EOL comprehensive testing system

Technical Specifications

（For reference, The actual product may be slightly different）

application area ： Electric vehicles, buses,
household energy storage, container energy storage,
Offline testing and quality control of battery modules and PACKs

（Test object diagram, for reference only）

1 Product specifications and models:

Model	EOL-300V

2 Product Overview:

2.1 Introduction:

The EOL comprehensive testing system is a device used to test the insulation and voltage resistance performance of finished and semi-finished battery packs, as well as the comprehensive performance of BMS communication. After manual wiring, the system automatically tests and determines whether it is qualified, and records data automatically. Based on ASP The upper computer developed on the. NET platform has powerful data processing capabilities, is stable and reliable, and can save test data in real-time to the database and upload it to the MES system.

2.2 Product Features:

◆ Modular design of the entire machine, strong stability and reliability, and convenient maintenance and upgrading;

◆ Equipped with charge discharge reverse protection and reverse connection prompt function;

◆ The main control chip adopts high-performance ARM, and the equipment runs smoothly and stably;

◆ Adopting a 24 bit ADC, it has higher precision in voltage and current testing than in the industry;

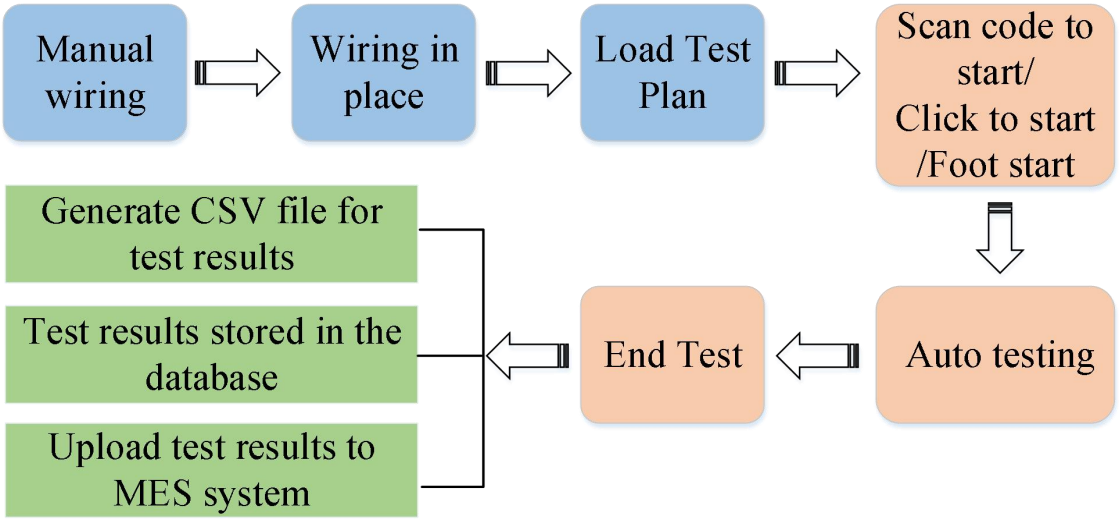
◆ The upper computer software operation interface is concise and clear, the testing step sequence can be edited, and the testing parameters can be adjusted;

◆ The voltage and current are sampled using a four wire system, with high voltage sampling accuracy and good long-term stability;

