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PRODUIT :

PowerSpy2

DOCUMENT :

USER MANUAL

REFERENCE :

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SUMMARY :

This document is the user and reference manual for the advanced energy analyzer ***PowerSpy2*** from ALCIOM.

It applies to hardware version 1.0, firmware version 4.0 and PC software version 2.0 and later.

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1 PowerSpy2 at a glance

Congratulations for the purchase of the PowerSpy2 from ALCIOM !
This product is an advanced energy analyzer, with performance and features unmatched on the market.

1.1 Ultra-flexible and powerful

- One device, 2 modes : **Autonomous data logging mode,** or **real time mode**
- **In data logging mode,** periodic measurement of U, I, P (RMS and peak to peak) and line frequency, storage on internal memory (4 GB), CSV export
- **In a real time mode,** a real oscilloscope : U, I and P waveforms, RMS and peak, Q, S, power factor, crest factor, frequency, THD, automatic triggering or on threshold (U, I or P)
- **Advanced triggering**, period per period calculated RMS values or U, I and P
- **Statistics**, energy accumulation, U/I curve, **HTML configurable reports**
- **Harmonic analysis** and automatic comparison with IEC IEC 61000-3-2 v2.2 Classes A, B, C et D)

1.2 Powerful and open

- 90 to 240V AC, 1mA to 6A RMS, 10mW to 1300W, 45 to 65Hz
- Integration and logging period from 1 minute to **20ms !**
- **One month of storage with a resolution of 20ms**, up to 20 years (5s)
- 1% precision, reliable measurement of very low powers (16 bits resolution)
- High speed acquisition (256 measurements per period up to 16,64Ksps)
- Factory or user calibration, possibility to restore the factory calibration
- **Blue tooth** link between the PowerSpy2 and your PC, no safety hazard
- **Windows XP/Vista/Windows 7/Windows 8** Compatible
- Designed and manufactured in France, eco-designed, global consumption of only 1 W

1.3 Multiple-applications

- **Energy audits, consulting**, power line quality surveys
- Analysis of the consumptions for in service/sleep mode power equipments
- **Evaluation and optimization** of power supplies, **education**
- **EMC pre-qualification and environmental standards** (ErP, EnergyStar,...)

2 Precautions for use and safety instructions

Never connect the PowerSpy2 to a power source other than a standardized and protected plug according to the applicable regulations.

Never connect the PowerSpy2 to a load in a different way than through a connection cable ended with a standardized and protected power connector.

This device belongs to the protection class I according to the CIS 61010-1 standard and is then equipped with a 3-plugs grounded connector. Never connect the PowerSpy2 to a non-earthed power plug or through a cable or plug not providing a correct earth connection.

Never connect the PowerSpy2 to a voltage lower than 90VAC or above than 240VAC, or with a frequency outside the 45Hz-65Hz range.

Never connect to the PowerSpy a load exceeding 6A or 1380W.

To avoid any risk of electrocution or fatal injury, inspect the PowerSpy2 before using it. Look for cracks, missing plastic parts or other damages on the product and connectors. Make sure that the connectors insulation is intact. Repeat the same procedure for the equipment connected to the PowerSpy2 before applying power.

Do not use the PowerSpy2 near explosive gases, vapors or dust. The powerSpy2 serves as an emergency power breaking device and has to remain always easily accessible.

Conditions of use: altitude up to 2000m, ambient temperature between 0°C and 40°C, relative humidity lower than 80%

Compliance to the CE European harmonized standards
The CE label displayed on the PowerSpy2 device means that our devices complies with the EMC directive (89 / 336 / EEC) and more globally with the CE approval directives (93 / 68 / EEC).

Compliance to the DEEE European directive
This device has a pictogram in accordance with the European Directive 2002 / 96 / CE relative to the waste of electric and electronic equipments (DEEE). This Directive stipulates the legal framework for the selective collection and recycling of the worn devices in all the European Union. Do not throw your PowerSpy2 at the end its life, leave it in a local public waste reception center to value materials that could be salvaged or recycled.

Guarantee and responsibility
The PowerSpy2 device is guaranteed 6 months, parts and workforce, starting at invoice date. This guarantee is not applicable in case of dismantling, of failure to comply with the documented use or miss-connection. This guarantee does not apply to fuses and protection parts. Alciom's responsibility can't be engaged beyond the repair or the replacement of the PowerSpy2 device. In particular Alciom can't be responsible for any direct, indirect, accidental or consecutive damage, neither any damage nor loss of data. Distributors are not authorized to apply another guarantee by engaging Alciom.

3 Installation

3.1 Package content

You will find in the package the following components :

- A PowerSpy2 advanced energy analyzer unit
- A Bluetooth dongle
- A quick start guide

In order to use your PowerSpy2 you will also need a standard PC computer working under Windows XP, Vista, Windows 7 or 8 (© Microsoft Corp) with at least the following characteristics :

- Processor Intel Core 2 or equivalent
- 1Go of RAM or more
- Graphic card and display with a minimal 1024x768 pixels resolution
- At least 25MB available disk space
- A free USB2 port

3.2 Installation procedure steps

The installation of the PowerSpy2 device on your computer will require four successive steps: :

1. Installation of the Bluetooth dongle
2. Installation of the Powerspy software
3. Setup of the Bluetooth connection
4. Powerspy software launch and functional checks

3.3 Installation of the Bluetooth dongle

If your computer doesn't already have a Bluetooth interface, you will have to install first the supplied Bluetooth dongle. Insert simply the Bluetooth dongle in an available USB port of your PC and Windows will recognize it and will install the standard drivers. At the end of the PlugNPlay procedure, locate the Bluetooth icon in the task-bar :

3.4 Installation of PowerSpy2 software

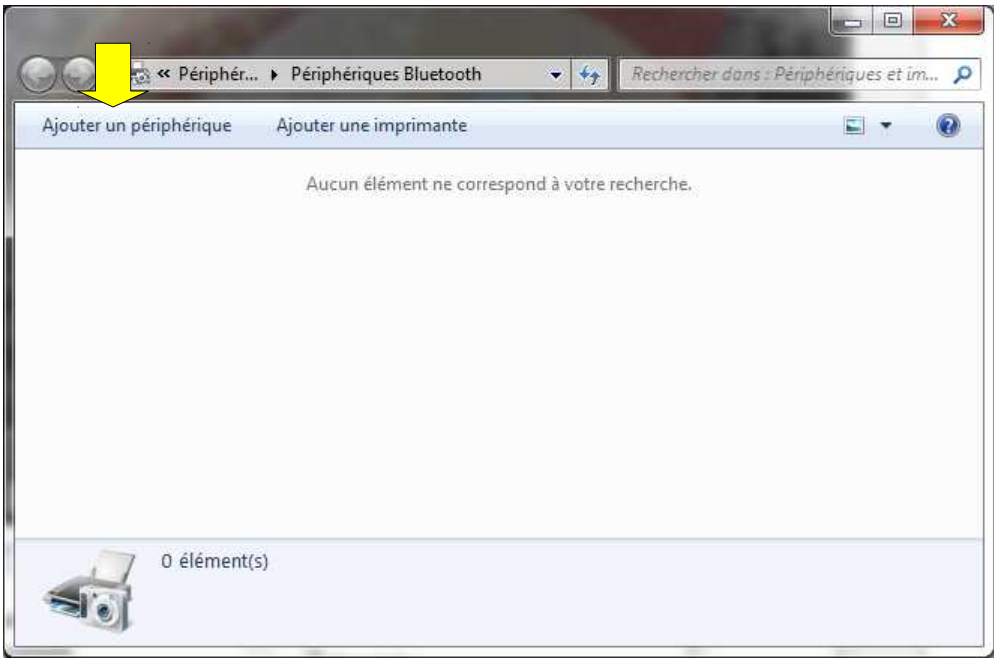
- Download the last version of the PowerSpy software from www.alciom.com, select either the french or english version of the software
- Unzip the downloaded file and store the included PowerSpy2 folder on your desktop.
- Open this catalog and double click on the setup.exe icon. Follow the installation steps. The software will then be installed and available on your computer.

3.5 Bluetooth connection set up

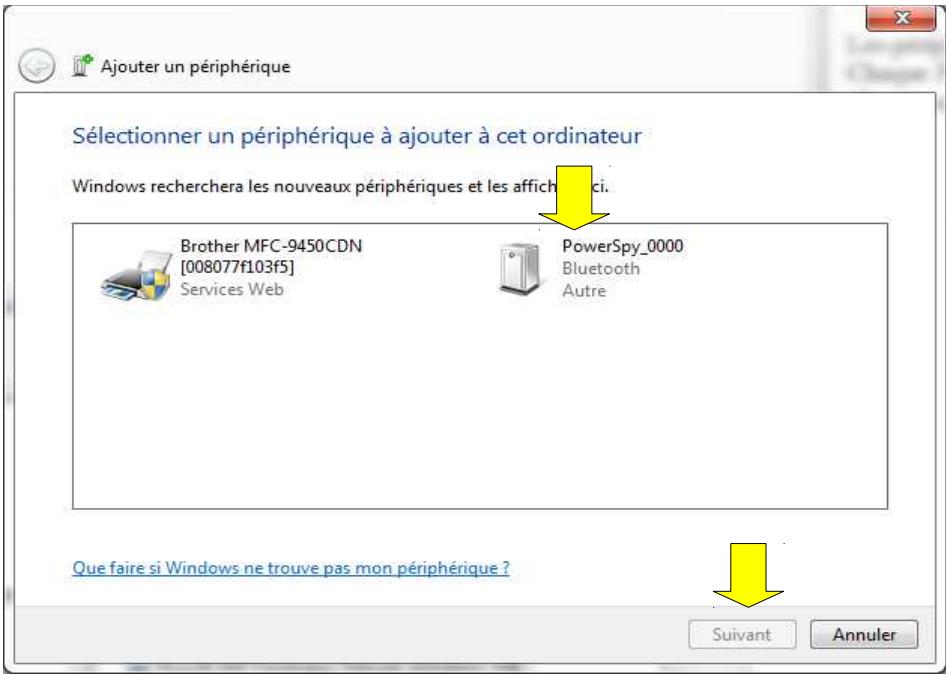
Insert now your PowerSpy2 analyzer into a powered plug and connect to it a low power test load, for example a desk lamp or similar. When you switch power on, the PowerSpy2 LED indicator will briefly flash in red then will stabilize in green after a few seconds.

Double-click on the Bluetooth icon of the task bar :

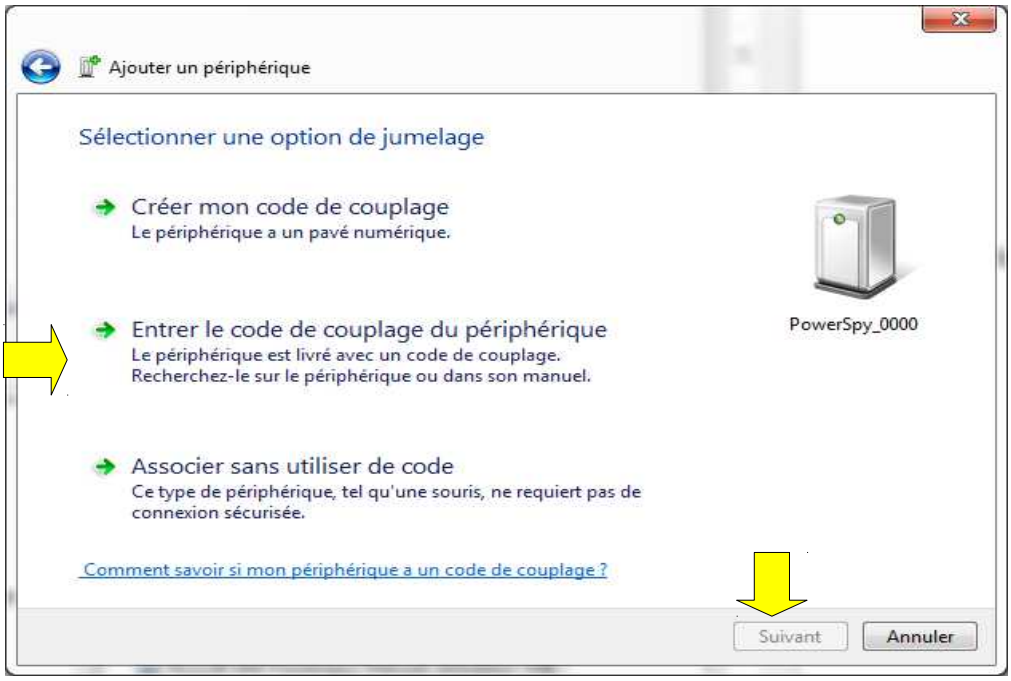
This will open the Bluetooth peripherals window. Click "Add" in the tab " Peripherals ":



