

Title of Article: A simple resistive load I-V curve tracer for monitoring photovoltaic module characteristics

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Abstract: Current-Voltage (I-V) curve tracers are useful implements for solar Photovoltaic (PV) research and manufacturing, particularly when wishing to ascertain module yield viz-a-viz solar irradiation falling on the module in different climatic conditions. This paper presents a simple affordable and easy to fabricate instrument for tracing I-V characteristics of a PV module. It comprises of rapidly varying resistive loads centred on power resistors connected to relays and controlled by an electronic circuitry. The circuitry consists of a 555 astable oscillator that is used to send clock pulses to the clock terminal of a 4017 decade counter which in turn produces a sequence of pulses. Each progression of pulse advances by one bit to sequentially turn on individual relays via driver transistors. The speed of the count is made variable from the frequency determining network of the 555 oscillator. The I-V characteristics of the module are thus measured by the sequential selection of the relays which are each connected each to a selected load resistor to determine the operating point on the I-V curve. The currents and voltages are then recorded simultaneously with irradiance from a pyranometer, by a datalogger to which the instruments are connected. The circuit was tested on two monocrystalline modules to compare the effect of Harmattan dust on PV output yield