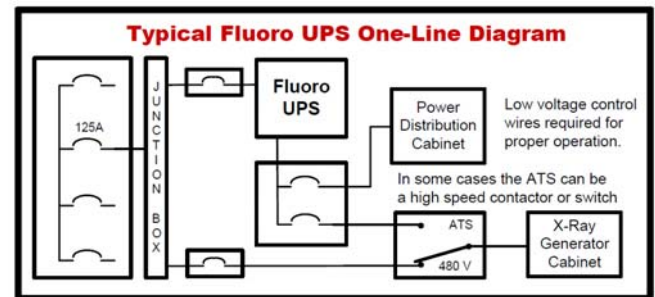


BACKGROUND

Rhode Island Hospital is a 683-bed teaching hospital located in Providence, RI. CPN Power was approached in early 2008 to review the requirement for a UPS System to support (3) VIR Labs. The hospital intended to install (1) VIR Lab initially, a second VIR Lab within a year, and a third VIR Lab within a 2-year timeframe.

The hospital was initially planning on purchasing all (3) Labs from one vendor. The hospital clinical and facilities engineering staff received pricing from the medical equipment vendor for a 150 kVA Fluoro design UPS to support all 3 Labs. The Fluoro UPS is designed to protect the complete system associated with the VIR Lab *except* the x-ray generator during normal operation. In the event of a power outage, the x-ray generator is transferred onto the output of the UPS via an ATS or high-speed contactor and is limited to operate in Fluoro mode via control logic with the VIR Lab. This control logic restricts the medical-equipment-vendor-supplied UPS to operate only with its own Labs. The 150 kVA UPS was sized to support all (3) VIR Labs operating simultaneously in Fluoro mode. The Fluoro UPS approach has some advantages, but has many more disadvantages.

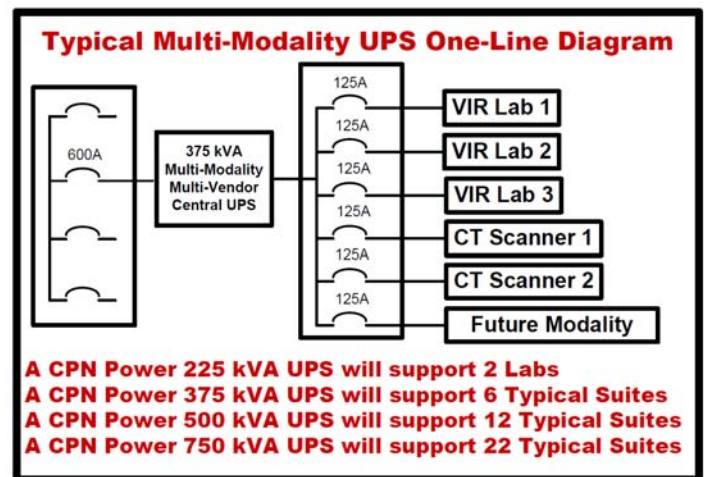


Fluoro UPS Disadvantages

- No power conditioning or voltage regulation for the x-ray tube during normal operation, which is 99.999% of the time
- The x-ray tube is exposed to the outage event and all of the taxing power anomalies associated with that outage
- The x-ray generator may fail due to power disturbances associated with the outage
- Power anomalies contribute to accumulative component damage over time, thereby reducing the life of the x-ray tube
- Configured to operate with a single medical equipment vendor and therefore locks in the customer to that vendor
- Does not allow the interventional cardiologist to capture a high resolution image during an outage

Fluoro UPS Advantages

- Reduced overall UPS footprint
- Fluoro operation during an outage
- UPS protection against data/image loss



CPN Power was asked to provide design recommendations for a UPS to support all (3) Labs. After reviewing the project with the Hospital Clinical Facilities Coordinator, CPN Power learned that, in addition to the (3) VIR Labs planned, there was also discussion regarding several additional future Radiology modalities in the same general area. These modalities would likely be (2) CT Scanners, but possibly (1) CT and (1) MRI. The hospital was still reviewing several options and liked the idea of a Central Total System UPS that offered flexibility. **The CPN Power Total System UPS provides power conditioning and outage protection for the entire modality.** The hospital also noted that space was limited and that the budget was tight. *(This was the first time that a hospital expressed those concerns!)*

Based on years of experience with the application of Central UPS for Diagnostic Imaging, along with many successful installations, CPN Power recommended a 375 kVA Central UPS System with a single battery cabinet and maintenance bypass to support the initial (3) VIR Labs. The 375 kVA Central UPS was sized to additionally support the (2) future Radiology Suites reviewed with the hospital. In fact, the UPS System was designed to support up to (6) major Suites.

