Power availability in critical hospital applications

The client: University Hospitals Trust of Strasbourg

Les Hôpitaux Universitaires de STRASBOURG

The University Hospitals Trust of Strasbourg includes six hospital sites around the city of Strasbourg. More than 12,000 people work there, taking in a maximum capacity of 2,711 patients. Healthcare provision is very wide-ranging, catering for the most diverse pathologies.

The University Hospital of Strasbourg Centre sets itself apart with its investment in innovation and research. It also includes 7 colleges and institutes, divided into 10 teaching sectors which manage the training of future healthcare professionals.

In 2006, Socomec won an initial contract with the University Hospitals Trust of Strasbourg for a hospital bay at the New Civil Hospital, one of the Trust's 6 hospital sites. As part of the project to build the new Medical Technology and Musculoskeletal Unit and the new Regional Cancer Institute at the Hautepierre site, Socomec supplied 39 equipped hospital bays to ensure continuity of power to operating theatres.

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Innovative Power Solutions

The project

Two new buildings are under construction at the hospital site of Hautepierre.
- A new Medical Technology and Musculoskeletal Unit.
  This building will house departments specialising in orthopaedics, trauma and maxillofacial surgery. It will include 39 operating rooms at a total implementation cost of €150 million.
- This unit will be closely linked to the new Regional Cancer Institute which will replace the current Paul Strauss Centre.

The construction of the Medical Technology and Musculoskeletal Unit will free up valuable space in the current building at Hautepierre and is the precursor to a major restructuring of these buildings.

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In addition to this major restructuring, Hautepierre hospital wanted to equip its Angiography Department with two new operating rooms. Thierry Oswald, Operations Electrical Engineer at the Trust, took the decision to combine the electrical equipment needs for all these projects to find a single solution that fits all requirements: “My idea was to take advantage of the new operating theatres built for the Angiology Department project to develop a hospital bay solution designed to fit with the overall construction project of the Medical Technology and Musculoskeletal Unit and Regional Cancer Institute”.

The work will be completed mid-2017 to allow for new infrastructure to be started up in 2018.

Project Requirements

Energy availability

In a hospital setting, it is critical that power to the operating rooms is continually available. The installed solutions must address several challenges.

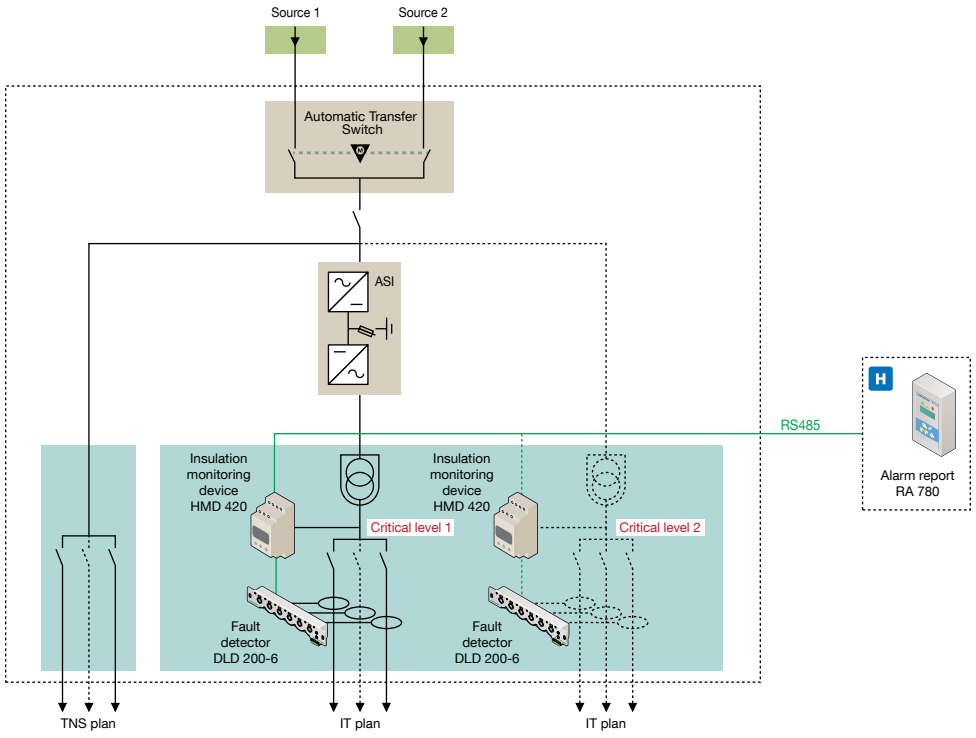
- At Hautepierre, operating theatres will be powered by two outputs from the low voltage mains panel powered by two MV/LV transformers; this redundancy can mitigate any processor failure. If there is a power grid outage upstream of the transformers, the backup gensets will take over. “The philosophy of the Trust is not based on an architecture with inverters upstream of the cabinets powering the operating theatres”, explains Thierry Oswald. “We want the inverted power to be integrated into the hospital bay, which is what MEDSYS does”.
- In addition, the IT layout requires the bay to feature an insulation monitoring device to protect people against indirect contact.
- Finally, the electrical installation of the new Medical Technology and Musculoskeletal Unit must conform to standard NFC 15-211, which sets out design, implementation and operation methods for the LV power supply in a healthcare facility. This norm and the standard HD 60364-7-710 requires a medical IT layout for group 2 premises and at least one transformer for each operating room or each medical site. For the Trust, the electrical cabinet powering an operating theatre must meet criticality levels 1 and 2 of the standard NFC 15-211.

