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IEM Hosts CFRT Membership Meeting

Fremont, CA, September, 2010 – CFRT (Critical Facilities Round Table) provides an open forum for members and their guests to come together and share information and to witness cutting-edge mission critical solutions, with the intention of helping each other improve in technical expertise and develop solutions for the challenges of day-to-day critical facilities operations.

The September CFRT Membership Meeting was hosted by Ed Rossi and Industrial Electric Mfg. (IEM), providing presentations and discussion on the following topics.

Agenda

- Data Center Kyoto Cooling Air Economizers – Humid & Dirty Air
- 5000 KV Electrical Distribution Equipment for Data Center Energy Efficiency
- Rotary UPS Systems with Frictionless Bearings
- Modular UPS with Operating Bypass Mode
- Electrical Power Conditioning Proven to Improve Equipment Performance, Energy Efficient
- Electrical Distribution & Minimizes Waste Heat
- Real Time Electrical Signal Monitoring Identifies Power Quality Problems to Help Prevent Equipment Failure, Improve Energy Efficiency and Monitor Branch Lines
- Quick Connect Server Busway Minimizes Installation Costs and Maintenance of Electrical Distribution Systems
- Motor & Compressor Controls Improve Equipment Performance Sometimes Better than VFD's
- Opportunistic Removal of Heat from the Refrigeration Loop Allows HVAC Systems to Work Less and Save Energy

Mr. Rossi conducted a factory tour and gave an overview of IEM's perspective on electrical distribution in the growing data center market.

Q. Ed, can you give us a brief description of your company and its history?

A. IEM is an independent electrical equipment builder with history back to 1950 when Frank Howe started producing equipment in a barn in Fremont, CA. He remained fiercely independent during industry consolidations in the later 1950s and developed an approach to the business that allowed him to remain a market share leader in Northern California until the 1980s. His innovation and early adoption of CAD/CAM methodology was key to establishing that leadership in Silicon Valley.

We've tried to continue that independent spirit and to implement new technology to grow our business beyond the local market with a focus on customers who want and need specialized solutions to their power distribution needs. The efforts of our 135 employees have resulted in revenues of over \$50M last year, and we are poised for significant growth.

Q. How would you summarize the energy efficiencies of using medium voltage power in data center applications?

A. Most data centers require large amounts of power that the utility company supplies at medium voltage which is technically defined as 2,400 to 38,000 volts. Data centers are normally provided with power between 12,000 to 34,500 volts. The normal distribution strategy is to transform the utility power to a lower voltage (generally 480 volts) and to distribute large blocks of power at that lower voltage.

Our view of power efficiency in data centers is focused on what we know – power distribution. Every time electrical power is transformed in terms of voltage or from AC to DC or DC to AC, there are losses that generally also have a heat impact where they occur. Our strategy is simple: minimize the number of required voltage or system changes and the result will be fewer losses. By using medium voltage further into the system (even onto the raised floor) that goal can be accomplished and gains in efficiency of 8 to 15% can be realized by the data center operator.

Q. Most data centers focused on energy efficiency think of Direct Current (DC) when they think of power greater than 220V. Could you describe why it's not necessary in your vision of energy efficiency?

A. DC systems over 480V are not widely used in the sites that we have seen, so I'm not familiar with all of the implications of higher DC voltage systems. DC power does have advantages in regard to synchronizing various sources more easily than AC; and larger AC to DC conversion devices (an AC to DC conversion is ultimately required within the server with an AC system) may well prove more efficient. At the same time, DC power has its own set of challenges since it is far more difficult to interrupt DC power than AC and simple things like the plugs to connect servers to the system need to take this fact into account. In any case, the two strategies are not necessarily in conflict since the final conversion can be made from the medium voltage AC system to either an AC or DC floor distribution system.

Q. How long do you think before 4160 power is brought into the mainstream data center as a pilot, and how long will it take to gain acceptance as an industry standard?

A. There is an operating 4160V system in a major data center that is in full operation today. The major issue has been the availability of distribution equipment that is more suitable to the data center environment and the associated operating needs. We expect that there will be significant interest now that such equipment is available, and I doubt whether it will take more than a few years for MV to be a common distribution voltage. The challenge for full implementation will likely be the availability of MV UPS systems that don't require transformers.

Q. When you roll out your higher voltage cabinets, will the competitive landscape be different than it is today?

A. All major manufacturers have MV products. All of those manufacturers have a strong market presence and loyal users. The manufacturers' challenge will likely be to adapt their existing MV products that were designed for utilities and heavy industrial users to meet the new needs of the data center markets. Most of those manufacturers also have UPS companies that have a significant investment in 480V systems that will require major changes to adapt to an MV distribution system. I'm not certain how those companies will respond; whether they will respond with new products or try to resist any changes. We also know that at least some of the data centers will continue with their current 480V or 600V systems for expansion and new sites rather than re-train their personnel. Other users – and we hope there will be many of them – will be eager to get the operational advantages of a lower cost system that uses MV distribution.

About IEM

Headquartered in Fremont, CA, IEM is the largest independent full-line manufacturer of electrical distribution and power quality equipment in the U.S. For over half a century, IEM has delivered customer-specific solutions to meet the ever changing power requirements of growth industries in North America. At IEM, tradition and technology still drive innovation. An experienced engineering staff and one of the most flexible design and manufacturing systems in the industry set IEM apart from standard product manufacturers.

About CFRT

The Critical Facilities Roundtable (www.cfroundtable.org) is dedicated to the discussion and resolution of industry issues regarding mission-critical facilities, their engineering and design, and their maintenance.