

IEEE Guide for Field Testing of Relaying Current Transformers

IEEE Power and Energy Society

Sponsored by the
Power System Relaying and Control Committee

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Abstract: Field test methods described in this guide assure that current transformers are connected properly, are of marked ratio and polarity, and are in a condition to perform as designed both initially and after having been in service for a period of time.

Keywords: current transformers, excitation, field testing, IEEE C57.13.1™, insulation, polarity, ratio, relaying

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Introduction

This introduction is not part of IEEE Std C57.13.1-2017, IEEE Guide for Field Testing of Relaying Current Transformers.

This project revises the previous guide to keep it current with technological changes in instrument transformers and test equipment.

In the application of protective relays, a widely used input quantity is current. A multiplicity of different protective relays either utilize current directly, combine it with other currents as in differential schemes, or combine it with voltage to make impedance or power measurements. The source of relay input current is from current transformers, which may be located on the bushings of power circuit breakers and power transformers on the bus bars of metal clad switchgear, or installed as separate items of equipment located as required.

This guide should be used in conjunction with other references, such as IEEE Std C57.13™, IEEE Standard Requirements for Instrument Transformers;¹ IEC 60044-8, Instrument Transformers—Electrical Current Transducers [B2]; and *Handbook for Electricity Metering*, EEI Publication No. 93-02-03 [B1].²

¹Information on references can be found in [Clause 2](#).

²Numbers in brackets correspond to those of the bibliography in [Annex D](#).

Contents

1. Overview.....	11
1.1 Scope.....	11
1.2 Purpose.....	11
2. Normative references	11
3. Definitions.....	12
4. Consideration of American National Standards Institute (ANSI) accuracy classes.....	12
5. Precautions in field testing current transformers (CTs).....	12
5.1 Demagnetizing CTs	13
5.2 Greater primary winding turns.....	13
6. Types of tests and measurements.....	13
6.1 Ratio test.....	13
6.2 Polarity test.....	13
6.3 Insulation resistance test.....	14
6.4 Resistance measurement.....	14
6.5 Excitation test.....	14
6.6 Admittance test.....	14
6.7 Burden test.....	14
7. AC sources for primary current injection tests.....	14
8. Ratio tests.....	14
8.1 Voltage method.....	15
8.2 Out-of-service current method	15
8.3 In-service current manual method	17
8.4 In-service current automated method	17
9. Polarity test.....	17
9.1 DC voltage test	17
9.2 AC voltage test—oscilloscope.....	18
9.3 Current method.....	19
9.4 Phase angle method	19
10. Insulation resistance tests.....	21
11. Winding and lead resistance (internal resistance).....	22
12. Excitation test.....	23
12.1 Safety.....	23
12.2 Type of test.....	23
12.3 How to interpret the test results	24
13. Admittance test.....	28
14. Burden tests.....	28
15. Burden measurements	29
16. Specialized situations.....	29
16.1 CT in a closed-delta transformer connection	29
16.2 Generator CTs.....	30
16.3 Inter-core coupling check	30

Annex A (informative) Wiring integrity, test switches, and test equipment	33
Annex B (informative) Excitation voltage measurement considerations	36
Annex C (informative) Optical current sensor systems	41
Annex D (informative) Bibliography	44

IEEE Guide for Field Testing of Relaying Current Transformers

1. Overview

1.1 Scope

The scope of this guide is to describe field test methods that assure current transformers (CTs) are connected properly, are of marked ratio and polarity, and are in a condition to perform as designed both initially and after being in service for a period of time.

[Annex A](#) describes wiring integrity checks, the use of test jacks, current-shortening switches, and relay test equipment.

[Annex B](#) illustrates excitation voltage measurement differences between rms responding voltmeters (commonly used under field conditions) and average responding voltmeters (commonly used in laboratory tests) and also discusses the effect of the source impedance.

[Annex C](#) describes the characteristics, and other pertinent information, of optical current sensor systems used with protective relaying. It provides an overview of the components used in an optical sensor system, discusses the differences from conventional CTs, and provides testing information.

[Annex D](#) is the bibliography for this guide.

1.2 Purpose

The purpose of the guide is to provide information on the current technology for field testing of instrument transformers and to more closely coordinate the information with the other industry standards, for example, the National Electrical Safety Code® (NESC®) (Accredited Standards Committee C2).³

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

Accredited Standards Committee C2, National Electrical Safety Code® (NESC®).⁴

³Information on references can be found in [Clause 2](#).

⁴The NESC is available from the Institute of Electrical and Electronics Engineers (<http://standards.ieee.org/>).