Uninterrupted power supply

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The APC Back-UPS PRO series of Uninterruptible Power Supply are the ...

An uninterruptible power supply (UPS) or uninterruptible power source is a type of continual power system that provides automated backup electric power to a load when the input power source or mains power fails. A UPS differs from a traditional auxiliary/emergency power system or standby generator in that it will provide near-instantaneous protection from input power interruptions by switching to energy stored in battery packs, supercapacitors or flywheels. The on-battery run-times of most UPSs are relatively short (only a few minutes) but sufficient to "buy time" for initiating a standby power source or properly shutting down the protected equipment. Almost all UPSs also contain integrated surge protection to shield the output appliances from voltage spikes.

A UPS is typically used to protect hardware such as computers, hospital equipment, data centers, telecommunications equipment or other electrical equipment where an unexpected power disruption could cause injuries, fatalities, serious business disruption or data loss. UPS units range in size from ones designed to protect a single computer (around 200 volt-ampere rating) to large units powering entire data centers or buildings.

The primary role of any UPS is to provide short-term power when the input power source fails. However, most UPS units are also capable in varying degrees of correcting common utility power problems:

Some manufacturers of UPS units categorize their products in accordance with the number of power-related problems they address.[1]

A UPS unit may also introduce problems with electric power quality. To prevent this, a UPS should be selected not only by capacity but also by the quality of power that is required by the equipment that is being supplied.

The three general categories of modern UPS systems are on-line, line-interactive and standby:[2][3][4]

Most UPS below one kilovolt-ampere (1 kVA) are of the line-interactive or standby variety which are usually less expensive.

For large power units, dynamic uninterruptible power supplies (DUPS) are sometimes used. A synchronous motor/alternator is connected on the mains via a choke. Energy is stored in a flywheel. When the mains power fails, an eddy-current regulation maintains the power on the load as long as the flywheel"s energy is not exhausted. DUPS are sometimes combined or integrated with a diesel generator that is turned on after a brief

delay, forming a diesel rotary uninterruptible power supply (DRUPS).

The offline/standby UPS offers only the most basic features, providing surge protection and battery backup. The protected equipment is normally connected directly to incoming utility power. When the incoming voltage falls below or rises above a predetermined level the UPS turns on its internal DC-AC inverter circuitry, which is powered from an internal storage battery. The UPS then mechanically switches the connected equipment onto its DC-AC inverter output. The switch-over time can be as long as 25 milliseconds depending on the amount of time it takes the standby UPS to detect the lost utility voltage. The UPS will be designed to power certain equipment, such as a personal computer, without any objectionable dip or brownout to that device.

The line-interactive UPS is similar in operation to a standby UPS but with the addition of a multi-tap variable-voltage autotransformer. This is a special type of transformer that can add or subtract powered coils of wire, thereby increasing or decreasing the magnetic field and the output voltage of the transformer. This may also be performed by a buck-boost transformer which is distinct from an autotransformer, since the former may be wired to provide galvanic isolation.

This type of UPS is able to tolerate continuous undervoltage brownouts and overvoltage surges without consuming the limited reserve battery power. It instead compensates by automatically selecting different power taps on the autotransformer. Depending on the design, changing the autotransformer tap can cause a very brief output power disruption,[5] which may cause UPSs equipped with a power-loss alarm to "chirp" for a moment.

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