

PVK 3.2.n - Documentation

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1. Introduction

PVK 3.2.n is the control and data acquisition software for the I-V curve analyser (PV-KLA) and can also be used for display, save and print I-V curves.

2. System Requirements

IBM-compatible PC, 6 MB free harddisk space, one free RS232 port, display resolution at minimum 800x600, Windows 9x/2000/XP.

3. Software installation

Execute the file *setup.exe* and follow the instructions.

If the LabVIEW RunTimeEngine V5.1.1 not exists, it will be installed on your system. This is necessary for executing PVK 3.2.n and other LabVIEW-RunTimeApplications.

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If PVK 3.2.n be installed from the harddisk, a request appears after installation to insert the installation disk into a drive. If the installation disk is not available, you can alternatively copy the file *pvk.res* into the pvk path (default: c:\program files\pvk 3.2.n).

4. Connecting the PV-KLA

Before turning on the PC connect the PV-KLA with the cable to a COM-Port (RS232).

5. Using PVK 3.2.n

The program PVK 3.2.n starts by executing the file *pvk.exe*. Following window appears:

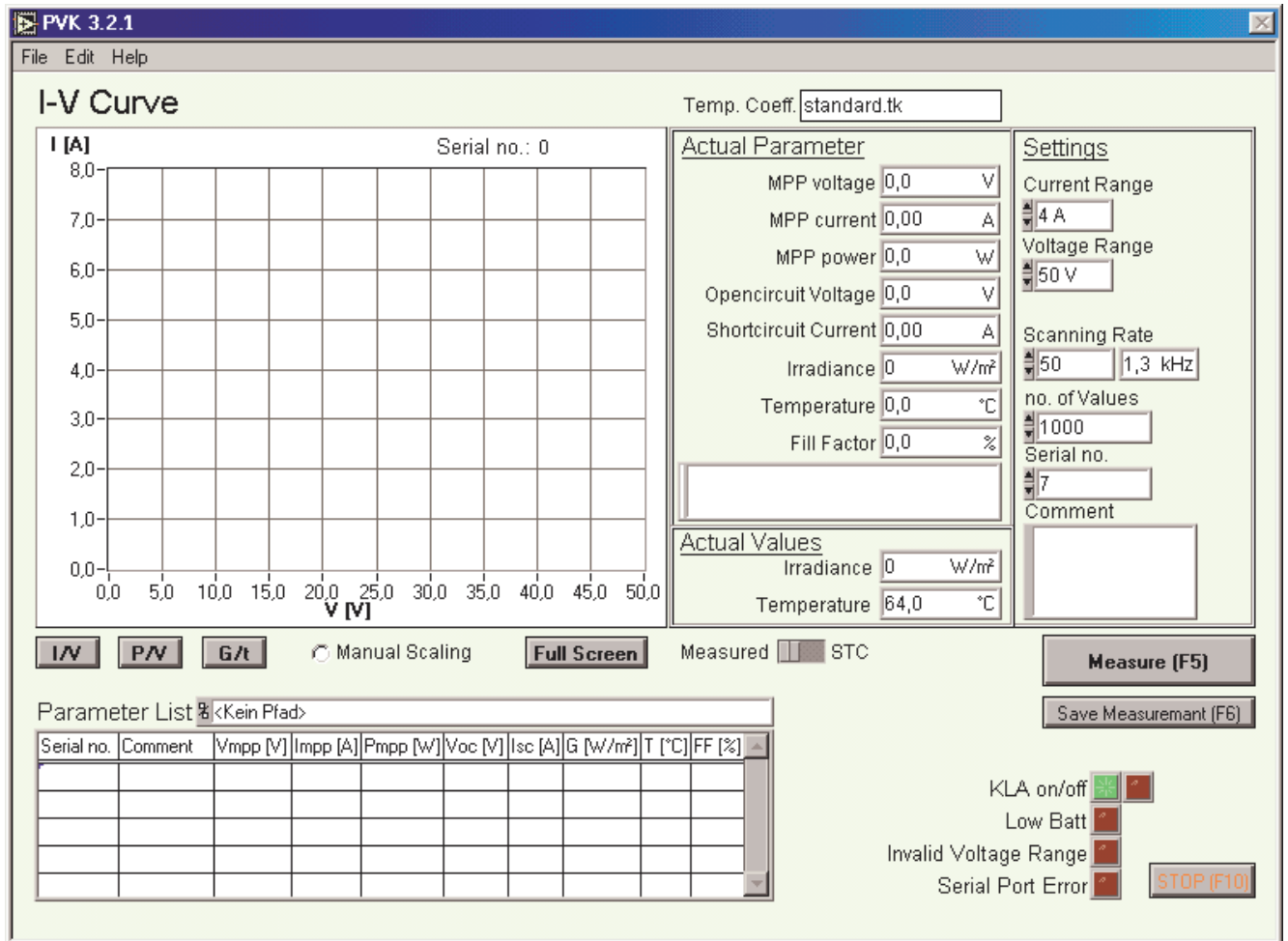


Fig. 1: PVK

If the PV-KLA is turned on and connected to the PC, it is indicated by the green LED *KLA on/off*. If need is the correct COM port has to be set in the preferences (see cap. 5.1). If the red LED lights, the PV-KLA is turned off or not connected to the (correct) port. In this case the button *measure (F5)* is disabled.

Also when *accu nearly empty*, *invalid voltage range* or *error serial port* occurs, no measurement is possible.

5.1 PVK Preferences

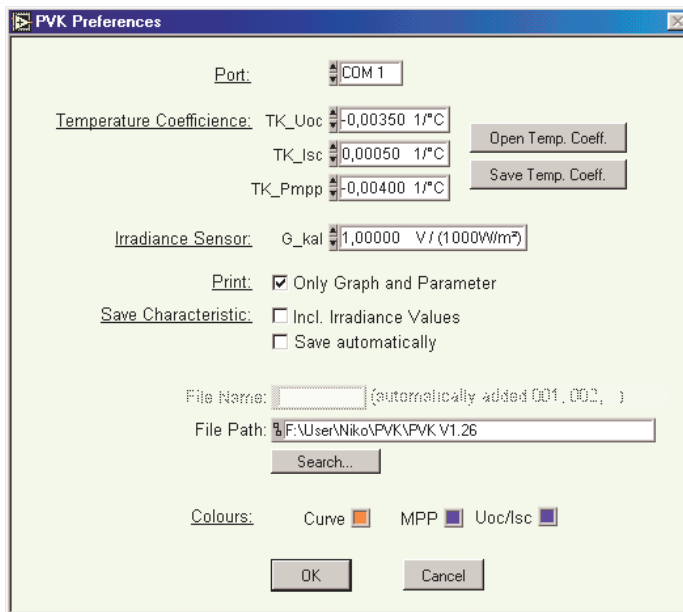


