

Microcontroller based DC energy logger for off-grid PV system application

ABSTRACT

This paper presents the development of a microcontroller-based DC energy power logger using the low-cost ATmega328 microcontroller to measure the PV system DC voltage and current, while at the same time logging the measured data over time to calculate the generated energy in kWh. An existing 1 kWp off-grid 24V DC PV System has been applied as the testbed for the prototype logger where its voltage sensor can sense the voltage PV array output range between 0-50V using a voltage divider sensor circuit. For current measurement, 50A ACS756 hall effect sensor were adopted for precise sensing of the PV array current output. The data was recorded and stored in comma-separated values (CSV) text format which is accessible using MS Excel. LCD displayed the real time voltage, current, power and time lapsed of the logging duration. Measured data were compared with standard digital multimeter for calibration. This energy logger's stand-alone feature is very suitable for off-grid PV System application beside its high accuracy performance for V & I measurement.

Keyword: Photovoltaic (PV); Energy logger; Agrivoltaic system; Greenhouse; Power logger