Repower BMS Tester Technical Specification

Model：PCBA-32S400A

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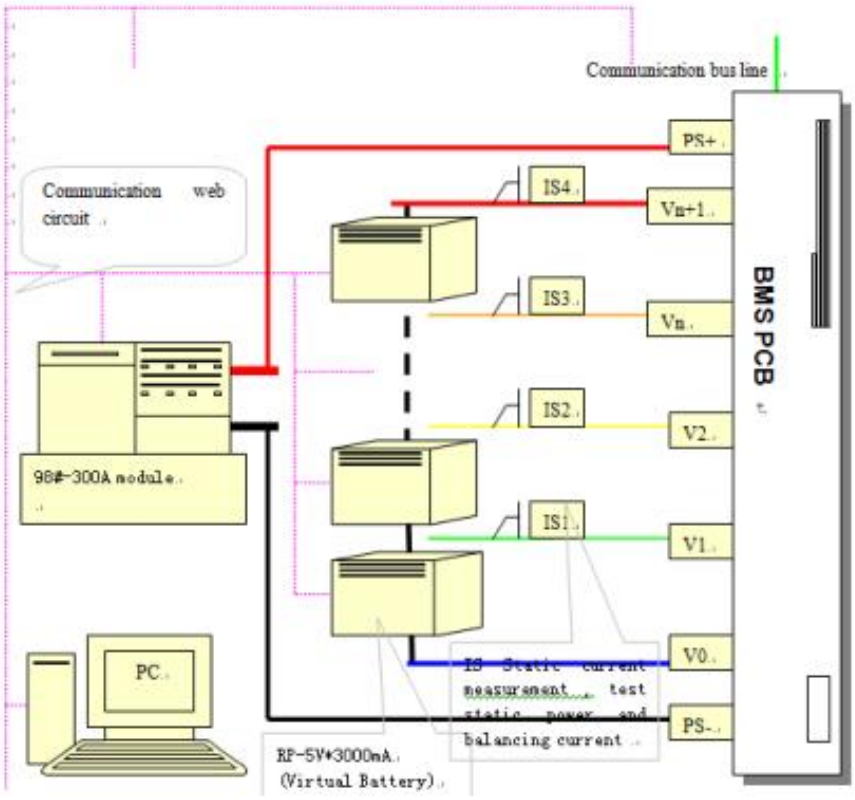
Date：2024-09

一、Introduction(including basic functions)

The testing equipment of the protection board is composed of virtual battery, charge and discharge power supply, temperature detection unit, communication unit, host computer software and other functional modules. Through the control of the host computer, it can complete the comprehensive detection of protection function, communication function, balancing function, on-resistance, self-consumption, charge and discharge function, and determine whether the test results are within the qualified range, and visually screen out bad products. And save the test results. The product is mainly used in production testing, incoming material testing, quality control, R & D test and so on.

二、Equipment hardware principle



The system consists of analog battery, charge and discharge power supply, function module, upper computer software, test line, crocodile clip and so on.

三、Technical Parameters

3.1This section describes the application scope and functions of the device

product name	Power protection board test system
1. Use	Can test 4~32 string BMS, modular setting, support upgrade and extension
2. Testing items	
2.1	Open circuit voltage test
2.2	Balanced current verification

2.3	Overcharge voltage verification
2.4	Overrelease of underpressure verification
2.5	Total static current measurement
2.6	Single-section static current measurement
2.7	Equalize the open voltage measurement
2.8	Balanced current measurement
2.9	Equalize off the voltage measurement
2.10	Total pressure overvoltage protection measurement
2.11	Total pressure overpressure recovery measurement
2.12	Total pressure and under-pressure protection measurement
2.13	Total-pressure underpressure recovery measurement
2.14	Overcharge protection delay
2.15	The monomer overcharge voltage protects the OVP
2.16	Single-body overcharge recovery voltage
2.17	Over-release protection delay
2.18	Single unit overdischarge protection voltage UVP
2.19	Single unit overdischarge unit recovery voltage
2.20	Charging protection current OCP
2.21	Discharge protection current, OCP
2.22	Charge and discharge overdelay
2.23	Protection delay of secondary overcharge
2.24	Single-unit secondary overcharge voltage protection of 2nd OVP
2.25	Single-unit secondary overcharge recovery voltage
2.26	Load impedance test
2.27	Single-unit voltage alignment test (read through communication)
2.28	Single-cell temperature comparison test (read by communication)
2.29	Discharge short circuit protection function test (maximum current 400A, 200A current lasts only 5S for test over current and short circuit protection)
3. Communication function of BMS	Support the parameter comparison test of CAN and other mainstream communication methods in the market; (free debugging of two boards with communication test)
4. Secondary development function	Support the secondary development, provide the dynamic link library, and provide the technical support;
5. Start the test program	Support for barcode scanning one-button self-start / manual start /
6. test data	It can generate data tables to save and connect to the MES system to upload the data
7. Scope of application	Can urable "lithium iron phosphate, ternary materials, lithium cobalt oxide, lithium manganese oxide, titanate and other" lithium battery BMS
8. Protection function	Support software and software and software BMS test, compatible with the same port, BMS board test.

