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**Electricity metering equipment (AC) - Particular
requirements - Part 21: Static meters for active energy
(classes A, B, C, D and E)**

电测量设备（交流） 特殊要求 第 21 部分：静止式有功电能表（A
级、B 级、C 级、D 级和 E 级）

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Electricity metering equipment (AC) - Particular requirements - Part 21: Static meters for active energy (classes A, B, C, D and E)

1 Scope

This Part of GB/T 17215.3 specifies the standard electricity value, structure, meter's marking and documentation, metering performance, climate environment, external influence, metering performance protection, electrical requirements, for static meters for active energy.

This Part of GB/T 17215.3 is only applicable to the newly manufactured static meters for active energy, which is used to measure the AC active energy, in 50 Hz or 60 Hz power grid, AND has an accuracy class of A, B, C, D, E. (below referred to as "meter"). It is also applicable to other type tests.

Note 1: For other requirements (such as structure, EMC, reliability), refer to GB/T 17215.211-2021, as well as the relevant parts of GB/T 17215.911, GB/T 17215.921, GB/T 17215.9311, GB/T 17215.9321, GB/T 17215.941.

This Part applies to newly manufactured electricity metering equipment, which is used to meter and control electrical energy in the power grid, that has a voltage not exceeding 600 V. All special functional units, except the electrical energy measuring function, can be integrated in the meter enclosure, OR can form a separate enclosure.

Note 2: The above voltage is the line-to-neutral line voltage, which is derived from the nominal voltage, as shown in Table 7 of IEC 62052-31:2015.

If the meter has functions other than metering active energy, for example:

- Measurement of voltage amplitude, current amplitude, power, frequency, power factor, etc.;
- Measurement of power quality parameters;
- Load control function;
- Data communication interface.

If encapsulated in the meter enclosure, the relevant standards can apply to these

functional requirements. However, the requirements for these functions are not within the scope of this Part.

Note 3: The requirements for power monitoring devices and measurement functions (such as voltage amplitude, current amplitude, power, frequency, etc.) have been covered in GB/T 18216.12; BUT equipment, that complies with GB/T 18216.12, is not suitable as a payment meter, unless they also meet the accuracy class requirements of this Part.

Note 4: The requirements for power quality monitoring meters have been covered in IEC 62586-1. The measurement methods for power quality monitoring functions have been covered in GB/T 17626.30-2012. The test requirements for power quality monitoring functions are covered in IEC 62586-2.

The requirements of this Part apply, if the meter is designed to be mounted on a specified mating (meter) socket or rack. The test is performed, with the meter mounted on the specified mating socket or rack. However, the requirements for such socket or rack are outside the scope of this Part.

Note 5: Examples of rack-mounted meters are: rail-mounted meters, panel-mounted meters, etc.

If the meter is designed to install a separated indicator display, the requirements of this Part apply; meanwhile, the meter can be connected to its separated indicator display for testing, unless otherwise specified.

If the meter has more than one current circuit per phase (for example: multi-unit meter), the requirements of this Part apply to all current circuits of any current-measuring unit, in the meter enclosure.

This Part also applies to auxiliary input and output circuits, operating indicators, test outputs of electricity metering equipment.

Note 6: For example, pulse input and output, control input and output, power test output.

This Part distinguishes:

- Single-phase meters and multi-phase meters;
- Directly connected meters and meters connected via a transformer;
- Meters with integrated indicating displays and meters with separated indicating displays;
- Indoor and outdoor meters.

This Part does not apply to:

- The meters, which have a line-to-neutral voltage in excess of 600 V derived from the nominal voltage;

4.4 Power consumption

Power consumption shall comply with the requirements, test conditions, test procedures, acceptance criteria, which are specified in 4.4 of GB/T 17215.211-2021.

5 Structure

5.1 General requirements

The general requirements of the structure shall comply with the provisions in 5.1 of GB/T 17215.211-2021.

5.2 Mechanical test

The mechanical test shall comply with the provisions of 5.2 in GB/T 17215.211-2021. It shall also comply with the spring hammer test requirements, test conditions, test procedures, acceptance criteria, which are specified in 8.2 of IEC 62052-31:2015.

5.3 Windows

The window requirements shall comply with the provisions in 5.3 of GB/T 17215.211-2021.

5.4 Sealing requirements

The requirements for sealing shall comply with the provisions in 5.4 of GB/T 17215.211-2021.

5.5 Display of measured value

The measurement value display requirements shall comply with the provisions of 5.5 in GB/T 17215.211-2021.

