Minia University

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Defination

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BASIC ELECTRICAL DEFINITIONS

Accent Lighting - Directional lighting to emphasize a particular object or draw attention to a part of the field of view.

Accessible - (As applied to wiring methods) Capable of being removed or exposed without damaging the building structure or finish, or not permanently closed in by the structure or finish of the building.

Accessible - (as applied to equipment) Admitting close approach: not guarded by locked doors, elevation, or other effective means. (see Accessible, Readily)

Accessible, Readily - (Readily Accessible) Capable of being reached quickly for operation, renewal, or inspections, without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, chairs, etc.

Ambient Temperature - The temperature of the air, water, or surrounding earth. Conductor ampacity is corrected for changes in ambient temperature including temperatures below 86°F. The cooling effect can increase the current carrying capacity of the conductor. (Review Section 310-10 of the Electrical Code for more understanding)

Ammeter - An electric meter used to measure current, calibrated in amperes.

Ampacity - The current-carrying capacity of conductors or equipment, expressed in amperes.

Ampere - The basic unit measuring the quantity of electricity.

Anodizing - Any electrolytic or chemical process by which a protective or decorative film is released on a metal surface.

Apparent Power -The product of voltage and current in a circuit.

Arc -Sparking that results when undesirable current flows between two points of differing potential. This may be due to leakage through the intermediate insulation or a leakage path due to contamination.

Armature Coil -A winding that develops current output from a generator when its turns cut a magnetic flux.

Arrester -A nonlinear device to limit the amplitude of voltage on a power line. The term implies that the device stops overvoltage problems (i.e. lightning). In actuality, voltage clamp levels, response times and installation determine how much voltage can be removed by the operation of an arrester.

Asymmetric - Unequal distribution about one or more axes.

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, power conditioners attenuate surges to varying degrees.

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

Autotransformer -A transformer used to step voltage up or down. The primary and secondary windings share common turns, and it provides no isolation.

Auxiliary Source -A power source dedicated to providing emergency power to a critical load when commercial power is interrupted.

Ballast

- An auxiliary electrical device for fluorescent and other discharge light sources.

Bonding Jumper - A bare or insulated conductor used to ensure the required electrical conductivity between metal parts required to be electrically connected. Frequently used from a bonding bushing to the service equipment enclosure to provide a path around concentric knockouts in an enclosure wall: also used to bond one raceway to another.

BTU -British Thermal Unit. Energy required to raise one pound of water one degree Fahrenheit. One pound of water at 32 degrees F requires the transfer of 144 BTUs to freeze into solid ice.

Buck-Boost Transformer -A small, low voltage transformer placed in series with the power line to increase or reduce steady state voltage.

Busbar -A heavy, rigid conductor used for high voltage feeders.

Candlepower (or Candela) - Basic unit for measuring luminous intensity from a light source in a given direction.

Coefficient of Utilization - The amount of light (lumens) delivered in a workplace as a percent of the rated lumens of the lamp.

Cold Cathode Lamp - An electric-discharge lamp whose mode of operation is that of a glow discharge (Neon Lights).

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 Node Noise -An undesirable voltage which appears between the power conductors and ground.

Conduit -A tubular raceway for data or power cables. Metallic conduit is common, although non-metallic forms may also be used. A conduit may also be a path or duct and need to be tubular.

Continuity - The state of being whole, unbroken.

Continuous Load - A load where the maximum current is expected to continue for three hours or more. Rating of the branch circuit protection device shall not be less tan 125% of the continuous load.

Current -The movement of electrons through a conductor. Measured in amperes and its symbol is "I".

Current Transformer-(or CT) - A transformer used in instrumentation to assist in measuring current. It utilizes the strength of the magnetic field around the conductor to form an induced current that can then be applied across a resistance to form a proportional voltage.

Demand Factor - For an electrical system or feeder circuit, this is a ratio of the amount of connected load (in kV or amperes) that will be operating at the same time to the total amount of connected load on the circuit. An 80% demand factor, for instance, indicates that only 80% of the connected load on a circuit will ever be operating at the same time. Conductor capacity can be based on that amount of load.

