

A man in a purple shirt is looking at a tablet in a server room. The server racks are filled with equipment, including Ovation and PowerEdge units. The scene is dimly lit, with blue light from the server racks illuminating the man's face.

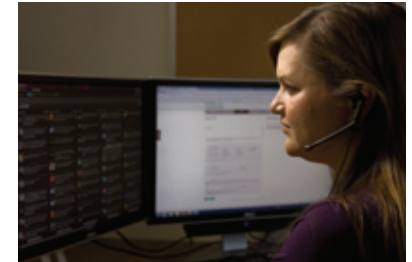
# INTEGRATED POWER SYSTEMS FOR DATA CENTERS



“Cat® standby integrated power solutions mitigate company risk and play a critical role in allowing SAS to implement a wide range of environmentally responsible practices and technologies.”

– Jerry Williams, SAS program manager for environmental sustainability

SAS headquarters in Cary, North Carolina, USA, requires reliable power for critical systems that support ongoing software development, technical support, sales and other business operations. The Cat team designed a true integrated system into the sequence and provided turnkey support.



#### **CUSTOMER**

SAS

#### **LOCATION**

Cary, North Carolina, USA

#### **CUSTOMER BUSINESS ISSUE**

Backup power for global provider of business intelligence solutions

#### **SOLUTION**

- 17 Cat diesel generator sets ranging in output from 150 to 1825 kW
- Cat UPS 300 Series, UPS 900 Series and UPS 1200 Series uninterruptible power supply systems
- Cat custom XLM switchgear
- Delivery, set-up, installation and maintenance

#### **CAT DEALER**

Gregory Poole

# IT'S OUR JOB TO PROTECT YOURS.

The phrase “mission critical” says it all. Your data cannot be compromised – and that requires a power system delivered by people who never compromise either. Every day, the people at Caterpillar work tirelessly to design, manufacture and support the products that give you 100 percent uptime.

As the world evolves into a more digital economy, the need for critical, conditioned power is increasing by the day. We serve hundreds of data centers across the globe but, like fingerprints, no two are the same. That's why your unique challenges and every critical item on your checklist drive the design of your power system.

Our customer-focused approach requires people with the knowledge, focus and global presence to come through for you without fail. Once we assess your specific situation, we will develop a fully integrated power system designed to operate and work seamlessly together. And we will tailor each component to develop a fully optimized system, including attachments and performance options to meet your specific application.



# WHY WE'VE BECOME THE LIFELINE FOR DATA.

Digitized information has reshaped commerce in every way, bringing new efficiencies and unprecedented access. The only challenge is that without power, data is rendered useless – or worse, lost completely. Below are a few of the data centers that turned to us to serve as the backbone of their business.



**IO DATA CENTERS – PHOENIX, ARIZONA, USA**

For their Phoenix facility, ranked among the ten largest data centers in the world by Data Center Knowledge, IO Data Centers selected Cat dealer Empire Power Systems to provide backup power system solutions.

The IO Phoenix site is currently served by a dedicated, on-site substation, expandable to 120 MW. Empire Power Systems has deployed and supports more than 27 MW of uninterruptible power supply (UPS) systems and 58 MW of Cat 3516 backup generators. The generator sets feed into Cat paralleling switchgear.

“If something goes wrong with an engine generator, we want to be teamed up with a company that has a large global footprint, and that has a very good stock of parts in its service center to respond to what is needed right away,” explained Andreas Zoll, vice president for engineering and development for IO. “This is the major reason that we are so closely partnered with Empire.”



**DOCLERWEB DATA CENTER – BUDAPEST, HUNGARY**

DoclerWeb provides co-location, server hosting and application hosting to hundreds of customers, allowing them to offer complex Internet portals, databases or multimedia content in a safe, high-standard technical environment to a large number of visitors from all over the world.

