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Display Demonstrates Increasing Viability Of 400-V DC For Telecom And Datacenter Applications

In response to the increasing interest in 400 V within their industries, several notable suppliers to the datacenter and telecom industries including Anderson Power Products (APP), Emerson Network Power, IBM, Universal Electric, NTT and Vicor demonstrated a 400-V dc ecosystem during the recent INTELEC conference, which was held Sept. 28-Oct. 2 in Vancouver. The display featured all the components necessary for a fully functioning 400-V dc deployment for datacenter or telecom environments, including power supplies and conversion systems, busway, power distribution units (PDUs), servers, network switches, connectors and breakers. More than 20 manufacturers were represented.

In the past, the ready availability of UL-certified, production-level equipment has been a challenge to 400-V dc adoption. Two years ago, at INTELEC 2012 in Phoenix, Emerson Network Power and Vicor hosted a demonstration of 400-V technology (also referred to as 380 V dc) to help educated customers about the overall power architecture and the availability of 400-V ready equipment.

However, as Maurizio Salato, director of systems engineering at Vicor explains, that earlier demonstration was a table-top demo that served primarily as a proof of concept. It was intended to show how HVDC improves and streamlines power distribution in datacenter and telecom type applications versus traditional power distribution systems based on a 48-V dc bus.

The equipment used in that demo showed how HVDC could power different types of loads representing different power levels. For instance, an Emerson rectifier generated 380 V dc, which then powered loads such as a high-voltage lighting unit, a Vicor bus converter, and a small Intel industrial microserver. The 380 V dc also fed a second Vicor bus converter that fed a telecom-level router from Juniper Networks.

However, the recent demo presented at INTELEC 2014 was on a larger scale with a configuration of rack-mounted equipment that "more closely mimicked what would be found in telecom and datacenter facilities," says Salato. This demo contained two racks. One housed a 380-V dc rectifier, battery backup, breakers and distribution elements. The second rack contained computing equipment including Juniper routers, IBM servers, plus multiple power strips incorporating the latest Anderson dc plugs. A wiring diagram is shown in Fig. 1 and photos of the actual equipment racks are shown in Fig. 2.

One objective of the demo was to call attention to the fact that the availability of HVDC-compatible equipment has increased dramatically in the two years since the previous demo. In addition, to the equipment featured in the demo racks, the exhibit also had a table display of interesting HVDC-compatible piece parts.

Salato notes that another objective of the new full-scale demo was its expected appeal to classic telecom customers, whose central offices look increasingly like datacenters. According to Salato, some of these customers are reluctant to move away from the low-voltage approach. However, the full-scale demo at INTELEC 2014 showed telecom customers that an HVDC power system housed in the familiar rack-mount setting looks very much like a 48-V power system, only with smaller cables.

Salato notes that this demo was also intended to appeal to datacenter customers who are doing cloud computing. "However, these customers are generally more inclined to experiment with new power distribution architectures," says Salato.

Interest in 400 V dc remains high because, in the right applications, it presents several potential advantages over traditional ac and -48-V dc architectures. For example, 400-V dc power significantly reduces the cost of copper cabling and installation in traditional -48-V telecom applications. In datacenters, it simplifies the power chain, which improves availability and potentially efficiency compared to ac power, while optimizing the interface with local backup and generation sources. This year's INTELEC exhibit illustrated those advantages while demonstrating the flexible, plug-and-play architecture that makes 400-V dc power easy and safe to deploy and configure.

Both telecom and datacom customers recognize the technical advantages of HVDC. And the obstacles to its implementation are typically not hardware issues but rather issues involving facility maintenance. Most of the maintenance crews working in telecom and datacom facilities are versed in 60-V max systems. "When you move to 380 V, you need to retrain your maintenance crews," says Salato who adds that this is a fixed cost.

For more information, visit www.EmersonNetworkPower.com/400VDC or http://www.vicorpower.com/about-vicor/news-and-press/400v-dc-technologies-at-intelec.

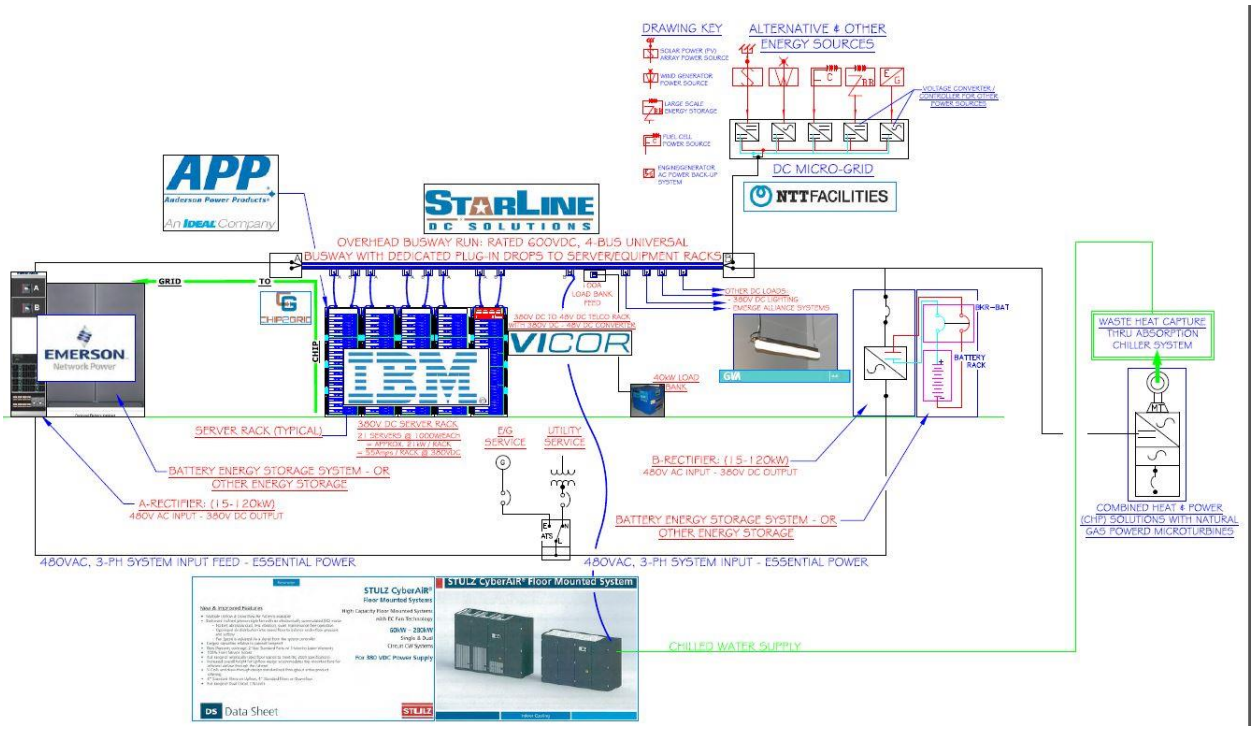

Fig 1. A small but full scale demo of a high-voltage dc power system presented at INTELEC 2014 incorporated the types of equipment that would be found in telecom and datacom facilities assembled in standard rack-style configurations. What's different here is that the equipment, interconnects, and circuit protection are designed for 380-V dc operation rather than 48 V dc. The two racks that housed this equipment are shown below in Fig 2.

Fig. 2. Front and side views of the two equipment racks in the HVDC power system demo at INTELEC 2014.