

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

*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 |
| IT8513C+ | 120V | 120A | 600W | 1/2 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 |

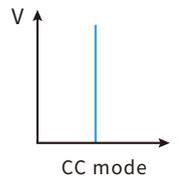
Automatic Test Function

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.



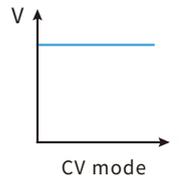
Constant Current (CC)

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



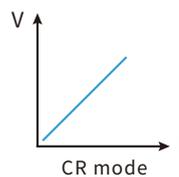
Constant Voltage (CV)

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



Constant Resistance (CR)

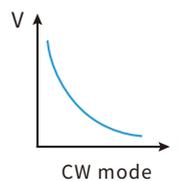
In CR mode, the module will sink a current linearly proportional to the input voltage in accordance with the programmed resistance.



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.

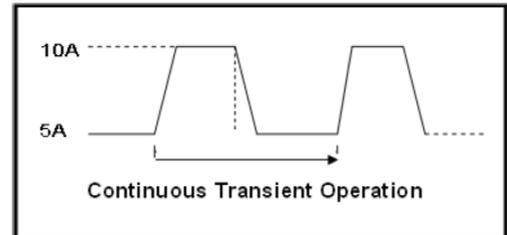


Transient Mode

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.

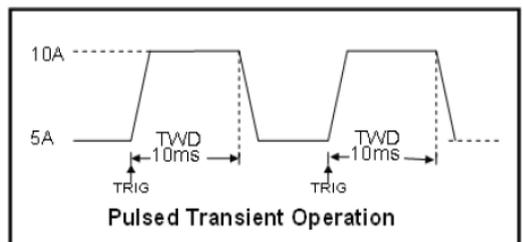
Continuous Mode

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.



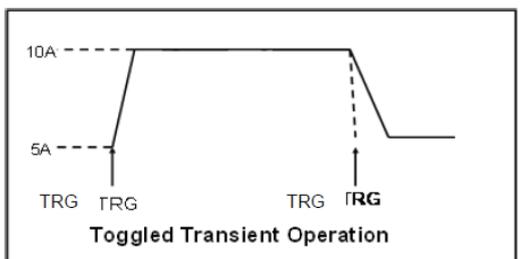
Pulse Mode

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.



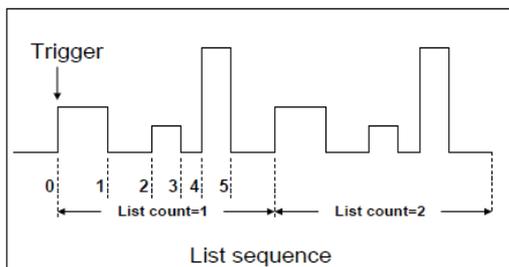
Toggle Mode

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.



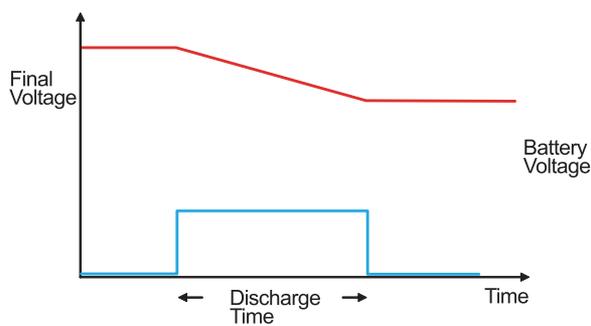
List Mode

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

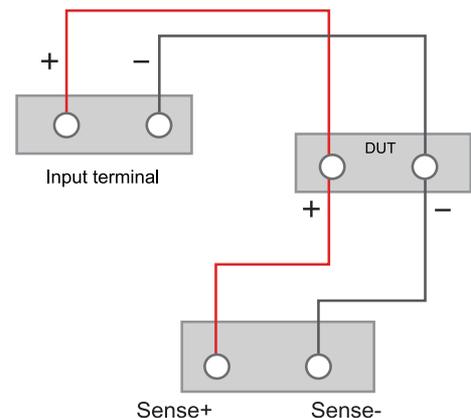
Battery discharge test of IT8500+ series can be achieved under CC mode. There are three cut-off conditions for IT8500+ include cut-off voltage, cut-off capacity and cut-off time, when any of the three conditions are met, discharge test will be stopped, the load will be automatically switched to OFF.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

