

IEEE 100
The Authoritative Dictionary of
IEEE Standards Terms

Seventh Edition

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CHICAGO OFFICE

03-14-100 1750 RC10



Published by
Standards Information Network
IEEE Press

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3 Park Avenue, New York, NY, 10016-5997, USA*

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To order IEEE Press publications, call 1-800-678-IEEE.

Print: ISBN 0-7381-2601-2

SP1122

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Library of Congress Cataloging-in-Publication Data

IEEE 100 : the authoritative dictionary of IEEE standards terms.—7th ed.
p. cm.

ISBN 0-7381-2601-2 (paperback : alk. paper)

1. Electric engineering—Dictionaries. 2. Electronics—Dictionaries. 3. Computer engineering—Dictionaries. 4. Electric engineering—Acronyms. 5. Electronics—Acronyms. 6. Computer engineering—Acronyms. I. Institute of Electrical and Electronics Engineers.

TK9 .I28 2000
621.3'03—dc21

00-050601

contrast rendition factor (illuminating engineering) The ratio of visual task contrast with a given lighting environment to the contrast with sphere illumination. (EEC/IE) [126]

contrast sensitivity (illuminating engineering) The ability to detect the presence of luminance differences. Quantitatively, it is equal to the reciprocal of the brightness contrast threshold. *See also:* brightness contrast threshold. (EEC/IE) [126]

contrast stretching An image enhancement technique in which the contrast between image subsets and their complements is increased. (C) 610.4-1990w

contrast transfer function square-wave response (diode-type camera tube) The contrast transfer function or CTF represents the response of the imaging system in the spatial frequency domain to a square-wave input. A bar pattern represents a one-dimensional input to a two-dimensional imaging sensor. CTF is synonymous with the square-wave amplitude response, R_{sq} (N). (ED) 503-1978w

contravariance A rule governing the overriding of a property and requiring that the set of values acceptable for an input argument in the overriding property shall be a superset (includes the same set) of the set of values acceptable for that input argument in the overridden property, and the set of values acceptable for an output argument in the overriding property shall be a subset (includes the same set) of the set of values acceptable for that output argument in the overridden property. (C/SE) 1320.2-1998

contributing cause A cause that, of itself, may not result in failure. (SWG/PE) C37.10-1995

control (1) (A) (electronic computation) Usually, those parts of a digital computer that effect the carrying out of instructions in proper sequence, the interpretation of each instruction, and the application of the proper signals to the arithmetic unit and other parts in accordance with this interpretation. (B) **(electronic computation)** In some business applications of mathematics, a mathematical check. (C) 162-1963

(2) **(cryotron)** An input element of a cryotron. (ED) [46]

(3) **(packaging machinery)** A device or group of devices that serves to govern in some predetermined manner the electric power delivered to the apparatus to which it is connected. (IA/PKG) 333-1980w

(4) **(electric power systems in commercial buildings)** Any device used for regulation of a system or component. (IA/PSE) 241-1990r

(5) **(overhead power lines)** In experiments, establishment of an untreated group of animals, plants, cells, etc., that serve as the basis for comparing responses of a similar, but treated, group that has been subjected (exposed) to some agent (i.e., an electric field). (T&D/PE) 539-1990

(6) A visual user interface element that is defined by IEEE Std 1295-1993. (C) 1295-1993w

(7) The execution of a system change by manual means, remote means, automatic means, or partially automatic means. (SWG/PE/SUB) C37.100-1992, C37.1-1987s

(8) In an IDEF0 model, a condition or set of conditions required for a function to produce correct output. (C/SE) 1320.1-1998

control accuracy The degree of correspondence between the final value and the ideal value of the directly controlled variable. *See also:* feedback control system. (IA/ICTL/IAC) [60]

control action (automatic control) Of a control element or a controlling system, the nature of change of the output effected by the input. *Note:* The output may be a signal or the value of a manipulated variable. The input may be the control loop feedback signal when the command is constant, an actuating signal, or the output of another control element. One use of control action is to effect compensation. *See also:* compensation. (PE/EDPG) [3]

control acquisition (1) The total of all bus activity associated with acquiring exclusive control of the bus by a module. (C/BA) 896.3-1993w

(2) The total of all bus activity associated with acquiring exclusive control of the bus. (C/BA) 10857-1994, 896.4-1993w

control action, derivative *See:* derivative control action.

