

COMPUTERIZED TEST EQUIPMENT

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# ZENSOL

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ON LOAD TAP CHANGER ANALYZER

**OpenZen**  
**Universal Data Recording Software**

**Quick Setup Guide**

**TAP-4**

August 13th, 2013

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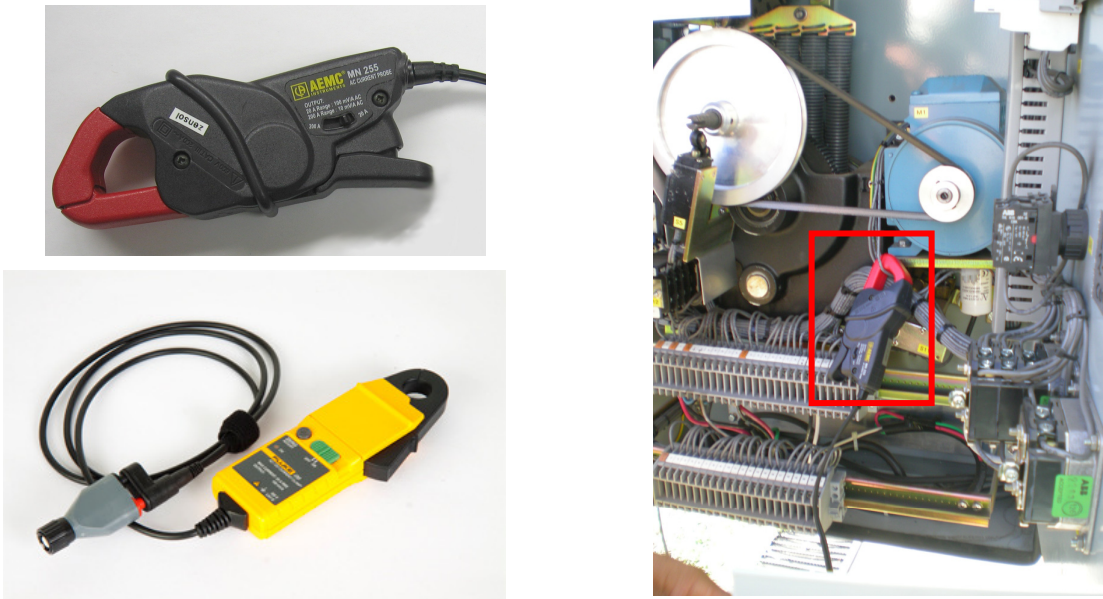
STEP 1 – REQUIRED HARDWARE

|   |  |  |
|---|--|--|
| <p><b>TAP-4</b></p>                    | <p><b>Power cable</b></p>                          | <p><b>USB cable</b></p>               |
| <p><b>Ground cable</b></p>            | <p><b>Accelerometer with calibration card</b></p>  | <p><b>10-32 cable</b></p>            |
| <p><b>BNC cable male-female</b></p>  | <p><b>AC/DC current clamp</b></p>                | <p><b>Crazy Glue and studs</b></p>  |

## Step 1a – Accessories

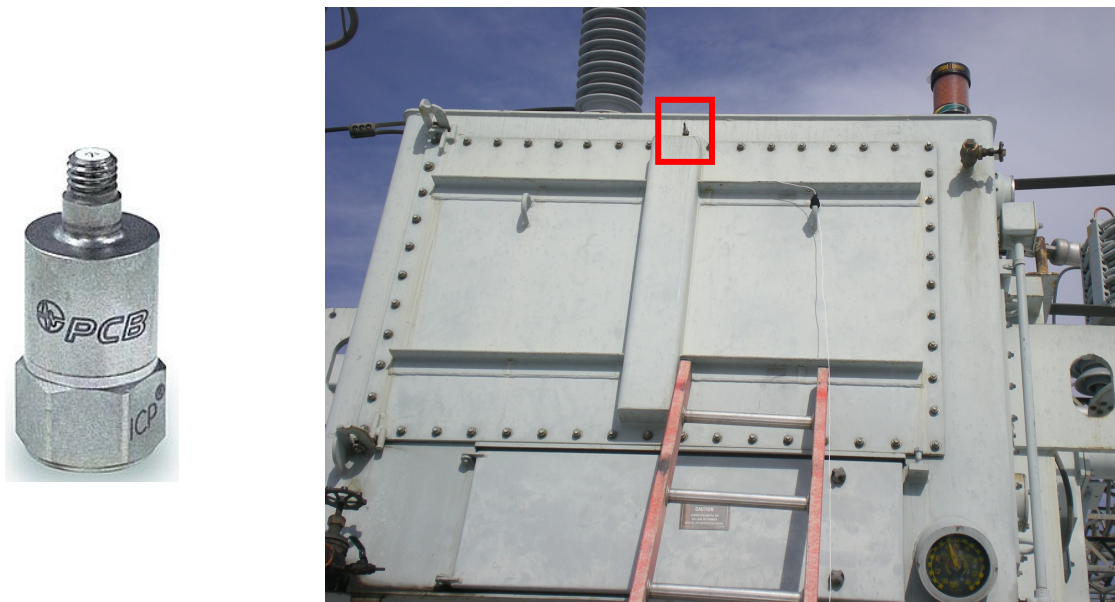
### Current Clamp

In input #1, plug the AC/DC current clamp and install it on a current wire from the tap changers motor as shown on the following picture:



### Accelerometers

In the other inputs, you can plug the accelerometers which are glued to the tap changer. Below an example of the accelerometer location:





