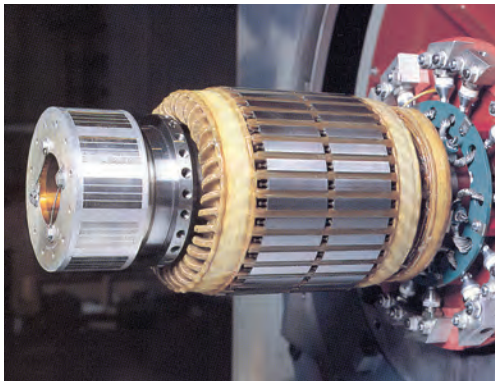




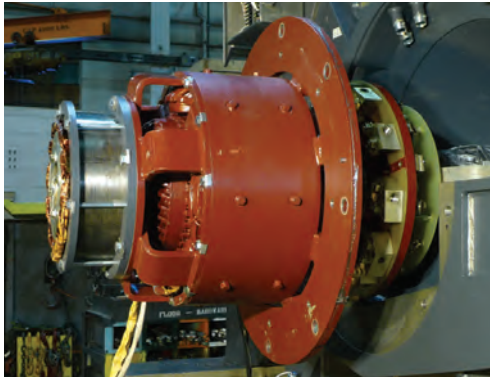
Brushless Excitation System

Parallel Redundancy for 2-pole Generators
70-449kW at 3,000-3,600rpm

Electric Machinery's (EM) brushless excitation system provides high reliability through elimination of brushes, collector rings and carbon dust, which in turn greatly reduces inspection and maintenance costs. Rotating rectifier redundancy with detection of diode failure while in operation allows for more convenient maintenance intervals.



Top row (L to R): PMG with armature and rectifiers; Armature with rectifiers



Bottom row (L to R): Fuse side of diode wheel; Exciter assembly with PMG stator and exciter field

- 100% parallel redundant fused diodes are provided to ensure continuous service.
- No exciter outboard bearing is required which eliminates alignment problems associated with three bearing arrangements.
- No carbon dust problems. The exciter operates in the same enclosure as the generator.
- The shaft driven permanent magnet pilot exciter provides a reliable source of exciter field power that eliminates bulky power transformer and dependence on station battery for field flashing.

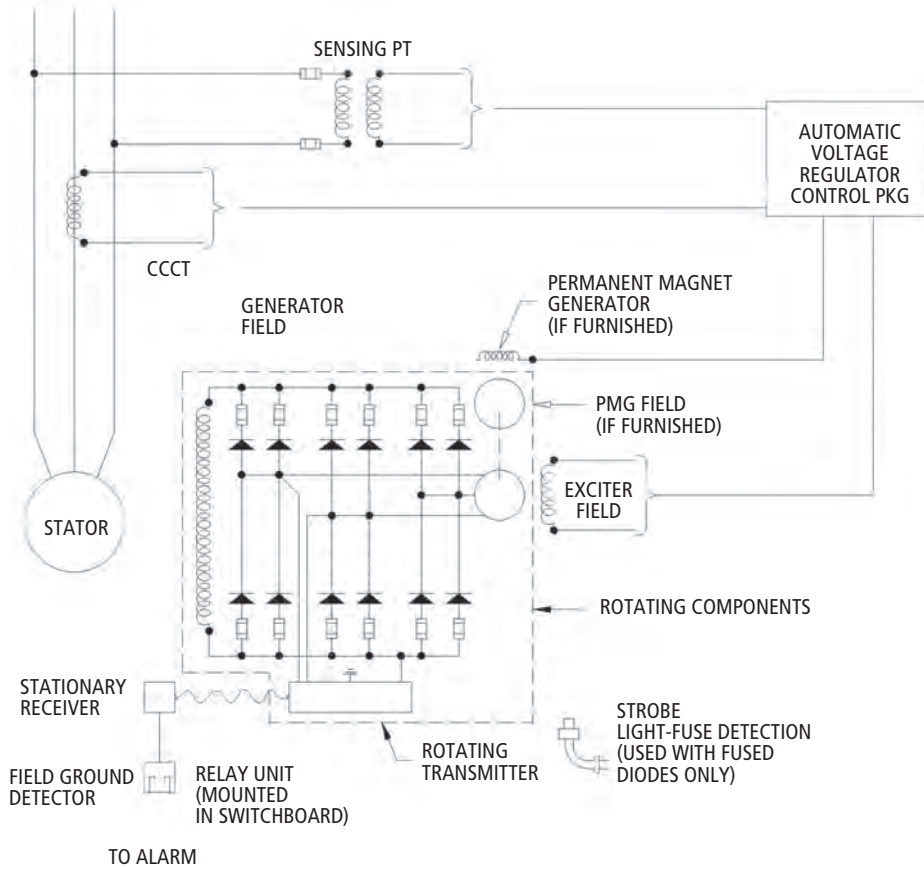
Experience

- EM has over a century of design and manufacturing experience, and more than 500 units installed.
- EM is the industry leader in brushless excitation for 2-pole turbine generators.
- EM brushless exciters are utilized by generator manufacturers worldwide to meet their brushless requirements.

How the brushless exciter provides generator main field excitation.

- Various designs are available to match voltage and current requirements.
- Ability to fit various shaft and mounting configurations.
- No collector rings, brushes or commutators which require maintenance, adjustments and inspections.
- Short circuit sustaining capability provides fault current support.
- No heavy bus work or cable connections are required between excitation cubicles and the generator, thus simplifying installations.





Functional diagram of exciter with Permanent Magnet Generator.

Brushless excitation provides increased reliability and reduced maintenance costs.

The Permanent Magnet Generator (PMG) supplies high frequency AC power to the voltage regulator. The voltage regulator receives voltage and reactive current feedback provided by potential and current transformers to provide voltage and reactive current feedback. Comparing these signals to a reference setpoint in the voltage regulator, the voltage regulator provides a controlled variable DC current to the stationary field of the rotating exciter. With its stationary field and rotating armature, the exciter generates three phase high frequency AC output. This output is rectified by the rotating rectifiers. This DC current is fed via conductors to the center of the rotor shaft and carried by a special lead bar in the hollow shaft area

under the bearing journal which is then applied to the main generator field winding. The rotating rectifier is a three phase full wave diode bridge. 100% diode redundancy provides 100% of full rating with a diode out of service.

For parallel redundancy, 100% rated redundant diodes with indicating fuses in series connected in parallel paths permit full load operation even with one diode out of service caused by a failure to a shorted condition. Open fuses are detected during operation by using the strobe light furnished.

Field ground detection is provided without slip rings by means of a transmitter mounted on the diode wheel assembly. A light signal is sent across an airgap to a stationary receiver and relay to indicate presence of a ground.



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