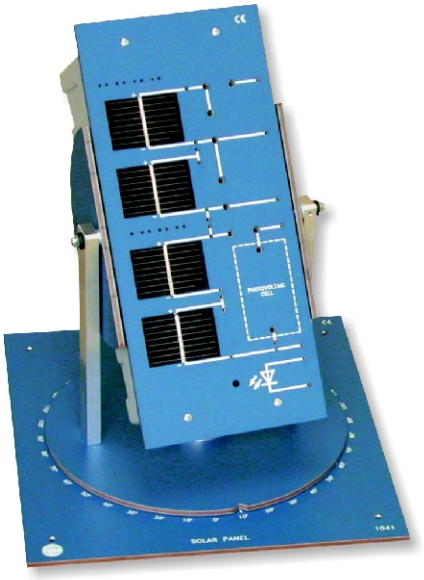
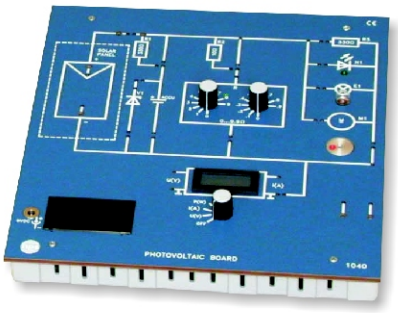
Fundamentals of Electrical Engineering / Photovoltaics

PHOTOVOLTAIC BOARD, Type 1040

SOLAR PANEL Type 1041



SOLAR PANEL (Type 1041)



PHOTOVOLTAIK BOARD (Type 1040)

- **Mains-independent training system for photovoltaics**
- **Experiments possible with natural sunlight or in the laboratory with a lamp**
- **Angle of inclination and rotation of the SOLAR PANEL can be set exactly using the printed scale**
- **String and bypass diodes can be plugged directly to the SOLAR PANEL**
- **PHOTOVOLTAIC BOARD with resistor decade, four different consumers and energy Stores (GOLD CAP)**
- **Current, voltage and power meter integrated in the PHOTOVOLTAIC BOARD**

Experiments with photovoltaics

- **Physical principles**
  - The LED as a photoelement
  - The solar cell as a diode
  - Investigation of various light sources
- **Investigation of solar cells**
  - No-load voltage and short-circuit current at different luminous intensities
  - No-load voltage and short-circuit current with partially covered solar cell
  - Power characteristic and filling factor
  - Temperature behaviour of a solar cell
  - Influence of the incident radiation angle on current, voltage and power
- **Structure of solar modules**
  - Series and parallel circuiting of solar cells
  - Behaviour in the event of partial shadowing
  - Bypass or shunt diodes
  - Blocking or string diodes
- **Energy stores**
  - Charging and discharging
  - Discharge protection
  - Currents in an isolated system (island)
  - Loading with various consumers

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PHOTOVOLTAIC BOARD, Type 1040

SOLAR PANEL Type 1041

Accessories for the photovoltaic training system

Lamp (Type 1042)

Solar Module (Type 1041.1)

Recommended Accessories

- Experiment manual: „Experiments with Photovoltaics” (Type V 0107)
- Set of Connecting Leads and Plugs (Type 1040.1)
- Set of Accessories (Type 1040.2), consisting of plug-in power pack, 3 pluggable diodes and cover plate for shadowing a solar cell with foil to simulate contamination.

Subject to technical modifications.

Technical Data

PHOTOVOLTAIC BOARD, Type 1040

- Resistor decade,
  for recording the power characteristics of solar cells
  Resistance range:
  0 ... 9.9 (in steps of 0.1)
  10 … 19.9 (with series resistor 10)
- 4 consumers
  Resistor: 330
  LED: green
  Filament lamp: 3.8 V / 70 mA
  Solar motor: 5.9 V / 50 mA
- Energy store: 1 F (Gold Cap),
  with Z-Diode (1.5 V) for voltage limiting and charging resistor 330
- Meter, built-in
  Voltage measuring range: 0 ... 19.99 V
  Current measuring range: 0 ... 1.999 A
  Power measuring range: 0 ... 1.999 W
  Operating voltage for meter: 9 V DC
  (by battery or via external power pack)
- Dimensions / weights:
  266 x 297 x 110 mm (w x h x d) / weight: approx. 1.4 kg

SOLAR PANEL, Type 1041

- Swivellable and rotatable, with degree scale
- 4 solar cells, monocrystalline:
- U_L = 0.6 V; I_k = 0.54 A, built-in
- 1 additional slot for solar cell
- 1 LED (clear)
- Dimensions / weights:
  266 x 297 x 350 mm (w x d x h) / weight: approx. 1.95 kg

Lamp, Type 1042

- 230 V / 120 W (PAR 38)
- Dimensions / weights:
  133 x 297 x 210 mm (w x h x d) / weight: approx. 1.25 kg

Solar Module, Type 1041.1

- Solar cell, polycrystalline: U_L = 0.55 V; I_K = 0.43 A,
  for inserting in the SOLAR PANEL
- Dimensions / weights:
  60 x 70 x 31 mm (w x h x d) / weight: approx. 50 g

Common technical data

Mechanical data
The front panels of the PHOTOVOLTAIC BOARD and the SOLAR PANEL are made of 5 mm thick laminate, matt blue with white engraving. The rear is covered by a grey plastic protective cover.