ET 255

Using photovoltaics: grid-connected or stand-alone

Network capable GUNT software: control and operation via 1 PC. Observation, acquisition, analysis of the experiments at any number of workstations via the customer's own LAN/WLAN network.

Learning objectives/experiments

- application aspects of electrical components for photovoltaic systems
- efficiency and dynamic behaviour of system components in grid-connected and stand-alone operation
- function of MPP tracker
- function of inverters
- function of charge controllers
- behaviour of components under varying temperature and illuminance

Description

- **working with electrical components from the real world usage of photovoltaics**
- **selectable mode for grid-connected or stand-alone operation**
- **operation with real photovoltaic modules e.g. ET 250 or with the integrated photovoltaic simulator**
- **network capability: observe, acquire, analyse experiments via customer's own network**

Photovoltaic solar current can be used to feed into a public power grid: grid-connected operation or for local consumption: stand-alone operation. The ET 255 trainer allows typical electrical components to be studied for both possible uses of photovoltaics under different operating conditions.

It can be run both with actual solar modules, such as ET 250, and with the built-in photovoltaic simulator. Operation and parametrisation of the photovoltaic simulator is carried out via a dropdown menu in the software program. With relatively little effort, the photovoltaic simulator makes it possible to investigate the effects of changing illuminance and temperatures.

The measurements are transmitted directly to a PC via USB and analysed there using the GUNT software included. The network capable GUNT software makes it possible to observe, acquire, and analyse the experiments at any number of workstations via the customer's own network with just one licence.

The efficiency and dynamic behaviour of the electrical system components can be studied by analysing these results. These experiments allow for detailed findings on the operation of inverters, charge controllers and MPP trackers.

The trainer is fitted with measuring points for current and voltage at the relevant points of the respective connection in order to be able to use external measurement instruments to study the principle of operation of the system components.

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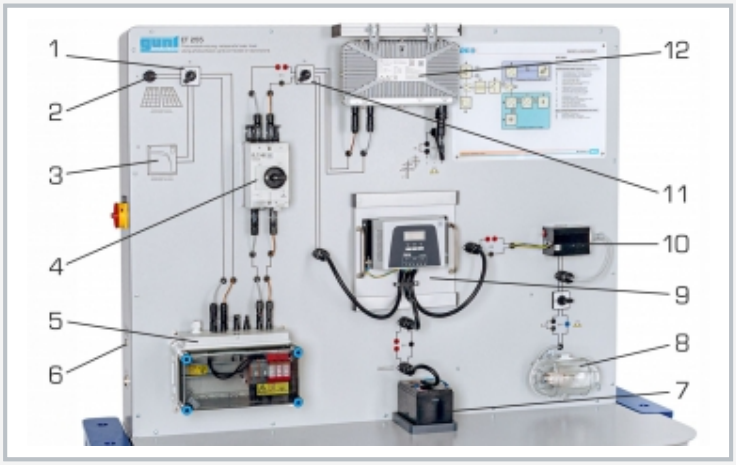
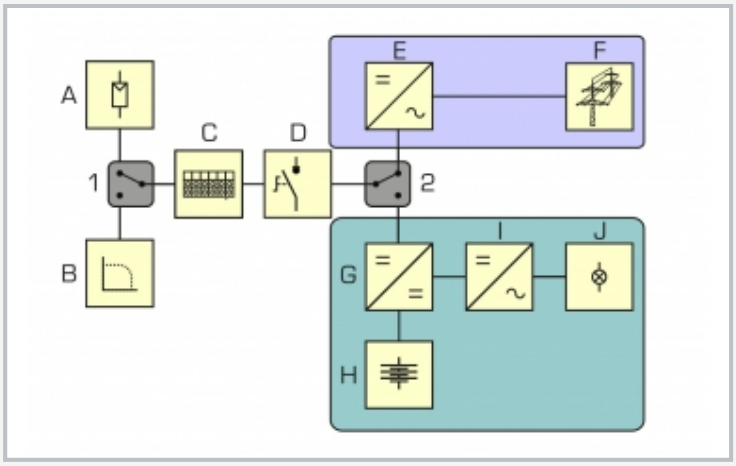


1 toggle switch: photovoltaic simulator/photovoltaic module, 2 connection socket for photovoltaic module e.g. ET 250, 3 symbol for photovoltaic simulator, 4 DC switch-disconnector, 5 combiner box, 6 module temperature and illuminance connection socket, 7 solar battery: stand-alone, 8 lamp: stand-alone, 9 charge controller with MPP tracker: stand-alone, 10 inverter: stand-alone, 11 toggle switch: grid-connected/stand-alone, 12 inverter with MPP tracker: grid-connected



Wiring diagram: A photovoltaic module e.g. ET 250, B photovoltaic simulator, C combiner box, D DC main switch;
Components for grid-connected operation: E inverter with MPP tracker, F mains connection;
Components for stand-alone operation: G charge controller, H solar battery, I inverter, J lamp;
Toggle switches: 1 photovoltaic simulator/photovoltaic module e.g. ET 250, 2 grid-connected/stand-alone

The illustration showsET 255 together with ET 250
e.g. the effect of influencing variables of real photovoltaic modules on the power optimisation and transmission efficiency of the system components can be investigated

Specification

[1] typical electric components from practical usage of photovoltaics
[2] operation with photovoltaic simulator or actual photovoltaic modules e.g. ET 250
[3] grid-connected or stand-alone operation
[4] inverter with MPP tracker for grid-connected operation
[5] inverter and charge controller for stand-alone operation
[6] solar battery and lamp for stand-alone operation
[7] commercially available combiner box
[8] display of the operation states in the software
[9] network capability: observe, acquire, analyse experiments at any number of workstations with GUNT software via the customer's own LAN/WLAN network
[10] GUNT software via USB under Windows 8.1, 10

Technical data

Photovoltaic simulator
- max. output: approx. 140W
- short-circuit current: approx. 4,5A
- open-circuit voltage: approx. 40V

Inverter for grid-connected operation
- rated input power: 150W
- max. output power: 125W
- max. efficiency: 89%

Charge controller for stand-alone operation
- charging current: 20A
- end charging voltage: approx. 14V

230V, 50Hz, 1 phase
230V, 60Hz, 1 phase
230V, 60Hz, 3 phases
UL/CSA optional
LxWxH: 1520x790x1760mm
Weight: approx. 165kg

Required for operation

PC with Windows

Scope of delivery

1 trainer
1 measuring amplifier
1 set of accessories
1 GUNT software + USB cable
1 set of instructional material

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Optional accessories

for Remote Learning		
010.10000	GU 100	Web Access Box
with		
061.25500W	ET 255W	Web Access Software

Other accessories

061.25000	ET 250	Solar module measurements