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IEEE Trial-Use Standard for Optical AC Current and Voltage Sensing Systems

IEEE Power & Energy Society

Sponsored by the
Power System Instrumentation and Measurements Committee

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USA

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IEEE Trial-Use Standard for Optical AC Current and Voltage Sensing Systems

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Power System Instrumentation and Measurements Committee
of the
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Abstract: The performance of optical current and voltage measurement systems used in the generation, transmission, and distribution of alternating current electricity, and to assist in the proper selection of such equipment is described in this trial-use standard. This standard covers certain physical characteristics of the sensing systems that use optical techniques to measure current and voltage. This standard provides the requirements for the performance characteristics and the test of optical current and voltage sensors of a nominal system voltage of 1 kV and above, the information related to the nature of these sensors, and the information related to the application and use of these sensors.

Keywords: current sensor, high voltage, IEEE 1601, instrument transformer, optical sensor

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Secretary, IEEE-SA Standards Board
445 Hoes Lane
Piscataway, NJ 08854
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Introduction

This introduction is not part of IEEE Std 1601-2010, IEEE Trial-Use Standard for Optical AC Current and Voltage Sensing Systems.

This standard is intended for use with optical voltage and current sensor systems (OVCSS) for high-voltage (HV) electric energy systems. Since various proprietary technologies have been used in implementing OVCSS, this standard intends to avoid technology-specific requirements; rather, it intends to treat the OVCSS as a "black box" and specify requirements (and tests) that have to be met (regardless of particular technology or implementation used) for a user to be able to use the OVCSS on HV networks.

In producing this document, focus has been on requirements and specifications that are particularly new or unique to OVCSS. Other relevant requirements and information that have been available in other standards have been incorporated by reference. It has been the intention of the working group to minimize repetition of requirements that have been adequately documented in other standards, particularly those given for conventional instrument transformers in IEEE Std C57.13™ and IEEE Std C57.13.5™, and those given for electronic voltage and current transforms in IEC 60044-7 and IEC 60044-8, respectively.

For user's convenience, certain key requirements, such as HV dielectric requirements from IEEE Std C57.13 and IEEE Std C57.13.5, have been reproduced in an informative annex. In case of any update to IEEE Std C57.13 and Std C57.13.5, the latest version of those standards shall be used.

The content of this first version of this standard has been limited to minimum set of requirements for effective use and testing of OVCSS. It is envisioned that future revisions of this standard will incorporate lessons learned from manufacturing and field experiences with this relatively new technology.

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Errata

Errata, if any, for this and all other standards can be accessed at the following URL: http://standards.ieee.org/reading/ieee/updates/errata/index.html. Users are encouraged to check this URL for errata periodically.

Interpretations

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Publication of this trial-use standard for comment and criticism has been approved by the IEEE. Trial-Use standards are effective for 24 months from the date of publication. Comments for revision will be accepted for 18 months after publication. Suggestions for revision should be directed to the Secretary, IEEE-SA Standards Board, 445 Hoes Lane, Piscataway, NJ 08854, and should be received no later than 18 months from publication date. It is expected that following the 24-month period, this trial-use standard, revised and balloted as necessary, shall be submitted to the IEEE-SA Standards Board for approval as a full-use standard.

Participants

At the time this trial-use standard was submitted to the IEEE-SA Standards Board for approval, the Power System Instrumentation and Measurements Working Group had the following membership:

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The following members of the individual balloting committee voted on this trial-use standard. Balloters may have voted for approval, disapproval, or abstention.

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When the IEEE-SA Standards Board approved this trial-use standard on 17 June 2010, it had the following membership:

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Satish Aggarwal, *NRC Representative*
Richard DeBlasio, *DOE Representative*
Michael Janezic, *NIST Representative*

Michelle D. Turner
IEEE Standards Program Manager, Document Development

Matthew J. Ceglia
IEEE Standards Program Manager, Technical Program Development

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IEEE Trial-Use Standard for Optical AC Current and Voltage Sensing Systems

1. Overview

1.1 Scope

This standard is intended for use as a basis for performance and interchangeability of equipment covered, and to assist in the proper selection of such equipment. This standard covers certain electrical, dimensional, and mechanical characteristics of optical current and voltage sensing systems used in the measurement of electricity and the control of equipment associated with the generation, transmission and distribution of alternating current.

1.2 Purpose

To provide a standard for current and voltage sensing systems which use optical techniques as shown in 1.1.

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.

ANSI Z540.1-1994, Calibration Laboratories and Measuring and Test Equipment – General Requirements.[1]

IEC 60044-7, Instrument Transformers–Part 7: Electronic Voltage Transformers.[2]

[1] ANSI publications are available from the Sales Department, American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036 USA (http://www.ansi.org).

[2] IEC publications are available from the Sales Department of the International Electrotechnical Commission, Case Portale 131, 3, rue de Varembé, CH-1211, Genève 20, Switzerland/Suisse (http://www.iec.ch/). IEC publications are also available in the United States from the Sales Department, American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, NY 10036, USA.