G Aircraft Alternators
Features and applications

Diefany Ketlin Gaelzer  
WEG Energia  
Brazil  
diefanyg@weg.net

Summary – This article aims to present the features and applications of the Aircraft G line alternators produced by WEG.

Aircraft G-series 400Hz frequency alternators are applied to GPUs (Ground Power Units) known as Mobile Generator Groups, to provide electrical power to aircraft when they are on the ground. GPUs are used for maintenance and/or extended permanence of grounded aircraft, which replace the APU (Auxiliary Power Unit) aircraft generator for greater fuel economy and maintenance, while reducing noise provided by the APU.

In Figure 2, it is possible to see a GPU (Ground Power Unit), providing electrical energy to keep the aircraft and all its controls running while passengers board.

Figure 1: GPU with Aircraft G alternator

Figure 2: Aircraft electrically powered by a GPU
The G Aircraft alternator series meets power ratings from 30 to 320 kVA, 20, 24 or 26 poles, voltages of 208/120 Vac or 200/115 Vac with insulation class H (180 °C). The degrees of protection are IP21 or IP23, with the possibility of supplying single bearing alternators and flexible or double bearing coupling discs, according to the application needs.

G Aircraft alternators are capable of operating at ambient temperatures from -20 °C to 50 °C with a power factor of 0.8 and continuous service regime.

The alternator excitation system is brushless with shunt voltage regulator power and harmonic distortion less than 3%.

Depending on the need or specification, G Aircraft alternators may be supplied with the following optional accessories:
- Temperature detectors on stator windings and bearings;
- Heating resistance (dehumidifiers);
- Special painting plan (as needed).

The main features and advantages of using Aircraft G-Series WEG alternators are highlighted below:
- Manufactured with noble electromagnetic materials, the alternators have high performance, which provide greater fuel economy for the application;
- The electromagnetic design is developed using finite element simulation tools, aiming at a more robust and more efficient product;
- Alternators have low magnetic inductions and current densities, keeping rotor and stator temperatures below the maximum insulation class temperatures, avoiding degradation of insulating materials.
The mechanical design has been designed to meet application requirements for ease of maintenance as well. As shown in Figure 6, the exciter and diode wheel are on the outside of the housing and are protected by a polymeric material cover, making it easier to maintain the exciter and diode wheel, and it is not necessary to disassemble the alternator.

All Aircraft G-line alternators are built as the requirements of NBR5117, VDE0530 - Part 1, IEC 60034.1 standard and are also capable of meeting MIL-704F standard. WEG has its own quality system, certified in accordance with the requirements of ISO 9001 and 14001. The WEG quality system is audited and certified by the Bureau Veritas Quality Institute, an international certification organization, which aims to indicate quality standards in production, marketing, and environment. WEG is the absolute leader in the Brazilian alternator market and is present in more than 40 countries in 5 continents. Committed to growth on a global scale, WEG continually invests in its manufacturing units with the latest technology, processes, and development of new solutions for the market.

Figure 6: External diode wheel and exciter