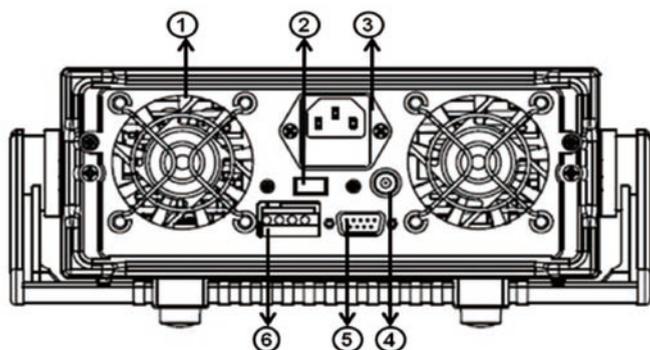


IT8500+ Specifications

| | | 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 | 0~18V | 0~150V | 0.1~50V | 0.1~500V | 0.1~18V | 0.1~150V |
| | Resolution | 1mV | 10mV | 1mV | 10mV | 1mV | 10mV |
| CC mode | Accuracy | ±(0.05%+0.025%FS) | | ±(0.05%+0.05%FS) | | ±(0.05%+0.02%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 | 0.1Ω~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 | 20uS~3600S /Res:1 uS | | 20uS~3600S /Res:1 uS | | 20uS~3600S /Res:1 uS | |
| | Accuracy | 2uS±100ppm | | 2uS±100ppm | | 2uS±100ppm | |
| Min response time | Up/down slope | 0.0001~0.12A/uS≐10uS | 0.001~0.6 A/uS≐10uS | 0.0001~0.2A/uS≐10uS | 0.001~0.8A/uS ≐10uS | 0.0001~0.2A/uS | 0.001~1.5A/uS |
| Measuring range | | | | | | | |
| Readback Voltage | Range | 0~18V | 0~150V | 0~50V | 0~500V | 0~18V | 0~150V |
| | Resolution | 0.1 mV | 1mV | 1 mV | 10 mV | 0.1 mV | 1 mV |
| | 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 | | ≐300KΩ | | ≐1MΩ | | ≐300KΩ | |
| 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+ | | | IT8512H+ | | |
|-----------------------------|---------------|---------------------------|---------------------|------|---------------------------|-----------|---------------------|
| Rated (0~40 °C) | Voltage | 0~500V | | | 0~800V | | |
| | Current | 0~3A | 0~15A | | 0~1A | 0~5A | |
| | Power | 300W | | | 300W | | |
| CV mode | MOV | 0.6V/3A | 3V/15A | | 1.4V at 1A | 7V at 5A | |
| | Range | 0.1~50V | 0.1~500V | | 0.1~80V | 0.1~800V | |
| | Resolution | 1mV | 10mV | | 1mV | 10mV | |
| CC mode | Accuracy | ±(0.05%+0.05%FS) | | | ±(0.05%+0.05%FS) | | |
| | Range | 0~3A | 0~15A | | 0~1A | 0~5A | |
| | Resolution | 0.1mA | 1mA | | 0.1mA | 1mA | |
| CR mode | Accuracy | ±(0.05%+0.05%FS) | | | ±(0.05%+0.1%FS) | | |
| | Range | 0.3Ω~10Ω | 10Ω~7.5KΩ | | 2Ω~10Ω | 10Ω~7.5KΩ | |
| | Resolution | 16bit | | | 16bit | | |
| CP mode | Accuracy | 0.01%+0.08S | | | 0.01%+0.08S*2 | | |
| | Range | 300W | | | 300W | | |
| | Resolution | 10mW | | | 10mW | | |
| Dynamic mode | Accuracy | ±(0.1%+0.2%FS) | | | 0.2%+0.2%FS | | |
| | T1&T2 | 20uS~3600S /Res:1 uS | | | 20uS~3600S /Res:1 uS | | |
| | Accuracy | 2uS±100ppm | | | 2uS±100ppm | | |
| Min response time | Up/down slope | 0.0001~0.2A/uS≐10uS | 0.001~0.8A/uS ≐10uS | | 0.0001~0.04A/uS≐20uS | | 0.001~0.2A/uS ≐20uS |
| Measuring range | | | | | | | |
| Readback Voltage | Range | 0~50V | 0~500V | | 0~80V | 0~800V | |
| | Resolution | 1 mV | 10 mV | | 1 mV | 10 mV | |
| | Accuracy | ±(0.025%+0.025%FS) | | | ±(0.025%+0.025%FS) | | |
| Readback Current | Range | 0~3A | 0~15A | | 0~1A | 0~5A | |
| | Resolution | 0.1mA | 1mA | | 0.1mA | 1mA | |
| | Accuracy | ±(0.05%+0.05%FS) | | | ±(0.05%+0.05%FS) | | |
| Readback Power | Range | 300W | | | 300W | | |
| | Resolution | 10mW | | | 10mW | | |
| | Accuracy | ±(0.1%+0.2%FS) | | | ±(0.2%+0.2%FS) | | |
| Protected range | | | | | | | |
| Over power protection | | | ≐320W | | | ≐320W | |
| Over current protection | | ≐3.3A | | ≐16A | ≐1.1A | | ≐5.5A |
| Over voltage protection | | | ≐530V | | | ≐850V | |
| Over temperature protection | | | ≐85°C | | | ≐85°C | |
| Specification | | | | | | | |
| Short circuit | CC | ≐3.3/3A | | | ≐1.1/1A | | |
| | CV | ≐0V | | | ≐0V | | |
| | CR | ≐180mΩ | | | ≐1.4Ω | | |
| Input terminal impedance | | 1MΩ | | | 2MΩ | | |
| Size(W*H*D) | | 214.5mmW*354.6mmD*88.2mmH | | | 214.5mmW*354.6mmD*88.2mmH | | |

