

Permanent Magnet Alternator for Advanced Military Mobile Power Generator Sets

Objective

To develop a versatile, lightweight, reliable family of mobile diesel generator sets to meet military requirements in the 5-60 kW range.

Goals

- Develop generator sets that are lighter, quieter, and more compact, reliable, and efficient than existing military tactical quiet generator sets.
- As a logistics savings, reduce the number of family members required to meet military requirements in the 5-60 kW range.

New Technologies

- Lightweight permanent magnet alternators will be driven at variable speeds at the most efficient engine operating point.
- Inverter allows each generator set to produce selectable fundamental frequency of 50 Hz, 60 Hz, and 400 Hz and selectable voltage configuration of single phase, dual phase, or three phase.
- A bi-directional dc-to-dc converter will charge the battery during normal operation and use battery energy to maintain high voltage dc link when large loads are added to generator set.
- An integrated digital control, diagnostics, and prognostics system will be part of gen-set package.

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A prototype PM alternator is mounted on a lightweight diesel engine that serves as the prime mover in a 7 kW generator set.