Fig. 2: PVK Preferences

By selecting menu *Edit – PVK Preferences* following settings are possible:

- The serial port (COM1...COM4), the PV-KLA is connected to.
- The temperature coefficients for Pmpp, Isc and Uoc with which PVK 3.2.n converts the measured parameters linear to Standard Test Conditions (STC, $G=1000\text{W/m}^2$, $T=25^\circ\text{C}$). The temperature coefficients have to be edited as $1/^\circ\text{C}$, so that values as $\text{mV}/^\circ\text{C}$ or $\%/^\circ\text{C}$ has to be converted to $1/^\circ\text{C}$. The temperature coefficients can be saved and loaded. If one temperature coefficient is changed it has to be saved before OK is enabled.
- The default setting $1\text{V} / 1000\text{W/m}^2$ for the irradiance sensor can be changed.
- Print setting, if only the graph and parameter should be printed or the whole window.
- Irradiance values should also be saved (not only the average)
- Enabling automatically saving. In this case a filename has to be edit, which is automatically extended by 001, 002,...
- Path for saving of curve and parameter files.
- Colors for I-U curve, MPP and Uoc/Isc.

The PVK preferences can be set to default by exiting PVK 3.2.n and erasing the file *<PVK-path>\pvk.ini* (default: *c:\program files\pvk 3.2.n\pvk.ini*).

5.2 Starting an I-V Curve Measurement

Before starting a I-V curve measurement the controls on top of the button *measure (F5)* have to be set.

The current and voltage range have to be set. If the selected voltage range is lower than the opencircuit voltage or the opencircuit voltage is nearly zero the error *invalid voltage range* appears and a measurement is not possible.

The *scanning rate* and *no. of values* depends on the expected shortcircuit current and opencircuit voltage.

