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

GB/T 44114-2024

**Specification of operation and control for connecting
electrochemical energy storage system to low-voltage
distribution network**

电化学储能系统接入低压配电网运行控制规范

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Foreword

This document was issued on 28 May 2024 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 December 2024.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 44114-2024 is the low-voltage counterpart to the grid-scale storage standard: it covers batteries connected to the distribution network, at the scale of a building, a factory or a home with rooftop solar. The engineering problem changes with the scale. These systems are numerous rather than large, installed by contractors rather than commissioned by utilities, and connected to a network that was designed to carry power in one direction only. Individually none of them matters; collectively they determine whether the local network voltage stays within limits, and whether a fault leaves a portion of the network energised by batteries after the utility supply has been disconnected - which is a hazard for anyone working on the line. Metering matters commercially here in a way it does not upstream, since these systems participate in tariffs and export arrangements. This document specifies the general requirements for electrochemical energy storage systems connected to the

low-voltage distribution network and the technical requirements for operational management, on-grid and off-grid switching, power control, power quality and power metering. Under CCS F19, it is written for storage system manufacturers and installers, distribution network operators, and inspection bodies.

This Document specifies the general requirements of electrochemical energy storage system

connected to low-voltage distribution network; and the technical requirements for its operational management, on/off-grid switching, power control, operational adaptability, protection, communication, power quality and power metering.

This Document applies to the operation and control of electrochemical energy storage system

connected to distribution network below 10(6) kV.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in 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) is applicable to this Document.

GB/T 12325 Power quality - Deviation of supply voltage

GB/T 12326 Power quality - Voltage fluctuation and flicker

GB/T 14285 Technical code for relaying protection and security automatic equipment

GB/T 14549 Quality of Electric Energy Supply - Harmonics in Public Supply Network

GB/T 15543 Quality of electric energy supply - Admissible three-phase voltage unbalance factor

GB/T 17215.321 Electricity metering equipment (AC) - Particular requirements - Part 21.

Static meters for active energy (Classes A, B, C, D and E)

GB/T 24337 Power quality - Inter-harmonics in public supply network

GB/T 36558 General technical requirements for electrochemical energy storage system of power system

GB/T 36572 Guidelines of cyber security protection for electric power system supervision and control

GB/T 40427 Technical guidelines for power system voltage and reactive power

GB/T 43526 Technical requirements for connecting user-side electrochemical energy storage system to distribution network

GB/T 50063 Code for design of electrical measuring device of power system

DL/T 645 Multi-function watt-hour meter communication protocol

DL/T 2528 Basic terminology of electrical energy storage

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in DL/T 2528 apply.

4 General Requirements

4.1 The electrochemical energy storage system shall meet the requirements of GB/T 43526; and

the technical conditions of its equipment shall meet the requirements of GB/T 36558.

4.2 The electrochemical energy storage system connected to the 380 V distribution network shall be done in a three-phase balanced manner. Before the electrochemical energy storage

system is connected to the 220 V distribution network in a single phase, the three-phase energy

storage capacity and load shall be checked; and the three-phase power imbalance should not

occur.

4.3 Before the electrochemical energy storage system is connected to the low-voltage distribution network, it shall be reported to the power grid management department and the network access procedures shall be handled.

4.4 When an electrochemical energy storage system fails or is abnormal, it shall be disconnected

from the grid.

4.5 The electrochemical energy storage system shall clarify the operation and maintenance

requirements and formulate emergency measures.

4.6 For electrochemical energy storage systems of non-natural person users, operation and maintenance personnel shall be established or specified to be responsible for daily inspections

and fault handling of the operating equipment of the electrochemical energy storage system.

5 Operational Management

5.1 The electrochemical energy storage system shall not change the grid-connected capacity

and grid-connected access mode.

5.2 The operation modes of the electrochemical energy storage system shall include peak cut,

demand response, voltage/power factor control, planned islanding, etc.

5.3 In the peak cut mode, the electrochemical energy storage system shall operate according to

the power planning curve.

5.4 In the demand response mode, the system power of the electrochemical energy storage

system shall track the response demand within the validity period of the invitation.

5.5 In the voltage/power factor control mode, the electrochemical energy storage system shall

automatically adjust the grid connection point power factor according to the voltage control strategy and meet the requirements of GB/T 40427.

5.6 In the planned island operation mode, the electrochemical energy storage system shall promptly notify the grid operation and maintenance department.

6 On/Off-Grid Switching

6.1 If the electrochemical energy storage system is disconnected from the grid due to a fault or

abnormality on the grid side, it shall be delayed to connect to the grid after the grid resumes normal operation; and the grid-connected delay setting value shall be greater than 20 s.