Lithium Battery Internal Short Circuit and Self-Discharge Diagnostic Instrument - Product Manual

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1. Product Description

1.1. Product Introduction

This instrument (Model: SDC-5000) is a high-precision, multi-channel automated testing device integrating high-frequency data acquisition and analysis for lithium battery packs. It can monitor the internal short circuit condition of cells in real-time and accurately measure the self-discharge rate. It is specially designed for lithium battery R&D, production quality inspection, and cascade utilization sorting, applicable to various lithium battery cells including cylindrical, prismatic, and pouch cells.

1.2. Core Functions

- **Real-time Voltage Monitoring:** Collects cell voltage with 1mV accuracy, supporting up to 300 cells.
- **Internal Short Circuit Monitoring:** Identifies minute internal short circuit risks within the battery based on a built-in algorithm.
- **Self-Discharge Monitoring:** Automatically evaluates static and dynamic self-discharge rates for single cells/battery packs.
- **Hierarchical Alarm Management:** Multi-level visual pop-ups and sound-light prompts for abnormal indicators, with remote alarm capabilities.
- **Alarm Testing.**

1.3. Application Scenarios

- **Aging & Recycling:** Performance evaluation of old cells, recycling and cascade utilization of retired batteries (Ref: GB/T44111-2024; IEC 63330:2021).
- **Module / PACK:** Consistency screening, defective product failure analysis (Ref: GB 38031-2025).
- **Cell Production:** Pre-injection separator insulation testing, post-formation self-discharge sorting (Ref: GB/T 38698.1-2020).

- **R&D Laboratory:** Material validation, process optimization, lifespan prediction.
- **Power Battery Performance Evaluation:** Health assessment and residual value appraisal of retired power batteries, auxiliary maintenance (Ref: GB 38031-2025).

2. Technical Parameters

2.1. Internal Short Circuit Monitoring Module

Parameter Item	Parameter Value / Description
Testing Principle	Voltage drop monitoring
Voltage Accuracy	±0.1% FS
Testing Method	Real-time monitoring
Judgment Basis	Voltage drop amplitude, slope, leakage current

2.2. Discharge Monitoring Module

Parameter Item	Parameter Value / Description
Testing Principle	Zero voltage difference (ΔV=0) DC micro-current method
Cell Voltage Range	0.5V~5.0V
K-value Testing	Supports self-discharge rate calculation via OCV method

2.3. Other Parameters

Parameter Item	Parameter Value / Description
Number of Channels	48 (Expandable to 300)
Display Screen	10.1-inch touch screen
Working Power Supply / Overall Power Consumption	DC 12V ±10% / 1A / < 5W
Working Environment	Temperature: 15°C~30°C; Humidity: 30%~70% RH
Device Dimensions	350mm (L) × 200mm (W) × 55mm (H)
Device Weight	Approx. 1kg

3. Structure and Interface Description

3.1. Front Panel

- **Display Screen:** Parameter setting, voltage monitoring, internal short circuit and self-discharge monitoring, alarm testing (as shown in Figure 5.1.1).
- **Wiring Terminals:** CH0~CH48 test interfaces.

3.2. Side Panel

- Power switch, power socket, antenna.

3.3. Software Interface

- **Test Settings:** Parameter configuration, alarm test.
- **Real-time Monitoring:** Voltage / self-discharge voltage difference / internal short circuit degree (slight/severe status).

4. Operation Steps

4.1. Before Monitoring

1. Connect the remote alarm power supply.
2. Connect the battery pack correctly according to the wiring sequence.
3. Turn on the device power.
4. Set the corresponding parameters according to the battery pack being measured (as shown in Figure 4.1.1).
5. Operate the screen to enter the function selection page (as shown in Figure 4.1.2).
6. Enter the alarm test page and test the alarm function (as shown in Figure 4.1.3).
7. Enter voltage measurement to ensure the number of cells measured by the instrument matches the actual number.
8. Enter internal short circuit and self-discharge monitoring, and click the checkbox in the upper right corner to activate the function (as shown in Figure 4.1.4).

4.2. After Monitoring

1. Click the checkbox in the upper right corner again to turn off the monitoring function (as shown in Figure 4.2.1).
2. Power off the instrument.
3. Remove the wiring sequentially.

4. End.
   (For details, please refer to the internal user manual of the instrument)

5. Safety Instructions

5.1. General Safety Regulations

- This device is a high-precision electronic testing instrument, restricted to use in dry, dust-free indoor environments without corrosive gases.
- Operators must possess basic electrical safety knowledge and be familiar with lithium battery characteristics. Unauthorized operation, disassembly, or modification by non-professionals is strictly prohibited.

5.2. Operation Safety Key Points

- **Battery Polarity:** Strictly distinguish positive and negative poles; reverse connection is prohibited, otherwise it will damage the device and battery.
- **Testing Range:** Testing beyond the device's rated voltage and current ranges is strictly prohibited.
- **Emergency Stop:** If battery heating, abnormal odor, or abnormal sound is detected during testing, press the emergency stop button immediately and disconnect the wiring.

6. Standard Accessories

- Detector, DC power adapter 12V × 1 pair
- Alarm light, DC power adapter 12V × 1 pair
- Alligator clip wires (several)
- Wireless remote control socket × 1 pc
- Product Manual × 1 copy

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