3.2 Equipment composition

No.	Main Part Name (Description)	Model specification	Quantity	Remarks
1	Simulation battery	RP-5V 1A	32CH	
2	Program control resistance module	RP-RES-CK-01	8 Road	Simulation temperature
3	Signal integration unit	RP-SIGNAL-TEST	1CH	
4	constant-current source	RP-400A	1pc	Simulated charge and discharge
5	CAN newsbox	USBCAN-2E-U	1CH	
6	The RS485 communication box	RP-RS485	1CH	
7	cabinet	Standard 18U cabinet	1pc	Used to install modules
8	computer	Commercial machine	1pc	Contains a display
9	software system	testing software	1set	

3.3 Equipment parameters and basic principles

3.3.1 Equipment Parameters

No.	Unit name	specifications and models	remarks
1	Repower virtual battery unit	5V 1A	1) Simog cell voltage, current signal; 2) Voltage resolution 0.1 mV, current resolution 0.1mA/0.1uA; 3) Support current double range output 5 mA / 1A; 4) Output voltage range: 0~5V; 5) Accuracy of output voltage: ± (0.03%FS + 0.03%RD); 6) Accuracy of recovery voltage: ± (0.03%FS + 0.03%RD); 7) Output current range: 0~1A, 0 ~ 5000 uA; 8) Set current accuracy: ± (0.1%FS + 0.1%RD);

			9) Accuracy of recovery current: ± (0.03%FS + 0.03%RD); 10) The channel input / output mode adopts the differential four-electrode mode; 11) With the working status indicator light, to facilitate the troubleshooting; 12) Power consumption detection of each channel; 13) Support the expansion of up to 255 string;
2	High-precision constant-current source unit	5V 400A	1) The ability of real current output; 2) Control resolution: 100 mA; 3) With simulated charging and discharge functions; 4) Output accuracy: ± (0.1%FS + 0.1%RD); 5) Measuring accuracy: ± (0.1%FS + 0.1%RD);
3	The PCBA signal acquisition unit	RP-SIGNAL-TEST	1) The 16-way voltage signal test; 2) 9-road DO; 3) 4-road DI; 4) 3-circuit auxiliary power supply output;
4	The CAN communication unit	USBCAN-2E-U	1) Support for standard frames and extended frames; 2) Support for the CAN2.0A and CAN2.0B protocol; 3) Porter rate 5 Kbps ~ 1 Mbps adjustable;
5	Temperature simulation detection unit	10Ω ~10M Ω	1) Resistance-type signal output; 2) Minimum step value: 1 Ω; 3) Resistance accuracy: ± 3%; 4) Single-channel independent output, 8 channels / module, support for later expansion;
6	control software	software system	1) Reneng BMS equipment test software 1 set;
7	computer	computer	1) 1 Set;

3.3.2 Industrial computer configuration list

No.	Main Part Name	Model and specification (description)	Brand	Qty.
1	computer	/	/	1pc
2	indicator	graphoscope	/	1pc
3	mouse	/	/	1pc
4	fingerboard	/	/	1pc

3.3.3 Functional description of each unit of the system

3.3.3.1Virtual Battery (VBS) unit

The virtual battery simulation system is mainly used to test the voltage collection range, voltage collection accuracy, balanced current, channel power consumption and other functions of the battery management system. The battery simulation system can realize automatic and streamlined voltage setting through the configuration of software programs, so as to reduce the equipment operation process and improve the test accuracy.

