DEPARTMENT OF ELECTRONICS AGH UST

LABORATORY
OF
ELECTRONIC DEVICES

I-V PLOTTER USER MANUAL

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REV. 1.0

1. DESCRIPTION

I-V plotter allows to measure a current-voltage characteristics using NI ELVIS II. The plotter controls VPS (Variable Power Supply) voltage sources, optionally[1] FGEN output is used as third voltage source -5V÷5V, and measures the current with DMM (Digital Multi Meter). Gathered data is plotted in real-time; as well as it can be exported to a text file for further analysis.

2. MAIN WINDOW

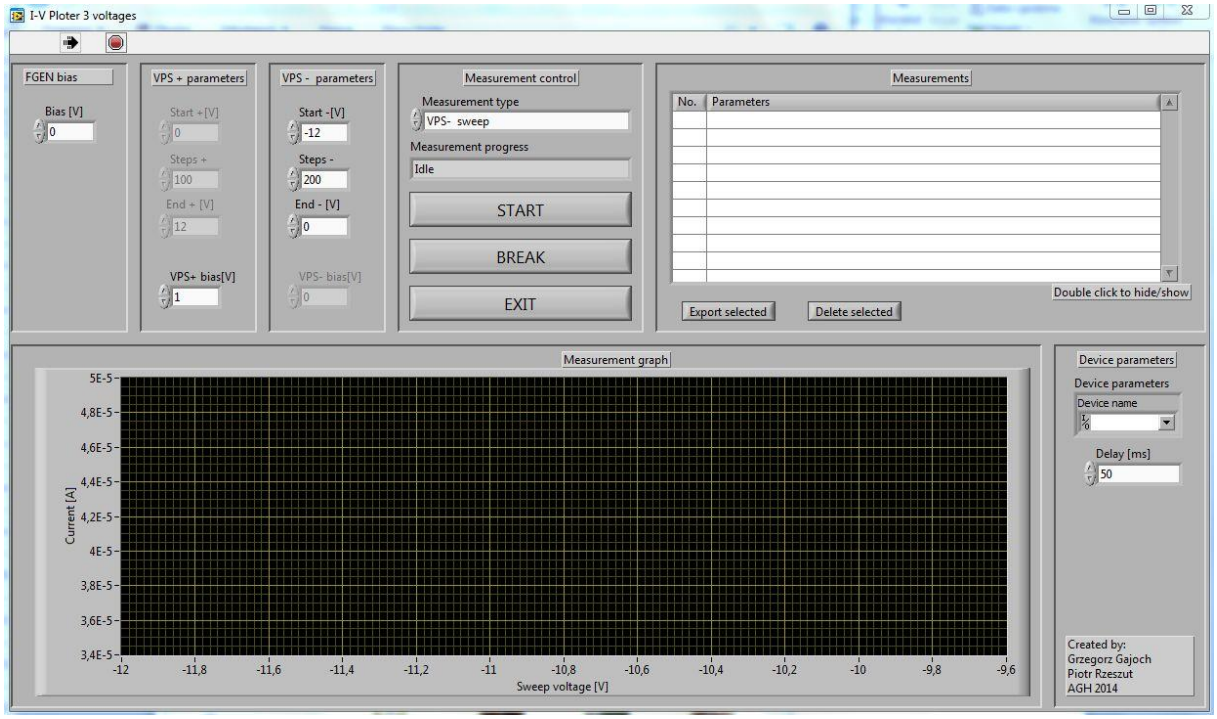

Fig. 1 User interface of IV3 application

3. HARDWARE CONFIGURATION

Controlled voltage sources are accessible on NI ELVIS II prototyping board. As the input for current measurement “COM” and “A” labeled banana connectors, located on the left side of device, should be used. Pin layout is shown on figure 2.

- current measurement: “COM” and “A” labeled terminals (positive and negative pole of the ammeter, respectively);
- VPS+ source: pin 48 (ground on pin 49);
- VPS- source: pin 50 (ground on pin 49);
- FGEN source: pin 33 (ground on pin 49);

[1] Feature in IV3 version.

