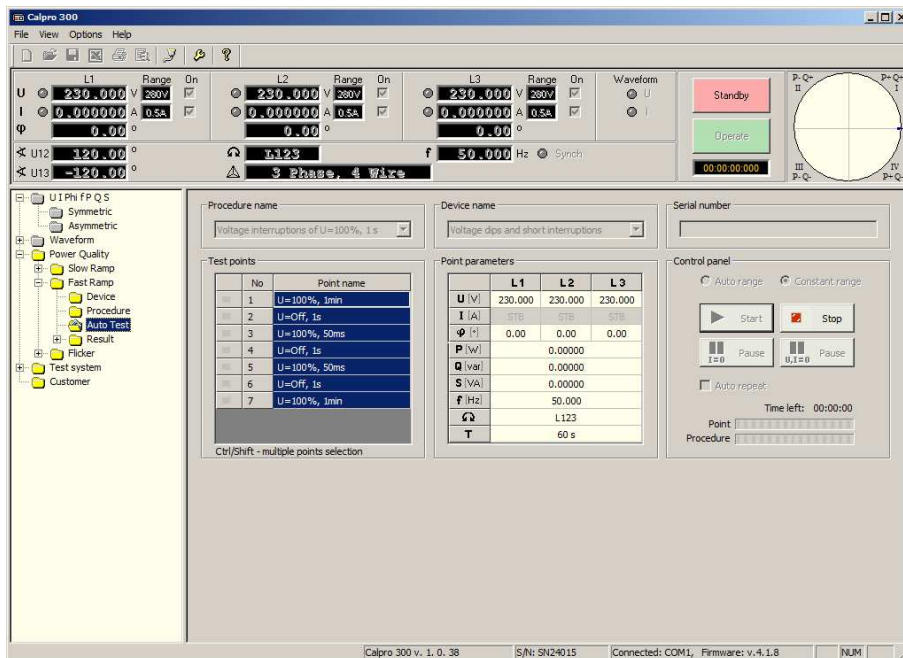


# The Calmet C300 Voltage Dips & Interruptions generation according to the IEC62052-11

The C300 Calibrator with the Calpro300 PQ PC Program can be used to generate voltage dips and short interruptions according to IEC/EN-62052-11. The Calpro300 PQ PC Program has the Fast Ramp function for that purpose.

Application note presents the following tests of a Device Under Test (DUT):

- Voltage interruptions of  $\Delta U = 100\%$ , 1s (chapter 1),
- Voltage interruptions of  $\Delta U = 100\%$ , two cycles at rated frequency (chapter 2),
- Voltage dips of  $\Delta U = 50\%$  (chapter 3).



To test the DUT the user have to:

- create a *Device* file with parameters of the DUT (chapter 1.1),
- create a *Procedure* file with procedure test points (chapter 1.2),
- perform an automatic test (chapter 1.3),
- edit and save to a file test parameters (chapter 1.4).

Example of realization of a *voltage interruptions of  $\Delta U = 100\%$ , 1s* is presented in chapter 1.5.

### 1.1. Device FUNCTION

Configuration of the *Device* file for the DUT is presented in Fig.1.1 and consists of:

- nominal voltage  $U = 230V$  value of a power supply of the DUT,
- nominal frequency  $f = 50Hz$  value of a power supply of the DUT,

To create a *Type* file (Fig.1.1) the user have to:

- press the *Device* of the *Power Quality / Fast Ramp* function (pos.1) and specify the DUT name (pos.2),
- set the nominal parameters of the DUT (pos.3) and *Comment* of the *Device* file (pos.4),
- save the *Device* file (pos.5).

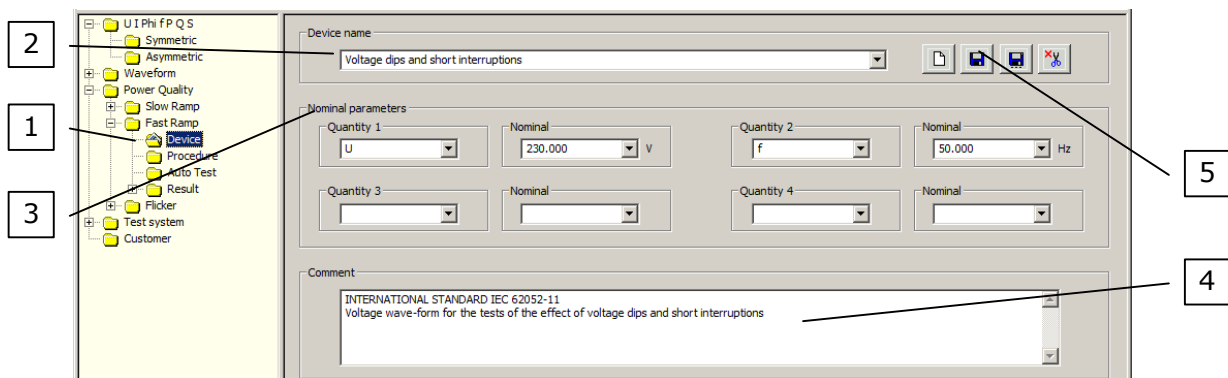


Fig.1.1. Configuration of a *device* function for *voltage dips and short interruption* tests

### 1.2. Procedure FUNCTION

Configuration of the procedure for a *voltage interruptions of  $\Delta U = 100\%$ , 1s* test is presented in Fig.1.2. This procedure contains from 7 points:

- $U=100\%$ , 1min,
- $U=Off$ , 1s,
- $U=100\%$ , 50ms,
- $U=Off$ , 1s,
- $U=100\%$ , 50ms,
- $U=Off$ , 1s,
- $U=100\%$ , 1min.

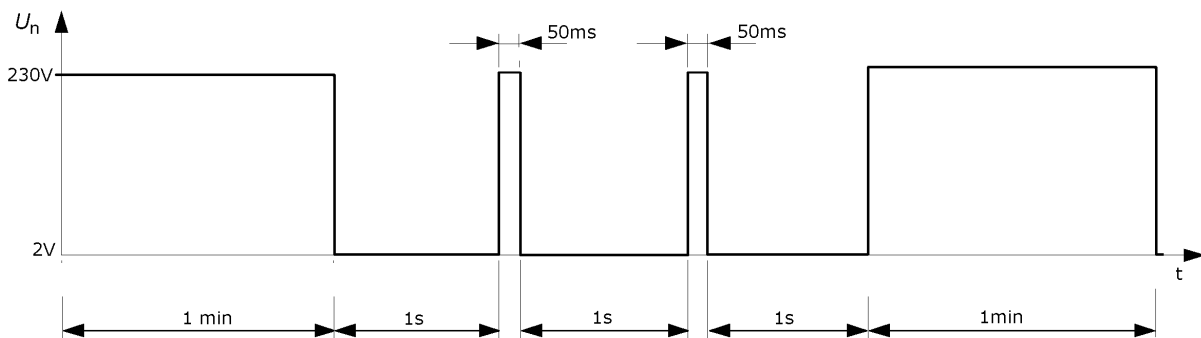


Fig.1.2. Voltage interruptions of  $\Delta U = 100\%$ , 1s

To create a *Procedure* file (Fig.1.3) the user have to:

- press the *Procedure* of the *Power Quality / Fast Ramp* function (pos.1) and specify the *Procedure name* (pos.2),
- set the *Test point's* parameters (pos.3):
  - point name to U=100%, 1min,
  - voltage U to 230V,
  - frequency f to 50Hz,
  - current I to STB (currents off),
  - phase angle  $\varphi$  to  $0^\circ$ ,
  - angle between voltages  $\angle U_{12}$  to  $120^\circ$  and  $\angle U_{31}$  to  $-120^\circ$ ,
  - rotation to L123,
- set the *Change setting's Duration* time (pos.4) to 60 s (seconds),
  - $U_p=230V$  (nominal power supply of the DUT),
- add configured point to the procedure (pos.5),
- repeat points from b) to d) to add rest of test points (according to Fig.1.2) – change will be required only in:
  - point name,
  - voltage U: 230V for U=100% and 2V for U=Off,
  - Duration* time,
- save the procedure file (pos.6).

