



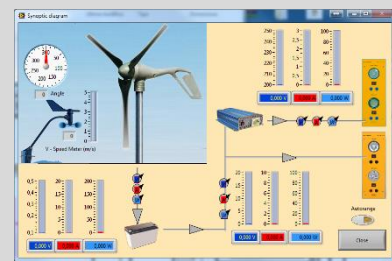
SOLAR/WIND ENERGY TRAINER WITH CONNECTION TO MAINS



DL SUNWIND-GT

Modular trainer for the theoretical and practical study of the electrical installations with photovoltaic solar energy and wind energy.

With the solar/wind trainer it is possible to perform experiments to determine the characteristics of a wind generator and a photovoltaic panel and study their on-grid operation with the connection to the mains network.



Complete with connecting cables, experiment manual and **software for data acquisition and processing**.

TRAINING OBJECTIVES

STUDY OF PHOTOVOLTAIC SOLAR PANEL

- Measuring solar radiation: Changing the inclination and azimuth of the solar panel
- Investigating the PV module response to shadow formation
- Recording the characteristics of the solar modules:
 - Solar Panel Voltage-Irradiation Curve
 - Solar Panel Current-Irradiation Curve (calculating the inner resistance of the solar panel)
 - Obtaining the solar panel current-voltage curve
 - Obtaining the solar panel current-power curve
 - Measurement of the voltage and current of the photovoltaic module with overload

TECHNICAL SPECIFICATIONS

- Rheostat module
- Network monitor module used to measure electrical parameters in a single-phase circuit.
- A circuit breaker module
- Fixed single phase power source rated at mains voltage with auxiliary 12 Vdc fixed regulated voltage output to power measurement modules.
- Inclinal photovoltaic panel, approx. 90W, 12V, complete with a cell for measuring the solar irradiation and a temperature sensor.
- Motor/generator group for the simulation of a wind turbine. Composed of a brushless motor and a three-phase permanent magnet generator.
- Control module for brushless motor drive
- Anemometer
- AC load module. It includes a dichroic lamp and LED lamps, with independent switches.



ON GRID SYSTEM – PHOTOVOLTAIC SOLAR ENERGY

- Measuring the electricity delivered to the mains grid
- Measuring the electricity produced by the solar panel, delivered/taken from the mains grid, and the loading of AC lamps
- Determining the efficiency of the grid connected inverter
- Investigating the response of a PV system to a mains failure

STUDY OF WIND TURBINE

- Identification of wind turbine components
- Operating the Wind Turbine Breaker
- Calculating wind power
- Measuring Wind turbine electrical power
- Study of wind turbine with load.

ON GRID SYSTEM – WIND ENERGY

- Measuring the electricity produced by the wind generator, delivered/taken from the mains grid, and the loading of AC lamps.
- Calculating the efficiency of the complete on-grid wind energy system.
- Investigating the response of a wind system to a mains failure
- Energy balance

- Single-phase and three-phase grid-tie inverter modules.
- Multifunction measurement module: solar irradiation, solar panel temperature, 2 DC power meters and 1 AC power meter.
- Multifunction measurement module for wind applications: It includes four separate instruments to measure all fundamental parameters for the study of a wind-system.
- Three-level frame for the modules

OPTION:

DL SIMSUN – Module with lamps to provide suitable lighting for the solar panel when used indoor.

Average training hours: 10h.

Approx. packing dimensions: 2.12 x 1.12 x 1.13 m.