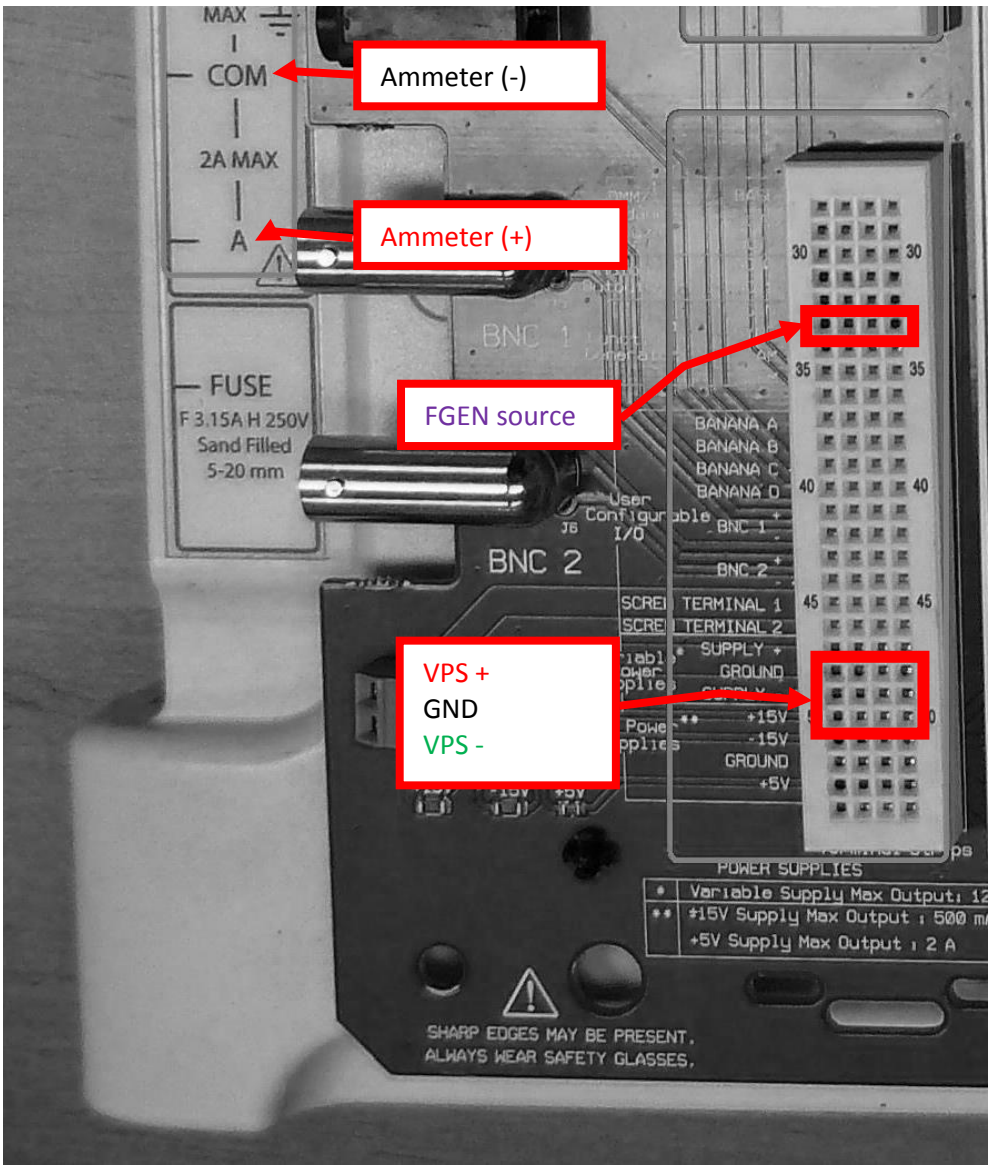

Fig. 2 Inputs and outputs layout

4. USAGE

Once the device is connected accordingly to the laboratory instruction, the application should be run and the settings needed for the measurement have to be set.

4.1. Device parameters

In the field labeled *Device name* the name of ELVIS device have to be chosen. In most cases, there is only one item on the list – typically *Dev1*, *Dev2* etc.

Delay [ms] field defines the delay between applying the voltage to the circuit and conducting the current measurement. The option has to be set in accordance with the instruction. It has to be noted that value of the field affects the speed of conducting measurement.

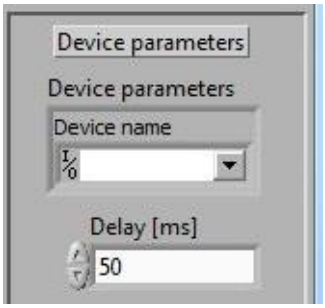

Fig. 3 *Device parameters*

4.2. Measurement control

In the field *Measurement type,* voltage source, which voltage will be changing during the measurement, may be chosen. The data will be drawn on plot's X-axis.

START, *BREAK*, *EXIT* buttons are intended to: start the measurement (note that the options have to be set before the measurement begins), abort the measurement (e.g. in case of wrong connection there is no need to wait until measurement will be carried out), and leaving the application.