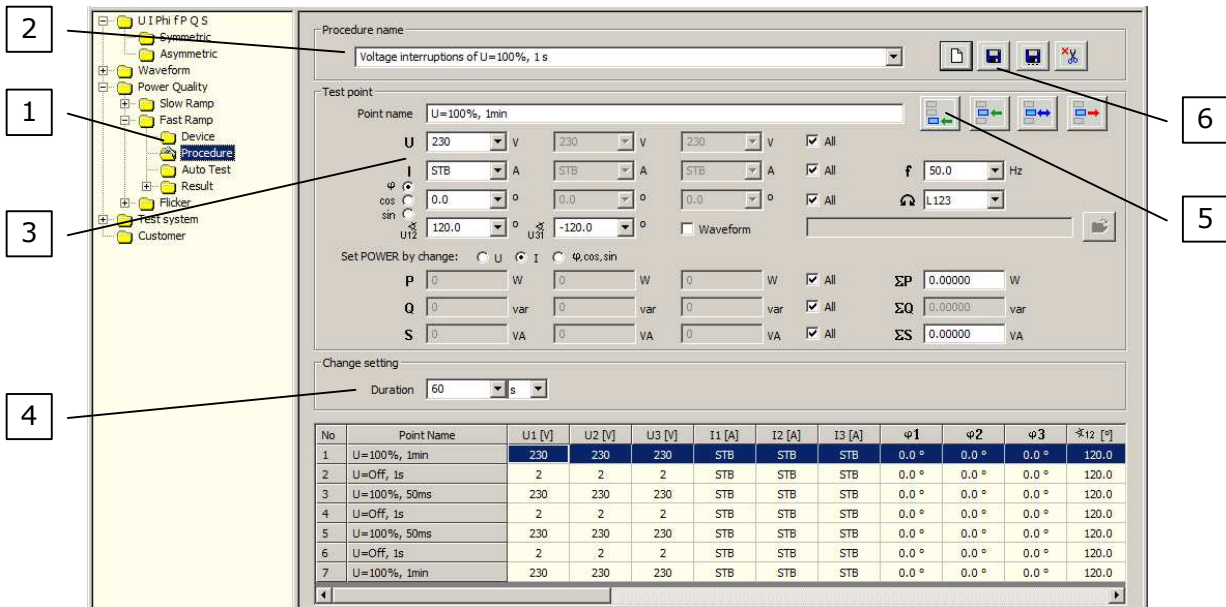


Fig.1.3. Configuration of a *Procedure* function for voltage interruptions of  $\Delta U = 100\%$ , 1s test

### 1.3. Autotest FUNCTION

In Fig.1.4, 1.5 and 1.6 are presented *Autotest* function with selected procedure points, procedure in progress and finished procedure.

To perform a test the user have to:

- press the *Autotest* of the *Power Quality / Fast Ramp* function (pos.1 Fig.1.4),
- choose a correct *Procedure name* (pos.2 Fig.1.4) and *Device name* (pos.3 Fig.1.4),
- select all *Test points* (pos.4 Fig.1.4) and press the *Start* button (pos.5 Fig.1.4).
- wait until procedure is not finished (Fig.1.6).

When the procedure is in progress the user can abort a procedure (in any time) by the *Stop* button (pos.1 Fig.1.5).