The equipment has leakage protection function to ensure the safety of the operator when the equipment is in use. All the simulation functions support the use condition of long-term continuous use and frequent parameter setting. The virtual battery modules are independent, flexible in series combination, support hot swap, and have good durability. The test system can support online control and management with computer (PC) at the same time, support remote control;

2.1 Virtual battery unit: It has the simulation function of single voltage and total voltage, which can simulate the battery pack voltage of the battery in series, and the voltage of each battery can change within 0-5V to simulate the charge and discharge function; It can be adjusted individually and as a whole to meet the conditions of battery balance, overvoltage and undervoltage. The output current can be used to test the battery equalization function of the product, the static current test function, and the sampling working current test function. Can be used for product verification and product aging.

2.2 Upper computer software: Run the test software system on the computer, coordinate and control the entire test system, complete instruction sending, data collection and sorting, generate test reports, and complete data exchange in the production line system. The test software system of Reneng has independent intellectual property rights, and the software system is fully functional, open to customers, and can support secondary development.

2.3 Support bar code start, button start, bar code + button start and other modes, can be manually or automatically run. The upper computer can be configured and displayed (all configuration values), and the comparison error; Pass/fail the test result according to user-defined rules; The test system saves all test results locally in the form of Excel and txt files.

3.3.3.2 High-precision turnable constant current source

It is used for total current I accuracy comparison test, EV working condition simulation (collect road condition information according to the actual customer, convert it to Excel file to simulate test at 1S time interval), and over-current OCP protection function test.

The high precision constant current source receives the communication command of the computer host to output the real adjustable -300A~300A current, and detects the sampling device shunt and Hall's detection accuracy of the BMS current.

No.	Model		5V/400A Module
1	Number of main channels		1CH / module
2	Channel action mode		Completely independent
3	Main channel operating mode		Charging: constant current charging CC,; Discharge: constant current discharge CD; Support current bidirectional. stewing;
4	Main channel voltage	Single-channel measurement range	0V-5V
		accuracy	±（0.05%FS+0.05%RD ）
		resolution ratio	0.1mV
	Main channel current	Single-channel measurement range	±400A
		Run the limit	200A has no output limit; 400A limit time 5S.
		Minimum output current	10mA
		accuracy	Grade A: ± (10-400A) ± 0.1%FS Grade mA: ± (0.01-10A) ± 0.05%FS
		resolution ratio	0.1mA

		Current start-response time	≤10ms
		Current switching time	≤100ms
	time	resolution ratio	10us
	power	output power	The single-channel continuous running power is 1,500 W
		stability	±0.5%FS
5	Equipment communication mode		232
13	Test line and sampling terminals		Four-electrode sampling mode, the clamp uses crocodile clip or other
14	Energy consumption mode		Energy consumption type
15	cooling-down method		forced air cooling
16	security classification		Compliance with the EN60950, GB4943 requirements
	noise		Test the noise following IEC62040-3. the noise is less than 70 dBA, the sound level meter should meet the requirements of type I in IEC804, and the accuracy should be better than that of ± 0.5dB
	levels of protection		IP20
	lightning protection		To meet the level 2 lightning protection requirements of GB17626
17	maintainability		Modular structure, available with spare parts, spare parts for timely replacement, maintenance, free of charge during the warranty period
18	Software upgrade service		Provide a software upgrade service until the hardware is incompatible

3.3.3.3 CAN communication unit

The CAN communication bus unit completes the data communication, instruction interaction and collection of the BMS management chip, which is convenient for system comparison and analysis.

User description CAN change rules, the test system allows users to write and cooperate to upgrade CAN communication messages, CAN adapt to different CAN communication protocols.

3.3.3.4 Temperature Simulation detection unit

By simulating the change of NTC resistance value to achieve temperature simulation, allowing users to define their own NTC, import any RT table, the software calculates the resistance value corresponding to the set temperature and switches the output, complete the BMS temperature acquisition function calibration, comparison function test.

A temperature simulation unit contains 8 channels (including 8 modules), supporting expansion, similar to analog battery expansion, increase the number of analog units, can expand the number of temperature simulation detection channels.