They turned to local Cat dealer Huntraco for an integrated power system, including a Cat 300 Series UPS unit and a Cat 3516B-HD 2500 kVA diesel generator set. The Cat UPS provides up to 750 kVA of power and, when combined with the generator set, provides stable, clean, quality power for DoclerWeb's data center and the rest of the company's facilities.

The radiators for the engine were installed on the roof of the building as opposed to the typical placement in the generator room, leaving space for an additional generator set that will be needed as the data center expands. "Only Huntraco was able to offer a customized solution that included the installation of a cooling system on the roof," said Balazs Sarkadi, sales engineer.

# INTEGRATED SOLUTIONS WITH YOU IN MIND.



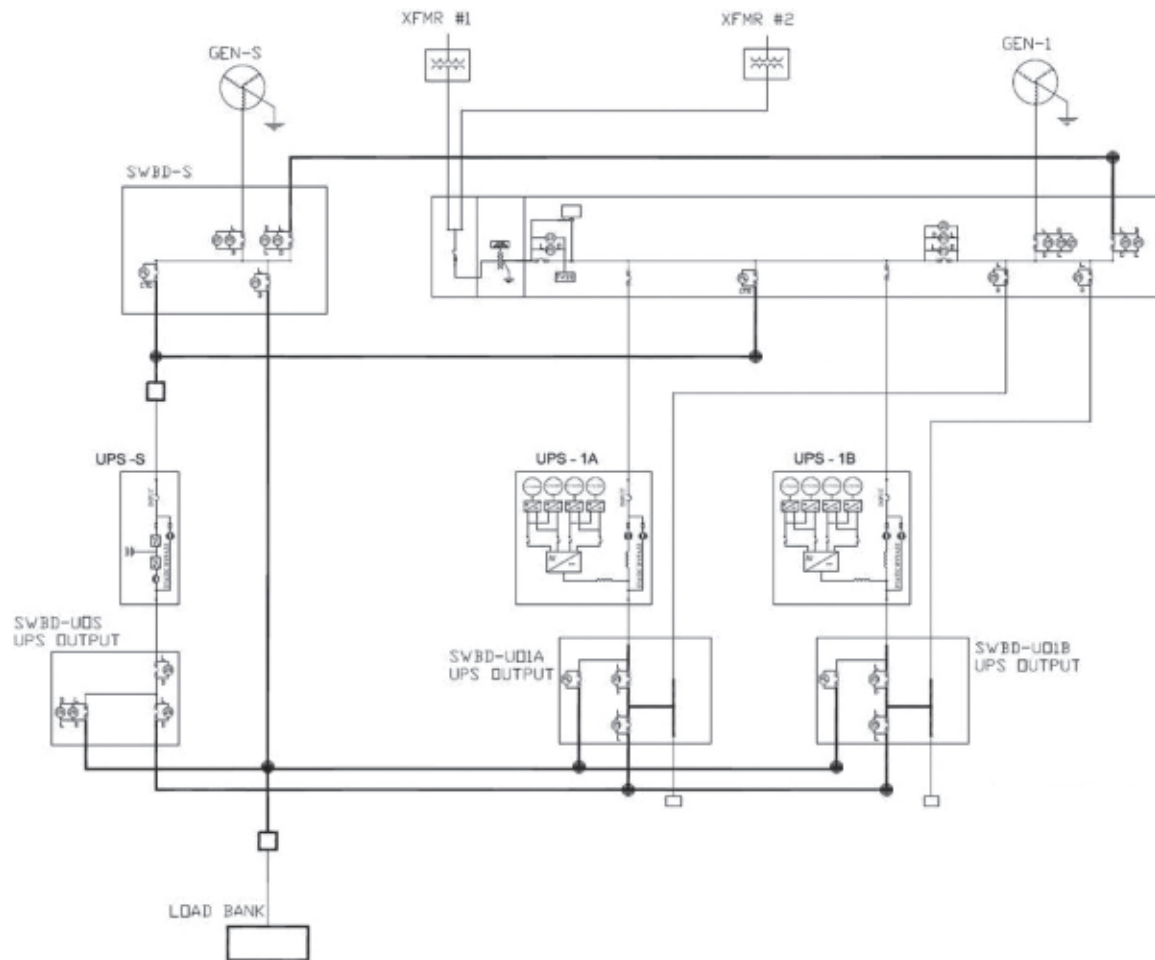
Generator Set



Double Conversion/Battery UPS



Flywheel UPS & Paralleling Switchgear



UPS Output Gear



System Monitoring & Control



Cat Dealer Service

When it comes to designing a customized power solution for your data center, having strong support throughout the configuration, installation and operation is crucial. With Caterpillar, you will be working with a single source provider with a broad range of solutions readily available – delivering the products that you need to power your operation, and the necessary support to keep your facility up and running.

Pre-configured Cat components will decrease site installation time and cost, while increasing overall system reliability. Additionally, Caterpillar tailors each component to develop a fully optimized system via attachments and performance options to meet your specific application.

From diesel- and gas-powered generator sets to UPS, ATS and switchgear, Caterpillar has everything you need to maintain clean, uninterrupted power for your business operations. All Cat products are designed to work together, with all elements relating to the generator set production, control and monitoring functions integrated into a single-source package.

You'll also have the benefit of a single source for parts and service. Your local Cat dealer is always available to provide the support you need, from system design to long-term maintenance.

To us, delivering an integrated solution means providing the custom power system that your project demands from one provider. For you, installing an integrated solution means you get the answers you need from one convenient partner, saving you time and work so you can keep focused on the job ahead.

