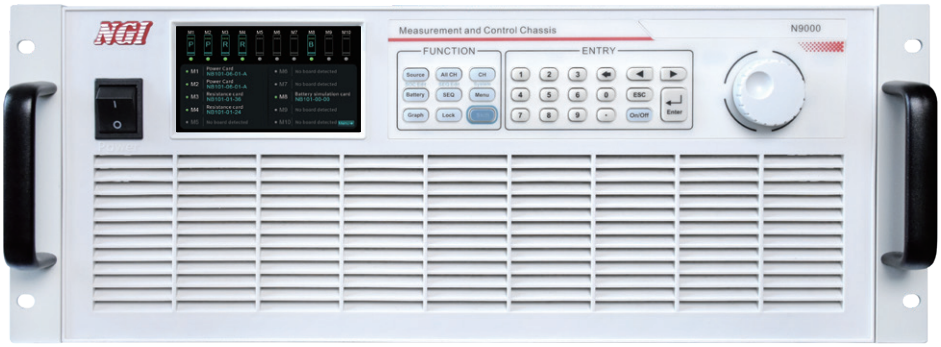
N9000 Series Multi-Channel Modular Measurement and Control Platform



Product Introduction

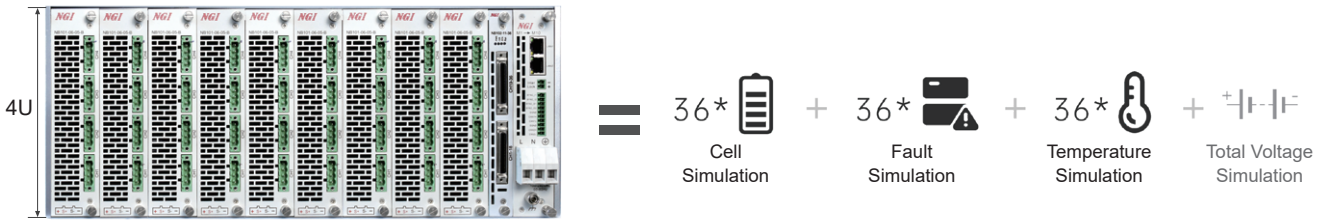
N9000 series is a high real-time, high-synchronous, high-power measurement and control platform, consisting of N9000 measurement and control chassis and a variety of modules. N9000 is a standard chassis with 4U height and 19-inch width, support for the insertion of battery analogue modules, programmable resistance modules, high-voltage power supply modules and other types, the chassis can be integrated into 10 slot measurement and control modules, electrical isolation of the modules. N9000 series supports local/remote control and synchronous trigger function, which can realize multi-module high-speed synchronous control, and is widely applicable to multi-channel, high-integrity, high-power automated test and measurement scenarios.

The NB101 series is a high-precision, dual-quadrant programmable battery simulation module that supports voltage accuracy up to 0.1mV and μA-level current measurement. It is equipped with various test functions such as power mode, SOC simulation, sequence test, graph and fault simulation. It can meet the requirements of BMS HIL test system, AFE chip, energy storage, electric vehicle, electric two-wheeler/tricycle, base station power supply, and other multi-scenario BMS test applications.

NB102 series is a high-precision, multi-channel programmable resistance module, resistance range: 0Ω~11.11MΩ, programming accuracy up to 0.1%. The flexible design supports 12/24/36 channels with a resolution up to 1Ω, which can be widely used in simulation test scenarios such as NTC resistors and resistive sensors.

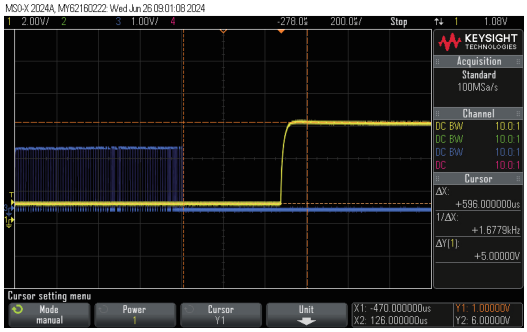
Modular design for convenient operation and flexible expansion

The N9000 series is a multi-channel modular measurement and control platform. The standard chassis can integrate 36 channels of single cell simulation, 36 channels of battery failure simulation and 36 channels of temperature simulation, which effectively saves users' space. Single module with 4 channels for battery simulation, single module with 12/24/36 channels optional for temperature simulation. With multiple models, users can choose products according to the actual needs, which is convenient for subsequent expansion.