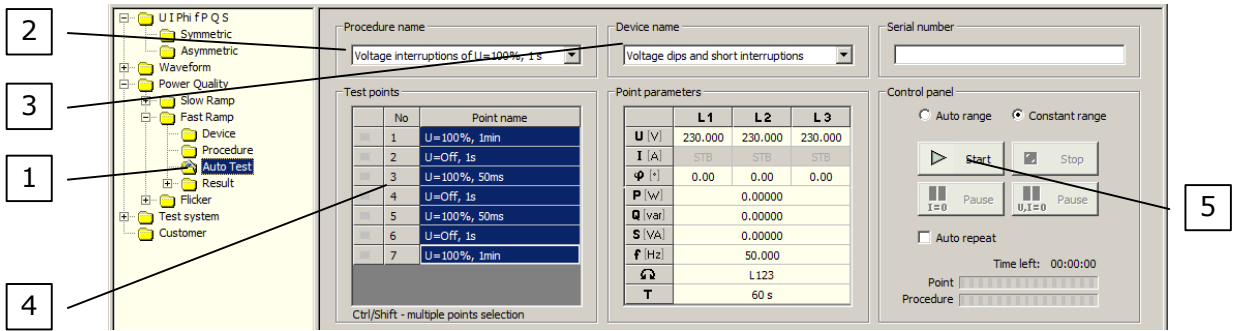


Fig.1.4. Autotest function with selected procedure points

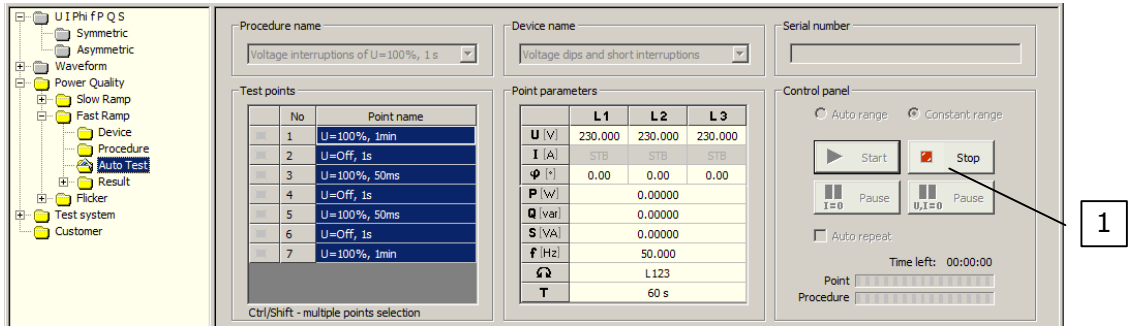


Fig.1.5. Autotest function with procedure in progress

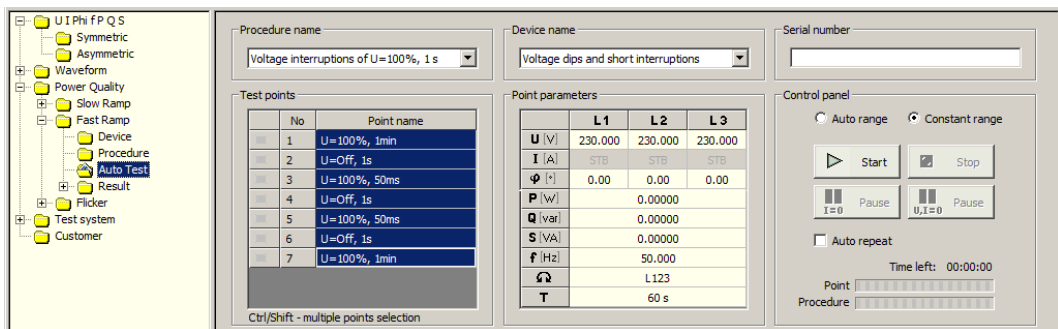


Fig.1.6. Autotest function with finished procedure

#### 1.4. Result FUNCTION

To view a table with parameters of measurement points (Fig.1.7) the user have to press the *Table* of the *Power Quality / Fast Ramp / Result* function (pos.1). After that the user can save to the file (pos.2), print (pos.3) or export to the *MS Excel* test parameters (pos.4).

The *Result* table consists of parameters of measurement points and all information about settings (pos.5), including: point name, date, time, all parameters of the Calibrator and Duration.

To export data to *MS Excel* program the user have to press the *Export to Excel* button (pos.4 Fig.1.7). After that appear *Export to Excel* window (pos.1 Fig.1.8) with fields to set the parameters of a data to export (pos.2 Fig.1.8). When the user confirm changes by the *OK* button (pos.3 Fig.1.8) then a *MS Excel* program run with exported test parameters (Fig.1.9).

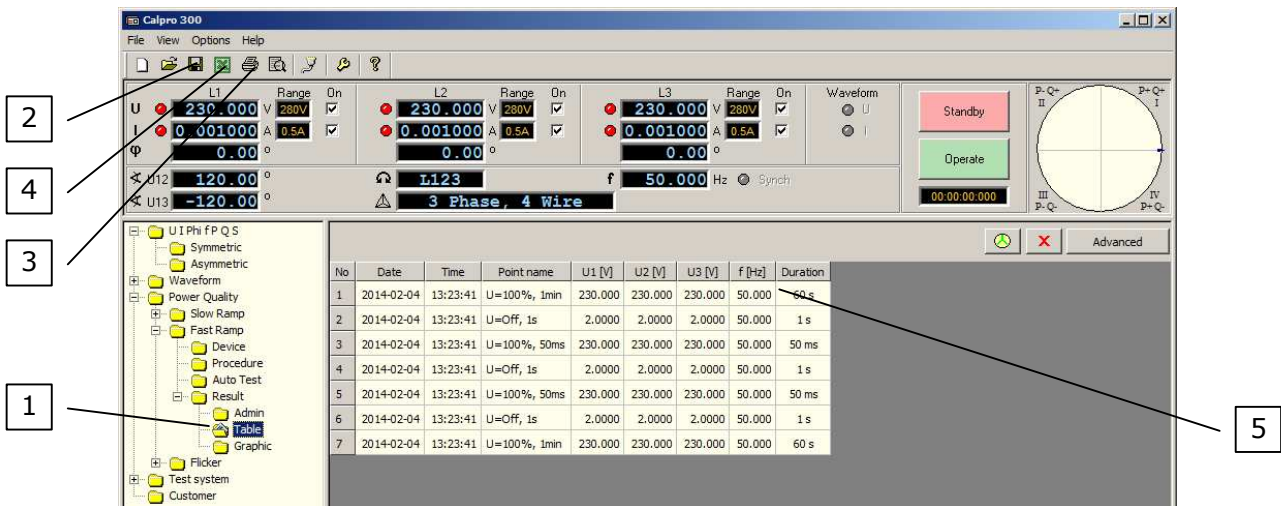


Fig.1.7. Table function with parameters of measurement points

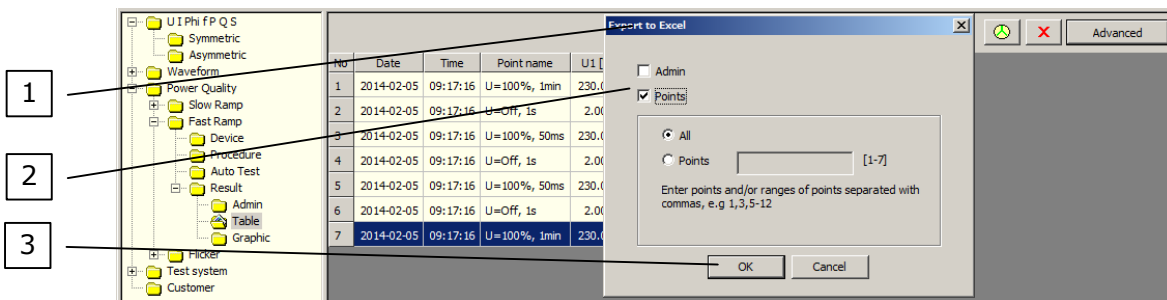


Fig.1.8. Table function with *Export to Excel* window

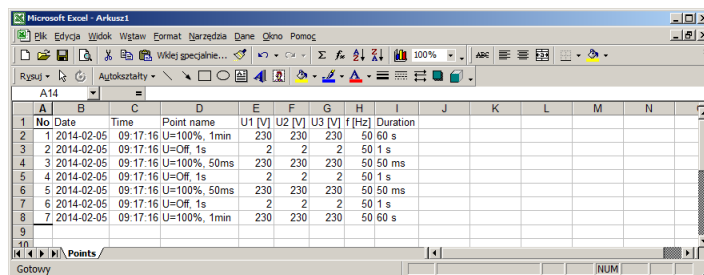


Fig.1.9. MS Excel program with exported parameters of measurement points

1.5. Example of realization of a voltage interruptions of  $\Delta U = 100\%$ , 1s.

Example (Fig.1.10) shows realization of a *voltage interruptions of  $\Delta U = 100\%$ , 1s* with C300 calibrator. Interruptions are recorded by Caltest 300 Analyser connected to the voltage output U1 of C300 calibrator.

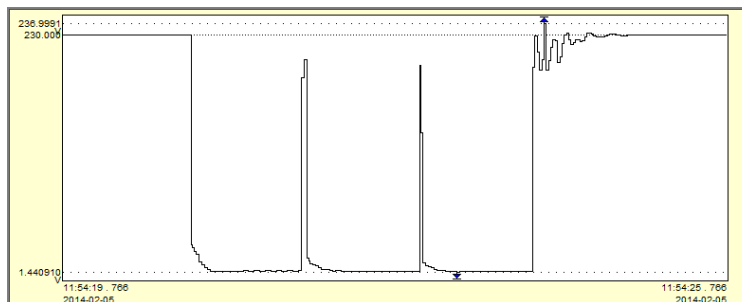


Fig.1.10. Realization of a *voltage interruptions of  $\Delta U = 100\%$ , 1s* with C300 calibrator

To test the DUT the user have to:

- create a *Device* file with parameters of the DUT (chapter 2.1),
- create a *Procedure* file with procedure test points (chapter 2.2),
- perform an automatic test (chapter 2.3),
- edit and save to a file test parameters (chapter 2.4).

