Excitation System
Tasks and Structure

- Supply of DC excitation current to rotor winding of generator
- Control of DC excitation current such that generator voltage is maintained constant within the set tolerances (Automatic Voltage Regulator AVR)

Excitation systems for
generators with exciters

Excitation systems for
static excitation
## Excitation Systems for Synchronous Generators

**Generator rating**

<table>
<thead>
<tr>
<th>Generator rating</th>
<th>0.01</th>
<th>0.1</th>
<th>1</th>
<th>10</th>
<th>100</th>
<th>1000 MVA</th>
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</thead>
</table>

### Excitation systems for generators with exciters

<table>
<thead>
<tr>
<th>System</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIPOL</td>
<td></td>
</tr>
<tr>
<td>RG3-S7</td>
<td></td>
</tr>
<tr>
<td>RG3-T4</td>
<td></td>
</tr>
<tr>
<td>THYRISIEM</td>
<td></td>
</tr>
</tbody>
</table>

### Excitation systems for load-dependent static excitation

<table>
<thead>
<tr>
<th>System</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>THYRIPART</td>
<td></td>
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<tr>
<td>THYRIPO-L</td>
<td></td>
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</tbody>
</table>

### Excitation systems for static excitation

<table>
<thead>
<tr>
<th>System</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>THYRIPO-L</td>
<td></td>
</tr>
</tbody>
</table>

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SPPA-E3000 Electrical Solutions
SIPOL Excitation and Voltage Regulation System for small Synchronous Generators with Exciters

- Excitation output rating up to 20 A DC
- Transistorized chopper regulators
- Digital open- and closed-loop control functions
- Operating modes (with bumpless changeover) and user-adjustable limiters as follows:
  Automatic voltage regulator, excitation current controller, reactive power or power factor controller
- Potential free output interfaces
- Overvoltage protection and de-excitation
- Options:
  - Analog value outputs
  - Installation in 8MF cabinet or Rittal enclosure
- Excitation system is supplied fully assembled, tested and installed on a mounting plate

Mounting plate dimensions: 580x600x350 mm
RG3-S7 Modular Excitation System for Voltage Regulation, Synchronization and Protection of Synchronous Generators

Configurable excitation system:
- Digital open- and closed-loop control functions up to 40 A DC
- Operating modes (with bumpless changeover) and user-adjustable limiters as follows:
  Automatic voltage regulator, excitation current controller, reactive power or power factor controller

Automatic synchronizer:
Bumpless and fully automatic synchronization by means of RAISE/LOWER pulses to generator or voltage regulator

Configurable generator protection:
- Digital, configurable generator protection,
- all protection functions integrated into just two devices

Excitation, synchronization and protection systems supplied fully assembled and tested. Little commissioning effort is thus required (giving short outage times)

SPPA-E3000 Electrical Solutions
RG3-T4 Excitation and Voltage Regulation System
for small Synchronous Generators with Exciter Sets

- Excitation output rating from 4 A to above 90 A
- Transistorized chopper regulator in four-quadrant operation
- Digital open- and closed-loop control functions
- Extremely flexible system, allowing its use with all different generator types, power supplies, operation and control concepts
- Automatic voltage regulator, excitation current controller, reactive power or power factor controller and user-adjustable limiters
- Online self monitoring and signaling
- High reliability and plannable availability level (by appropriate redundancy concept)
**THYRISIEM Excitation and Voltage Regulation System for Synchronous Generators with Exciter Sets**

- Excitation output rating from 50 A to 225 A
- Fully controlled thyristor controller
- Digital open- and closed-loop control functions and data acquisition
- Straightforward operation and monitoring from control room or via monitor panel in cabinet door
- High reliability and plannable availability level (by appropriate redundancy concept)
- Online self-monitoring
- Freely plannable, plain language fault alarms
- Power supply from pilot exciter (150/400Hz) and/or from unit auxiliary supply (50/60Hz)
THYRIPART Static Compound Excitation and Voltage Regulation System for Synchronous Generators

- Excitation output rating from 100 A to above 600 A
- Self-excited, thus has black start capability
- Short-circuit current boosting by compounding for selective short-circuit protection
- High reliability and availability level through use of small number of uncomplicated components
- Digital open- and closed-loop control with various monitoring functions
- Low rate of rise of voltage at output, thereby particularly suited for older field windings
**THYRIPOL** Static Compound Excitation and Voltage Regulation for Synchronous Generators

- Air-cooled resin-encapsulated excitation transformer
- Excitation output rating from 1000 A to above 6000 A
- Fully controlled thyristor converter
- Fully digital open- and closed-loop control functions from actual value acquisition to generation of trigger pulses
- Straightforward operation and monitoring from control room or via monitor panel in cabinet door
- High reliability and plannable availability level (by appropriate redundancy concept)
- Online self-monitoring
- Freely plannable, plain language fault alarms
- Options: - Low current levels of above 100 A
  - Compounding (**THYRIPOL-L**)
Excitation Systems

Highlights

- Static excitation system integrated in plant I&C system
- Operation displays on plant I&C
- Remote operation and supervision via HMI

- Fast response time for excitation current control and automatic voltage regulation AVR
- Fast and accurate closed loop control functions
- Self-monitoring
- Fault analysis system

Reduced maintenance costs
Higher availability