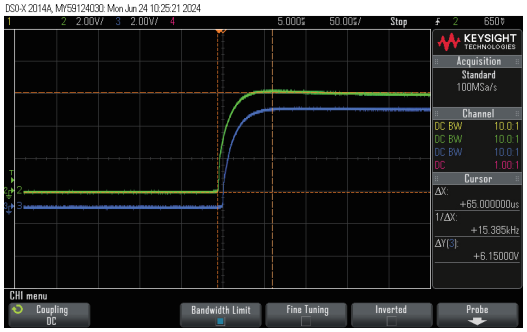


High speed response, high speed synchronization, high throughput data

As a high real-time, high-synchronous measurement and control platform, the N9000 series supports Gigabit LAN and CANFD communication, hardware synchronous triggering and high-speed synchronous clocks, with command response speed of ≤1ms and multi-channel synchronization of ≤200μs, which is particularly suitable for high-speed simulation test such as BMS HIL.



▲Command response time ≤1ms

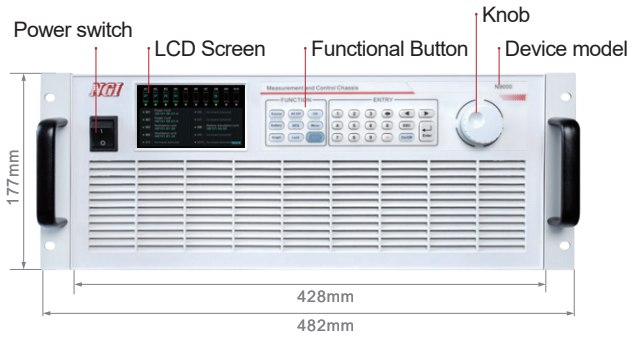


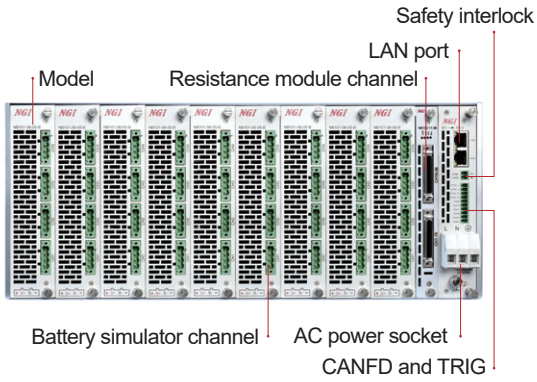
▲Channel synchronization + rise time up to 65μs

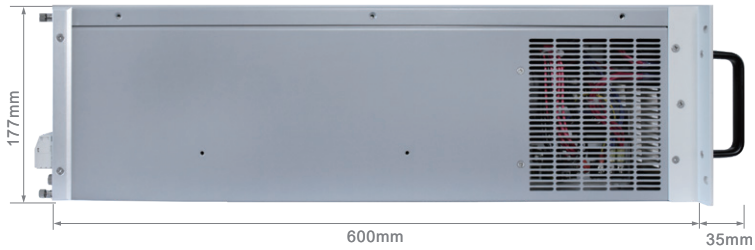
High precision, matching BMS and AFE chip trends

AFE chip is the core component of BMS, with the management getting more and more refined, the voltage acquisition accuracy of AFE chip and BMS is getting higher and higher. NGI has launched 0.1mV ultra-high precision battery simulator since 2016, which has been widely recognized by the industry and become the first choice for AFE chip testing. The modular battery simulator launched under the N9000 measurement and control platform supports 0.1mV and 0.5mV voltage accuracy, which can meet the industry's high-precision testing needs.

