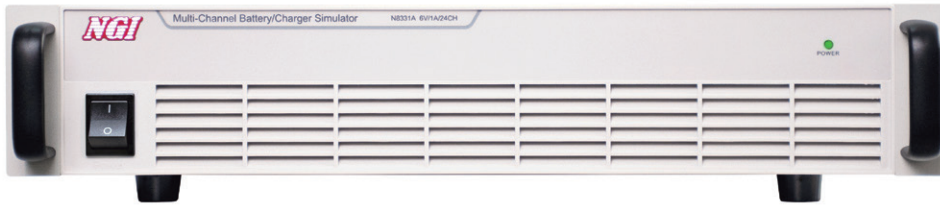


## N8331 Series High-accuracy Multi-channel Battery Simulator



### Product Introduction

N8331 is a programmable battery simulator with low-power, multi-channel and high-accuracy. It also can be used as a high-accuracy multi-channel DC power supply. N8331 standalone supports up to 24 channels. Each channel is isolated. Users can set voltage & current for each channel on NGI standard application software, which is easy to use and can meet the needs of multi-channel, multi-parameter and complex test environments. N8331 application software supports multi-channel batch operation. Data and graphs for each channel can be displayed. At the same time, data analysis and report functions are supported.

### Application Fields

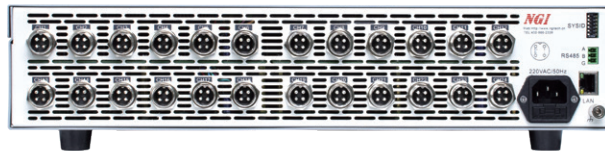
- ▶ BMS/CMS test for new energy vehicle, UAV and energy storage
- ▶ Portable consumer electronics R&D and production, such as mobiles, bluetooth earphones, smartwatch, etc.
- ▶ Calibration of voltage acquisition device, such as fuel cell voltage monitor

### Main Features

- ▶ Voltage range: 0~5V/0~6V
- ▶ Voltage accuracy: 0.6mV
- ▶ Voltage ripple noise  $\leq 2\text{mVrms}$
- ▶ Single device with up to 24 channels, each channel isolated
- ▶ Professional application software, with data analysis and report
- ▶ Current range: 0~1A/0~2A/0~3A
- ▶  $\mu\text{A}$  level current measurement
- ▶ LAN port and RS485 interface

### Ultra-high integration, single device with up to 24 channels

N8331 series adopts a standard 19-inch 2U chassis, with up to 24 channels in a single device. Each channel is isolated. One device can support 24-station test simultaneously, which greatly reduces the instruments used and improves test efficiency.



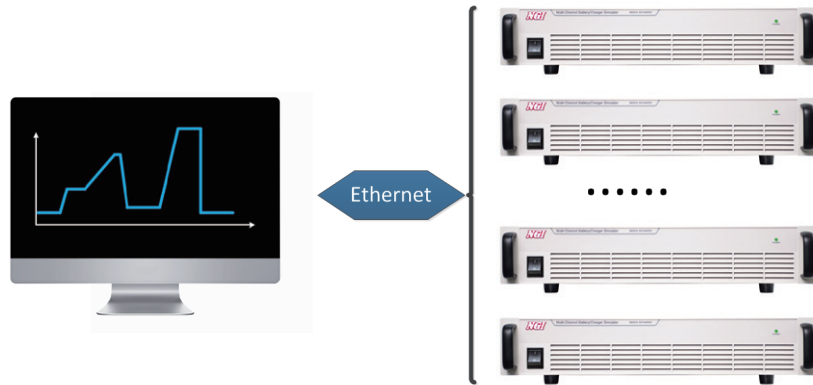
▲ Rear Panel Diagram with 24 Channels

### $\mu\text{A}$ level current measurement, supporting static current and protection parameter test

N8331 series is with high accuracy and resolution. The current resolution is up to  $0.1\mu\text{A}$ . The voltage resolution is up to  $100\mu\text{V}$ . In standby mode, there is still  $\mu\text{A}$ -level current existing in electronic component. The ultra high current resolution can test the static current. Meanwhile,  $100\mu\text{V}$  resolution can meet the high demand of protection parameters test of charging & discharging board.

## Series connection available to simulate working condition of battery pack

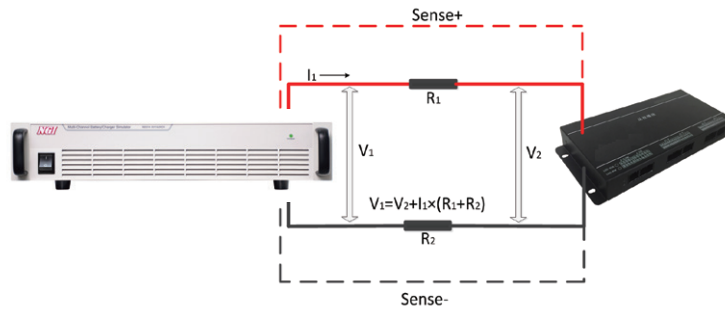
When simulating multiple strings of battery cells, N8331 supports multiple devices connection in serial mode. Users can realize remote control and other automatic tests on the application software.



