Supporting a clean energy transformation
Synchronous condensers from ABB ensure efficient and reliable operation of power grids through reactive power compensation and additional short-circuit power capacity.

Modular synchronous condenser solutions
ABB’s AMS synchronous condenser (SC) is an ideal device to support network voltage by providing reactive power compensation and additional short-circuit power capacity and inertia.

ABB synchronous condenser modules are compact and fully functional units, with a minimal footprint on-site. A typical synchronous condenser module includes equipment such as condenser cooling, lube oil supply, auxiliary power distribution, excitation system, starting equipment.

The UNITROL® 1000 Series is ABB’s brushless excitation control system for synchronous machines. There are over 20,000 units installed globally. Answering to the strict requirements of the German Grid Code (VDE-AR-N 4110 and VDE-AR-N 4120) based on European ENTSO-E standard, the UNITROL® 1000 Series is the first approved grid code compliant excitation system.

The AMS synchronous condenser modular solution provides tailored and proven grid compliant network stability - all in one OEM package.

The power grid revolution
The electric power grid is undergoing an unprecedented revolution. Distributed and intermittent energy sources are rapidly growing in the installed base, pushed by environmental regulation, incentives and policies adapted to reduce the long-term effects of climate change.

Progressive deregulation of the electricity market and the rise of independent power producers (IPPs) has led transmission system operators (TSOs) to strengthen their grid codes, a set of rules power utilities need to comply with to connect their power generating assets to the electric grid. Power generators are therefore mandated to provide high-fidelity power system simulation reports verifying the grid code compliance for connection allowance.

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Grid code compliance
Many power grid authorities have a stringent grid code compliance process requiring high levels of engineering studies for application to final grid connection approval. The simulations provided are for verification through each stage. These processes are extensive and detailed. Confidence that the simulation models have been benchmarked and compliant to the required AMEO standard must be assured.

ABB has developed a set of unique original OEM PSCAD and PSSE models for analysis, and computer real-time simulations. These models are the representation of the equipment that will be delivered and installed in the power generation plant – whether solar or wind.

These models are developed in accordance with the AEMO Access Standard Assessment Guide 20190131 and AEMO Power System Model Guidelines (dated July 1, 2018). These models can be used for ABB AMS Synchronous Condensers in the range of AMS 710 to AMS 1400 and AMS 1400 with flywheel and ABB’s excitation system UNITROL 1000 platform.

Grid code compliance commissioning services
ABB provides experienced commissioning engineering services, performing excitation system grid code compliance site testing. We can offer simple generator voltage reference step response tests, through to full generating unit transfer function analysis for evaluating damping capabilities. ABB has defined three main commissioning packages based on the most common cases:

- **Basic commissioning**: Simple machine site testing as voltage reference step responses are performed
- **Advanced commissioning**: Providing transfer function testing for PSS damping performance
- **Verification**: Full compliance testing, suitable for full grid code compliance commissioning where advanced testing procedures are required by the TSOs

ABB Grid Code Compliance and Modelling Support
ABB’s experienced in-house engineering team can offer support services to assist customers with the AEMO grid code compliance process. These services include supporting the connection application and R1 Design process which is completed prior to commissioning and R2 Grid Code Compliance Report and Model Validation which is completed during and after commissioning.

R1 Design Studies
AEMO requires detailed connection studies to be performed prior to any installation commencement. These studies involve modelling the entire plant including synchronous condensers and excitation systems. ABB can support the integration and coordination of the OEM models throughout the entire connection process.

R2 Grid Code Compliance Report and Model Validation
Compliance testing is necessary during commissioning to demonstrate that the installed plant meets the grid code requirements. ABB can provide experienced site engineers and high-speed measurement equipment to assist with commissioning and live onsite modelling support during compliance testing.

Proven ABB generators enable reliable power production with the lowest lifetime cost throughout the life cycle
ABB offers the most extensive service portfolio of capabilities to fit your needs. From installation and commissioning, through to spares, repairs and upgrades, and remote monitoring solutions. Based on 130 years’ experience of building and servicing motors and generators, ABB extended service units and authorised value providers offer services that maximise performance, uptime and efficiency throughout the life cycle of your generators.

Service near you
Our 24/7 network of service centres and certified partners span the world. This enables us to deliver local support no matter where you are located and ensures that we can always provide you with the most optimum, cost-effective solution.

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