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IEEE Guide for Evaluating and Testing the Electrical Performance of Energy Saving Devices

IEEE Power and Energy Society

Sponsored by the
Power System Instrumentation and Measurement Committee

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IEEE Guide for Evaluating and Testing the Electrical Performance of Energy Saving Devices

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Abstract: Described in this guide are methods to evaluate and test the electrical performance of energy saving devices (ESDs). Measurement methods that focus on monitoring the power consumed or generated by the observed load or generator without the ESD connected into the circuit and with the ESD connected and energized into the circuit are described. Detailed protocols describe step-by-step the testing circuits, the type and accuracy of evaluation instrumentation, and the order of the test measurements. Special emphasis is given to sources of measurement errors due to incorrect connection of instrumentation, inadequate instrumentation, or incorrect interpretation of results. Contained in Annex B are practical examples and explanations of the physical mechanisms of phenomena that may cause errors. This guide applies to any electrically connected ESD controlling electrical power delivered from a source and powering an electrical load. While an independent, certified testing laboratory might be contracted to perform ESD testing, the intent of this standard is to provide guidance to those involved with ESDs wishing to obtain accurate and objective data to aid in evaluating ESD performance.

Keywords: electrical energy consumption, electrical test protocol, energy saving device, ESD, IEEE 1889™ RESD, retrofit energy saving device

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Introduction

This introduction is not part of IEEE Std 1889-2018, IEEE Guide for Evaluating and Testing the Electrical Performance of Energy Saving Devices.

A non-industry-specific guide for evaluating the effectiveness of electrically connected energy saving devices (ESDs) and technologies connected to low-voltage power systems is detailed in this document. A clause containing detailed analysis of energy saving devices provides insight into how ESDs might reduce energy consumption. Testing procedures and test equipment requirements for evaluating the energy saving capabilities of ESDs are clearly defined within this document for single-phase and three-phase systems. This guide also defines testing procedures and test reporting requirements.

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IEEE Guide for Evaluating and Testing the Electrical Performance of Energy Saving Devices

1. Overview

1.1 Scope

This guide describes methods to evaluate and test the electrical performance of energy saving devices (ESDs). It describes measurement methods that focus on monitoring the power consumed or generated by the observed load or generator without the ESD connected into the circuit and with the ESD connected and energized into the circuit. Detailed protocols describe step-by-step the testing circuits, the type and accuracy of evaluation instrumentation, and the order of the test measurements. Special emphasis is given to sources of measurement errors due to incorrect connection of instrumentation, inadequate instrumentation, or incorrect interpretation of results. Annex B contains practical examples and explains the physical mechanisms of phenomena that may cause errors. This guide applies to any electrically connected ESD controlling electrical power delivered from a source and powering an electrical load. While an independent, certified testing laboratory might be contracted to perform ESD testing, the intent of this standard is to provide guidance to those involved with ESDs wishing to obtain accurate and objective data to aid in evaluating ESD performance.

1.2 Purpose

It is the purpose of this guide to provide instructions for the measurement protocol of the most relevant electrical parameters such as voltage, current, kilowatts, and kilovars that are needed in determining the energy consumption of ESDs. This guide also provides guidance for measuring performance characteristics of various loads affected by the ESD, such as lumens, rotations per minute, torque, temperature, voltage, etc.

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/IEEE Std 112™-2004, IEEE Standard Test Procedure for Polyphase Induction Motors and Generators.[1,2]

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