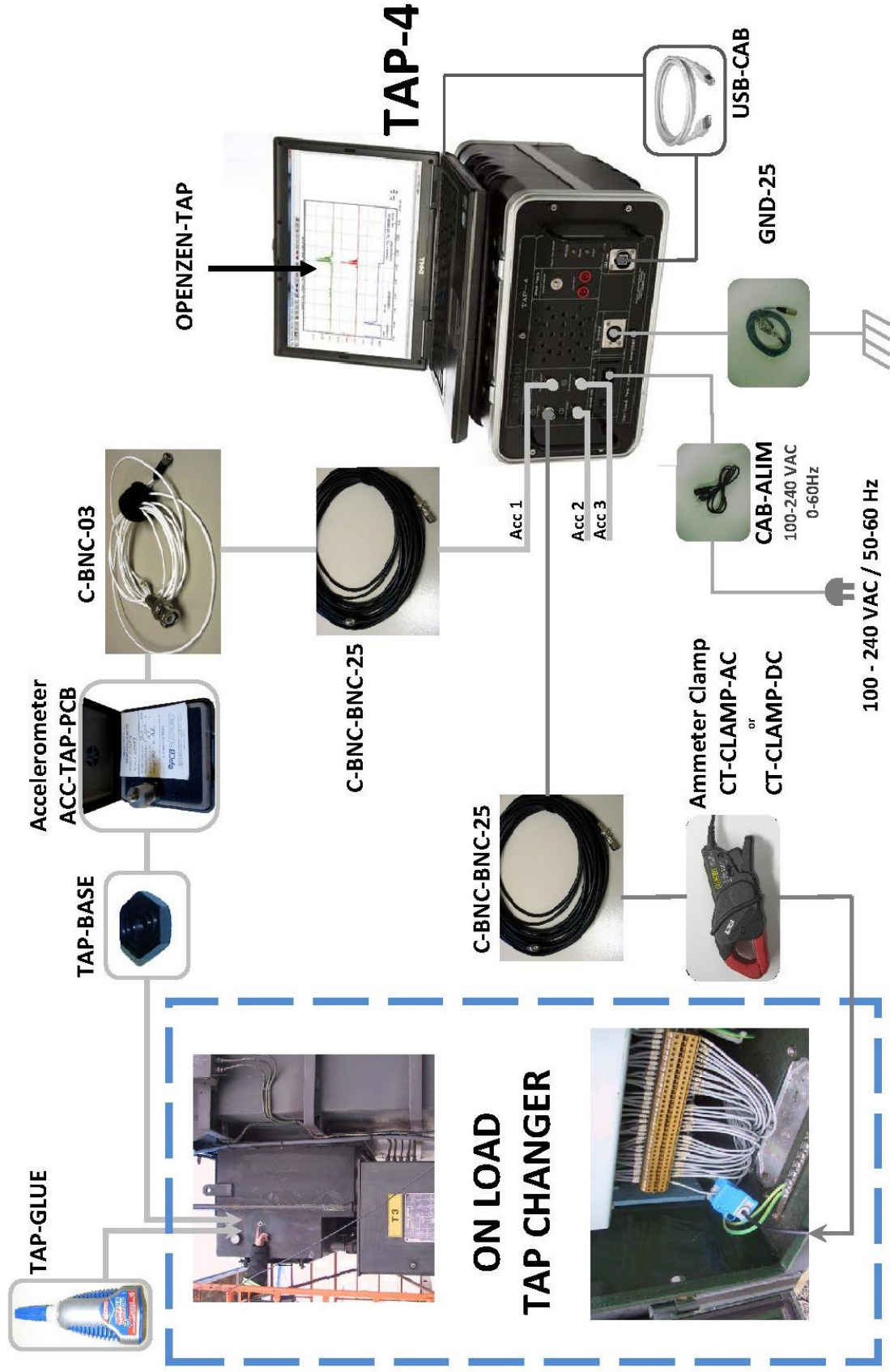
## STEP 2- CONNECTIONS

### Step 2a - Tap-4 channels configuration



| RAW Signals        | Envelopes Signals                            |
|--------------------|--|
| 1: Current         | 100: Current                                 |
| 2: Accelerometer 1 | 101: High Frequency Envelope Accelerometer 1 |
|                    | 102: Low Frequency Envelope Accelerometer 1  |
| 3: Accelerometer 2 | 103: High Frequency Envelope Accelerometer 2 |
|                    | 104: Low Frequency Envelope Accelerometer 2  |
| 4: Accelerometer 3 | 105: High Frequency Envelope Accelerometer 3 |
|                    | 106: Low Frequency Envelope Accelerometer 3  |

Step 2b – Connections to the tap-changer





## STEP 3 – SOFTWARE INSTALLATION AND FOLDER STRUCTURE

### Step 3a – Downloading the application from the Zensol website

Go to [www.zensol.com](http://www.zensol.com) and in the products menu, select **TAP-4 OLTC Analyzer**.

The screenshot shows the Zensol website interface. At the top, there is a navigation bar with 'HOME', 'ENGLISH', 'FRANCAIS', and 'ESPAÑOL'. Below this is a 'PRODUCTS' dropdown menu. The main content area displays the 'CBA-32P Circuit Breaker Analyzer' product page. A red arrow points to the 'PRODUCTS' menu item. Another red arrow points to the 'OpenZen Software' download link in the 'Software and installation' section.

In the product page of the TAP-4, scroll down to the "CUSTOMERS" section and click on the "OpenZen Software"

scroll and link.

#### FOR TAP-4 CUSTOMERS

You need a username and password to access these files and documents. Contact us for more information.

#### Software and installation

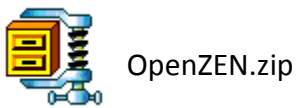
|                                     |                               |        |            |  |
|-------------------------------------|-------------------------------|--------|------------|--|
|                                     | OpenZen Software              | 9.0 MB | 16 Apr. 10 |  |
| <i>Universal Recording Software</i> |                               |        |            |  |
| <b>Start Here</b>                   |                               |        |            |  |
|                                     | Quick Setup Guide for OpenZen | 1.5 MB | 15 Feb. 10 |  |
|                                     | Job aid for OpenZen           | 1.8 MB | 16 Feb. 10 |  |

Enter your username and password when prompted.

Save the ZIP file on your computer at the location of your choice.

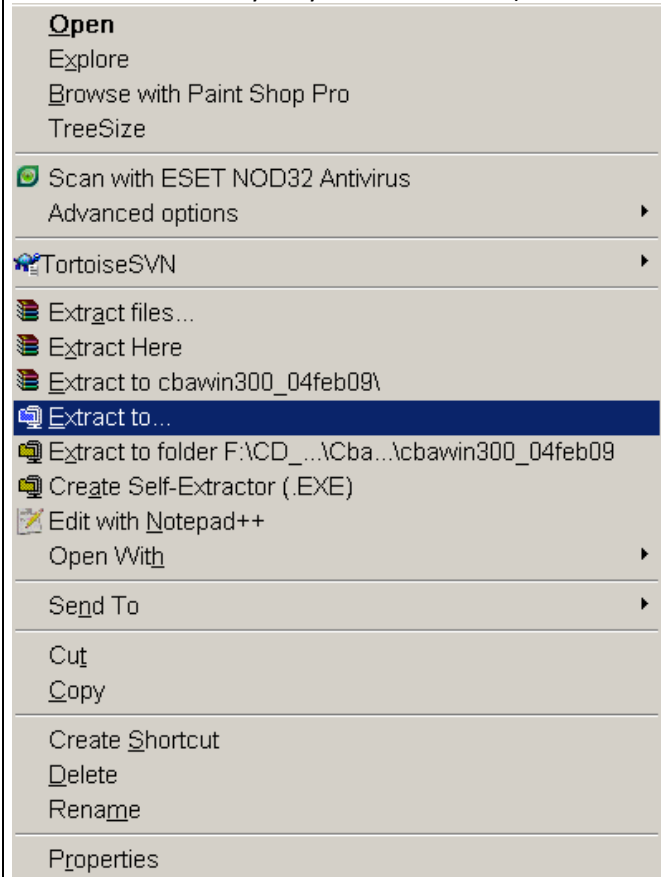
### Step 3b - Decompressing and installing on Windows XP (method 1):

Right-click on the icon for the file you downloaded:

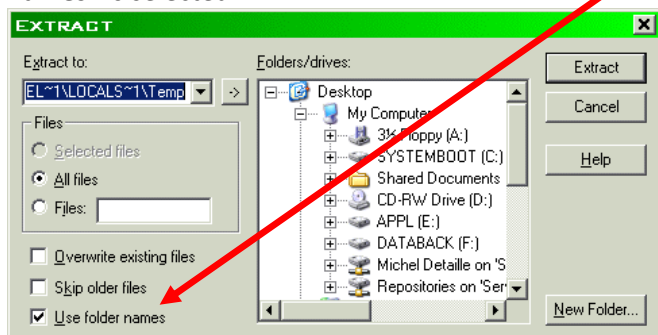


(or file for latest version and date)

Select "**Extract to...**" (note: this example uses WinZip – other extractors may vary in their method):



Select the folder of your choice, and before proceeding, make sure that the option "**Use folder names**" is selected:



A new folder will appear at the location specified in the previous step (example folder name):





### Step 3c - Decompressing and installing on Windows XP (method 2):

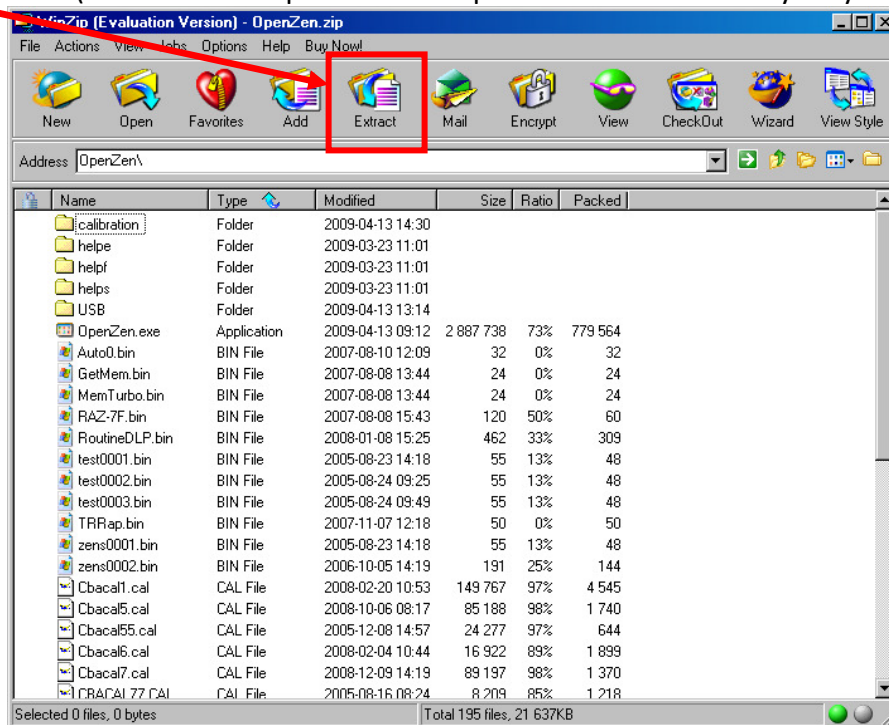
Use this method in case the one in Step 2b fails or cannot be executed.  
 Double-click on the icon for the file you just downloaded:



OpenZEN.zip

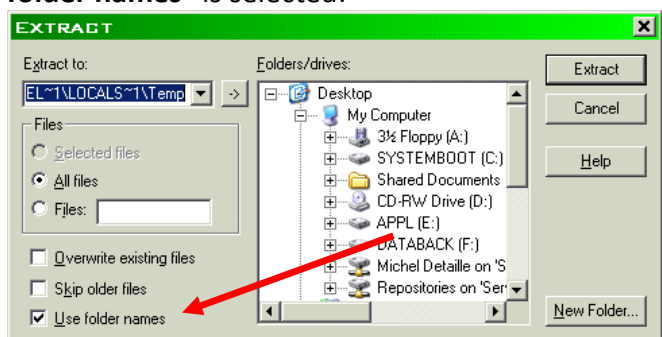
(or file for latest version and date)

Click the "Extract" button (note: this example uses WinZip – other extractors may vary in their method):



Select the folder of your choice, and before proceeding, make sure that the option "Use folder names" is selected:

A new folder will appear at the location specified in the previous step (example folder name):

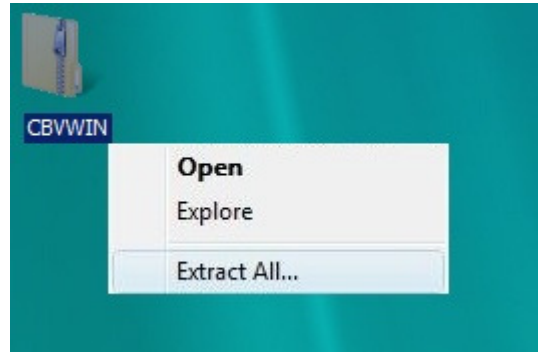


OpenZen

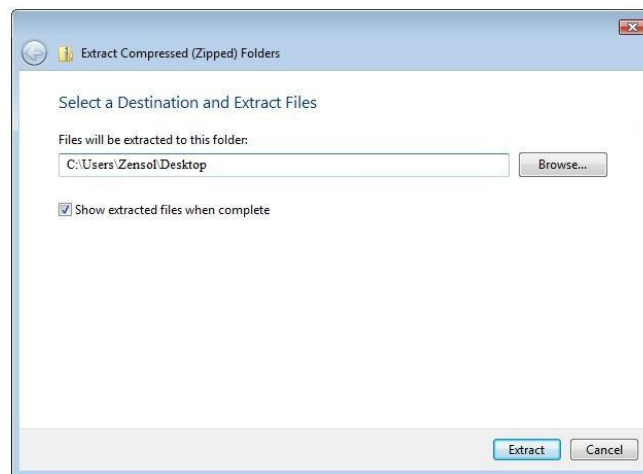
### Step 3d - Decompressing and installing on Windows Vista / 7 / 8

Right-click on the icon for the file you just downloaded (exact file name will depend on version downloaded):

OpenZen



Enter the destination folder where you want the files decompressed (click on Browse to search for a suitable folder – example folder name shown – or type in an absolute path, such as C:\OpenZEN ):

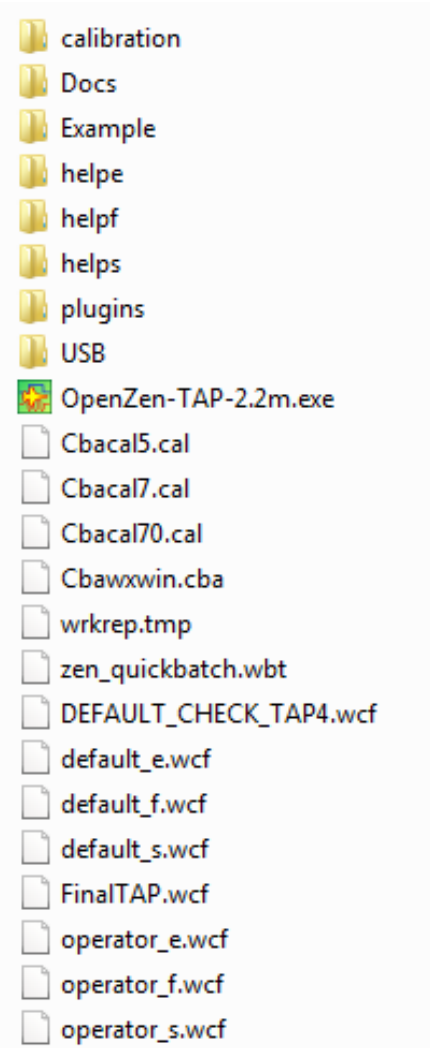


### Step 3e – Contents of the OpenZen folder

Here are some explanations on the contents of the OpenZEN folder. This folder contains all the data and files required by the TAP-4.

