

JB

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

JB/T 11137-2011

General requirements for lithium-ion battery assemblies

锂离子蓄电池总成通用要求

(English Translation)

Issued on: May 18, 2011

Implemented on: August 1, 2011

**Issued by: Ministry of Industry and Information Technology of the
People's Republic of China**

Table of Contents

Foreword	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 Classification and model	8
4.1 Classification	8
4.2 Model	9
4.3 Composition of lithium-ion battery assembly	11
5 Technical requirements	11
5.1 Appearance	11
5.2 Technical requirements	11
5.3 Safety requirements	21
5.4 Environmental requirements	23
5.5 Electromagnetic compatibility (EMC)	25
6 Test method	27
6.1 Test conditions	27
6.2 Appearance	28
6.3 Consistency test of lithium-ion battery	28
6.4 Interface and communication protocol test	28
6.5 Electric energy (kW·h) test	33
6.6 Service life test	34
6.7 Peak power consumption	35
6.8 Insulation resistance test	36
6.9 Electromagnetic compatibility test	38
7 Inspection	39
7.1 Classification of inspections	39
7.2 Exit-factory inspection	39
7.3 Type test	40
7.4 Inspection rules	40
8 Marking, packaging, transportation and storage	41
8.1 Marking	41
8.2 Packaging	42

8.3 Transportation	43
8.4 Storage	43
Appendix A (Normative) Function configuration of lithium-ion battery management system	44
A.1 Function configuration	44
A.2 Technical requirements	45
A.3 Charge control circuit	46
A.4 Discharge control circuit	46
A.5 I/O circuit	46
A.6 Voltage monitoring circuit of battery cell	46
A.7 Automatic balanced circuit	46
Appendix B (Normative) Composition of lithium-ion battery assembly	47
B.1 Overview	47
B.2 Composition of standard and balanced battery assembly	47
B.3 Composition of basic lithium-ion battery assembly	49
B.4 Composition of I/O type lithium-ion battery assembly	49
B.5 Lithium-ion battery module	50
B.6 Lithium-ion battery assembly controller (BECU)	50
Appendix C (Normative) Discharge control mode of lithium-ion battery module and assembly	52
C.1 Overview	52
C.2 Discharge control method of proportional multiplier	52
C.3 Digital control discharge method	53
C.4 I/O discharge control method	53
Appendix D (Informative) Consistency test method of lithium-ion battery	54
D.1 Overview	54
D.2 Consistency Index (C)	54
D.3 Consistency test method	56

1 Scope

This standard specifies the terms and definitions, classification and model, requirements, test methods, inspection, marking, packaging, transportation and storage of lithium-ion battery assemblies.

This standard applies to systems, which are composed of lithium-ion batteries with a capacity greater than or equal to 6 A·h.

2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this standard.

GB/T 156-2007 Standard voltage

GB 2893-2008 safety colors

GB 2894-2008 Safety signs and guideline for the use

GB 4208-2008 Degrees of protection provided by enclosure (IP code)

GB 4824-2004 Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement

GB/T 5465.2-2008 Graphical symbols for use on electrical equipment - Part 2: Graphical symbols

GB/T 17626.2-2006 Electromagnetic compatibility (EMC) - Testing and measurement techniques - Electrostatic discharge immunity test

GB/T 17626.3-2006 Electromagnetic compatibility - Testing and measurement techniques - Radiated radio-frequency electromagnetic field immunity test

GB/T 17626.4-2008 Electromagnetic compatibility - Testing and measurement techniques - Electrical fast transient/burst immunity test of the positive and negative potential pairs.

3.3 Lithium-ion battery pack

A combination of several lithium-ion battery cells, which are connected by a circuit, in a single mechanical-electrical unit.

3.4 Lithium-ion battery module

A combination of lithium-ion battery packs and circuit modules (monitoring and protection circuits, connection circuits, communication interfaces, thermal management equipment, etc.), which is placed in a mechanical-electrical unit.

3.5 Lithium-ion battery assembly

A power supply system which, composed of one or several lithium-ion battery modules, circuit equipment (protection circuit, lithium-ion battery management system, circuit and communication interface), etc., is used to provide electrical energy to electrical equipment.

3.6 Lithium-ion battery assembly controller

A short-circuit unit which, composed of circuits and circuit interfaces and communication interfaces which are controlled by an embedded microcontroller, is used for battery assembly data processing, charge management, discharge management, provision of relevant data for user equipment. It is shortly referred to as battery assembly controller (BECU).

3.7 Voltage monitoring circuit unit for battery cell

A unit, which is connected with each battery cell, for continuous monitoring of the highest and lowest operating voltage of the battery cell.

3.8 Electric energy

The amount of electric energy provided by the lithium-ion battery, when it is Example: Lithium-ion battery assembly, which has a model number of FEB 12.5-144/3-50/9-4009, represents that:

- FEB: Standard configuration (B) energy type (E) lithium iron phosphate (F) battery assembly;
- 12.5: The electric energy is 12.5 kW·h;
- 144/3: Consists of 3 battery modules with a nominal voltage of 48 V; the nominal voltage of the battery pack is 144 V;
- 50/9: The rated discharge current is 50 A; the maximum discharge current is 450 A (50 A x 9);
- 4009: The battery module adopts a standard battery module box, which has a type code of 4009.

4.2.1 Type code

The type code of the lithium-ion battery assembly consists of three characters: The first character (A): Battery module type, see 4.1.1; The second character (B): Battery type, see 4.1.2;

The third character (C): Function configuration of battery management system (BMS), see 4.1.3.

4.2.2 Electric energy

The electric energy is represented by three effective Arabic numerals, in the unit of kilowatt·hour (kW·h).