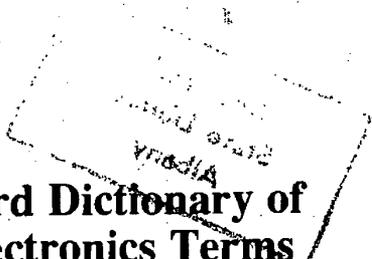


IEEE Std 100-1996



# The IEEE Standard Dictionary of Electrical and Electronics Terms

Sixth Edition

Standards Coordinating Committee 10, Terms and Definitions  
Jane Radatz, Chair

This standard is one of a number of information technology dictionaries being developed by standards organizations accredited by the American National Standards Institute. This dictionary was developed under the sponsorship of voluntary standards organizations, using a consensus-based process.

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## Introduction

Since the first edition in 1941 of the American Standard Definitions of Electrical Terms, the work now known as IEEE Std 100, The IEEE Standard Dictionary of Electrical and Electronics Terms, has evolved into the unique compendium of terms that it is today.

The current edition includes all terms defined in approved IEEE standards through December 1996. Terms are categorized by their technical subject area. They are also associated with the standards or publications in which they currently appear. In some cases, terms from withdrawn standards are included when no current source can be found. Earlier editions of IEEE Std 100 included terms from sources other than IEEE standards, such as technical journals, books, or conference proceedings. These terms have been maintained for the sake of consistency and their sources are listed with the standards in the back of the book.

The practice of defining terms varies from standard to standard. Many working groups that write standards prefer to work with existing definitions, while others choose to write their own. Thus terms may have several similar, although not identical, definitions. Definitions have been combined wherever it has been possible to do so by making only minor editorial changes. Otherwise, they have been left as written in the original standard.

Users of IEEE Std 100 occasionally comment on the surprising omission of a particular term commonly used in an electrical or electronics field. This occurs because the terms in IEEE Std 100 represent only those defined in the existing or past body of IEEE standards. To respond to this, some working groups obtain authorization to create a glossary of terms used in their field. All existing, approved standard glossaries have been incorporated into this edition of IEEE Std 100, including the most current glossaries of terms for computers and power engineering.

IEEE working groups are encouraged to refer to IEEE Std 100 when developing new or revised standards to avoid redundancy. They are also encouraged to investigate deficiencies in standard terms and create standard glossaries to alleviate them.

The sponsoring body for this document was Standards Coordinating Committee 10 on Definitions (SCC10), which consisted of the following members:

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Assistance was provided by the IEEE Standards editorial staff.

## How to use this dictionary

The terms defined in this dictionary are listed in *letter-by-letter* alphabetical order. Spaces are ignored in this style of alphabetization, so *cable value* will come before *cab signal*. Descriptive categories associated with the term in earlier editions of IEEE Std 100 will follow the term in parentheses. New categories appear after the definitions (see Categories, below), followed by the designation of the standard or standards that include the definition. If a standard designation is followed by the letter s, it means that edition of the standard was superseded by a newer revision and the term was not included in the revision. If a designation is followed by the letter w, it means that edition of the standard was withdrawn and not replaced by a revision. A bracketed number refers to the non-IEEE standard sources given in the back of the book.

Acronyms and abbreviations are no longer listed in a separate section in the dictionary; rather, they are incorporated alphabetically with other terms. Each acronym or abbreviation refers to its expanded term, where it is defined. Acronyms and abbreviations for which no definition was included in past editions have been deleted from this edition of IEEE Std 100.

Abstracts of the current set of approved IEEE standards are provided in the back of the book. It should be noted that updated information about IEEE standards can be obtained at any time from the IEEE Standards World Wide Web site at <http://standards.ieee.org/>.

## Categories

The category abbreviations that are used in this edition of IEEE Std 100 are defined below. This information is provided to help elucidate the context of the definition. Older terms for which no category could be found have had the category "Std100" assigned to them. Note that terms from sources other than IEEE standards, such as the National Electrical Code® (NEC®) or the National Fire Protection Association, may not be from the most recent editions; the reader is cautioned to check the latest editions of all sources for the most up-to-date terminology.

**transfer trip** A form of remote trip in which a communication channel is used to transmit a trip signal from the relay location to a remote location (PE/SWG) C37.100-1992

**transform analysis** A software development technique in which the structure of a system is derived from analyzing the flow of data through the system and the transformations that must be performed on the data. *Synonyms:* transform-centered design; transformation analysis. *See also:* data structure-centered design; input-process-output; modular decomposition; object-oriented design; rapid prototyping; stepwise refinement; structured design; transaction analysis.

(C) 610.12-1990

**transformation** A segment attribute that determines the translation, scaling, and rotation applied to a segment when it is displayed on a display surface. (C) 610.6-1991

**transformation analysis** *See:* transform analysis.

**transformation function** A mapping function that performs graphical coordinate transformations such as scaling, rotation, and translation. (C) 610.6-1991

**transform-centered design** *See:* transform analysis.

**transformer (1)** A device, which when used, will raise or lower the voltage of alternating current of the original source.

(NEC/NESC) [86]

(2) **(power and distribution transformers)** A static electric device consisting of a winding, or two or more coupled windings, with or without a magnetic core, for introducing mutual coupling between electric circuits. Transformers are extensively used in electric power systems to transfer power by electromagnetic induction between circuits at the same frequency, usually with changed values of voltage and current.