Battery Simulator

## Four-wire sense to ensure measurement accuracy

To ensure accurate voltage measurement, N8331 adopts four-wire system connection, that is, two wires are used for voltage output, and the other two used for measuring the DUT voltage directly. The voltage loss caused by the lead resistance from N8331 to the DUT can be eliminated by four-wire sense.



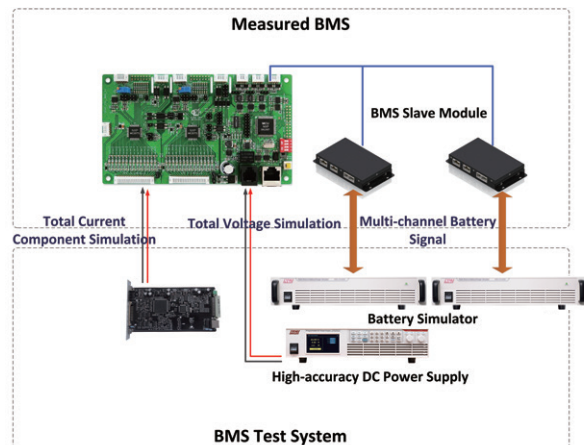
## Application -BMS Test

### System Introduction

BMS (battery management system) is a device used to conduct safety monitoring and effective management of battery packs, and improve battery service efficiency. For electric vehicles, BMS can effectively control the charging and discharging of the battery pack, which can increase the endurance mileage, extend the service life, reduce the operating cost, and ensure the safety and reliability of power battery pack. BMS has become one of the essential core components of electric vehicles. In order to ensure the proper operation, it is necessary to test BMS comprehensively.

### System Architecture

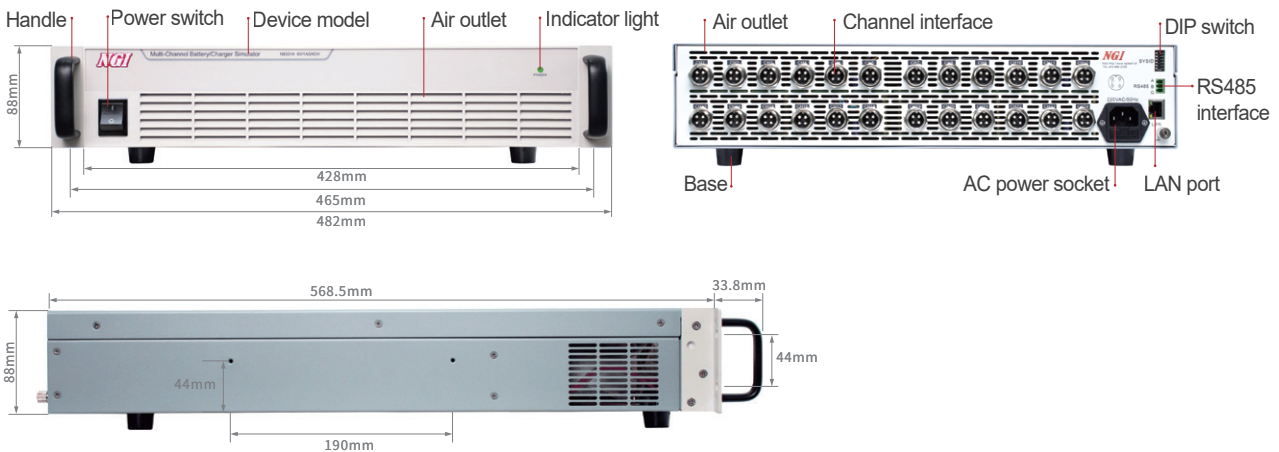
NGI BMS test platform adopts the modular design. It consists of high-accuracy battery simulator, temperature simulation unit, charge & discharge current simulation unit, high voltage power supply, IO detection unit, insulation detection unit, BMS signal and on/off detection unit, CAN communication unit, software control system, etc. The system can provide customization on Li-on battery strings according to customers' needs and generate data reports. The system is highly integrated, convenient and efficient, supporting expansion and upgrade.



### Test Items

Number	Test Type	Test Item
1	Index accuracy & calibration test	Accuracy test of total voltage Accuracy test and calibration of total current Accuracy test and calibration of single cell voltage Accuracy test of temperature resistance Accuracy test of insulation resistance
2	Protection parameter test	Insulation resistance test Withstand voltage test Over voltage test Reverse voltage test Short-circuit protection test
3	Fault diagnosis test	Over temperature fault, low temperature fault Total voltage over/under voltage fault Charging/discharging over current fault Insulation fault Communication interface failure High voltage interlock fault SOC low fault, SOC high fault Relay stuck simulation
4	Wake-up test	Key signal test Quick charging signal test Slow charging signal test 12V high-level wake-up test of CP signal Continuous operation test after power failure
5	Balancing test	Balancing state test Balancing current test
6	SOC test	SOC low SOC high SOC correction
7	Pre-charge simulation	Pre-charge simulation
8	PWM test	PWM test