Usage requirements

The solution must also:

- meet a small footprint of 2000 x 800 x 800 (H x W x D),
- allow for easy and intuitive use for electrical work,
- ensure the safety of maintenance staff: all installations should meet protection class IP2x,
- ensure the availability of the installation,
- allow the power source to be manually operated in an emergency,
- integrate current and energy measuring functions in accordance with RT 2012.

Electrical architecture



MEDSY 019 A GB

Reminder
These criticality levels determine the permissible time from loss of power depending on the type of load (electrical medical devices) that can be found in the operating room:
- criticality 1: no cut-off allowed,
- criticality 2: cut-off of less than 15 s allowed.

The solution

APPLI 803 A

39 MEDSYS 60 hospital bays made wholly by Socomec will equip the operating theatres of the new Medical Technology and Musculoskeletal Unit and the 2 angiography operating rooms.

The MEDSYS modular cabinet creates both a physical separation between the input and output wiring as well as a separation between low and high currents. It is equipped with a pivoting and reversible front panel, and fully extractable transformer and inverter compartments. The heart of the system is a culmination of "expert" functions:

- ISOM Insulation Monitoring Device, specific to hospital applications,
- NETYS UPS to ensure criticality level 1 without cut-off,
- ATyS transfer switch to ensure the redundancy between the double power supply upstream and the energy monitoring required by RT2012.

The connection is made by two IT neutral arrangements comprising a 10 kVA isolation transformer connected to an HMD 420 insulation monitoring device.
To ensure criticality level 2 (cut-off < 15), an isolation transformer is installed downstream of the ATyS switch.
If there is an isolation or overheating fault on the transformer, the monitoring interface (RA 780L) warns the surgery staff with a visual and audible alarm.

APPLI 804 A

With criticality level 1, no cut-off is allowed ; a second isolation transformer is installed upstream of the inverter (see the architecture diagram opposite).
If one of the sources fails, the UPS takes over when switching to the ATyS p transfer switch.

The advantages

MEDSY 005 A

Guaranteed safety for people and the installation

- The solution protects people against indirect contact (IT neutral arrangement, insulation) and direct contact (IP21, segregation).
- The ATyS p transfer switch incorporates a watchdog timer to continuously monitor the product and its switching capability, in order to safeguard the system.
- In an emergency, an emergency lever allows staff to control the device quickly, easily and safely.