Generally: high opencircuit voltages – low scanning rate
 high shortcircuit currents – high scanning rate

The best settings have to be find out empirically.

The *no. of values* sets how many values are read out of the PV-KLA. Only the values until reaching the opencircuit voltage are used for calculation and saving.

The *serial-no.* can be set or is incremented automatically after each measurement.

Comments (max. 100 characters) are saved in the header of the curve-file.

The indicators in *actual values* shows the actual temperature and irradiance to inform about the circumstances for the measurement.

After these setting the measurement can be started by pressing the button *measure (F5)*.

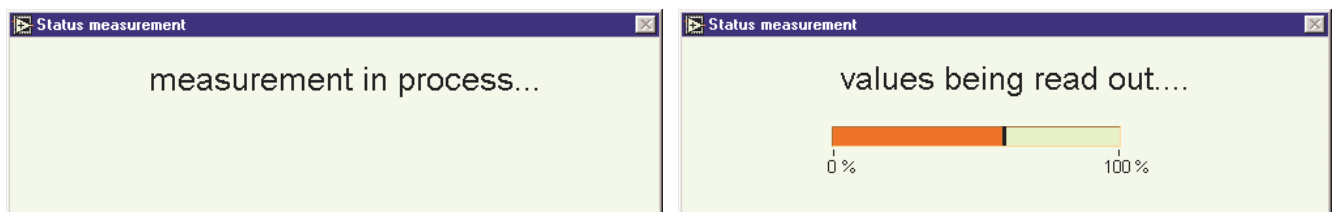


Fig. 3: Status measurement

5.3 Curve Diagram

After finishing measurement the I-V curve is shown within the diagram, beside of the paramerters.

You can choose between I-U, P-U and G-t diagrams. By enabling *manual scaling*, double-click on the first and last axis values to scale individually the diagram.

The parameter you can switch between measured or STC-parameters. The convertation to STC-values is linear to irradiance (at Pmpp and Impp) and to temperature (at Pmpp, Impp and Umpp) and the temperature coefficients set within the PVK preferences (cap. 5.1).

Attention! Converted STC parameter measured at irradiances of $G < 750 \text{ W/m}^2$ can be very inaccurate.

5.4 Fullscreen Diagram

With *fullscreen* you get a fullscreen diagram, choose between I-U, P-U and G-t diagrams.

With a right mouse click into the diagram you can get some tools to style the diagram.

The diagram can be printed or saved as graphic file in bmp, jpg or png format.
 The diagram title can be expanded (mouse click behind the title).