### Product Dimension



## Technical Data Sheet(1)

Model	N8331A	N8331B	N8331C
Current	1A/CH	2A/CH	3A/CH
Voltage	6V/CH	5V/CH	5V/CH
Power	6W/CH	10W/CH	15W/CH
Channels	24CH	16CH	16CH
<b>CC Mode</b>			
Range	0~1A	0~2A	0~3A
Setting Resolution	0.1mA		
Setting Accuracy ( 23±5°C )	1mA	2mA	3mA
Readback Resolution	0.1mA		
Readback Accuracy ( 23±5°C )	1mA	2mA	3mA
Temperature Coefficient ( 0~40°C )	50ppm/°C		
Long-term Stability	100ppm/1000h		
<b>CV Mode</b>			
Range	0~6V	0~5V	0~5V
Setting Resolution	0.1mV		
Setting Accuracy ( 23±5°C )	0.6mV		
Readback Resolution	0.1mV		
Readback Accuracy ( 23±5°C )	0.6mV		
Temperature Coefficient ( 0~40°C )	30ppm/°C		
Long-term Stability	100ppm/1000h		
Voltage Ripple Noise ( 20Hz-20MHz)	≤2mVrms		
<b>Dynamic Characteristics</b>			
Voltage Rise Time	≤3ms ( no load ) ( 10%-90%F.S. Variation Time)		
Voltage Rise Time	≤3ms ( full load ) ( 10%-90%F.S. Variation Time)		
Voltage Fall Time	≤3s ( no load ) ( 90%-10%F.S. Variation Time)		
Voltage Fall Time	≤3ms ( full load ) ( 90%-10%F.S. Variation Time)		
Transient Recovery Time <sup>1</sup>	≤200μs		
<b>Others</b>			
Isolation ( Output to Ground )	1500VDC		
Isolation ( Inter-channel )	500VDC		
Communication Response Time	≤10ms		
Interface	LAN/RS485(Isolated)		
AC Input	Single phase, 220V AC±10%, current <2A, frequency 47Hz~63Hz		
Temperature	Operating temperature: 0°C~40°C, storage temperature: -20°C~60°C		
Operating Environment	Altitude <2000m, relative humidity: 5%~90%RH(non-condensing), atmospheric pressure: 80~110kPa		
Net Weight	Approx. 20kg		
Dimension	2U, 88.0(H)*482.0(W)with handle*568.5(D)mm		

Note 1: Load varies from 10% to 90% by full voltage output, with voltage recovering within 50mV of previous voltage.

Note 2: For other specifications, please contact NGI.

Note 3: All specifications are subject to change without notice.

**Technical Data Sheet(2)**

Model	N8331BP		N8331CP	
Current	2A/CH		3A/CH	
Voltage	5V/CH		5V/CH	
Power	10W/CH		15W/CH	
Channels	16CH		16CH	
<b>CC Mode</b>				
Range	0~2mA	0~2A	0~3mA	0~3A
Setting Resolution	0.1μA	0.1mA	0.1μA	0.1mA
Setting Accuracy ( 23±5°C )	2μA	2mA	3μA	3mA
Readback Resolution	0.1μA	0.1mA	0.1μA	0.1mA
Readback Accuracy ( 23±5°C )	2μA	2mA	3μA	3mA
Temperature Coefficient ( 0~40°C )	50ppm/°C			
Long-term Stability	100ppm/1000h			
<b>CV Mode</b>				
Range	0~5V			
Setting Resolution	0.1mV			
Setting Accuracy ( 23±5°C )	0.6mV			
Readback Resolution	0.1mV			
Readback Accuracy ( 23±5°C )	0.6mV			
Temperature Coefficient ( 0~40°C )	30ppm/°C			
Long-term Stability	100ppm/1000h			
Voltage Ripple Noise ( 20Hz-20MHz )	≤2mVrms			
<b>Dynamic Characteristics</b>				
Voltage Rise Time	≤3ms ( no load ) (10%-90%F.S. Variation Time)			
Voltage Rise Time	≤3ms ( full load ) (10%-90%F.S. Variation Time)			
Voltage Fall Time	≤3s ( no load ) (90%-10%F.S. Variation Time)			
Voltage Fall Time	≤3ms ( full load ) (90%-10%F.S. Variation Time)			
Transient Recovery Time <sup>1</sup>	≤200μs			
<b>Others</b>				
Isolation ( Output to Ground )	1500VDC			
Isolation ( Inter-channel )	500VDC			
Communication Response Time	≤10ms			
Interface	LAN/RS485(Isolated)			
AC Input	Single phase, 220V AC±10%, current <2A, frequency 47Hz~63Hz			
Temperature	Operating temperature: 0°C~40°C, storage temperature: -20°C~60°C			
Operating Environment	Altitude <2000m, relative humidity: 5%~90%RH(non-condensing), atmospheric pressure: 80~110kPa			
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