mV	1mV	10mV
CC mode	Accuracy	±(0.05%+0.02%FS)	±(0.05%+0.025%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.02%FS)	±(0.05%+0.025%FS)
	Range	0~3A	0~30A	0~3A	0~10A	0~3A	0~30A
	Resolution	0.1mA	1mA	0.1mA	1mA	0.1mA	1mA
CR mode	Accuracy	±(0.05%+0.05%FS)		±(0.05%+0.05%FS)		±(0.05%+0.05%FS)	
	Range	0.05Ω~10Ω	10Ω~7.5kΩ	0.5Ω~10Ω	10Ω~7.5kΩ	0.05Ω~10Ω	10Ω~7.5kΩ
	Resolution	16bit		16bit		16bit	
CP mode	Accuracy	0.01%+0.08S ⁻²	0.01%+0.0008S	0.01%+0.08S ⁻²	0.01%+0.0008S	0.01%+0.08S ⁻²	0.01%+0.0008S
	Range	150W		150W		300W	
	Resolution	10mW		10mW		10mW	
Dynamic mode	Accuracy	±(0.1%+0.1%FS)		±(0.1%+0.2%FS)		±(0.1%+0.1%FS)	
	T1&T2	20μs~3600s /Res:1μs		20μs~3600s /Res:1μs		20μs~3600s /Res:1μs	
	Accuracy	2μs±100ppm		2μs±100ppm		2μs±100ppm	
	Up/down slope	0.0001~0.12A/μs ≈ 20μs	0.001~0.6 A/μs ≈ 30μs	0.0001~0.2A/μs ≈ 10μs	0.001~0.8A/μs ≈ 10μs	0.0001~0.2A/μs	0.001~1.5A/μs
Measuring range							
Readback Voltage	Range	0~18V	0~150V	0~50V	0~500V	0~18V	0~150V
	Resolution	0.1mV	1mV	1mV	10mV	0.1mV	1mV
	Accuracy	±(0.025%+0.025%FS)		±(0.025%+0.025%FS)		±(0.025%+0.025%FS)	
Readback Current	Range	0~3A	0~30A	0~3A	0~10A	0~3A	0~30A
	Resolution	0.1mA	1mA	0.1mA	1mA	0.1mA	1mA
	Accuracy	±(0.05%+0.05%FS)		±(0.05%+0.05%FS)		±(0.05%+0.05%FS)	
Readback Power	Range	150W		150W		300W	
	Resolution	10mW		10mW		10mW	
	Accuracy	±(0.1%+0.1%FS)		±(0.1%+0.2%FS)		±(0.1%+0.1%FS)	
Protected range							
Over power protection		≈ 160W		≈ 160W		≈ 320W	
Over current protection		≈ 3.3A	≈ 33A	≈ 3.3A	≈ 11A	≈ 3.3A	≈ 33A
Over voltage protection		≈ 160V		≈ 530V		≈ 160V	
Over temperature protection		≈ 85°C		≈ 85°C		≈ 85°C	
Specification							
Short circuit	CC	≈ 3.3/3A	≈ 33/30A	≈ 3.3/3A	≈ 11/10A	≈ 3.3/3A	≈ 33/30A
	CV	≈ 0V		≈ 0V		≈ 0V	
	CR	≈ 80mΩ		≈ 400mΩ		≈ 180mΩ	
Input terminal impedance		150kΩ		1MΩ		150kΩ	
Size(W*H*D)		214.5mm*88.2mm*354.6mm		214.5mm*88.2mm*354.6mm		214.5mm*88.2mm*354.6mm	

*This information is subject to change without notice

IT8511A+ / IT8512A+ / IT8511B+ / IT8512B+ / IT8512C+ / IT8512H+ / IT8513A+ / IT8513C+



- ① Air vents
- ② Voltage switch (110V/220V)
- ③ AC line input
- ④ Current monitoring Terminal
- ⑤ 9-Pin serial port interface connector
- ⑥ Trigger and remote sensing terminal block

