



Reliable Power Helps Beaumont Hospital Save Lives

The idea of “critical power” has no more important application than in the healthcare industry. With sensitive equipment that demands extreme levels of power quality to operate correctly, even a momentary lapse in power quality or — even worse — a power system failure can result in a tragic event. Patients take for granted that when you check into a hospital, the lights won’t suddenly turn off just as the surgeon is preparing to perform a delicate maneuver.

Keeping power issues under wraps is no small task even at a small medical center, but it’s especially demanding when you’re one of the nation’s largest healthcare facilities. Beaumont Hospital started in 1955 as a single 238-bed hospital suited to serve a small community in Royal Oak, Mich., and has grown into a two-hospital regional medical center, with locations throughout metro Detroit. In fact, the Royal Oak hospital is now a 1,061-bed tertiary care, teaching, research and referral hospital that is now the largest inpatient hospital in the country for inpatient volume and second for surgeries performed. Its medical staff includes more than 2,400 physicians representing more than 91 medical and surgical specialties.

The Royal Oak facility is not only large in scope and scale, but a heavyweight in terms of influence and reputation. It’s a regular industry award winner and is repeatedly named on best hospital lists, such as the annual *U.S. News & World Report* “Best Hospitals” list.

And Beaumont Hospital continues to grow and rapidly expand its campus. But with this growth comes more demanding energy and power requirements and a significant staff to keep it running. In 1997, Beaumont Hospital brought in Optim, a company specializing in providing consulting and management services exclusively to hospitals and the healthcare industry for construction, technology and facilities programs, to provide energy efficient buildings and systems for the hospital.

Now, Optim has integrated staff in-house at Beaumont Hospital, including an architect, an energy engineer, a mechanical engineer, electrical engineers and skilled tradesmen in related fields all working together.

Blackout Brings EPSS to Forefront

One of the areas in which Optim has played a major role at Beaumont Hospital has been with managing the hospital’s emergency power supply system (EPSS). The EPSS supplies the critical backup power needed during a power issue or outage. And this is no small task, as the Royal Oak Beaumont Hospital campus EPSS contains 107 automatic transfer switches (ATSs) and 11 diesel-powered generators distributed over the expansive 3 million square feet of the facility.

Industry:

Healthcare

Objective:

Provide more access to status information for Beaumont Hospital’s EPSS through installation of a reliable and easy-to-use power monitoring system

Solution:

A PowerLogic® power monitoring system from Schneider Electric, including Telemecanique® Modicon® Momentum™ PLCs and Magellis® iPC units, Square D® PowerLogic 800 series power meters and PowerLogic Ethernet Gateways (EGX) 100 in custom ATS interface and generator communications enclosures

Benefits:

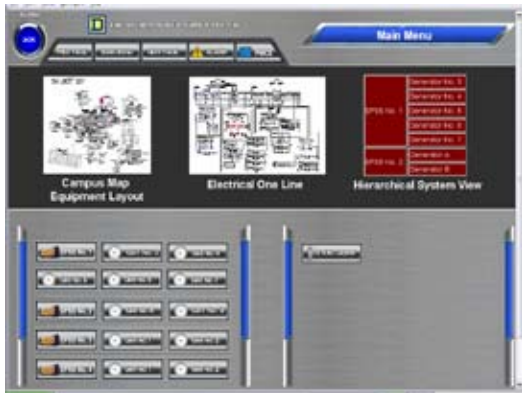
- Easy EPSS test reporting to meet code requirements
- Improvement in overall power reliability and response time
- Easy access to system status — faster identification and assessment of power issues
- Trending information for evaluation of loading and preventive maintenance

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A major test came Aug. 14, 2003, when a large portion of the East Coast fell under a widespread power blackout. Its reach spread far into the state of Michigan and caused significant power interruptions in Detroit and much of southeastern Michigan. While Beaumont Hospital's EPSS performed as it was intended to and kept the facility online — keeping all important areas and functions up and running — through the blackout, the event was an eye-opening experience for the staff.

