

Case Study



Mayo Clinic

Pioneering Medical Imaging: Active Power Flywheel UPS Powers Cutting-Edge Photon Counting CT-Scanner at Mayo Clinic

CUSTOMER AND LOCATION

Mayo Clinic in Jacksonville, Florida, is a renowned medical institution celebrated for its exceptional patient care, groundbreaking research, and medical education initiatives. Specializing in various medical fields, it upholds a steadfast commitment to patient-centered healthcare, boasts a state-of-the-art infrastructure, and has a stellar reputation within Mayo Clinic's network of world-class healthcare institutions.

The Jacksonville campus houses imaging centers offering an extensive array of diagnostic services that play a crucial role in the comprehensive healthcare provided. Patients benefit from advanced technologies such as MRI, CT scans, ultrasound, X-rays, and other imaging modalities, all supported by experienced radiologists and technologists who collaborate closely with Mayo Clinic's medical teams to ensure top-quality imaging services.

CUSTOMER REQUIREMENT

Mayo Clinic sought a reliable power protection solution for their cutting-edge Photon-Counting CT Scanner, an advanced medical imaging technology designed to enhance image quality and reduce radiation exposure.

CT scanners rely on a stable power supply to function correctly and safely. Power interruptions can lead to a number of issues:

- If the scanner stops mid-scan, it may result in incomplete or compromised images. This would result in the need to rescan and lead to patient discontent and wasted time



Figure 1. Mayo Clinic Facility in Jacksonville Florida.



Figure 2. Photon-Counting CT Scanner protected by Active Power.

- ▶ When a CT scanner is in operation, it emits X-ray radiation to create images. If there is a power interruption, the X-ray tube may not shut down properly.
- ▶ CT scanners are sophisticated and sensitive medical devices. Sudden power interruptions can lead to damage or malfunction of critical components, including the X-ray tube, detectors, and computer systems. Repairing or replacing these components can be extremely costly and result in extended downtime for the scanner.
- ▶ In addition, there are other costs and damaging effects associated with power interruptions such as data loss, downtime and delays, loss of revenue, and increased maintenance.

To address these concerns, Mayo Clinic sought a 550kVA UPS system with a compact footprint to fit their limited space. The customer opted for the CLEANSOURCE® HD 675kW UPS for its industry-leading power density and battery-free design. The UPS allows for seamless operation of one CT scanner initially and has the capacity to add another in the future. The transition to flywheel technology eliminates the need for temperature-controlled battery rooms and the frequent battery replacements associated with traditional UPS systems. The solution ensures uninterrupted, cost-effective, and safe CT scanning.

SOLUTION

CLEANSOURCE® (High Density) UPS

- ▶ 675kW, 480V, 60Hz, UL, 4-Wire
- ▶ Up to 98% efficient
- ▶ Half the space of legacy battery-based UPS
- ▶ OSHPD* Pre-Approved

In addition to delivering the CLEANSOURCE® HD UPS, Active Power equipped the customer with an external 800A Maintenance Bypass featuring the added safety of a Solenoid Key Release Unit (SKRU). This setup ensures convenient power redistribution during maintenance procedures and enhances operational efficiency and safety.



Figure 3. Active Power CLEANSOURCE® HD UPS.

TIMELINE

TIMELINE	
July 2022	Opportunity identified
September 2022	Customer places PO
December 2022	Active Power ships UPS and Switchboard to site
January 2023	CLEANSOURCE® HD 675kW is commissioned and protecting load

*OSHPD pre-approved products play a crucial role in ensuring the safety, compliance, and functionality of hospitals. They provide peace of mind in terms of safety, reliability, and performance in regions prone to seismic activity

OUTCOME AND FUTURE

After the successful execution of the CLEANSOURCE® HD 675kW project in early 2023, Mayo Clinic has already initiated the next phase of their power solution journey. Through our valued distribution partner, Ring CAT, they have confirmed a subsequent order for a CLEANSOURCE® XT 250kW system. This cutting-edge solution is scheduled for installation at the same Jacksonville facility in mid-2024.

With a track record of seamless performance, Mayo Clinic continues to place its trust in Active Power's CLEANSOURCE® Flywheel UPS products. These solutions are renowned for their high reliability, extended lifespan, and minimal risk. In contrast to conventional chemical batteries, our technology remains the preferred choice to empower Mayo Clinic's critical imaging equipment.

ACTIVE POWER IN HEALTHCARE

525+

Healthcare Units Installed

185+

Healthcare Customers

14+

Countries

Active Power CLEANSOURCE® Flywheel UPS are currently used to back up hundreds of imaging centers globally, such as those at Mayo Clinic in Jacksonville, by providing a stable and uninterrupted power supply to critical diagnostic imaging equipment. They offer surge protection, voltage regulation, and flywheel energy storage backup to ensure continuous operation during power fluctuations or outages. Active Power Flywheel UPS systems are used safeguard patient data, aid in regulatory compliance, are particularly well suited to extending equipment lifespan, and contribute to the reliable and uninterrupted functioning of diagnostic imaging services.

WHY BATTERY-BACKED UPS ARE THE WRONG CHOICE FOR MRI SCANNERS

MRI scanners operate by intermittently drawing significant electrical current in pulses. These scanners rely on powerful magnetic fields and radio-frequency (RF) pulses to produce highly detailed images of the body's internal structures. The pulsed current plays a crucial role in generating the necessary magnetic field gradients for spatial encoding and image formation.

The current pulses generated by MRI scanners can have various impacts on power distribution systems, including voltage fluctuations, harmonic distortion, circuit overloads, and potential disruptions to other equipment.

Efficiently managing the impact of these current pulses on the facility electrical infrastructure of an MRI scanner is possible using a UPS (Uninterruptible Power Supply).

Traditional battery systems are ill-suited to handle the demands of imaging equipment due to the cycling effect caused by current pulses. This can lead to a considerable reduction in battery lifespan and the frequent, costly need for battery replacements. Active Power's flywheel UPS, on the other hand, offers a distinct advantage in such scenarios. Its mechanical flywheel is not limited by cycling effects and can maintain the same energy-holding capacity on day one as it does even after 20 years of operation. This longevity and reliability make it an ideal choice for ensuring continuous power and protecting MRI equipment during critical imaging procedures.

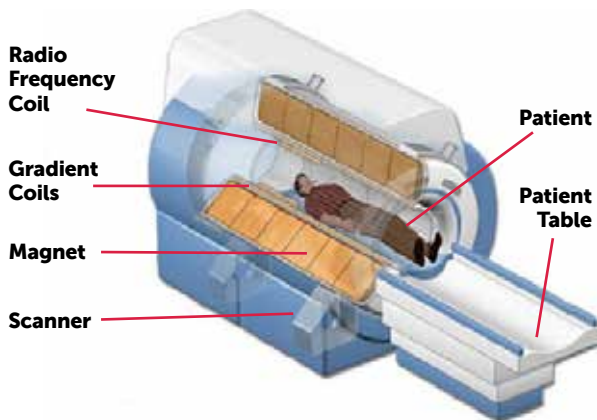


Figure 4. MRI Scanner Cross-Section.
(Source: Slideshare.net)

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