ICS 29.020
CCS F 12

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 33589-2026

Replacing GB/T 33589-2017

Technical requirements for connecting microgrids to the power system

微电网接入电力系统技术规定

Issued on: April 30, 2026 **Implemented on: November 1, 2026**

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

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1 Scope

GB/T 33589-2026 is the Chinese national standard covering the connection of a microgrid to the wider network - the point of common coupling, the transition between grid-connected and islanded operation and back, the protection and the information exchanged with the operator. It replaces GB/T 33589-2017 and has been in force since 1 November 2026, and it is read with the microgrid black start standard GB/T 47850-2026. It was issued on 30 April 2026 and takes effect on 1 November 2026, replacing GB/T 33589-2017. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document specifies the overall requirements for connecting microgrid to power system, technical requirements such as active power, reactive voltage, operational adaptability, safety, power quality, operation mode switching, relay protection, electric energy metering, communication and information, as well as grid-connected testing. This document applies to the connection, commissioning, and operation of newly built, renovated (expanded) grid-connected microgrids connected to the power grid at voltage levels of 35 kV and below.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB 2894 Safety colours and safety signs

GB/T 12325 Power quality - Deviation of supply voltage

GB/T 12326 Power quality - Voltage fluctuation and flicker

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 15945 Power quality - Frequency deviation for power system

GB/T 19862 General requirements for monitoring equipment of power quality

GB/T 22239 Information security technology - Baseline for classified protection of cybersecurity

GB/T 24337 Power quality - Interharmonics in public supply network

GB/T 33593 Technical requirements for grid connection of distributed resources

GB/T 33982 Technical specification for grid connection protection of distributed resources

3 Terms and definitions

For the purpose of this document, the terms and definitions defined in GB/T 33593, as well as the following apply.

3.1 microgrid A small-scale power supply and distribution system composed of distributed resources, power supply and distribution facilities, electrical loads, monitoring, protection, and automation devices, capable of achieving basic internal power and energy balance. NOTE. Microgrids are divided into grid-connected microgrids and stand-alone microgrids.

3.2 grid-connected microgrid A microgrid that can operate both grid-connected and off-grid, but primarily operates in grid-connected mode.

3.3 point of interconnection Connection point between the microgrid and the external power grid. NOTE. For microgrids with a step-up substation, this refers to the high-voltage side bus or node of the step-up substation. For microgrids without a step-up substation, this refers to the point where the microgrid and the external power grid converge to consume/output power.

3.4 maximum output power into powergrid The maximum value of power that a microgrid is

allowed to output to the external power grid through the point of interconnection.

3.5 maximum power consumed from powergrid The maximum value of power that a microgrid is allowed to consume from the external power grid through the point of interconnection.

4 Overall requirements

4.1 A microgrid shall have power and energy self-balancing capability, be able to operate in coordination with the connected power system, and meet the power quality requirements for power supply and consumption.

4.2 The connection voltage level of a microgrid shall be determined based on its maximum output power into powergrid and power consumed from powergrid with the external power grid, after comprehensive technical and economic comparison, and shall not be lower than the highest AC voltage level within the microgrid.

4.3 When a microgrid is connected to the grid, the distributed resources within the microgrid shall meet the relevant requirements of GB/T 33593.

5 Active power

5.1 The active power exchanged between the microgrid and the external power grid shall not exceed the maximum output power into powergrid and the maximum power consumed from powergrid.

5.2 For microgrids connected to the grid at voltage levels of 10(6) kV ~ 35 kV, the output active power into powergrid and the active power consumed from powergrid at the point of interconnection shall be adjustable according to the instructions of the power dispatching agency or the frequency of the point of interconnection.

5.3 Microgrids connected to the grid at a voltage level of 380 V shall be able to receive and automatically execute active power control commands at the point of interconnection. Their maximum output power into powergrid and power consumed from powergrid, and power change rate can be set remotely or manually on-site.

6 Reactive voltage

6.1 For microgrids connected to the grid at voltage levels of 10(6) kV ~ 35 kV, the power factor at the point of interconnection shall be adjustable within the range of 0.98 (leading) ~ 0.98 (lagging). Within its reactive power output range, it shall have the ability to adjust reactive power output according to the voltage level of the point of interconnection and participate in grid voltage regulation. Parameters such as adjustment method, reference voltage, and voltage droop rate shall be set according to the requirements of the power dispatching agency.

6.2 For microgrids connected to the grid at a voltage level of 380 V, the power factor at the point of interconnection shall be adjustable within the range of 0.95 (leading) ~ 0.95 (lagging), and it should have the ability to participate in grid voltage regulation.

7 Operational adaptability

7.1 The microgrid shall be able to operate normally when the point of interconnection's voltage deviation meets the requirements of GB/T 12325, voltage fluctuation and flicker values meet the requirements of GB/T 12326, harmonic values meet the requirements of GB/T 14549, interharmonic values meet the requirements of GB/T 24337, and three-phase voltage unbalance meets the requirements of GB/T 15543.

7.2 The frequency adaptability of microgrids meets the requirements of Table 1. Table 1 -- Frequency adaptability requirements for microgrids

8 Safety

8.1 The grounding method within the microgrid shall be consistent with the grounding method on the external power grid side, meeting the requirements for personal and equipment safety and protection coordination, and shall meet the relevant requirements of GB 14050.

8.2 For microgrids connected to the grid at voltage levels of 10(6) kV ~ 35 kV, an easily operable, interlockable switching device with a clearly visible break point, grounding function, and capable of interrupting fault current shall be installed at the point of interconnection. For microgrids connected to the grid at a voltage level of 380 V, an easily operable switch with a clearly visible break point and capable of interrupting fault current shall be installed at the point of interconnection.

8.3 For microgrids connected to the grid at voltage levels of 10(6) kV ~ 35 kV, warning signs such as "Beware of Electric Shock" shall be marked near electrical equipment and lines; for microgrids connected to the grid at a voltage level of 380 V, the dedicated low-voltage switchgear connecting the microgrid and the external power grid shall have prominent markings. The marking shall include warning text such as "Warning" and "Dual Power Supply" and symbols. The type, shape, color, size, and location of the markings shall comply with the provisions of GB 2894.

9 Power quality

9.1 Microgrids connected to the grid at voltage levels of 10(6) kV ~ 35 kV shall be equipped with a Class A online power quality monitoring device meeting the requirements of GB/T 19862 at the point of common coupling. Historical power quality monitoring data shall be retained for at least one year.