control action, proportional (1) Control action in which there is a continuous linear relation between the output and the input. *Note:* This condition applies when both the output and input are within their normal operating ranges. (IA/ICTL/IAC) [60]

(2) **(automatic control)** Action in which there is a linear relation between the output and the input of the controller. *Note:* The ratio of the change in output produced by the proportional control action to the change in input is defined as the proportional gain. (PE/PSE) 94-1970w

control action, proportional plus derivative Control action in which the output is proportional to a linear combination of the input and the time rate-of-change of input. *Note:* In the practical embodiment of proportional plus derivative control action the relationship between output and input, neglecting high frequency terms, is

$$\frac{Y}{X} = \pm P \frac{\frac{I}{s} + 1 + Ds}{\frac{bI}{s} + 1 + \frac{Ds}{a}} \quad \begin{matrix} a > 1 \\ 0 \leq b \ll 1 \end{matrix}$$

where

a = derivative action gain

D = derivative action time constant

P = proportional gain

s = complex variable

X = input transform

Y = output transform

Synonym: P.D. (CS/PE/EDPG) [3]

control action, proportional plus integral *See:* proportional plus integral control action.

control action, proportional plus integral plus derivative *See:* proportional plus integral plus derivative control action.

control and instrumentation cables (cable systems in substations) Insulated electrical conductors utilized to convey information or to intermittently operate devices controlling power switching or conversion equipment. The cross-sectional areas of the conductors are generally No. 6 American Wire Gage (AWG) or smaller, and the duty cycle is such that conductor heating is insignificant. 382

control and status register (CSR) (1) A memory-mapped register that is accessed through read and write transactions and is used to observe the state of a node or to control its operation. (C/BA) 896.9-1994w

(2) A register used to control the operation of a device and/or record the status of an operation. It is accessible through a separate address space in a FASTBUS device. CSR#0, mandatory for all devices, contains the manufacturer's ID for the device and a number of device status bits as well as some user-defined bits. (NID) 960-1993

(3) A register, storage location, or address that is used to control buses, interconnects, and multiple processor systems. (C/BA) 14536-1995

control and status registers (CSR) A set of registers, storage locations, and addresses that are used to control buses, interconnects, and multiple processor systems. (C/BA) 896.5-1993s

control and status register space (FASTBUS acquisition and control) A FASTBUS primary address cycle may specify with a code on the mode select (MS) control lines one of two separate address spaces in a device; CSR space and data space. CSR space contains registers for control of and status reporting registers for the device. Its allocation and usage is part of the FASTBUS specification. *Synonym:* CSR space. *See also:* data space. (NID) 960-1986s

control apparatus A set of control devices used to accomplish the intended control functions. *See also:* control. (IA/IAC) [60]

controlled-speed axle generator An axle generator in which the speed of the generator is maintained approximately constant at all vehicle speeds above a predetermined minimum. *See also:* axle-generator system. (EEC/PE) [119]

controlled system (automatic control) The apparatus, equipment, or machine used to effect changes in the value of the ultimately controlled variable. *See also:* control system. (PE/EDPG) [3]

controlled vented power fuse (installations and equipment operating at over 600 volts, nominal) A fuse with provision for controlling discharge circuit interruption such that no solid material may be exhausted into the surrounding atmosphere. The discharge gases shall not unite or damage insulation in the path of the discharge nor shall these gases propagate a flashover to or between grounded members or conduction members in the path of the discharge when the distance between the vent and such insulation or conduction members conforms to manufacturer's recommendations.

(NESC/NEC) [86]

controller (1) (electric pipe heating systems) A device that regulates the state of a system by comparing a signal from a sensor located in the system with a predetermined value and adjusting its output to achieve the predetermined value. Controllers, as used in electric pipe heating systems, regulate temperatures on the system and can be referred to as temperature controllers or thermostats. Controller sensors can be mechanical (bulb, bimetallic) or electrical (thermocouple, resistance-temperature detector [RTD] thermistor).

(PE/EDPG) 622A-1984r, 622B-1988r

(2) A device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected. (NESC/NEC) [86]

(3) **(packaging machinery)** A device or group of devices that serves to control in some predetermined manner the apparatus to which it is connected. (IA/PKG) 333-1980w

(4) The component of a system that functions as the system controller. A controller typically sends program messages to and receives response messages from devices.

