Power Quality Terminology

Active filter. Any of a number of sophisticated power electronic devices for eliminating harmonic distortion.

CBEMA curve. A set of curves representing the withstand capabilities of computers in terms of the magnitude and duration of the voltage disturbance. Developed by the Computer Business Equipment Manufacturers Association (CBEMA), it has become a de facto standard for measuring the performance of all types of equipment and power systems.

Crest factor. A value reported by many power quality monitoring instruments representing the ratio of the crest value of the measured waveform to the rms value of the waveform.

Current distortion. Distortion (deviation from the normal sine wave) in the ac line current.

Fast tripping. Refers to the common utility protection relaying practice in which the circuit breaker or line recloser operates faster than a fuse can blow. Effective for clearing transient faults without a sustained interruption, but is somewhat controversial because industrial loads are subjected to a momentary or temporary interruption.

Fault. Generally refers to a short circuit on the power system.

Fault, transient. A short circuit on the power system usually induced by lightning, tree branches, or which can be cleared by momentarily interrupting the current.

Flicker. Impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time.

Ground. A connecting connection, whether intentional or accidental, by which an electric circuit or equipment is connected to the earth, or to some conducting body of relatively large extent that serves in place of the earth.

Ground loop. A potentially detrimental loop formed when two or more points in an electrical system that are nominally at ground potential are connected by a conducting path such that either or both points are not at the same ground potential.

Harmonic content. The quantity obtained by subtracting the fundamental component from an alternating quantity.

Harmonic distortion. Power system frequencies that are multiples of the fundamental frequency. The frequencies involved are created by nonlinear loads, or loads in which the current waveform does not conform to the waveform of the supply voltage.

Harmonic filter. On power systems, a device for filtering one or more harmonics from the power system. Most are passive combinations of inductance, capacitance, and resistance.

Harmonic resonance. A condition in which the power system is resonating near one of the major harmonics being harmonics being produced by nonlinear elements in the system, thus exacerbating the harmonic distortion.

Impulse transient. A sudden nonpower frequency change in the steady-state condition of voltage or current that is unidirectional in polarity.

Interharmonic (component). A frequency component of a periodic quantity that is not an integer multiple of the frequency at which the supply system is designed to operate.

Interruption, momentary. A type of short-duration variation. The complete loss of voltage on one or more phase conductors for a time period between 30 cycles and 3 seconds.

Interruption, sustained. A type of long-duration variation. The complete loss of voltage on one or more phase conductors for a time period between 3 seconds and l minute.

Linear load. An electrical load device, which, in steady-state operation, presents an essentially constant load impedance to the power source throughout the cycle of, applied voltage.

Noise. Unwanted electrical signals that produce undesirable effects in the circuits of the control systems in which they occur.

Nonlinear load. Electrical load which draws current discontinuously or whose impedance varies throughout the cycle of the input ac voltage waveform.

Outage. A complete loss of power lasting from several milliseconds to several hours. Outages affect all electrical equipment, but some particularly sensitive equipment may be disrupted by outages as short as 15 seconds.

Overvoltage or undervoltage. Abnormally high or low voltage conditions lasting for more than a few seconds. These conditions are caused by circuit overloads, poor voltage regulation, and intentional reduction in voltage by the utility.

Passive filter. A combination of inductors, capacitors, and resistors designed to eliminate one or more harmonics. The most common variety is simply an inductor in series with a shunt capacitor, which short-circuits the major distorting harmonic component from the system.

Phase shift. The displacement in time of one voltage-waveform relative to another.

Power factor. The ratio of active power (watts) to apparent power (volt-amperes).

Spikes. Also called impulses, switching surges or lightning surges, are high voltage transients of very short duration (typically a microsecond to a millisecond) with high amplitudes.

Total harmonic distortion. The ratio of the root mean squared (rms) of the harmonic content to the rms of the fundamental quantity, expressed as a percent of the fundamental.

Transient. Pertaining to or designating a phenomenon or a quantity, which varies between two consecutive steady states during a time interval that is short, compared to the time scale of interest. A transient can be a unidirectional impulse of either polarity or a damped oscillatory wave from the first peak occurring in either polarity.

Undervoltage or overvoltage. Abnormally high or low voltage conditions lasting for more than a few seconds. These conditions are caused by circuit overloads, poor voltage regulation, and intentional reduction in voltage by the utility.

Voltage sags and swells. Momentary (generally less than two seconds) deviations from the standard voltage levels for which electronic devices are equipped.

Voltage unbalance. A condition in which the three phase voltages differ in amplitude or are displaced from their normal 120 degree phase relationship or both.

Waveform distortion. A steady-state deviation from an ideal sine wave of power frequency principally characterized by the spectral content of the deviation.