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

Dustproof - Constructed or protected so that dust will not interfere with its successful operation.

Dust-tight - Constructed so that dust will not enter the enclosing case under specified test conditions.

Duty, continuous - A service requirement that demands operation at a substantially constant load for an indefinitely long time.

Duty, intermittent - A service requirement that demands operation for alternate intervals of load and no load, load and rest, or load, no load, and rest.

Duty, periodic - A type of intermittent duty in which the load conditions regularly reoccur.

Duty, short time - A requirement of service that demands operations at a substantially constant load for a short and definitely specified time.

Duty, varying - A requirement of service that demands operation at loads, and for intervals of time, both of which may be subject to wide variation.

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.

Efficiency -The percentage of input power available for used by the load. The mathematical formula is: **Efficiency = P_o/ P_i** Where "**P_o**" equals power output, "**P_i**" equals power input, and power is represented by watts.

Electrical Degrees- One cycle of AC. power is divided into 360 degrees. This allows mathematical relationships between the various aspects of electricity. Also, what the mothers of many liberal arts majors wish their daughters had married (or vice-versa)

Electromagnetic -A magnetic field cause by an electric current. Power lines cause electromagnetic fields which 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 if dissimilar static charge along the points. The voltage level is usually in kilovolts (volts times 1000).

EMF -Electromotive force or voltage

EMI, RFI -Acronyms for various types of electrical interference: electromagnetic interference, radio frequency interference.

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

Explosion-proof - Designed and constructed to withstand and internal explosion without creating an external explosion or fire.

Feeder - A circuit, such as conductors in conduit or a busway run, which carries a large block of power from the service equipment to a sub-feeder panel or a branch circuit panel or to some point at which the block power is broken into smaller circuits.

Ferroresonance -Resonance resulting when the iron core of an inductive component of an LC circuit is saturated, increasing the inductive reactance with respect to the capacitance reactance.

Ferroresonant Transformer -A voltage regulating transformer which depends on core saturation and output capacitance.

Filter Frequency Range –The frequency range within which the filter operates.

Flashover -Flashing due to high current flowing between two points of different potential. Usually due to insulation breakdown resulting from arcing.

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

Flux -The lines of force of a magnetic field.

Forward Transfer Impedance -The amount of impedance placed between the source and load with installation of a power conditioner. With no power conditioner, the full utility power is delivered to the load; even a transformer adds some opposition to the transfer of power. On transformer based power conditioners, a high forward transfer impedance limits the amount of inrush current available to the load.

Frequency (Noise) Attenuation –The range of attenuation (limiting) for a given frequency range. In this case, the greater the negative number, the more noise reduction.

Ground - A large conducting body (as the earth) used as a common return for an electric circuit and as an arbitrary zero of potential.

Grounded, effectively - Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to prevent the buildup of voltages that may result in undue hazards to connect equipment or to persons.

Grounded Conductor - A system or circuit conductor that is intentionally grounded, usually gray or white in color.

Grounding Conductor - A conductor used to connect metal equipment enclosures and/or the system grounded conductor to a grounding electrode, such as the ground wire run to the water pipe at a service; also may be a bare or insulated conductor used to ground motor frames, panel boxes, and other metal equipment enclosures used throughout electrical systems. In most conduit systems, the conduit is used as the ground conductor.

Grounding Equipment Conductor - The conductor used to connect the non-current-carrying metal parts of equipment, raceways, and other enclosures to the system grounded conductor, the grounding electrode conductor, or both, of the circuit at the service equipment or at the source of a separately derived system.

Grounding Electrode - The conductor used to connect the grounding electrode to the equipment-grounding conductor, to the grounded conductor, or to both, of the circuit at the service equipment or at the source of a separately derived system.

Ground Fault Circuit Interrupter - A device intended for the protection of personal that functions to de-energize a circuit or portion thereof within an established period of time when a current to ground exceeds some predetermined value that is less than required to operate the overcurrent protection device of the supply circuit.

