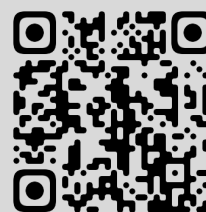


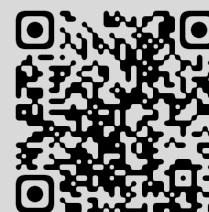
BSS series

Battery simulator

Product Manual v1.0



manual



products

www.takemind.com

Introduction to BSS series battery simulator

BSS(Battery Simulator Standard)series battery simulator features multi-channel isolation and ultra-high precision, enabling engineers to test battery management controllers at all levels. Its own programming software is simple to operate, can intuitively set, monitor the parameters of each channel and fault simulation information, can meet the laboratory development and design needs. The communication protocol based on CAN can easily communicate with various automatic test systems. Fault Injection Simulation (FIS) can simulate short circuit, open circuit, and reverse connection faults, and has external stopping function to solve the voltage drop caused by wire harnesses.

Main Features

- 0.1mV voltage accuracy
- 0.01mV Voltage setting resolution
- Low ripple noise
- 0.1mV voltage accuracy
- 0.01mV Voltage setting resolution
- Low ripple noise

High precision , Ultra high resolution

Built-in top-notch reference voltage source achieves 0.1mV voltage accuracy and 1uA current accuracy, 24bit ADC achieves <1uV voltage read-back resolution, and over 20bit DAC achieves 10uV voltage setting resolution.



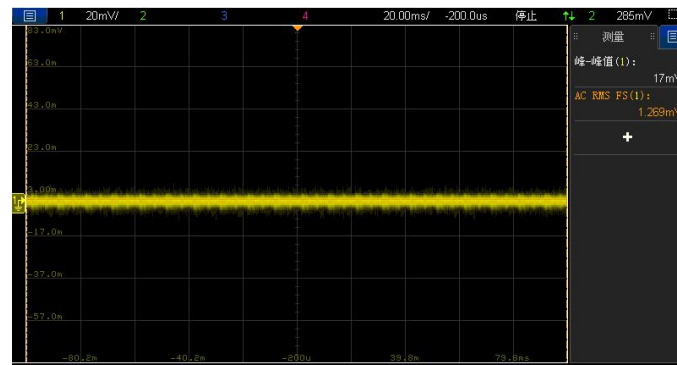
Multimeter measures voltage
@4.2V0.8A



Measure voltage @4.2+V
(interval 50uV) 0.8A

Low ripple, low noise

In the power supply category, the noise of chemical batteries is extremely low, much lower than that of electronic circuits. Through careful circuit design, low ripple and low noise can be realized to more accurately simulate the real battery.

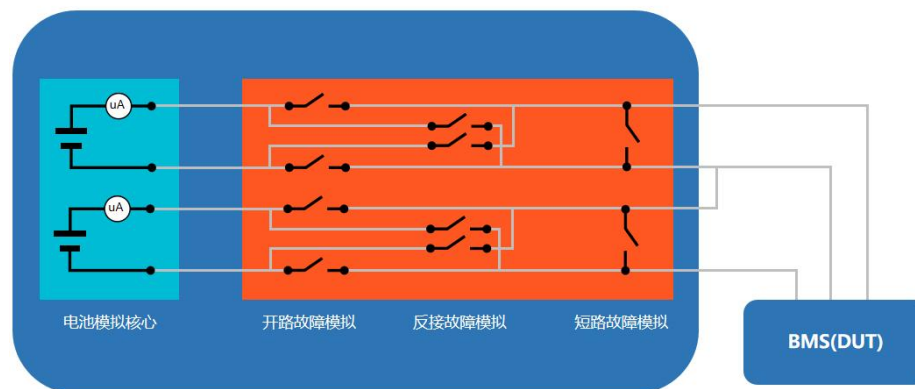


The oscilloscope measures the ripple

Fault injection simulation(FIS)

Fault injection test is an inevitable test item in the development of functional safety of battery manager. FIS can independently realize the wiring harness short circuit, open circuit and battery polarity reverse connection fault for each channel, and no additional equipment is required during the test. The battery backconnection simulation can also

simulate the output negative voltage, which can verify the battery manager's ability to measure the busbar voltage.



Fault injection simulation



Backconnection fault injection simulation

External sampling

The four-wire mode is adopted to realize the compensation of the wire harness voltage, which perfectly guarantees the accuracy of the voltage applied to the equipment under test, even in the equalization process can ensure the accuracy of the voltage on the equipment under test.





Multimeter measures voltage
@4.2V 0.8A



Measuring voltage@4.2+V
(interval 50uV) 0.8A

Isolation and Protection

In addition to the 1500V isolation protection between channels, between channels and housing, and between channels and communication, although the maximum output voltage between the voltage output poles is 6V, the overvoltage protection capacity reaches 30V, effectively avoiding equipment damage caused by misconnection. At the same time, the voltage output has short circuit, over current, over temperature protection.