# DIESEL AND GAS GENERATOR SETS

Information is power. To keep that information flowing, you need to be sure your power source is never compromised. We are a leader in the manufacture of diesel and gas generator sets and mission critical applications with more than 450,000 kW installed in data centers and hospitals in a single year.

We are also a leader in developing cleaner and more efficient generator sets to meet the increasingly stringent global emission requirements. Our focus on optimized engine performance to achieve lower emission levels has resulted in more cost-effective solutions for you.

Whether you install a Cat diesel or gas generator set for continuous or standby use, your data center will be protected with consistently reliable performance. Our engineering programs demand some of the most stringent testing requirements in the industry, which means that the products are manufactured to run for thousands of hours without overhaul.

Data centers reduce operating costs by implementing a combined heat and power (CHP) system using clean pipeline natural gas as a fuel source. Cat gas generator sets can simultaneously provide electricity for electrical loads and convert waste heat into a server cooling source via absorption chillers. The result is a power system with energy efficiency up to 90 percent, reduced energy costs, smaller carbon footprint and Energy Efficiency Points toward Leadership in Energy and Environmental Design (LEED) Certification.



**CAT DIESEL GENERATORS**  
12 to 17,460 kW / 15 to 21,825 kVA



**CAT GAS GENERATORS**  
66 to 6,520 kW

Advantages to you :

- Powered by Cat engines for the reliability you demand
- Wide range of factory-designed options to meet your requirements
- Easy to specify, permit, install and test
- Low life-cycle costs
- Excellent transient response and steady state performance
- Emissions compliance with most worldwide regulations
- Single source and turnkey support from the Cat dealer network



# UNINTERRUPTIBLE POWER SUPPLY (UPS)

When it comes to your data, every second counts. Surges, sags, spikes, failures – your business can't tolerate any of these. The Cat UPS with flywheel or battery (double conversion) energy storage provides immediately available power to ride through disturbances and conditions power from the source. When integrated with other Cat products – including generator sets, ATS and switchgear – you can be assured of the cleanest, most reliable source of power protection.

