

Racktivity “Everything Power” Glossary

AC Alternating Current. AC current is a waveform that regularly reverses in positive and negative directions. The U.S.A. electrical power alternates 60 times per second (60 Hz). Europe and other countries have standardized on 50 Hz.

AMPERE (or AMP) A unit of electrical current or rate of flow of electrons. One volt across one ohm of resistance causes a current flow of one ampere. A flow of one coulomb per second equals one ampere.

APPARENT POWER The product of voltage and current in a circuit.

ATTENUATION The reduction of a signal from one point to another. For an electrical surge, attenuation refers to the reduction of an incoming surge by a limiter (attenuator). Wire resistance, arresters, and power conditioners attenuate surges to varying degrees.

AWG American Wire Gauge. This term refers to the U.S. standard for wire size.

AUTOTRANSFORMER A transformer used to step voltage up or down. Because its primary and secondary windings share common turns, it does not provide isolation.

AUXILIARY SOURCE A power source dedicated to providing emergency power to a critical load when commercial power is interrupted.

BALANCED LOAD An alternating current power system consisting of more than two current-carrying conductors in which these conductors all carry the same current.

BATTERY A collection of cells, grouped together to provide higher voltage and/or higher current than a single cell.

BLACKOUT Total loss of commercial power for an extended period of time (greater than a second or so in duration).

BRANCH CIRCUIT A division of a load circuit with current limited by a fuse or circuit breaker.

BREAK-BEFORE-MAKE Operational sequence of a switch or relay where the existing connection is opened prior to making the new connection.

BROWNOUT An reduction of voltage by a utility or its transmission components in response to a power demand in excess of its generation capability. Nominal intentional reductions are 3, 5, or 8 percent. Unintentional brownouts can be any size.

BUILDING SERVICE ENTRY The point where commercial power enters the building and which is used to measure raw consumption for analytics purposes, when calculating such performance indicators as PUE or DCeP.

BUSBAR A heavy, rigid conductor used for feeders.

CAPACITIVE REACTANCE The behavior of alternating current as it interacts with capacitance encountered in a circuit.

CAPACITOR A device consisting of two conducting surfaces separated by an insulating material or dielectric. A capacitor stores electrical energy, blocks the flow of direct current, and permits the flow of alternating current to a degree dependent essentially on the capacitance and frequency.

CIRCUIT BREAKER A resettable device that responds to a preset excess of current flow by opening the circuit thereby preventing damage to circuit elements.

CLAMP-ON CT A current transformer which clamps around a current-carrying conductor so the conductor does not have to be opened for insertion of the transformer primary. Particularly suited for monitoring when current must be sensed at many points for relatively short periods.

COMMON MODE (CM) The term refers to electrical interference which is measurable as a ground referenced signal. In true common mode a signal is common to both the current carrying conductors.

COMMON MODE NOISE Abnormal signals that appear between a current carrying line and its associated ground.

CSA The abbreviation which stands for Canadian Standards Association. This is a Canadian safety assurance agency similar to Underwriter's Laboratories. Safety assurance.

CURRENT The flow of electricity in a circuit as expressed in Amperes. Current refers to the quantity or intensity of electrical flow. In contrast, Voltage on the other hand refers to the pressure or force causing the electrical flow.

CURRENT BALANCE A term that describes the nearly equal flow of current on each leg of a three phase power system. With this flow balanced the theoretical flow of current in the neutral with respect to ground will be zero.

CYCLES PER SECOND This term describes the frequency of alternating current. Frequency is more properly described using the term Hertz (Hz) which is synonymous with cycles per second.

DELTA A method of connecting a three-phase source (or load) in a closed series loop with the input (or output) connections made to each of the three junctions.

DELTA-DELTA The connection between a delta source and a delta load.

DELTA-WYE The connection between a delta source and a wye load.

DIRECT CURRENT (DC) Current which flows in only one direction.

DROPOUT A discrete voltage loss. A voltage sag (complete or partial) for a very short period of time (milliseconds) constitutes a dropout.

EARTH GROUND A low impedance path to earth for the purpose of discharging lightning, static, and radiated energy, and to maintain the main service entrance at earth potential.

EARTHING ELECTRODE A grounding electrode, water pipe, or building steel, or some combination of these, used for establishing a building's earth ground.

