

Custom Global Power Systems

Eaton Large Systems Group



EATON

Powering Business Worldwide

Eaton LSG

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A hands-on approach to reliability.



Eaton Large Systems Group, (LSG), has over 40 years of experience in building and designing large power solutions to meet a wide range of specifications and applications. Using innovative technology, reliable designs, and passionate people, Eaton can tailor a power solution for the specific needs of your facility. No matter the project location, or spread of your global operations, with Eaton schedules will be met, costs will be contained, and growth anticipated. Doing it right from the beginning can greatly reduce the future risks of costly power-related downtime and allow the flow of business to run uninterrupted. Simply the most reliable power solutions available, customized for your needs.



At Eaton, we invest in developing breakthrough technology—and in the team that makes it work in the real world.

The Eaton Difference

Innovative technology drives cost-savings, efficiency and reliability, and is at the heart of all Eaton LSG custom solutions. However, our industry-leading technology only tells part of the story because the best technology in the world is only as good as the people backing it up. And that's where Eaton makes the difference. At Eaton, we invest in developing breakthrough technology—and in the team that makes it work in the real world. By understanding that you can't have one without the other, Eaton's custom power solutions marry the best technology with the engineering know-how to tailor power systems to work in complex, global installations.

Eaton LSG brings together four critical elements for reliable end-to-end power systems:

- Technology
- Team
- Global reach
- Process

Each of these areas are critical to the overall effectiveness of Eaton's custom power systems and together they deliver what customers demand: fully integrated solutions that work right, all the time.

Eaton Technology

There are many facets to consider when designing and implementing a large power system. High-capacity power needs, redundancy, integration into building management systems (BMS) and network management systems (NMS) for system monitoring, data gathering, and extended battery backup time requirements often lead customers to a system that can include redundant UPSs, software, power distribution and custom battery systems.

At the core of Eaton's custom power systems are three-phase UPSs from the Powerware® series. Long recognized for dependability, Eaton UPSs are built on technology advancements that include patents for UPS reliability, wireless paralleling for redundancy and capacity, and superior energy efficiency. Any custom Eaton power solution may include products from Eaton's portfolio of superior power technology for end-to-end power reliability:

- UPSs
- Power distribution
- Batteries
- Switchgear
- Surge suppression
- Communications
- Software

And while Eaton's existing products cover a vast range of real-world requirements, Eaton LSG's flexibility and expertise enable us to customize existing products, and even build special products to achieve your precise power requirements.

Leave it to the Experts

With all the mergers, acquisitions, consolidation and constant change in today's business world, it's almost unheard of to find people who have been with the same company, working on the same technology, for years or even decades. However, within Eaton's LSG group you'll find people with 10, 30 and even 40 years of experience working on your team. The value they bring to designing and implementing a complex power system lies not only in their unmatched technical expertise, but also in the real-world experience in understanding where the potential pitfalls and obstacles lie—and with judicious forethought they can help you avoid them. To put it bluntly, they've seen it all. From the squirrel that ate through the utility wires to the hundred-year flood to the regional blackout, they can anticipate problems and head them off at the pass. They can help you navigate the sometimes treacherous waters of building a power infrastructure that not only meets your needs, but your budget and your timeline.

With Eaton, you get a dedicated project team to track development, testing and implementation with you until your system is fully commissioned and operating. This means that you'll deal with the same people throughout the process, people intimately familiar with your system, for fast response and quick issue resolution.

Customer Witness Test Center

Specialized testing ensures end-to-end system reliability



An important step in the process of delivering the highest level of reliability is testing each large system to ensure top performance, interoperability and availability. When customers choose a custom power solution from Eaton, they come to the Witness Test Center to see the system put through its paces, giving them hands-on experience with the system that will be in their facility, and confidence that the system will operate efficiently and trouble-free from day one. With Eaton, you aren't relegated to the sidelines as an observer—you are fully engaged with hands-on experience. This is your chance to kick the tires.

The Eaton Customer Witness Test Center tests power modules, including UPS, PDU, switchgear, and static transfer switches, plus, it tests third-party equipment interfaces, a crucial capability in a multi-vendor world. In addition to testing the individual devices, the entire system as a whole is tested, ensuring end-to-end interoperability.

