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

GB/T 17626.10-2017

Replacing GB/T 17626.10-1998

**Electromagnetic compatibility -- Testing and measurement
techniques -- Damped oscillatory magnetic field immunity test
(English Translation)**

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1 Scope

This part of GB/T 17626 specifies the disturbance of damped oscillating magnetic fields in medium and high voltage substations by equipment under operating conditions:

Immunity requirements:

This section mainly applies to electronic equipment installed in high-voltage substations: Other possible applications are determined by relevant professional standardization technical committees Will consider:

For equipment installed in different locations, the applicability of this section is determined by the electromagnetic phenomena described in Chapter 3:

This standard does not consider disturbances caused by capacitive and inductive coupling in cables or other components of field equipment:

Conducted disturbances related to this are considered in other standards:

The purpose of this section is to establish a common and repeatable benchmark to evaluate the damped oscillation magnetic field in medium and high voltage substations:

Performance of electrical and electronic equipment in the field:

This section stipulates the following items:

- Recommended test levels;
- Test equipment;
- Test layout;
- Test procedures:

2 Normative reference documents

The following documents are essential for the application of this document: For dated references, only the dated version applies to this article:

pieces: For undated referenced documents, the latest version (including all amendments) applies to this document:

3 Overview

Magnetic fields to which equipment is exposed may affect the reliable operation of equipment and systems:

The tests in this section apply when the equipment is subjected to damped oscillating magnetic fields associated with its specific location and installation conditions (for example, the equipment is close to a source of disturbance):

Testing can verify the immunity of the equipment:

The damped oscillating magnetic field is generated when the isolation knife switch is connected to the high-voltage bus:

The waveform of the test magnetic field is the damped oscillation waveform shown in Figure 2, and its characteristics are given in 6:1:1:

Information on oscillation frequency is given in Appendix E:

4 Terms and definitions

The following definitions and terms apply to this document and apply only to magnetic field disturbances: Not all of these terms are included in IEC 60050 (161) in:

EUT equipmentundertest Equipment under test:

induction coil A conductor ring with a certain shape and size: When a current flows through the ring, a certain magnetic field is generated in its plane and in the enclosed space:

induction coil factor the ratio of the magnetic field intensity generated by an induction coil of a certain size to the corresponding current: The magnetic field intensity is the value when there is no EUT:

Measured at the center of the coil plane:

immersionmethod

The method of applying a magnetic field to the EUT is to place the EUT in the middle of the induction coil (Figure 1):

proximitymethod

The method of applying a magnetic field to the EUT uses a small induction coil to move along the side of the EUT to detect particularly sensitive areas:

A conductive plane whose potential is used as a common reference potential for magnetic field generators and auxiliary equipment (a grounded reference plane can be used as an induction coil part, see Figure 5):

Decoupling network, anti-inverse filter decoupling network, backfilter Circuit used to avoid interaction with equipment other than magnetic field testing:

burst

A limited number of clearly discernible pulse trains or oscillations of limited duration:

5 Test levels

The preferred range of test levels is shown in Table 1:

The magnetic field strength is expressed in A/m: 1A/m is equivalent to the magnetic induction intensity in free space of 1:26 μ T:

6 Test equipment

The test magnetic field is generated by the current in the induction coil and is applied to the EUT using the immersion method:

An example of applying the immersion test is shown in Figure 1:

Test equipment includes current source (test generator), induction coil and auxiliary test instruments:

6.1

Test generator

The output waveform of the test generator should be consistent with the waveform of the test magnetic field and can provide the required current for the induction coil specified in 6.2:

The size of the generator capacity should be determined by the coil impedance: The coil inductance can range from 2:5 μ H (1m standard coil) to several microhenries (such as 6 μ H, 1mx2:6m rectangular induction coil, see 6.2) within the scope:

The technical parameters of the test generator are as follows:

---Current, determined by the selected highest test level and induction coil factor (see 6.2:2 and Appendix A), the range of the induction coil factor the range ranges from 0:87m-1 (1m standard coil for testing desktop equipment or small equipment) to 0:66m-1 (for vertical equipment or large equipment):

1mx2:6m rectangular induction coil for type equipment testing);

---Operationability under short circuit conditions;

---The low-voltage output terminal is connected to the ground terminal (the ground terminal is connected to the safety ground of the laboratory);

---Take precautions to prevent strong disturbance emissions that may be injected into the power supply network or affect the test results:

The characteristics and performance of the current source considered in this section, that is, the test generator, are given in 6:1:1:

6.1.1

Characteristics and performance of test generator Test generators are generators that repeatedly produce damped sinusoidal currents: Its technical parameters and characteristics are as follows:

Oscillation frequency: 0:1 (1±10%) MHz and 1 (1±10%) MHz;

Decay rate: Decay to 50% of the peak value after 3 to 6 cycles;

Repetition rate: at 0:1MHz, at least 40 attenuated oscillation waves per second; at 1MHz: at least 400 attenuated oscillation waves per second;

Test duration: 2(-0%, 10%)s or continuous operation;

Output current range: 10A~100A, divided according to coil factor:

Note: The current output range of the standard coil is 12A~120A:

The output current waveform is shown in Figure 2;

The schematic diagram of the generator is shown in Figure 3:

6.1.2

Verification of test generator characteristics in order to compare the test results obtained by different test generators, the basic characteristics of their output current parameters should be verified:

The output current of the generator connected to the standard induction coil specified in 6:2:1a) should be verified; the connecting wire should be no longer than 3m, with a cut length of Moderately twisted pair or coaxial cable:

Disturbance emissions produced by the generator should be verified (see 6.1):

Features to be verified are:

---Output current peak value;

---Damping characteristics;