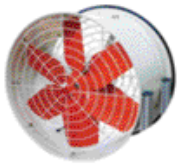
model:GT-Solar & Wind energy700

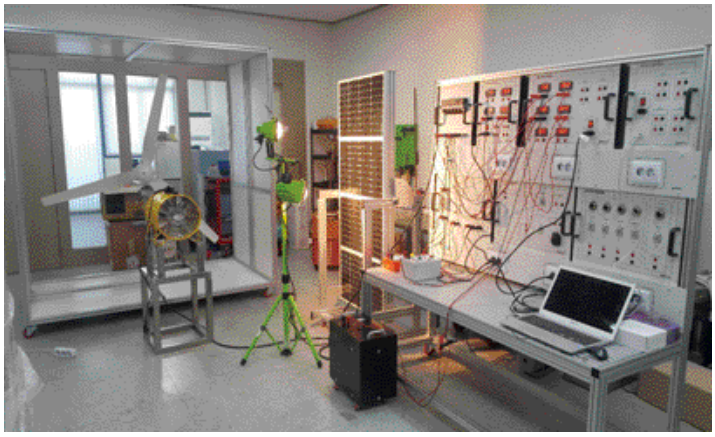
Solar & Wind energy trainer

Overview

1) GT-Solar & Wind Energy700 is the training system for solar and wind turbine hybrid systems.
   Solar modules, wind power module batteries, AC volt amps, DC volt amps, etc., are spplied to this system.
2) This system is constructed so that it can interoperate with solar power system and wind power system
   in order to understand the principle of utilization of solar energy and use of wind energy and various experiments
3) This system is constructed so that various data can be acquired and this system can calculate
   the energy yields generated from solar and wind power devices
4) This hybrid system is constructed & operated through independent solar photovoltaic systems,
   and thus help user understand for stand-alone photovoltaic systems.
5) This hybrid system is able to configure grid-connected photovoltaic system together
   with grid-assisted photovoltaic system.
6) For convenience of transportation, each solar and solar heat system is made to be separated
   and moved separately, and it is made to be able to practice by combining easily in practice place.
7) Renewable Wind and Solar Hybrid Program is provided.

System configuration





Components

Hardware platform	1 set
Wind Blade	1 set
Wind Blower	1 set
Photovoltaic module	1 set
Light source (bulb)	1 set
Battery	1 ea
Monitoring Program CD	1 ea
Manual book	1 book

Experiment (Study objectives)

Chap 1, about Energy classification
Chap 2, Solar Energy technology
Chap 3, Wind Energy technology
Chap 4, Battery Overview
Chap 5, Photovoltaic power generation that can be inter-working with outdoor production system
Chap 6, Measuring brightness (illuminance) of light
Chap 7, Measure the intensity of light along a distance
Chap 8, Measuring efficiency of solar panels.
Chap 9, Experiment of Solar Module Characteristics by Light Intensity
Chap 10, Solar Module Characteristics Experiment with Temperature Variation
Chap 11, Experiment of connecting wind module
Chap 12, Experiments of wind module according to wind speed
Chap 13, Electrical characteristics of solar cell module according to the angle of incidence
Chap 14, Hybrid Direct / Parallel Connection Characteristics Experiment
Chap 15, Hybrid charge controller experiment
Chap 16, Hybrid DC-AC inverter experiment
Chap 17, Hybrid DC-AC inverter load experiment
Chap 18, Grid-connected inverter experiment (No load)

Specs

1) Photovoltaic module : Two modules for serial connection and parallel connection 400W or more,DC12 / DC24V
2) Wind Energy system
  ① Rated Power : 400W
  ② Rated Voltage : 12V/24VDC
  ③ Numbers of Blades : 3
  ④ Rated Rotating Rate : 950r/m
  ⑤ Length of Blades : 58CM
  ⑥ Rotor Diameter : 1200mm
2)Stand-alone artificial power supply
  ① Display voltage and current using LCD display
  ② Stable voltage, current output function
  ③ Voltage : DC 0-30V
  ④ Rated Current : DC 0-3A
3) Grid-connected inverter
  ① 250W or less Micro Inverter
  ② 24-hour trace control function
4) Stand-alone inverter
  ① Capacity: 1KW or more
  ② Soft start function by program
  ③ Program conversion control function
  ④ Rated PWM similar step wave method
  ⑤ Rated Automatic control of input voltage by program
  ⑥ Input power terminal screw fixing method
  ⑦ Automatic control of input / output by overheating / overload
  ⑧ Automatic low voltage / high voltage control by program
  ⑨ Low voltage / high voltage re-operation function by program
  ⑩ Battery protection by program

5) Battery
① Voltage : DC 12V
② Capacity : 12V 100AH, Gel type
6) Distribution box and connection bar
8) Lulti-test
① C Ampear
② Hook meter
③ Mulimeter9) Watt Hour Meter Module
10) DC Voltage Meter(3ea), DC Ampere Meter(3ea)
11) AC wiring breaker module: 1EA
12) AC Voltage Meter(1ea), AC Ampere Meter(1ea)13) AC LOAD MODULE
14) Genseral spec
(1) Wind generator : 400W of DC power
(2) Photovoltaic generator : DC power of 400W
(3) Hybrid System : Interoperable system of wind and solar power enables various power conversion experiments
(4) Stand-alone Inverter : Provides up to 1,000W of capacity when converting DC 12V battery power to AC220V
(5) System monitoring
① Voltages and ammeters for wind and solar power systems can be monitored
② Protects heating and low battery conditions for auto shutdown, overload, short circuit
③ Computer can monitor the Inputs and outputs of wind turbine for voltage and wattage, and can monitor the solar in the battery inverter
④ Monitor system records for 1 hour to 1 year
⑤ Real-time monitoring of various graphs and energy saving effects
(6) 12V Renewable energy Deep cycle Battery: Renewable energy
(7) Deep Cycle battery
(8) Load device : provide Variable load device & maximum load
15) Software program spec
(1) DC voltage, DC current, AC voltage, AC current,,, etc are displayed for each part of Solar module, charge controller, battery, grid-tie inverter, stand-alone inverter, commercial power, etc.
(2) DC part and AC part are divided and displayed in table format to provide user's monitoring convenience.
(3) When user configure stand-alone invert and grid-tie inverter, inverter efficiency is calculated in real time by detecting each input voltage and output voltage.
(4) Voltage and current data of each point of DC part and AC part is displayed in real time graph with the equipment configuration, and only selected data is displayed as a graph.
(5) Battery status monitoring is possible.
(6) ESS System protection function
- Protection against temperature
If any cell of battery temperature < 0°C, stop charging / release at +2°C
If any cell of battery temperature > +45°C, stop charging / release at +43°C
If any cell of battery temperature < -20 °C, stop discharging / open MC4 / release at -18 °C
If any cell of battery temperature > + 55°C, stop discharging / open MC4 / release at 53°C
If any cell of battery temperature < +2°C and cell is being charged, turn on cell heating mat release at +4°C
If any cell of battery temperature > +43°C, turn on cooling fan / release at +40°C
- Protection against voltage
If any of cell voltage < 8.1V, stop discharging / Stop PCU / release at 13.4V
If any of cell voltage < 7.0V, System off
If any cell of battery voltage > 14.25V, open MC and trigger alarm: alarm message: “cell short” / release by power reset
- Protection against current
If battery discharge current > 13.5A, open MC alarm message “over discharge current”/ release by power reset
- Protection against Short circuit (If pack voltage < 9.5V, open MC)
- Protection fuse (Use slow blow fuse)