IT8500+ Specifications

		IT8512B+		IT8512C+		IT8512H+	
Rated (0~40 °C)	Voltage	0~3A	0~500V	0~6A	0~120V	0~1A	0~800V
	Current	0~15A		0~60A		0~5A	
CV mode	Power	300W		300W		300W	
	MOV	0.6V/3A	3V/15A	0.25V/6A	2.5V/60A	1.4V at 1A	7V at 5A
	Range	0~50V	0~500V	0~18V	0~120V	0.1~80V	0.1~800V
	Resolution	1mV	10mV	1mV	10mV	1mV	10mV
CC mode	Accuracy	±(0.05%+0.02%FS)	±(0.05%+0.025%FS)	±(0.05%+0.02%FS)	±(0.05%+0.025%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)
	Range	0~3A	0~15A	0~6A	0~60A	0~1A	0~5A
	Resolution	0.1mA	1mA	0.1mA	1mA	0.1mA	1mA
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.1%FS)	±(0.05%+0.05%FS)
CR mode	Range	0.3Ω~10Ω	10Ω~7.5kΩ	0.3Ω~10Ω	10Ω~7.5kΩ	2Ω~10Ω	10Ω~7.5kΩ
	Resolution	16bit		16bit		16bit	
	Accuracy	0.01%+0.08S	0.01%+0.0008S	0.01%+0.08S	0.01%+0.0008S	0.01%+0.08S	0.01%+0.0008S
	Range	300W		300W		300W	
CP mode	Resolution	10mW		10mW		10mW	
	Accuracy	±(0.1%+0.1%FS)		±(0.1%+0.1%FS)		±(0.2%+0.2%FS)	
	T1&T2	50μs~3600s /Res:1μs		50μs~3600s /Res:1μs		20μs~3600s /Res:1μs	
	Accuracy	5μs±100ppm		5μs±100ppm		2μs±100ppm	
Dynamic mode	Up/down slope	0.0001~0.2A/μs ≈ 10μs	0.001~0.8A/μs ≈ 10μs	0.0001~0.3A/μs	0.001~3A/μs	0.0001~0.04A/μs ≈ 20μs	0.001~0.2A/μs ≈ 20μs
Measuring range							
Readback Voltage	Range	0~50V	0~500V	0~18V	0~120V	0~80V	0~800V
	Resolution	1mV	10mV	1mV	10mV	1mV	10mV
	Accuracy	±(0.025%+0.025%FS)		±(0.025%+0.025%FS)		±(0.025%+0.025%FS)	
Readback Current	Range	0~3A	0~15A	0~6A	0~60A	0~1A	0~5A
	Resolution	0.1mA	1mA	0.1mA	1mA	0.1mA	1mA
	Accuracy	±(0.05%+0.05%FS)		±(0.05%+0.05%FS)		±(0.05%+0.05%FS)	
Readback Power	Range	300W		300W		300W	
	Resolution	10mW		10mW		10mW	
	Accuracy	±(0.1%+0.1%FS)		±(0.1%+0.1%FS)		±(0.2%+0.2%FS)	
Protected range							
Over power protection		≈ 320W		≈ 320W		≈ 320W	
Over current protection		≈ 3.3A	≈ 16A	≈ 6.5A	≈ 65A	≈ 1.1A	≈ 5.5A
Over voltage protection		≈ 530V		≈ 125V		≈ 850V	
Over temperature protection		≈ 85°C		≈ 85°C		≈ 85°C	
Specification							
Short circuit	CC	≈ 3.3/3A	≈ 16/15A	≈ 6.5A	≈ 65A	≈ 1.1/1A	≈ 5.5/5A
	CV	≈ 0V		≈ 0V		≈ 0V	
	CR	≈ 180mΩ		≈ 40mΩ		≈ 1.4Ω	
Input terminal impedance		1MΩ		150kΩ		2MΩ	
Size(W*H*D)		214.5mmW*354.6mmD*88.2mmH		214.5mmW*354.6mmD*88.2mmH		214.5mmW*354.6mmD*88.2mmH	
		IT8513A+		IT8513B+		IT8513C+	