Advantages of the flywheel UPS to you

- Lower operating/maintenance/replacement costs
- Smallest available footprint
- Complete system capable of operating at 40°C; no need to up-size HVAC systems
- Industry leading Total Cost of Ownership



Advantages of the double conversion UPS to you

- Lower initial capital investment
- Ability to support extended and ride through requirements
- Continuous control of UPS output sine wave
- Up to 94 percent total UPS system efficiency
- Electrical isolation between input and output

# PARALLELING SWITCHGEAR

The amount of control you require varies from application to application. That's why, for simple or complex applications, Cat switchgear provides paralleling capability for multiple generator sets, with single or multiple points of utility connection.

Our switchgear also provides a single point of monitoring and control of your complete solution, including Cat ATS and Cat UPS. When you combine switchgear with Cat generator sets, you get an integrated solution that meets your unique requirements.

## Advantages to you

- Available 208 V to 35 kV
- Intuitive and easy-to-use graphical operator interface (minimizing potential for operator errors, and integrating other elements of your Cat system such as generator sets, ATS and UPS)
- Redundant communications bus and distributed control processing ensure the utmost in reliability for data center applications
- Automated reporting capability, including generation of custom reports and real-time PUE
- Available in a broad array of configurations, including highly customized designs specifically developed to address specific site requirements



# AUTOMATIC TRANSFER SWITCH (ATS)

To ensure you have the power you need, a fully integrated system designed to operate together is crucial. And if your first indicator – your ATS – isn't reliable, your entire system can be compromised. Caterpillar offers you a broad range of transfer solutions and ATS products designed for mission critical applications. These transfer schemes can be arranged to suit any application from simple to highly complex multiple ATS/generator set switchgear systems.

## Advantages to you

- Available in sizes from 40 to 5000 amps in 2, 3 and 4 pole configurations
- Contractor and circuit breaker-based solutions for flexible coordination
- Open, closed and delayed transition designs available to meet your specific needs
- Bypass/Isolation type ATS (UL/IEC type)
  - ATS and bypass mechanisms rack in/out with door closed to maximize operator safety
  - Bypass operation accomplished with door closed, again maximizing operator safety
  - Load is not interrupted during bypass operation
  - Interchangeable ATS and bypass mechanisms provide the utmost in redundancy
  - Full automatic mode functionality is maintained with ATS in bypass

# PACKAGING SOLUTIONS



No matter how remote your location, a custom package containing Cat electric power equipment can meet your project specific needs in any environment. We have dedicated resources to help provide solutions for your most complex design issues. Caterpillar can provide the flexible resources to design and procure custom parts not available in our standard price list, so that you can meet and exceed your project goals.

## Advantages to you

- Accountability for entire package and system integration
- Complete set of documentation from single provider
- Reduction of inventory carrying costs and labor resources
- Ability to leverage global Cat parts and service network
- Worldwide warranty

# CONTROLS – EMCP 4

The EMCP 4 controllers feature the reliability and durability you have come to expect from your Cat equipment. EMCP 4 is a scalable control platform designed to ensure reliable generator set operation, providing extensive information about power output and engine operation. These systems can be further customized to meet your needs through programming and expansion modules.

## Advantages to you

- Intuitive navigation and configuration
- Advanced telemetry capabilities for remote communications to ensure safety for operators
- Complete engine and generator monitoring, protection and control
- Generator protective relays, including over/under voltage, over/under frequency, over current and reverse power
- Communication options over Modbus and ethernet
- Expansion modules, including local annunciators, remote annunciators, input/output and generator temperature monitoring



# YOUR CAT® DEALER IS HERE WITH THE ANSWER.

Cat dealers are committed to cost-effective, quality controlled, fast turnaround service. Their service facilities represent a substantial investment in plant, tooling, diagnostic and testing equipment – as well as in people.

Combined, Cat dealers have over 140,000 employees and more than 75 percent are engaged in product support to help customers attain maximum value and reliability from their Cat products.

You can count on technical assistance being just a phone call away 7 days a week, 24 hours a day. Cat dealers are committed to having someone at your facility within two hours of a reported problem. On average, there is a service location within a 35-kilometer (20-mile) radius of every one of our customers' facilities. Cat service, along with unparalleled parts availability, helps us ensure the long-term reliability of your Cat power system.

