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PEOPLE'S REPUBLIC OF CHINA**

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**Technical specification for anti-stealing equipment based on
primary side current monitoring
(English Translation)**

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Foreword

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

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the Electric Power Industry Standardization Technical Committee (DL/T C43).

Drafting organizations of this standard. State Grid Zhejiang Electric Power Co., Ltd., State Grid Corporation of China, China Electric Power Research Institute Co., Ltd., State Grid Chongqing Electric Power Company, State Grid Jiangxi Electric Power Co., Ltd. Electric Power Research Institute, Zhejiang Huacai Technology Co., Ltd., Beijing Xinyuan Green Network Festival Energy Technology Co., Ltd., Beijing Zhixin Microelectronics Technology Co., Ltd.

1 Scope

This standard specifies the monitoring of anti-theft equipment based on primary current in power grids with a voltage of 10kV~35kV and a frequency of 50Hz.

Capability requirements, technical requirements, inspection methods and requirements, inspection rules.

This standard is applicable to the inspection, use and in-operation inspection of

anti-electricity stealing equipment based on primary-side current monitoring.

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 2423.1-2008 Environmental testing of electric and electronic products Part 2: Test method Test A. Low temperature GB/T 2423.8-1995 Environmental testing of electrical and electronic products Part 2: Test method Test Ed. Free fall GB/T 2423.17-2008 Environmental testing of electric and electronic products Part 2: Test method Test Ka. Salt spray GB/T 2423.24-2013 Environmental testing of electrical and electronic products Part 2: Test methods Test Sa. Simulate solar radiation on the ground GB/T 2828.1-2012 Sampling inspection procedure by attributes Part 1: Batch inspection sampling plan retrieved by acceptance quality limit (AQL) GB/T 4208-2017 Enclosure protection grade (IP code) GB/T 5169.11-2006 Fire hazard test for electric and electronic products Part 11: Glow wire/hot wire basic test method GB/T 16927.1-2011 High Voltage Test Technology Part 1: General Definition and Test Requirements GB/T 17215.211-2006 Alternating current measuring equipment general requirements, tests and test conditions Part 11: Measuring equipment GB/T 17626.8-2008 Electromagnetic compatibility test and measurement technology Power frequency magnetic field immunity test GB 26859-2011 Electric Power Safety Work Regulations Power Line Part GB/T 32856-2016 General technical requirements for high-voltage energy meters DL/T 645 Multifunctional Energy Meter Communication Protocol DL/T 698.45 Electric energy information acquisition and management system Part 4-5.Object-oriented interoperability data exchange protocol DL/T 877 General requirements for the use of live working tools, devices and equipment DL/T 1527-2016 Electricity Information Security Protection Technical Specification

3 Terms and definitions

The following terms and definitions apply to this standard.

Monitoring anti-electricity stealing equipment based on primary side current Composed of a current acquisition module and a data receiving module, it can monitor the current of the primary side line of the special transformer, and has data acquisition, processing, Equipment with power theft or measurement abnormality judgment function.

Current acquire module Connected to the 10kV~35kV primary side power line, it can collect and store the primary side current data, and has a communication encryption function module.

Data receiving module the module that receives data from the current acquisition module

and performs power theft or measurement abnormality judgment. It has remote and local communication functions.

4.1 Anti-theft monitoring methods

The anti-theft device based on primary side current monitoring should work as shown in Figure 1. Monitoring through the current acquisition module installed on the primary side Three-phase current data, and sent to the data receiving module. The data receiving module calculates the primary side apparent power and compares it with the apparent power monitored by the metering point.

If the relative error of the apparent power exceeds the set threshold, it is determined that there is electricity theft or measurement abnormality. Comparison judgment can be in the data receiving in the module, it can also be carried out in the electric energy information collection and management system (anti-electricity theft audit monitoring platform).

4.2.1 Primary side apparent power calculation

The apparent power of primary side is calculated according to formula (1).

4.2.2 Calculation of Apparent Power of Metering Point

The apparent power of the measuring point is calculated according to formula (2).

4.2.3 Abnormal discrimination

The relative error RS of the apparent power between the primary side and the metering point is calculated according to formula (3). When RS exceeds the threshold, it is judged that the user has theft or Abnormal measurement. The threshold can be set and is not less than 20%.

4.3 Data storage requirements

The current acquisition module should store no less than 30 minutes of data, and the storage interval can be set. The data storage space should not be less than 32k bytes.

The data receiving module should store data for no less than 60 days. The storage interval can be set. The maximum interval time should not exceed 1h.

Time stamps are required, and the time stamps of each stored record should be aligned. The data storage space should not be less than 2M bytes.

4.4 Clock call test and time synchronization function

The current acquisition module should adopt an active time synchronization method and actively apply for clock information from the data receiving module for time synchronization.

Current acquisition module start the time should be adjusted when moving, and the time should be handled at least twice a day.

The data receiving module should prepare its own clock chip and clock backup power supply. After the power supply is off, the clock should work normally. Clock error is not greater than 0.5 second/day, can accept remote clock call test and time synchronization.

4.5 Parameter setting and query function

The data receiving module should support remote and local settings and query the following parameters.

- a) The real-time collection value of the current on the primary side;
- b) Real-time collection value of current at the metering point;
- c) The relative error RS of apparent power between the primary side and the measurement point;
- d) Load curve record;
- e) Configuration parameters;
- f) Communication parameters.

4.6 Event record

The data receiving module should be able to classify and record events as important events and general events according to the event attributes. The content of each record includes events the type, time of occurrence, and related quantities at the time of the event. The event classification and recording method are shown in Table 1.

4.7.1 Communication data

The remote communication of the data receiving module shall meet the following requirements.

- a) Send various information such as monitoring data and event records according to the set rules;
- b) There are safety protection measures for all data and parameter settings.

4.7.2 Communication method

The communication method of the equipment should meet the following requirements.

- a) The data receiving module has an uplink communication interface for power wireless private network or public communication network;