PV Power Analyzer

Type VK-PA-300

For I-V Tracing, Maximum Power Point Tracking, & Cyclic Voltammetry

The Measuring Range (up to ±12V, up to ±4A)

Specifications	
Measurement Range (For details see page 4)	Voltage: ±12 V Current: ±2A (±4 A Pulse) with 5½-digits resolution
Measuring Technique	Digital Source Meter Type
Inputs	Front: 4 probes for PV devise
A/D Converters	24 Bit (2 independent ADCs for V & I measurements)
User Interface and data collecting	Computer software is provided for control of all the functions and data logging. Measurement data can be saved as a text file (.csv or .txt) and directly plotted on ®Microsoft Excel graph. (Windows based PC required)
Communication	Bluetooth
Power Requirement	100 VAC (50-60 Hz) 230 VAC (50-60 Hz)
Dimensions, Weight	260 mm(W) x 350 mm(D) x 133 mm(H), 6 kg

Features of Solar Cell I-V Tracer

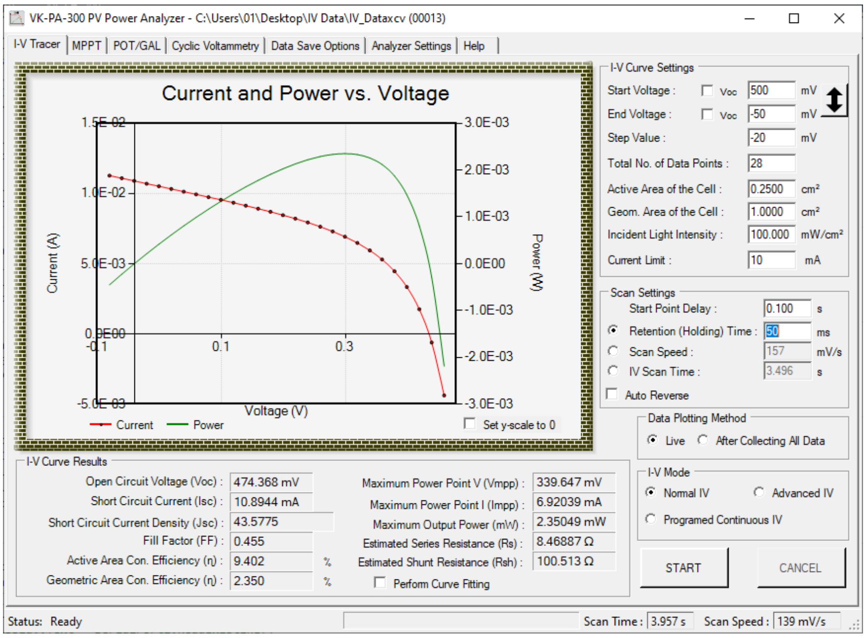
User selectable START, END and STEP voltages. Plots current and power vs. voltage curves. Calculated results include V_{oc}, I_{sc}, J_{sc}, P_{max}, V_{mpp}, I_{mpp}, FF, R_s, R_{SH}, $\eta_{activeA}$, and η_{geoA}. User can set the desired scan speed, scan time, or holding time. Advanced I-V option allows initial, middle, and end point holding times. I vs. t transient plot for all data points and/or under a selected fixed voltage. Programmed Continuous IV" function allow user to take series of IV curves on given time intervals.

Features of Maximum Power Point Tracking (MPPT) Function

Analyzer acts like the best load for the cell to extract maximum power point (MPP) and keep tracking MPP continuously. Plots P_{max}, V_{mpp}, I_{mpp} and Efficiency vs. time curves and also display current/power vs. voltage plots.

Features of Potentiostat/Galvanostat Function

Plot the current vs. time under a given constant voltage or constant current. User can directly measure the open circuit voltage, and short circuit current of the cell.



Features Cyclic Voltammetry (CV)

Allows user to get both three electrode and two electrode CV plots for given voltage range, scan speed and number of cycles. This function mimics the analog triangle wave of voltage without digital voltage steps.

