GES-100
Solar Cell Trainer

*Notebook is excluded

The GES-100 Solar Cell Trainer is an easy and self-contained trainer designed for learning the basic configuration and characteristics of a solar cell.

Through the use of different irradiations for various load units, students study the photoelectric effect of solar cells and plot the current-voltage curve as well as charging / discharging curves.

Features

1. Self-contained solar cell trainer
2. Adjustable solar irradiation and azimuth for sunlight simulation
3. DAQ Equipped is of much benefit to acquire and save the experimental data

Specifications

Solar Cell Base (GES-18001)

1. Solar Cell Modules
   (1) 4 pcs of monocrystalline silicon solar cell (6x12)cm
   (2) Each solar cell unit :
      a. Open circuit voltage (Voc): 0.55V
      b. Short circuit current (Isc) : 2.3A
      c. Max. load voltage (Vpm) : 0.5V
      d. Max. load current (Ipm) : 2.2A
      e. Max. power (Ppm) : 1.1W
      f. Efficiency (Eff) : 15%
2. Dimmer
   (1) Adjust the brightness of halogen lamp :
      a. Input voltage : 110V AC or 220V AC
      b. Output voltage : 12V
3. Light Source
   (1) Halogen lamp : 12V/50W
   (2) Beam angle : 60°
4. Heater
   (1) Input voltage : 24V (Max.)
   (2) Power : 80W

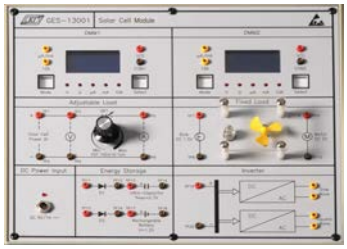
GES-18001

Solar Cell Module (GES-13001)

1. Digital Multimeter x 2
   (1) DC voltage : 400mV, 4V, 40V, auto range, input resistance ≥ 10MΩ
   (2) AC voltage : 400mV, 4V, 40V, auto range, input resistance ≥ 10MΩ
   (3) DC current : 400μA, 400mA,10A, push button selector switch
      10A range : 250V/10A fuse protected
      mA/μA ranges : 250V/0.5A fuse protected
   (4) AC current : 400μA, 400mA,10A, push button selector switch
      10A range : 250V/10A fuse protected
      mA/μA ranges : 250V/0.5A fuse protected
   (5) Resistance : 400Ω, 4KΩ, 40KΩ, 400KΩ, 4MΩ, 40MΩ, auto range
   (6) Diode test : 0~1.5V
   (7) Continuity : buzzer for the measured resistance < 30Ω
   (8) Display : 3 ¾ digit LCD, Max. indication 3999
2. Energy Storage
   (1) NiMH rechargeable battery : 1.2V/80mAh
   (2) Super capacitor : 10F/2.7V
3. Load
   (1) DC motor : 0.5V~6V,10mA
   (2) Light bulb : 1.1V, 300mA
   (3) Potentiometer : 100Ω, 10-turn
4. Inverter
   (1) Input voltage : 2V DC
   (2) Output :
      a. Modified sine wave : 1Vpp 50Hz/60Hz
      b. Square wave : 2Vpp 50Hz/60Hz

Power Supply

1. Input Voltage : 110V/220V AC
2. Output Voltage : 15V DC/1A



GES-13001

DAQ with Software

1. Channel 1 and 2 : Max. input voltage ±5V
2. Channel 3 and 4 : Max. input current 1A
3. System Requirement
   (1) PC : 1GHz or faster 32-bit (x86) or 64-bit (x64) processor,
   1GB RAM, 1GB more free disk space
   (2) OS : Windows 7 / 8 / 10

● List of Experiments

1. Measuring the irradiation of various light sources
2. Energy conversion of solar cells
3. Diode characteristic of a solar cell
4. Effect of light-sensing area on the open-circuit voltage of solar cell
5. Effect of light-sensing area on the short-circuit current of solar cell
6. Effect of irradiation on open-circuit voltage and short-circuit current of solar cells
7. Relationship between the angle of irradiation and the short-circuit current of solar cell
8. Open-circuit voltage and short-circuit current of solar cells connected in series-shading
9. Open-circuit voltage and short-circuit current of solar cells connected in parallel-shading
10. I-V curve of solar cells
11. Conversion efficiency and Maximum Power Point (MPP)
12. Simulating a daily course of sunlight
13. Charging a capacitor with solar cells
14. Capacitor discharging
15. Constructing a solar power island system
16. Inverter
17. Effect of temperature on solar performance

● Accessories (GES-19001)

1. Test Leads : 1set
2. Experiment Manual
3. Instructor's Manual
4. Basic solar Power Meter (GES-18002)
   (1) Operating with DAQ
   (2) Measuring range 10W/m^2~1200W/m^2
5. 25% Shading Plate
   50% Shading Plate
   75% Shading Plate
   100% Shading Plate

GES-18002

● Optional

Solar Power Meter(TES-1333)

1. Display : 3 ½ digit LCD, Max. indication 1999
2. Measuring Range : 2000W/m^2, 634Btu/(ft^2 x h)
3. Resolution : 0.1W/m^2, 0.1Btu/(ft^2 x h)
4. Accuracy : ±10W/m^2, ±3Btu/(ft^2 x h)
5. Sampling Rate : 2Hz

TES-1333