Example of realization of a *voltage interruptions of  $\Delta U = 100\%$ , two cycles at rated frequency* is presented in chapter 2.5.

2.1. Device FUNCTION

Configuration of the *Device* file for the DUT is presented in Fig.2.1 and consists of:

- nominal voltage  $U = 230V$  value of a power supply of the DUT,
- nominal frequency  $f = 50Hz$  value of a power supply of the DUT,

To create a *Type* file (Fig.2.1) the user have to:

- press the *Device* of the *Power Quality / Fast Ramp* function (pos.1) and specify the DUT name (pos.2),
- set the nominal parameters of the DUT (pos.3) and *Comment* of the *Device* file (pos.4),
- save the *Device* file (pos.5).

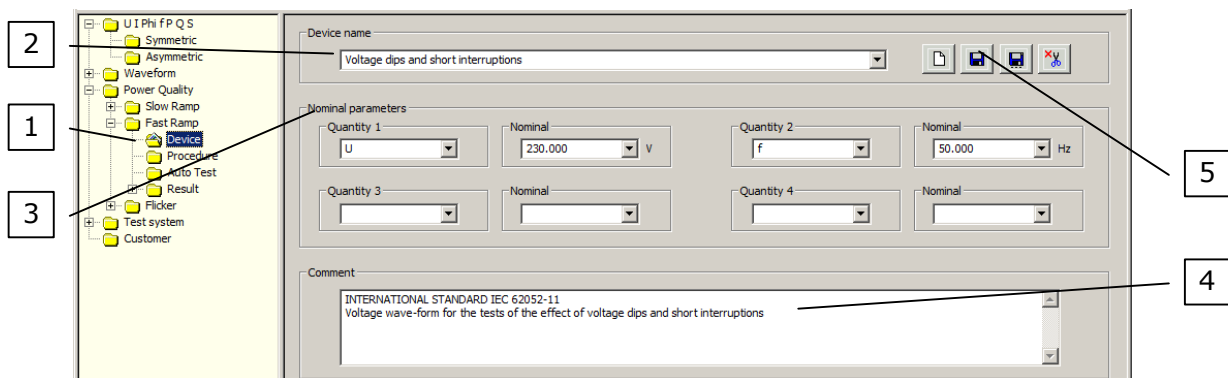


Fig.2.1. Configuration of a *device* function for *voltage dips and short interruption* tests

2.2. Procedure FUNCTION

Configuration of the procedure for a *voltage interruptions of  $\Delta U = 100\%$ , two cycles at rated frequency* test is presented in Fig.2.2. This procedure contains from 3 points:

- $U=100\%$ , 1min,
- $U=Off$ , 40ms (two cycles),
- $U=100\%$ , 1min.

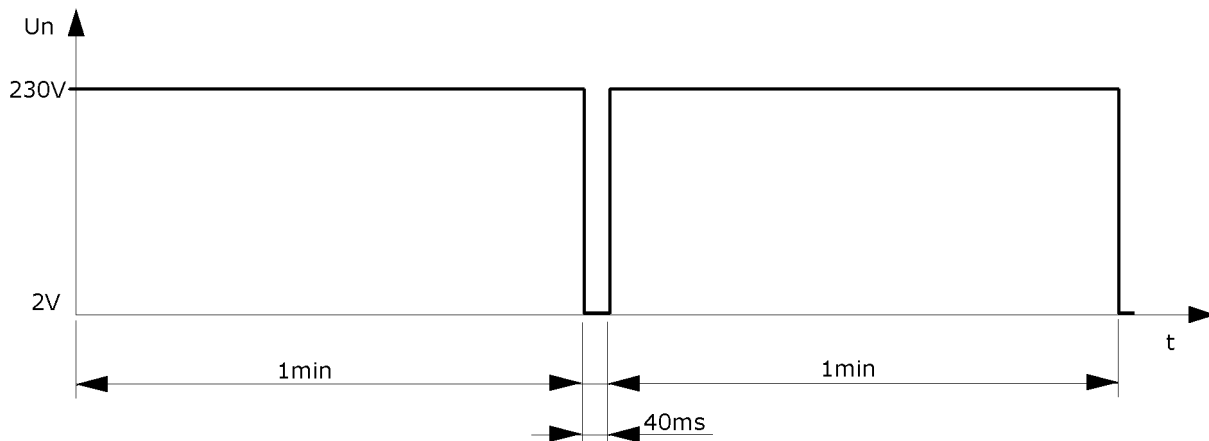


Fig.2.2. *Voltage interruptions of  $\Delta U = 100\%$ , two cycles at rated frequency*

To create a *Procedure* file (Fig.2.3) the user have to:

- a) press the *Procedure* of the *Power Quality / Fast Ramp* function (pos.1) and specify the *Procedure name* (pos.2),
- b) set the *Test point's* parameters (pos.3):
  - point name to U=100%, 1min,
  - voltage U to 230V,
  - frequency f to 50Hz,
  - current I to STB (currents off),
  - phase angle  $\varphi$  to  $0^\circ$ ,
  - angle between voltages  $\angle U_{12}$  to  $120^\circ$  and  $\angle U_{31}$  to  $-120^\circ$ ,
  - rotation to L123,
- c) set the *Change setting's* *Duration* time (pos.4) to 60 s (seconds),
- $U_p=230V$  (nominal power supply of the DUT),
- d) add configured point to the procedure (pos.5),
- e) repeat points from b) to d) to add rest of test points (according to Fig.2.2) – change will be required only in:
  - point name,
  - voltage U: 230V for U=100% and 2V for U=Off,
  - *Duration* time,
- f) save the procedure file (pos.6).

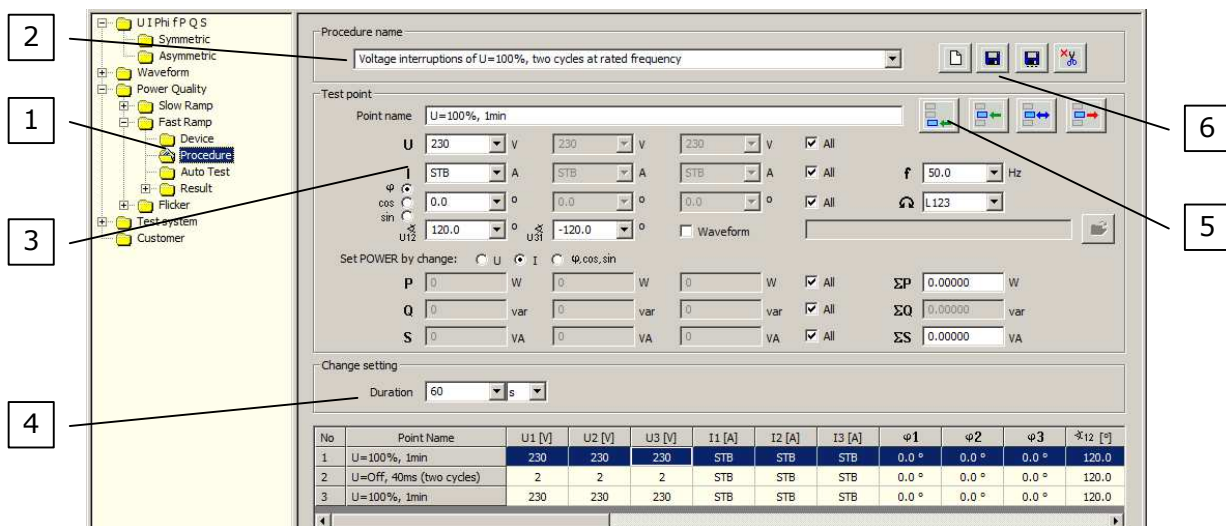


Fig.2.3. Configuration of a voltage interruptions of  $\Delta U = 100\%$ , two cycles at rated frequency test

### 2.3. Autotest FUNCTION

In Fig.2.4, 2.5 and 2.6 are presented *Autotest* function with selected procedure points, procedure in progress and finished procedure.