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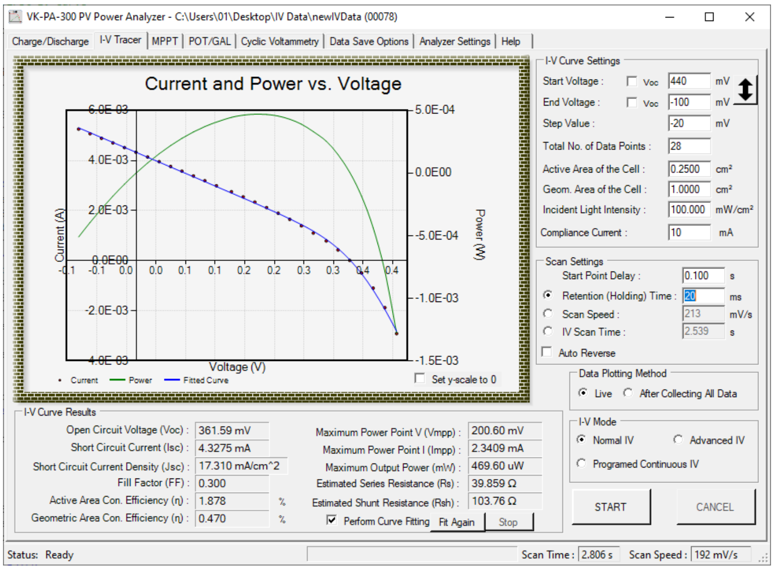
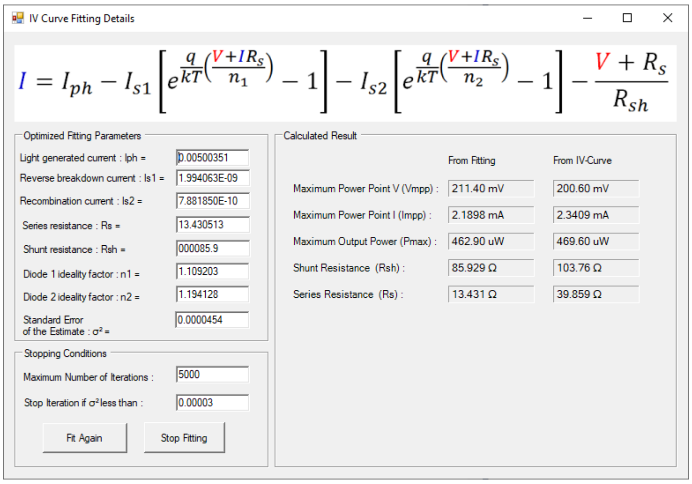
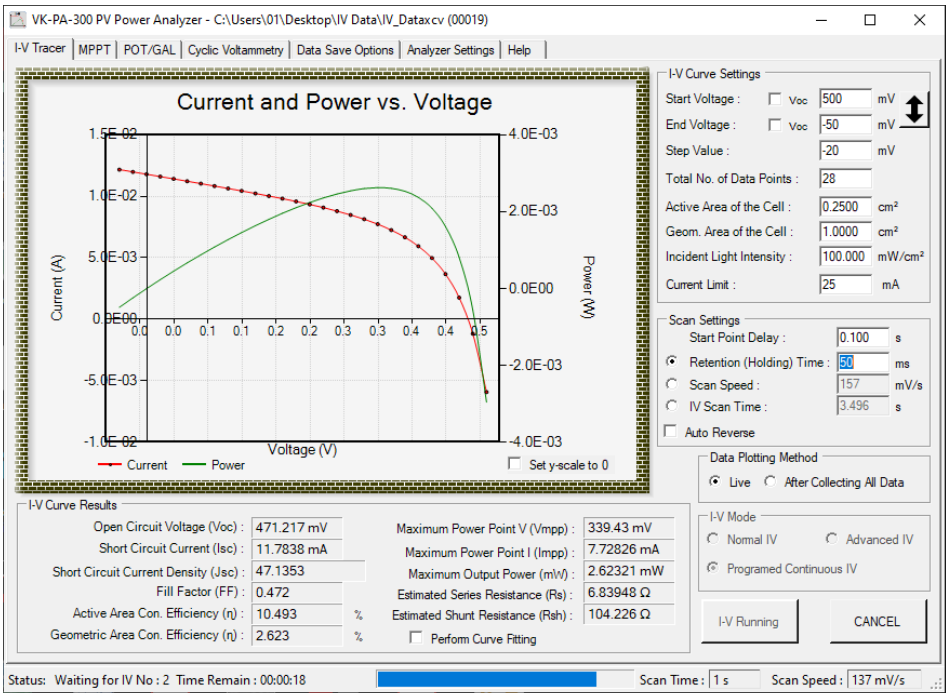
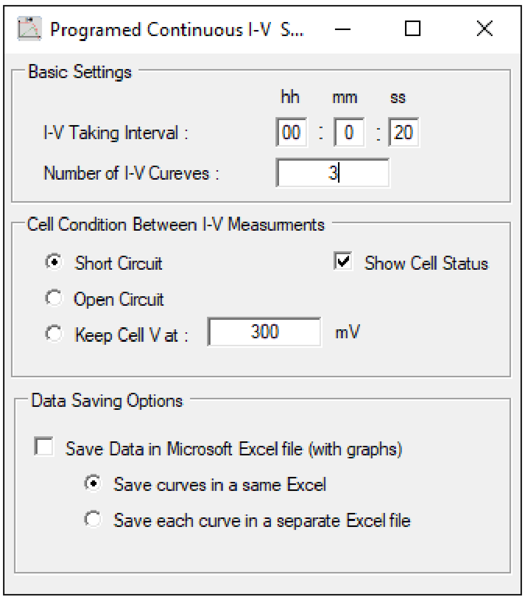
All the graphs and data can be saved in a Microsoft Excel Workbook.