(PE) C57.12.80-1978r

(3) **(failure data for power transformers and shunt reactors)** A static electric device consisting of a winding, or two or more coupled windings, with or without a magnetic core, for introducing mutual coupling between electric circuits. *Note:* The transformer includes all transformer-related components, such as bushings, LTCs, fans, temperature gauges, etc, and excludes all system-related components, such as surge arresters, grounding resistors, high voltage switches, low-voltage switches, and house service equipment.

(PE) C57.117-1986r

(4) An inductive electrical device which uses electromagnetic energy to transform voltage and current levels within a circuit.

(C) 610.10-1994

(5) *See also:* dry-type encapsulated water-cooled transformer; dry-type transformer; liquid-filled, or liquid-cooled transformer; transformer coupled.

(IA) 668-1987w

**transformer, alternating-current arc welder** A transformer with isolated primary and secondary windings and suitable stabilizing, regulating, and indicating devices required for transforming alternating current from normal supply voltages to an alternating-current output suitable for arc welding.

(EEC) [91]

**transformer category definitions (distribution, power and regulating transformers)** *Note:* All kVA ratings are minimum nameplate kVA for the principal windings. Category I includes distribution transformers manufactured in accordance with ANSI C57.12.20-1974, Requirements for Overhead-Type Distribution Transformers 67 000 Volts and Below; 500 kVA and Smaller, up through 500 kVA, single phase or three phase. In addition, autotransformers of 500 equivalent two-winding kVA or less that are manufactured as distribution transformers in accordance with ANSI C57.12.20-1974 are included in Category I, even through their nameplate kVAs may exceed 500.

(PE) C57.12.00-1987s

**transformer class designations** *See:* transformer, oil-immersed.

**transformer, constant-voltage** *See:* constant-voltage transformer.

**transformer correction factor (TCF)** The ratio of the true watts or watthours to the measured secondary watts or watt-

hours, divided by the marked ratio. *Note:* The transformer correction factor for a current or voltage transformer is the ratio correction factor multiplied by the phase angle correction factor for a specified primary circuit power factor. The true primary watts or watthours are equal to the watts or watthours measured, multiplied by the transformer correction factor and the marked ratio. The true primary watts or watthours, when measured using both current and voltage transformers, are equal to the current transformer ratio correction factor multiplied by the voltage transformer ratio correction factor multiplied by the marked ratios of the current and voltage transformers multiplied by the observed watts or watthours. It is usually sufficiently accurate to calculate true watts or watthours as equal to the product of the two transformer correction factors multiplied by the marked ratios multiplied by the observed watts or watthours.

(PE) [57], C57.12.80-1978r, C57.13-1993

**transformer coupled** (electrical heating applications to melting furnaces and hearths in the glass industry) The power modulation device is connected in the primary circuit of a transformer whose secondary circuit is connected to the glass.

(IA) 668-1987w

**transformer, dry-type** *See:* dry-type transformer.

**transformer, energy-limiting** A transformer that is intended for use on an approximately constant-voltage supply circuit and that has sufficient inherent impedance to limit the output current to a thermally safe maximum value. *See also:* transformer, specialty.

(PE) [57]

**transformer equipment rating** A volt-ampere output together with any other characteristics, such as voltage, current, frequency, and power factor, assigned to it by the manufacturer. *Note:* It is regarded as a test rating that defines an output that can be taken from the item of transformer equipment without exceeding established temperature-rise limitations, under prescribed conditions of test and within the limitations of established standards. *See also:* duty.

(PE) [57]

**transformer, grounding** *See:* grounding transformer.

**transformer, grounding switch and gap (capacitance potential devices)** Consists of a protective gap connected across the capacitance potential device and transformer unit to limit the voltage impressed on the transformer and the auxiliary or shunt capacitor, when used; and a switch that when closed removes voltage from the potential device to permit adjustment of the potential device without interrupting high-voltage line operation and carrier-current operation when used. *See also:* outdoor coupling capacitor.

(PE) 43-1974r

**transformer, group-series loop insulating** An insulating transformer whose secondary is arranged to operate a group of series lamps and/or a series group of individual-lamp transformers. *See also:* transformer, specialty.

(PE) [57]

**transformer, high-power-factor** A high-reactance transformer that has a power-factor-correcting device such as a capacitor, so that the input current is at a power factor of not less than 90% when the transformer delivers rated current to its intended load device. *See also:* transformer, specialty.

(PE) [116]

**transformer, high-reactance (1) (output limiting)** An energy-limiting transformer that has sufficient inherent reactance to limit the output current to a maximum value. *See also:* transformer, specialty.

(PE) [57]

(2) **(secondary short-circuit current rating)** The current in the secondary winding when the primary winding is connected to a circuit of rated primary voltage and frequency and when the secondary terminals are short-circuited. *See also:* transformer, specialty.

(PE) [57]

(3) **(kilovolt-ampere or voltampere short-circuit input rating)** The input kilovolt-amperes or volt-amperes at rated primary voltage with the secondary terminals short-circuited. *See also:* transformer, specialty.

(PE) [57]

**transformer, ideal** A hypothetical transformer that neither stores nor dissipates energy. *Note:* An ideal transformer has the following properties: Its self and mutual impedances are