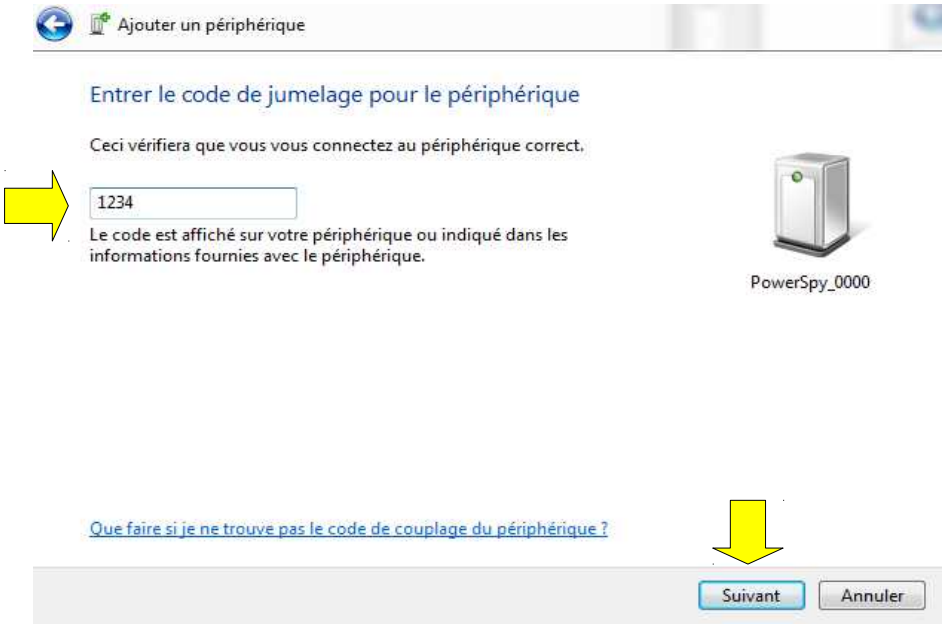
The Bluetooth accessible peripherals will then be looked for and listed in a new window. Each PowerSpy2 found will be displayed with its serial number (it can also appear with the name “Other” on some PC). Select the desired PowerSpy2 and click on “Next" :



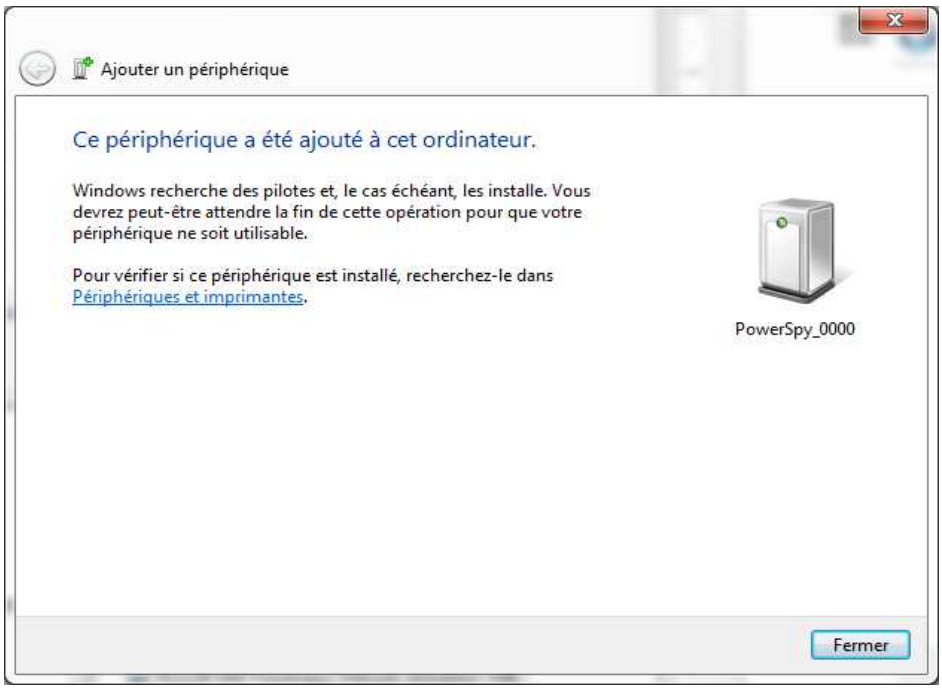
In the next window, select : "Enter the coupling code of the peripheral"



Enter the code « 1234 » and click on «next »:



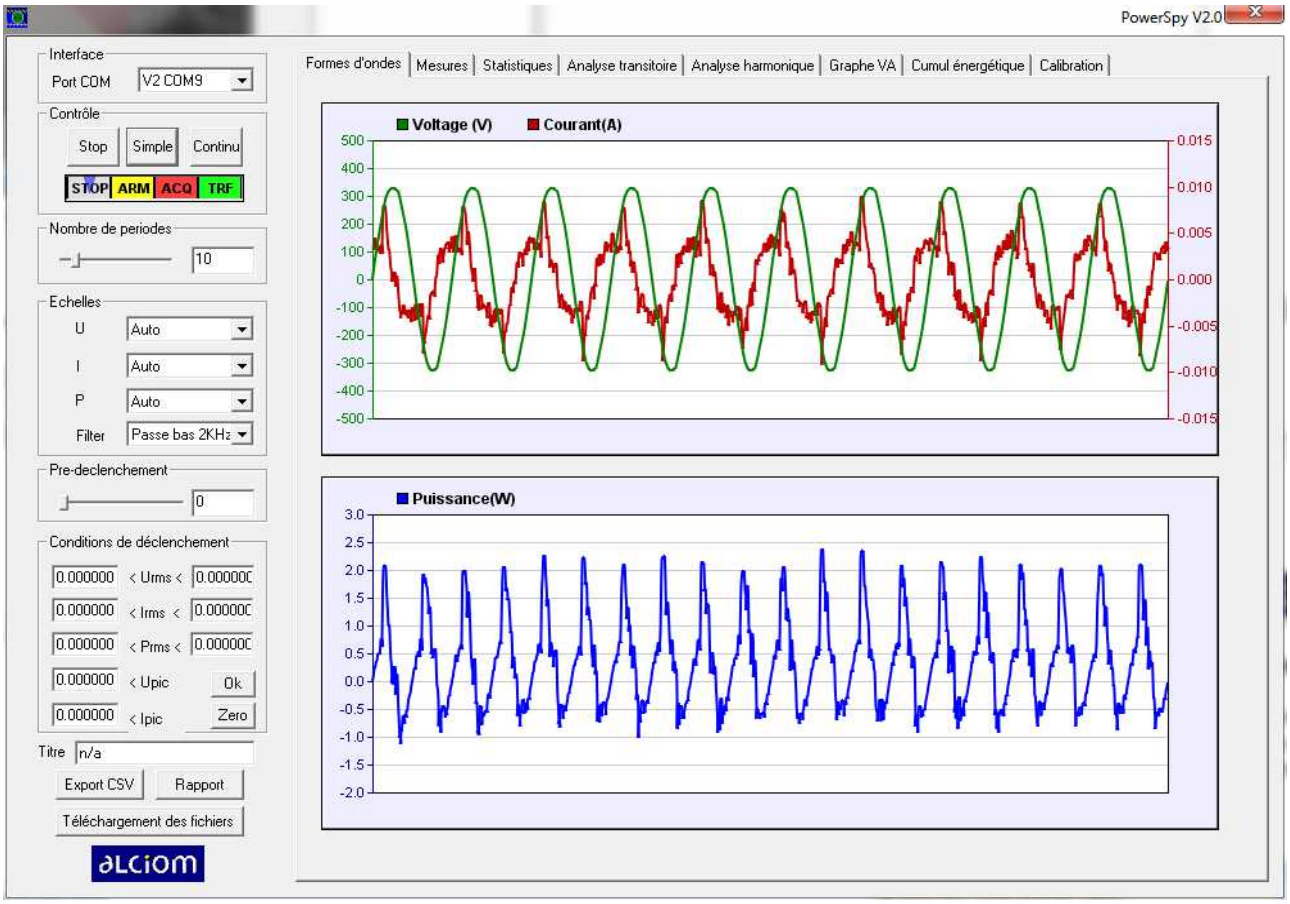
A last window will confirm you that your PowerSpy2 is correctly connected. It will now appears to the system as a virtual serial port.



3.6 PowerSpy software launch and functional test

Launch the PowerSpy software via the shortcut situated in your Program menu. After an initialization phase and search for all accessible PowerSpy (up to 20 seconds), your PowerSpy2 will automatically be configured and connected.

The main PowerSpy2 window will then be displayed. Voltage, current and power real time displays will be updated. Your PowerSpy2 is operational!

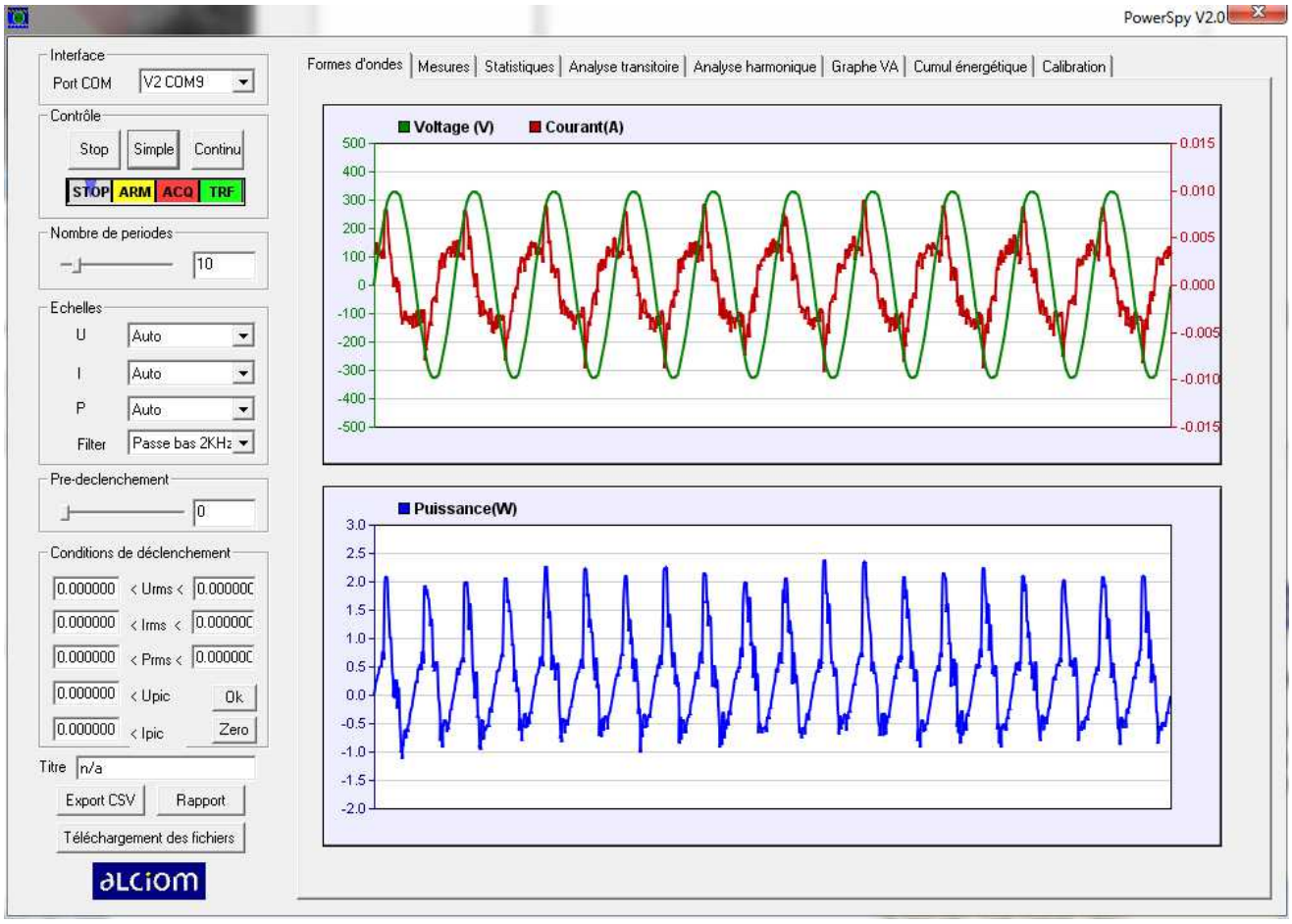


Note : if the PowerSpy software is launched and no PowerSpy2 analyzer is found, the software will be launched in “demonstration” mode. In case of abnormality, please refer to the section "Problem solving" at the end of this manual.