You should see the following files and subfolders (partial list shown for clarity) if the installation was successful:

**TIP:** For quicker access, right click on your OpenZen.exe file and select Send to... → Desktop (as a shortcut)



**Main folder:** It contains the program, the USB driver, a reference file (cbawxwin.cba), default test plans (default.wcf), calculation files (cbacal###.cal).

**Calibration folder:** This contains the calibration file.

**Docs folder:** This folder contains manuals and job aid of the software.

**Examples folder:** This folder contains data and excel export examples.

**Help folders:** These contain the software's online help files.

**Plugins folder:** This contains useful applications used by OpenZen.

**USB folder:** This contains the USB driver installation and help files, if required.

## STEP 4 – COMMUNICATION (usb driver installation or fiber optic installation)

### Step 4a - First installation



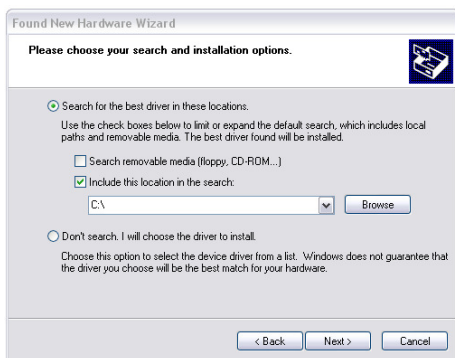
Plug the TAP-4 into a free USB port.



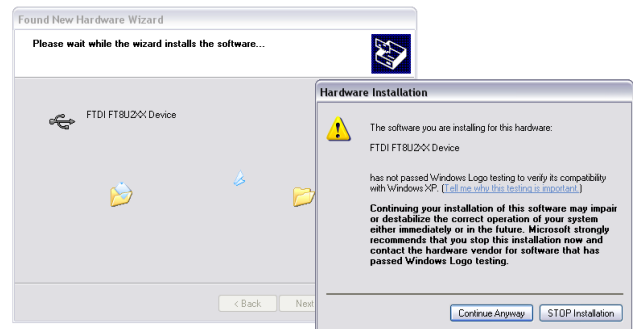
Then, connect your TAP-4 to a power outlet and start it. Windows should now recognize the unit and display a window about it.



**In this window, select "Install from a list or specific location" and click Next.**



Now, select "Search for the best driver in these locations" and "Include this location in the search". Then click "Browse". In the OpenZEN folder, go into the **USB** folder and go into the folder **CDM 2.08.02...** then click OK.



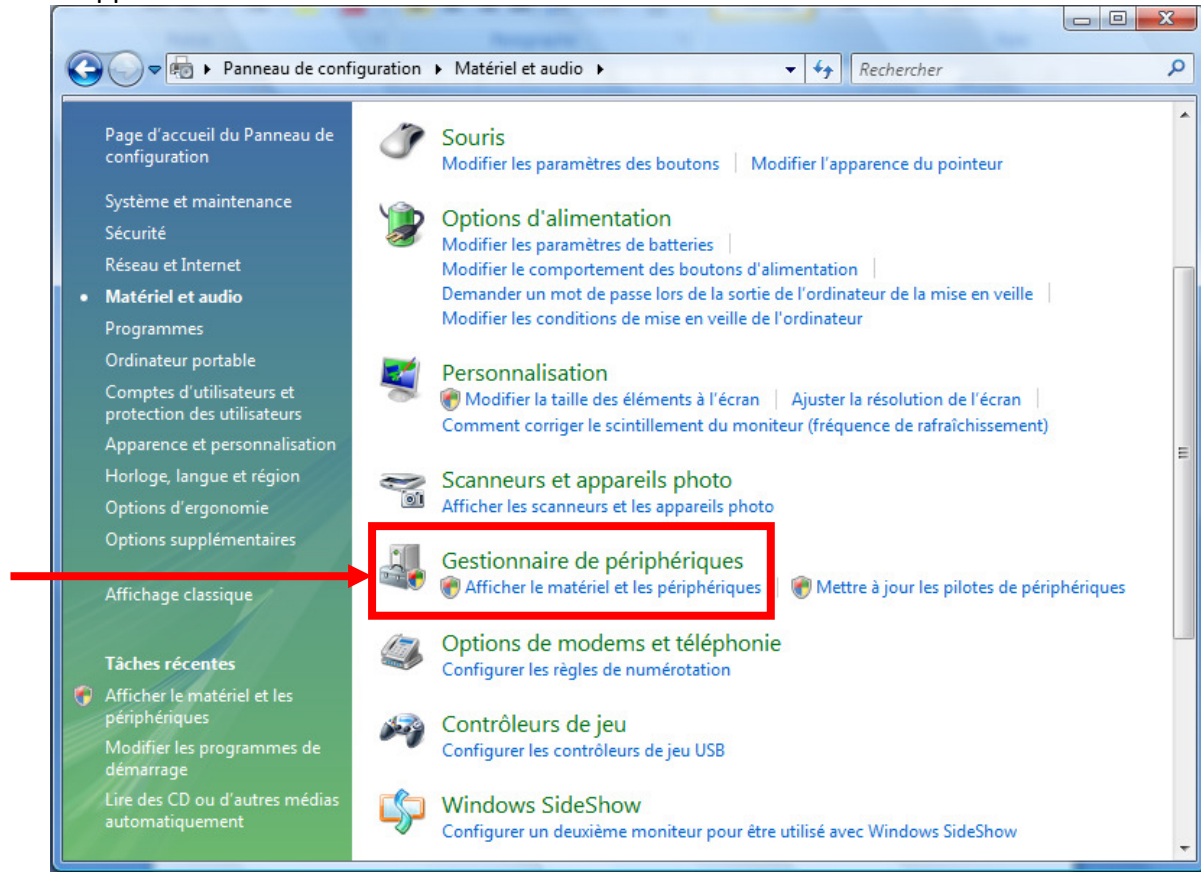
If, during the process, a "Hardware installation" window appears, click on "Continue" (this may appear more than once).

**Note:** In the case where Windows would ask you to install the driver **twice**, please follow the procedure once again to finish the installation.



