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**Types of Uninterruptible Power Supply (UPS) Systems**

[Electrical power supply interference](http://www.thomasnet.com/articles/electrical-power-generation/power-supply-interference) can come in a range of forms, such as voltage dips and surges, harmonics, or voltage spikes. These disruptions can cause serious harm to sensitive electrical equipment, particularly during the critical processing or production stages of an operation. To reduce the risk of power supply distortion, uninterruptible power supply (UPS) systems are often incorporated in electrical networks.[Manufacturers of electronic power supplies](http://www.thomasnet.com/products/power-supplies-electronic-62660279-1.html) provide reliable, high-quality power flow for sensitive electrical load equipment and are commonly found in industrial processing applications, medical facilities, emergency equipment, telecommunications, and computerized data systems. A UPS system can be a helpful tool for ensuring proper power supply performance.

* [**Industrial UPS**](http://www.thomasnet.com/products/uninterruptible-power-supplies-ups-industrial-89801567-1.html)

For use in industrial/manufacturing situations, such as plant facilities and factories.

* [**Medical UPS**](http://www.thomasnet.com/products/uninterruptible-power-supplies-ups-medical-96148119-1.html)

Used in hospitals and medical centers, Medical UPS systems are incredibly important, as they support life-support systems and other critical equipment.

* [**Computer and Communication System**](http://www.thomasnet.com/products/uninterruptible-power-supplies-ups-computer-communication-system-95915005-1.html)

Found in server farms and web hosting sites, along with phone companies, computer/communication UPS is probably the most commonly known to the average person, but they range from those made for a home-office to those that 

* [**Military Specification (MIL-SPEC)**](http://www.thomasnet.com/products/uninterruptible-power-supplies-ups-military-specification-95992160-1.html)

Miliary grade UPS systems are certified for quality under the MIL-SPEC certification.  They are used in military operations throughout the world.

* [**High Temperature**](http://www.thomasnet.com/products/uninterruptible-power-supplies-ups-high-temperature-96219142-1.html)

As the name implies these systems are specially suited for high temperature situation.

**UPS Performance Characteristics**

[UPS systems](http://www.thomasnet.com/products/uninterruptible-power-supplies-ups-computer-communication-system-95915005-1.html) may be necessary in situations where power fluctuations or outages frequently occur because they can provide backup power circuitry that keeps vital systems operational in case the power supply is cut off. Under conditions involving short fluctuations or voltage disruption, the UPS can maintain constant power to keep loads running, and if electrical failure occurs, it activates reserve power to keep systems operating until they can be safely shut down. In addition, these UPS systems can often also reduce the risk posed by harmonic disruptions and line transients. An effective UPS usually includes several of the following features: 

* Regulated output voltage with low harmonic distortion unaffected by input voltage or load changes
* An input current with reduced harmonic distortion
* A low degree of electromagnetic interference and acoustic noise
* Minimal transition times between normal and backup operations
* High levels of reliability and efficiency
* Relatively low cost, weight, and size requirements

Although most individual [power supply systems](http://www.thomasnet.com/products/power-supply-systems-62681200-1.html) cannot provide all of these features simultaneously, it is usually possible to find a UPS with the characteristics suited to an application’s needs. The Department of Energy’s[Office of Scientific and Technical Information](http://www.osti.gov/bridge/servlets/purl/373887-S5pAFS/webviewable/373887.pdf) provides more information on harmonics measurements.

**Standby UPS**

Standby UPS, also known as off-line or line-preferred UPS, typically consists of an AC/DC and DC/AC inverter, a battery, a static switch, a low pass filter to reduce switching frequency from the output voltage, and a surge suppressor. The standby system operates with the switch setting the AC input as a primary power source, and alternating to the battery and inverter as backup sources in case of primary power failure. The inverter normally remains on standby, only activating when the power fails and the transfer switch automatically switches the electrical load to the backup units. This type of UPS system provides a high degree of efficiency, small size, and relatively low costs, making it a common option for personal computing.

**Standby-Ferro UPS**

The standby-Ferro UPS relies on a specialized saturating transformer with multiple power connections. The primary power flows from the AC input, moving through the transformer and on to the output. If there is a power failure, the transfer switch activates the inverter to pick up the output load. As in normal standby UPS systems, the inverter remains in standby mode, but the specialized Ferro transformer can provide some degree of voltage regulation and control over the output waveform. Standby-Ferro systems are useful for their reliability and line filtering characteristics, however, their efficiency decreases when coupled with certain kinds of generators or computers, and the Ferro transformer itself carries the risk of voltage distortion and overheating.

**Line Interactive UPS**

In the line interactive design, the battery and AC power inverter are perpetually connected to the UPS output, and the battery can be charged by operating the inverter in reverse while AC power is set at normal levels. In case of power failure, the transfer switch can shift electrical flow from the battery to the system output. Because the inverter is continuously connected to the output, the UPS provides additional filtering and lowers the risk of switching transients. A tap-changing transformer is sometimes included in the line interactive UPS, and this allows it to provide voltage regulation that prevents the UPS from switching to battery power prematurely. The line interactive design’s high levels of efficiency and reliability, as well as its relatively small size and low cost, make it well-suited for a range of uninterruptible power applications.

**Double Conversion**

Double conversion UPS systems are commonly used for higher voltage applications and they feature a configuration similar to those of standby units, but with a primary power path focused on the inverter rather than the AC main. This type of UPS system takes virtually no time to transfer between modes because input AC power failure does not trigger the transfer switch. Instead, the input AC charges the backup battery, which in turn powers the output inverter. This configuration results in highly efficient electrical power performance, but may cause long-term wear on components and can occasionally interfere with power wiring or standby generators.

**Delta Conversion UPS**

Delta Conversion is a relatively recent addition to the uninterruptible power supply industry and was introduced to alleviate some of the disadvantages presented by double conversion systems. Like the double conversion design, the delta conversion UPS has an inverter continuously supplying load voltage, however, it also issues power to the inverter output. Under power failure or electrical distortions, this UPS acts similarly to a double conversion unit, but provides more efficient energy performance by converting power from input to output rather than cycling between power and battery sources. It is more compatible with generator systems and produces less heating and component wear. 