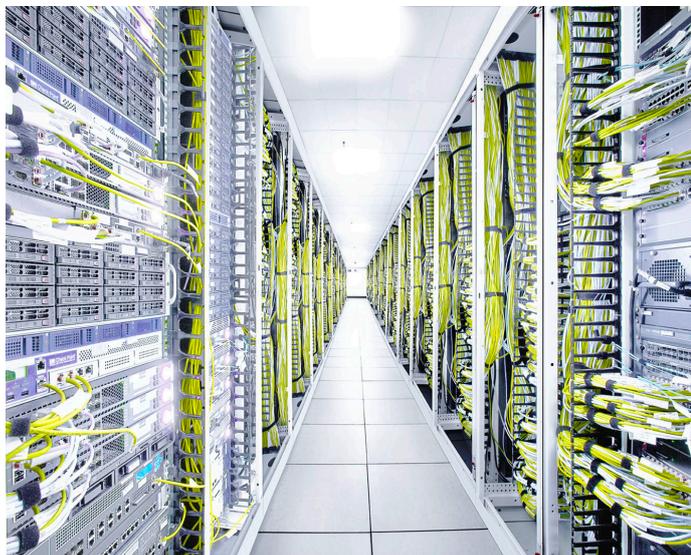


Article

Power protection - ABB's PCS100 solutions for protecting data centers



The data center industry is driven by the digital revolution and cloud computing, one of the most dynamic and fastest growing market sectors. Data centers require a continuous clean electrical supply for reliable operation and electric power is a major cost for data center operation.

ABB now has an extremely comprehensive range of power protection products available to data center designers and operators. Protecting the server load from outages and other voltage events is a major consideration in any data center. Uninterruptible Power Supplies (UPS) are the solution of choice and ABB has this requirement well covered with a very comprehensive range of both stand-alone and modular UPS. For server protection the flagship products are Conceptpower DPA and PowerWave 33 which utilize a highly modular Distributed Parallel Architecture (DPA) that provides best in class reliability, system availability and the ability to scale with your business.

ABB also have a highly innovative range of industrially rated UPSs and Voltage Conditioners that have been widely applied to protect the world's most sophisticated industrial processes including silicon chip and liquid crystal display manufacturing. The PCS100 UPS-I and AVC (Active Voltage Conditioner) are suited for the protection of demanding direct connected motor and motor drive loads along with very sensitive electronics. These products also have application in data centers and are an ideal choice for the protection of balance of data center loads such as air-conditioning data center that may just require voltage conditioning or short outage protection.

In very large and specialized applications the UPS-I can also be used for server protection. For example where space is at a premium the extremely small product footprint along with compatibility with new generation storage technologies such as super capacitors and lithium ion batteries can mean the UPS-I is an ideal fit.

The UPS-I is a single conversion modular redundant design with a centralized static bypass which provides typical system efficiency of greater than 99 percent. Available in a range of low voltages modules from 208, 400 through to 480 VAC and now at medium voltages (MV) with ratings up to 6 MVA the MV UPS-I range is well suited to protection of Mega scale data centers.

Identifying the need

In a typical UPS-I application a Swiss government data center had been protected by rotary UPS systems only and static UPSs were to be added to enhance system reliability. ABB's PCS100 UPS-I was identified as an ideal solution for the retrofit into the data center due to their very high electrical efficiency of the UPS and small footprint. Efficiency and space are always important considerations but restricted space and cooling in this application meant they were essential features. Four UPS-I systems with a capacity of 1800 kW/2000 kVA were selected and ordered.

Voltage Conditioning Applications

Although UPSs are the technology of choice for data centers they do come at a relatively high operational cost particularly as a result of battery maintenance and replacement. In a typical power system 90 to 95 percent of problematic voltage events are voltages sags which can be corrected with a voltage conditioner. ABB's PCS100 AVC range of active voltage conditioners correct voltage sags and surges within a few milliseconds while maintaining exceptional efficiency performance. For application where outage ride through is not required they can offer an ideal solution. This can include bypass (or reserve) supply conditioners for UPSs, conditioning of balance of data center loads to prevent nuisance trips through to conditioning the alternative feed on a dual reticulated server protection application where running two independent UPSs is not justified.

Current Conditioning Applications

Voltage disturbances are not the only power quality problem present in data centers. Power electronic loads on both the balance of data center and servers can create harmonic and power factor problems. Most servers utilize wave shaping rectifiers on their switch mode power supplies but these will often draw leading reactive current (capacitive) under light loading conditions. As most of these supplies are redundantly configured they do run very lightly loaded.

Harmonics and power factor problems cause increased apparent power (kVA) loading on the electrical supply often resulting in higher electricity charges from the utility. Most data centers also run standby diesel generators and they can require considerable de-rating for poor power factor, harmonics and supply imbalance. Leading power factor is a particularly bad problem for generators and even quite low levels of leading reactive current can cause the alternator to enter an unsafe operating area and potentially lose control of voltage.

The PCS100 RPC Reactive Power Conditioner is an active solution to power factor and low order harmonic problems. Its fast operation and flexible control mean even the most difficult power factor problems including leading power factor are resolved. In addition to power factor and harmonics the RPC can also correct the component of supply imbalance, negative sequence current that is most problematic for diesel generators.

ABB have a comprehensive range of power protection products that can be applied to ensure data centers can operate with highest levels of reliability, availability and energy efficiency.

See www.abb.com/powerquality for more information, or see links below for articles on ABB's PCS100 power protection range for protecting data centers:

[Weta Digital](#) and [NIWA](#)



PCS100 UPS-I (150 kVA to 3000 kVA)



PCS100 AVC (150 kVA to 2.4 MVA)

