

Glossary of Power Terms

Alternating current — current that reverses its direction of flow periodically (Hz).

Ampere — a unit of measure for the rate of current flow.

Apparent power — applied voltage multiplied by current in an AC circuit. This value would not take the power factor into account. Unit is voltamperes (VA).

Balanced load — AC power system using more than two wires, where the current and voltage are of equal value in each energized conductor.

Bandwidth — the range of frequencies over which an instrument provides accurate measurement.

Billing consumption — total amount of energy consumed during a predetermined period (usually 28 to 33 days).

Consumption (active energy) — actual electrical energy used measured in kilowatthours (kWh) by the watt-hour meter, regardless of the power factor.

Crest factor — the ratio of the peak value of a waveform (voltage or current) to the RMS value.

Current transformer — an instrument accessory which detects current flow without breaking the circuit under test. An AC transformer, usually step-down; typical ratio listing would be 1000:1. This would indicate 1000A on the primary and 1A on the secondary.

Current transformer ratio — the ratio of primary amperes divided by secondary amperes.

Delta connection — a circuit formed by connecting three electrical devices in series to form a closed loop; most often used in three-phase connections.

Demand (active, real, or true power) — the power which is actually consumed by the load. This measurement takes the power factor into account.

Demand interval (integration period) — the period of time over which the energy is averaged. Typical demand intervals are 15, 30, or 60 minutes.

Derating Factor — a number defined as $1.414 \times$ average RMS phase current/ peak phase current. This factor, when applied to the rated load of a transformer, gives an indication as to the percent loading that is reasonable when that transformer must service nonlinear loads.

Displacement power factor — the difference between apparent power and true power when only the phase relationship of voltage and current at the fundamental are taken into account.

Distortion factor (%DF) — Total harmonic Distortion referenced to the total RMS signal (THD-R).

Distortion power factor — the difference between apparent power and true power at all harmonic frequencies.

Frequency — the number of complete cycles of AC voltage which occurs during one second (Hz).

Harmonics — current or voltages which have frequencies that are integer multiples of the fundamental power frequency; common and sometimes dangerous in nonlinear loads.

Heating effect — temperature increase in electrical distribution equipment caused by an increase in RMS current.

Impedance — the total opposition to alternating current flow in an electrical circuit (Z).

Inductive reactance — the force which acts as a resistance in an inductor to limit the flow of current. This force creates a leading power factor in AC circuits.

Initiator pulses — electrical impulses generated from utility revenue meters. Each pulse indicates a specific number of watts consumed. These pulses are used within energy analyzers to measure energy consumption and demand.

K factor — a number based on the harmonic content of load current that determines the maximum safe loading on a power source.

K-rated transformers — a transformer that is rated or designed to serve as the source for a predefined capacity of harmonic current.

Peak demand (maximum RMS power) — the highest average load during a specified time interval (kW).

Phase — time relationship between current and voltage in AC circuits.

Potential transformer — an instrument transformer used to step down high voltage potentials to lower levels acceptable for the input of electrical test instruments.

Power factor — the ratio of true power (watts) to apparent power (voltamperes). Expressed in decimal form, e.g., .98.

Ratchet demand — determining the billing demand based upon a pre-established peak average demand (usually at 75%, 80%, or 100% of the pre-established peak).

Reactance — the opposition to current flow in an AC circuit introduced through inductance or capacitance.

Reactive compensation power — the reactive power to be applied to an AC network for power factor correction; adding capacitance in order to bring the voltage and current waveform in phase.

Reactive power (kvar) — power which is actually “borrowed” from the load and returned to the power source each cycle; unused power.

Resolution — the smallest unit value that an instrument can measure.

Resonance — when the inductance in the system and the natural capacitance of the system, or added capacitors, form a tuned circuit resonant at one or more of the harmonic frequencies produced by nonlinear loads.

RS-232 — a computer interface connector used to connect serial devices such as instruments for information transfer.

Sensitivity — the smallest input that will provide a specified output.

Skin effect — phenomenon in which high harmonic frequencies cause electrons to flow to the outer sides of a conductor, reducing its cross-sectional diameter, and hence its ampacity rating.

Sliding demand — calculating average demand by averaging the average demand over several successive time intervals, advancing one interval at a time.

THD (%THD, Total Harmonic Distortion) — the contribution of all harmonic frequency currents or voltages to the fundamental current or voltage, expressed as a percentage of the fundamental.

THDF (Transformer Harmonic Derating Factor) — method of calculating transformer derating established by CBEMA for phase-to-neutral loads.

True RMS — capability to accurately measure the value of AC voltage and current having a nonsinusoidal waveform as well as sinusoidal waveforms.

Unbalanced load — an AC power system using more than two wires, where the current is not equal in the current-carrying wires due to an uneven loading of the phases.

Watt — the measure of real power. It is the power expended when one ampere of direct current flows through a resistance of one ohm.

Wye connection — a connection of three components made in such a manner that one end of each component is connected; generally used to connect devices to a three-phase power system.

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