| | | IT8513A+ | | | IT8513C+ | | |
|-----------------------------|---------------|------------------------|-------------|-------------|------------------------|------------|--------------------|
| Rated (0~40 °C) | Voltage | 0~150V | | | 0~120V | | |
| | Current | 0~6A | 0~60A | | 0~12A | 0~120A | |
| | Power | 400W | | | 600W | | |
| CV mode | MOV | 0.25V at 6A | 2.5V at 60A | | 0.2V at 12A | 2V at 120A | |
| | Range | 0.1~18V | 0.1~150V | | 0.1~18V | 0.1~120V | |
| | Resolution | 1mV | 10mV | | 1mV | 10mV | |
| CC mode | Accuracy | ±(0.05%+0.02%FS) | | | ±(0.05%+0.02%FS) | | |
| | Range | 0~6A | 0~60A | | 0~12A | 0~120A | |
| | Resolution | 0.1mA | 1mA | | 1mA | 10mA | |
| CR mode | Accuracy | ±(0.05%+0.05%FS) | | | ±(0.05%+0.05%FS) | | |
| | Range | 0.1Ω~10Ω | 10Ω~7.5KΩ | | 0.05Ω~10Ω | 10Ω~7.5KΩ | |
| | Resolution | 16bit | | | 16bit | | |
| CP mode | Accuracy | 0.01%+0.08S | | | 0.01%+0.08S *2 | | |
| | Range | 400W | | | 600W | | |
| | Resolution | 10mW | | | 10mW | | |
| Dynamic mode | Accuracy | ±(0.2%+0.2%FS) | | | ±(0.2%+0.2%FS) | | |
| | T1&T2 | 100uS~3600S /Res:1 uS | | | 100uS~3600S /Res:1 uS | | |
| | Accuracy | 10uS±100ppm | | | 10uS±100ppm | | |
| Min response time | Up/down slope | 0.001~0.15A/uS | | 0.001~1A/uS | 0.001~0.2A/uS≐60uS | | 0.01~1.6A/uS ≐60uS |
| Measuring range | | | | | | | |
| Readback Voltage | Range | 0~18V | 0~150V | | 0~18V | 0~120V | |
| | Resolution | 0.1 mV | 1mV | | 0.1 mV | 1mV | |
| | Accuracy | ±(0.025%+0.025%FS) | | | ±(0.025%+0.025%FS) | | |
| Readback Current | Range | 0~6A | 0~60A | | 0~12A | 0~120A | |
| | Resolution | 0.1mA | 1mA | | 1mA | 10mA | |
| | Accuracy | ±(0.05%+0.05%FS) | | | ±(0.05%+0.05%FS) | | |
| Readback Power | Range | 400W | | | 600W | | |
| | Resolution | 10mW | | | 10mW | | |
| | Accuracy | ±(0.2%+0.2%FS) | | | ±(0.2%+0.2%FS) | | |
| Protected range | | | | | | | |
| Over power protection | | | ≐420W | | | ≐620W | |
| Over current protection | | ≐6.6A | | ≐66A | ≐13A | | ≐130A |
| Over voltage protection | | | ≐165V | | | ≐125V | |
| Over temperature protection | | | ≐85°C | | | ≐95°C | |
| Specification | | | | | | | |
| Short circuit | CC | ≐6.6/6A | | | ≐13/12A | | |
| | CV | ≐0V | | | ≐0V | | |
| | CR | ≐30mΩ | | | ≐15mΩ | | |
| Input terminal impedance | | ≐280KΩ | | | 150KΩ | | |
| Size(W*H*D) | | 214.5mm*88.2mm*453.5mm | | | 214.5mm*88.2mm*453.5mm | | |