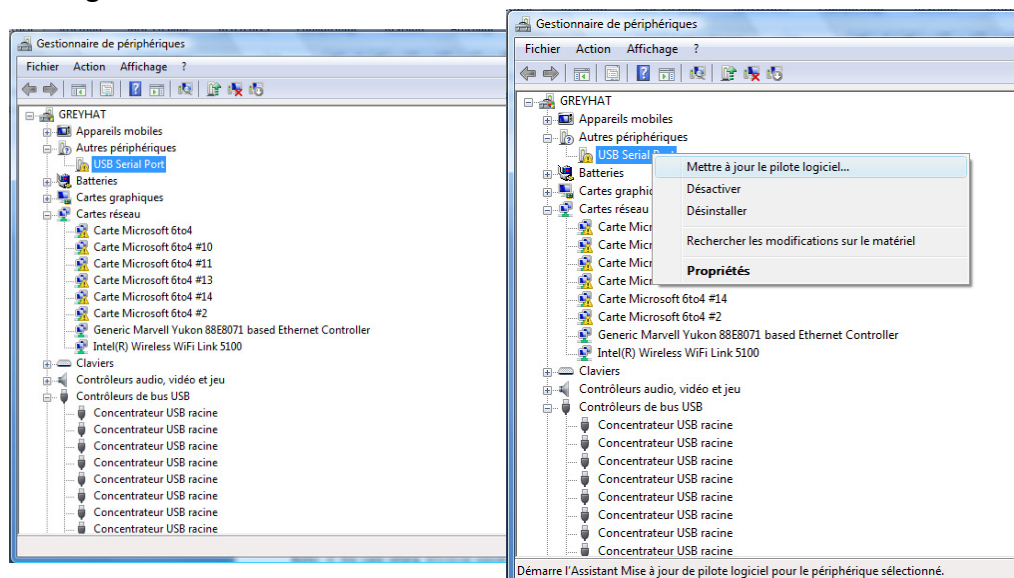
**Step 4b – If the “Found New Hardware Wizard” window is not launched:**

Click **Windows button** bottom left of your desk, then **control panel** in the right row. This window appears:



Select **Device Manager**, then click right on **USB Serial Port**:

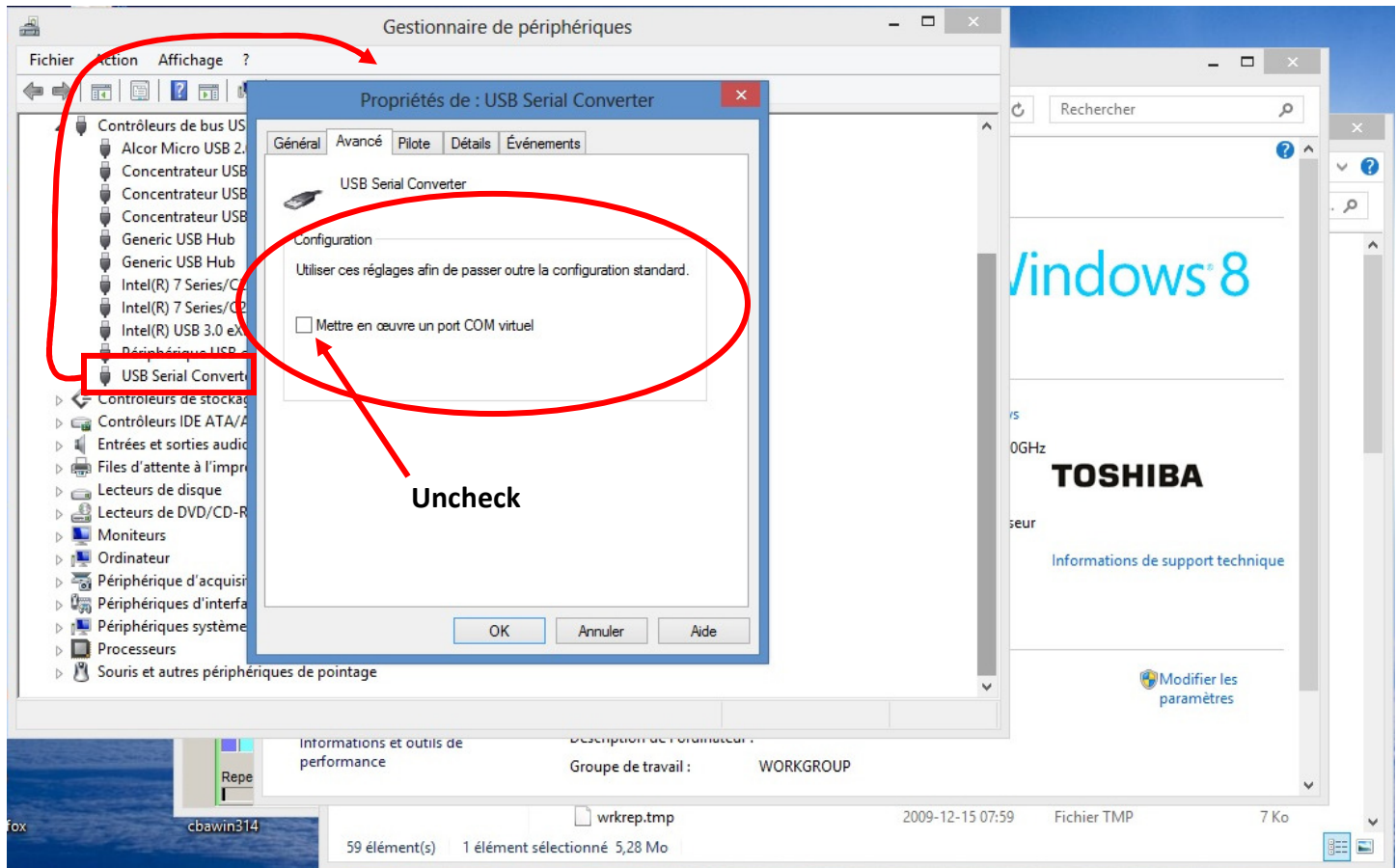
Choose to **Update Driver**, and then **Search for a driver on my computer** and then click **Browse**. In the **OpenZEN** folder, go into the **USB** folder and go into the folder **CDM 2.08.02...** finally click **OK**.



### Step 4c – Windows 7 and 8 notice

To make sure that you will not run into problems with the driver, it is better to deactivate a feature of the driver, the virtual COM port which is not necessary for our application.

Go into the device manager (as seen in previous page) and locate your device under the USB branch. Double-click on it and go into the **Advanced** tab.



**Uncheck** the Virtual COM Port configuration so that only a USB driver will be seen by Windows.

Disconnect and reconnect your USB cable, you should now only see the driver under the USB Controller branch.

### **Step 4d - In case of a problem during the driver installation**

If the driver installation fails, you will need to re-install it from the “**Device Manager**” of Windows, located in the systems properties.

To get to the device manager:

- Go into the **control panel** of Windows.
- Double-click on the icon “**System**”.
- Go into the tab “**Hardware**”.
- Click on the button “**Device manager**”.

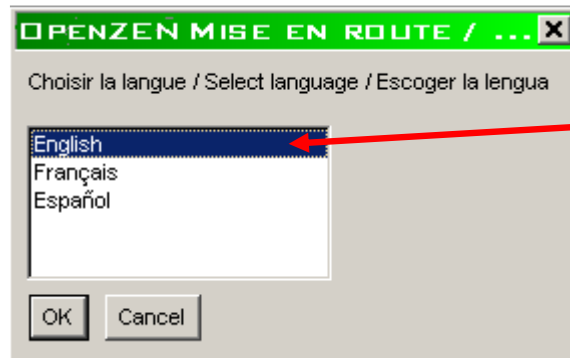
Now find the USB device under “**USB bus controller**”. Then, all you have to do is right click on the new device and choose uninstall.

