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GB/T 47510-2026

Short-circuit current calculation for distributed renewable energy sources

分布式新能源短路电流计算

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Foreword

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20 National Standards of the People's Republic of China Calculation of short-circuit current of distributed renewable energy sources Published on 2026-04-

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01 State Administration for Market Regulation The State Administration for Standardization issued a statement.

1.Scope This document specifies the general requirements and calculation models for short-circuit current of distributed renewable energy sources such as distributed photovoltaic power and distributed wind power, as well as distributed energy storage. The type describes the calculation method. This document applies to the calculation of short-circuit current of distributed new energy sources connected to AC power systems with voltage levels of 10(6)kV and below.

4 General Requirements

4.1 Short-circuit calculations for AC power systems containing distributed renewable energy sources may include the initial value, steady-state value, peak value, breaking value, and... DC component, and takes into account both balanced and unbalanced short-circuit faults.

4.2 The short-circuit current at the fault point includes the short-circuit current of distributed renewable energy sources near the fault point and the short-circuit current of other power sources in the AC power system. The short-circuit current calculation model for distributed renewable energy sources should take into account the characteristics of controlled current sources, and the short-circuit current calculation model for other power sources in AC power systems should also be considered. The type should conform to the requirements of

GB/T 15544.1.

4.3 When calculating the maximum short-circuit current at the fault point, the distributed power sources connected to the fault point in the vicinity should be calculated as if they were all connected to the grid.

5 Computational Model

5.1 Distributed new energy sources and energy storage connected to a 10(6)kV AC power system via unit transformers

5.1.1 The short-circuit current calculation model for distributed wind power connected to a 10(6)kV AC power system shall comply with the provisions of GB/T 44659.1.

5.1.2 The short-circuit current calculation model for distributed photovoltaic systems connected to a 10(6)kV AC power system via a unit transformer should conform to... The provisions of GB/T 44659.2.

5.1.3 The short-circuit current calculation model for distributed energy storage connected to a 10(6)kV AC power system via a unit transformer should conform to... The provisions of GB/T 44659.3.

5.2 Distributed photovoltaic power connected to the 380V AC power system via combiner box

5.2.1 A typical distributed photovoltaic topology connected to a 380V AC power system via a combiner box is shown in Figure

1.The positive sequence model equivalent circuit adopts... The equivalent circuit shown in Figure 2a). When negative sequence control is available, the equivalent circuit of the negative sequence model is shown in Figure 2b); when negative sequence control is not available... When the negative sequence model is used, the equivalent circuit shown in Figure 2c) is adopted. When zero-sequence control is available, the equivalent circuit shown in Figure 2d) is adopted. Equivalent circuit; when zero-sequence control is not available, the equivalent circuit of the zero-sequence model is the equivalent circuit shown in Figure 2e).

5.3 Distributed energy storage connected to the 380V AC power system via combiner box

5.3.1 A typical distributed energy storage topology connected to a 380V AC power system via a combiner box is shown in Figure

3.The equivalent circuit of the positive sequence model adopts... The equivalent circuit shown in Figure 4a). When negative sequence control is available, the equivalent circuit of the negative sequence model is shown in Figure 4b); when negative sequence control is not available... When the negative sequence model is used, the equivalent circuit shown in Figure 4c) is adopted. When zero-sequence control is available, the equivalent circuit shown in Figure 4d) is adopted. Equivalent circuit; when zero-sequence control is not available, the equivalent circuit of the zero-sequence model adopts the equivalent circuit of Figure 4e).

5.3.3 For distributed energy storage connected to a 380V AC power system via a combiner box, the negative sequence calculation model for short-circuit current is divided into the following two cases.

a) When negative sequence control is available, the negative sequence model adopts the equivalent impedance model, and the equivalent impedance is calculated according to GB/T 44659.3;

b) Without negative order control, the negative order model is equivalent to an open circuit.

5.3.4 For distributed energy storage connected to a 380V AC power system via a combiner box, the zero-sequence short-circuit current calculation model is divided into the following two cases.

6.1 Balanced Short Circuit

6.1.1 The short-circuit current at the fault point is provided by two parts. the equivalent voltage source and the controlled current source. The initial value of its AC component is calculated according to formula (6).

6.2.2 The initial value of the AC component of the short-circuit current at the fault point is calculated according to the formula in Table

2.The location of the short-circuit current for different fault types is shown in Figure 5.

6.2.3 Other components of the short-circuit current at the fault point shall be calculated as follows:

a) The steady-state value of the AC component of the short-circuit current is taken as its initial value;

b) The peak short-circuit current is calculated according to formula (9);

c) The initial value of the AC component is taken for the symmetrical interrupting current.

6.3 Calculation Example See Appendix B for a calculation example of a fault occurring when distributed renewable energy is connected to an AC power system.