

Emerson unveils innovative transformer-free central inverter system

US-based Emerson unveils a ground-breaking transformerless central inverter system for utility-scale photovoltaic power plants. The company says this is set to maximise investor returns through optimised availability, efficiency and yield ...

Control Techniques' SPV is constructed using 145kWp, 176kWp and multiple 176kWp parallel connected inverter modules to produce any desired power rating up to 1760kWp. The inverter modules are based on a mature design that is well-proven in thousands of demanding industrial applications worldwide including the booming PV industry. Control Techniques is now introducing a unique control methodology which enables the modular inverters to switch between standby and active states to match the instantaneous power available from the solar array, significantly enhancing both efficiency and plant availability.

The SPV inverter design focuses on reliability. Each inverter is constructed from one or more, easy-to-handle, compact modules that are mass produced ensuring inherent quality, short delivery times and minimised spares holding. The active/standby sequence of the inverter modules rotates daily ensuring that all modules are exercised equally with the added benefit that individual modules accrue fewer operational hours per year than the alternative bulk inverter solution commonly found in the market.

As a consequence the CT modular solution offers longer service life. Critically the SPV is extremely fault tolerant; in the event of the loss of an inverter module the system



automatically isolates the single module and continues to operate efficiently and with reduced capacity. Often there is no reduction in output if the prevailing meteorological conditions are below the optimum. The SPV can also be oversized if required, to provide redundancy for critical installations or additional reactive power capability without additional thermal losses.

Control Techniques' SPV inverter achieves Euro and CEC weighted efficiencies of 97.6 per cent. However, the real gains are in the SPV's very flat

load/efficiency curve and its ability to maximise energy yield in low to medium light conditions. The alternative to Control Techniques modular inverters are large single bulk inverters whose efficiency tumbles below 20 per cent of rated power. The SPV sequentially energises power modules in response to varying solar irradiation eliminating the large fixed switching losses associated with bulk inverters. Regardless of power rating, SPV can turn on/off at an exceptionally low power threshold of only 900W, effectively extending the length of the operational day. The



benefit of increased yield under low light conditions may not be accurately reflected by the traditional efficiency weighting methodology, particularly in less temperate zones such as northern Europe, and can have major impact on investment returns.

The energy yield of the SPV inverter is further enhanced by Control Techniques' second generation Maximum Power Point Tracking (MPPT) algorithm. The software is designed to track transient changes in irradiation whilst accurately determining the optimum condition across the operating temperature range of the PV plant. The MPPT range of the SPV is 400 to 800VDC, with the planned UL version operating from 300-600VDC.

Control Techniques SPV inverters are suitable for all large scale PV applications, with either thin-film or crystalline photovoltaic modules. Inverter



maximum turn-on voltage is 1000V DC. The inverters are compliant with all key international grid connection standards offering both Mains Dip Ride Through and Anti Islanding capability. The SPV generates around 3.5 per cent ITHD, consequently, no special design or de-rating of the transformer is necessary. The inverters can be easily integrated with third-party SCADA using Ethernet, Modbus or other communication networks.

Control Techniques can provide as much or as little of the PV inverter as required,

from an inverter to a complete turnkey solution, including medium voltage equipment, shelter, SCADA and string connection boxes. Whilst the technology behind PV generation continues to mature, it's crucial for project developers to select a vendor with an appropriate understanding, credibility and a successful track record in PV.

While the goal of all PV developers is to reach or exceed anticipated plant yield, a key factor in achieving this goal is the engagement of competent vendors with quality products which seamlessly integrate into the overall scheme. Investors must have confidence in the financial stability, long-term outlook, reliability and support of the chosen inverter vendor to ensure ongoing support during the 20-plus year operational phase of the project. Sound engineering knowledge and close working relationships with project developers, EPCs and Integrators, both pre- and post sales, are essential if the plant is to yield its full potential.

Control Techniques is part of the \$21bn Emerson group with its power generation experience, unsurpassed R&D and international manufacturing resources and supported by a comprehensive network of offices around the world providing engineering, project management and after sales support.

Control Techniques high-yield SPV inverters ensure a return on investment that is not only impressive in the short term, but one that goes on to generate income reliably and consistently in the long term. Tailored warranty and support plans to 20 years ensure that performance is maintained over the lifetime of the installation. ■

About Control Techniques

Control Techniques, an Emerson Industrial Automation company, is a world leader in the design, production and marketing of electronic variable speed drives for the control of electric motors and inverters for power conversion in PV applications. Our strategy is to concentrate on delivering drives and servo products that enhance the productivity of our customer's machines and processes. We operate through a global network of Drive Centres and Application Centres that both distribute product and add value by building our drive products into custom designed systems and by offering the highest levels of customer service.

Our Control Techniques Drive Centres also provide us with invaluable feedback and market intelligence so that we can further improve our products and service. This customer-focused strategy will enable us to continue to grow profitably. Our competitive edge is based on our unique focus on drives, our strength in research and development, our investment low-cost manufacturing and an effective worldwide marketing strategy.

For more please visit:
www.controltechniques.com

About Emerson

Emerson (NYSE:EMR), based in St. Louis, Missouri, is a global leader in bringing technology and engineering together to provide innovative solutions to customers through its network power, process management, industrial automation, climate technologies, and appliance and tools businesses. Emerson's sales in fiscal 2009 were \$20.9bn. The company is ranked 94th on the Fortune 500 list of America's largest companies. Emerson Industrial Automation, a subdivision of Emerson, is a global technology provider that enables productivity, efficiency and quality gains for customers across a spectrum of industries. Products include alternators, electric motors and drives, electrical distribution devices and mechanical power transmission, fluid automation and ultrasonic joining solutions.

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