

Operation and Maintenance Customer Training

All types Gas-insulated switchgear: 3 days on-site



For anyone managing GIS assets, it is essential to have a thorough understanding of its components, modes of operation and maintenance criteria.

Our training concept combines theoretical and practical lessons in the optimal way.

Hitachi Power Grids is a leader in high-voltage GIS technology with a global installed base of more than 30,000 bays.

This training covers the three main know-how fields for Operating and Maintaining a GIS. The following program is used as reference.

The program can be adjusted according to special customer needs.

Main components:

- Circuit breaker and breaker operating mechanism
- Disconnecter, earthing switch, fast acting earthing switch
- Local control modules for apparatus
- Current transformer and voltage transformer
- Static components like connecting elements & bus-bars
- Interface such as SF₆-gas to-air bushing and connections to HV cables and transformers
- Metal-oxide GIS surge arresters

SF₆-gas:

- Working principle of SF₆-gas density supervision system, incl. lecture about correlation of pressure, temperature, and density
- SF₆-gas properties and environmental aspects when working with SF₆-gas
- SF₆-gas handling equipment and application of Reclaimer (evacuating, filling, reclaiming)
- SF₆-gas measuring instruments

Operation and Maintenance:

- Guide through the switchgear manual
- Maintenance philosophy
- Planning and checkpoints of a maintenance tour
- Troubleshooting on apparatus and operating mechanisms

Detailed course description

Day 1	Welcome and organization	Information about health and safety whilst in training Training schedule
	Switching components	<ul style="list-style-type: none"> • Circuit-breaker features and mechanical design • Disconnecter, Earthing Switch and Fast-Acting Earthing Switch • Arc extinguishing principle • Operating mechanism mechanical arrangement, functions and hydraulic circuits
	Static elements	<ul style="list-style-type: none"> • Current and voltage transformers • Connecting bus and elbows • Lateral dismantling devices and compensators (VP and VQL) • Gas partition insulators and drying filters • Bushings, cable and transformer connections, surge arresters
	SF ₆ -gas properties	<ul style="list-style-type: none"> • Properties of SF₆-gas and its environmental aspects • SF₆-gas measurements, instruments and values according standards
Day 2	Operation and maintenance	<ul style="list-style-type: none"> • How to schedule a maintenance tour and checkpoints • Maintenance Philosophy • Time-based maintenance, condition-based maintenance and its intervals • Filters and pressure relief device • SF₆-gas measurements, instruments and values • Corrosion protection, flange greasing
Day 3	Hands on training	<ul style="list-style-type: none"> • Tour around the GIS to identify all components and parts • Electrical & manual operation of the GIS (incl. hand crank and safety lock system) • Inspection and maintenance exercises • Demonstration of SF₆-gas reclaiming and analyzer • Operating mechanism (motor, sensors and switching behavior)
	Conclusions, final discussion	<ul style="list-style-type: none"> • Round-up sessions to clarify last questions

Important notes:

- For practical on-site exercises, full access to the equipment must be granted by the customer. Customer's approval for switching of apparatus and handling must be given.
- Tools and instruments for GIS operation, maintenance, gas handling / measuring must be available on-site for practical exercises.
- The course language is English. If trainees do not feel comfortable to follow in English, an interpreter must be present to guarantee training success.
- Course documentation is in English. Documents may be translated to local language. However, English original version prevails all other.
- After training, confirmation of attendance will be issued to the course attendees.