Now you can repeat **step 4a** one more time.

## STEP 5 – STARTING WITH THE SOFTWARE

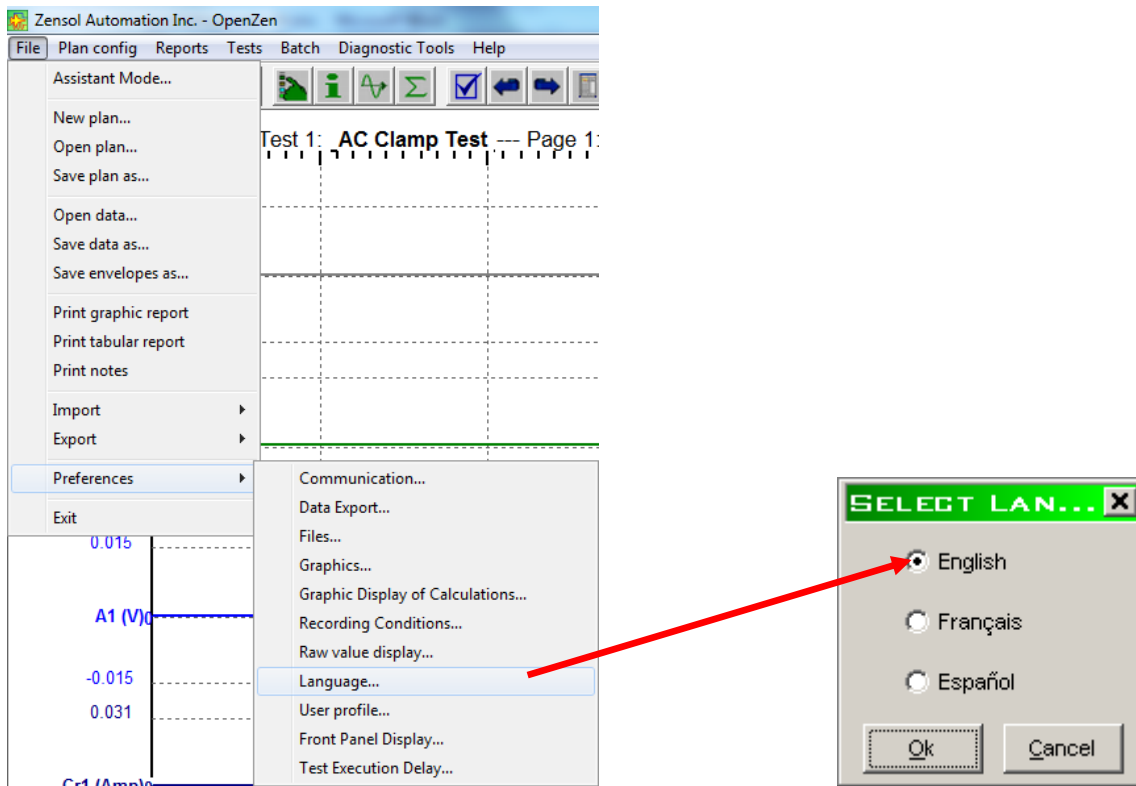
### Step 5a –Language configuration

Run the executable file **OpenZEN-TAP.EXE** (or file of latest version). The first time it is run, you will be prompted to choose for the default language:



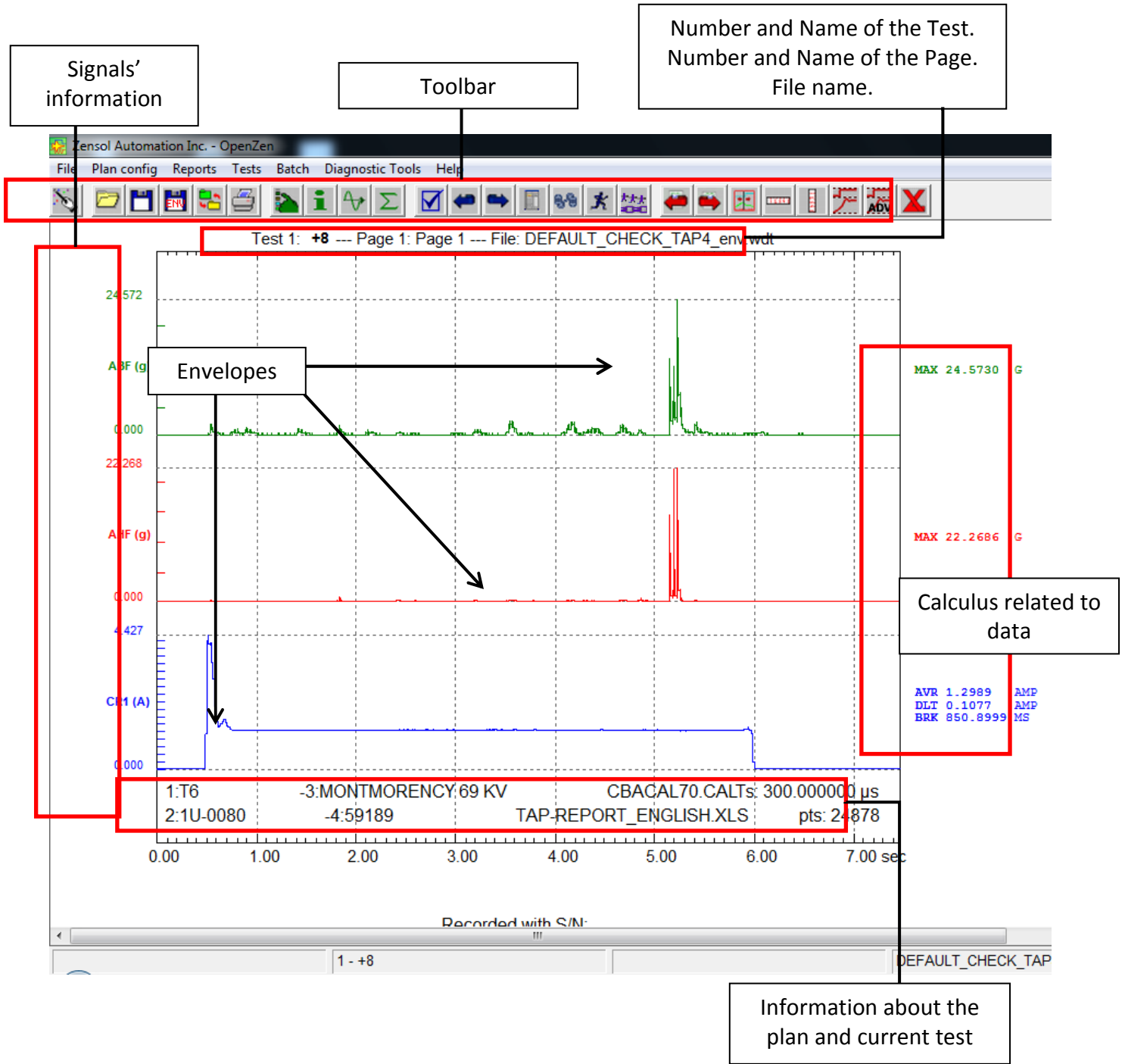
Select "**English**" and click **OK**. The software will now start.