To perform a test the user have to:

- a) press the *Autotest* of the *Power Quality / Fast Ramp* function (pos.1 Fig.2.4),
- b) choose a correct *Procedure name* (pos.2 Fig.2.4) and *Device name* (pos.3 Fig.2.4),
- c) select all *Test points* (pos.4 Fig.2.4) and press the *Start* button (pos.5 Fig.2.4).
- d) wait until procedure is not finished (Fig.2.6).

When the procedure is in progress the user can abort a procedure (in any time) by the *Stop* button (pos.1 Fig.2.5).

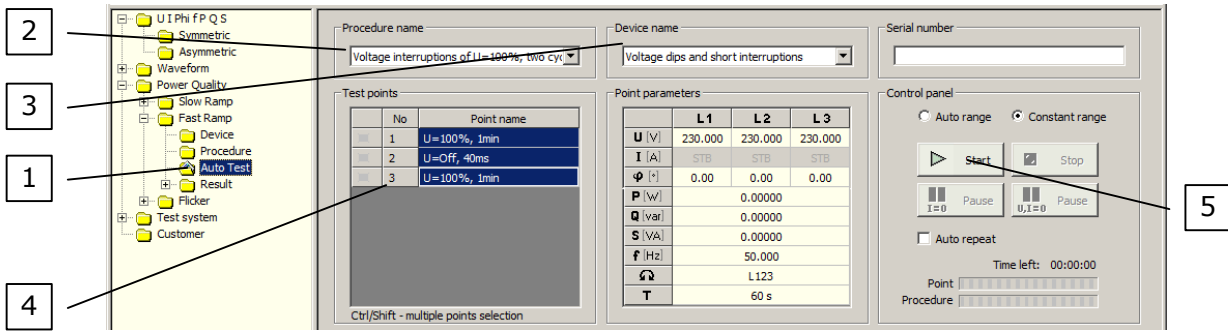


Fig.2.4. Autotest function with selected procedure points

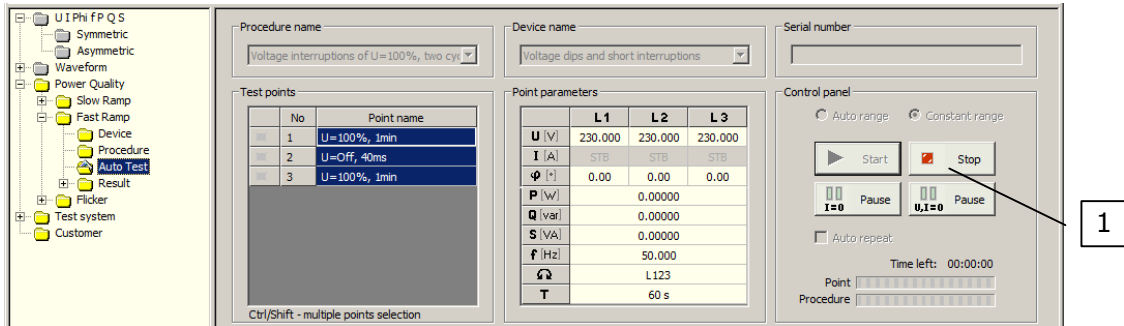


Fig.2.5. Autotest function with procedure in progress

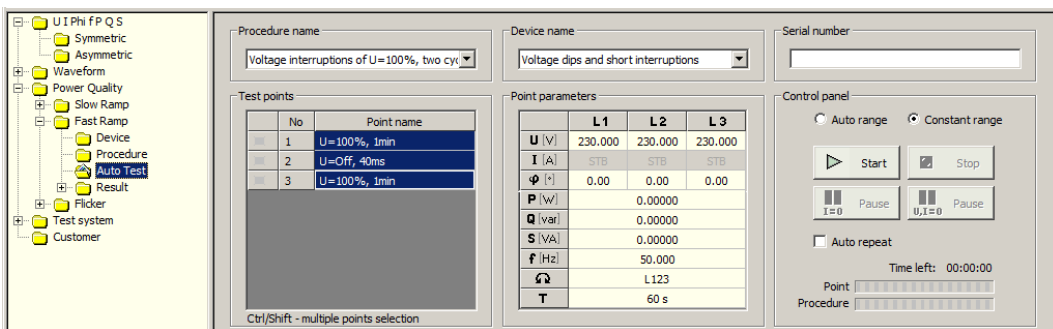


Fig.2.6. Autotest function with finished procedure

## 2.4. Result FUNCTION

To view a table with parameters of measurement points (Fig.2.7) the user have to press the *Table* of the *Power Quality / Fast Ramp / Result* function (pos.1). After that the user can save to the file (pos.2), print (pos.3) or export to the *MS Excel* test parameters (pos.4).

The *Result* table consists of parameters of measurement points and all information about settings (pos.5), including: point name, date, time, all parameters of the Calibrator and Duration.

To export data to *MS Excel* program the user have to press the *Export to Excel* button (pos.4 Fig.2.7). After that appear *Export to Excel* window (pos.1 Fig.2.8) with fields to set the parameters of a data to export (pos.2 Fig.2.8). When the user confirm changes by the *OK* button (pos.3 Fig.2.8) then a *MS Excel* program run with exported test parameters (Fig.2.9).