I-V curve fitting function automatically fit the I-V data with two diode model and calculate various parameter.





“Programmed Continuous IV” function allow user to take series of IV curves on given time intervals. User can also determine the cell keeping condition during I-V measurements. Data can be save in a single Excel file or separate files.

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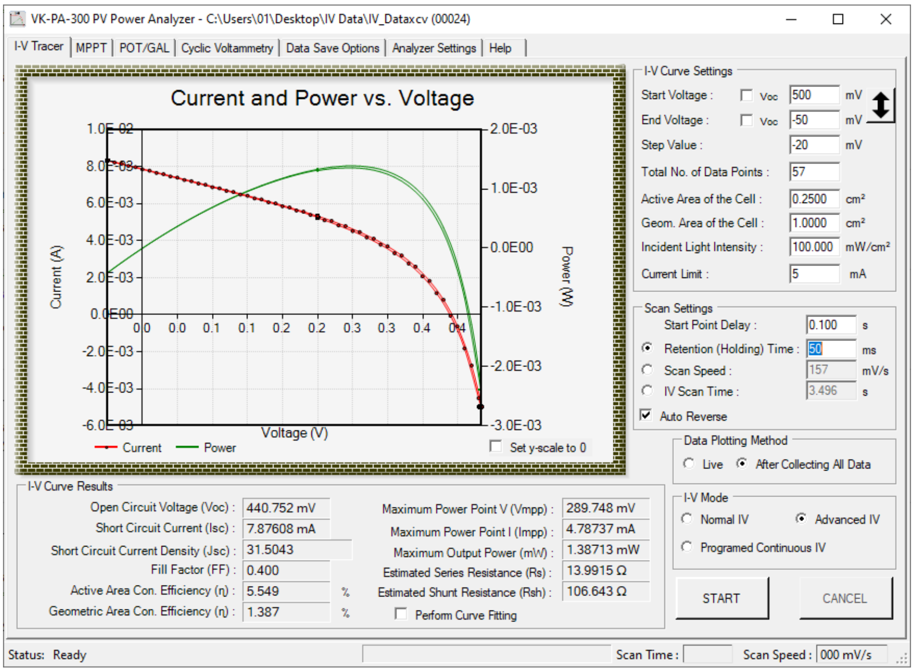
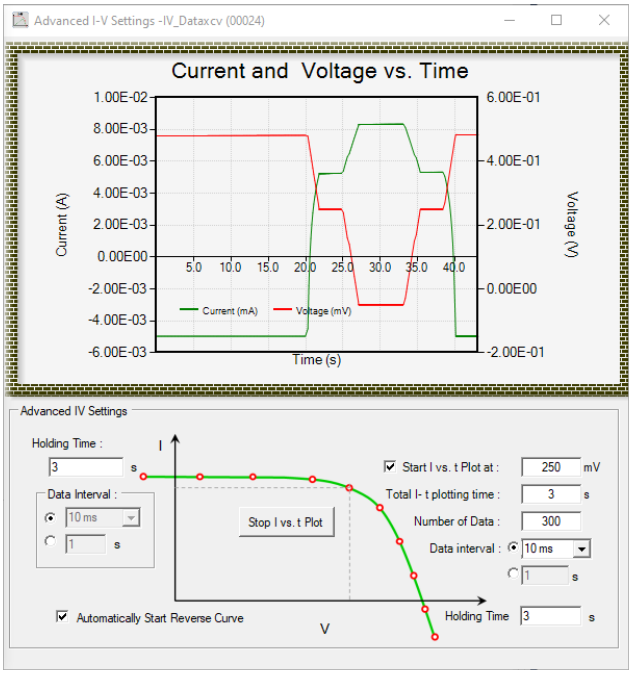
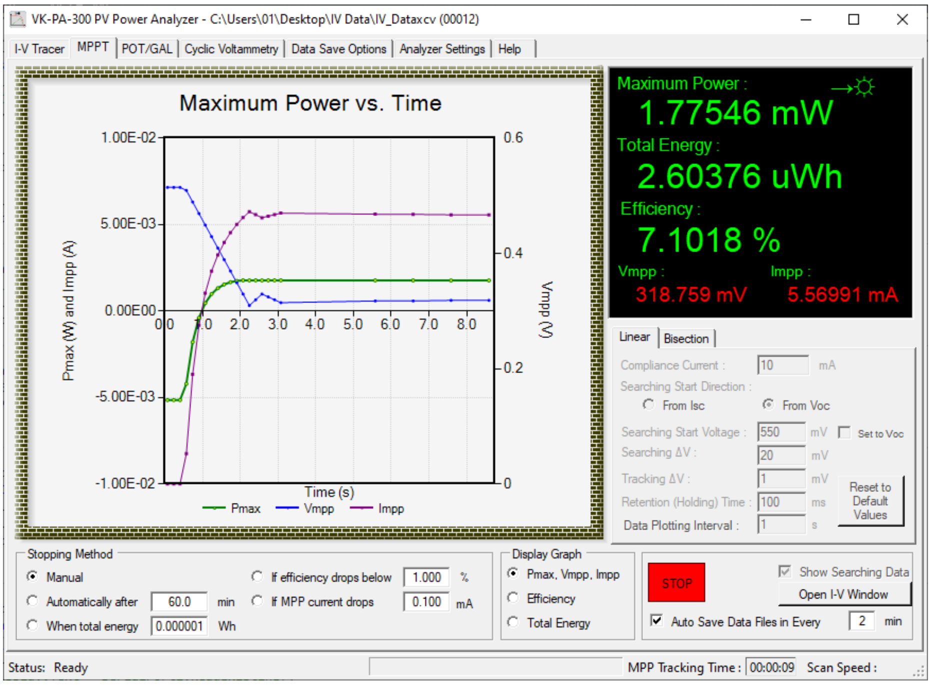
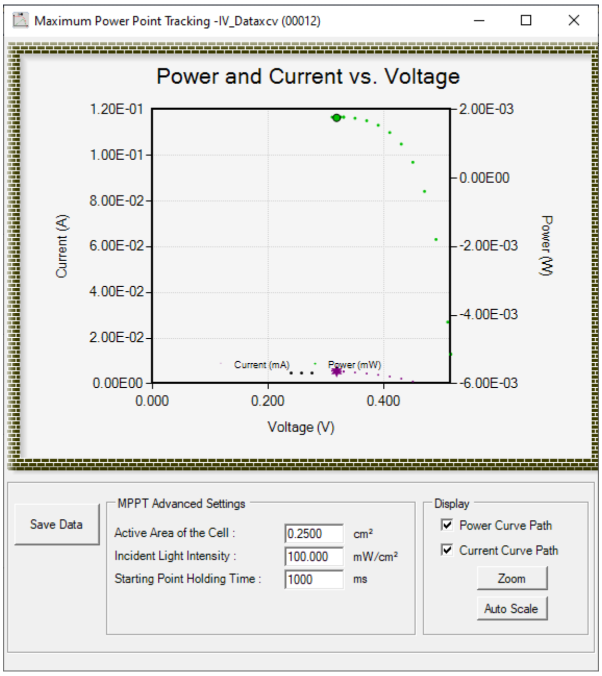