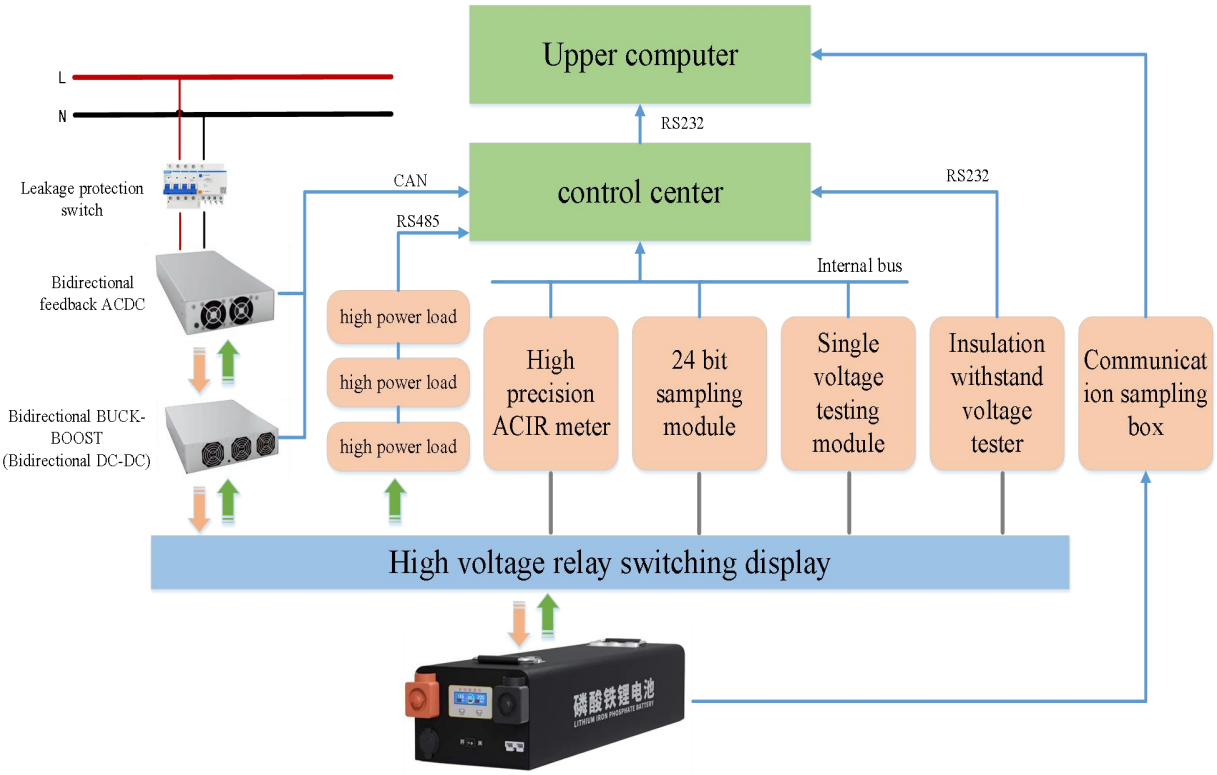
◆ Support one-dimensional and two-dimensional codes, and support scanning/foot start;

◆ Test data can be automatically saved, and a powerful database facilitates quality traceability.

2.3 Basic testing process：



2.4 2.4 Product Design Principle Block Diagram:



2.5 system function(Test items)：

Basic functions	
1.Open circuit voltage （OCV）	The battery voltage measured by the device when the battery pack is not being charged or discharged.
2.AC internal resistance （ACIR）	The AC internal resistance of the battery is measured using a four wire measurement method. A sine wave current signal (with a frequency of 1KHZ and a constant current of ≤ 100mA) is injected into the positive and negative terminals of the battery pack, and a series of processes such as voltage sampling, rectification, and filtering are used to accurately measure the AC impedance of the battery.
3.Foot switch Start	Mechanical foot switch, which replaces manual operation with foot stepping, improves work efficiency and safety.
4.Scan Code Start (Barcode Record)	By scanning one-dimensional and two-dimensional codes to activate the device for testing, the convenience and intelligence of the device can be improved. The scanned barcode is saved together with the test results in the database, and the test results can be queried and traced based on this barcode in the later stage.
5.Insulation resistance (positive electrode and shell of battery pack)	Insulation resistance refers to the resistance between the live and exposed parts of the tested component. In order to avoid leakage accidents, the insulation voltage must be sufficiently high. This project tests the insulation resistance value between the positive electrode of the battery pack and the battery casing.
6.Insulation resistance (battery pack negative electrode and shell)	This project tests the insulation resistance value between the negative electrode of the battery pack and the battery casing.

7.AC withstand voltage/leakage current (positive pole and shell of battery pack)	Leakage current can easily cause electric shock injury to the human body, and withstand voltage/leakage current testing is a very important part of safety testing. Testing principle: Apply high voltage to the tested object and detect the leakage current generated under this condition. If the detected leakage current is within the specified range, the withstand voltage/leakage current performance meets the requirements. This project tests the AC withstand voltage performance between the positive electrode of the battery pack and the battery casing.
8.AC withstand voltage/leakage current (battery pack negative electrode and shell)	This project tests the AC withstand voltage performance between the negative electrode of the battery pack and the battery casing.
9.DC withstand voltage/leakage current (positive electrode and shell of battery pack)	This project tests the DC withstand voltage performance between the positive electrode of the battery pack and the battery casing.
10.DC withstand voltage/leakage current (battery pack negative electrode and shell)	This project tests the DC withstand voltage performance between the negative electrode of the battery pack and the battery casing.
12.MES system connection	After the testing is completed, the test results of this device can be easily and quickly uploaded to the MES system (Manufacturing Execution System).