EFFICIENCY The ratio of the output to input power times 100, expressed as a percentage. Efficiency = $(P_{out}/P_{in}) \times 100$.

ELECTROMAGNETIC A magnetic field cause by an electric current. Power lines cause electromagnetic fields that can interfere with nearby data cables.

ELECTROMECHANICAL A mechanical device which is controlled by an electric device. Solenoids and shunt trip circuit breakers are examples of electromechanical devices.

ELECTROSTATIC A potential difference (electric charge) measurable between two points which is caused by the distribution of dissimilar static charge along the points. The voltage level is usually in kilovolts.

EMF Electromotive Force or voltage.

EMI Electromagnetic interference. A term that describes electrically induced noise or transients.

ESD Electrostatic Discharge (static electricity). The effects of a static discharge can range from simple skin irritation for an individual to degraded or destroyed semiconductor junctions for an electronic device.

FEEDERS Transmission lines supplying power to a distribution system.

FLUCTUATION A surge or sag in voltage amplitude, often caused by load switching or fault clearing.

FREQUENCY The number of complete cycles of sinusoidal variation per unit time. For AC power lines, the most widely used frequencies are 60 and 50 hertz (Hz).

GAUGE The term used to refer to wire thickness. The smaller the Gauge number, the HIGHER the current carrying capabilities. Also referred to as AWG

GROUND A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conducting body that serves in place of the earth.

GROUND LOOP The condition of having two or more ground references in a common system. When two or more grounds have a potential difference between them, current can

flow. This flow of current is a new circuit or loop which can interfere with the normal operation of the system.

GROUND FAULT Any undesirable current path from a point of differing potential to ground.

GROUNDING Connected to earth or to some conducting body that serves in place of the earth.

HARMONIC A sinusoidal component of an AC voltage that is a multiple of the fundamental waveform frequency.

HARMONIC DISTORTION The presence of harmonics which change an AC waveform from sinusoidal to complex. This can cause overheating of circuit elements and might appear to a device as data corrupting noise.

HARMONIC NEUTRALIZATION A cancellation process: harmonics at the output of a circuit are inverted and fed back in their opposite phase.

HERTZ (Hz) Unit of frequency, one hertz (Hz) equals one cycle per second.

HV Shorthand for High voltage.

I²R The expression of power resulting from the flow of current through a resistance: $P = I^2R$. P = Power I = Current R = Resistance

IMPEDANCE The total opposition (i.e., resistance and reactance) a circuit offers to the flow of alternating current at a given frequency.

INDUCTANCE The ability of a coil to store energy and oppose changes in current flowing through it. A function of the cross sectional area, number of turns of coil, length of coil, and core material.

INDUCTIVE REACTANCE A term used to describe the impedance to alternating current offered by an inductive circuit.

INDUCTOR A conductor, usually coiled, which tends to oppose any change in the flow of current through itself.

INRUSH CURRENT The initial surge of current required by a load before resistance or impedance increases to its normal operating value.

INVERTER A device used to convert DC current to AC current. Common used in modern power supplies and in high quality UPS systems.

JOULE A unit of energy. One joule equals one watt/second.

KILO (k) A metric prefix meaning 1000 or 10^3 .

kVA Kilovolt amperes; apparent power.

kW Kilowatts; real power delivered to a load.

LINE A term used generally to describe a current carrying conductor.

LINE TO LINE A term used to describe a given condition between conductors of a multiphase feeder.

LINE TO NEUTRAL A term used to describe a given condition between a phase conductor and a neutral conductor.

LINEAR LOAD Those electrical loads in which the impedance is constant regardless of the voltage, so that if the voltage is sinusoidal the current drawn will also be sinusoidal.

LINE IMBALANCE Unequal loads on the phase lines of a multiphase feeder.

MAIN SERVICE ENTRANCE The enclosure containing connection panels and switchgear, located at the point where the utility power lines enter a building.

MTBF, MEAN TIME BETWEEN FAILURE A statistical estimate of the time a component, subassembly, or operating unit will operate before failure will occur.

MTTR, MEAN TIME TO REPAIR A statistical estimate of the repair time for a failed item.

NEUTRAL Conductor used as the primary return path for current during normal operation of an electrical device. Also, the junction of the legs in a wye circuit.

NOISE An undesirable signal which is irregular yet oscillatory that is super imposed on the desired signal. See common mode noise and normal mode noise.