Product Dimension







Product Selection (1): 0.1mV Voltage Accuracy Battery Simulator

Product Model	Specification	Configuration		
		Module Model	PC	Specification
N9108-06-01	6V/±1A/8CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-01-A	2	6V/±1A/4CH
N9112-06-01	6V/±1A/12CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-01-A	3	6V/±1A/4CH
N9116-06-01	6V/±1A/16CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-01-A	4	6V/±1A/4CH
N9120-06-01	6V/±1A/20CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-01-A	5	6V/±1A/4CH
N9124-06-01	6V/±1A/24CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-01-A	6	6V/±1A/4CH
N9128-06-01	6V/±1A/28CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-01-A	7	6V/±1A/4CH
N9132-06-01	6V/±1A/32CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-01-A	8	6V/±1A/4CH
N9136-06-01	6V/±1A/36CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-01-A	9	6V/±1A/4CH
N9108-06-05	6V/±5A/8CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-05-A	2	6V/±5A/4CH
N9112-06-05	6V/±5A/12CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-05-A	3	6V/±5A/4CH
N9116-06-05	6V/±5A/16CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-05-A	4	6V/±5A/4CH
N9120-06-05	6V/±5A/20CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-05-A	5	6V/±5A/4CH
N9124-06-05	6V/±5A/24CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-05-A	6	6V/±5A/4CH
N9128-06-05	6V/±5A/28CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-05-A	7	6V/±5A/4CH
N9132-06-05	6V/±5A/32CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-05-A	8	6V/±5A/4CH
N9136-06-05	6V/±5A/36CH Battery simulator Voltage accuracy:0.1mV	N9000	1	Measurement and control chassis
		NB101-06-05-A	9	6V/±5A/4CH

Product Selection (2): 0.5mV Voltage Accuracy Battery Simulator

Product Model	Specification	Configuration		
		Module Model	PC	Specification
N9008-06-01	6V/±1A/8CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-01-B	2	6V/±1A/4CH
N9012-06-01	6V/±1A/12CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-01-B	3	6V/±1A/4CH
N9016-06-01	6V/±1A/16CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-01-B	4	6V/±1A/4CH
N9020-06-01	6V/±1A/20CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-01-B	5	6V/±1A/4CH
N9024-06-01	6V/±1A/24CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-01-B	6	6V/±1A/4CH
N9028-06-01	6V/±1A/28CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-01-B	7	6V/±1A/4CH
N9032-06-01	6V/±1A/32CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-01-B	8	6V/±1A/4CH
N9036-06-01	6V/±1A/36CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-01-B	9	6V/±1A/4CH
N9008-06-05	6V/±5A/8CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-05-B	2	6V/±5A/4CH
N9012-06-05	6V/±5A/12CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-05-B	3	6V/±5A/4CH
N9016-06-05	6V/±5A/16CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-05-B	4	6V/±5A/4CH
N9020-06-05	6V/±5A/20CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-05-B	5	6V/±5A/4CH
N9024-06-05	6V/±5A/24CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-05-B	6	6V/±5A/4CH
N9028-06-05	6V/±5A/28CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-05-B	7	6V/±5A/4CH
N9032-06-05	6V/±5A/32CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-05-B	8	6V/±5A/4CH
N9036-06-05	6V/±5A/36CH Battery simulator Voltage accuracy:0.5mV	N9000	1	Measurement and control chassis
		NB101-06-05-B	9	6V/±5A/4CH

Product Selection (3): Temperature Analogue Module

Optional-Temperature Analogue Module			
Model	Specification	Model	Specification
NB102-01-12	1.11MΩ/1Ω/12CH	NB102-11-12	11.11MΩ/10Ω/12CH
NB102-01-24	1.11MΩ/1Ω/24CH	NB102-11-24	11.11MΩ/10Ω/24CH
NB102-01-36	1.11MΩ/1Ω/36CH	NB102-11-36	11.11MΩ/10Ω/36CH
NB102-A6-12	600kΩ/1Ω/12CH	NB102-06-12	6MΩ/10Ω/12CH
NB102-A6-24	600kΩ/1Ω/24CH	NB102-06-24	6MΩ/10Ω/24CH
NB102-A6-36	600kΩ/1Ω/36CH	NB102-06-36	6MΩ/10Ω/36CH

[Note]:
1. Single battery simulator supports one NB102 series module insertion.
2. 600kΩ, 6MΩ models support NTC short circuit simulation, NTC open circuit simulation.