3 Technical Indicators：

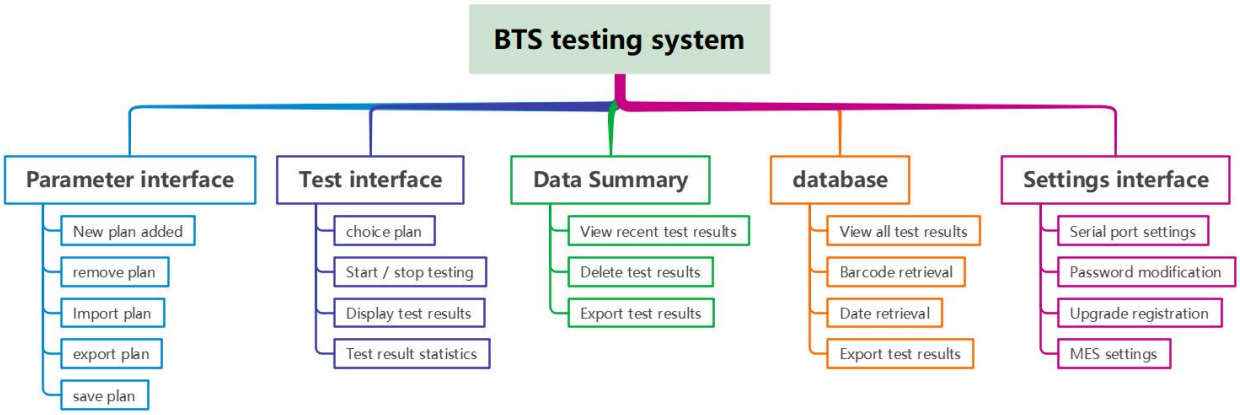
model	**EOL-300V**	
Power	2KW	
AC input interface	1. Input single-phase AC220V ± 10% 2.Input current： max 9A 3. Frequency 50Hz	
Measure voltage range	0~±300.000V	
Voltage accuracy	±0.05%rdg.±2dgt	
Voltage resolution	1mV	
data save mode	1. Save data in CSV file format 2. Database storage, providing query and traceability by barcode, scheme, date, and other methods	
Voltage withstand test parameters	AC voltage withstand test	0.05KV～5KV；0.001mA～10mA；
	DC withstand voltage test	0.05KV～6.0KV；0.1uA～5mA
	precision	± (2% x reading+5 words)
Insulation test parameters	testing voltage	+50V~+1200V accuracy: ± 0.5% FS
	0.001MΩ≦R＜10MΩ	Accuracy: ± (2% reading+0.003M Ω)
	10MΩ≦R＜100MΩ	Accuracy: ± (2% reading+0.03M Ω)
	100MΩ≦R＜1GΩ	Accuracy: ± (2% reading+0.3M Ω)
	1GΩ≦R＜5GΩ	Accuracy: ± (2% reading+3M Ω)
	R≥5GΩ	Accuracy: ± (10% reading+30M Ω)
Internal Resistance (ACR)	1~20000mΩ	
Communication method	Serial port RS232	

power-off protection	Automatically disconnect the electrical connection between the battery and the device after an unexpected power outage in the communication input
Emergency stop function	Pressing the emergency stop button will disconnect the electrical connection between the battery and the device, and turn off the load power of the device
Cooling method	Forced air cooling
Dimensions (W * D * H)	680*850*1710mm
environment	-20℃~50℃
temperature	10-90%RH

4 computer software

4.1 Software architecture

The upper computer software architecture of the system is as follows, based on the modular design concept, divided into 5 large modules. The interface is concise and clear, easy to navigate, and users can easily browse and switch between different functional modules. The upper computer of this system is based on ASP NET platform development has extremely high stability, reliability, and scalability.



4.2 Login interface

The login interface can select three languages: Simplified Chinese, Traditional Chinese, and English. User management includes three types of users, corresponding to different operation permissions, which are defined as follows:

(1) Operator: Can operate the testing interface, view data summaries, and view databases. This permission only allows basic operations and viewing test results, and cannot perform parameter settings or other operations.