Experience in complicated system design.

Along with the right technology and experienced team is the established process that Eaton has developed that provides end-to-end accountability, quality assurance and project completion milestones. Your project will never "fall through the cracks" and you'll never have to track someone down for a status report.

The very nature of the custom power system business requires a proven process. Eaton uses its ISO-9001 certification as a starting place, ensuring quality from beginning to end. The Eaton custom power system process can be boiled down to five main steps:

Formal engineering and review



Makes sure the project makes good sense from an electrical and technical perspective.

Your Eaton Project Team



Applications Engineer

Conceptualizes project, defines scope of work, asks detailed questions so that your solution is well-thought-out, cost-effective and can be smoothly implemented.



Design and Drafting

Puts pen to paper, outlines project specifics down to the receptacle, outlines every part thoroughly and guarantees that everything will work together.



Project Engineer

Manages the manufacturing schedule and secures appropriate safety and electrical approvals/certifications.



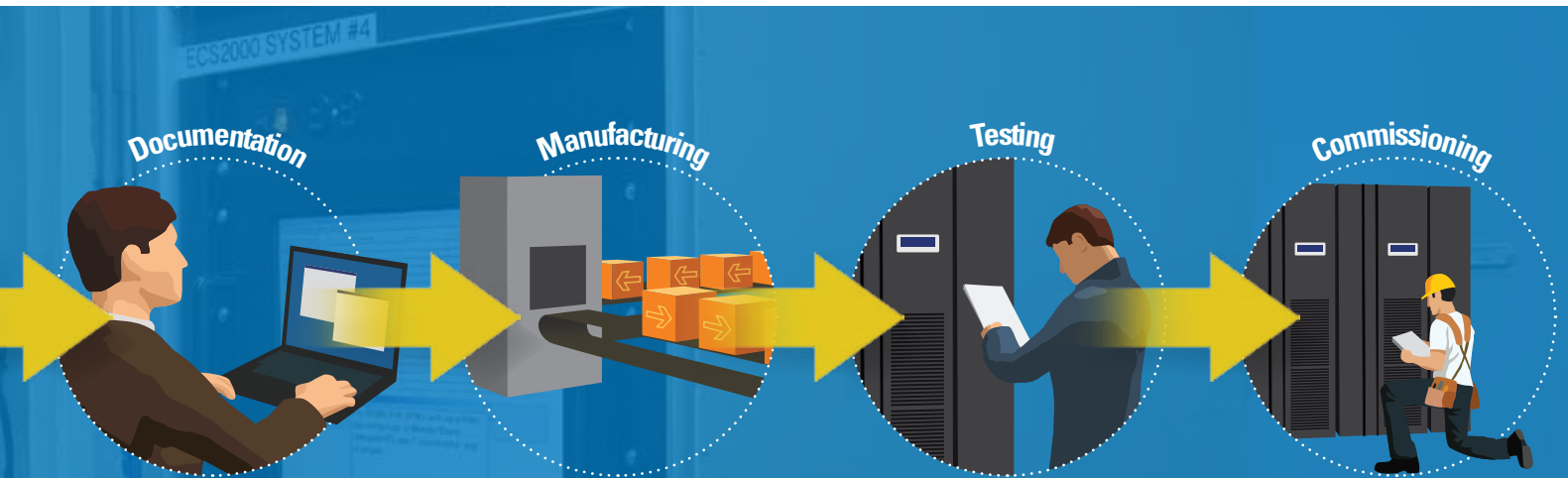
Project Manager

Your main point of contact, creates the timeline, makes sure everything happens, manages manufacturing lead times so that all products and parts are available when needed. In most metropolitan areas you'll have a dedicated, local project manager for face-to-face interaction.



Mechanical Engineer

Designs mechanical components of large systems including enclosures and custom electrical cabinets.



Detailed documentation with custom specifics are created and evaluated for serviceability. The project is assigned a unique part number so all details are available well into the future for reference by personnel not involved in the initial project development for seamless maintenance, upgrades and expansion.