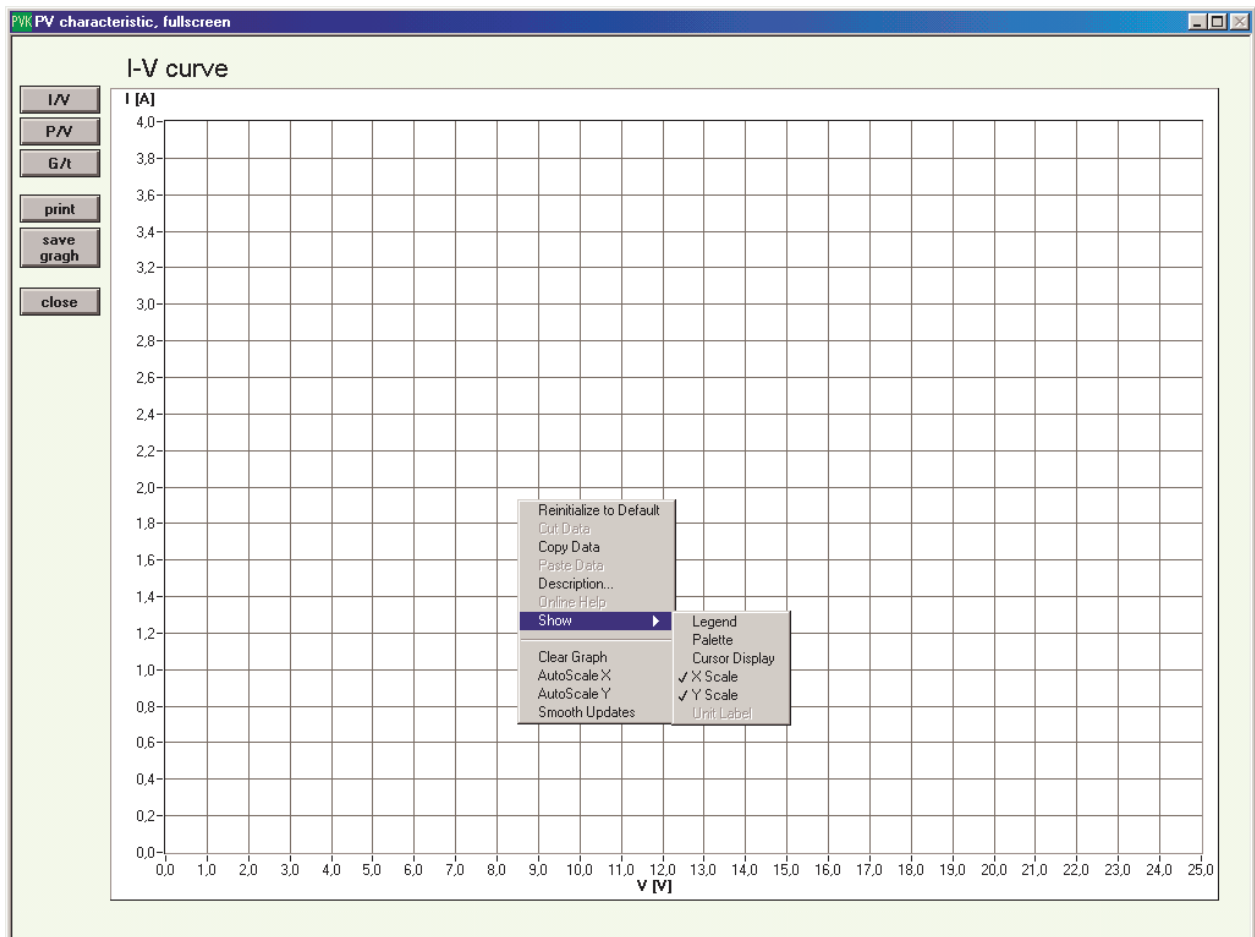


Fig. 4: Fullscreen diagram

5.5 Save Measurement

By pressing the *Save Curve* button (or menu *Save Curve as...*) the measurement will be saved as an ASCII file including serial no., date and time of measurement, comment, parameters and V-I curve values.

example:

```
I-V Curve; Serial-no.: 2; 14.03.02 14:19:56
Comment: Modul xy
```

Measurement Settings:

```
V Range [V] I Range [A] Scan Rate no. Values autorange
50 4 50 1000 0
```

```
Vmpp [V] Impp [A] Pmpp [W] Voc [V] Isc [A] G [W/m²] T [°C]
FF [%]
33,49 5,881 196,95 37,46 6,556 843 21,9 80,2
```

```
U [V] I [A] G [W/m²]
0,360 6,503 825
0,564 6,458 826
...
```

If enabled in the PVK preferences the irradiance values G [W/m²] are also saved to get some information about the irradiance trend during the measurement.

Saved measurements can be opened within PVK 3.2.n (menue *File – Open Measurement...*).
Preferences of your OS are used for decimal seperators.

5.6 Print diagram

The I-V curve can be printed with menue *File – Print*, either the diagram with the parameters or the whole window (menue *Edit – PVK preferences*). The diagram title can be expanded (mouse click behind the title). The background is printed with, the colours for I-V curve, MPP and Uos/Isc can be selected in the PVK preferences.

See menue *File – Printer Setup...* for printer preferences.

5.7 Save graphics

You can save the whole window as bmp, jpg or png graphic file (menue *File – Save Graph as...*).

5.8 Parameter List

The measured parameters of each measurement are added to the parameter list below the diagram. The parameter list can be saved as ASCII file (menue *File – Parameter Save as...*).

Saved parameter lists can be opened. Following measurement add new parameters not to the opened parameter list but to the parameter list of the actual measurement session.

The name of the parameter list is shown in the path above the table, <no path> is the actual measurement session.

5.9 PVK Help

By selecting menue *Help – Show Help* a window with short information is opened, showing some help to the objects the cursor is moved over.

5.10 Exit PVK 3.2.n

PVK 3.2.n exits by *STOP (F10)*

After exiting PVK 3.2.n the last measurement and parameter set can be saved by copying the files <temporary path>\PVkennlinie.tmp and PVparameter.tmp (default: c:\windows\temp\...) **before** the next start of PVK 3.2.n.