NONLINEAR LOAD Electrical loads in which the instantaneous current is not proportional to the instantaneous voltage, or, effectively, the load impedance varies with voltage.

OUTAGE An outage is a long-term power interruption. From the utility perspective, an outage occurs when a component of the distribution system is not available to provide its normal function (i.e., the generator cannot supply power). Normally, utility companies do not include short power interruptions (grid switching) in their classification of outage history and also may only count power interruptions with a duration longer than 1 to 5 minutes.

OVERVOLTAGE A voltage greater than the rating of a device or component. Normally overvoltage refers to long term events (several AC cycles and longer). The term can also apply to transients and surges.

PDU, POWER DISTRIBUTION UNIT A portable electrical distribution device that provides an easily expandable and flexible electrical environment for a computer and its associated peripherals.

PEAK The maximum instantaneous measurement of an electrical event.

PEAK LINE CURRENT Maximum instantaneous current during a cycle.

PHASE A term used to describe the timing between two or more events tied to the same frequency.

PHASE BALANCING The practice of placing equal electrical loads on each leg of a three phase system.

PHASE ROTATION The sequence in which a comparable voltage appears in all three phases: A, B, and C, of a three phase system.

POWER A general term which means the capacity for doing work. In the electrical environment this is usually measured in watts.

POWER FACTOR The ratio of real power to apparent power. Power factor will be "leading" or "lagging" depending on which way the load shifts the current's phase with respect to the voltage's phase. Inductive loads cause current to lag behind voltage, while capacitive loads cause current to lead voltage.

POWER LINE MONITOR A measuring device which reports information on the changing conditions of electrical power.

PUE A performance indicator associated with data centers and used to describe the ratio of total power consumed over the amount of power doing useful work. (The Green Grid, 2007)

REACTANCE Opposition to the flow of alternating current. Capacitive reactance is the opposition offered by capacitors, and inductive reactance is the opposition offered by a coil or other inductance.

REAL POWER Also known as Watts

RMS Root Mean Square (RMS) is a calculation process for alternating current and voltage waveforms. The RMS calculation is intended to provide a measurement of an AC current that is equivalent to a comparable DC current.

RMS LINE CURRENT The square root of the average of the squares of all instantaneous current amplitudes occurring during a given cycle.

RMS LINE VOLTAGE The square root of the average of the squares of all instantaneous voltage amplitudes occurring during a given cycle.

SAFETY GROUND An alternate path of return current, during a fault condition, for the purpose of tripping a circuit breaker. Also, the means of establishing a load at earth level. NEC refers to it as equipment grounding conductor.

SAG A reduction in a voltage envelope. The duration is usually from one cycle to a few seconds. Usually, sags are caused by fault clearing or heavy load startup.

SINGLE PHASE That portion of a power source which represents only a single phase of the three phases that are available.

SINGLE POINT GROUND The practice of tying the power neutral ground and safety ground together at the same point avoiding differential ground potential between points in a system.

SINE WAVE A waveform which oscillates periodically with the amplitude of points on the waveform proportional to the sine of the phase angle of the point.

SUBSTATION Location where high voltage transmission lines connect to switchgear and step-down transformers to produce lower voltages at lower power levels for local distribution networks. Many times located on premise of large consumers of electricity.

SURGE A short-term positive change in amplitude of a voltage.

TOTAL HARMONIC DISTORTION (THD) The square root of the sum of the squares of the RMS harmonic voltages or currents divided by the RMS fundamental voltage or current. Can also be calculated in the same way for only even harmonics or odd harmonics.

TRANSIENT A high amplitude, short duration impulse superimposed on the normal voltage or current.

UL The abbreviation for Underwriters Laboratories, an independent United States product safety assurance agency. Typically required for electronic equipment in the USA.

VAC Volts of Alternating Current

VOLT (V) The unit of voltage or potential difference.

VOLT-AMPERE The unit of measurement of apparent power.

VOLTAGE REGULATOR A circuit that has a constant output voltage when input voltage fluctuates.

WATT (W) The unit of power. Equal to one joule per second.

WYE A wye connection refers to a polyphase electrical supply where the source transformer has the conductors connected to the terminals in a physical arrangement resembling a Y. Each point of the Y represents the connection of a hot conductor. The angular displacement between each point on the Y is 120 degrees. The center point is the common return point for the neutral conductor.