Ground Fault Protection of Equipment - A system intended to provide protection of equipment from damaging line to ground fault currents by operating to cause a disconnecting means to open all ungrounded conductors of the faulted circuit. This protection is provided at current levels less than those required to protect conductors from damage through the operations of a supply circuit overcurrent device.

High Intensity Discharge Lamps (HID.) - A general group of lamps consisting of mercury, metal halide, high-pressure sodium, and low pressure sodium lamps.

High-pressure Sodium Lamps - A sodium vapor in which the partial pressure of the vapor during operation is the order of 0.1 atmospheres.

Hot Cathode Lamp - An electrical discharge lamp whose mode of operation is that of an arc discharge.

mpedance -Forces which resist current flow in AC circuits, i.e. resistance, inductive reactance, capacitive reactance.

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.

Input Power Frequency –This is the frequency range that can be input into the suppressor without damaging it.

In Sight From - (within sight from, within sight) Where this Code specifies that one equipment shall be "in sight from", "within sight from" or "within sight", etc. of another equipment, the specified equipment is to be visible and not more that 50´ distant from the other

Interrupter Rating - The highest current at rated voltage that a device is intended to interrupt under standard test conditions.

Joule - A measure of the amount of energy delivered by one watt of power in one second, or 1 million watts of power in one microsecond. The joule rating of a surge protection device is the amount of energy that it can absorb before it becomes damaged. In comparing surge protection performance, the Joule rating of a surge suppressor is less important than the let-through voltage rating. This reflects the fact that surge suppressors may protect equipment by deflecting surges as well as absorbing them. There is no standard for measuring the joule rating of surge suppressors which has resulted in wildly exaggerated claims by unscrupulous vendors.

Kilo--(K) -A metric prefix meaning 1000 or 10^3.

KVA -(Kilovolt amperes) (volts times amperes) divided by 1000. 1 KVA=1000 VA. KVA is actual measured power (apparent power) and is used for circuit sizing.

KW -(Kilowatts) watts divided by 1000. KW is real power and is important in sizing Uninterruptible Power Supplies, motor generators or other power conditioners. See also "power factor".

KWH -(Kilowatt hours) KW times hours. A measurement of power and time used by utilities for billing purposes.

Labeled - Items to which a label, trademark, or other identifying mark of nationally recognized testing labs has been attached to identify the items as having been tested and meeting appropriate standards.

Lagging Load -An inductive load with current lagging voltage. Since inductors tend to resist changes in current, the current flow through an inductive circuit will lag behind the voltage. The number of electrical degrees between voltage and current is known as the "phase angle". The cosine of this angle is equal to the power factor (linear loads only).

LC Circuit -An electrical network containing both inductive and capacitive elements.

Leading Load -A capacitive load with current leading voltage. Since capacitors resist changes in voltage, the current flow in a capacitive circuit will lead the voltage.

Linear Load -A load in which the current relationship to voltage is constant based on a relatively constant load impedance.

Line Conditioner - This term isn't used consistently, therefore its meaning has been blurred. The term is sometimes used to describe equipment that provides some type of filtering or Regulation to an AC power source and may be any of the following devices: Surge Suppressor, Ferroresonant Transformer, AC Filter or Tap Changing Regulator.

Line Imbalance -Unequal loads on the phase lines of a multiphase feeder.

Listed - Equipment or materials included in a list published by an organization acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials, and whose listing states either that the equipment or material meets appropriate designated standards or has been tested and found suitable for use in specified manner.

Load- The driven device that uses the power supplied from the source.

Load Balancing -Switching the various loads on a multi-phase feeder to equalize the current in each line.

Load Fault -A malfunction that causes the load to demand abnormally high amounts of current from the source.

Load Regulation -A term used to describe the effects of low forward transfer impedance. A power conditioner with "load regulation" may not have voltage regulation. Removing the power conditioner altogether will improve load regulation.

Load Switching- Transferring the load from one source to another.

Load Unbalance -Unequal loads on the phase lines of a multi- phase system.

