

Information about Principles and Applications of Turbo Generators

Robert Hughes*

Department of Electrical Engineering, Rotterdam University, Rotterdam, Netherlands

Editorial

The first turbo generator known as an electric generator was powered through a water turbo. A turbo generator with DC steam powered using a dynamo was demonstrated by an Engineer namely "Charles Algernon Parsons" in the year 1887. After that, the first large industrial AC turbo generator was supplied with megawatt power to a nuclear power plant in the year 1901, Elberfeld, Germany. Turbo generator is used as a power source on steam locomotives for coach lighting & water pumps used for heating systems. This article gives you an overview of turbo generators and how they work in your applications.

What is a turbo generator?

A generator connected to the shaft of a gas or steam turbo to generate electrical energy is called a turbo generator. Huge steam generators supply electricity mainly to the world. These generators are also used in steam-powered turbo-electric vessels. Small turbo generators powered by gas turbos are often used as APUs (auxiliary power units), especially for aircraft.

Operating principle

Turbo generators operate on the principle of electromagnetic induction. When this turbo is connected to a generator, the kinetic energy (CU) of the steam cancels the turbo's fan blades and the generator's rotor spins to generate electricity. Construction of turbo generators includes stators, stator frames, stator cores, stator windings, bushings, excitation systems, cooling systems, rotors, rotor shafts, rotor windings, retaining rings, rotor wedges, etc. It can be done using various components of the rotor fan. The parts of the turbo generator are described below. The stator is the stationary part of the generator and the stator frame is the heaviest part of the generator. The body of the stator is completely gas-encapsulated and its construction is made of high quality austenitic and mild steel. This frame is used to reduce vibration and withstand the pressure of the gas boiler.

The stator core contains thin laminations, each of which is manufactured in several separate segments. The main feature of the stator core is that it provides mechanical support and efficiently transports magnetic flux. Thin fins are used here to reduce eddy currents. The stator windings have three-phase and pitched two-layer windings that allow the fifth and seventh harmonics to match. The openings and ends of the three-phase winding are insulated from the stator frame using bushings to provide high voltage insulation. These bushings are connected to the stator frame at the end of the exciter. The rotor shaft is a sturdy single piece made of vacuum cast steel in which the slots are located. The rotor body edge is provided with 60% of longitudinal slots with field winding.

***Address for Correspondence:** Robert Hughes, Department of Electrical Engineering, Rotterdam University, Rotterdam, Netherlands, E-mail: robhughes2@reu.nl

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The rotor is a rotating part of the turbo generator thus it protects the winding from the centrifugal force effects and they are protected by rotor slot wedges. The cooling air in the turbo generator is dispersed by an axial fan disposed on the shaft of the rotor. For example, in a 250 MW rotor type, two axial flow fans are used in both the excitation end and the turbo, and a 500 MW axial fan is mainly used on the edge of the turbo. As soon as both the rotor and the stator are created, all of these parts are connected through the implementation. The suggestion is a method of generating a magnetic field by current. Turbo generators are particularly exciting machines. The excitation system continuously provides the flow of C fields corresponding to the interfacial winding. Brushless pathogens have two abstracts such as three domestic areas and permanent magnetic pilots.

Cooling system

The cooling system in the turbo generator is mainly used to dissolve the heat generated by different losses and extend the life of the insulating material. This system is separated into three parts, such as air cooling, hydrogen, water cooling. The rotation speed of a turbo generator is typically 1500 rpm or 3000 rpm with two or four poles at a frequency of 50 Hz and 1800 rpm or 3600 rpm with two or four poles at a frequency of 60 Hz. Speed, parts of this generator can cause high mechanical load. In turbo generators, the rotor is typically forged using alloys and solid steel to mechanically strengthen the rotor.

Turbo generator applications include:

- Turbo generators are used to connect to the shafts of steam or gas turbos to generate electricity.
- Large steam based turbo generators provide electricity
- These turbos are used by turbidic vessels operated by current.
- Small targets are often operated by gas turbos, so they often use APUs (auxiliary power supply units).
- Turbo generators can be used as auxiliary power supply units.
- A motor generator using diesel fuel for controlling motor on sites.
- These generators are used when emergency and standby power is required when supply capacity of power supply current occurs.
- Turbo generators are used in hospitals during power outages.
- Used in various power plants such as solar power plants, thermal power plants, and hydropower plants.

Therefore, this is an overview of turbo generators and their possible uses. This generator is used to convert energy from machinery to electricity by exchanging fuels such as wind, steam, solar and fossil fuels. With this turbo generator, you can connect the generator to the turbo to supply mechanical energy to the generator and convert the mechanical energy into electrical energy. This energy conversion can be done by electromagnetic induction Faraday law. Turbo generators require some outsourcing fuel to develop energy [1-5].

Conflict of Interest

None

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