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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 43526-2023

Technical requirements for connecting user-side electrochemical energy storage system to distribution network

用户侧电化学储能系统接入配电网技术规定

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Standardization Administration of the PRC

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Foreword

This document was issued on 28 December 2023 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 July 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 43526-2023 sets the terms on which a battery storage system installed behind a customer's meter is allowed onto the distribution network. The overall requirements settle the connection voltage level, decided by weighing the capacity the customer has declared, the rated power of the storage system and the way it will be used, rather than by a rule of thumb. Power control follows, with the active and reactive control modes chosen to match the application and the connection voltage, then fault ride-through, operational adaptability, power quality, and the start-stop clause that keeps the act of switching the system in or out from disturbing the supply. Relay protection has to meet reliability, selectivity, sensitivity and speed at the point of connection; information and communication cover the operating data,

energy readings, remote control and remote regulation signals, and the alarm and protection records the system must make available. Metering and the grid connection test and evaluation close the document. A user-side battery is invisible to the network operator until it misbehaves, tripping on a disturbance the grid would have ridden through or feeding a fault it should have stopped feeding, so industrial and commercial users, EPC contractors, storage suppliers and distribution utilities need one set of conditions they can all design and test against.

This document specifies the technical requirements for power control, fault ride-through, operational adaptability, power quality, start-stop, relay protection, information and communication, and electric energy metering of electrochemical energy storage systems connected to user's distribution network, as well as grid connection test and evaluation.

This document is applicable to the construction, access, commissioning, testing, inspection and operation of newly constructed, re-constructed and expanded electrochemical energy storage systems connected to the user's distribution network at a voltage level of 220 V and above.

Electrochemical energy storage systems connected to the public power grid at a voltage level of 380 V / 220 V may take this as a reference in implementation.

2 Normative References

The contents of the following documents constitute indispensable clauses of this document through the normative references in the text. In terms of references with a specified date, only versions with a specified date are applicable to this document. In terms of references without a specified date, the latest version (including all the modifications) 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 13955 Installation and Operation of Residual Current Operated Protective Devices

GB 14050 Types and Safety Technical Requirements of System Earthing

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 Power Quality - Three-phase Voltage Unbalance

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 19862 General Requirements for Monitoring Equipment of Power Quality

3.3 point of connection

The connection point between the electrochemical energy storage system and the user's internal

distribution network.

NOTE: for energy storage systems with a boosting transformer, the point of connection refers to

the bus or node on the high-voltage side of the boosting transformer. For energy storage

systems without the boosting transformer, the point of connection refers to the output

aggregation point of the energy storage system.

3.4 primary frequency control; PFC

When the power system frequency deviates from the target frequency, the control function of

the electrochemical energy storage system to automatically adjust the active power in response

to the system frequency deviation.

[source: GB/T 40595-2021, 3.1, modified]

4 Overall Requirements

4.1 The voltage level of the user-side electrochemical energy storage system connected to the

user's distribution network shall be determined after technical and economic comparison based

on the user's reported capacity, rated power of the energy storage system, application mode,

current carrying capacity of the user's distribution network equipment and grid structure of the

access point.

4.2 The installed capacity of the user-side electrochemical energy storage system shall be coordinated with the application mode and user supply and demand balance.

4.3 For the user-side electrochemical energy storage system connected via a 220 V single-phase connection, the access phase shall be selected based on the three-phase load conditions. When multiple user-side electrochemical energy storage systems are connected, each phase should be evenly distributed.

4.4 The energy storage batteries, battery management systems, energy storage converters, relay protection and other equipment of the user-side electrochemical energy storage system shall comply with the provisions of GB/T 36558.

4.5 Within the allowable power output range, the active power and reactive power of the user-side electrochemical energy storage system shall be continuously adjustable in four quadrants, be able to accept remote or local power control commands, and be able to set the power generation and consumption plan curve and automatically execute it.

4.6 The protection configuration and setting at the point of connection of the user-side electrochemical energy storage system shall be coordinated with the protection of the user's distribution network.

4.7 The neutral point grounding mode of the user-side electrochemical energy storage system shall be compatible with the grounding mode of the user's distribution network, and the system lightning protection and grounding shall comply with the provisions of GB 14050, GB 50057 and GB/T 50065.

4.8 The power control, primary frequency control, inertia response, fault ride-through,