Location, damp - A location subject to moderate amount of moisture such as some basements, barns, cold storage, warehouse and the like.

Location, dry - A location not normally subject to dampness or wetness: a location classified as dry may be temporarily subject to dampness or wetness, as in case of a building under construction.

Location, wet - A location subject to saturation with water or other liquids.

Maximum Operating Voltage –This is the maximum 50 to 60 Hz AC voltage the unit can sustain without damage or failure of the suppressor.

Measured Limiting (used to be known as "let-through") Voltage –This is the maximum voltage measured across the terminals of the suppressor during the time the testing voltages were applied to the unit..

Mega--(M) -A metric prefix meaning 1,000,000 or 10^6.

Megger - A test instrument for measuring the insulation resistance of conductors and other electrical equipment; specifically, a mega-ohm (million ohms) meter; this is a registered trademark of the James Biddle Co.

Mega-ohm - A unit of electrical resistance equal to one million ohms.

Mega-ohmmeter - An instrument for measuring extremely high resistance.

Megger - A test instrument for measuring the insulation resistance of conductors and other electrical equipment; specifically, a mega-ohm (million ohms) meter; this is a registered trademark of the James Biddle Co.

Mercury Lamps - An electric discharge lamp in which the major portion of the radiation is produced by the excitation of mercury atoms.

Metal Halide Lamps - A discharge lamp in which the light is produced by the radiation from the mixture of metallic vapor and the products of disassociation.

Metal Oxide Varistor-(MOV) -A MOV is a voltage sensitive breakdown device which is commonly used to limit overvoltage conditions (electrical surges) on power and data lines. When the applied voltage exceeds the breakdown point, the resistance of the MOV decreases from a very high level (thousands of ohms) to a very low level (a few ohms). The actual resistance of the device is a function of the rate of applied voltage and current.

Micro--(U)-A metric prefix meaning one millionth of a unit or 10^{-6}.

Micron -A metric term meaning one millionth of a meter.

Milli--(m) -A metric prefix meaning one thousandth of a unit or 10^{-3}

Motor, Shunt- Wound - This type of motor runs practically constant speed, regardless of the load. It is the type generally used in commercial practice and is usually recommended where starting conditions are not usually severe. Speed of the shunt-wound motors may be regulated in two ways: first, by inserting resistance in series with the armature, thus decreasing speed: and second, by inserting resistance in the field circuit, the speed will vary with each change in load: in the latter, the speeds is practically constant for any setting of the controller. This latter is the most generally used for adjustable-speed service, as in the case of machine tools.

Motor, DC, Series- Wound - This type of motor speed varies automatically with the load, increasing as the load decreases. Use of series motor is generally limited to case where a heavy power demand is necessary to bring the machine up to speed, as in the case of certain elevator and hoist installations, for steelcars, etc. Series-wound motors should never be used where the motor can be started without load, since they will race to a dangerous degree.

Motor, DC, Compound- Wound - A combination of the shunt wound and series wound type, which combines the characteristics of both. Varying the combination of the two windings may vary characteristics. These motors are generally used where severe starting conditions are met and constant speed is required at the same time.

Motor, Squirrel-Cage-Induction - The most simple and reliable of all electric motors. Essentially a constant speed machine, which is adaptable for users under all but the most severe starting conditions. Requires little attention as there is no commutator or slip rings, yet operates with good efficiency.

Motor, Wound-Rotor (Slip Ring) Induction - Used for constant speed-service requiring a heavier starting torque than is obtainable with squirrel cage type. Because of its lower starting current, this type is frequently used instead of the squirrel-cage type in larger sizes. These motors are also used for varying-speed-service. Speed varies with this load, so that they should not be used where constant speed at each adjustment is required, as for machine tools.

Motor, Single-Phase Induction - This motor is used mostly in small sizes, where polyphase current is not available. Characteristics are not as good as the polyphase motor and for size larger that 10 HP, the line disturbance is likely to be objectionable. These motors are commonly used for light starting and for running loads up to 1/3 HP Capacitor and repulsion types provide greater torque and are built in sizes up to 10 HP.