4 Using in real time mode

4.1 Main window and acquisition commands

The main PowerSpy2 window shows on the right side the voltage and current real time waveforms (top area) and the instantaneous power waveform (bottom area):



The commands are grouped on the left and allow to control the data acquisition process. The functions of various controls are the following :

- **ComPort** : Selection of a given PowerSpy2 analyzer among those linked by Bluetooth. This parameter is positioned automatically by default on the first available PowerSpy2, and must be modified only for multi-devices installations (nota : only a single PowerSpy could be managed with the current version of the software and Bluetooth stack).

- **Control** : The acquisition is done either in nonstop mode, meaning with automatic trigger arming after each measure cycle (RUN mode) or for a unique cycle after trigger detection (SINGLE mode). These three buttons allow to select the current mode or to stop acquisitions (STOP).

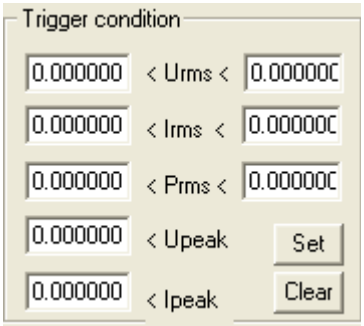
- **Number of periods** : Allows to configure how many periods of the signal must be acquired for every measurement cycle, from 1 to 99. A lower number of periods allows naturally to accelerate the measurements but reduces the quality of the measures.

- **Range (U, I, P)** : Allows to configure the display scale for voltages, currents and power (automatic by default)

- **Filter** : After acquisition, the data are numerically filtered to improve the resolution of the measures. A low pass 2KHz filter is selected by default and allows to obtain the optimal performances of the product. For specific uses this switch allows either to avoid the digital filtering or to select a 1KHz filter. In this last case, the harmonic analyzes will however shows wrong results for high harmonics (above rank 15).

- **Pretrigger** : Allows to configure how many signal periods should be acquired before the trigger.

- **Trigger condition** : By default the PowerSpy realizes the acquisition of current and voltage continuously. For specific applications it is however useful to analyze the current and voltage waveforms after a given event: voltage drop or voltage peak, peak of current or power corresponding to a switch-on of the load or to mode change, etc. To set a specific trigger condition just enter the wanted values and click on "Set". They will be taken into account at the next measurement cycle. The « Clear » button allows to return to the default trigger (0, corresponding to an always true condition), which will be effective by pressing on "Set".

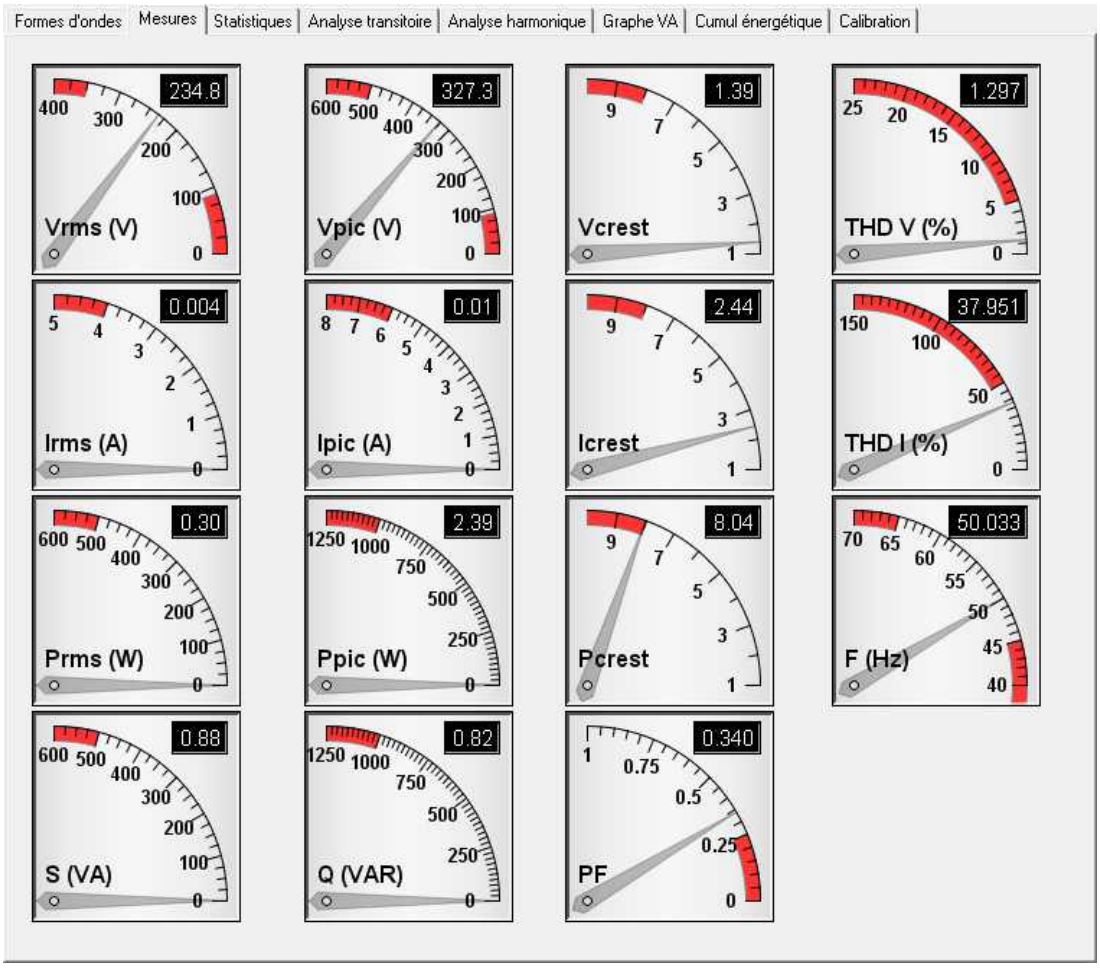


- **Title, Export data, Make report** : Cf chapter 6

- **Files downloading** : Cf chapter 5

4.2 « Measurements » tab

Select this tab to display the average values calculated on all the periods of the last acquisition :



The displayed values are, from right to left and from top to bottom :

- **Vrms** : Round mean square line voltage (or effective line voltage)

$$V_{RMS} = \sqrt{\frac{1}{N} \sum_{i=1..N} V_i^2}$$

- **Vpeak** : Peak line voltage
- **Vcrest** : Line voltage crest factor

$$V_{Crest} = \frac{V_{peak}}{V_{rms}}$$

- **THD V** : Line voltage total harmonic distortion (*)
- **Irms** : Round mean square load current (or effective load current)

$$I_{RMS} = \sqrt{\frac{1}{N} \sum_{i=1..N} I_i^2}$$

- **Ipeak** : Peak load current
- **Icrest** : Load current crest factor
- $$I_{Crest} = \frac{I_{peak}}{I_{rms}}$$
- **THD I** : Load current total harmonic distortion (*)
- **Prms** : Real load power

$$P_{real} \approx \frac{1}{N} \sum_{i=1..N} V_i \, x \, I_i$$

- **Ppeak** : Peak load power
- **Pcrest** : Load power crest factor

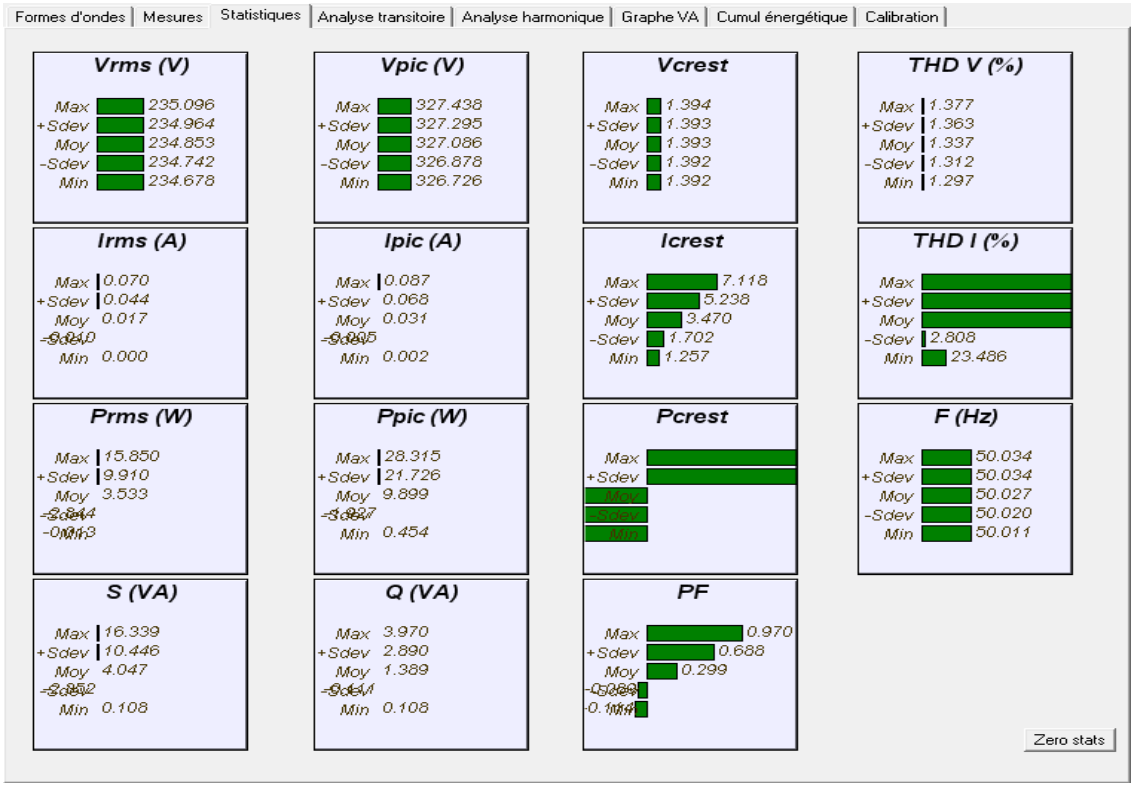
$$P_{Crest} = \frac{P_{peak}}{P_{rms}}$$

- **F** : Average line frequency
- **VA** : Apparent load power
- $$p_{apparent} = V_{RMS} \, x \, I_{RMS}$$
- **Preac** : Reactive load power
- $$P_{reac} = \sqrt{P_{apparent}^2 - P_{rms}^2}$$
- **PF** : Mean power factor
- $$PF = \frac{P_{real}}{P_{apparent}}$$

(*) : Harmonic distortion are calculated on the first acquisition period. Cf 4.5.All other parameters are averaged on the complete acquisition.

4.3 « Statistics » tab

This tab allows to display the statistics of all the values calculated in the « Measurements » tab :



For every measured value, the following statistics are displayed :

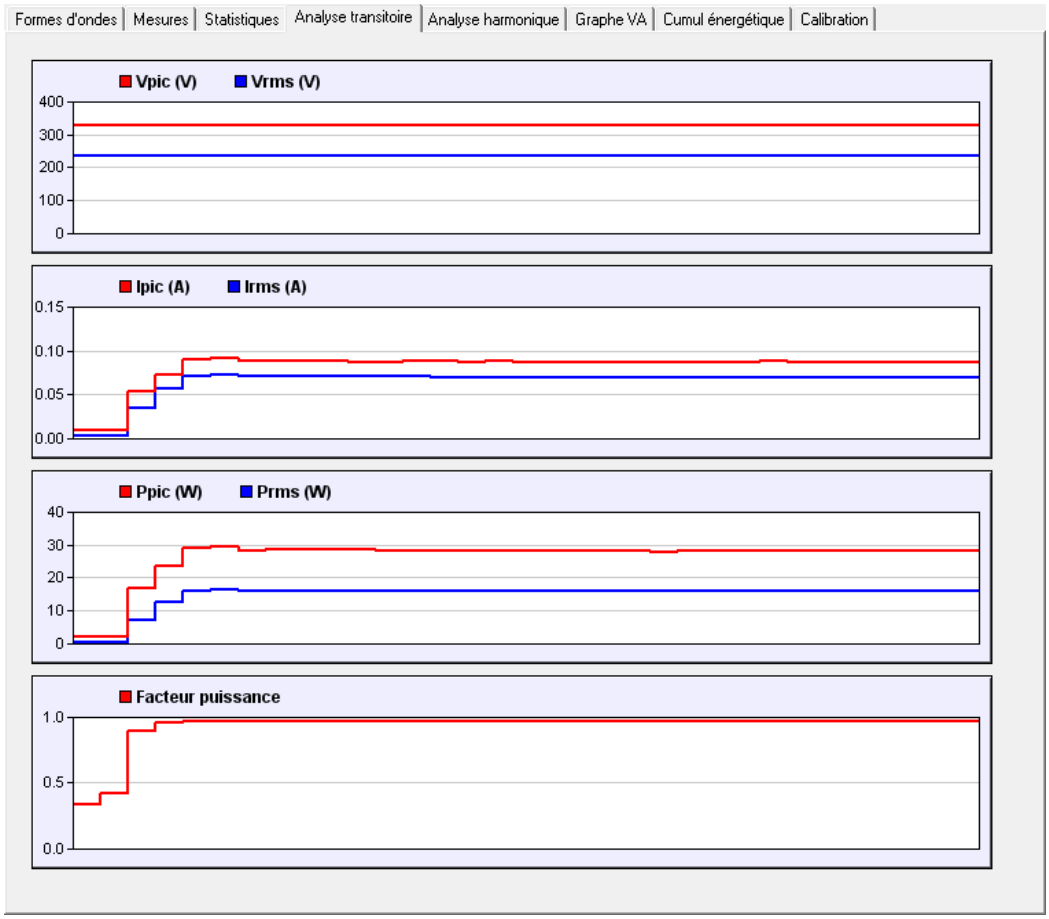
- **Max** : Maximum measured
- **+SDev** : Average plus one times the standard deviation
- **Avg** : Average value
- **-SDev** : Average less one times the standard deviation
- **Min** : Minimum measured

The « reset stats » button located below on the right allows to reset the statistical data.

Nota :These values are statistics of the numerical values displayed on the Measurements tab, which means statistics of averaged measurements on the number of periods configured for the acquisition. For statistics on single periods values, select Number of periods =1 or use the tab « Inrush current » as described below.

4.4 « Inrush analysis » tab

The « Inrush analysis » tab allows to calculate and display the RMS currents, voltages and powers as well as the peak power and and power factor period by period and for all the periods of acquisition :

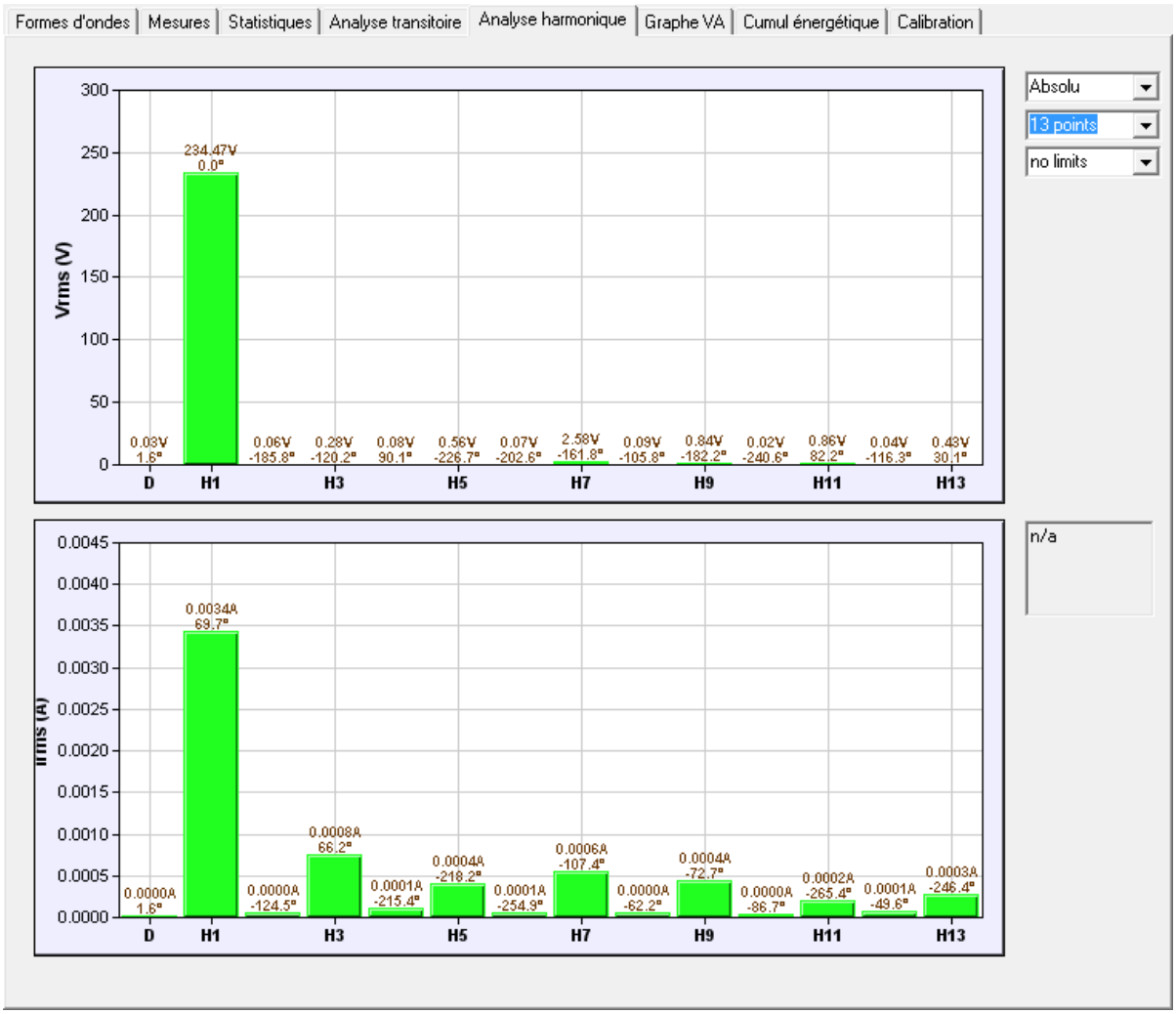


This feature is particularly useful to analyze startup currents (for example a motor starting up), with an appropriate trigger condition. The following procedure could then be applied :

- Click on STOP
- Define the number of wanted periods and a non-null value for the pretrigger counter
- Define a the minimal trigger current (« 0.1A < Irms » for example)
- Click on “Set” to activate the trigger, then on SINGLE
- Switch on the load, the plot will be displayed a few seconds later

4.5 « Harmonic analysis » tab

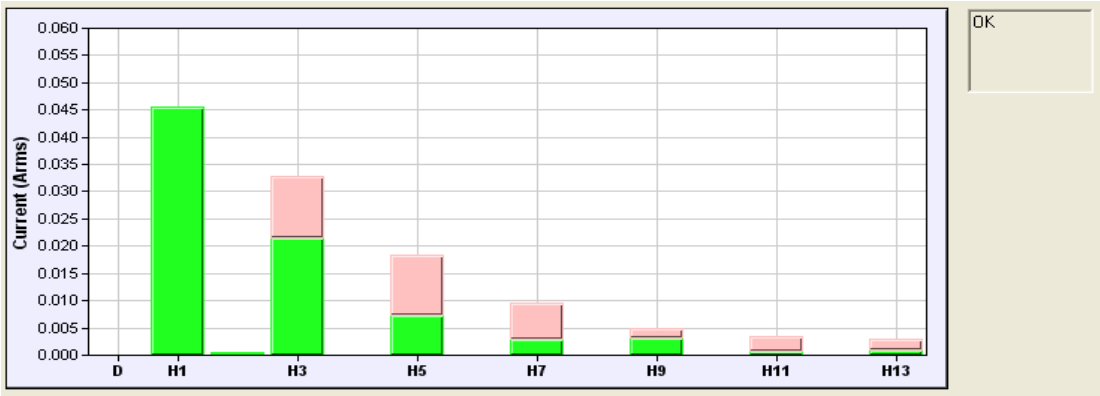
The " Harmonic analysis " tab allows to display the result of an harmonic analysis calculated by a Fast Fourier Transform (FFT) over the first period of the acquisition, on the voltage sector (top) and on the current drawn by the load (bottom) :



For every harmonic, the voltage (or the current) of the harmonic is displayed as well as its relative phase as compared to the line voltage. The three selectors on the right allow to select respectively:

- The display mode (absolute, in percentage of the total value and in linear or logarithmic scale, in percentage of the value of the fundamental and in linear or logarithmic scale)
- The number of harmonic displayed (13 or 40)
- The standard compliance limits (respectively without or with classes A, B, C or D limits as defined by EN 61000-3-2 standard).

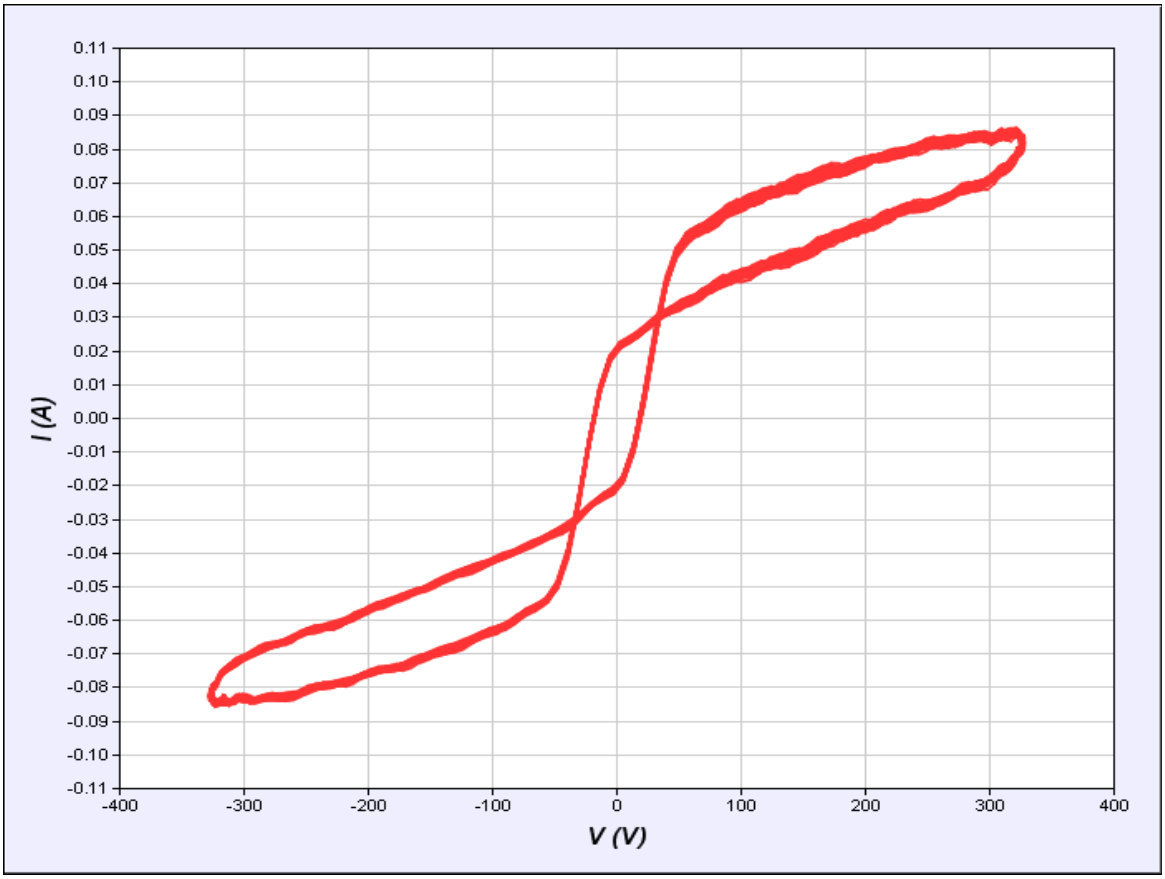
If a standard compliance limit is selected, then the display is automatically configured in the most adapted mode, the standard limited are displayed in light red and the non compliant harmonics are displayed in dark red.



Warning *: these standard compliance limits are only given for information and without any commitment from Alciom. Indeed, these frames can evolve with time and the measurement precision of the PowerSpy can also be insufficient to guarantee the compliance to these standards. It is the responsibility of the user to check these points before any conclusion. The PowerSpy is a tool of pre-validation and not a formal qualification.*

4.6 «VA graph » tab

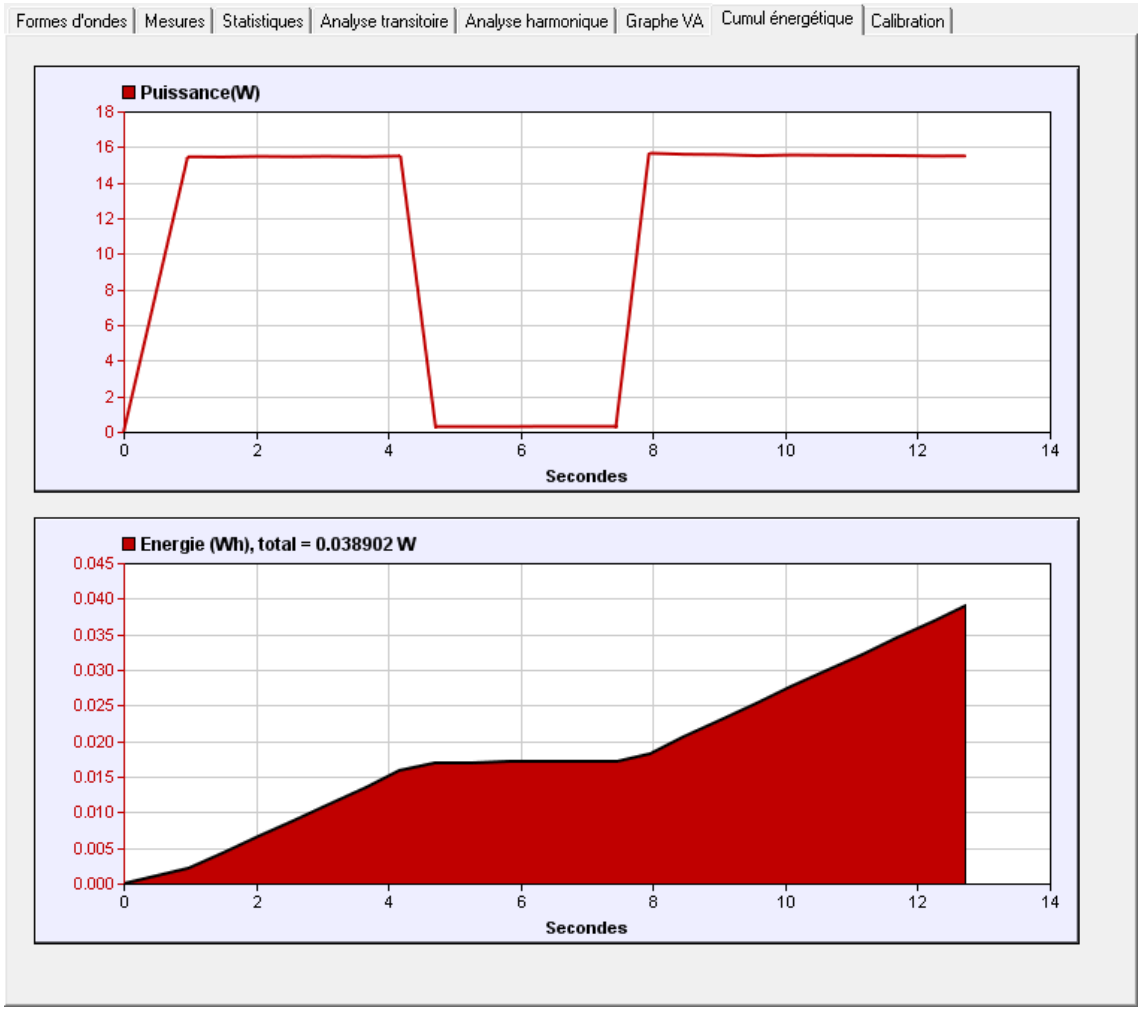
The « VA graph » tab allows to display a XY curve showing the realtime relationship between the instantaneous current and voltage.



This kind of curve allows to estimate quantitatively the degree of non linearity of the load.

4.7 « Energy logger » tab

The « Energy logger » tab allows to display the accumulation of the energy measured during each acquisition cycle. The top curve shows the average power measured for every acquisition, the lower curve gives the sum (integral) of this power which means the overall used energy, as well as the corresponding total value in watt-hour.



The energy accumulation is done as long as the acquisition is in progress and is reset to zero at every stop of the acquisition. It is then very simple to measure the consumption of a functional phase of a given product by using buttons RUN / STOP.

Note 1: The duration of the power integration can be modified by modifying the number of periods per acquisition.

Note 2: This tab shouldn't be used with non-default trigger conditions as the integration will be usually meaningless in such a case.

Note 3 : For long time acquisitions, please refer to recorder mode (chapter 5).

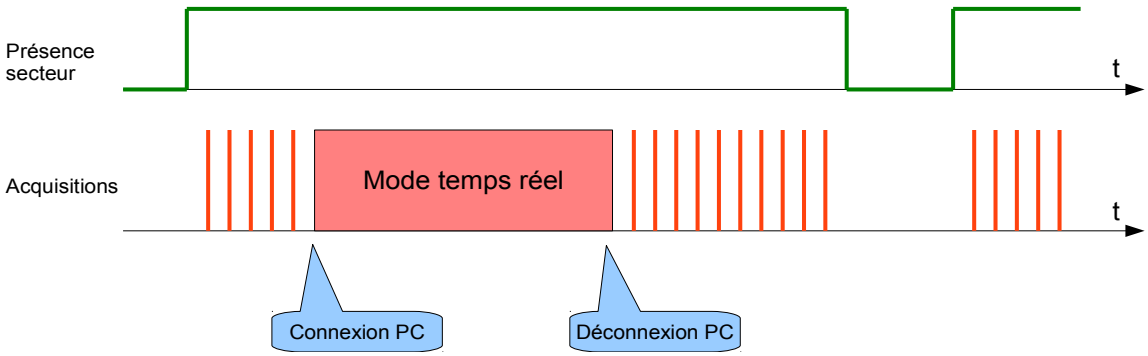
5 Using logger mode

5.1 Operating modes

The Powerspy2 automatically switches between the two modes:

- The Powerspy2 operates in real-time when a connection is made using the Powerspy software from your PC;

- **The Powerspy2 operates automatically in logger mode recorder the rest of the time.** This mode is started as soon as the Powerspyt2 is powered from an AC source.



In logger mode, the Powerspy2 measures at a programmable rate (measurement period from 20ms to 1 minute) the following parameters:

- Line votage (RMS and peak to peak)
- Load current (RMS and peak to peak)
- Load power (RMS and peak to peak)
- Line frequency

These elements, as well as the current time, are stored in an internal 4GB memory as raw data. A file is created for each day (midnight to midnight).

The internal memory capacity of Powerspy2 allows continuous recording for long durations (see below). Once the memory is full the oldest files are automatically deleted.

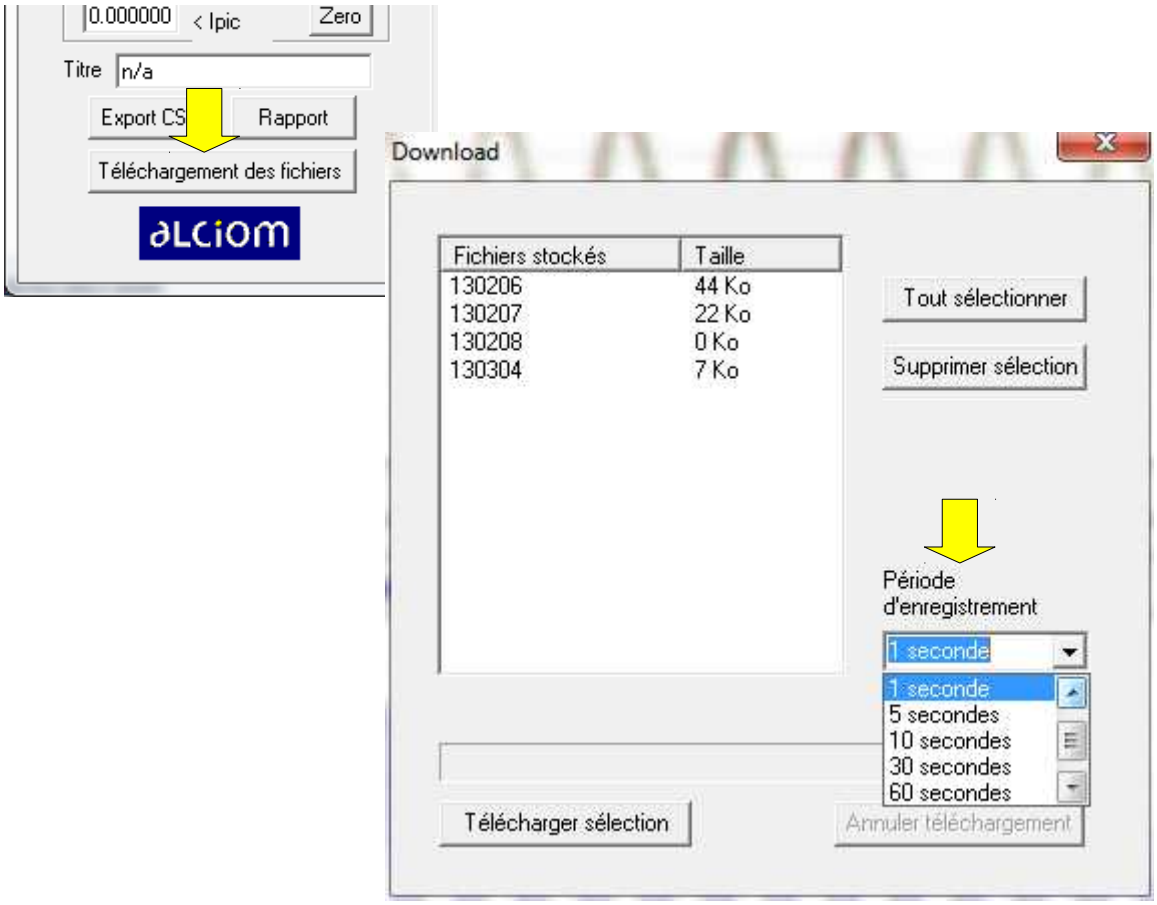
Measurement time	20ms	1s	5s	10s	30s	60s
Max time acquisition	1 month	4 years	25 years	> 25 years	> 25 years	> 25 years

Note: RMS values are integrated on the measurement time, so a longer measuring period provides a less noisy measurement.

5.2 Configuring the logger

The Powerspy2 is delivered from the factory configured for an acquisition every second, which is optimal for most applications. To change the frequency of acquisition:

- Run the Powerspy software
- Stop acquisition (STOP)
- Click on the "Download file" button
- Change the logging period from dropdown list
- Close the dialog and the Powerspy software
- Check for new frequency acquisition by the flashing of the LED of the Powerspy2

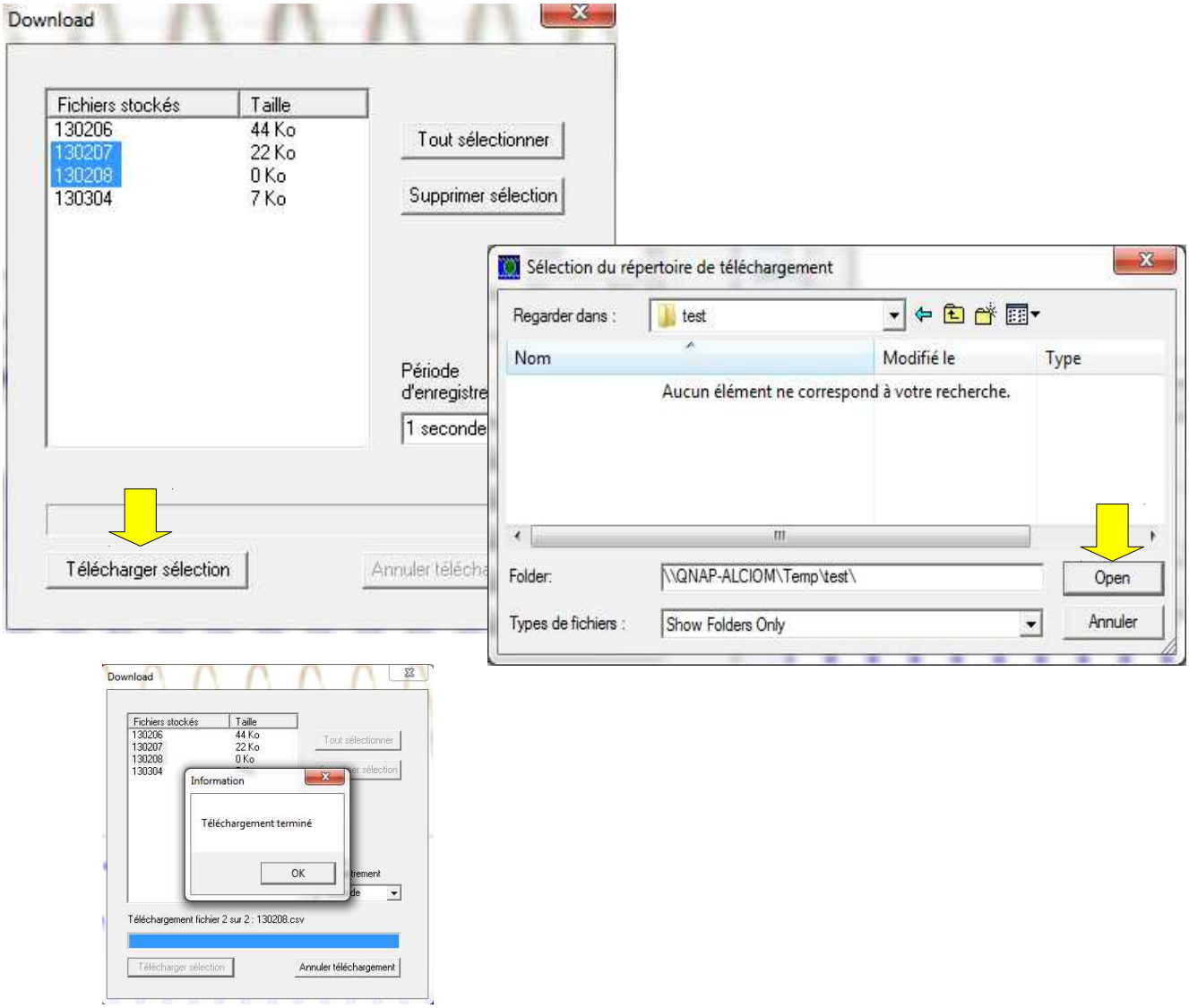


Note: The Powerspy2 internal clock is automatically set to the current time when launching the Powerspy software. An internal backup battery keeps time even in case of power failure.

5.3 Downloading Files

Downloading log files from the internal memory to the hard disk of your PC is made via the Bluetooth connection:

- Run the Powerspy software
- Stop acquisition (STOP)
- Click on "File Download". All files in the internal memory of the device are displayed. The file name is the date of the day (format YYMMJJ), the file size is function of the acquisition speed and the duration of the power presence
- Select files to upload ("select all" button or select one or more files by clicking while holding down the Control key)
- Click "Download selection" and select the directory file storage on your PC
- Wait for the transfer, then if necessary, and after checking the recovered files, delete files from the internal memory using the "Delete selection" button

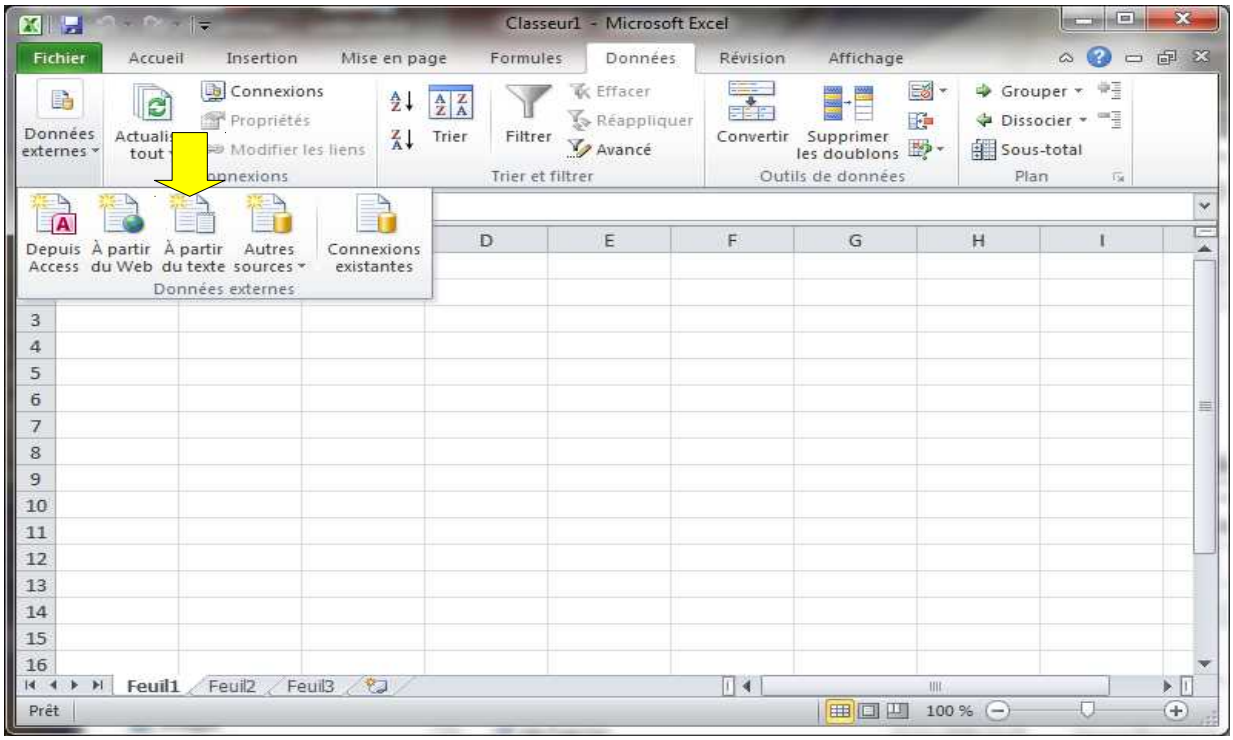


5.4 Exploitation of logged files

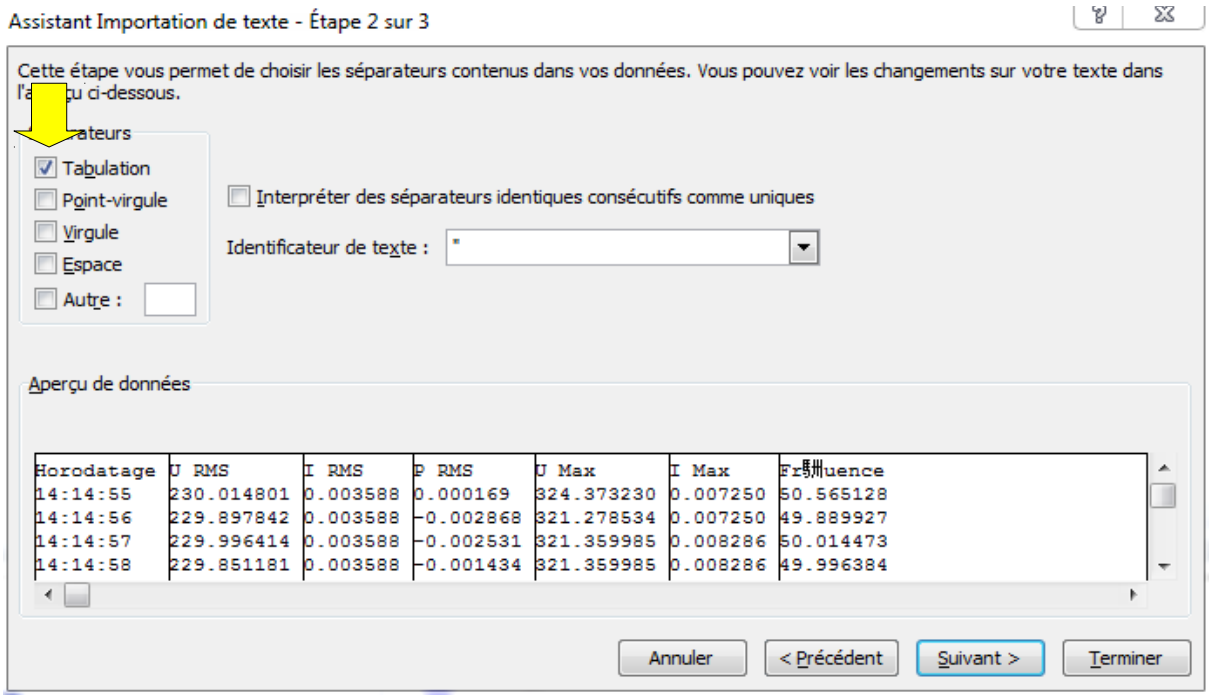
Data files on your PC are stored as text files. These files contain one line per measurement point, the fields are separated by tabs.

Dedicated software facilitating the use of these files will soon be proposed by ALCIOM, but these files can be easily analyzed in a spreadsheet. To use these files for example in Excel (© Microsoft)

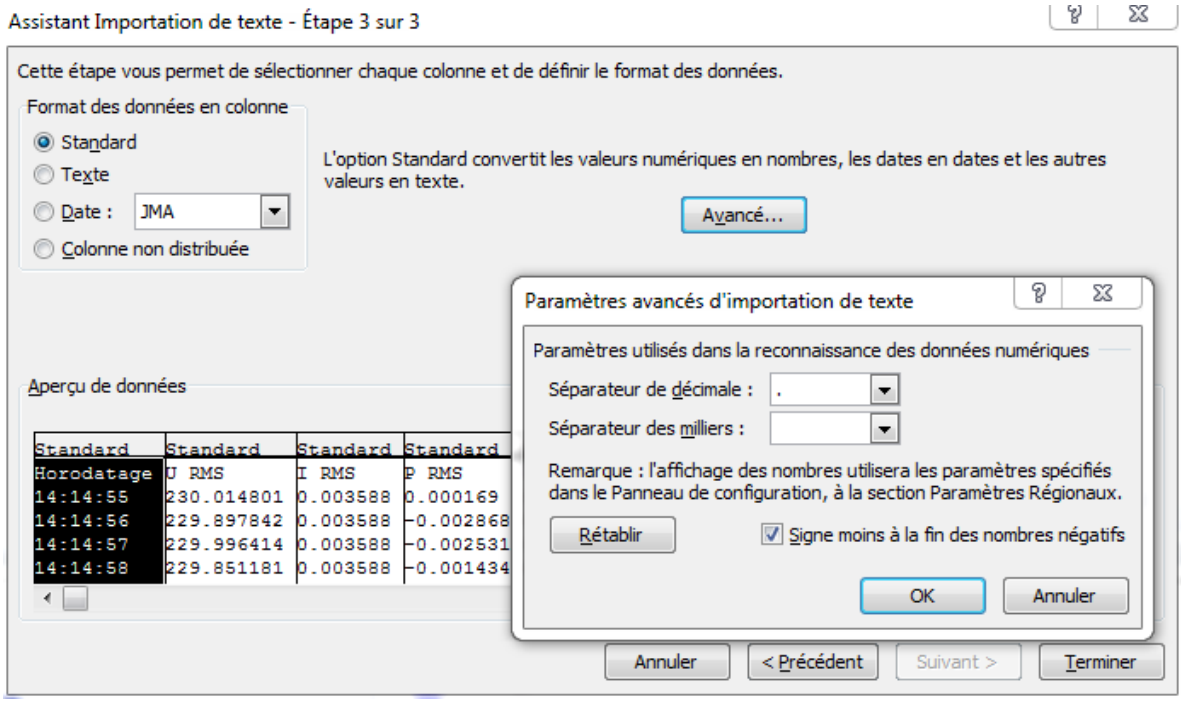
- Start Excel and create a blank page
- In the "Data" tab, select « External Data » then "from text"



