

# Application note

## Generators for Solar Power Production

ABB is a global leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact. ABB operates in more than 100 countries and has offices in 87 of those countries to give its global and local customers the support they need to develop and conduct their business successfully.



### ABB motors and generators

ABB designs and manufactures a wide range of motors and generators: AC and DC, induction and synchronous. Over one century of experience enables ABB to adapt the motor and generator designs to any application in the solar industry where high efficiency and reliability are requested. ABB motors and generators can be used both in photovoltaic and solar thermal technologies and ABB's wide sales and service network ensures a local presence to support customers everywhere.

### ABB generator offering

ABB can deliver a complete generator package including the generator, different cooling options, maintenance tools, main terminal box with metering and protective equipment as well as the generator control panel. After commissioning, ABB's worldwide service organization will be there to help on a local basis. A generator is a critical part of any electricity production. An efficient, high quality product with little downtime is critical to a profitable operation.

### ABB generators for solar power production

Solar power production sets special demands on the electric generator. The generator needs to manage the fact that an installation often has limited water supply, is located in severe hot environments, is connected to a sometimes weak network and is operated over a broad load spectrum. Further, the limitation of solar radiation as a source often requires electric generators in solar installations to be started daily. These requirements are not new to ABB; we have long experience in providing optimized generators for installations in severe environments and operating under very specific electrical requirements.

ABB generators can be driven with single as well as a double shaft ends, which can be an advantage during operation with large load variations or for continuous power production, using for example one gas turbine and one steam turbine. Although the generator is based on standard modules to reduce the lead time, the possibilities to customize are great.

ABB has broad experience in delivering generators to locations the world over, this requires that the generators are designed to meet applicable standards and grid codes as well as different climatic and environmental conditions.

## Technical information

ABB offers module based generators where the active parts are designed according to each specific installation in order to provide the electrical characteristics you need, as well as reliable operation in combination with a short lead time.

The turbine generators have a solid salient pole rotor design that operates below the first critical speed. As a result, no natural frequencies need to be passed through before reaching the rated speed. The rotor design also provides a high inertia, which gives an inherent stability and an excellent permanence even when operated under low load conditions.

ABB generators for solar installations have symmetrical cooling which makes higher efficiency possible as well as providing control of hot spots. The generators are mostly used within temperature rise class B, but the insulation system is designed for class H in the rotor and the rest of the machine for class F, assuring a long life time of the generators.

## Main features

Power	2-80MVA
Voltage	3-15kV
Frequency	50 & 60 Hz
Standards	IEC, NEMA, BS, VDE, CSA
Ambient temp.	-50°C to +60°C -58°F to +140°F
Hazardous area	Ex(n), Ex(p), Class I Div 2/Zone 2
Protection	IP20 to IP56
Cooling forms	IC01, IC21, IC31, IC616, IC81W, IC86W

## More than just the generator

The generator control system is designed to fit in smoothly with the driver and ancillary equipment. ABB can provide complete generator control, synchronizing and protection equipment that can easily be fitted to your needs and the special requirements of your installation.

## Customer values

- Maximizing plant output  
Each generator is specially designed to meet the output of the turbine over the entire load spectrum, with a high efficiency.
- Dependable generators for extreme environments  
ABB references of installations in harsh environments are many, including installations in deserts, so we know what works also in the most severe environments.
- Support the networks  
ABB can optimize each generator for the needs of each site, whether it is supporting a weak grid, starting a large motor or help minimize the plant short circuit current.
- Return on investment  
A 4-pole generator typically offers lower capital investment and lower operating cost compared to a 2-pole generator. The size is also smaller and the packages typically lighter and quieter.
- Reliable performance  
Long-term profitable operation requires reliable performance from every component. To achieve this ABB does not only offer a dependable product, but can also on a global basis offer services that extend well beyond the warranty period and a service program that has been proven and developed over decades.
- Low environmental impact  
In addition to high efficiency, ABB has environmental product declarations allowing for a total emission calculation during manufacturing and de-commissioning of the generator.

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