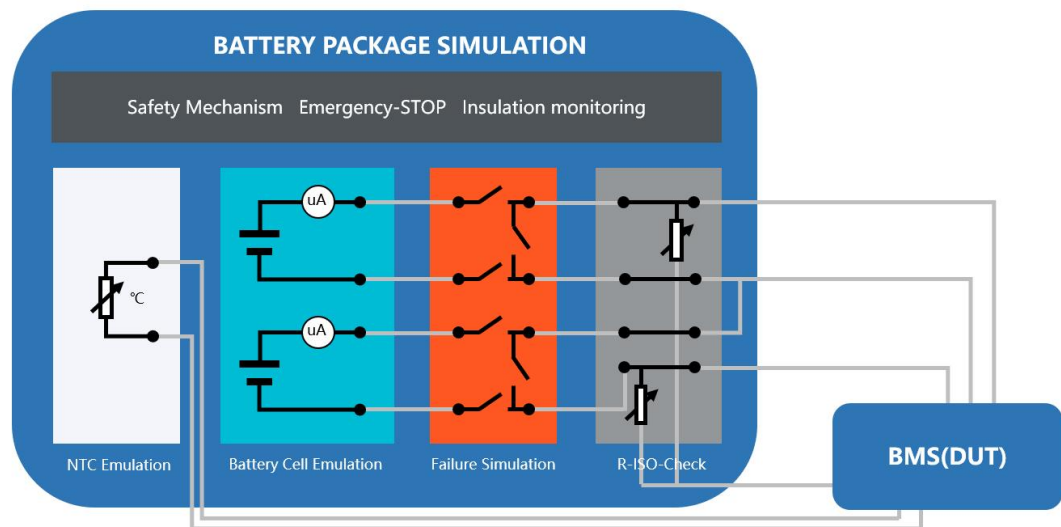
Product Data

Basic Information	
Range of temperature	0~40°C
Working Environment	Elevation: <2000m; Relative humidity: 5~90%RH (Relative Humidity)Suitable Pressure: 80~110kPa
Size	483x400x178mm (4U)
Weight	10kg
Communication interface	CAN (Isolation)
Supply voltage range	90~264VAC
Supply voltage frequency	47~63Hz
Power supply current	3A/230VAC 6A/115VAC
Number of channels	12、18、24
Safety protection	
Voltage of isolation (Channel to shell ground)	1.5kV
Isolation voltage (between channels)	1.5kV
Isolation voltage (channel to communication board)	1.5kV
Short circuit protection	Output short circuit, over voltage, over current protection
Over temperature protection	With
Voltage parameter	
Output voltage	0~6V
Setting voltage accuracy	0.001%+0.1mV
Setting voltage resolution	0.01mV
Read back voltage accuracy	0.001%+0.1mV
Read back voltage resolution	0.01mV
Voltage ripple	<20mVpp <3mVrms
Coefficient of temperature	10ppm/°C
Voltage rise time (10%-90%)	10ms no-load
Voltage upturn time (90%~10%)	10ms no-load
Parameter of current	
Output current current	0~±1A
Read back current accuracy	0.001%+1uA(0~3mA) 0.001%+1mA(>3mA)
Read back current resolution	0.1uA(0~3mA) 0.1mA(>3mA)
Coefficient of temperature	20ppm/°C
Fault injection simulation	
Output short circuit	With
Open output circuit	With
Polarity reverse connection	With

BMS Hardware-in-loop (HIL) Simulation system

As we all know, new energy vehicles have begun to gradually replace the traditional fuel-powered vehicles, and battery technology is one of the key technologies of new energy vehicles. Since the Battery pack of new energy vehicles consists of a large number of single cells in series and parallel, which are different from each other, Battery Management System (BMS) is needed to manage each cell. With the leaping development of energy density and life of single cell, new requirements have been put forward for BMS technology, including the monitoring, balance management, thermal management, safety monitoring, and charge-discharge monitoring of each cell.

The BMS hardware-in-the-loop testing solution provided by TAKEMIND can satisfy the whole process of BMS design, development, testing and verification, which can help engineers quickly realize the development of BMS functions in the development stage, improve the development efficiency and speed up the product iteration, and effectively ensure the functional completeness and performance stability of BMS in the test and verification stage. And improve the degree of test automation, greatly reduce research and development manpower and time costs.



BMS Verify the test (DV) system

BMS in the development process also need to conduct a complete DV verification, including temperature testing, electrical and electronic testing, EMC testing and durability testing. With its high current output capacity, the battery simulator of Zhuzhi Intelligent Technology can meet the requirements of multiple BMS sharing a battery simulator for voltage and balance testing.

BMS Offline test (EOL) system

In addition to the strict testing in the development and verification process, the testing in the offline process of BMS is extremely important, which can ensure that each product generated by the enterprise meets the offline standards defined by customers and enterprises, and ensure the quality of its products.

Update Logs

Version	Chapter	Description	Date
1.0	All	First Release	2022/09/01

Users can download the latest documentation for the BSS series of battery emulators:<http://www.takemind.com/bss/>

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