

Power Conversion Terms

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Ambient Temperature:

The temperature of the environment in which the power supply is operating, e.g., "room temperature." For forced air-cooled units, the ambient temperature is measured at the air inlet.

Applied Patient Current:

Any diagnostic or therapeutic current intended to be administered to a patient. This includes currents applied for measurement purposes.

Bandwidth:

The range of frequencies over which something is measured. Typically used in regard to electromagnetic compatibility (EMC) testing and the measurement of output noise.

Basic Insulation:

The insulation applied to live parts to provide basic protection against electric shock. Does not necessarily include insulation used exclusively for functional purposes.

Battery Backup:

A power supply system where if the ac line fails, a battery will provide input energy to keep the dc outputs from failing. Refer to Application Notes section for further details.

Burn In:

The process of operating a power supply (usually at full load), typically in an elevated ambient temperature, immediately after manufacture. This process is useful in eliminating early life failures.

Common Mode Noise:

The component of noise voltage that appears equally and in phase on conductors relative to a common reference.

Constant Current Power Supply:

A power supply which is designed to regulate its output current within a specified range.

Constant Voltage Power Supply:

A power supply which is designed to regulate its output voltage within a specified range.

Control Section:

In a closed-loop system, the circuitry which maintains the control loop is referred to as the control section by incorporating an error amplifier in the feedback of the system.

Cross Regulation:

The effect of a load change to one output upon the other outputs in a system.

Crowbar:

A method of overvoltage protection which shorts the output to ground in the event an excessive voltage is detected.

Current Limiting:

The limiting of the output current to prevent damage to the power supply and the system in which it is used.

Derating:

A reduction in the power output capacity of a power supply due to its external environment such as altitude, airflow and ambient temperature.

Differential Mode Noise:

The conducted noise of an output as referenced to its return path. This is typically how "ripple and noise" specifications are defined.

Double Insulation:

Independent insulation applied to basic insulation in order to reduce the risk of electric shock in the event of a failure of the basic insulation.

Efficiency:

The ratio total output power to total input power, expressed as a percentage, under specified conditions.

EMC(Electromagnetic Compatibility):

The requirement for electromagnetic emissions and susceptibility dictated by the physical environment and regulatory governing bodies in whose jurisdiction a piece of equipment is operated.

EMI (Electromagnetic Interference):

Signals emanating from internal or external sources that disrupt or prevent operation of electronic systems. In present practice, the term "EMI" (which refers to the emission of unwanted signals), has been replaced by "EMC" (which refers to both emissions and susceptibility).

Foldback Current Limiting:

The method of limiting the output current in which the current decreases as the voltage is decreased by the output overload.

Ground Loop:

Undesirable voltages caused by ground currents of several circuits flowing in a common ground circuit or ground plane.

Hold-Up Time:

The period of time during which the output voltage will stay within its specified regulation in the event of the loss of the input power.

Inrush Current:

The ac input current as measured during the initial turn-on of the power supply. This current reduces to a lower steady-state current once the input capacitors charge.

Isolation Transformer:

A transformer in which one or more output windings is electrically separated from the input winding and all other output windings by an insulation at least equivalent to double insulation or reinforced insulation.

Isolation Voltage:

The level of ac or dc potential which can be applied to the various portions of a power supply, e.g., input-to-output, output-to-ground, primary-to-secondary, etc.

Leakage Current:

UL 2601-1 defines leakage current as any current, including capacitively coupled currents, which may be conveyed from accessible parts of an appliance to ground or other accessible parts of the appliance and which is not intended to be applied to a patient.

Line Regulation:

The percentage change in output voltage due to a change in input voltage level. This is usually a measurement of the output deviation as the input voltage is varied from low line to high line.

Load Regulation:

The percentage change in output voltage due to a change in output loading. This is usually a measurement of the output deviation as the loading is changed from no load to full load.

Minimum Load:

The minimum amount of current which must be drawn from an output to maintain output regulation.

MTBF (Mean Time Between Failures):

This is an indicator of reliability, and may be calculated or demonstrated. Demonstrated values are usually arrived at by operating a population of power supplies at elevated ambient temperature at full load.

Output Good:

A TTL signal which indicates that the output voltage is within its specified regulation levels. If the output goes out of regulation, the state of this signal changes.

Output Noise:

The differential-mode output ripple and noise as measured with a 20 MHz bandwidth.

Output Power:

The specified level of power of which a power supply is capable. Typically, power supplies have a continuous rating and a peak rating. These are usually a function of the ambient temperature. See "Derating."

Overvoltage Protection:

The use of circuitry which will protect the user's system in the event of a failure in the power supply. This circuit will limit the output voltage to a predetermined limit which, if exceeded, will cause the power supply to shut down.

Peak Current:

The maximum amount of current which an output is capable of sourcing for brief periods of time.

Power Fail:

A TTL signal which indicates that the input power has failed. This signal gives the user a chance to store information or switch over to backup power before the system goes down.

Power Factor:

The ratio of true ac input power to the apparent ac input power. If both voltage and current are sinusoidal, power factor is the cosine of the phase angle between them.

Power Factor Correction (PFC):

Technique of increasing the power factor of a power supply. Switching power supplies without power factor correction draw current in short, high-magnitude pulses. These pulses can be smoothed out by using active or passive techniques. This reduces the input rms current and apparent input power, thereby increasing the power factor.

Power Limiting:

The limiting of the total output power of a power supply.

Reinforced Insulation:

An improved basic insulation with such mechanical and electrical properties that, in itself, the insulation provides the same degree of protection against electrical shock as double insulation. It may consist of one or more layers of insulation material.

Remote Sensing:

The monitoring of the output voltage directly at the load rather than at the power supply output terminals; this improves regulation. Useful when using long load cables.

Ripple and Noise:

The measurement of the differential mode dc output ripple and noise over a 20 MHz bandwidth.

Safety Circuit:

Any circuit (either the primary or the secondary) that is relied upon to reduce risks of electrical shock or fire (an interlock circuit, for example).

Secondary Circuits:

Secondary circuits are those circuits supplied from transformer output windings that are electrically separated from the input windings.

Short Circuit Protection:

In the event that the output is shorted, this circuit will protect the power supply by limiting the amount of current flowing through the short circuit.

Switching Frequency:

The frequency at which the pulse-width modulator switches the dc voltage in a switching power supply.

Temperature Coefficient:

The effect of ambient temperature changes upon output voltage regulation, expressed as a percentage change per degree of temperature.

Temperature Derating:

The reduction in output power due to an increase in ambient temperature.

Temperature Range:

Operating: The specified ambient temperature over which it is safe to operate the power supply. Storage: The specified ambient temperature in which the power supply can be stored without risk of damage.

Transient Response:

The response of a circuit to a sudden change in an input or output quantity. In power supplies, this is the excursion of the output voltage and the time it takes to recover from a step change in the output load or the input voltage.