

# Application note

## 4-pole turbine generators for high power

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.



Heating power plant Gärstadverket, Linköping, Sweden

### ABB's synchronous generators

ABB designs and manufactures motors and generators that are engineered to meet the highest demands for efficiency, performance and reliability. With over a century of experience in producing motors and generators, ABB has unrivaled expertise in specific applications. Optimal generator designs are specified to increase productivity while enhancing production safety.

### What can ABB offer?

ABB can deliver a complete generator package for your turbine including the generator, cooling system, main terminal box and maintenance tools as well as the generator control panel.

From initial offering through the project phase, ABB provides expert technical support. 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 down time is critical to a profitable operation.

### 4-pole turbine generators for large power

More turbine manufacturers, packagers, engineering companies and end users are choosing ABB's 4-pole generator concept for steam and gas turbine packages as the power requested has been continuously rising. As the market leader for large 4-pole generators ABB has responded to customer demands by developing the generator line into an even higher range of power. As a result 4-pole generators with an output of up to 65MW can now be offered using the same proven design.

ABB has experience of delivering generators to places all over the world, which requires that the generators are designed to meet different standards and grid codes. IEC, NEMA or API designs are available as well as certification from DNV, Lloyd's, ABS, GOST and others.

Due to the flexibility of ABB's generator design, they can easily comply with most country specific grid codes.

## Technical information

ABB offers module based generators adapted to each specific application in order to achieve the highest possible efficiency and reliable operation.

The turbine generators have a solid salient pole rotor design that operates below the first critical speed. As a result, there are no forbidden speed windows and more easily managed vibration characteristics. The rotor design also provide a large inertia which offers excellent speed stability.

ABB's generators also have symmetrical cooling with a good control of hot spots. The cooling surfaces on the rotor coils are maximized resulting in highly efficient cooling.

## Main features

Power	2-80MVA
Voltage	3-15kV
Frequency	50 & 60 Hz
Standards	IEC, NEMA, BS, VDE, CSA, API, GOST
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 a generator

The generator control is part of a system that must fit easily with the turbine and all ancillary equipment. ABB can offer a wide, flexible range of systems for collecting and transmitting information from the generator for protection and for supervision. A concept can easily be fitted to your needs and the requirements of your installation.

## What are the customer benefits?

- Knowledge of local requirements

ABB has delivered synchronous generators to places all over the world and is the leading manufacturer for large 4-pole turbine generators. Depending on the application where the generator will be installed, the generators can be designed and certified accordingly

- Continuous operation

The generators are built for long operating times and maintenance intervals can be implemented to safeguard the turbine and optimize plant reliability.

- No down time

Long-term profitable operation of these machines requires dependable performance from every component. To achieve this ABB can offer services that extend well beyond the warranty period.

- 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. The high output compared to the size also results in reduced environmental impact.

- 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.