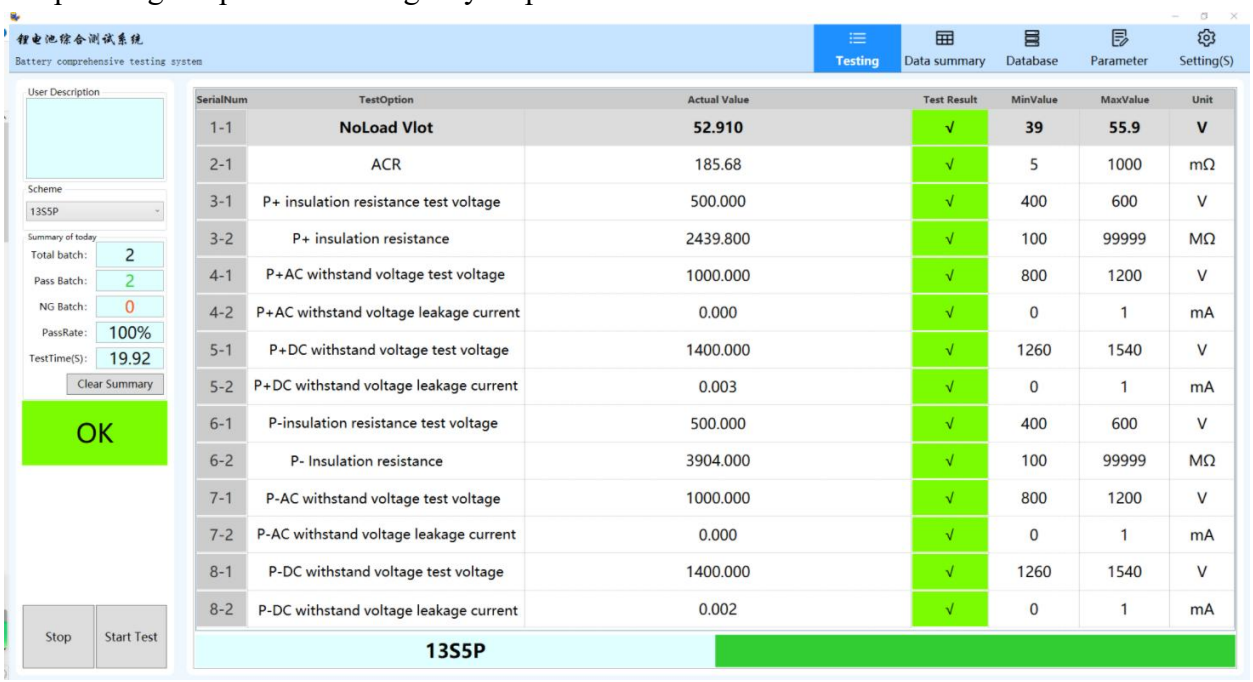
(2) Technician: Can operate the testing interface, view data summary, view database, set

execution plan parameters, set serial communication parameters, modify operator and technician passwords, etc.

(3) Administrator: The manufacturer reserves a debugging interface to view parameters when the device is running abnormally.