Motor, Synchronous - Run at constant speed fixed by frequency of the system. Require direct current for excitation and have low starting torque. For large motor-generators sets, frequency changes, air compressors and similar apparatus which permits starting under a light load, for which they are generally used. These motors are used with considerable advantage, particularly on large power systems, because of their inherent ability to improve the power factor of the system.

MTBF -(Mean Time Between Failure) the probable length of time that a component taken from a particular batch will survive if operated under the same conditions as a sample from the same batch.

Nano--(n) -A metric prefix meaning one billionth of a unit or 10^{-9}.

NEMA -National Electrical Manufacturers Association.

NEC -National Electrical Code.

Neutral -The grounded junction point of the legs of a wye circuit. Or, the grounded center point of one coil of a delta transformer secondary. Measuring the phase to neutral voltage of each of the normal three phases will show whether the system is wye or delta. On a wye system, the phase to neutral voltages will be approximately equal and will measure phase to phase voltage divided by 1.73. On a center tapped delta system, one phase to neutral voltage will be significantly higher than the other two. This higher phase is often called the "high leg".

Neutralizing Winding -An extra winding used to cancel harmonics developed in a saturated secondary winding, resulting in a sinusoidal output waveform from a ferroresonant transformer.

Nominal Voltage -The normal or designed voltage level. For three phase wye systems, nominal voltages are 480/277 (600/346 Canada) and 208/120 where the first number expresses phase to phase (or line to line) voltages and the second number is the phase to neutral voltage. The nominal voltage for most single phase systems is 240/120.

Non-inductive Circuit - A circuit in which the magnetic effect of the current flowing has been reduced by one several methods to a minimum or to zero.

Non-linear Load - A load where the wave shape of the steady state current does not follow the wave shape of the applied voltage.

Ohm - The derived unit for electrical resistance or impedance; one ohm equals one volt per ampere.

Ohmmeter - an instrument for measuring resistance in ohms. Take a look at this diagram to see how an ohmmeter is used to check a small control transformer. The ohmmeter's pointer deflection is controlled by the amount of battery current passing through the moving coil. Before measuring the resistance of an unknown resistor or electrical circuit, the ohmmeter must first be calibrated. If the value of resistance to be measured can be estimated within reasonable limits, a range selected that will give approximately half-scale deflection when the resistance is inserted between the probes. If the resistance is unknown, the selector switch is set on the highest scale. Whatever range is selected, the meter must be calibrated to read zero before the unknown resistance is measured.

Overcurrent - Any current in excess of the rated current of equipment or the ampacity of a conductor. It may result from overload, short circuit or ground fault.

Overload - Load greater than the load for which the system or mechanism was intended. A fault, such as a short circuit or ground fault, is not an overload.

Panelboard - A single panel or group of panel units designed for assembly in the form of a single panel: includes buses and may come with or without switches and/or automatic overcurrent protective devices for the control of light, heat, or power circuits of individual as well as aggregate capacity. It is designed to be placed in a cabinet or cutout box that is in or against a wall or partition and is accessible only from the front.

Peak Surge Current –The maximum current allowed for a single impulse with continuous voltage applied.

Plenum - Chamber or space forming a part of an air conditioning system

Power -Electrical energy measured according to voltage and current (normally watts). Power in watts equals volts times amperes for DC circuits. For single phase AC circuits, watts equal volts times amperes times power factor.

Power Factor -Watts divided by voltamps (VA), KW divided by KVA. Power factor: leading and lagging of voltage versus current caused by inductive or capacitive loads, and 2) harmonic power factor: from nonlinear current.

Propagation-The travel of an electrical waveform along a medium. In other words, a surge passing along a power cord to a system.

Protector -A protector is another name for an arrester or diverter.

Rainproof - So constructed, projected, or treated as to prevent rain from interfering with the successful operation of the apparatus under specified test conditions.

Rain-tight - So constructed or protected that exposure to a beating rain will not result in the entrance of water.