5.6 Storage of measured values

The storage requirements of the measured values shall comply with the provisions in 5.6 of GB/T 17215.211-2021.

5.7 Output

The output requirements shall comply with the provisions of 5.7 in GB/T 17215.211-2021.

5.8 Electrical pulse input

The electrical pulse input requirements shall comply with the provisions in 5.8 of GB/T 17215.211-2021.

5.9 Working indicator

The working indicator requirements shall comply with the provisions of 5.9 in GB/T 17215.211-2021.

5.10 Protection against mechanical hazards

The meter shall not produce mechanical hazards, under normal working conditions. The protection test for mechanical hazards shall be carried out, in accordance with 7.2 of IEC 62052-31:2015.

5.11 Measures to protect the connection

The requirements for the protective earth terminal shall comply with the provisions of 6.5.2.3 in IEC 62052-31:2015. The requirements for the protective connection impedance of the permanently connected equipment shall comply with the provisions in 6.5.2.4 of IEC 62052-31:2015.

Note: Class I protective equipment requires a protective earth terminal.

5.12 Prevention of flame spreading

The flame spreading prevention shall comply with the provisions of 9.3.2.1 of IEC 62052-31:2015.

5.13 Meter temperature limit and heat resistance

5.13.1 Surface temperature limits to prevent burns

When the ambient temperature is 40 °C, the temperature of the easy-to-contact surface

of the meter shall not exceed the value given in 1) in Table 31 of IEC 62052-31:2015, under normal conditions.

When the ambient temperature exceeds 40 °C, the temperature of the easily accessible surface of the meter is allowed to exceed the value, which is given in 1) in Table 31 of IEC 62052-31:2015, BUT the excess value shall not be greater than the difference, between the ambient temperature and 40 °C.

The surface of the terminal box, which is covered by the terminal cover, OR the surface of the board-mounted meter, which is protected by the fence, is not regarded as an accessible surface.

The test method shall comply with the provisions in 10.4 of IEC 62052-31:2015.

5.13.2 Temperature limits for terminals

When the ambient temperature is 40 °C, the temperature of the terminal shall not exceed the value, which is given in Table 32 of IEC 62052-31:2015, under normal conditions.

When the ambient temperature exceeds 40 °C, the temperature of the terminal is allowed to exceed the value, which is given in Table 32 of IEC 62052-31:2015, BUT the excess value shall not be greater than the difference, between the ambient temperature and 40 °C.

The test method shall comply with the provisions in 10.4 of IEC 62052-31:2015.

6 Marking and documentation of the meter

The marking and documents of the meter shall comply with the provisions of Chapter 6 in GB/T 17215.211-2021.

7 Metering performance

7.1 General test conditions

The general test conditions shall comply with the provisions in 7.1 of GB/T 17215.211-2021.

7.2 Methods of accuracy verification

The method of accuracy verification shall comply with the provisions in 7.2 of GB/T 17215.211-2021.

11.3 Tests for voltage circuits

11.3.1 Withstand long-term overvoltage test

The withstand long-term overvoltage test shall comply with the provisions of 6.10.3.2 in IEC 62052-31:2015.

11.3.2 Surge test

The surge test shall comply with the provisions of 9.3.9 in GB/T 17215.211-2021.

11.4 Dielectric strength test

11.4.1 Humidity conditioning

The humidity conditioning test shall comply with the provisions in 6.10.4.2 of IEC 62052-31:2015.

11.4.2 Test method and test equipment preparation

The dielectric strength test shall comply with the requirements of 6.10.4.3.1 in IEC 62052-31:2015. The preparation of the test equipment shall comply with the requirements in 6.10.4.3.2 of IEC 62052-31:2015.

11.4.3 Impulse voltage test

The impulse voltage test shall comply with the provisions of 6.10.4.3.3 in IEC 62052-31:2015. The test voltage shall comply with the provisions in Table 7 of IEC 62052-31:2015.

11.4.4 AC power frequency voltage test

The AC power frequency voltage test shall comply with the provisions of 6.10.4.3.4 in IEC 62052-31:2015. The test voltage shall comply with the provisions in Table 11 in IEC 62052-31:2015.

11.5 Short-time overcurrent test

The short-time overcurrent test shall comply with the provisions of 9.4.11 in GB/T 17215.211-2021.

12 Type test

The type test shall comply with the provisions of Chapter 11 of GB/T 17215.211-2021.

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