Battery Simulator Module Specification (1)

Model	NB101-06-01-A		NB101-06-05-A	
Current	±1A/CH		±5A/CH	
Voltage	6V/CH		6V/CH	
Power	6W/CH		30W/CH	
Channels	4CH			
CV Mode				
Range	0-6V			
Setting Resolution	0.01mV			
Setting Accuracy(23±5℃)	0.1mV			
Readback Resolution	0.01mV			
Readback Accuracy(23±5℃)	0.1mV			
Temperature Coefficient(0~40℃)	20ppm/℃			
CC Mode				
Range	-1-1A	-1~1mA	-5-5A	-1~1mA
Setting Resolution	0.1mA	0.1μA	0.1mA	0.1μA
Setting Accuracy(23±5℃)	1mA	1μA	5mA	1μA
Readback Resolution	0.1mA	0.1μA	0.1mA	0.1μA
Readback Accuracy(23±5℃)	1mA	1μA	5mA	1μA
Temperature Coefficient(0~40℃)	50ppm/℃			
Dynamic Characteristic				
Voltage Rise Time	≤40μs(No load, 10%-90% variation time)			
Voltage Rise Time	≤40μs(Pure resistive full load, 10%-90% variation time)			
Voltage Fall Time	≤100μs(No load, 90%-10% variation time)			
Voltage Fall Time	≤100μs(Pure resistive full load, 90%-10% variation time)			
Transient Recovery Time	<100μs(Pure resistive load, 10%-90% variation time)			
Fault Simulation				
Supportable Functions	Positive and negative short circuit, positive and negative disconnection, polarity reversal simulation			
Other				
Isolation(output to ground)	2000V DC			
Isolation(channel and channel)	500V DC			
Temperature	Working temperature:0℃~40℃; Storage temperature: -20℃~60℃			
Operating Environment	Altitude: ＜2000m; relative humidity: 5%~90%RH (no condensation); operating air pressure:: 80~110kPa			
Dimension	Single module single slot, one N9000 chassis support 9 single module insertion			

Note 1: For other specifications, please contact NGI.
Note 2: All specifications are subject to change without notice.

Battery Simulator Module Specification (2)

Model	NB101-06-01-B		NB101-06-05-B	
Current	±1A/CH		±5A/CH	
Voltage	6V/CH		6V/CH	
Power	6W/CH		30W/CH	
Channels	4CH			
CV Mode				
Range	0-6V			
Setting Resolution	0.1mV			
Setting Accuracy(23±5℃)	0.5mV			
Readback Resolution	0.1mV			
Readback Accuracy(23±5℃)	0.5mV			
Temperature Coefficient(0~40℃)	20ppm/℃			
CC Mode				
Range	-1-1A	-1~1mA	-5-5A	-1~1mA
Setting Resolution	0.1mA	0.1μA	0.1mA	0.1μA
Setting Accuracy(23±5℃)	1mA	1μA	5mA	1μA
Readback Resolution	0.1mA	0.1μA	0.1mA	0.1μA
Readback Accuracy(23±5℃)	1mA	1μA	5mA	1μA
Temperature Coefficient(0~40℃)	50ppm/℃			
Dynamic Characteristic				
Voltage Rise Time	≤40μs(No load, 10%-90% variation time)			
Voltage Rise Time	≤40μs(Pure resistive full load, 10%-90% variation time)			
Voltage Fall Time	≤100μs(No load, 90%-10% variation time)			
Voltage Fall Time	≤100μs(Pure resistive full load, 90%-10% variation time)			
Transient Recovery Time	<100μs(Pure resistive load, 10%-90% variation time)			
Fault Simulation				
Supportable Functions	Positive and negative short circuit, positive and negative disconnection, polarity reversal simulation			
Other				
Isolation(output to ground)	2000V DC			
Isolation(channel and channel)	500V DC			
Temperature	Working temperature:0℃~40℃； Storage temperature: -20℃~60℃			
Operating Environment	Altitude: ＜2000m； relative humidity: 5%~90%RH (no condensation)； operating air pressure:： 80~110kPa			
Dimension	Single module single slot, one N9000 chassis support 9 single module insertion			

Note 1: For other specifications, please contact NGI.
Note 2: All specifications are subject to change without notice.

