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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

DL/T 1498.5-2019

**Technical specification for on-line monitoring device of
transformation equipment. Part 5: On-line monitoring device of
transformer core earthing current
(English Translation)**

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1 Scope

This part specifies the technical requirements, test items and requirements, inspection rules, and marking, packaging, transportation, and storage requirements for on-line monitoring devices for transformer core earthing current.

This part applies to the design, production, and inspection of on-line monitoring devices for transformer (reactor) core earthing current.

2 Normative references

The following documents are essential for the application of this document. For any dated reference, only the version corresponding to that date applies to this document;

for any undated reference, the latest version (including all amendments) applies to this document.

DL/T 1498.1-2016 Technical specification for on-line monitoring device of transformation equipment - Part 1.General technical specification

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

transformer core working earthing point

The reliable earthing point of the transformer core when a transformer is in operation, which is generally grounded through the bushing lead-out wire.

3.2

transformer clamp working earthing point

The reliable earthing point of the transformer clamp when a transformer is in operation, which is generally grounded through the bushing lead-out wire.

3.3

transformer core earthing current

The current flowing through the working earthing point of the core when a transformer is running, which is expressed as an effective value.

3.4

transformer clamp earthing current

The current flowing through the working earthing point of the clamp when a transformer is running, which is expressed as an effective value.

3.5

on-line monitoring device of transformer core earthing current

A device for continuous or periodic automatic monitoring of the transformer core/clamp earthing current.

NOTE: It mainly consists of a current sensor, data acquisition and processing part, and communication control part. It is generally divided into two types. one with monitoring and alarm

functions; the other with monitoring, alarm and current limiting functions, and with the addition of a current-limit unit in its structure.

3.6

current-limit unit

The functional unit for limiting the core/clamp earthing current.

NOTE: The current-limit unit is connected in series in the core/clamp earthing circuit. When the core/clamp earthing current exceeds the standard, it can be automatically or manually activated to limit the earthing current to the range required by the regulations.

4.1 General technical requirements

The safety performance, reliability, basic functional requirements, insulation performance requirements, electromagnetic compatibility performance requirements, environmental performance requirements, mechanical performance requirements, enclosure protection performance, structure and appearance, and other general technical requirements of the on-line monitoring device of transformer core earthing current shall comply with the relevant requirements of DL/T 1498.1-2016. The connection safety performance and functional requirements of the on-line monitoring device of transformer core earthing current shall comply with 4.2 and 4.3 of this part.

4.2 Connection safety requirements

4.2.1

The connection of on-line monitoring devices shall not lead to safety hazards to the monitored equipment or adjacent equipment.

4.2.2 For monitoring devices with current limiting function, their earthing current loop

shall have protection against open circuit and meet the protection requirements for personnel and equipment.

4.3 Functional requirements

4.3.1

The basic functional requirements for the device are as follows.

- a) It has the function of continuous or periodic automatic monitoring of the transformer core/clamp earthing current.
- b) The monitoring device shall have the ability to work stably for a long time, meet the requirements of on-site verification, and have the functions of not losing data when power is off, self-diagnosis and self-recovery.

c) It has functions, such as over-limit alarm, device abnormality alarm, and communication abnormality alarm.

4.3.2 The monitoring device with current limiting function (the structural diagram of

the current-limit unit is shown in Figure 1) shall also meet the following functions.

a) The current setting value for controlling the current-limiting resistor on and off is 100 mA. If there are special requirements, the current-limiting resistor setting shall be changed in consultation with the equipment manufacturer.

When switching the current-limiting resistor on and off, the earthing current can be limited to the range required by the regulations, and an automatic alarm shall be triggered. Switching the current-limiting resistor on and off shall not cause a dead loop.

b) The current-limit unit shall have an overvoltage protection function. When the voltage exceeds the set value, the protection unit shall operate reliably.

c) It has automatic/manual mode switching and branch switching indication functions.

4.3.3 For monitoring objects with high harmonic content of transformer core/clamp

earthing current (such as converter transformers), the device shall have the function of monitoring the fundamental effective value.

NOTE 1: The accuracy class of the high-precision current measuring device for laboratories is not lower than Class 1.

NOTE 2: When the measured value of the on-line monitoring device is less than 20 mA, the measurement error shall be calculated according to formula (1). When the measured value of the on-line monitoring device is greater than or equal to 20 mA, the measurement error shall be calculated according to formula (2).

Table 1 -- Technical specifications of on-line monitoring device of transformer core earthing current

5.1 Test environment

Except for environmental impact tests, other tests shall be conducted in the following test environments.

- a) ambient temperature. 15 °C~35 °C;
- b) relative humidity. 25%~75%;
- c) atmospheric pressure. 80 kPa~106 kPa.