Each Eaton component of your system is made to your specifications in our manufacturing facility, under the close watch of a manufacturing manager to meet schedules and project timelines. Non-Eaton components follow a rigorous Eaton-approved process to ensure they are available on time and work as specified.

The entire system is then tested at the Eaton Test Center to make sure it is operating as specified. All components are tested for interoperability so there will be no surprises when commissioned at your site. In fact, the people responsible for commissioning your system in the field are often present at the testing, ensuring that your installation is smooth.

Upon successful testing at our test center, your system is installed at your site. The system is tested on-site to eliminate and resolve any unanticipated issues, ensuring your system operates reliably from day one.



Witness testing with advanced facilities.

Raleigh, NC Customer Witness Test Center features

- Four parallel system test stations
- Voltage, current, frequency and watts monitored on all I/O circuit breakers.
- 30 MW of power available to support testing of large systems
- Higher capacities supported through a 1.75 MW 50/60 Hz engine generator as well as plug-ins for additional generators
- Test results are compiled into a custom report that is provided at the conclusion of each test

Each testing station features:

- 1 MVA UPS module bay
- Multi-module capability, including SBM
- 1.5 MW resistive load
- 0.8 pf lagging inductive load
- 0.9 pf leading capacitive load
- 50/60 Hz capability
- 208, 400, 480 or 600 Vac I/O
- 5000A load bus capacity
- DC Source



Types of Testing

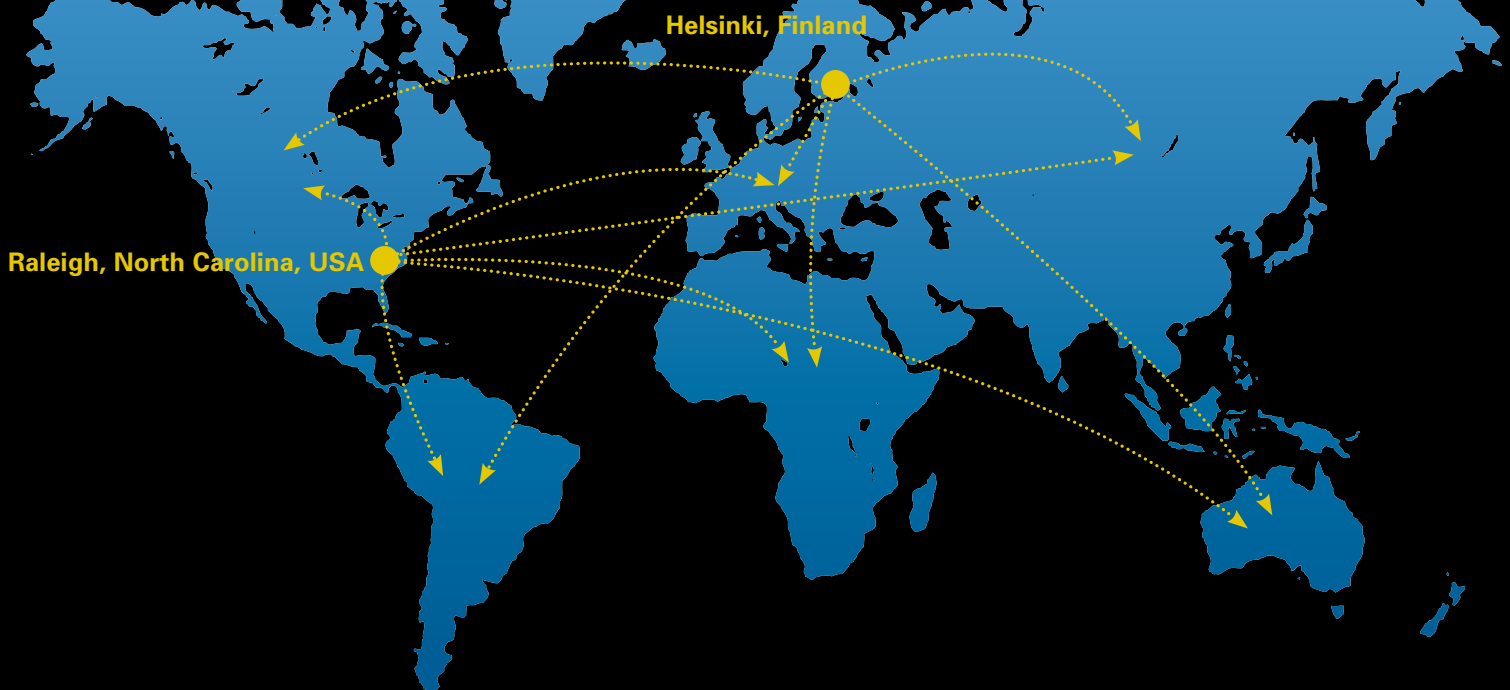
In addition to the Raleigh facility, Eaton also has a European test center in Helsinki, Finland. Each test is customized based on the system components and configuration but most tests include:

