

ICS 47.020.60

CCS U 62



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

GB/T 46162-2025

**Design requirement of lithium battery management system for
submersible**

潜水器用锂离子电池管理系统设计要求

Issued on: August 29, 2025

Implemented on: March 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

Preface	III
1 Scope	1
2 Normative references	1
3 Terms and Definitions	1
4 Abbreviations	2
5 General Requirements	2
6 Function, classification and composition	2
6.1 Function	2
6.2 Classification	3
6.3 Composition	3
7 Performance Requirements	3
7.1 Pressure resistance	3
7.2 State parameter measurement accuracy	3
7.3 Battery Fault Diagnosis	4
7.4 Electrical adaptability	4
8 Interface Requirements	6
8.1 Power Supply Interface	6
8.2 Information Interface	6
9 Environmental adaptability requirements	6
9.1 High temperature requirements	6
9.2 Low temperature requirements	6
9.3 Salt spray requirements	6
9.4 Humidity and heat requirements	7
9.5 Vibration requirements	7
9.6 Tilt and sway requirements	7
10 Electromagnetic compatibility performance requirements	8
10.1 Conducted disturbance requirements	8
10.2 Radiated disturbance requirements	8
10.3 Power Line Transient Conducted Immunity Requirements	8
10.4 Signal line/control line transient conduction immunity requirements	8
10.5 Electrical fast transient burst immunity requirements	8
10.6 Radiated Immunity Requirements	8

10.7 Electrostatic Discharge Requirements	8
11 Circuit Design Requirements	9
11.1 Main Control Circuit	9
11.2 Slave Control Circuit	9
12 Component Selection Requirements	9
12.1 Sensors	9
12.2 Power Distribution Components	9
12.3 Connectors and cables	9
12.4 Electronic Components	9
13 Installation and layout requirements	10
Appendix A (Normative) System Functional Status Level	11
A.1 Class A11 A.2 B level	11
A.3 C level	11
A.4 D-level	11
A.5 Class E	11
Reference	12

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting.

Please note that some of the contents of this document may involve patents. The issuing organization of this document does not assume the responsibility for identifying patents.

This document is proposed and coordinated by the National Technical Committee for Standardization of Submersibles (SAC/TC306).

This document was drafted by: China Ship Science Research Center and the 712th Research Institute of China Shipbuilding Industry Corporation.

The main drafters of this document are: Zheng Peng, Hu Zhen, He Weiwei, Ye Cong, Yang Shenshen, Zhang Xianggong, Shen Dan, Yu Feng, Song Deyong, Zhang Wei, Zhou Sisi, Wang Xuan, Wang Chuan, Liu Bohan, and Chen Xiaoyang.

Design requirements for lithium-ion battery management systems for submersibles

1 Scope

This document specifies the design requirements for lithium-ion battery management

systems for submersibles, including general requirements, functional classification and composition, performance requirements, Interface requirements, environmental adaptability requirements, electromagnetic compatibility requirements, circuit design requirements, component selection requirements and installation layout requirements.

This document applies to the design of lithium-ion battery management systems for submersibles, including pressure-resistant batteries installed in pressure-compensated battery compartments.

Management system and non-pressure-resistant battery management system installed in pressure-resistant cabins. Lithium-ion battery management systems of other underwater equipment shall be implemented in accordance with the same regulations.

2 Normative references

GB/T 4365-2024

GB/T 13407

GB/T 38661-2020

GB/T 40073-2021

3 Terms and Definitions

GB/T 4365-2024, GB/T 13407, GB/T 38661-2020, GB/T 40073-2021 and the following terms and Definitions apply to this document.

3.1 Submersible

A general term for various underwater operating equipment.

Note. Submersibles include manned submersibles and unmanned submersibles. Manned submersibles are submersibles that carry crew members and usually include operational manned submersibles, deep-sea rescue submersibles, and Lifeboats, underwater tour boats, diving bells, life-saving bells, single-person normal pressure diving suits and dual-function submersibles, etc.; unmanned submersibles are submersibles that do not carry passengers.

It often includes remotely operated submersibles, autonomous submersibles, underwater gliders and towed submersibles.

[Source. GB/T 40073-2021, 3.1]

3.2 A system of device communication interfaces

Monitor the battery status (temperature, voltage, state of charge, etc.), provide

communication, safety and management control for the battery, and provide

3.3 State of charge

The capacity that can be released in the current battery under specified discharge conditions is a percentage of the available capacity.

[Source. GB/T 38661-2020, 3.6]

3.4

Water pressure relative to maximum operating depth.