IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems

Sponsor

IEEE Standards Coordinating Committee 21 on Fuel Cells, Photovoltaics, Dispersed Generation, and Energy Storage

Approved 9 June 2005

IEEE-SA Standards Board

Approved 21 February 2006

American National Standard Association

Abstract: This standard specifies the type, production, and commissioning tests that shall be performed to demonstrate that the interconnection functions and equipment of the distributed resources (DR) conform to IEEE Std 1547™.
Keywords: distributed resources, interconnection, test procedures

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Print: ISBN 0-7381-4736-2 SH95346
PDF: ISBN 0-7381-4737-0 SS95346

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Introduction

This introduction is not part of IEEE Std 1547.1-2005, IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems.

IEEE Std 1547.1 is one of a series of standards developed by Standards Coordinating Committee 21 (SCC21) concerning distributed resources (DR) interconnection. The titles of the additional documents in that series follow:

— IEEE Std 1547, IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems[a]

— IEEE P1547.2™, Draft Application Guide for IEEE Std 1547, Interconnecting Distributed Resources with Electric Power Systems [B6][b]

— IEEE P1547.3™, Draft Guide for Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems [B7]

— IEEE P1547.4™, Draft Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems [B8]

— IEEE P1547.5™, Draft Technical Guidelines for Interconnection of Electric Power Sources Greater Than 10 MVA to the Power Transmission Grid [B9]

— IEEE P1547.6™, Draft Recommended Practice for Interconnecting Distributed Resources with Electric Power Systems Distribution Secondary Networks [B10]

The root standard, IEEE Std 1547, defines a set of uniform requirements for the interconnection of DR to the distribution segment of the electric power system (EPS). IEEE Std 1547 is an outgrowth of the changes in the environment for production and delivery of electricity and builds on prior IEEE recommended practices and guidelines developed by SCC21.

IEEE Std 1547 includes requirements relevant to the operation of the interconnection. It generally defines limitations and set points for various parameters that must be satisfied prior to the connection of a DR unit to the EPS, at the instant of connection, and for the separation of such resources from the EPS for abnormal conditions.

IEEE Std 1547.1 provides conformance test procedures to establish and verify compliance with the requirements of IEEE Std 1547. When applied, the IEEE 1547.1 test procedures can provide a means for manufacturers, utilities, or independent testing agencies to confirm the suitability of any given interconnection system (ICS) or component intended for use in the interconnection of DR with the EPS. Such certification can lead to the ready acceptance of confirmed equipment as suitable for use in the intended service by the parties concerned. While this standard defines test procedures, it does not specify measurement techniques. Suitable measurement techniques can be found in various technical publications including, but not limited to, IEEE Std 120™ [B13].

It is beyond the scope of IEEE 1547.1 to specify the design and performance criteria for ICSs or components. It is left to the parties concerned to determine that the equipment manufacturer's specifications and confirmed performance satisfy the technical needs of the EPS distribution circuit to which the DR unit is to be connected. Similarly, this standard does not address the local electrical power system technical needs nor load requirements for the facility or premises where the point of DR connection is made.

[a]Information on references can be found in Clause 2.

[b]The numbers in brackets correspond to the numbers of the bibliography in Annex B.

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IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems

1. Overview

This standard provides tests and procedures for verifying conformance of interconnection systems (ICSs) to IEEE Std 1547™.[1] It is recognized that an ICS can be a single device providing all required functions or an assembly of components, each having limited functions. Components having limited functions shall be tested for those functions in accordance with this standard. Conformance may be established through combination of type (referred to as "design" tests in IEEE Std 1547), production, and commissioning tests. Additionally, conformance to IEEE Std 1547 requires interconnection installation evaluation and periodic tests.

This standard also includes Annex A, which describes test signals and ramp functions used in conducting some tests. Additionally, a bibliography is included as Annex B; it lists documents that are referred to in this standard for informative purposes, but that are not required to implement the procedures defined in this standard.

1.1 Scope

This standard specifies the type, production, and commissioning tests that shall be performed to demonstrate that the interconnection functions and equipment of the distributed resources (DR) conform to IEEE Std 1547.

1.2 Purpose

Interconnection equipment that connects DR to an electric power system (EPS) must meet the requirements specified in IEEE Std 1547. Standardized test procedures are necessary to establish and verify compliance with those requirements. These test procedures must provide both repeatable results, independent of test location, and flexibility to accommodate the variety of DR technologies.

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

1.3 Limitations

This standard does not cover testing for safety.

Although this standard does not define a certification process, these tests may be used as part of such a process.

2. Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

The applicability of the following standards is determined by the specific requirements stated in this standard, such as requiring certain sections.

ANSI C37.06, American National Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis—Preferred Ratings and Related Required Capabilities.[2]

ANSI C84.1, American National Standard for Electric Power Systems and Equipment—Voltage Ratings (60 Hz).

IEEE C37.09™, IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis.[3, 4]

IEEE Std C37.90.1™, IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.

IEEE Std C37.90.2™, IEEE Standard for Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers.

IEEE Std C62.41.2™, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits.

IEEE Std C62.45™, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits.

IEEE Std 1547™, IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems.

NEMA MG-1, Motors and Generators.[5]

[2]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/).

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