

# Microgrid Learning System, LabVolt Series 8010-M

A flexible microgrid testbed for training or research



## Highlights

- Digital data acquisition with software-based instruments
- Individual station control and system-wide monitoring via SCADA
- Emulators for wind turbine, solar panel, and diesel generator
- Battery energy storage system (BESS) with battery management system (BMS)
- System operates in islanded mode or connected to a utility grid

**Microgrids represent a shift toward decentralized, resilient, and sustainable energy systems. Studying them provides a gateway into the technologies shaping the evolving energy landscape — from remote communities and industrial facilities to smart cities.**

### Your challenge

Teaching microgrids is complex. Energy sources, storage, power electronics, automation, grid interaction, load management, and safety must all be addressed. Providing meaningful, hands-on experience can be difficult and costly due to technical and safety challenges in sourcing, integrating, and operating the necessary equipment, as well as preparing basic guided experiments.

### Our solution

The 8010-M brings a modern subscale grid to your laboratory. It includes all the necessary hardware, software, and instructions to build, control, and operate a local energy grid. Learners can experiment with key microgrid technologies, study system dynamics, and apply real-world control strategies to respond to changing environmental conditions and consumer demand.

### Your benefits

- Quick, compact setup of a typical microgrid with commonly used energy sources and technologies.
- Customizable and expandable with LabVolt 8010 or third-party equipment.
- A long-term investment that evolves with training needs and budget.



→ [Video overview](#)

## System overview

Each station is controlled via a computer running LVDAC-EMS, a free software for measuring, analyzing, and controlling electrical and mechanical parameters, as well as equipment operations.

A SCADA interface enables system-wide monitoring and control, allowing students to apply supervisory strategies and optimize microgrid performance.



The first workstation includes a **diesel generator emulator** and electronically controlled **load modules**. Grid connection and synchronization modules act as the **point of common coupling (PCC)** for switching between islanded and grid-connected operation.

The second workstation features a **wind turbine emulator** that allows students to simulate changing wind speeds and observe their effect on energy production in real time.

The third workstation features a **battery energy storage system (BESS)**, which includes inverters, converters, and a lithium-ion batteries with an integrated **battery management system (BMS)** that ensures safe and efficient operation.

The fourth workstation features a photovoltaic **solar panel emulator**, allowing students to simulate changing solar conditions and observe variations in power output in real time.

### Built to last

- **Durable construction:** Sturdy steel hardware designed to withstand intensive lab usage and allow easy maintenance and repairs.
- **Safe learning environment:** Thanks to protections against overcurrent, overheating, and overvoltage, modules tolerate user errors and misconnections.
- **Reliable performance:** Equipment maintains precision and accuracy over time.
- **Proven platform with decades of success** in technical education and training, backed by outstanding customer support.

### Versatile equipment

The 8010-M includes a variety of training modules that can be reused to study additional topics in the Electric Power Technology Course Program, such as protective relaying, STATCOM, SVC, HVDC, and DFIG. Teachers can leverage existing modules or add a few more to cover new subjects, making the 8010-M a flexible and cost-effective investment.

### Hands-on activities

The course “Microgrid” outlines step-by-step experimentation procedures covering active and reactive power transfer, start-up after a power outage, reconnection to the network, and integration of a diesel generator in islanded mode. It is available in digital format on → **Festo LX**, or in print or PDF format.

### Take the next step toward your microgrid laboratory.

For inquiries or personalized quotes — whether for a new system or an upgrade of existing EMS equipment — please reach out to your Festo Didactic sales representative.

The 8010-M is available through a single, convenient order number: 8198895.