

## Multi-mode systems

These combine features of both single- and double-conversion technologies while providing substantial improvements in both efficiency and reliability:

- Under normal conditions, the system operates in line-interactive mode, saving energy and money while also keeping voltage within safe tolerances and resolving common anomalies found in utility power.
- If AC input power falls outside of preset tolerances for line-interactive mode, the system automatically switches to double-conversion mode, completely isolating IT equipment from the incoming AC source.
- If AC input power falls outside the tolerances of the double-conversion rectifier, or goes out altogether, the UPS uses the battery to keep supported loads up and running. When the generator comes online, the UPS switches to double-conversion mode until input power stabilizes. Then it transitions back to high-efficiency line-interactive mode.

Multi-mode UPSs are designed to dynamically strike an ideal balance between efficiency and protection. Under normal conditions, they provide maximum efficiency. When problems occur, however, they automatically sacrifice some efficiency to deliver maximum levels of protection. The end result is that data centers can save tens of thousands a year on energy without compromising data center performance or reliability. For more information on multi-mode UPSs, please see two additional white papers, "Which UPS is Right for the Job" and "Maximizing UPS Availability" at [www.eaton.com/pg/whitepapers](http://www.eaton.com/pg/whitepapers).

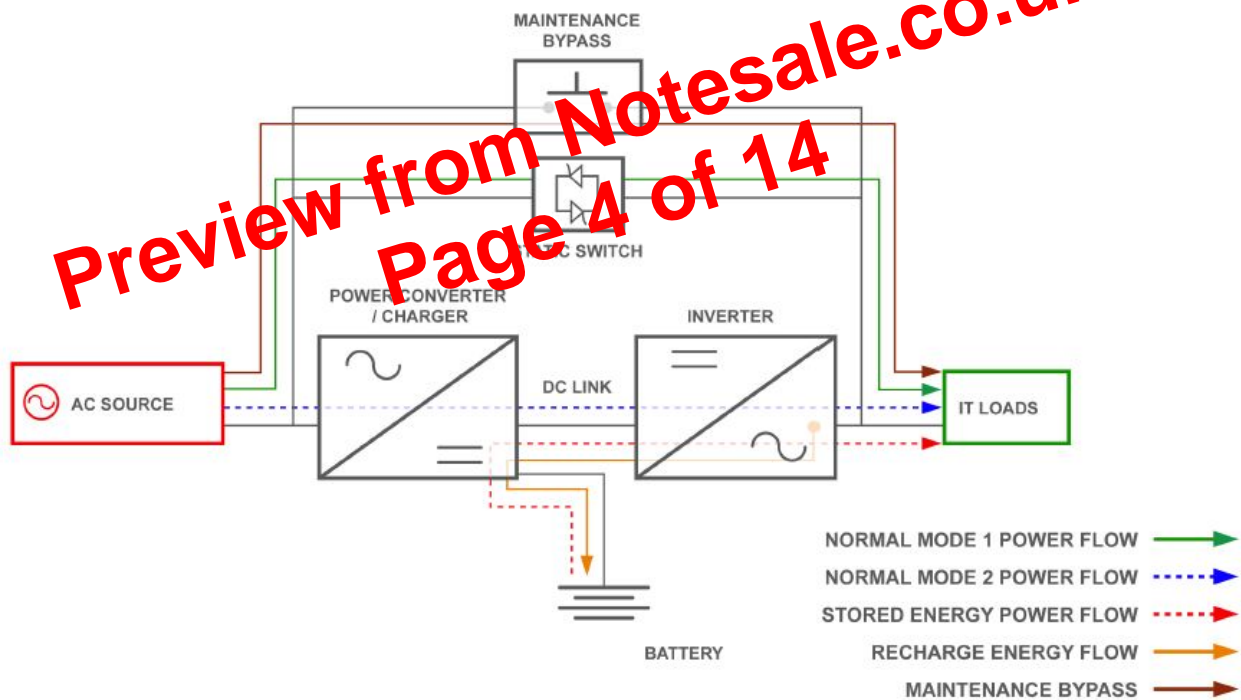


Figure 3. Internal design of a multi-mode UPS.