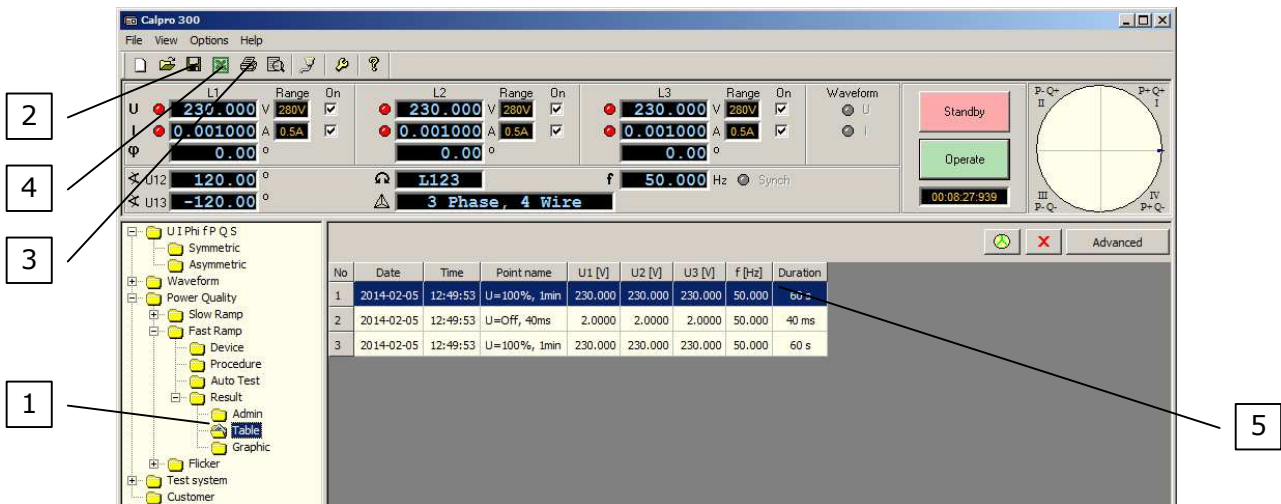


Fig.2.7. Table function with parameters of measurement points

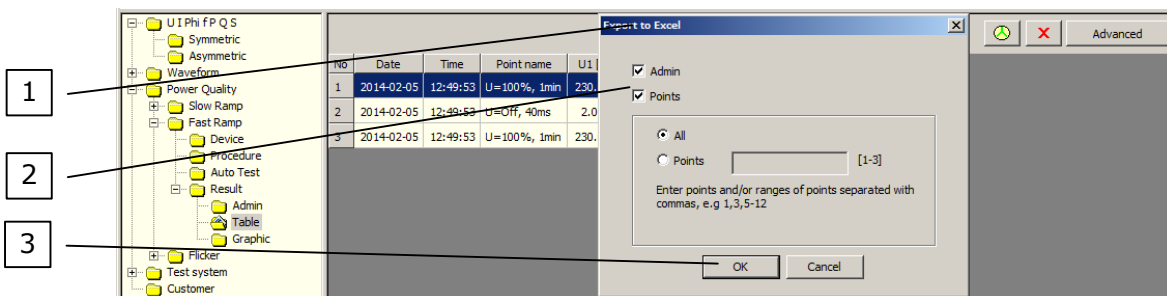


Fig.2.8. Table function with *Export to Excel* window

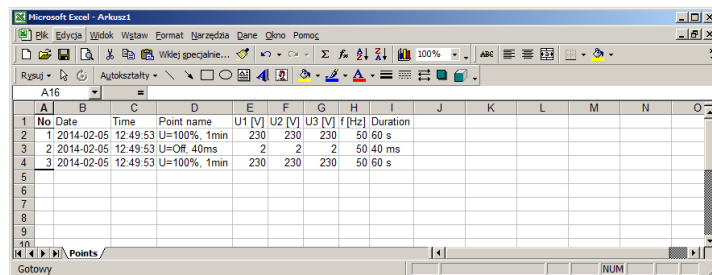


Fig.2.9. MS Excel program with exported parameters of measurement points

2.5. Example of realization of a *voltage interruptions of  $\Delta U = 100\%$ , two cycles at rated frequency.*

Example (Fig.2.10) shows realization of a *voltage interruptions of  $\Delta U = 100\%$ , two cycles at rated frequency* with C300 calibrator. Interruptions are recorded by Caltest 300 Analyser connected to the voltage output U1 of C300 calibrator.

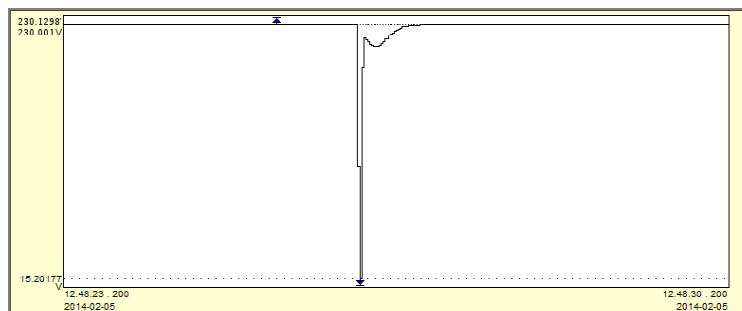


Fig.2.10. Realization of a *voltage interruptions of  $\Delta U = 100\%$ , two cycles at rated frequency* with C300 calibrator

To test the DUT the user have to:

- create a *Device* file with parameters of the DUT (chapter 3.1),
- create a *Procedure* file with procedure test points (chapter 3.2),
- perform an automatic test (chapter 3.3),
- edit and save to a file test parameters (chapter 3.4).

Example of realization of a *voltage dips of  $\Delta U = 50\%$*  is presented in chapter 3.5.

### 3.1. Device FUNCTION

Configuration of the *Device* file for the DUT is presented in Fig.3.1 and consists of:

- nominal voltage  $U = 230V$  value of a power supply of the DUT,
- nominal frequency  $f = 50Hz$  value of a power supply of the DUT,

To create a *Type* file (Fig.3.1) the user have to:

- press the *Device* of the *Power Quality / Fast Ramp* function (pos.1) and specify the DUT name (pos.2),
- set the nominal parameters of the DUT (pos.3) and *Comment* of the *Device* file (pos.4),
- save the *Device* file (pos.5).

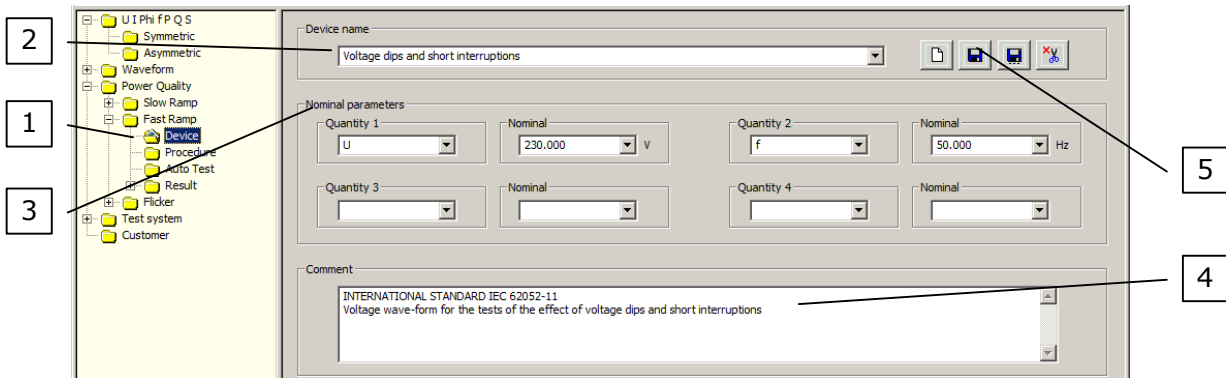


Fig.3.1. Configuration of the *device* function for *voltage dips and short interruption* tests

### 3.2. Procedure FUNCTION

Configuration of the procedure for a *voltage dips of  $\Delta U = 50\%$*  test is presented in Fig.3.2.

This procedure contains from 3 points:

- $U=100\%$ , 1min,
- $U=50\%$ , 1min,
- $U=100\%$ , 1min.

