

Solar Photovoltaic Auditing Application notes

The advantage of the Acksen products over most others is that our data loggers constantly sample information (recording the Min, Max and Average) over the set period, many other products only take 'snap shots' of what is going on and can miss 99.9% of the data that is critical to your overall analysis.

A solar photovoltaic installation is an energy conversion system, taking solar radiation and converting it first to DC voltage and current, then the inverter converts this to AC voltage and current. The energy can be used on site and/or exported to the power grid. The main efficiencies (or inefficiencies) in the overall system are the efficiency of the PV cells, typically 15% to 18% and the inverter, typically better than 95%, overall system efficiencies vary from 14% to 17%.



PV-3

Inverter efficiencies do not tend to vary much with time, they may vary with ambient temperature, so positioning them in cool places can help. The main concern is the efficiency of the PV cells, this can vary with temperature and poor optical transmission (dirt), the panels can also have individual cell failures within.

These inefficiencies are very difficult to detect as the energy output of the system can vary from day to day, depending on cloud cover, sun angle (season), ambient temperature, shading (whether a tree has leaves or not). Metrological data and records allow you to predict the output of a solar system, however when the system is in place and performance is being questioned, there is little alternative to a datalogging system, which will actually compare the efficiencies of the system.

Acksen Ltd offer several dataloggers to allow the measurement of a PV installation's performance.

The **PV-3** can measure and record, Solar Irradiance which is energy from the sun and is the energy input to the PV panels, DC Voltage and DC Current, these represent the energy output from the PV panels. This allows you to measure and record the efficiencies of the PV Panels over various periods of time. Our Electrosoft software allows you to input the area of the system along with the panel efficiency, and thus calculate and compare the actual solar energy input versus the actual output.

The **DC-3VA** can measure and record two channels of DC Voltage and one of DC Current, these represent the energy output from the PV panels. This allows you to measure and record the output of the PV Panels over various periods of time.

The **SR-1R** can measure and record, Solar Irradiance which is energy from the sun and is the energy input to the PV panels, this allows you to measure and record the likely energy that a future Solar PV or Solar Thermal installation would provide over various periods of time.

Our Electrosoft software allows you to input the area of the actual or proposed system along with the panel efficiency, and thus calculate the energy output.