

# Solar/Wind Power Training Packages

## Classroom study and experimentation

**FESTO**



### Highlights

- Modular, expandable packages with A4 modules
- Dynamometer emulating a real wind turbine
- Two types of charge controllers: PWM, MPPT
- Standalone and grid-tied production scenarios
- Load unit with replicable results
- Real wind turbine components

Power production using renewable energies is gaining momentum all around the world.

As solar power production becomes more affordable for residential applications, the pace of installations is skyrocketing. The result is an increasing demand for qualified technicians able to understand and manage such systems.

Just like solar power, wind power is getting more attention due to its ease of use and cost-effective installation. Small wind turbines represent many decentralized production points that should be considered in today's electrical network.

### Training solutions

Festo Didactic has developed training systems – available in basic, advanced, or complete packages – that combine necessary hardware equipment and courseware resources.

- The Solar Power Complete Package covers topics from the basics of solar power production and photovoltaic panels to producing power for “off-the-grid” and “grid-tied” applications.
- The Wind Power Complete Package allows for the study of wind power production on small scale wind turbines and use of this power to supply different types of loads.

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### Practical A4 design

The hardware equipment included in the Solar/Wind Training Packages are standard A4 modules, to be used in a workstation. Several types of modules are available (loads, transformers, batteries, power supplies, etc.). Modules are interconnected with safety cables; all inputs and outputs are isolated, and modules are grounded for increased safety.

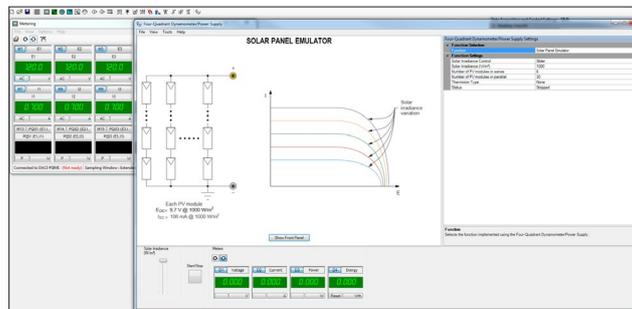
### State-of-the-art DACI and dynamometer

The Data Acquisition and Control Interface (DACI) is used to measure, observe, and analyze electrical and mechanical parameters. The 4-quadrant power supply and dynamometer controller offers computer-based instruments and control functions, enhancing the flexibility of the packages.

### Cost-effective expansion

Modules are compatible with other learning solutions from Festo Didactic. They can be integrated in different setups to expand learning to other topics in Electrical Engineering, making expansion possible without duplication of equipment

### Computer-based instrumentation



### Comprehensive courseware

#### Solar Power

(Complete package)

Topic coverage:

- The diode
- The solar (photovoltaic) panel
- Effect of temperature on panel performance and of shading on panel operation
- Storing energy into batteries
- Solar panel orientation, and performance vs. insolation
- Standalone PV systems for DC or AC loads
- Use of an MPPT charge controller in standalone PV systems
- Grid-tied PV systems

#### Wind Power

(Complete package)

Topic coverage:

- Voltage-speed and torque-current characteristics of a wind turbine generator
- Power vs. wind speed
- Storing energy from a wind turbine into batteries
- Standalone wind power systems for DC or AC loads

Courseware covers necessary theory and hands-on exercises, as well as test questions.

To see topic coverage of all available packages and their scope of delivery, please visit the website.

### Upcoming developments

The following packages will be based on the same hardware:

- AC and DC Fundamentals (Single and Three-Phase)
- Electrical Machines (Asynchronous, Synchronous, Wound Rotor, DC Machine, etc.)
- AC and DC Power Electronics (Chopper, Inverter, Rectifier, Thyristors, etc.)

Contact your sales representative for more information.

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