## **ADVANCED ELECTRICAL SERVICES**

Along with proper configuration and installation of your power system, Cat dealers are also equipped to coordinate your necessary long-term electrical system maintenance, testing, retrofit and engineering service needs such as infrared thermography, circuit breaker testing and arc flash studies. You can depend on us to be your partner for all electrical power servicing needs before, during and after the installation of your electrical system components.

Cat dealers are in full compliance with global and local regulations to minimize the risk for personal injury or product damage. Proper testing and maintenance from your Cat dealer can minimize your exposure to major financial risks, legal risks and regulatory violations caused by unexpected downtime.

## **ELECTRIC POWER RENTAL FLEET**

From planned events to unplanned power outages, having a temporary power plan in place is crucial to ensuring you have power when you need it. Dealers carry a large equipment inventory (including generator sets, temperature control, chillers, load banks, ancillary equipment) and all dealers work together – 1,600 locations strong. That means your dealer is never “rented out.” Make one call and your equipment is on the way no matter how many, how soon or for how long. Your dealer does the legwork, backed by the worldwide strength of Caterpillar, to get your equipment delivered, installed, fueled up and ready to run.

Our electric power rental fleets offer experienced technicians and engineers to help support your data center facility in managing emergency contingency plans.



# PEACE OF MIND. EVERY SINGLE DAY.

Your power system simply cannot fail. To ensure that you are able to maintain your system simply and affordably, we offer Extended Service Coverage, Customer Support Agreements and unparalleled parts availability.

## **EXTENDED SERVICE COVERAGE**

Your Extended Service Coverage offers transferable coverage beyond the standard warranty period, for all Cat branded electric power equipment. Extended Service Coverage protects against unexpected repair bills and a hedge against rising parts and labor costs by providing 100 percent parts and labor reimbursement for covered components, less any applicable deductible. The broad range of coverage options, which can be customized to suit your individual needs, combined with simple pricing terms provides confidence and peace of mind toward your power system's performance.

## **CUSTOMER SUPPORT AGREEMENT**

Your Customer Support Agreement is an individualized arrangement between you and your Cat dealer that helps you maintain your products while lowering your cost per unit of production, regardless of the size or age of your product. Agreements are tailored to fit your business needs and can range from simple preventive maintenance kits to sophisticated total cost performance guarantees. No matter which option you choose, you can be assured that your Cat dealer will provide you with the careful planning and ongoing attention that will help you succeed.

## **PARTS AVAILABILITY**

Your Cat dealer is equipped with a parts inventory and access to the global Cat parts network to fulfill 98 percent of parts orders within 24 hours from the time of order. We know that having the right parts on hand is crucial to keep your power system running, so we also provide 24/7 access to information at [parts.cat.com](http://parts.cat.com). Here, you will find videos, reference material and specs on Cat original, Classic™ and remanufactured parts, as well as information on repair and maintenance parts for your Cat electric power products, all manufactured to original equipment specifications and recommended by Caterpillar.



## DETERMINED THAT YOUR DATA CENTER NEVER LOSES A NANOSECOND.

The Cat® team shares your focus on protecting your customers – and your good name. You'll have a total power solution that delivers the 100% uptime data centers require, with easy installation and the lowest total cost of ownership. See why the world's largest search engines, social media sites and software companies rely on Cat power systems. We keep the power on, so you can keep your mind on getting things done.

[www.catelectricpowerinfo.com](http://www.catelectricpowerinfo.com)



LEXE0472-00 June 2012

CAT, CATERPILLAR, their respective logos, "Caterpillar Yellow," the "Power Edge" trade dress, as well as corporate and product identity used herein, are trademarks of Caterpillar and may not be used without permission. © 2012 Caterpillar. All Rights Reserved.