Rated (0~40 °C)	Voltage	0~150V		0~500V		0~120V	
	Current	0~6A	0~60A	0~3A	0~30A	0~12A	0~120A
CV mode	Power	400W		600W		600W	
	MOV	0.25V at 6A	2.5V at 60A	0.3V at 3A	3V at 30A	0.2V at 12A	2V at 120A
	Range	0.1~18V	0.1~150V	0.1~50V	0.1~500V	0.1~18V	0.1~120V
	Resolution	1mV	10mV	1mV	10mV	1mV	10mV
CC mode	Accuracy	±(0.05%+0.02%FS)	±(0.05%+0.025%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.02%FS)	±(0.05%+0.025%FS)
	Range	0~6A	0~60A	0~3A	0~30A	0~12A	0~120A
	Resolution	0.1mA	1mA	0.1mA	1mA	0.1mA	1mA
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.1%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.1%FS)
CR mode	Range	0.1Ω~10Ω	10Ω~7.5kΩ	0.05Ω~10Ω	10Ω~7.5kΩ	0.05Ω~10Ω	10Ω~7.5kΩ
	Resolution	16bit		16bit		16bit	
	Accuracy	0.01%+0.08S	0.01%+0.0008S	0.02%+0.08S	0.02%+0.0008S	0.01%+0.08S	0.01%+0.0008S
	Range	400W		600W		600W	
CP mode	Resolution	10mW		10mW		10mW	
	Accuracy	±(0.2%+0.2%FS)		±(0.2%+0.2%FS)		±(0.2%+0.2%FS)	
	T1&T2	20μs~3600s /Res:1μs		100μs~3600s /Res:1μs		100μs~3600s /Res:1μs	
	Accuracy	2μs±100ppm		10μs±100ppm		10μs±100ppm	
Dynamic mode	Up/down slope	0.001~0.15A/μs	0.01~1A/μs	0.001~0.05A/μs	0.01~0.5A/μs	0.001~0.2A/μs ≈ 60μs	0.01~1.6A/μs ≈ 60μs
Measuring range							
Readback Voltage	Range	0~18V	0~150V	0~50V	0~500V	0~18V	0~120V
	Resolution	0.1 mV	1mV	1 mV	10mV	0.1mV	1mV
	Accuracy	±(0.025%+0.025%FS)		±(0.025%+0.025%FS)		±(0.025%+0.025%FS)	
Readback Current	Range	0~6A	0~60A	0~3A	0~30A	0~12A	0~120A
	Resolution	0.1mA	1mA	1 mA	10mA	1mA	10mA
	Accuracy	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.05%+0.1%FS)
Readback Power	Range	400W		600W		600W	
	Resolution	10mW		10mW		10mW	
	Accuracy	±(0.2%+0.2%FS)		±(0.2%+0.2%FS)		±(0.2%+0.2%FS)	
Protected range							
Over power protection		≈ 420W		≈ 620W		≈ 620W	
Over current protection		≈ 6.6A	≈ 66A	≈ 3.3A	≈ 33A	≈ 13A	≈ 130A
Over voltage protection		≈ 165V		≈ 530V		≈ 125V	
Over temperature protection		≈ 85°C		≈ 85°C		≈ 95°C	
Specification							
Short circuit	CC	≈ 6.6/6A	≈ 66/60A	≈ 3.4/3A	≈ 34/30A	≈ 13/12A	≈ 130/120A
	CV	≈ 0V		≈ 0V		≈ 0V	
	CR	≈ 30mΩ		≈ 100mΩ		≈ 15mΩ	
Input terminal impedance		≈ 280kΩ		≈ 1MΩ		150kΩ	
Size(W*H*D)		214.5mm*88.2mm*453.5mm		436.5mm*88.2mm*463.5mm		214.5mm*88.2mm*453.5mm	