“It was very stressful with so much area and equipment to cover,” said Steve Fox, electrical engineer, Optim. “But the event helped us realize that we needed more accessible status information on the EPSS. We also wanted to be better prepared for any more normal utility issues we might experience. It was determined that a reliable and easy-to-use power monitoring system for the EPSS was required.”

While in this case, the EPSS performed as it was intended to, hospitals like Beaumont must perform and document routine EPSS tests to show preparedness for events such as a blackout. This is to stay in compliance with National Fire Protection Agency (NFPA) 99: Standard for Health Facilities and NFPA 110: Standard for Emergency and Standby Power Systems, as well as codes regulated by the Joint Commission of Care Standard.

The Joint Commission standard requires documentation proving the reliability of a facility's emergency power system. Meeting this requirement can be very time- and labor-intensive for a hospital's staff, as it covers rigorous testing of on-site generation, power control and power transfer equipment.

“We need to do EPSS testing every month, as required by the Joint Commission,” Fox said. “The stopwatch-and-clipboard method wasn't very efficient for us anymore with 107 ATs and 11 generators. We needed something easier and more automated.”

After an extensive request for proposal (RFP) process, Beaumont Hospital selected a power monitoring system from Square D® and its PowerLogic® group. Upon being selected, Square D personnel immediately began working closely with Optim's staff and Beaumont Hospital's staff on the project.

Team Effort Produces Robust System

“The power monitoring system we specified from Square D gives the detailed information necessary to monitor the operation of the EPSS and quickly locate and respond to power loss,” Fox said. “It also helps us examine EPSS loading, determine reserve capacity, and use that capacity appropriately — saving cost and providing a more reliable EPSS.”

An important feature was that everything needed to seamlessly integrate into the existing facility — a solution that could connect into their existing system and communicate to existing Modbus® ASCO 7000 monitoring equipment. This approach allowed for quick installation by eliminating the need for numerous ATS shutdowns.

The installation of the project was a complete team effort involving Square D staff, Optim staff and an electrical contractor. Square D provided a state-of-the-art power monitoring solution designed to monitor Beaumont Hospital's 11 Gen Sets and all 107 ATS units. The PowerLogic system controls and monitors all aspects of the EPSS such as Gen Set vitals, fuel levels, battery units (UPSs), ATS loading/trending and much more.



While the main purpose of the power monitoring system is to improve reliability and response time, it also provides automated monthly ATS and Gen Set testing and all the EPSS testing documentation needed to fulfill the requirements of the Joint Commission Environment of Care Standard EC.2.14. and NFPA 99 and 110. These once time-consuming and labor-intensive requirements can now be easily automated with less labor and a ready-made report created by the system.

PowerLogic Emergency Power Supply System (EPSS) Test Reporting provides reports of generators, and ATSs show testing compliance of a transfer and generator run at proper loading for 30 minutes. It uses information that is captured from the PowerLogic meters and stored in the software database. A wizard-driven user report interface allows the user to enter nameplate ratings, manually collected data and test observations.

From an equipment standpoint, the project contained products from across Schneider Electric's broad line of brand-name products, including Telemecanique® Modicon® Momentum™ PLCs and Magellis® iPC units with touch screens used for operator control and equipment monitoring in the facility. Square D PowerLogic 800 series power meters were installed at many of the generator locations, and PowerLogic Ethernet Gateways (EGX) 100 in custom ATS interface and generator communications enclosures.

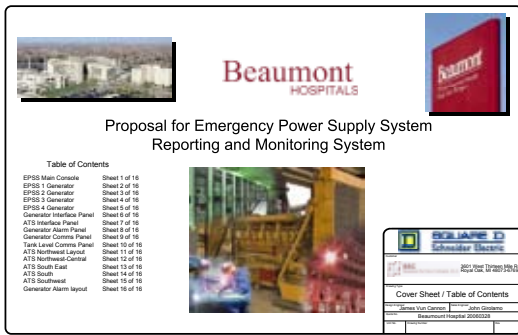
The power monitoring system also is being integrated into the hospital's emergency response plan. In the loss of a significant portion of the incoming utility power, the system will be used to quickly transfer load from the remaining endangered utility source to the hospital generators. When the situation has returned to normal, the system will be used to transfer back to utility power with the minimum effect to hospital operations.