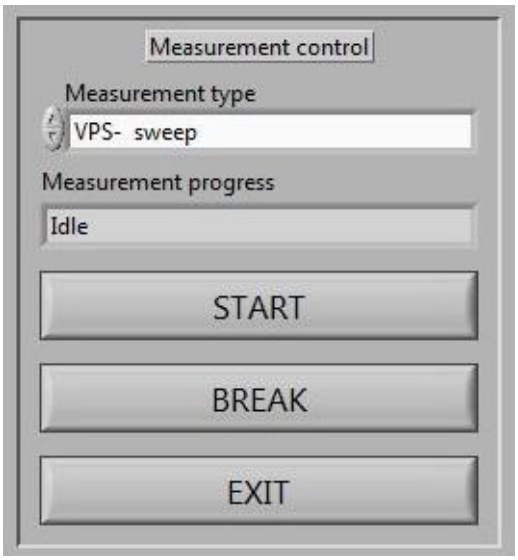

Fig. 4 *Measurement Control* section

4.3. VPS+ and *VPS-parameters*

In this fields you choose parameters of voltage sources. Appropriate fields will be active accordingly to set measurement mode. Depending on source you can set the voltages in ranges 0÷12V (VPS+) or 0÷-12V (VPS-):

Using these fields, the parameters of voltage sources may be adjusted. Availability of each field will vary in terms of measurement mode. The voltage can be set in the ranges of 0 ÷ 12 V and 0 ÷ -12V; for VPS+ and VPS-, respectively.

- *Start [V]* – initial voltage of the sweep
- *End [V]* – final voltage of the sweep
- *Steps* – number of steps in the range of sweep
- *VPS bias [V]* – voltage applied by the source which value is constant during the measurement

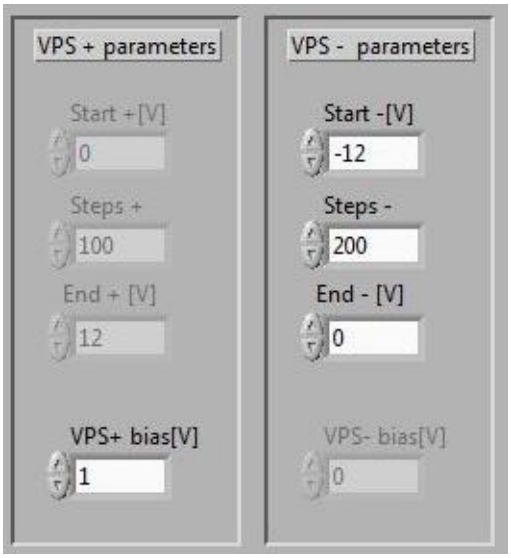

Fig. 5 *VPS+ parameters* and *VPS- parameters* section

4.4. FGEN bias

In the IV3 version of the application, there is an option to set the second constant voltage source to circuit (the output is FGEN pin). It can be set in range -5V÷5V.

Fig. 6 *FGEN bias*

4.5. Running the measurement

Once all parameters are set, the measurement can be started by *START* button. The current status of the measurement is shown in *Measurement progress*-labeled field. Some button may be inactive, so the change of each parameter will take result after restarting measurement.

4.6. Measurements

All gathered data so far should be listed. Each sample may be chosen by clicking on its number. The chosen ones are marked (underlined). Double click on the item makes it hidden. Once checked, the data may be also deleted by clicking on *Delete selected.* By using Export selected button, gathered and selected measurements to a text file.

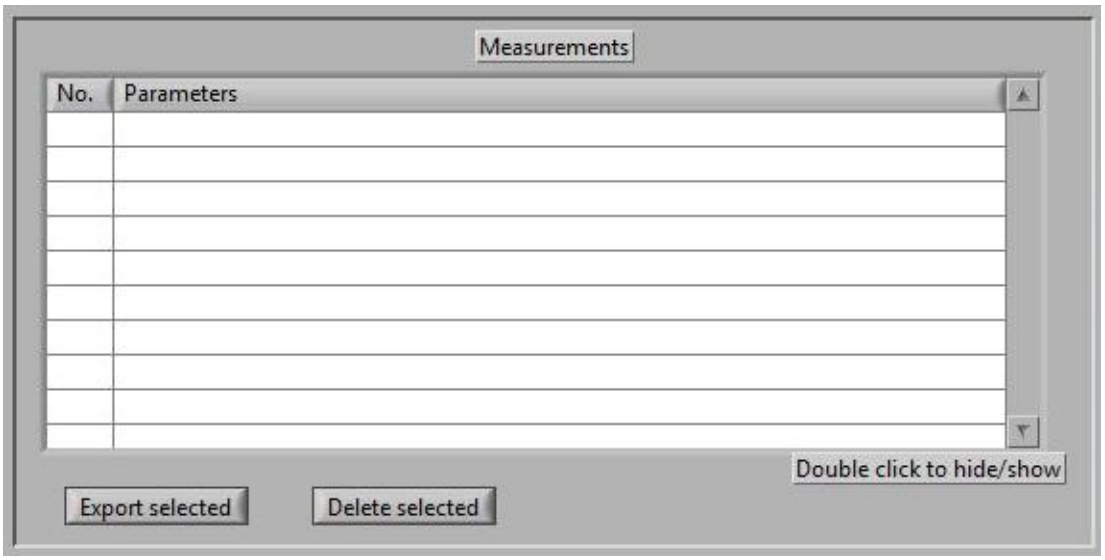

Fig. 7 *Measurements*

4.7. Measurement graph

Each selected measurement is plotted on the graph.