Continuity of service

- The solution ensures the continuity of use, even in the case of a single fault condition.
- It identifies an insulation fault in less than 10 seconds, even with highly disrupted sensors.
- The equipment conforms to norm NFC 15-211 and the standard HD 60364-7-710, guaranteeing an uninterruptible power supply.

Certified & tested equipment

IEC/EN 61439 READY

- The MEDSYS 60 hospital bay is a 100 % Socomec manufacturer solution, from sheet metal to automatic transfer switch, right through to the electronic protection devices and UPS.
- This solution has been certified and tested according to the standard IEC 61439, which will soon be integrated into standard NFC 15-211.

Easy implementation

- Thanks to the cable output/input compartment, the system is easy to install without having to touch any working units; all connections are grouped into this one compartment.
- Reduced size, with a footprint of 80 x 80 cm.

Easy maintenance

- The motorised section of the ATyS p is easy to replace.
- The modules containing the isolation transformers and UPS are removable.

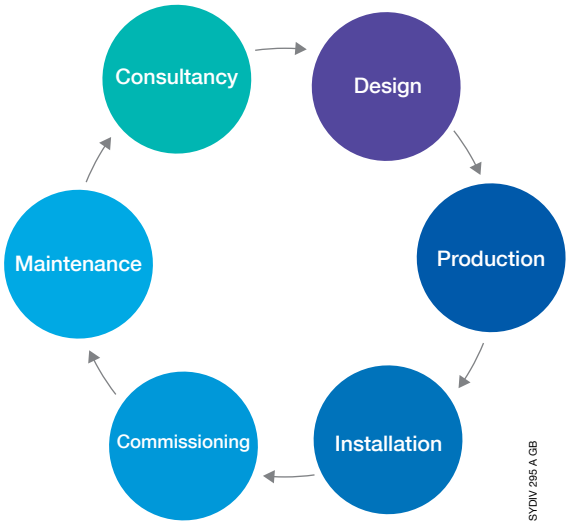
The results

After an initial testing phase, Socomec reviewed a part of the hospital bay design to ensure MEDSYS 60 met all the needs of the Trust.

Frédéric Kapps, Regional Sales Manager at Socomec, says that the MEDSYS 60 unit in its current form is the result of a close collaboration between Thierry Oswald and the Socomec design office: *"The equipment project of the new Medical Technology and Musculoskeletal Unit and the operating rooms for the Angiography Department spurred Socomec on to define and create our hospital bays. The MEDSYS 60 solution we now offer has reached new performance heights, since we took into account the requirements of the customer and the facility".*

Key success factors

- A “made-to-measure” solution that is flexible and adaptable to the specific requirements of the healthcare facility.
- An IEC 61439-certified and qualified manufacturer solution.
- An effective partnership, involving the onsite support of the Socomec teams, from design to maintenance.



The Outlook

This project is testimony to Socomec’s expertise in securing the availability of energy in healthcare facilities. Colmar Hospital in the Haut-Rhin area is also equipped with MEDSYS bays. The specifications for this project state that the type of bay installed must be fitted with 2 inverter inputs. Equipped with the STATYS static transfer system (a 100 % Socomec product) offering 2 inverter inputs, the modular cabinet solution MEDSYS 40 is a perfect match for the requirements of the Colmar Hospital’s electrical system.
The MEDSYS range includes 4 model versions and 8 configurations to meet a wide range of needs.

Focus on

Thierry Oswald, Operations Electrical Engineer

Thierry Oswald is an Operations Electrical Engineer within the Trust. Having put his faith in Socomec, he established close links with our Sales teams.

I am in regular contact with Socomec, attending customer events such as the technical event days, which are a great chance to exchange knowledge. On this particular project, the Socomec teams listened to me and understood my operating requirements. With their excellent interpersonal skills and ability to listen, Socomec came up with hospital bays that respond to our technical and financial project requirements.

Key figures
Total investment in the Medical Technology and Musculoskeletal Unit project: €150 million
Operating rooms equipped: 39
Cut-off tolerance: 0

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