CPN Power's recommendation was to possibly add a second battery cabinet at a future date when the Radiology Suites were added to the UPS distribution. (In fact, the 2nd battery cabinet was installed in conjunction with the addition of the (2) GE CT Scanners to the UPS System).

The Central UPS approach offered the best design, value, and the lowest up front cost for the hospital. This design also minimized the space allocation for UPS protection of all modalities added over time. This Central UPS design approach also offered conditioned power and outage protection for the whole suite, 100% of the time. The VIR Labs could not only operate in Fluoro mode, but the Cardiologist could fire the x-ray generator at full power to capture high resolution images as well, while operating on UPS battery operation during an outage.

The Central UPS approach offered the best design, value, and the lowest up front cost for the hospital. This design also minimized the space allocation for UPS protection for all of the modalities added over time.

The Hospital Clinical Facilities Coordinator ultimately selected the CPN Power 375 kVA Central UPS for the following reasons:

- The CPN Power 375 kVA Central UPS offered complete protection for the entire VIR Lab allowing for continued operation during battery operation **NOTE:** The 150 kVA Fluoro UPS offers only partial protection
- The CPN Power Central UPS is vendor neutral allowing for the hospital to change medical equipment vendors over time **NOTE:** The 150 kVA Fluoro UPS can only support the Philips Labs
- The CPN Power Central UPS offers conditioned power for the entire suite, thereby reducing accumulative component damage **NOTE:** The 150 kVA Fluoro UPS does not provide conditioned power for the x-ray tube/generator
- The CPN Power 375 kVA Central UPS offers protection for the (3) VIR Labs and could additionally support (3) future modalities (the hospital planned on adding two future suites) **NOTE:** The 150 kVA Fluoro UPS would only partially protect the (3) VIR Labs
- The CPN Power 375 kVA Central UPS was located in an electrical/mechanical space, thereby providing more space in the imaging suite area **NOTE:** The 150 kVA Fluoro UPS is commonly placed in the Lab Control Room
- The CPN Power 375 kVA Central UPS System pricing was slightly less than the medical equipment vendor 150 kVA Fluoro UPS **NOTE:** This was the icing on the cake

The CPN Power Multi-Modality / Multi-Vendor 375 kVA Central UPS is presently supporting:

- (1) Philips Bi-Plane VIR Lab
- (1) Toshiba VIR Lab
- (1) GE CT Scanner
- (1) GE CT Scanner

NOTE: This CPN Power 375 kVA UPS has capacity for (2) future major modalities

The CPN Power Total System UPS offers several significant advantages vs. the Fluoro UPS

- The total system UPS provides clean regulated power to all system components within the Lab (*not true with the Fluoro UPS*)
- The total system UPS ensures tight voltage regulation of $\pm 1\%$ to the medical equipment loads (*not true with the Fluoro UPS*)
- The total system UPS ensures more reliable operation over the life of the equipment (*not true with the Fluoro UPS*)
- The total system UPS ensures far fewer service calls (*not true with the Fluoro UPS*)
- The total system UPS also ensures fewer nuisance service calls for unexplained events (*not true with the Fluoro UPS*)
- The total system UPS protects the Labs during the monthly generator tests (*not true with the Fluoro UPS*)
- The total system UPS protects the Labs from all power anomalies, not just power outages (*not true with the Fluoro UPS*)
- The total system UPS ensures that the cardiologist can obtain high resolution images at all times, even when operating on UPS power (*not true with the Fluoro UPS*)
- The total system UPS allows for the Multi-Modality concept (*not true with the Fluoro UPS*)
- The total system Central UPS will protect Multi-Modality and Multi-Vendor Suites

Many healthcare institutions have benefited from complete, long-term protection of the entire Lab and/or other Imaging Modalities via a Central UPS System

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