"Advanced IV Setup" allows user to change various settings such as "start" point holding time, "end" point holding time, current vs. time plot for each data point, and/or at given fixed voltage in the middle of I-V curve tracing.





"Advanced MPP tracking" function shows the power, current, voltage and efficiency curves from the starting point of the MPP tracking so that user can see how it reach to maximum power point from different starting points and directions. It is continuously plot the conversion efficiency vs. tme curve.

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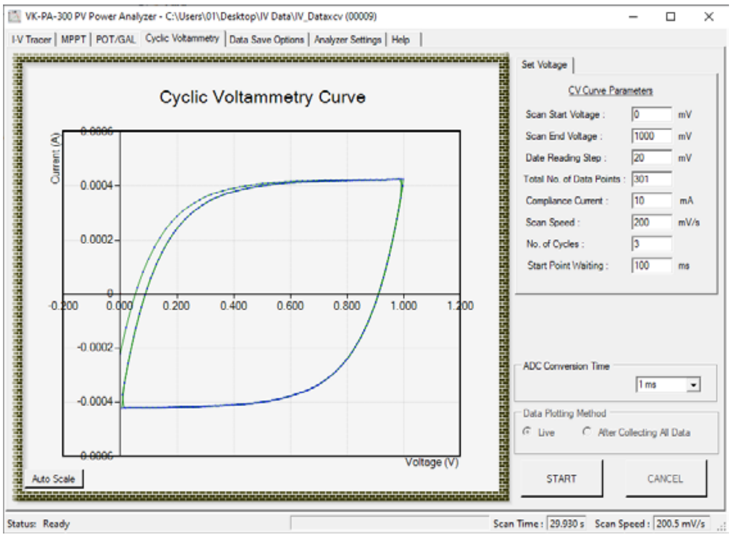
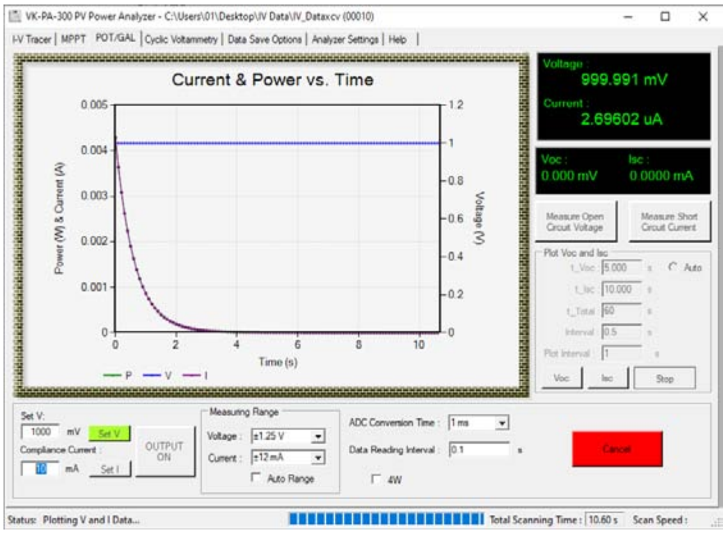
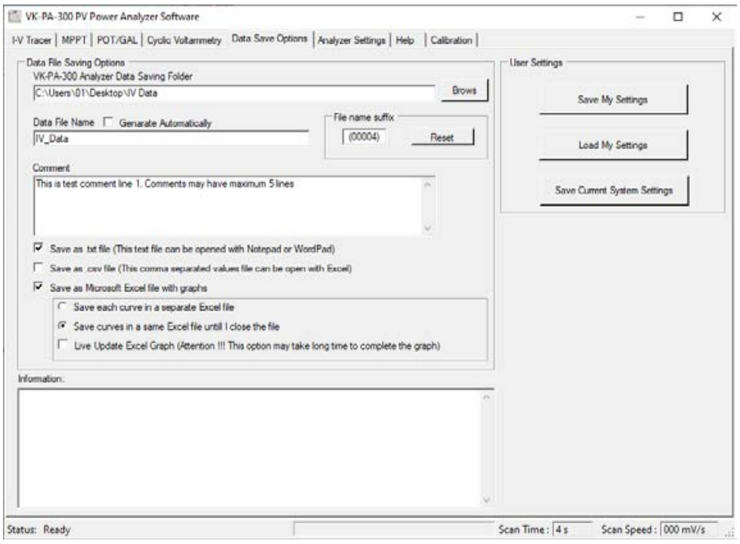


