

UPS and Diagnostic Imaging Equipment: What You Need to Know

By Anderson Hungria | October 12, 2015

Diagnostic imaging systems, such as MRI, CT, and X-ray machines, have dynamic power demands which create unique power requirements from the uninterruptible power supply (UPS) systems supporting them.

- These imaging devices have a very low continuous or idle power requirement of around 5 – 20 kVA, but during critical operation the maximum power demand can reach up to 200 kVA for around 10-50 milliseconds. This presents the facility's power systems with significant step loads that may cause outages or damage this sensitive equipment if not properly managed.
- Additionally, these machines require voltage regulation within 5 percent of nominal during the step load event in order for them to perform correctly, meaning the UPS must have a fast transient response without going to bypass.

The traditional way of dealing with these loads is to oversize the UPS and supporting equipment:

- ✓ Cabling
- ✓ Switchgear
- ✓ Breakers
- ✓ Batteries

This oversizing leads to higher costs, lower energy efficiency, and wasted space, but overprovisioning doesn't mean or guarantee the system will work.

When a conventional double-conversion UPS with batteries is exposed to a large step load, all additional power requirements for the load have to be produced by the inverter. If the inverter cannot generate enough power to support the load, the UPS will exceed its input current limit and do one of two things:

Extract power from the batteries to increase the DC bus voltage

or

Go to bypass

In these scenarios, the UPS is either unnecessarily taxing the batteries (which will speed time to replacement) or no longer protecting the load.

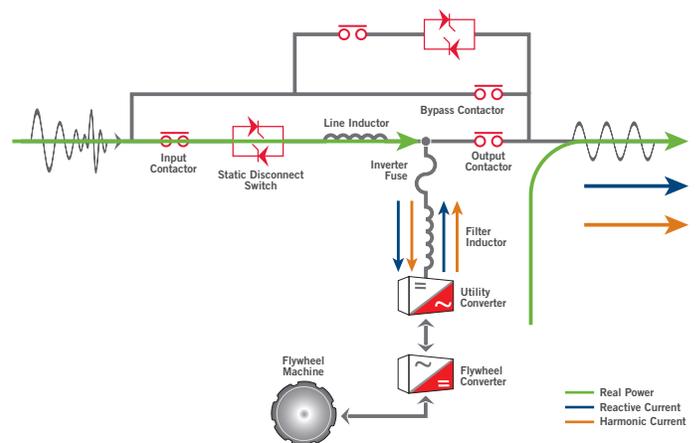
An Alternate Design

The design of Active Power's CleanSource® UPS better supports these step loads than traditional UPS, without the need to oversize the system.

Example: 130kW maximum load
Conventional double-conversion UPS: 250kVA
Active Power's CleanSource UPS: 150kVA

The parallel online design of CleanSource UPS has fewer active components in the critical power path than a traditional UPS, which allows it to more effectively handle large power swings without going to bypass, continuously protecting and regulating voltage to the load. The system relies on the utility source for the additional power demand from the load while the inverters are able to simultaneously handle the step load within a few milliseconds. This guarantees voltage regulation on the output and assures equipment performance.

Active Power CleanSource Topology



Power disruptions on diagnostic and imaging equipment can result in significant revenue losses, as well as patient dissatisfaction for healthcare facilities. The CleanSource UPS is more reliable, efficient, and cost effective in powering diagnostic imaging equipment than traditional alternatives.