To change the language at a later time, in the menu, go to **File**→**Preferences**→**Language** to open the language selection window:





Step 5b – Main window

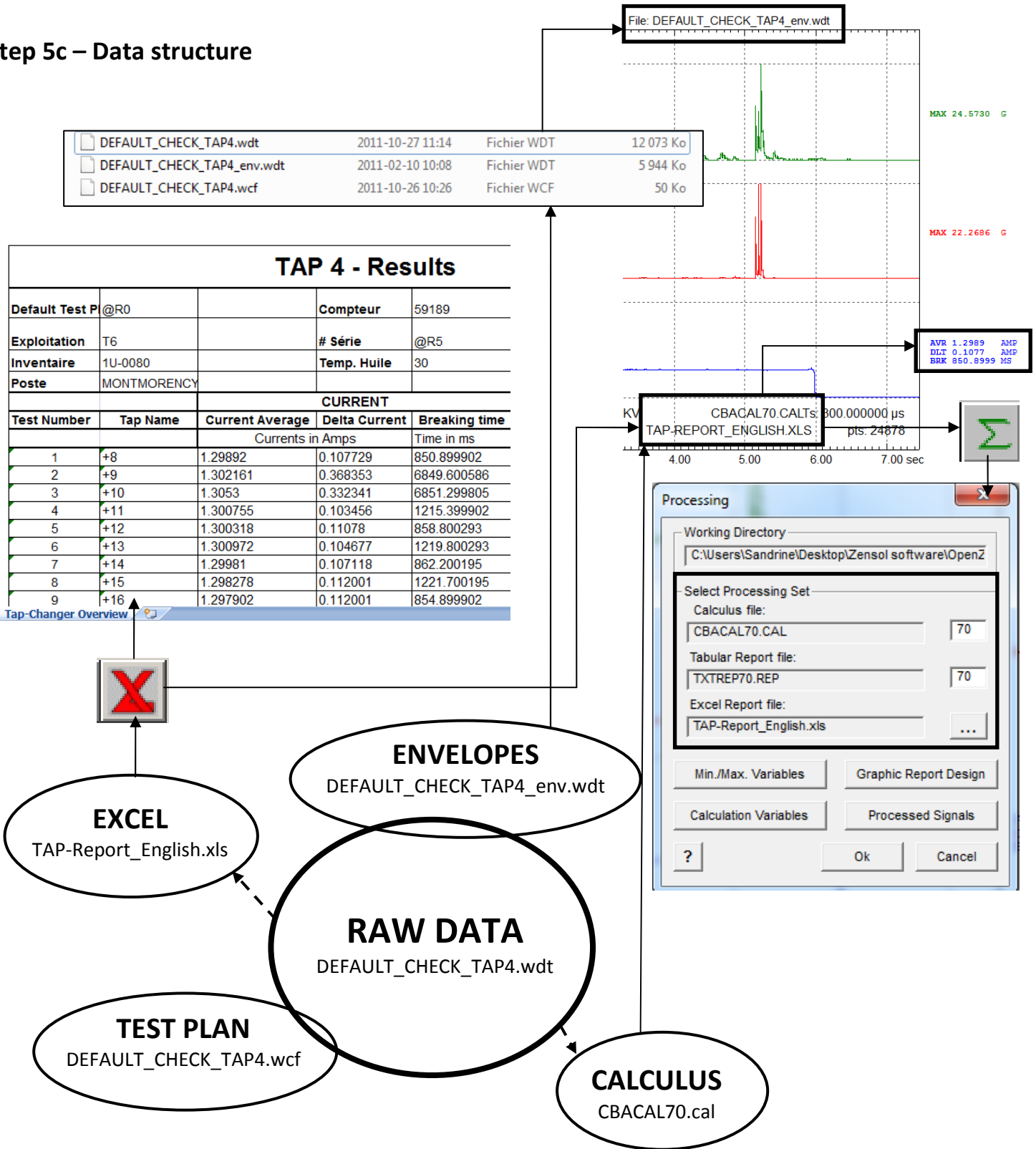


**Toolbar:**

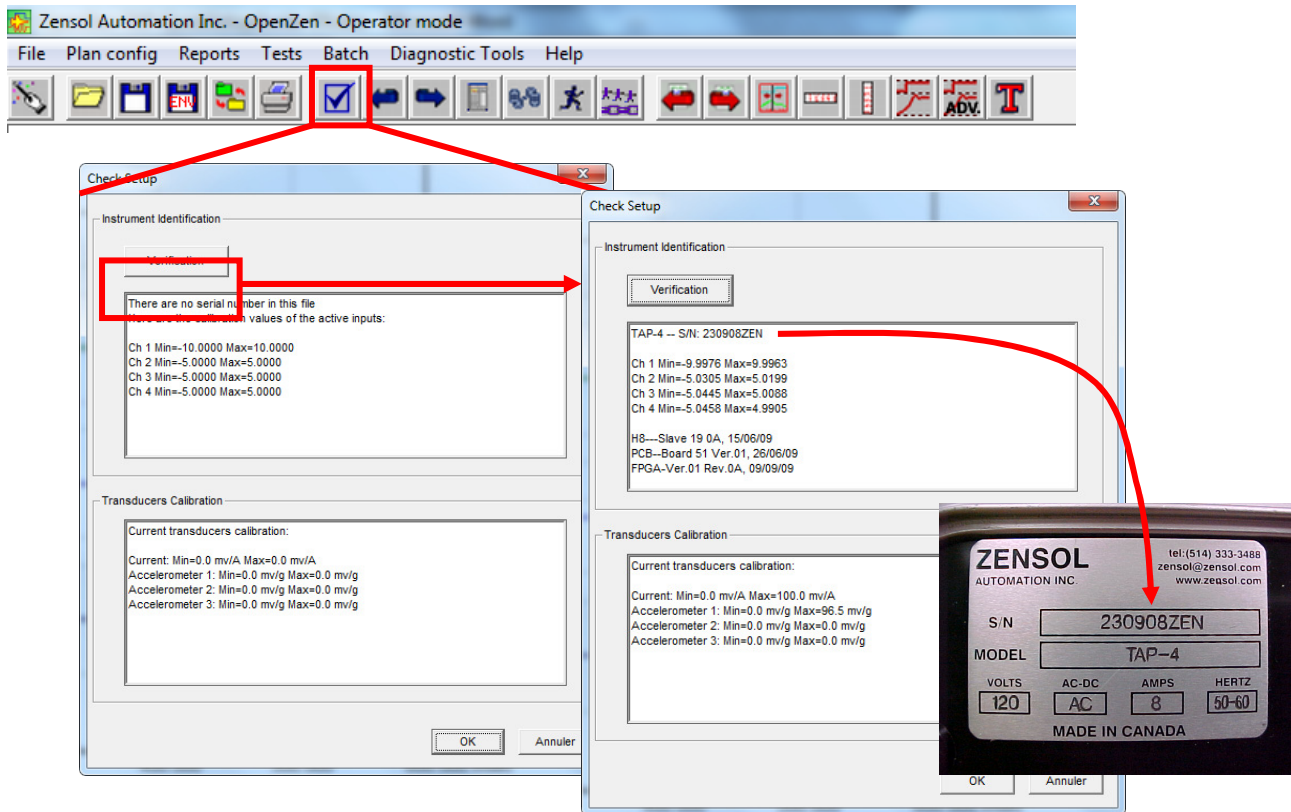


| Files manipulation |                                  | Test plan configuration |                    | In the field executions |                           | Data analysis tools |                                |
|--------------------|----------------------------------|-------------------------|--------------------|-------------------------|---------------------------|---------------------|--------------------------------|
|                    | Assistant mode                   |                         | Test configuration |                         | Check setup               |                     | Previous graphic page          |
|                    | Open plan                        |                         | Informations       |                         | Previous Test             |                     | Next graphic page              |
|                    | Save raw data only               |                         | Analog inputs      |                         | Next Test                 |                     | Examine time/amplitude         |
|                    | Save Hydro-Quebec envelopes only |                         | Processing         |                         | Connections information / |                     | Expand timing scale            |
|                    | Export                           |                         |                    |                         | Test link                 |                     | Vertical scale                 |