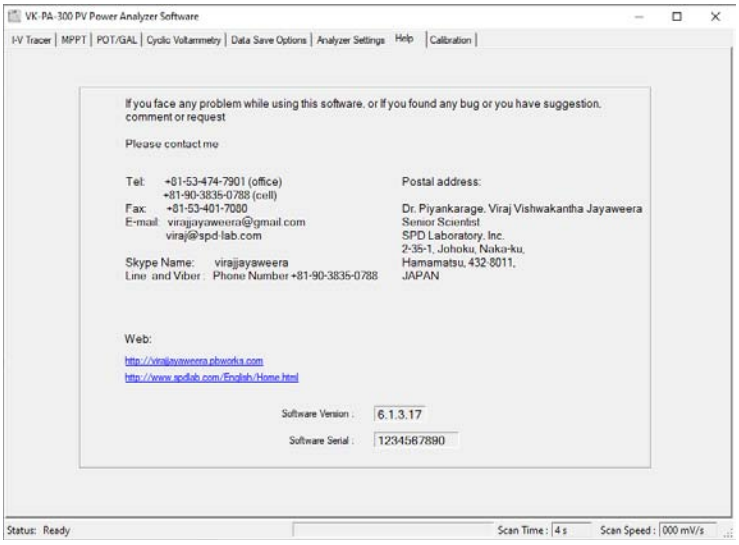
"Cyclic Voltammetry" allows user to get both three electrode and two electrode CV plots for given voltage range, scan speed and number of cycles.



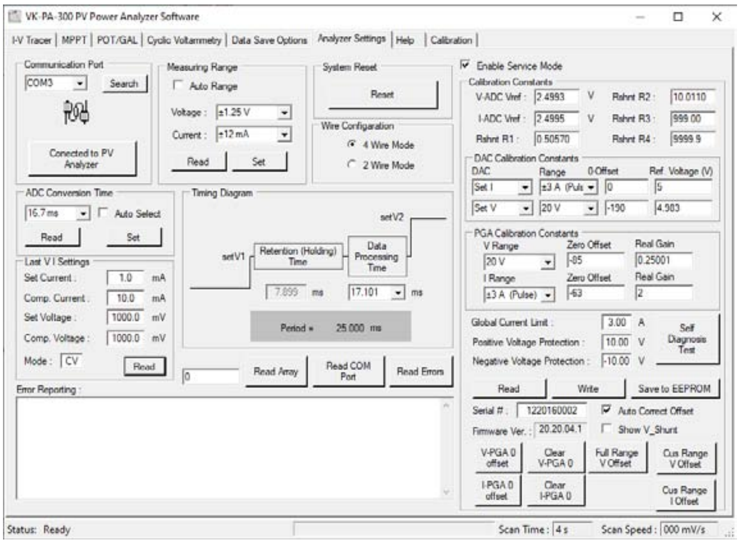
"POT/GAL" Tab allows user to set constant voltage or current to the sample and measure and plot data. Also Voc and Isc of solar cells can be measured with single click .