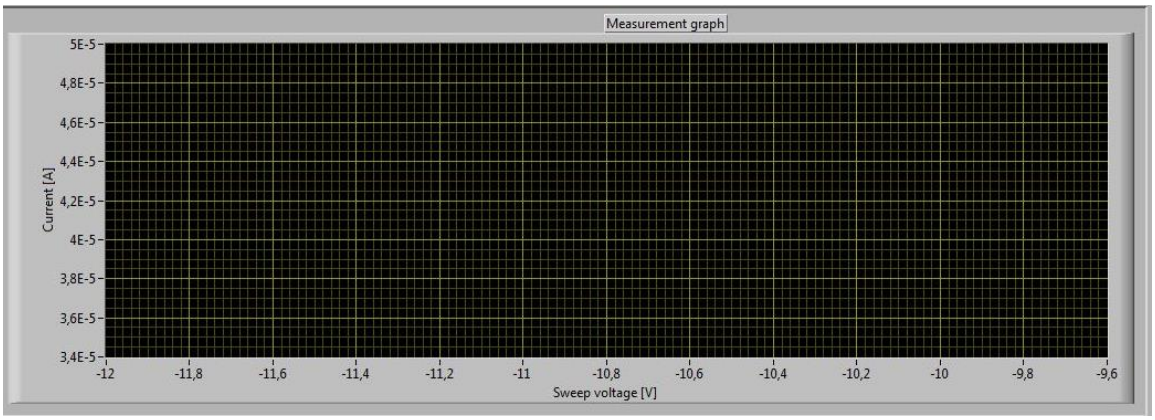

Fig. 8 *Measurement graph*

4.8. Measurement export

After clicking on *Export selected,* a selection of the folder to export data, should be done.

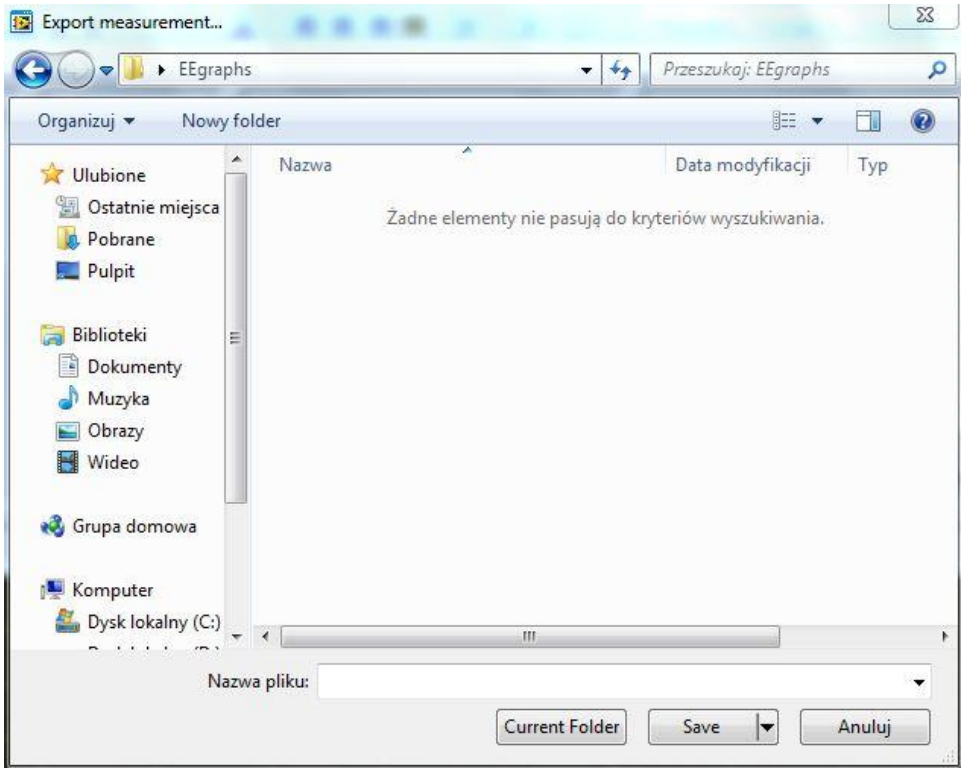

Fig. 8 *Export measurement…*

In this example: a new folder called *EEgraphs* was created and opened. To save a choice of "Current folder"-labeled button. After this operation every measurement shown on graph and ticked with "✓" mark will be exported to separate file.