

Uninterruptible Power Supply for X-ray systems

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A reliable source of power can be a matter of life and death in medicine. Siemens Healthcare Sector was impressed by the reliability and the performance of the Eaton UPS systems and integrated them into their angiographic diagnostic systems.

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Due to the critical nature of medical operations, it is natural that anyone operating an equipment relies not only on power from the grid but also on power from back-up systems with uninterruptible power supplies (UPS).

Eaton's products' reliability and performance were a key issue for Siemens Healthcare Sector when the company integrated Eaton UPS systems into its angiographic diagnostics systems. Among other things, the Axiom Artis emergency power supply systems ensure that invasive procedures in heart blood vessels can be performed safely at all times.

An angiograph is a depiction of blood vessels by means of a diagnostic imaging procedure. Angiographs allow vascular diseases such as arteriosclerosis and thrombosis to be diagnosed or even acute vascular obliteration to be detected and treated in

the event of a heart attack. One special form of this procedure is called Digital Subtraction Angiography (DSA), which allows even better images to be recorded.

What happens if the power fails?

The power supply for X-ray systems plays an important role in DSA, especially since the introduction of such invasive procedures. What happens if the power suddenly fails while the doctor is examining a clogged artery? The display monitor switches off and the doctor can no longer see where the catheter is – a potentially fatal situation. One wrong move of the catheter can damage the sensitive blood vessels. This means maximum radiology. These multi-functional X-ray systems are suited for X-ray examinations, for angiographs and for the so called X-ray directed invasive procedures. Equipped with a digital imaging system, DSA provides a sharp, high-con-

trast image of the patient's vascular system on the display monitor – an important factor, especially for invasive procedures.

Staying on the safe side with an integrated emergency power supply

The decisive advantage of the Axiom Artis system is its integrated emergency power supply, provided by Eaton® Power Quality. It prevents life-threatening situations for the patient. In such situations, the doctor is forced to cease all movement. Examinations and invasive procedures cannot be concluded without endangering the life or health of the patient. To prevent such dangerous situations, since 1998 Siemens Healthcare Sector has been working closely with Eaton Power Quality, a manufacturer of uninterruptible power supply systems. The companies jointly conceived a special EPS (Emergency Power Supply) solution for reliably supplying power to the

Axiom Artis line of products, which includes a system platform and multi-functional angiography system for use in cardiology.

The idea is that the system continues to function in the event of a power failure so that the doctor can continue working. To this end, Eaton Power Quality had to specially adapt its Powerware 9390 UPS (40 kVA) to work with the X-ray systems. Eaton had previous experience with predecessor systems from Siemens, a fact which greatly facilitated product introduction and system integration. Heribert Amtmann, Accessories/OEM Components Product Manager at Siemens Healthcare Sector, said: "We decided to go with Eaton because of the reliability and functionality of the Powerware products. To achieve optimum results from invasive procedures, it has to be possible to seamlessly integrate the emergency power supply into our systems – Eaton fulfilled this requirement perfectly with its UPS design."



Powerware 9390 (40 kVA)

In the event of a power failure, the Powerware 9390 takes over the task of providing uninterrupted emergency power to the entire system and supports the Axiom Artis system controller. This allows doctors to carry out all equipment movements and to generate X-ray images even in emergency mode. The UPS also protects the imaging system functions from loss of data. In addition to the UPS system, the emergency power supply system also has a Powerware ATS 160 A automatic switch-over unit. If the ATS (Automatic Transfer Switch) determines that the voltage drops below the specified value, it automatically disconnects the main power supply and switches to UPS power for the X-ray generator. At the same time, the output of the angiography system's emitter is limited, i.e. the X-ray system switches from full-powered X-raying of the patient to reduced output X-ray mode. Instead of a full display, only emergency X-raying is available, but this is sufficient for the doctor to see and safely retract the contrast agent catheter that is still in the blood vessel. In this way, the doctor can safely conclude the examination or invasive procedure. In emergency power mode, a back-up time of at least 10 minutes is guaranteed. Once normal power returns, a lamp indicates to the doctor that she can switch back to normal operation, and the Axiom Artis system is then available once again with full output.



The doctor can follow the angiography on the monitor.

Heribert Amtmann is very satisfied with the design: "With the ATS switch-over unit, Eaton has developed a technically reliable and cost-effective solution for the continuous supply of power to the system." The emergency power provided by the switch-over unit is completely adequate for ensuring the patient's safety. Without the ATS, a significantly larger UPS with approximately five times the output would be needed to completely safeguard the angiography system, and it would cost more than twice than the ATS solution. "With this solution, which we have approved and integrated into our system, we can guarantee safe functioning of the system in emergency mode," said Amtmann. Following the product development phase, the two companies continue to collaborate:

Eaton is assuming the task of assembling and setting up the systems. For service needs around the world, Siemens Medical Service is the first point of contact; on-site usage is then arranged by Eaton Powerware service in coordination with Siemens.