- Steady-state – 0% to 100%, plus overload, unbalanced loading and non-linear
- Loading Dynamic – 0% to 100% step loads, plus overload, unbalanced loading and non-linear loading
- Fault testing at various PF, both leading and lagging
- Testing using real batteries
- Third-party interface testing (switchgear, generator, batteries)
- Software testing, if applicable
- Powerware Hot Sync® wireless paralleling, selective tripping

System Performance

Testing typically takes about a week and certify individual device and system performance, including:

- Voltage regulation
- Frequency
- Input and output power factor
- Efficiency
- Harmonics



Global Reach

The rise of multi-national corporations and organizations has increased the complexity IT departments face. It's one thing to design for a single data center in a single location. It's a whole other world to create an infrastructure for a global enterprise with far-flung locations around the world. Eaton understands these challenges and is uniquely qualified to reduce the complexity, increase the reliability and render power problems moot. With offices and testing centers throughout the world, you will also have Eaton-trained and Eaton-employed CSEs monitoring, maintaining and servicing your power infrastructure.

Perhaps most importantly, Eaton has global UPS platforms deployed around the world. This means that your system in New York looks and works the same as your system in Dubai and your system in Johannesburg. This uniform approach greatly streamlines designing, deploying, maintaining and expanding global power systems for increased cost-effectiveness and reliability.

In addition to the witness test centers in Raleigh and Helsinki, Eaton has offices, plants and service operations around the world, including China, India, Canada and New Zealand. Our expansive global reach ensures a smooth, coherent implementation, and fast response to anywhere in the world.

Green Power

Managing power costs through energy-efficient technology and reducing energy consumption not only makes good business sense, but also good environmental sense. Eaton is a leader in driving down energy consumption costs as well as meeting global green initiatives. Eaton offers a broad range of energy efficient and environmentally-friendly electrical solutions that can help a building go green and qualify for Leadership in Energy and Environmental Design (LEED) credits through the U.S. Green Buildings Council (USGBC®).



In addition to its Ultra-efficient UPS, which offers 99% efficiency, Eaton is a leader in developing green technology. From fuel-cell installations to flywheel technology to alternative data center voltages, Eaton LSG can help you customize a green solution that helps the environment—and your bottom line.

UNITED STATES
8609 Six Forks Road
Raleigh, NC 27615 U.S.A.
Toll Free: 1.800.356.5794

www.eaton.com/powerquality

CANADA
Ontario: 416.798.0112

LATIN AMERICA
Brazil: 55.11.3616.8500
Caribbean: 1.949.452.9610
México & Central America:
52.55.9000.5252
South Cone: 54.11.4343.6323

EUROPE/MIDDLE EAST/AFRICA
Denmark: 45.3686.7910
Finland: 358.94.52.661
France: 33.1.6012.7400
Germany: 49.0.7841.604.0
Italy: 39.02.66.04.05.40
Norway: 47.23.03.65.50
Portugal: 55.11.3616.8500
Sweden: 46.8.598.940.00
United Kingdom: 44.1753.608.700



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Management®**

ASIA PACIFIC
Australia/NZ: 61.2.9693.9366
China: 86.21.6361.5599
HK/Korea/Taiwan: 852.2745.6682
India: 91.11.2649.9414 to 18
Singapore/SEA: 65.6829.8888

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