PowerLogic System Provides Additional Benefits

Beyond meeting code requirements and improving overall power reliability and response time, Beaumont Hospital is seeing a big list of benefits as a result of its new power monitoring system. The staff is provided with a status of the entire system at control consoles through graphical user interface, which also can be accessed via the Internet. The ability to test remotely from the central computer saves time that would otherwise have to be used in visiting each ATS location. Also, when alarms have occurred, the paging feature has given response personnel the information needed for immediate assessment and appropriate response.

“Delivering reliable power to critical hospital systems is necessary for patient, staff and visitor safety,” said Bob Glowinski, electrical engineer, Optim. “When power to these critical systems is disrupted, it is important to know, specifically, where the problem in the system has occurred so that an immediate response can be made.”

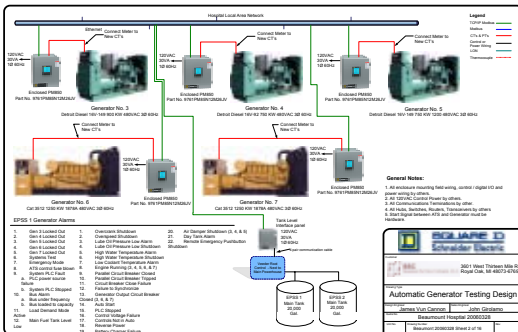
In addition, the power monitoring system provides trending information, which is used for evaluation of loading and preventive maintenance. “Our distribution system has a designed load for all our equipment, but the system helps us identify much more accurately what the actual load is, and, therefore, if there is some reserve capacity available on certain circuits,” Fox said. “We can then use that capacity elsewhere, or it helps us expand without purchasing new equipment to handle the capacity. It helps us answer the question: Do we need additional capacity?” Another feature of the system allows for partial monthly testing when areas such as operating rooms cannot be shut down and for required testing at a later date. This is done through the system's ability to “select all” and “deselect” ability with ATS lists specific to Beaumont Hospital.



Constant Change Requires Service and Support

More than just equipment, Beaumont Hospital needed reliable and local service available 24/7 for phone, site and online support, and system updating. Furthermore, the Square D team demonstrated a thorough understanding of generator and ATS systems, as well as reporting requirements throughout the process.

During construction, the Optim staff recognized that enhancements and clarifications to the original RFP could provide a system even better than originally conceived. Square D worked with Optim to incorporate the desired enhancements into the design.



“Square D was very willing to work with us and meet all our needs, and it really went above and beyond just the design scope of the project and the original RFP,” Fox said. “We never felt like we were stuck with an off-the-shelf solution; it was able to customize it every step of the way when we found something that needed to be tweaked during the process. As a result, now that the initial phase of installation is complete, the system is able to grow and expand with us over time.”

“Square D also has provided on-site and factory training to our staff so that the system can be expanded and administered by Optim in the future,” Glowinski said.

Going forward, it's understood that the EPSS will change often, and that EPSS changes create changes in monitoring system hardware and programming. To deal with that, Optim expects to have a Priority Support agreement with Square D in place by the expiration of the system start-up warranty period.

“In some cases, Optim will modify the system on projects that it completes in-house,” Glowinski said. “In other cases, Optim will provide the system specifications to electrical contractors modifying the system. Program changes will have to be made as soon as an alteration is made.”

A Strong Foundation for Future Growth

With the original scope of the project complete, a new one is now under way at Beaumont Hospital to add monitoring of essential UPSs and emergency lighting inverter systems to the emergency monitoring system. These systems are located between the EPSS now being monitored and the essential loads.

There also are plans to expand the system to other Beaumont facilities and connect them all via the Ethernet LAN to the server on the main campus.

With a reliable and robust EPSS and power monitoring system in place, Beaumont Hospital is prepared for future challenges, and for more growth in the next 50 years.

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