Programmable Resistance Module Specification

Model	Specification	Model	Specification
NB102-01-12	1.11MΩ/1Ω/12CH	NB102-11-12	11.11MΩ/1Ω/12CH
NB102-01-24	1.11MΩ/1Ω/24CH	NB102-11-24	11.11MΩ/1Ω/24CH
NB102-01-36	1.11MΩ/1Ω/36CH	NB102-11-36	11.11MΩ/1Ω/36CH
NB102-A6-12	600kΩ/1Ω/12CH [1]	NB102-06-12	6MΩ/1Ω/12CH [1]
NB102-A6-24	600kΩ/1Ω/24CH [1]	NB102-06-24	6MΩ/1Ω/24CH [1]
NB102-A6-36	600kΩ/1Ω/36CH [1]	NB102-06-36	6MΩ/1Ω/36CH [1]
Common Parameter			
Resolution	1Ω@600kΩ, 1Ω@1.11MΩ, 10Ω@11.11MΩ, 10Ω@6MΩ		
Channels	12CH/24CH/36CH optional		
Resistance Accuracy	0.1%+Rr(3Ω typical)		
Resistance Max. Power	0.25W		
Switch Closure Time	＜1.1ms		
Switch Release Time	＜0.4ms		
Expected Switch Life	Low load application: >1×10⁸ operations；Full load application:>1×10⁶ operations		
Max. Switching Voltage	125VAC, 60VDC		
Max. Switching Current	0.5A		
Temperature	Working temperature:0℃~40℃； Storage temperature: -20℃~60℃		
Operating Environment	Altitude: ＜2000m； relative humidity: 5%~90%RH (no condensation)； operating air pressure:： 80~110kPa		
Dimension	Single module ½ slot, one N9000 chassis support 9 single module insertion		

Note [1]: 600kΩ, 6MΩ models support NTC short-circuit simulation, NTC open circuit simulation

N9000 Measurement and Control Chassis Specification

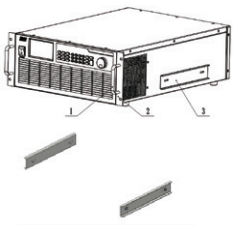
Model	N9000
Slot	Support single slot*9pcs + ½ slot*1pcs
Communication Interface	LAN/CAN
AC Input	Single phase 100~240V AC, frequency 47Hz~63Hz, current ≤9A@220V, ≤18A@110V
Earth Leakage Current	＜3.5mA@230VAC
Temperature	Working temperature:0℃~40℃； Storage temperature: -20℃~60℃
Operating Environment	Altitude: ＜2000m； relative humidity: 5%~90%RH (no condensation)； operating air pressure:： 80~110kPa
Dimension	177.0mm（H）*482.0mm（W）with handle*600.0mm（D）

Attachment

▪ Standard

 A1106-02 Power Cord 1pc 220VAC single phase three core power cord, cord length: 2 metres One end of the national standard 10A three-plug, one end of the chip terminal	 Network cable 1pc Super Category 5 cable, length: 2 metres
 Core Connector 1pc Port: 5.08mm 4pim terminal	 Resistor Module Connector 1pc (18CH and below) /2pcs (18CH and above) SCSI connector: 50pin
 CAN Communication Connector 1pc Port: 10 pin/3.5mm	 Inter Lock Connector 1pc Port: 2pin/3.5mm
USB flash drive 1pc (8G; contains information on master computer software/programming protocols, etc.)	
Product Performance Test Report 1set	Quick Selection Guide 1set

▪ Optional

 NB301-02/NB301-04 Battery Simulator Test Lead NB301-02(cable length 2 metres)/NB301-04(cable length 4 metres) 1mm² Teflon cable; 4 (1CH) nylon braid, fixed with cable ties, one end 5.08mm 4pim terminal (female), one end pin terminal (red positive and black negative distinction) with numbering tube	
 NB302-18-02/NB302-18-04 Resistor Module Test Lead NB302-18-02(cable length 2 metres)/NB302-18-02(cable length 4 metres) 1pc (18CH and below)/2pc (18CH and above) 0.3mm² RV cable; 36 harness (18CH) nylon braided sleeve, tie down, one end SCSI connector 50pin (male), one end pin terminal with numbering tube	
 A1103-02/A1103-04 Power Supply Cord A1103-02 (cable length 2 metres) /A1103-04 (cable length 4 metres) 220VAC single phase 6mm²RVV sheathed power cord, bundle of 3 cores (L/N/PE), wire length: 2/4 metres; both ends: tab terminals 3pin	
 NF00Y Uplift Kit Suitable for 4U height and 19-inch width models Name: Chassis rail; Material: 2.0mm SGCC; Quantity: 2pcs	