SOLAR PUMP SYSTEM

Overview

The Solar Pump System consists of a real PV panel, a halogen lamp as a sun simulator, MPPT controller, battery, BLDC water pump, transparent water basin and handheld irradiation meter. The components are mounted on a metallic frame with wheels. This allows to easily move the system indoor/outdoor to implement the experiments under real sunlight. The handheld irradiation meter helps to easily measure the outdoor irradiation as well as the irradiation of the solar simulator.

The power source of the pump is the PV panel itself. The system also includes a battery as well and can operate in two modes with battery and without it. The intensity of the sun simulator can be controlled by a dimmer, which is located on the frame. In addition, the light angle also can be changed to simulated different time of the day.

The system can be connected to a solar module replica as well. The system comes with an open source code based on graphical programming language, so the users are able to make further modifications in it.

It can be used for teaching and project-based learning.

Technical Specifications

- ✓ Small PV panel
- ✓ Halogen lamp with a dimmer
- ✓ MPPT controller with protection against reverse polarity, short-circuit and over temperature
- ✓ Lead acid battery
- ✓ BLDC water pump
- ✓ Control and Measurement Module based on reprogrammable controller, connectivity with SCADA software
- ✓ Voltage and current measurement, power calculation
- ✓ Digital input/output channels
- ✓ Handheld solar irradiation meter

SCADA Software Specifications

- ✓ User friendly SCADA software interface to monitor PV panel output, power consumption dynamics
- ✓ Manual and Remote control from the software over the pump
- ✓ Power measurement
  - o Voltage and Current RMS values
  - o Power calculation
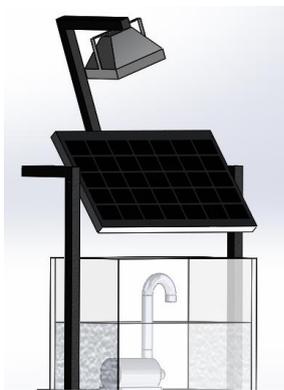
SOLAR PUMP SYSTEM

Connected

Power Supply Module

In — Out
Out

220VAC Out   +24DC GND

Switchgear Module

ON   OFF

1   2
3   4
5   6

Remote Start   Remote Stop

Enable Module

PV Panel Module

Panel Out
+
−

Controller

PV Panel In   Out
+   +
−   −

Pump

Pump In
+
−

Pump Power (W)

20.09 W
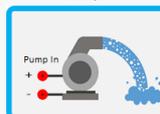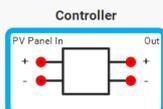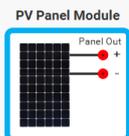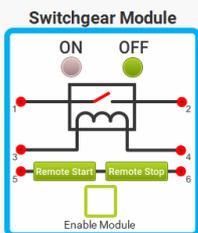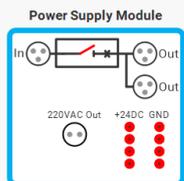
Control and Measurement Module

Voltage	Current	Sensor
PV Panel 12.09 V	Pump 1.69 A	Solar Irradiation 1834 W/m2

PV Panel Voltage

12.09 V

Pump Current

1.69 A

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