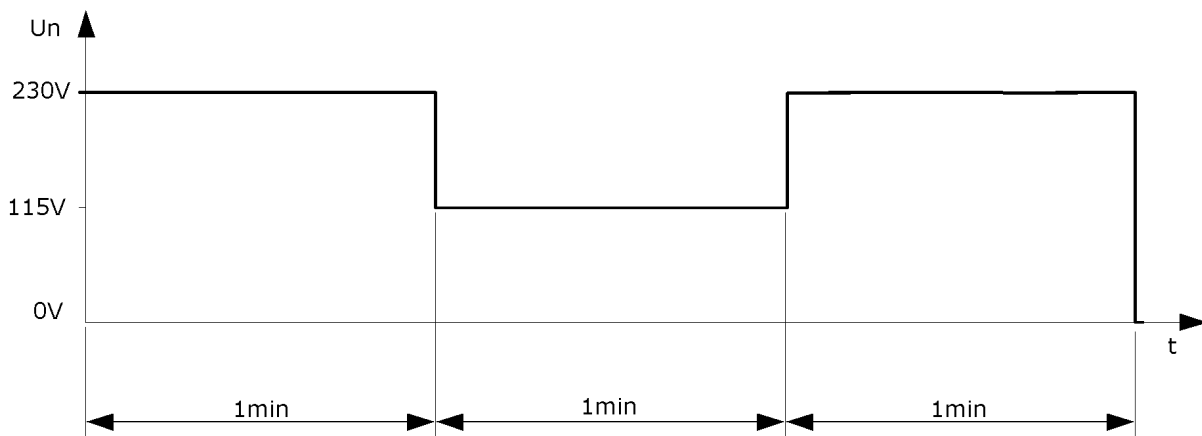


Fig.3.2. *Voltage dips of  $\Delta U = 50\%$*

To create a *Procedure* file (Fig.3.3) the user have to:

- a) press the *Procedure* of the *Power Quality / Fast Ramp* function (pos.1) and specify the *Procedure name* (pos.2),
- b) set the *Test point's* parameters (pos.3):
  - point name to U=100%, 1min,
  - voltage U to 230V,
  - frequency f to 50Hz,
  - current I to STB (currents off),
  - phase angle  $\varphi$  to  $0^\circ$ ,
  - angle between voltages  $\angle U_{12}$  to  $120^\circ$  and  $\angle U_{31}$  to  $-120^\circ$ ,
  - rotation to L123,
- c) set the *Change setting's Duration* time (pos.4) to 60 s (seconds),
- $U_p=230V$  (nominal power supply of the DUT),
- d) add configured point to the procedure (pos.5),
- e) repeat points from b) to d) to add rest of test points (according to Fig.3.2) – change will be required only in:
  - point name,
  - voltage U: 230V for U=100% and 115V for U=50%,
- f) save the procedure file (pos.6).

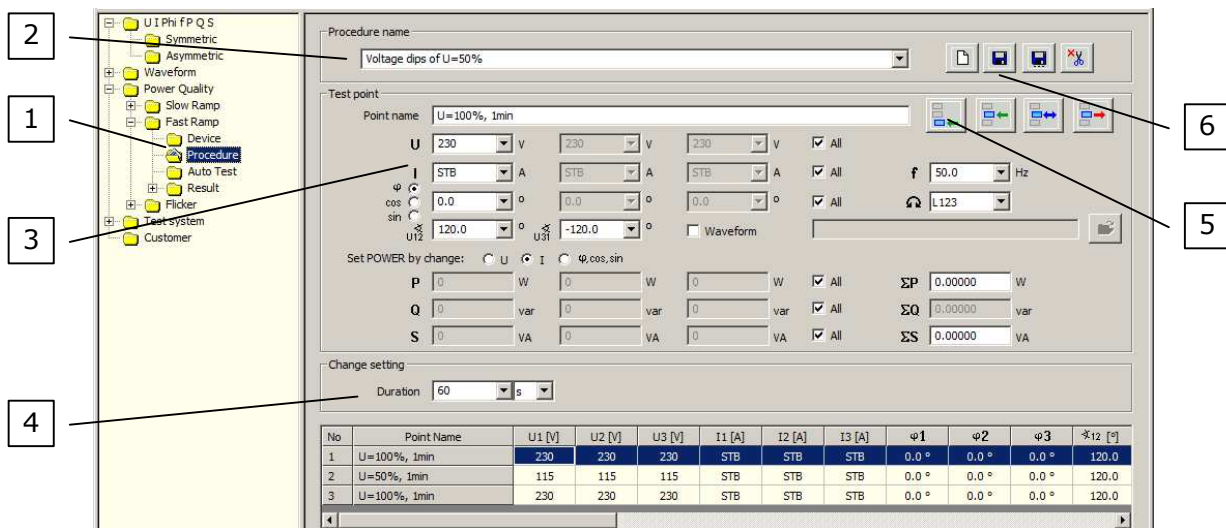


Fig.3.3. Configuration of the *voltage dips of  $\Delta U = 50\%$*  test

### 3.3. Autotest FUNCTION

In Fig.3.4, 3.5 and 3.6 are presented *Autotest* function with selected procedure points, procedure in progress and finished procedure.

To perform a test the user have to:

- a) press the *Autotest* of the *Power Quality / Fast Ramp* function (pos.1 Fig.3.4),
- b) choose a correct *Procedure name* (pos.2 Fig.2.4) and *Device name* (pos.3 Fig.3.4),
- c) select all *Test points* (pos.4 Fig.3.4) and press the *Start* button (pos.5 Fig.3.4).
- d) wait until procedure is not finished (Fig.3.6).

When the procedure is in progress the user can abort a procedure (in any time) by the *Stop* button (pos.1 Fig.3.5).

