

Article

PCS100 RPC - Reactive Power Conditioner technology



ABB has a variety of power protection products and the PCS100 Reactive Power Conditioner (RPC) is the latest addition to this portfolio. Specifically designed for industrial and commercial applications, the RPC is able to respond instantly to power quality events, while providing continuous reactive power correction.

Power problems can manifest themselves as power factor issues, inrush-generated sags, voltage imbalance or voltages outside regulatory requirements (a particular problem for direct online connected motors) and harmonics. These can result in financial penalties and costly electrical equipment malfunctions if left uncorrected. Although the PCS100 RPC's prime role is to condition current, by injecting reactive current to stabilize the voltage, the PCS100 RPC can provide a very cost-effective solution to these problems. Because the PCS100 RPC conditions the current drawn by the customer's load, it fits well with ABB's other products in the PCS100 family, such as the PCS100 UPS-I uninterruptible power supply (UPS) and the PCS100 Active Voltage Conditioner (AVC), which provide power supply to critical loads and condition voltage, respectively.

The PCS100 RPC is rated for applications from 100 kVA to 2,000 kVA and uses high-speed IGBT inverter technology to control reactive power flow into the AC network. By injecting capacitive or reactive current at different frequencies and phase angles, the PCS100 RPC efficiently and reliably provides:

- Fast dynamic reactive power
- Unity power factor
- Correction of current imbalance
- Harmonic cancellation

The inverter technology employed means the compensation is stepless, unlike many other solutions, which minimizes disturbances and ensures seamless power conditioning.

PCS100 RPC technology

A complete range of cabinets for the PCS100 RPC is available, suitable for direct connection to typical low-voltage supplies

(380 to 480 V). The devices are rated from 100 kVAr to several MVar. Combined with the PCS100 UPS-I and the PCS100 AVC, the RPC can be applied to a wide range of situations, from computer room backup through to large data centers and complete industrial plant protection. The highly reliable modular redundant design means the system is scalable and can be easily expanded as power needs grow. In addition, if one of the power modules fails, the system will not trip, but will continue to operate at reduced capacity. Because the granularity is small, the manufacturer can get full redundancy at very low cost; this level of reliability at such low cost is unique in the industry.

Proven PCS100 solutions

A comprehensive power assurance package can be created by combining the ABB PCS100 RPC with an ABB PCS100 UPS-I. Precisely this has been done for one particular customer to help protect his critical polyimide film manufacturing line.

This turnkey solution means that, if a power outage occurred, the PCS100 UPS-I would disconnect the load from the utility and supply the manufacturing line with full power for five minutes. Simultaneously, the PCS100 RPC would provide power factor control above 0.90. The customer's expectations were that, should a power outage occur, the UPS-I would supply power to the load of 1,000 kVA. ABB's PCS100 UPS-I is able to go beyond that expectation and supply 1,050 kVA to protect the load should a shutdown occur.

The PCS100 UPS-I includes a high speed static switch, meaning that a faster transfer to stabilize the power flow would occur if an outage prevailed. After further evaluations were undertaken, the company found that no other competing products could provide this. The final deciding factor related to system efficiency, as the manufacturer was able to save a large amount on air conditioning requirements, due to low heat loss from the PCS100 UPS-I. As well as an efficiency of 99 percent, the ABB PCS100 RPC itself has a small footprint, thus saving costly real estate.

The modular and scalable architecture of the ABB PCS100 RPC and its compatibility with the other members of the ABB power protection family, as well as its success in combating common industrial power problems has resulted in significant interest being shown in power protection applications.

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