3.3.3.5 Centralized control console

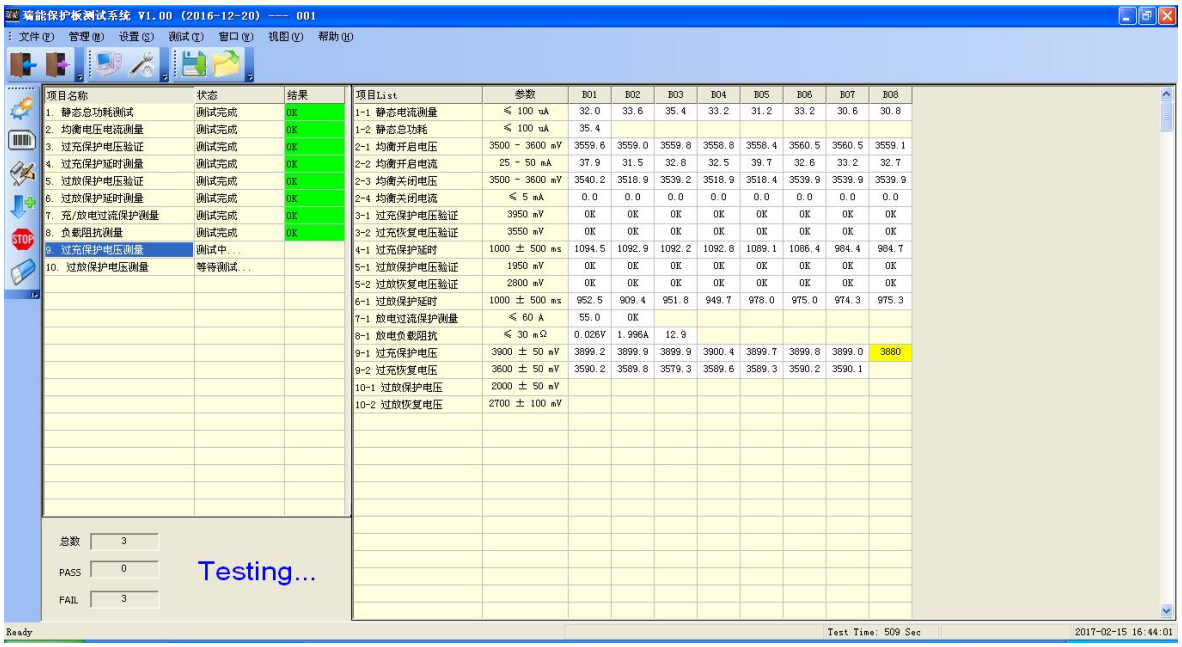
Run the BMS test software System on the computer, coordinate and control the whole BMS test system, complete instruction sending, data collection and sorting, generate test reports, and complete data exchange in the Shop Floor System.

Support BMS barcode startup, host computer can configure and display comparison error, monitoring BMS alarm; Pass/fail the test result according to user-defined rules; The test system saves all test results locally in the form of Excel and txt files.

3.5 Appearance diagram of the equipment

Front view of the test equipment

Cabinet size	600mm * 850mm * 1030mm (width, depth and height)
weight	≤150KG
Note: Different functional devices have different appearance	



Software test interface

四、Equipment environment requirements and technical parameters

1, power supply: AC voltage 220V±10%, frequency: 50Hz±5%, equipment power: 2.5KW;

2. Ambient temperature: 0 ∽ 45 ° C;

3, environmental humidity: no more than 85%R.H (no water vapor condensation);

4, there is no strong vibration in the environment, no corrosive gas and flammable and explosive gas;

五、List of random information

No.	product	description	main specifications	Qty.
1	test system	test system	PCBA-32S 400A	1pc
		Communication isolation box	232 Isolation box	1PC
		Test software system	PCBA testing software	1 set
		With the cargo U disk	16G custom-made logo HP	1PCS
		With the equipment document	Operating guide for equipment (electronic file)	/
			Preventive maintenance guide for	/

			equipment (electronic file)	
			Repower Product Certificate (Precision report)	/
2	Test the system control section	computer	/	1set

六、Contact us

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