(IM/AIN) 488.2-1992r

(5) (A) A functional unit in a computer system that controls one or more units of the peripheral equipment. *Synonym:* peripheral control unit. *See also:* input-output controller; dual-channel controller. (B) In robotics, a processor that takes as input desired and measured position, velocity or other pertinent variables and whose output is a drive signal to a controlling motor or activator. (C) A device through which one can introduce commands to a control system.

(C) 610.10-1994

(6) The entity that initiates RamLink transactions. There is exactly one controller on each RamLink ringlet.

(C/MM) 1596.4-1996

(7) A device or group of devices used to control in a predetermined manner the electric power delivered to the apparatus to which it is connected. (IA/MT) 45-1998

(8) **(CAMAC system)** *See also:* CAMAC crate.

(9) *See also:* SBus Controller. (C/BA) 1496-1993w

Controller *See:* SBus Controller.

controller, automatic *See:* automatic controller.

controller characteristics (thyristor) The electrical characteristics of an ac power controller measured or observed at its input or output terminal. (IA/IPC) 428-1981w

controller current (thyristor) The current flowing through the terminals of the controller. (IA/IPC) 428-1981w

controller diagram (electric-power devices) A diagram that shows the electric connections between the parts comprising the controller and that shows the external connections.

(IA/IAC) 270-1966w, [60]

controller equipment (thyristor) An operative unit for ac power control comprising one or more thyristor assemblies together with any input or output transformers, filters, other switching devices and auxiliaries required by the thyristor ac power controller to function. (IA/IPC) 428-1981w

controller faults (thyristor) A fault condition exists if the conduction cycles of some semiconductors are abnormal.

(IA/IPC) 428-1981w

controller ON-state interval (thyristor) The time interval in which the controller conducts. *Note:* It is assumed that the starting instant of the controller ON-state interval is coincident with the starting instant of the trigger pulse.

(IA/IPC) 428-1981w

controller power transformer (thyristor) A transformer within the controller employed to provide isolation or the transformation of voltage or current, or both.

(IA/IPC) 428-1981w

controller section (thyristor) That part of a controller circuit containing the basic control elements necessary for controlling the load voltage.

(IA/IPC) 428-1981w

controller, self-operated *See:* self-operated controller.

controllers for steel-mill accessory machines Controllers for machines that are not used directly in the processing of steel, such as pumps, machine tools, etc. *See also:* electric controller.

(IA/IAC) [60]

controllers for steel-mill auxiliaries Controllers for machines that are used directly in the processing of steel, such as screw-downs and manipulators but not cranes and main rolling drives. *See also:* electric controller.

(IA/IAC) [60]

controller, time schedule *See:* time schedule controller.

control line The line, connected to the memory transistor control element, that provides the reference voltage to the memory cell during a read and may provide a high voltage during a write cycle.

(ED) 1005-1998

controlling element, final *See:* final controlling element.

controlling elements The functional components of a controlling system. *See also:* feedback control system.

(IM/PE/EDPG) [120], [3]

controlling elements, forward *See:* forward controlling elements.

controlling means (of an automatic control system) Consists of those elements that are involved in producing a corrective action.

(PE/PSE) 94-1970w

controlling section A length of track consisting of one or more track circuit sections, by means of which the roadway elements or the device that governs approach to or movement within a block are controlled.

(EEC/PE) [119]

controlling system (1) (automatic control system without feedback) That portion of the control system that manipulates the controlled system.

(IM/PE/EDPG) [120], [3]

(2) **(control system feedback)** The portion that compares functions of a directly controlled variable and a command and adjusts a manipulated variable as a function of the difference. *Note:* It includes the reference input elements; summing point; forward and final controlling elements; and feedback elements. *See also:* feedback control system.

(IM/PE/EDPG) [120], [3]

controlling voltage, composite *See:* composite controlling voltage.

control loopback Loopback of output from one function to be control for another function in the same diagram. *Synonym:* feedback.

(C/SE) 1320.1-1998

control machine (A) (railroad practice) An assemblage of manually operated levers or other devices for the control of signals, switches, or other units, without mechanical interlocking, usually including a track diagram with indication lights. *See also:* car retarder. (B) **(railroad practice)** A group of levers or equivalent devices used to operate the various mechanisms and signals that constitute the car retarder installation. *See also:* centralized traffic-control system; car retarder.

(EEC/PE) [119]

control, manual *See:* manual control.

control mechanism (control systems for steam turbine-generator units) Includes all systems, devices, and mechanisms between a controller and the controlled valves.

(PE/EDPG) 122-1985s