## How do I choose the right UPS for the job?

To ensure that you always end up with the right UPS for your needs, be sure to consider these eight issues during your selection process:

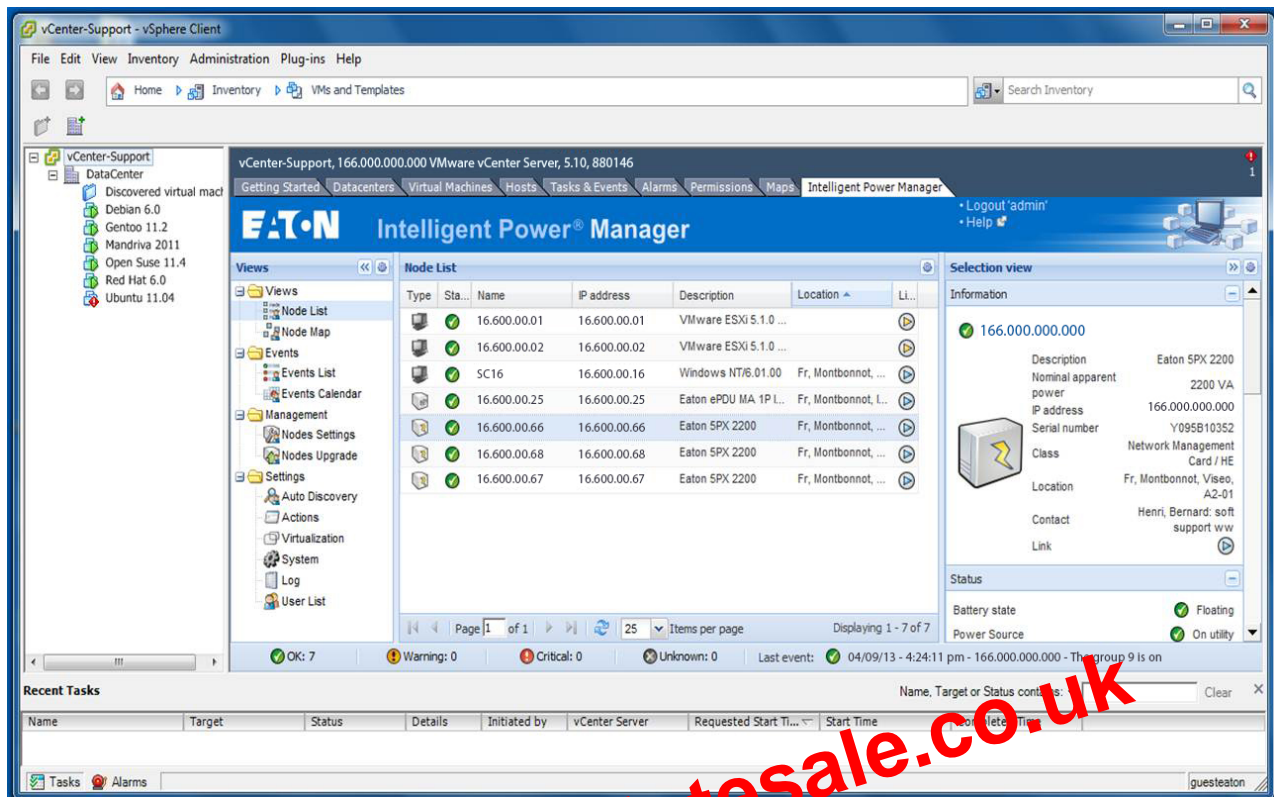


Figure 11. The UPS management software in this example plugs into the administrator's console for VMware vCenter, allowing the IT administrator to see and manage UPS-related events or alarms in the same system as their IT management tasks.

## Services

With proper servicing, a well-made UPS can operate safely and reliably for as long as 20 years. Without proper servicing, even the best UPS is significantly more likely to fail when you can least afford it. Companies in the market for UPS hardware, therefore, should also choose an appropriate UPS service plan from a service provider with the experience, know-how and resources to provide comprehensive, high-quality support. For more information on selecting the proper services for your system, please see the white paper on "Choosing a UPS Service Plan" at [www.eaton.com/pg/whitepapers](http://www.eaton.com/pg/whitepapers),

## What UPS accessories do I need?

A complete power protection solution typically includes more than just a UPS. Here are some accessories worth considering.

### UPS energy storage

Most power protection solutions get their emergency standby power from either sealed batteries (also known as Valve Regulated Lead Acid, or VRLA, batteries) or flooded batteries (also known as Vented Lead Acid, or VLA, batteries). Sealed batteries tend to be less expensive, but also wear out sooner. Flooded batteries generally require specialized installation and maintenance. Deciding which kind of battery is right for you basically comes down to whether you're willing to pay more upfront for batteries that you won't have to replace as often.

Though lead-acid batteries are a proven technology well suited to the rigors of the data center, they're also bulky and heavy. Furthermore, due to the toxic chemicals they contain disposing of them is an expensive and tightly-regulated process. As a result, more and more companies are supplementing lead-acid batteries