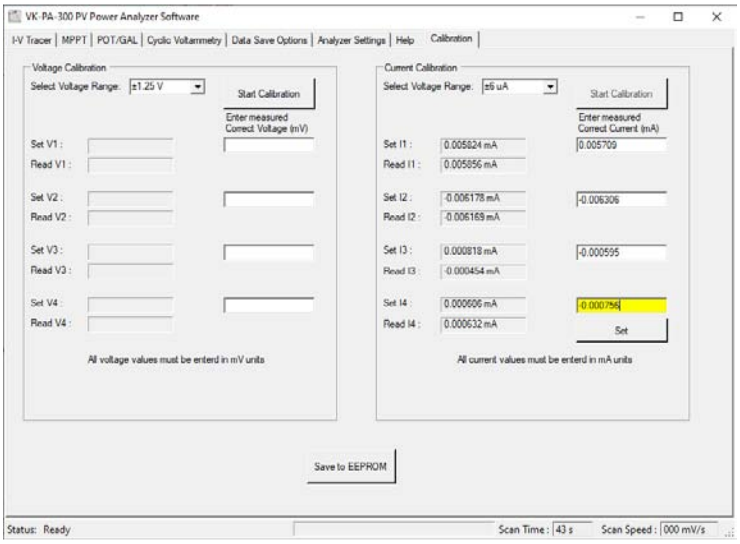
"Data Save Option" tab allow user to specify results saving folder and file name prefix. User can save setting parameter also.



"Help" shows contact information and Software Version.



"Analyzer Settings" tab allows user to change specific parameters of the PV power analyzer.



If needed user can recalibrate VK-PA-300 with a standard meter. (Please request password to access to calibration menu)

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VK-PA-300 Detailed Electrical Specifications	
Measuring Technique	Digital Source Meter with 4 probes connection to DUT.
Measuring Range	Voltage: ±12 V Current: ±2 A Continuous 4 A (pulse)
Specifications of A/D Converters	Resolution: 24 Bit Utilize on-chip digital calibration to eliminate offset and gain errors. ADC integration time can be selected from 16 different values from 400 ms to 33.3 µs.
Built-in Voltage Reference Parameters	Output Voltage : 2.500 ± 0.001 V Output Voltage Drift : 3 ppm/°C (-40°C to +85°C) Output Noise : 100 nV/Hz½

Voltage measuring ranges and reading (24-bit ADC) resolution and voltage setting (16-bit DAC) resolutions

Range	± 150 mV	± 300 mV	± 600 mV	± 1 V	± 2 V	± 4 V	± 8 V	± 1 2V
Reading Resolution	9 nV	19 nV	37 nV	74 nV	149 nV	298 nV	0.6 µV	1.2 µV
Setting Resolution	9.5 µV	9.5 µV	19.1 µV	19.1 µV	38.1 µV	76.3 µV	153 µV	305 µV

Current measuring ranges and reading (24-bit ADC) resolution and current setting (16-bit DAC) resolutions

Current Measuring Range	Current Reading Resolution (24-bit ADC)	Current Setting Resolution (16-bit DAC)
± 6 µA	0.8 pA	1 nA
± 12 µA	2 pA	1 nA
± 25 µA	3.4 pA	1 nA
± 50 µA	7 pA	1.7 nA
± 100 µA	13 pA	3.5 nA
± 200 µA	27 pA	7 nA
± 250 µA	37 pA	9 nA
± 500 µA	74 pA	19 nA
± 1 mA	148 pA	38 nA
± 2 mA	295 pA	76 nA
± 6 mA	887 pA	0.9 µA
± 12 mA	1.8 nA	0.9 µA
± 25 mA	3.5 nA	0.9 µA
± 50 mA	7.1 nA	1.8 µA
± 100 mA	14 nA	3.6 µA
± 200 mA	28 nA	7.3 µA
± 500 mA	75 nA	19.1 µA
± 1 A	149 nA	38.1 µA
± 2 A	298 nA	76 µA
± 5 A	0.6 µA	153 µA

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