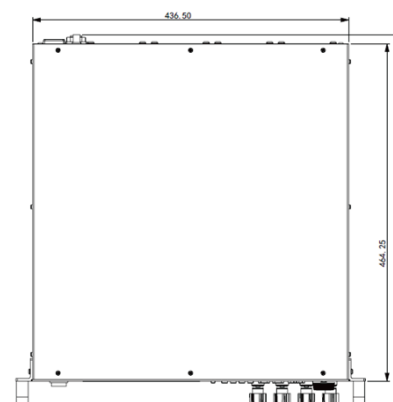
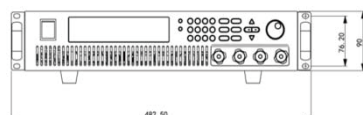
IT8500+ Specifications

		IT8514C+		IT8514B+		IT8516C+	
Rated (0~40 °C)	Voltage	0~120V		0~500V		0~120V	
	Current	0~24A	0~240A	0~6A	0~60A	0~24A	0~240A
	Power	1500W		1500W		3000W	
CV mode	MOV	0.25V at 24A	2.5V at 240A	0.25V at 6A	2.5V at 60A	0.15V at 24A	1.5V at 240A
	Range	18V	120V	0.1~50V	0.1~500V	0.1~18V	0.1~120V
	Resolution	1mV	10mV	1mV	10mV	1mV	10mV
CC mode	Accuracy	±(0.05%+0.02%FS)	±(0.05%+0.025%FS)	±(0.05%+0.02%FS)	±(0.05%+0.025%FS)	±(0.05%+0.02%FS)	±(0.05%+0.025%FS)
	Range	0~24A	0~240A	0~6A	0~60A	0~24A	0~240A
	Resolution	1mA	10mA	1mA	10mA	1mA	10mA
CR mode	Accuracy	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)	±(0.05%+0.05%FS)	±(0.05%+0.05%FS)	±(0.1%+0.1%FS)	±(0.1%+0.1%FS)
	Range	0.05Ω~10Ω	10Ω~7.5kΩ	0.05Ω~10Ω	10Ω~7.5kΩ	0.05Ω~10Ω	10Ω~7.5kΩ
	Resolution	16bit		16bit		16bit	
CP mode	Accuracy	0.02%+0.08S	0.01%+0.0008S	0.02%+0.08S ⁻²	0.02%+0.0008S	0.02%+0.08S ⁻²	0.02%+0.0008S
	Range	1500W		1500W		3000W	
	Resolution	10mW		10mW		10mW	
Dynamic mode	Accuracy	±(0.2%+0.2%FS)		±(0.2%+0.2%FS)		±(0.2%+0.2%FS)	
	T1&T2	100μs~3600s /Res:3μs		100μs~3600s /Res:1μs		120μs~3600s /Res:1μs	
	Up/down slope	10μs±100ppm		10μs±100ppm		10μs±100ppm	
Measuring range							
Readback Voltage	Range	0~18V	0~120V	0~50V	0~500V	0~18V	0~120V
	Resolution	0.1mV	1mV	0.1mV	1mV	0.1mV	1mV
	Accuracy	±(0.025%+0.025%FS)		±(0.025%+0.025%FS)		±(0.025%+0.025%FS)	
Readback Current	Range	0~24A	0~240A	0~6A	0~60A	0~24A	0~240A
	Resolution	1mA	10mA	1mA	10mA	1mA	10mA
	Accuracy	±(0.05%+0.05%FS)		±(0.05%+0.05%FS)		±(0.1%+0.1%FS)	
Readback Power	Range	150W		1500W		3000W	
	Resolution	10mW		10mW		10mW	
	Accuracy	±(0.2%+0.2%FS)		±(0.2%+0.2%FS)		±(0.2%+0.2%FS)	
Protected range							
Over power protection		≈ 1500W		≈ 1550W		≈ 3050W	
Over current protection		≈ 26.7A	≈ 267A	≈ 6.7A	≈ 67A	≈ 26A	≈ 260A
Over voltage protection		≈ 125V		≈ 530V		≈ 125V	
Over temperature protection		≈ 85℃		≈ 85℃		≈ 85℃	
Specification							
Short circuit	CC	≈ 13/12A	≈ 130/120A	≈ 6.7/6A	≈ 67/60A	≈ 26/24A	≈ 260/240A
	CV	≈ 0V		≈ 0V		≈ 0V	
	CR	≈ 15mΩ		≈ 30mΩ		≈ 5mΩ	
Input terminal impedance		150MΩ		150kΩ		150kΩ	
Size(W*H*D)		214.5mm*354.6mm*88.4mmH		436.5mm*88.2mm*463.5mm		436.5mm*176mm*463.5mm	

* This information is subject to change without notice

* 2 Resistance readback range: $(1/(1/R+(1/R)*0.01\%+0.08), 1/(1/R-(1/R)*0.01\%-0.08))$
IT8514B+/14C+/16C+: $(1/(1/R+(1/R)*0.02\%+0.08), 1/(1/R-(1/R)*0.02\%-0.08))$

IT8514B+/IT8514C+ Dimension figure



unit: mm