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**Electrochemical energy storage power station monitoring
system and battery management system communication
protocol**

电化学储能电站监控系统与电池管理系统通信协议 清晰版
(English Translation)

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

Please note that certain contents of this document may involve patents. The issuing agency of this document is not responsible for identifying these patents.

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This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the National Electric Power Storage Standardization Technical Committee (SAC/TC 550).

1 Scope

This standard specifies the basic principles, interfaces and basics of communication between the monitoring system of electrochemical energy storage power stations and the battery management system.

In the communication protocol DL/T 860.81, DL/T 634.5104, GB/T 19582.3 message specifications.

This standard applies to lithium-ion batteries, lead-acid batteries, lead-carbon batteries as energy storage carriers, with a power of not less than 500kW and for electrochemical

energy storage power stations with a fixed energy of not less than 500kWh, other types and scales of energy storage power stations can be implemented with reference to this standard.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version Applies to this document. For undated references, the latest version (including all amendments) applies to this document.

GB/T 19582.1 Industrial Automation Network Specification Based on Modbus Protocol Part 1: Modbus Application Protocol GB/T 19582.3 Industrial automation network specification based on Modbus protocol Part 3: Modbus protocol in TCP/IP Implementation guide on GB/T 36276 Lithium-ion battery for power storage GB/T 36280 Lead-carbon battery for power storage DL/T 634.5101 Telecontrol Equipment and System Part 5-101. Transmission Protocol Basic Telecontrol Task Supporting Standard DL/T 634.5104 Telecontrol equipment and system Part 5-104. Transmission protocol adopts IEC of standard transmission protocol set 60870-5-101 network access DL/T 860.5 Substation communication network and system Part 5: Functional communication requirements and device model DL/T 860.6 Electric power automation communication network and system Part 6: Internal distribution of substations related to intelligent electronic equipment Set description language DL/T 860.71 Substation communication network and system Part 7-1. Basic communication structure of substation and feeder equipment Principles and models DL/T 860.72 Substation communication network and system Part 7-2. Basic communication structure of substation and feeder equipment Abstract Service Communication Interface (ACSI) DL/T 860.73 Substation communication network and system Part 7-3. Basic communication structure of substation and feeder equipment Public data class DL/T 860.74 Substation communication network and system Part 7-4. Basic communication structure of substation and feeder equipment Compatible with logical node class and data class DL/T 860.81 Substation communication network and system Part 8-1. Specific communication service mapping (SCSM) vs. MMS (ISO 9506-1 and ISO 9506-2) and ISO/IEC 8802-3 mapping

3 Terms and definitions

The terms in GB/T 36276 and GB/T 36280 and the following terms and definitions apply to this document.

Battery management unit (BMU) A system that manages a battery module, monitors the battery status (voltage, temperature, etc.), and provides a communication interface for the battery
3.2 Battery cluster management unit (BCMU) A system for daily management and monitoring of battery clusters.

Battery system management unit (BSMU) A system for daily management and monitoring

of battery cluster management units.

Battery management system(BMS) Monitor the state of the battery (temperature, voltage, current, state of charge, etc.), provide a communication interface and protection system for the battery the system includes three levels. BMU, BCMU, and BSMU.

Power conversion system(PCS) A device for realizing real energy between the energy storage battery and the real current grid.

Electrochemical energy storage station(EESS) A power station that uses electrochemical cells as energy storage elements to store, implement and release electrical energy.

State of energy (SOE) Reflecting the battery's reverse energy state, it means that the battery's reverse energy is the rated energy of the battery.

State of health (SOH) Under the standard equipment, the battery is discharged at a certain rate in the full state and the energy released at the voltage and its corresponding mark the rated energy is as.

4 Basic regulations

4.1

The communication protocol between the monitoring system and the BMS should support the monitoring system to communicate with multiple BMSs at the same time to achieve information collection and control.

The number of supported access BMSs should not be less than 255.Each communication link should be independent of each other. The monitoring system should be Abnormal BMS communication should not affect the data interaction of other communication links in the system.

4.2

The monitoring system and BMS adopt Ethernet communication, and the communication protocol structure should meet the requirements of TCP/IP protocol.

4.3

The communication between the monitoring system and the BMS can adopt DL/T 860.81, DL/T 634.5104 or GB/T 19582.3 communication protocol.

4.4

The BMS information model and information point table can be expanded according to BMS functions and application requirements.

5 Communication protocol structure

5.1

The communication protocol structure should adopt a five-layer model based on the TCP/IP communication protocol, and the structure is shown in Table 1.

5.2

The physical layer should realize the physical connection between the monitoring system and the BMS, and should adopt shielded solid-paired wire or optical fiber connection. Monitoring Department the communication interface between the system and BMS should support the TCP/IP network interface. It is advisable to use the Ethernet with a communication rate of 100Mbps or 1000Mbps.

Network port.

5.3

The link layer should adopt a balanced transmission mode.

5.4

The network layer shall adopt the IP protocol. The Ethernet subnet mask in the station should be unified to 255.255.0.0 or 255.255.255.0;

The IP address of the BMS should be uniformly allocated and unique within the site.

5.5

The transport layer should adopt the client-server model to establish TCP connection, the monitoring system should be the client, and the BMS should be Service-Terminal. When using DL/T 860.81 communication protocol, the BMS port number should be 102. Using DL/T 634.5104 for communication protocol, the BMS port number should be 2404. When using the communication protocol of GB/T 19582.3, the BMS port number should be 502.

5.6

The application layer should be able to support system signal acquisition, monitoring, control and fault management, and should follow DL/T 860.71, respectively.

Requirements of DL/T 860.73, DL/T 860.74, DL/T 634.5104, GB/T 19582.1.

6 Communication protocol based on DL/T 860.81

6.1

The information model of BMS shall comply with the regulations of DL/T 860.5, DL/T 860.71, DL/T 860.73, DL/T 860.74 the information transmission service shall be selected according to the requirements of DL/T 860.72 and DL/T 860.81.