ALSPA Eurorec NEDG
Excitation system for nuclear emergency diesel generators

Increased efficiency through innovative solutions and technology for safer operation and high reliability.

Safe operation
Taking advantage of its in-depth knowledge of power plant processes, Automation & Controls, a part of GE’s Industrial Solutions business, has developed a comprehensive control and instrumentation system, providing modern operating control for power plants: ALSPA®.

ALSPA Eurorec™ NEDG is the latest excitation system specifically designed by GE for the control of emergency diesel generators in nuclear power plants to ensure the safe operation even under severe circumstances.

Its design is based on analog technology, that controls the insulated gate bipolar transistor (IGBT) power bridge integrated in a robust enclosure, thus ensuring a high level of reliability.
High performance setup
Among the ALSPA products, the Eurorec NEDG is part of GE’s automatic voltage regulator (AVR) family.

High accuracy and performance
ALSPA Eurorec NEDG is qualified 1E and thus offers the very high reliability that is mandatory for nuclear safety equipment. The fast response time of the proportional–integral–derivative (PID) controller provides very high accuracy at steady state. Taking advantage of years of experience in analog technology, ALSPA Eurorec NEDG allows continuous monitoring, treating and managing of all signals in their original form, ensuring high accuracy under all circumstances.

Robust design
The equipment is qualified to operate under severe external constraints (environmental, seismic), and has been designed to pass vibration and high seismic test levels. Based on Eurorec proven design, the system offers highest reliability in any working conditions.

Designed for increased safety
The ALSPA Eurorec NEDG is classified EPR F1A, is fully compliant with nuclear safety requirements and has been designed according to specific nuclear processes (IAEA-INSAG). Integrated in ALSPA family and as part of the GE Plant Integrator™ concept it can be easily integrated into all ALSPA plant automation solutions.

The ALSPA Eurorec NEDG is part of the GE excitation systems family. It has been specifically designed for the control of nuclear emergency diesel generators. This excitation system supplies the exciter with a direct current in order to generate and adapt the required flux for any operating conditions, at full load or no load. The ALSPA Eurorec NEDG takes advantages from over 45 years of know-how and proven experience in design and manufacturing of excitation systems.

The ALSPA Eurorec NEDG regulation system ensures generator voltage regulation, limitations (exciter current, under-excitation), control of the IGBT and protection of the excitation system. The following functions are provided in the regulator:

- one stator voltage regulation channel "AUTOMATIC CHANNEL"
- one field current regulation channel "MANUAL CHANNEL"

Conventional operation is ensured by the automatic channel, the manual channel being on stand-by.

An auto-tracking function allows bump-less switch-over between automatic and manual mode.

Main Characteristics
- fully analog PID-type automatic voltage regulation (AVR)
- automatic and manual set point
- permanent excitation current: 110% of nominal exciter field current
- limitations/protections:
  - under-excitation
  - over-current protection relay
- rotating diode fault detection
- designed to fulfill nuclear safety requirements of most national nuclear safety agencies (NNSA) worldwide
- EPR F1A class

Electromagnetic Compatibility
In a nuclear power plant safety equipment has to be reliably protected against the effects of electrical and magnetic interference fields, main interference, radio induced interference and disturbances caused by telecommunication. ALSPA Eurorec NEDG has been tested and qualified according to EMC international standards (IEC 61000-6-4).

Seismic Qualification
As the equipment can be subject to environmental vibration that produces significant effects during normal and accidental conditions, ALSPA Eurorec NEDG has been designed and tested to answer severe seismic required response spectra (RRS), OBE, SSE and ASW levels, along X, Y and Z axes at 5% of critical damping.