Real Power -Watts.

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

Recloser -The automatic closing of a circuit-interrupting device following automatic tripping.

Rectifier -An electrical device used to change AC power into DC power. A battery charger is a rectifier.

Redundancy -The inclusion of additional assemblies and circuits (as within a UPS) with provision for automatic switchover from a failing assembly or circuit to its backup counterpart.

Reflection -The return wave generated when a traveling wave reaches a load, a source, or a junction where there is a change in line impedance.

Reliability -The statistical probability of trouble-free operation of a given component or assembly. Used principally as a function of MTBF (Mean Time Before Failure) and MTTR (Mean Time to Repair).

RFI -Radio Frequency Interference.

Ride through-The ability of a power conditioner to supply output power when input power is lost.

RMS -(Root mean square)- used for AC voltage and current values. It is the square root of the average of the squares of all the instantaneous amplitudes occurring during one cycle. RMS is called the effective value of AC because it is the value of AC voltage or current that will cause the same amount of head to be produced in a circuit containing only resistance that would be caused by a DC voltage or current of the same value. In a pure sine wave the RMS value is equivalent to .707 times the peak value and the peak value is 1.414 times the RMS value. The normal home wall outlet which supplies 120 volts RMS has a peak voltage of 169.7 volts.

Separately Derived System - A premises wiring system whose power is derived from a battery, a solar photovoltaic system, or from a generator, transformer, or converter windings, and that has no direct electrical connection, including solidly connected grounded circuit conductor, to supply conductors originating in another system.

Service Drop - Run of cables from the power company's aerial power lines to the point of connection to a customer's premises.

Service Conductors - The supply conductors that extend from the street main or transformers to the service equipment of the premises being supplied

Service Entrance Conductors - (Overhead) The service conductors between the terminals of the service equipment and a point usually outside the building, clear of building walls, where joined by tap or splice to the service drop.

Service Entrance Conductors - (Underground) The service conductors between the terminals of the service equipment and the point of connection to the service lateral.

Service Equipment - The necessary equipment, usually consisting of a circuit breaker or switch and fuses and their accessories, located near the point entrance of supply conductors to a building and intended to constitute the main control and cutoff means for the supply to the building.

Service Lateral - The underground service conductors between the street main, including any risers at a pole or other structure or from transformers, and the first point of connection to the service-entrance conductors in a terminal box, meter, or other enclosure with adequate space, inside or outside the building wall. Where there is no terminal box, meter, or other enclosure with adequate space, the point of connection is the entrance point of the service conductors into the building.

Service Point - The point of connection between the facilities of the serving utility and the premises wiring.

Surge -A short duration high voltage condition. A surge lasts for several cycles where a transient lasts less than one half cycle. Often confused with "transient".

Switchboard - A large single panel, frame, or assembly of panels having switches, overcurrent, and other protective devices, buses, and usually instruments mounted on the face or back or both. Switchboards are generally accessible from the rear and from the front and are not intended to be installed in cabinets.

Switch, general use - A switch intended for use in general distribution and branch circuits. It is rated in amperes and is capable of interrupting its rated voltage.

Switch, general-use snap - A type of general-use switch so constructed that it can be installed in flush device boxes or on outlet covers, or otherwise used in conjunction with wiring systems recognized by the National Electric Code.

Switch, isolating - A switch intended for isolating an electrical circuit from the source of power. It has no interrupting rating and is intended to be operated only after the circuit has been opened by some other means.

Switch, knife - A switch in which the circuit is closed by a moving blade engaging contact clips.

Switch, motor-circuit - A switch, rated in horsepower, capable of interrupting the maximum operating overload current of a motor of the same horsepower rating as the switch at the rated voltage.

Switch, transfer - A transfer switch is an automatic or non-automatic device for transferring one or more load conductor connections from one power source to another.

Switch-Leg - That part of a circuit run from a lighting outlet box where a luminaire or lamp-holder is installed down to an outlet box that contains the wall switch that turns the light or other load on or off: it is a control leg of the branch circuit.