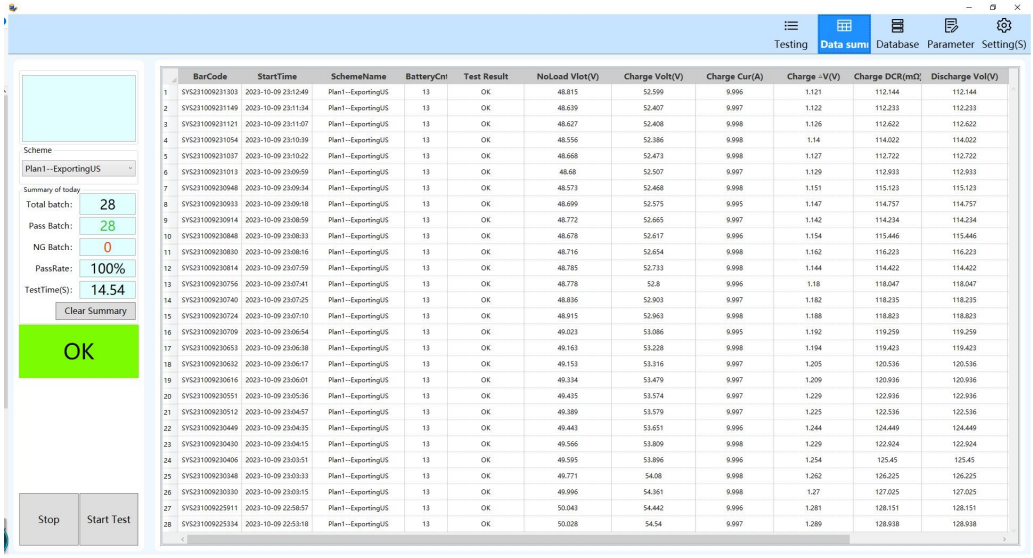
4.3 Main interface（Testing interface）

After setting the parameters and saving them, the system actively jumps to the testing interface. In the testing interface, different testing schemes can be selected based on different models and batches of batteries. After selecting the solution, click "Start Testing", and the system will automatically complete the testing and display the test results as shown in the following figure. When the test results are incorrect or errors such as battery reverse connection are detected, the system will stop the test and report an error. In emergency situations, you can click "stop testing" or press the emergency stop button.



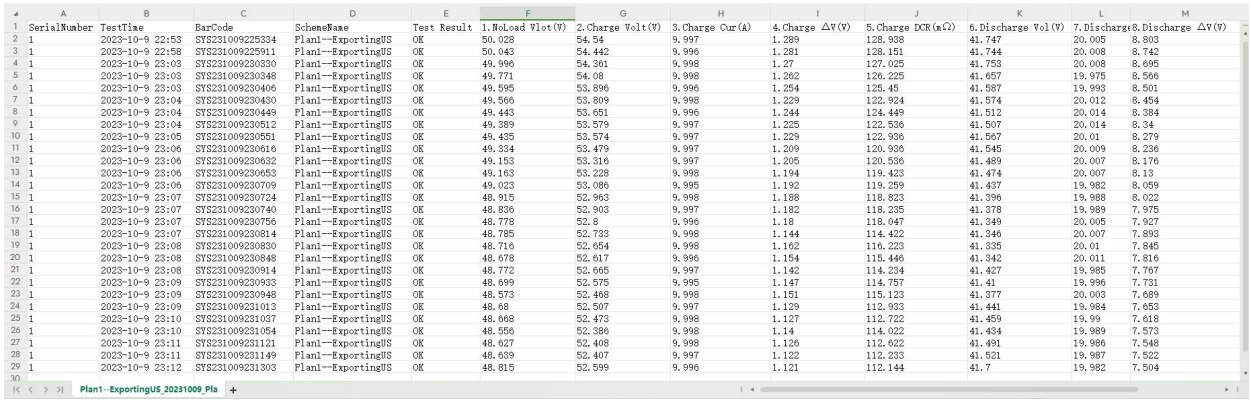
4.4 Data Summary Interface

The data summary interface will display the test results of all battery packs tested by the most recent test plan. Provide the function to delete a test result when the technician has permission. The test results are arranged in reverse chronological order, and the final test result is placed in the first row for the convenience of customers to view.



4.5 Excel file

The test results will be automatically saved as an Excel file, and the system will classify the test result files. The "OK" and "NG" files will be stored separately. The Excel file is named after the barcode name and the test time.



5 List of Main Accessories

NO	Main components	MAker	number	unit
1	Testing system software	Self-developed	1	PCS
2	Industrial computer	AOC	1	PCS
3	relay	HONGFA	14	PCS
4	chassis	Self-developed	1	PCS

5	power supply	Taiwan Mingwei	4	PCS
6	Code scanning gun	Guangzhou Wangbai	1	PCS
7	Leakage switch	chnt	1	PCS
8	fuse	US Littelfuse	1	PCS
9	Main CPU	US TI	1	PCS
10	Isolation module	MORNSUN	3	PCS
11	Internal resistance tester HP3563A	HePu	1	PCS
12	Insulation voltage tester RJ6835H	Rui Jie	1	PCS
13	High voltage relay switching module	Boompai	1	PCS

6 Shipping List:

Number	specific configuration	quantity
1	lithium battery comprehensive testing system (with industrial computer)	1 set
2	Integrated testing system upper computer software	1 PCS
3	Software manual	1 copy
4	code scanning guns	1 set
5	Foot switch	1 set
6	Battery test connection wire	1 set

7 After sales service:

(1) 1 year warranty for the entire equipment; Lifetime maintenance;

(2) Video guided installation or on-site installation and usage training;

(3) If the equipment malfunctions during use, a preliminary solution will be provided within 4 hours, and if necessary, after-sales personnel will arrive at the site within 48 hours(Within China);

Party A (seal):	Party B (seal):
Technical leader:	Technical leader:
Date:	Date: