IEEE SCC21 1547 Standards Update

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Presented at the Solar Power International Conference

IEEE SCC21 1547 Series of Standards*

IEEE Std 1547™(2003 and 2014 Amendment 1) Standard for Interconnecting Distributed Resources with Electric Power Systems

IEEE Std P1547™(full revision) Draft Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces

IEEE Std 1547.1™(2005 and 2015 Amendment 1) Standard for Conformance Tests Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems

IEEE Std P1547.1 (full revision) Draft Standard for Conformance Tests Procedures for Equipment Interconnecting Distributed Energy Resources with Electric Power Systems and Associated Interfaces

IEEE Std 1547.2™(2008) Application Guide for IEEE 1547 Standard for Interconnecting Distributed Resources with Electric Power Systems

IEEE Std 1547.3™(2007) Guide for Monitoring Information Exchange, and Control of Distributed Resources with Electric Power Systems

IEEE Std 1547.4™(2011) Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems

IEEE Std 1547.6™(2011) Recommended Practice for Interconnecting Distributed Resources with Electric Power Systems Distribution Secondary Networks

IEEE Std 1547.7™ (2013) Guide to Conducting Distribution Impact Studies for Distributed Resource Interconnection

IEEE Std P1547.8™ Draft Recommended Practice for Establishing Methods and Procedures that Provide Supplemental Support for Implementation Strategies for Expanded Use of IEEE Std 1547-2003

* Colored background designates IEEE published standard; clear background is draft standard work in progress.

IEEE Std 1547a – Amendment 1, May 2014

(Amendment 1: revisions to 4.1.1, 4.2.3, and 4.2.4)

4.1.1 Voltage Regulation

… DER allowed to change its output of active and reactive power.

4.2.3 *(Response to abnormal grid …)* Voltage

…. DER allowed to "ride through" abnormalities of grid voltage;

… grid and DER operators can mutually agree to other voltage trip and clearing time settings

4.2.4 (Response to abnormal grid …) Frequency

… DER allowed to provide modulated power output as a function of frequency

… … grid and DER operators can mutually agree to other frequency trip and clearing time settings

IEEE Std 1547.1a -- Amendment 1 [March 2015]

New type tests: 5.3 (DER real power output variation as a function of frequency); and **5.13 Voltage regulation** (next slide)

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5.3 Response to abnormal frequency conditions

Insert new subclauses (into IEEE Std 1547.1)

5.3.3 Real power reduction test where the EUT responds to over frequency

The manufacturer shall specify the response characteristics of the EUT real power reduction in response to over-frequency events

5.3.4 Real power increase test where the EUT responds to under frequency

The manufacturer shall specify the response characteristics of the EUT real power increase in response to under-frequency events.

IEEE Std 1547.1a (Mar. 2015 -- Amendment 1 to 1547.1)

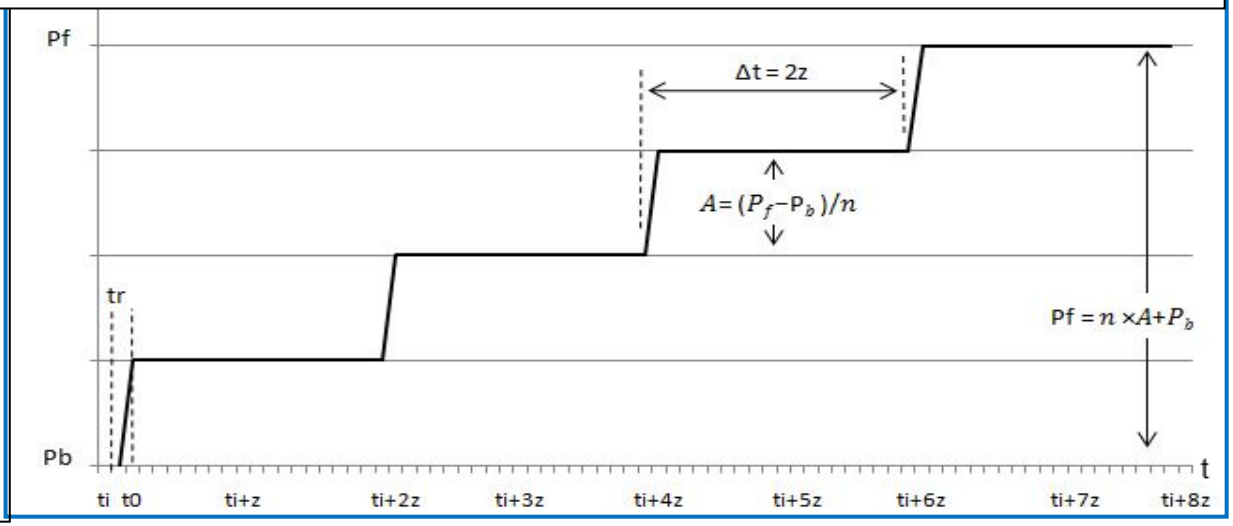
New type test …5.13 Voltage regulation … four categories of voltage regulation testing … each applicable to: static power inverters/converters, induction machines, and synchronous machines.

- Where the EUT responds to variations in voltage the manufacturer shall specify the response characteristics.
- Where the EUT responds to communicated settings the manufacturer shall specify the protocol, means of communications and the response characteristics.
- Where the EUT responds to a time schedule the manufacturer shall specify the response characteristics.
- Where the reactive power output of the EUT changes with respect to real power output, the manufacturer shall specify the response characteristics.

New annex for: 5.3 Real power variation test (over/under frequency)

P1547.1a Annex A. 5 Power variation test
(step-wise ramp function) – general

Figure A.6 -- *Graphical representation of power variation test -- using step-wise ramp function with n = 4*



IEEE P1547 (Full Revision) Project

Approved by the IEEE SASB on March 27, 2014

Title: Draft Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces.

Scope: This standard establishes criteria and requirements for interconnection of distributed energy resources (DER) with electric power systems (EPS), and associated interfaces.*

Purpose: This document provides a uniform standard for the interconnection and interoperability of distributed energy resources (DER) with electric power systems (EPS). It provides requirements relevant to the interconnection and interoperability performance, operation, and testing, and, safety, maintenance and security considerations.

Note: Interfaces and interoperability and related terms are defined and described in IEEE Std 2030

Std P1547 Full Revision: Example Works in Progress

Updates to many 1547 (2003) requirements, and new requirements, e.g.,

Voltage regulation:

Reactive Power Capability of the DER

… capable of injecting and absorbing minimum reactive power …

Voltage and Reactive Power Control

… capabilities of modes of reactive power control functions:
Power factor; Volt-Var; Active-power power-factor; Reactive power

Voltage & Frequency Ride Through: **3 classes (parameter ranges)**

Power Quality/Harmonics

Unintentional islanding

Interoperability Requirements

Special Interconnection Requirements: e.g.,

- Distribution Secondary Networks
- Energy Storage;
- Islanding/Microgrids.

IEEE P1547: Getting Involved

http://grouper.ieee.org/groups/scc21/1547_revision/1547revision_index.html
(next meeting Oct 27 – 29, 2015 – see listserv)

- FIRST, Sign up for P1547 ListServ
- NEXT, Meet Requirements for Working Group Membership
- CDT (Central DeskTop) Invitation sent to New Members
- Then, Identify yourself to Folder Subgroup Leads to get connected and involved in specific Folder subgroup for notices of activity and participation

P1547 Chair Tom Basso – National Renewable Energy Lab

P1547 Secretary/Treasurer Charlie Vartanian – Mitsubishi Electric Power Production, Inc.

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