

Case Study

Alcoa's Critical Operations Stay Up and Running with Falcon Electric UPSs

Alcoa is the world's leading producer of primary aluminum and fabricated aluminum, as well as the world's largest miner of bauxite and refiner of alumina. In addition to inventing the modern-day aluminum industry, Alcoa innovation has been behind major milestones in the aerospace, automotive, packaging, building and construction, commercial transportation, consumer electronics and industrial markets for more than 120 years. Alcoa employs approximately 59,000 people and operates in more than 200 locations in 31 countries.

Its aluminum reduction plant located in Massena, NY spans 5,000 acres and operates like a small city, including owning and operating several electrical power substations. The Massena plant is the longest continually operating aluminum facility in the world, serving customers in the automotive, transportation, aerospace and industrial distribution markets.

At its Massena facility, Alcoa operates an integrated aluminum smelting/fabricating facility and a smelting/casthouse facility. The two smelters produce a combined total of 252,000 metric tons of molten aluminum per year. With this type of production output, Alcoa won't take any chances with its power. Even with owning its own 115kV transmission lines and operating its own power substations, power interruptions are still a

threat to keeping production up and running 24 hours a day, all year long. "The aluminum reduction process is very sensitive to power outages and in fact, after about four hours of lost power, the pot lines are at a state where they can no longer be restored and a very expensive restarting process has to be undertaken to restore production," said Bryan Murphy, staff electrical engineer for Alcoa.


A pot line is like a large battery with an electrolytic process, so once the current stops flowing, it holds the voltage for a period of time, but as time goes on, the metal starts solidifying, cools off, and will start to freeze. If this happens, the process has to be started over – and this is no easy feat. "The pot is the size of a swimming pool and the anode along with the bath, aluminum, phosphate and other materials have to be jackhammered out.

The restarting of this process is problematic as it's very costly and time consuming," said Murphy. Because of the critical nature of the aluminum reduction process, Murphy and the Power System Group needed to find power protection systems that could meet the very high requirement of uptime, as their current uninterruptible power supplies (UPSs) had reached their end of life. Redundancy and scalability were also important criteria for any new UPS systems to assure continuous operations.

“The speed of delivery and customer service from Falcon has been excellent and build quality of the FN Series units are top notch.”

– Bryan Murphy,
Staff Electrical Engineer
Alcoa



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In Murphy's research he found that Falcon Electric's FN Series Scalable N+1 Tower UPSs would fit his precise requirements for protecting the main power control room that controls remote operations plus the intake water system. "Besides full redundancy and scalability, we also needed UPSs that we could easily transport from one floor to the other and roll into place. Most UPSs are of a rack mount design and that won't work for us," said Murphy.

Falcon's FN Series family of scalable N+1 redundant UPSs are designed to meet the rigorous power demands that Alcoa required. The FN Series is able to regenerate a pure power source, acting like a firewall between a computer and the generator, shielding against noise and harmonics. The doubleconversion on-line UPS includes a very fast processor that utilizes digital signal processing (DSP) technology, improving performance, capability and reliability. The FN UPSs are stand-alone units that can be connected in parallel, providing low-cost, scalable solutions from 3kVA up to 40kVA. This approach eliminates the added expense of buying cabinets to house power and battery modules.

"Now we can have a standardized modular solution that can be scaled up to accommodate the control station capacity - in our case four FN Series (4kVA units in an N+1 arrangement) - or scaled down to a smaller substation level configuration (two FN 4kVA in N+1). This flexibility allows us to purchase a standard unit as a spare that can be used in any location or for a working spare to be borrowed while a new unit is ordered to replace a failed unit," said Murphy. "In our control station we are running at a 10 percent load so hopefully we'll have a few hours of backup power. And if we can't get things back up in four hours then we have worse problems."

"The speed of delivery and customer service of Falcon has been excellent and build quality of the FN Series units are top notch," said Murphy. It's been great from a support standpoint that Falcon has been able to provide the units so quickly. Should we lose a unit, we know that we can get it replaced fast."



**FN Series Scalable N+1 UPS Tower-
3kVA to 40kVA**

Advanced Features:

- Parallel Units with a Single Output of up to 40kVA
- True N+1 Redundancy
- ECO Mode: 97% Efficiency
- DSP Double-Conversion On-line Sinewave Design
- Input Power Factor Correction
- Programmable 50/60Hz Frequency Conversion
- Precision Output Voltage Regulation
- Extended Brownout, Surge & Transient Protection
- Remote Emergency Power Off (REPO)
- Optional Extended Battery Banks & Chargers
- RS-232C, USB & Optional SNMP/HTTP Agent



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