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IT8500+ Specifications

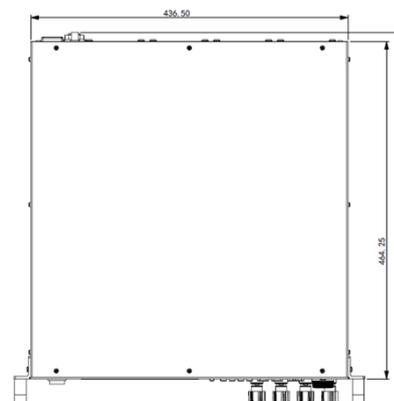
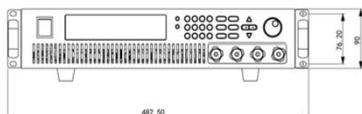
| Rated (0~40 °C) | Voltage Current | IT8514C+ | | IT8514B+ | | IT8516C+ | |
|-----------------------------|-----------------|------------------------|--------------|------------------------|-------------------|-----------------------|------------------|
| | | 0~24A | 0~120V | 0~240A | 0~6A | 0~500V | 0~24A |
| | Power | 1500W | | 1500 W | | 3000W | |
| | MOV | 0.25V at 24A | | 0.5V at 6A | | 3V at 60A | |
| CV mode | Range | 0~18V | 0.1~120V | 0.1~50V | 0.1~500V | 0.1~18V | 0.1~120V |
| | Resolution | 1mV | 10mV | 1mV | 10mV | 1mV | 10mV |
| | Accuracy | ±(0.05%+0.02%FS) | | ±(0.05%+0.05%FS) | | ±(0.05%+0.02%FS) | |
| CC mode | Range | 0~24A | 0~240A | 0~6A | 0~60A | 0~24A | 0~240A |
| | Resolution | 1mA | 10mA | 1mA | 10mA | 1mA | 10mA |
| | Accuracy | ±(0.1%+0.1%FS) | | ±(0.05%+0.05%FS) | | ±(0.1%+0.1%FS) | |
| CR mode | Range | 0.05Ω~10Ω | 10Ω~7.5KΩ | 0.05Ω~10Ω | 10Ω~7.5KΩ | 0.05Ω~10Ω | 10Ω~7.5KΩ |
| | Resolution | 16bit | | 16bit | | 16bit | |
| | Accuracy | 0.02%+0.08S | | 0.02%+0.08S*1 | | 0.02%+0.08S*1 | |
| CP mode | Range | 1500W | | 1500W | | 3000W | |
| | Resolution | 10mW | | 10mW | | 10mW | |
| | Accuracy | ±(0.2%+0.2%FS) | | ±(0.2%+0.2%FS) | | ±(0.2%+0.2%FS) | |
| Dynamic mode | T1&T2 | 100uS~3600S /Res:1uS | | 100uS~3600S /Res:1 uS | | 120uS~3600S /Res:1 uS | |
| | Accuracy | 10uS±100ppm | | 10uS±100ppm | | 10uS±100ppm | |
| Min response time | Up/down slope | 0.001~0.3A/uS | 0.01~3.2A/uS | 0.001~0.15A/uS=60uS | 0.01~0.8A/uS=60uS | 0.001~0.25A/uS=70uS | 0.01~24A/uS=70uS |
| | | Measuring range | | | | | |
| Readback Voltage | Range | 0~18V | 0~120V | 0~50V | 0~500V | 0~18V | 0~120V |
| | Resolution | 0.1 mV | 1mV | 0.1 mV | 1mV | 0.1 mV | 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 | 1500W | | 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 | | ≅ 1550W | | ≅ 1550W | | ≅ 3050W | |
| Over current protection | | ≅ 26.7A | ≅ 267A | ≅ 6.7A | ≅ 67A | ≅ 26A | ≅ 260A |
| Over voltage protection | | ≅ 125V | | ≅ 530V | | ≅ 125V | |
| Over temperature protection | | ≅ 85°C | | | | ≅ 85°C | |
| | | Specification | | | | | |
| Short circuit | CC | ≅ 26.7/24A | ≅ 267/240A | ≅ 6.7/6A | ≅ 67/60A | ≅ 26/24A | ≅ 260/240A |
| | CV | ≅ 0V | | ≅ 0V | | ≅ 0V | |
| | CR | ≅ 8mΩ | | ≅ 50mΩ | | ≅ 6mΩ | |
| Input terminal impedance | | 300KΩ | | 1MΩ | | 300KΩ | |
| Size(W*H*D) | | 436.5mm*88.2mm*463.5mm | | 436.5mm*88.2mm*463.5mm | | 436.5mm*176mm*463.5mm | |

*1 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))

*This information is subject to change without notice

IT8514B+/IT8514C+ Dimension figure



unit: mm