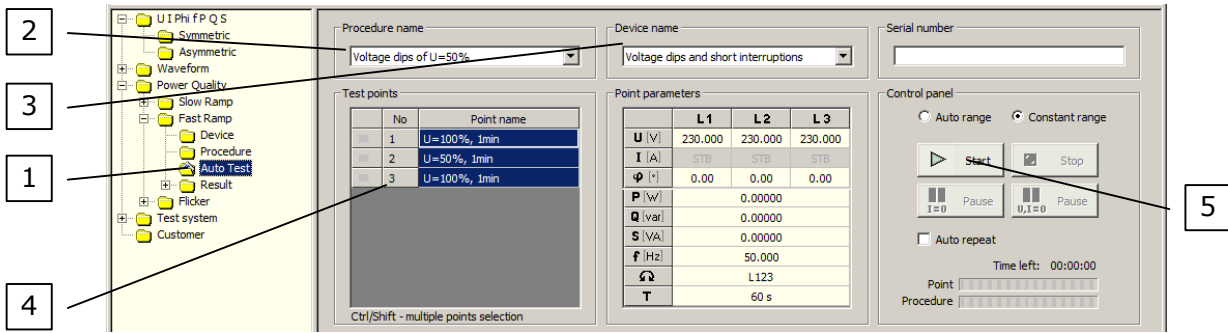


Fig.3.4. Autotest function with selected procedure points

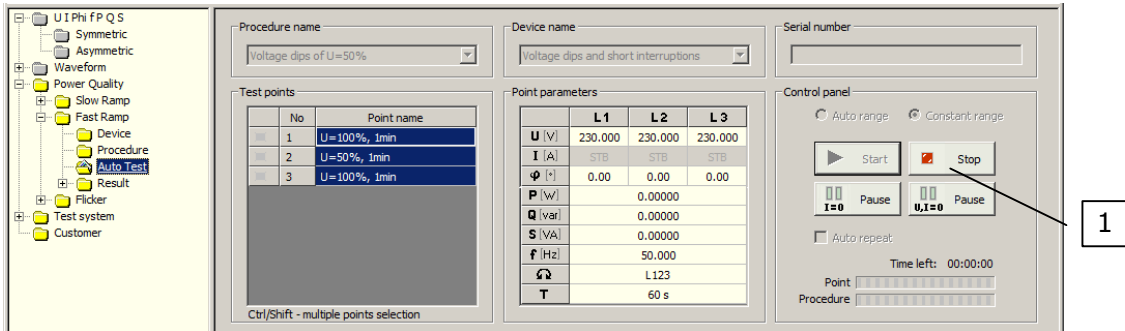


Fig.3.5. Autotest function with procedure in progress

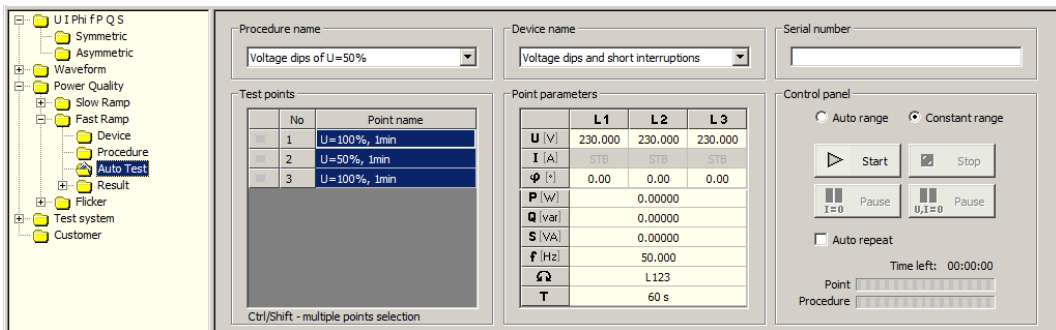


Fig.3.6. Autotest function with finished procedure

### 3.4. Result FUNCTION

To view a table with parameters of measurement points (Fig.3.7) the user have to press the *Table* of the *Power Quality / Fast Ramp / Result* function (pos.1). After that the user can save to the file (pos.2), print (pos.3) or export to the *MS Excel* test parameters (pos.4).

The *Result* table consists of parameters of measurement points and all information about settings (pos.5), including: point name, date, time, all parameters of the Calibrator and Duration.

To export data to *MS Excel* program the user have to press the *Export to Excel* button (pos.4 Fig.3.7). After that appear *Export to Excel* window (pos.1 Fig.3.8) with fields to set the parameters of a data to export (pos.2 Fig.3.8). When the user confirm changes by the *OK* button (pos.3 Fig.3.8) then a *MS Excel* program run with exported test parameters (Fig.3.9).

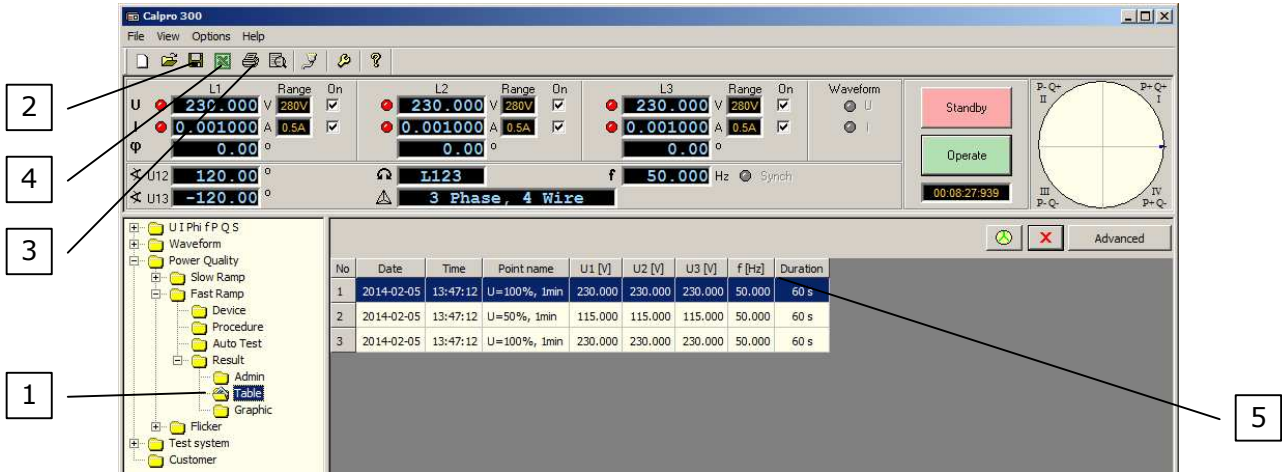


Fig.3.7. Table function with parameters of measurement points

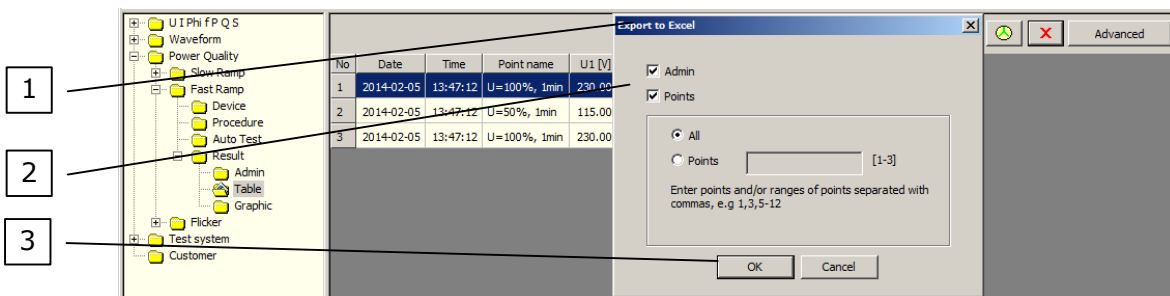


Fig.3.8. Table function with Export to Excel window

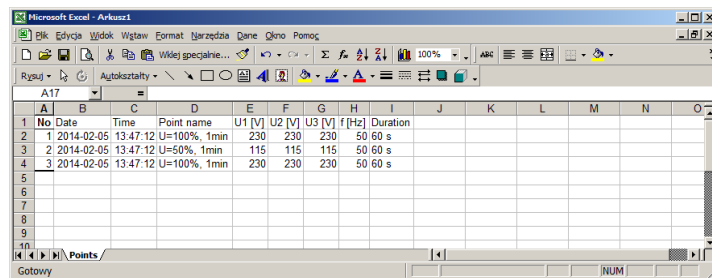


Fig.3.9. MS Excel program with exported parameters of measurement points

### 3.5. Example of realization of a voltage dips of $\Delta U = 50\%$ .

Example (Fig.3.10) shows realization of a voltage dips of  $\Delta U = 50\%$  with C300 calibrator. Dips are recorded by Caltest 300 Analyser connected to the voltage output U1 of C300 calibrator.



Fig.3.10. Realization of a voltage dips of  $\Delta U = 50\%$  with C300 calibrator

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