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IEEE Standard for Terminology and Test Methods for Circuit Probes

IEEE Instrumentation and Measurement Society

Sponsored by the

Waveform Generation, Measurement, and Analysis Technical Committee

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New York, NY 10016-5997
USA

IEEE Std 1696™-2013

IEEE Standard for Terminology and Test Methods for Circuit Probes

Sponsor

Waveform Generation, Measurement, and Analysis Technical Committee
of the
IEEE Instrumentation and Measurement Society

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IEEE-SA Standards Board

Abstract: Currently, no defined, industry-accepted method exists for characterizing the performance of electrical circuit probes. Each vendor has its own proprietary methods for characterization, leaving probe customers and users without a valid means of comparing probe performance and/or of understanding the circuit-loading effect of the probe. Methods for measuring parameters indicative of a probe's or probe system's performance and guidance on the design and use of a test fixture for measuring probe performance are provided by this standard. An industry-accepted, unbiased means for characterizing probe performance is given by these methods. High-impedance voltage probes that are used to measure the performance of electrical circuits are considered by this standard. The probe systems may include waveform acquisition hardware and software and signal/waveform analysis software. The probe will include the mechanism by which the circuit is contacted. This method and standard will be applicable to all individual probes having one signal conductor and one ground conductor or two signal conductors, and having an input impedance at least five times greater than the impedance of the circuit under test.

Keywords: common mode, frequency response, gain, IEEE 1696™, input resistance, linearity, offset error, offset range, probe, probe-only, probe system, scattering parameters, test fixture, text methods, time response, transfer function

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Introduction

This introduction is not part of IEEE Std 1696-2013, IEEE Standard for Terminology and Test Methods for Circuit Probes.

This standard defines the terms, definitions, and test methods used to specify, characterize, and test circuit probes. It is intended for the following:

— Individuals and organizations who specify circuit probes to be purchased

— Individuals and organizations who purchase circuit probes to be used to make measurements

— Individuals and organizations whose responsibility is to characterize and write reports on circuit probes available for use in specific applications

— Suppliers interested in providing high-quality and high-performance circuit probes to acquirers

This standard is designed to help organizations and individuals do the following:

— Incorporate quality considerations during the definition, evaluation, selection, and acceptance of supplier circuit probes for operational measurements

— Determine how supplier circuit probes should be evaluated, tested, and accepted for delivery to end users

This standard is intended to satisfy the following objectives:

— Provide useful practices on evaluating and qualifying circuit probes

— Assist individuals and organizations judging the quality and suitability of circuit probes for referral to end users

IEEE Std 1696™-2013 is intended to focus specifically on terms and definitions, as well as on test methods for a wide range of probe applications.

Contents

IEEE Standard for Terminology and Test Methods for Circuit Probes

1. Overview

Currently, no defined, industry-accepted method exists for characterizing the performance of electrical circuit probes. Each vendor has its own proprietary methods for characterization, leaving probe customers and users without a valid means of comparing probe performance and/or of understanding the circuit-loading effect of the probe. This method or these methods developed will provide an industry-accepted, unbiased means for characterizing probe performance.

1.1 Scope

This standard provides test method(s) and describes transfer (artifact) standards for characterizing electrical circuit probes and probes systems. The systems may include waveform acquisition hardware and software and signal/waveform analysis software. The probe includes the mechanism by which the circuit is contacted. This method and standard applies to all individual probes having one signal conductor and one ground conductor or two signal conductors, and having an input impedance greater than the impedance of the circuit under test.

1.2 Circuit probe background

A circuit probe is a device used to connect electronic test equipment (digital oscilloscope, sampling oscilloscope, network analyzer, etc.) to a device or circuit to be measured. There are many different types of circuit probes, ranging from simple low-frequency passive probes to complex high-frequency active probes.