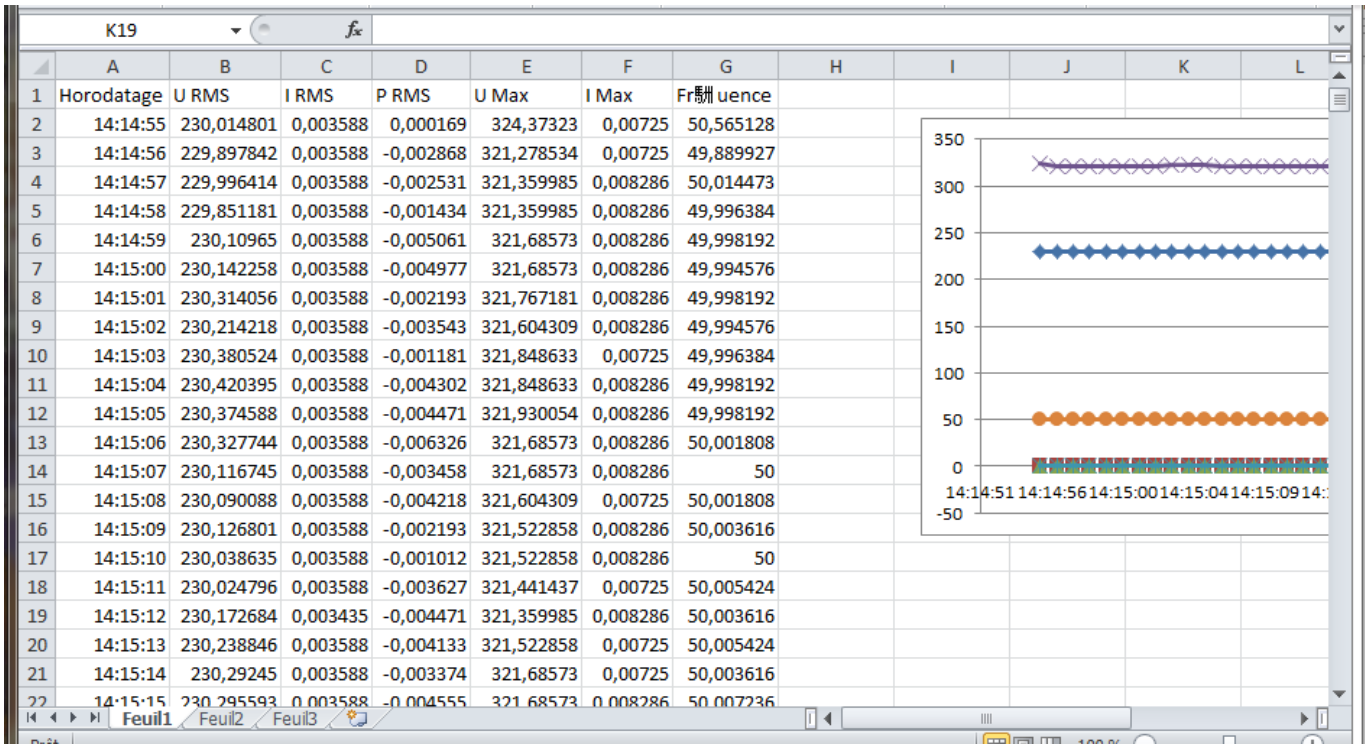
- In step 1/3 of the Import Wizard, select "Delimited"
- In step 2/3, choose the separator "Tab"



- Finally in step 3/3 Click on "Advanced" and check that the decimal separator is the point



Importing data is automatically performed:



K19

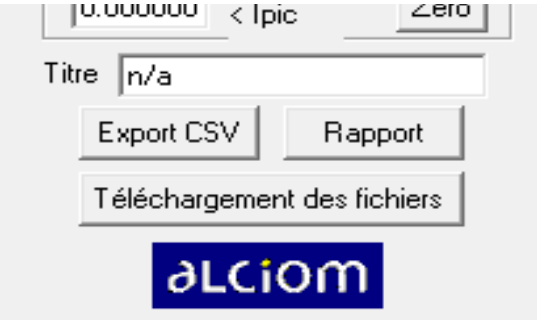
	A	B	C	D	E	F	G
1	Horodatage	U RMS	I RMS	P RMS	U Max	I Max	Fr駘uence
2	14:14:55	230,014801	0,003588	0,000169	324,37323	0,00725	50,565128
3	14:14:56	229,897842	0,003588	-0,002868	321,278534	0,00725	49,889927
4	14:14:57	229,996414	0,003588	-0,002531	321,359985	0,008286	50,014473
5	14:14:58	229,851181	0,003588	-0,001434	321,359985	0,008286	49,996384
6	14:14:59	230,10965	0,003588	-0,005061	321,68573	0,008286	49,998192
7	14:15:00	230,142258	0,003588	-0,004977	321,68573	0,008286	49,994576
8	14:15:01	230,314056	0,003588	-0,002193	321,767181	0,008286	49,998192
9	14:15:02	230,214218	0,003588	-0,003543	321,604309	0,008286	49,994576
10	14:15:03	230,380524	0,003588	-0,001181	321,848633	0,00725	49,996384
11	14:15:04	230,420395	0,003588	-0,004302	321,848633	0,008286	49,998192
12	14:15:05	230,374588	0,003588	-0,004471	321,930054	0,008286	49,998192
13	14:15:06	230,327744	0,003588	-0,006326	321,68573	0,008286	50,001808
14	14:15:07	230,116745	0,003588	-0,003458	321,68573	0,008286	50
15	14:15:08	230,090088	0,003588	-0,004218	321,604309	0,00725	50,001808
16	14:15:09	230,126801	0,003588	-0,002193	321,522858	0,008286	50,003616
17	14:15:10	230,038635	0,003588	-0,001012	321,522858	0,008286	50
18	14:15:11	230,024796	0,003588	-0,003627	321,441437	0,00725	50,005424
19	14:15:12	230,172684	0,003435	-0,004471	321,359985	0,008286	50,003616
20	14:15:13	230,238846	0,003588	-0,004133	321,522858	0,00725	50,005424
21	14:15:14	230,29245	0,003588	-0,003374	321,68573	0,00725	50,003616
22	14:15:15	230,295593	0,003588	-0,004555	321,68573	0,008286	50,007236

6 Data export and automatic reports

The PowerSpy software also allows to export data with two very flexible mechanisms :

- under a raw format (for example, for reintegration with a spreadsheet or a mathematical software),
- under a completely user-configurable HTML report format

The corresponding commands are available in the lower left section of the main window:



Warning : these commands are active only when the acquisition is stopped. Press the STOP button, then write a title for the report in the zone « Title ».

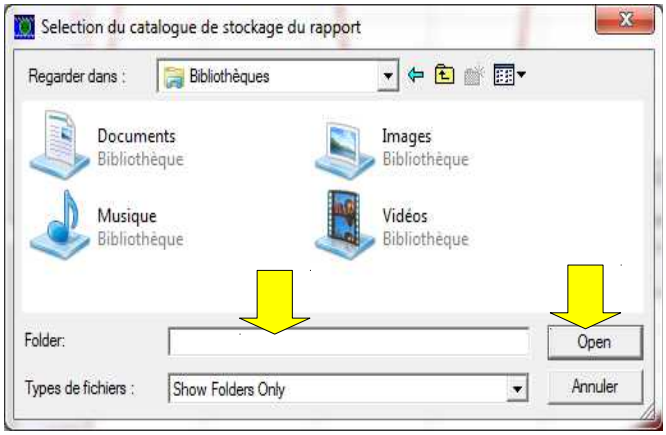
6.1 Raw data export

To export the raw data, click on " Export data " and give a name to the export file. The PowerSpy software will then generates a Comma Separated File (CSF) :

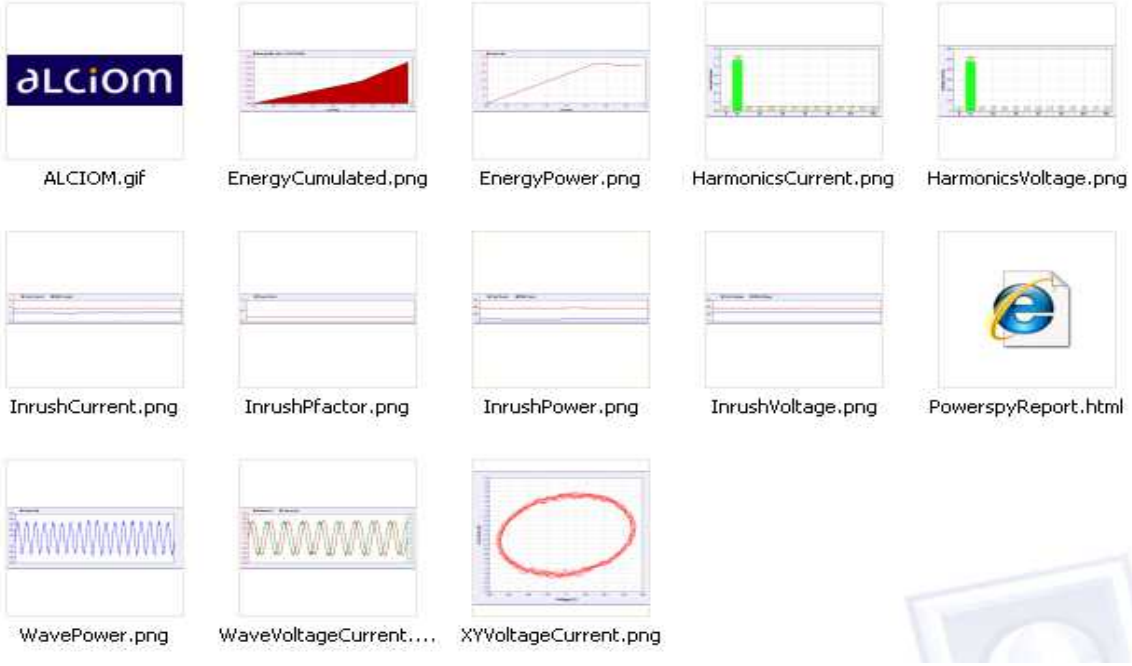
```
PowerSpy - ALCIOM - Exported raw data file

Current : 16/06/09 17:47:43,687

Sample #,Voltage (V),Current(A)
    0, 6.927, 1.59141
    1, 15.818, 1.63156
    2, 24.686, 1.67539
    3, 33.365, 1.69767
    4, 41.911, 1.68385
    5, 50.582, 1.64382
    6, 59.564, 1.60935
    7, 68.616, 1.61208
    8, 77.283, 1.66106
    9, 85.500, 1.72293
   10, 93.745, 1.74778
   ...
```

6.2 HTML reports

To export a HTML report, click on " Make report" and select the name of the **directory** (and not the name of the file) where you want to store the report into. It is possible to create a new directory at that stage by clicking on the corresponding Windows icon :

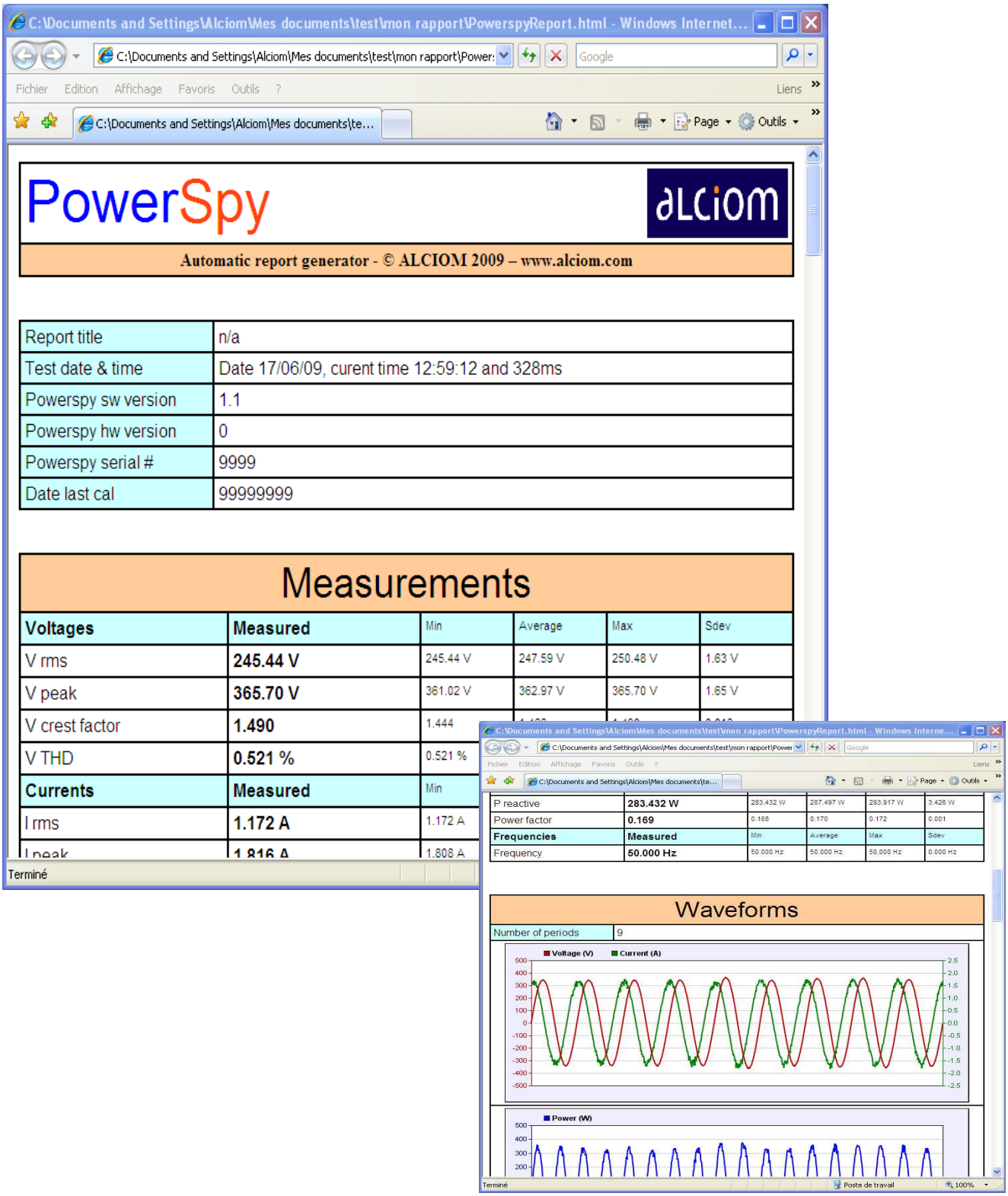


Give, if necessary a name to the new directory, select it and click on "Open" to launch the report generation. This command will create a set of files in the target directory :



