

Advanced low-voltage components for the next-generation of utility-scale photovoltaic solar plants

ABB's low-voltage solar portfolio provide advanced solar components that enable customers to begin next-generation 1500 V DC PV utility-scale designs

Solar technology can substantially reduce our reliance on fossil fuels and help us to avoid the worst effects of climate change through utility-scale photovoltaic (PV) power installations.

The beauty of solar PV generation, which converts sunlight into usable electricity, is its versatility. PV systems can range from small rooftop panels generating a few kilowatts of power to utility-scale stations deploying thousands of PV panels and generating hundreds of megawatts of power.

Solar PV technology is maturing so quickly and its costs have plummeted to such a degree that utility-scale PV installations are now considered a competitive business investment in comparison to new coal or even natural gas plants.

Solar PV systems require components that ensure the electricity generated can be used. Among other tasks, balance-of-system hardware ensures that direct current (DC) electricity generated from sunlight (called the input) can be safely and reliably converted into alternating current (AC) electricity that powers our appliances and machinery.

Component evolution

As utility-scale PV installations continue to grow, the component technology is also evolving to help lower the cost of energy production. The industry has in recent years marked a tremendous jump in input voltage - from 600 to 1000 volts (V) DC, which now represents most utility-scale solar PV power plants.

The next step will be systems with 1500 V DC inputs, and this is important because by increasing the voltage level, power output capability can be increased by as much as 50 percent, reducing system losses and costs.

ABB has already developed 1500 V DC low-voltage components to process this new power, including switches, molded-case circuit breakers, miniature circuit-breakers, contactors, surge protection devices and voltage/current sensors. Some components are even rated up to 3000 amperes (A) / 1500 V DC, and hold various certifications, UL and IEC included to cater the requirements worldwide.

Adapting 1500 V DC to the solar market has been challenging, because higher voltage capacity affects system design and insulation requirements. Another factor is PV plant components must often operate in extreme temperatures, frequently reaching 70° C.

New benefits

Components for 1500 V DC PV utility-scale installations may also have to be designed to deal with bidirectional current flow. These new products must ensure that 1500 V DC power is safely processed and, in addition, provide reduced power losses, smaller sizes, integrated heat dissipating feature and advanced arc-extinguishing technologies,

In addition to increased voltage, these new component products also handle higher currents - up to 6000 A - depending on the requirements. Some of these new products can handle two 1500 V DC inputs simultaneously.

For commercial and large-scale utility installations, ABB provides factory assembled combiner boxes at 1500 V DC with options of monitoring parameters, enhancing the plant performance and reliability.

Already a leading supplier to all PV applications, ABB can now provide also advanced solar components that enable customers to begin next-generation 1500 V DC PV utility-scale designs that bring greater efficiency and lower costs to their systems.

About ABB

ABB (www.abb.com) is a leading global technology company in power and automation that enables utility, industry, and transport & infrastructure customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in roughly 100 countries and employs about 135,000 people

For more information about low-voltage solutions for the solar industry, visit

<http://new.abb.com/low-voltage/industries/solar>

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