



Eaton's busway enables smooth operations and new levels of data center flexibility

Location:

Southeastern United States

Challenge:

Establish a highly reliable, scalable and modular power distribution system capable of supporting the evolving needs of a 470,000 sq-ft data center

Solution:

Eaton's Pow-R-Flex™ busway and receptacle units for durable, flexible, secure, and easy-to-install power distribution

Results:

Successful implementation of a robust and flexible power distribution system that emphasizes change and adaptation while improving personnel safety and white space aesthetics

Background

When a major American multinational telecommunications corporation announced that it would invest \$200 million to build a major 470,000 sq-ft data center in the Southeastern U.S., it recognized the need for a highly scalable and reliable power distribution system capable of supporting the growing needs of its user base of more than 128.6 million mobile customers.

The goal was to deploy a power distribution network that would not only meet its current regional requirements, but also provide the agility to quickly expand to meet the demands of the future—all while minimizing upfront costs and labor.

Challenge

For years, traditional data centers were designed around clean aesthetic rooms, and power cables were layered below floor tiles. That design made it difficult to implement upgrades and changes. Further, it created airflow issues with the underflow cooling.

The next-generation data center design implemented by the telecommunications corporation would shift the under floor power cables overhead, using cable tray, to improve cable organization. However, this approach would not completely solve the problems encountered with changes and upgrades, as modifications in cable routing and outlet wiring take time and can be costly.

Most large data centers add or replace server racks frequently as the workloads they support increase. For this reason, the company required a dynamic, yet solid, electrical foundation that would allow for rapid growth and change.

After consulting with Eaton's application experts, the project team saw value within Eaton's innovative power distribution strategy that could enable modular scalability while lowering financial risk and promoting a more reliable environment throughout the lifecycle of the data center.

At the heart of Eaton's proposed solution was busway, a flexible and expandable approach to power distribution that would enable the data center to accommodate changes more swiftly, simply and cost-effectively.



Powering Business Worldwide



Data centers have long distributed electrical power via cable and conduit. Busway is a more efficient alternative for accomplishing the same goal. The ceiling mounted power distribution solution includes the following core elements:

- **Conductors:** Also known as busbars, these are solid bars of either copper or aluminum that conduct electrical current
- **Housing:** This is a metal enclosure, typically made of aluminum, that contains the conductors
- **Insulation:** This key component prevents electrical faults by separating conductors from one another and from the unit's housing

In addition, power distribution systems using busway would not require the corporation to purchase remote power panels, so the company could lower capital outlay and conserve expensive floor space. Further, the busway's size advantage over cable and conduit would result in increased airflow, easier air management and lower cooling costs.

Solution

The corporation developed a power distribution infrastructure primarily composed of Eaton's Pow-R-Flex low ampere busway product. The solution is designed to provide flexible power distribution for many applications where change and adaptation are important, and its heavy-duty design does not sacrifice on aesthetics.

Eaton's unique receptacle plug-in unit design makes the Pow-R-Flex line the most flexible in the industry. Pow-R-Flex receptacle plug-in units arrived at the data center site fully assembled and wired to reduce installation time. Each unit was also built-to-order based upon the receptacle type and the rating combinations required.

Eaton's phase optimization program took the worry out of balancing the current load on each phase of the busway system. This vital service allowed the data center design team to ensure that individual receptacle plug-in units were optimally phase balanced. Additionally, all the receptacle plug-in units for each run were optimally phase balanced against each other to achieve the best possible current equalization on each run.

For ease of installation, Eaton's Pow-R-Bridge joint connections allow the busway sections to be joined to each other quickly without the use of special tools. Further, the busway sections are reusable and can be added, removed or repositioned per user requirements, allowing the company to make adjustments without the need to purchase additional units.

The data center needed to be available all of the time. So, as circuits need to be added or removed, the busway needs to remain energized. For this reason, Eaton engineered the Pow-R-Flex with enhanced safety in mind. All Pow-R-Flex busway ratings and configurations have been tested and listed to UL® 857 safety standards, and all conductors remain fully enclosed, eliminating any incidental contact with live conductors from hands, tools and wire. For extra protection, plug-in provisions along the busway have a spring closure safety shutter that automatically opens and closes when a plug-in is inserted or removed.

To ensure the entire design and installation process went as smoothly as possible, Eaton's expert team of field engineers remained on-site throughout the entire process—from design to installation and startup—with full commissioning services to ensure maximum safety and reliability.

Results

It has long been proven that the total installed cost of a busway system is less than the cost of a traditional wire and conduit system. Because busway is engineered and built to specific layout needs, and shipped ready for installation, it can be installed with only 40 percent of the labor required for conduit and wire systems.

For this multinational telecommunications corporation, the application of Eaton's busway provided a ready-to-install power distribution solution that minimized installation time and labor while eliminating the need to purchase remote power panels, additional cables, trays and outlets. In addition, each outlet and plug-in unit was delivered fully wired, which helped the company greatly maintain its project timeline.

The telecommunications company also achieved a more reliable system with safer working environments for personnel, through the ability to make changes to circuit configurations without needing to de-energize runs.

Additionally, the reusable, re-routable and expandable solution is allowing the customer to change data center layout at any time while reducing material costs and contributing to a more flexible, scalable power distribution system.

Finally, busway uses less copper and steel compared with cable and conduit, wastes less material, and can be easily reused to meet changing power distribution needs. This means the company can take pride in making less environmental impact while achieving a more efficient data center design.



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