Tap Changing Regulator - a device that improves the regulation of an AC power source. The regulator is placed between an AC power source and the load to be protected. A tap-changing regulator has a special transformer with multiple outputs or taps. Typically, one of the output taps provides a voltage equal to the input voltage, while other taps provide various voltages which are a few percent higher or lower than the input voltage. An automatic selector switch chooses the tap which provides the voltage closest to the desired output voltage. In operation, if the AC power source were to suddenly decrease in voltage by 5% from nominal and remain at that voltage, then the Tap-Changing Regulator would respond by choosing a transformer tap 5% higher than the input voltage and would supply this corrected voltage to the load. Tap-Changing Regulators are especially useful in situations where a site is experiencing chronically high or low line voltage.

Three-Phase Power -Three separate outputs from a single source with a phase differential of 120 electrical degrees between any two adjacent voltages or currents. Mathematical calculations with three phase power must allow for the additional power delivered by the third phase. Remember, both single phase and three phase have the same phase to phase voltages, therefore you must utilize the square root of 3 in your calculations. For example, KVA equals volts times amps for DC and for

single phase. For three phase the formula is volts times the square root of three times amps.

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.

Transformer -A static electrical device which , by electromagnetic induction, regenerates AC power from one circuit into another. Transformers are also used to change voltage from one level to another. This is accomplished by the ratio of turns on the primary to turns on the secondary (turns ratio). If the primary windings have twice the number of windings as the secondary, the secondary voltage will be half of the primary voltage.

Transient -A high amplitude, short duration pulse superimposed on the normal voltage wave form or ground line.

Transient Response -The ability of a power conditioner to respond to a change. Transient step load response is the ability of a power conditioner to maintain a constant output voltage when sudden load (current) changes are made.

Transmission Line -The conductors used to carry electrical energy from one location to another.

Transverse Mode Noise -(Normal mode)- An undesirable voltage which appears from line to line of a power line.

UL 1449 - a UL *(UNDERWRITER'S LABORATORIES)* safety specification that surge suppression products are tested against. This specification includes a requirement that surge suppression devices be marked with the surge let-through voltage for a specific UL test

UL Approved - This is a widely used term which is technically not correct. The correct terms are **UL Listed** or **UL Recognized**.

UL Listed - UL grants this form of approval to equipment that will be user installed or operated and that is found to meet the safety requirements of the applicable UL standards. If a product is UL Listed, then it must be marked with the UL insignia.

UL Recognized - This is a form of formal approval granted by UL to devices that are not used as free standing equipment on their own, but are to be installed into some other system by a manufacturer, electrician, or possibly by an end user. Examples of UL Recognized equipment are wall switches, wire connectors, wires, fuses, and circuit breakers. (See also **UL Listed** above).

VAC -Volts of alternating current.

VDC -Volts of direct current.

Volt (V) -The unit of voltage or potential difference.

Voltage Drop - The loss of voltage between the input to a device and the output from a device due to the internal impedance or resistance of the device. In all electrical systems, the conductors should be sized so that the voltage drop never exceeds 3% for power, heating, and lighting loads or combinations of these. Furthermore, the maximum total voltage drop for conductors for feeders and branch circuits combined should never exceed 5%.

VOM -Volt ohm-meter.

Voltage -Electrical pressure, the force which causes current to flow through a conductor. Voltage must be expressed as a difference of potential between two points since it is a relational term. Connecting both voltmeter leads to the same point will show no voltage present although the voltage between that point and ground may be hundred or thousands of volts. This is why most nominal voltages are expressed as "phase to phase" or "phase to neutral". The unit of measurement is "volts". The electrical symbol is "e".

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

Watertight - So constructed that water/moisture will not enter the enclosure under specified test conditions.

Weatherproof - So constructed or protected that exposure to the weather will not interfere with successful operation.

Zero Signal Reference -A connection point, bus, or conductor used as one side of a signal circuit. It may or may not be designated as ground. Is sometimes referred to as circuit common.

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