very graph is exported in an independent file as a .PNG graphic file. These images can then be very easily re-imported in the software of your choice. In addition, a HTML file " PowerspyReport.html " is generated. This file is the complete measurement report. Thanks to the HTML format this report can be easily converted for example under a word processor format.

The format of the report is completely customizable (cf below). By default, all the measurements values are included in a table and links are created to every image.



6.3 HTML report customization

The HTML report generated by the PowerSpy software is completely user-customizable in order to be adapted to your needs : modification of the displayed information, specific logos, presence and format of the textual fields, integration or no integration of the graphs, etc. The mechanism used by the software PowerSpy is the following :

- A HTML « template » is present in the PowerSpy software main directory :
- During the generation of the HTML report, this template is copied in the destination directory, but the specific HTML tags included in this template are replaced by the real measurement values.
-

- To customize the report, you just have to modify the content of the template with a HTML editor of your choice (for example sweb, include in OpenOffice) or manually with the Windows text editor. The list of HTML tags recognized by the software PowerSpy is defined in the standard file template. An extract is given below :

Report title	%TITLE%
Test date & time	%DATETIME%
Powerspy sw version	%SWVERSION%
Powerspy hw version	%HWVERSION%
Powerspy serial #	%SERIALNUM%
Date last cal	%LASTCAL%

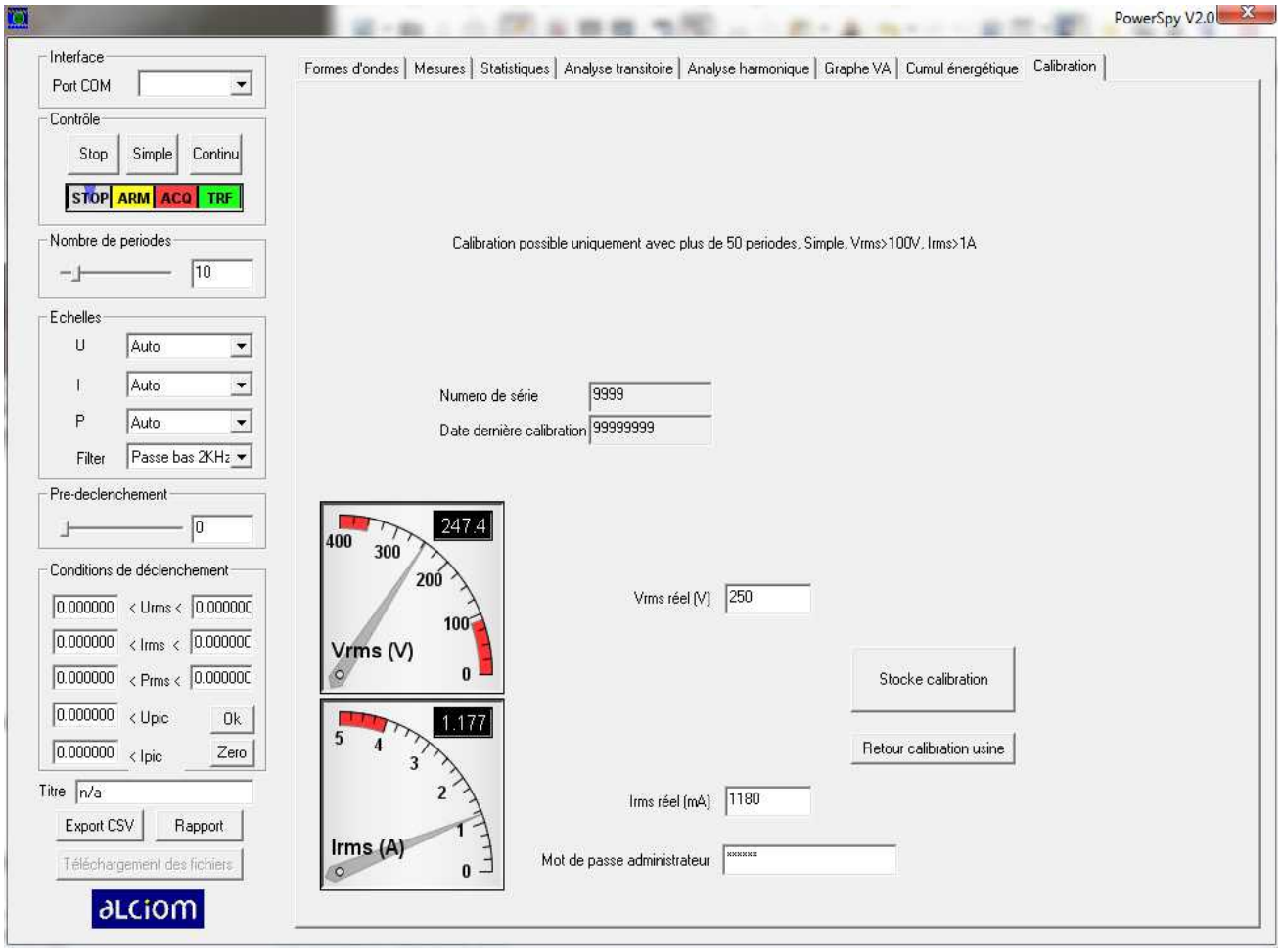
Measurements					
Voltages	**Measured**	Min	Average	Max	Sdev
V rms	**%VRMS%**	%VRMS_MIN%	%VRMS_AVG%	%VRMS_MAX%	%VRMS_SDEV%
V peak	**%VPEAK%**	%VPEAK_MIN%	%VPEAK_AVG%	%VPEAK_MAX%	%VPEAK_SDEV%
V crest factor	**%VCREST%**	%VCREST_MIN%	%VCREST_AVG%	%VCREST_MAX%	%VCREST_SDEV%

Warning : before any modification of the HTML file template, keep a copy of the original version ...

Nota : if you wish to include a logo or a specific picture in the HTML report, make sure to code a complete access path in the HTML file. This path should start from the root directory so that the picture file can be found. Otherwise, you will have to manually copy the picture file in each report directory.

7 Recalibration by the user

The tab "Calibration" allows to make a recalibration of the PowerSpy analyzer. This procedure is recommended once a year to guarantee the performances of the measurements.



This tab also allows to know the serial number of the analyzer as well as the date of the last calibration (format DDMMYYYY).

7.1 Restoration of the factory parameters

In case of abnormality, a specific button allows to **restore the original calibration** realized by ALCIOM when the PowerSpy was manufactured (click on STOP, then on "Restore Factory Calibration"). Any user calibration data are then lost.

7.2 Calibration process

Calibration process is as follows :

- Connect the PowerSpy2 to a very stable AC voltage source (+/-0.5 % or better) between 200V and 240Vrms (lab class AC source or verified line network) and with a RMS value known or measured with a precision better than 1 %.

- Connect the PowerSpy2 to a very stable load with at least 1A current and low harmonic distortion (less than 5 %: heating resistor, stabilized filament bulb, etc.). Make sure to have an external mean to measure the RMS current actually consumed by the load. This current measurement must be imperatively realized between the PowerSpy unit and the load (and not upstream to the PowerSpy unit), and with a precision better than 1 %

- Select a number of periods between 50 and 100 and click on "SINGLE"

- Select the “Calibration" tab. The voltages and current values measured by the PowerSpy2 are indicated on the two graphic dials. Write down in the associated box the REAL values of the voltage and current RMS such as measured by the external equipments ((voltage must be specified in volts, current in milliamperes). Enter the security code in the "administrator password", this code is "314159")

- Click on " Store new calibration "

The new calibration parameters will be automatically calculated and stored in the PowerSpy2 non volatile memory. After a few seconds, a new measurement cycle will be automatically launched and the displayed values on both dials should be very close to the calibration values.

8 Problem solving

The PowerSpy2 analyser is not found when you launch the software (software starts in demo mode)

→ Verify that the PowerSpy2 analyzer is well connected and ready (LED lighted in green)
→ The Bluetooth pairing is otherwise probably lost. Exits the PowerSpy software and apply the following procedure :

1. Double click on the « Bluetooth neighborhood » icon displayed in the Windows task bar
2. Click on “ show the accessible peripherals”
3. Select one by one all Bluetooth devices and click "Delete"
4. Click "Add a Bluetooth Device" and recommend the procedure described above (Chapter 3)

The calibration seems incorrect, the voltage or current measures are incorrect

→ Redo a calibration procedure, or restore the factory calibration data (cf 6.1 ou 6.2)

The PowerSpy analyser LED doesn't light on at all

→ Connect the load directly to the power source to check the voltage presence
→ Check the protection fuse inside the PowerSpy2 (cf chapter 8)

The LED of the PowerSpy2 remains red

→ The frequency locking circuitry doesn't work. Check the frequency stability of the power source

The light of the analyzer PowerSpy2 remains orange

→ The analyzer is probably waiting for a trigger. Check the trigger conditions or reset the conditions to default (STOP, “Clear”, “Set”, RUN). In case of failure, apply the following procedure :

Note: In standalone recorder mode with a period of 20ms LED flashes very quickly and can be confused with orange. If in doubt change the frequency of acquisition.

The functioning is abnormal, but I am not in one of the previous cases

→ Exits the PowerSpy software, disconnect the PowerSpy2 from its voltage source and then reconnect it. Check that the LED switches on in green. Relaunch the PowerSpy software

9 Fuse replacement (maintenance operation)

The PowerSpy2 analyzer is protected internally by a fuse. This fuse can be damaged in case of abnormal use, and in particular in case of connecting to a load higher than 6A. In that case the LED of the PowerSpy2 will remain off.

Warning : the replacement procedure of the internal fuse is a maintenance operation reserved to qualified and authorized personnel with appropriate line power safety qualification.

Warning : the opening of the Powerspy2 to replace the fuse cancels the contractual guarantee of the product.

Warning : Never replace the fuse by a model different from the recommended one (6.3A 250Vac fast fuse)

Warning : Never open the PowerSpy2 if it is powered or has just be disconnected from a power source less than 5 minutes ago. Never use the PowerSpy2 with the unit opened. Check the condition of the PowerSpy2 unit (correct closure, absence of cracks, connectors in good condition) before any new powering.

The procedure of replacement of the internal fuse is the following one :

1. Disconnect the analyzer PowerSpy2 from the power line and from any load
2. Wait at least 5 minutes to avoid the presence of dangerous residual voltages
3. Unscrew the 4 screws present on the back of the analyzer and lift the upper hood without pulling on the connection wires.
4. Remove the fuse and replace it by a strictly identical model (model 5x20mm, **6.3A 250Vac fast fuse**, sectioning rating 63A or higher
5. Check the good positioning of the fuse, the absence of any contact with nearby elements; the absence of any foreign body in the unit and the good connecting of the connection wires
6. Reposition the upper hood, re-screw the 4 screws on the back of the device
7. Check the condition of the PowerSpy2 unit (correct closure, absence of cracks, connectors in good condition) before any new switch on.