|                    | Print displayed report           |                         |                    |                         | Execute test              |                     | Graphic report design          |
|                    |                                  |                         |                    |                         | Execute batch test        |                     | Advanced graphic report design |
|                    |                                  |                         |                    |                         |                           |                     | Export to excel                |

Step 5c – Data structure

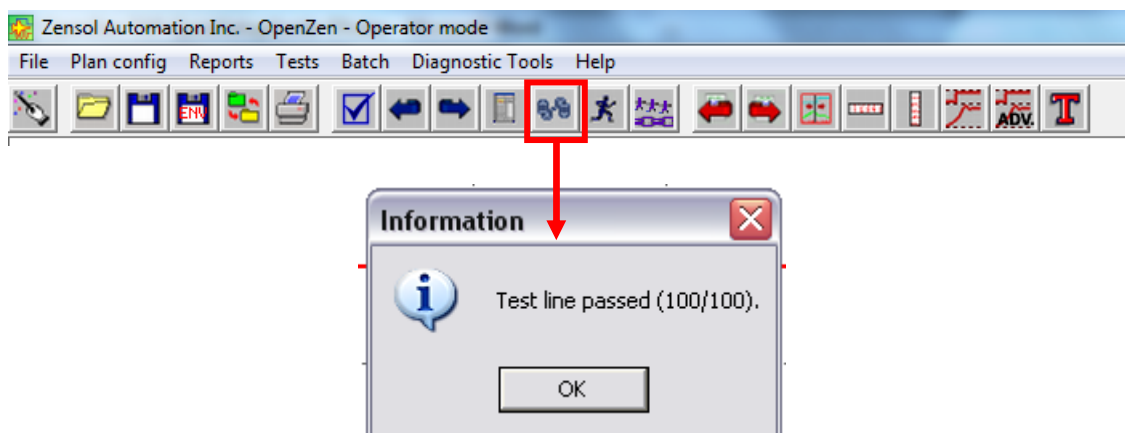


### Step 5d – Calibration checkup



Once the “Verification” button is pressed, the software connects to your instrument, reads the calibration data and applies it to your test plan. It has to be done every time you open a new blank test plan.

### Step 5e - Testing the communication



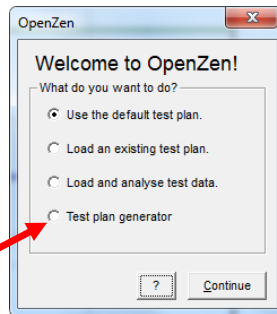


## Step 5f – Creating a new test plan

In the button bar, click on the **Assistant mode** icon.

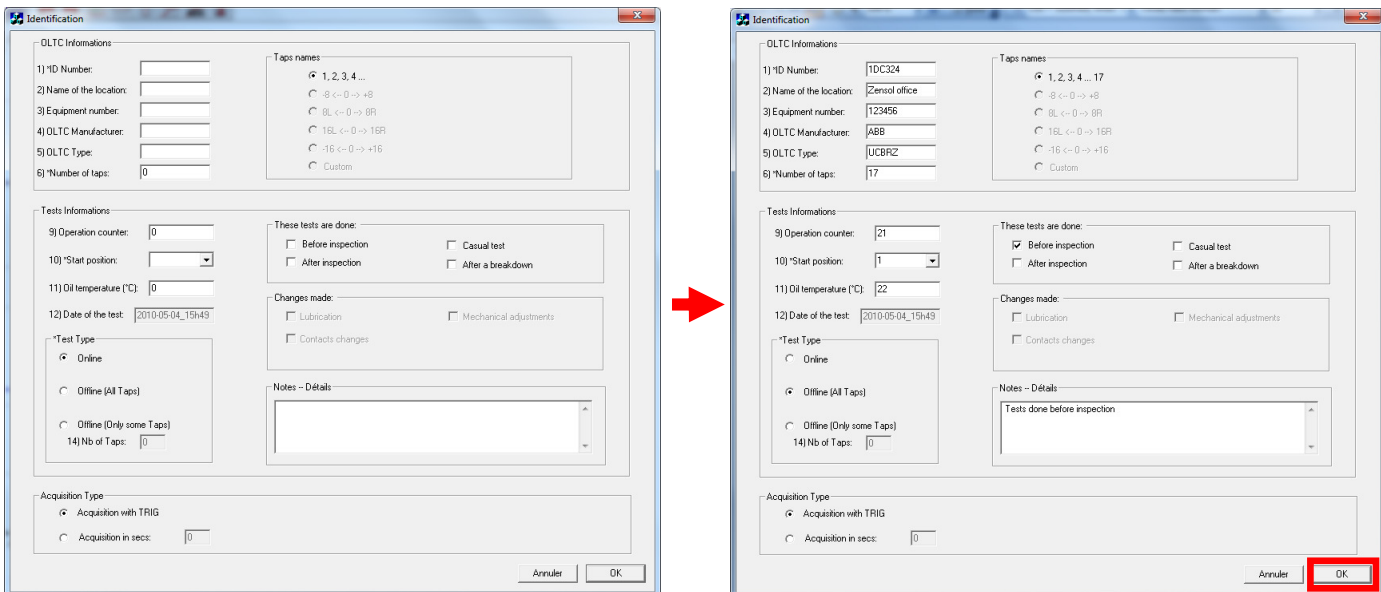


A welcome window will appear asking you what you want to do:



Select the test plan generator and click “continue”.

In this screen, you can write down all the necessary information about your tests. If you fill out every box, it will be easier for you to retrace this test in the following years.



When you will click on “OK” the software will then create the appropriate test plan according to your input.

## Step 5g – Analog inputs configuration

- **Current input**

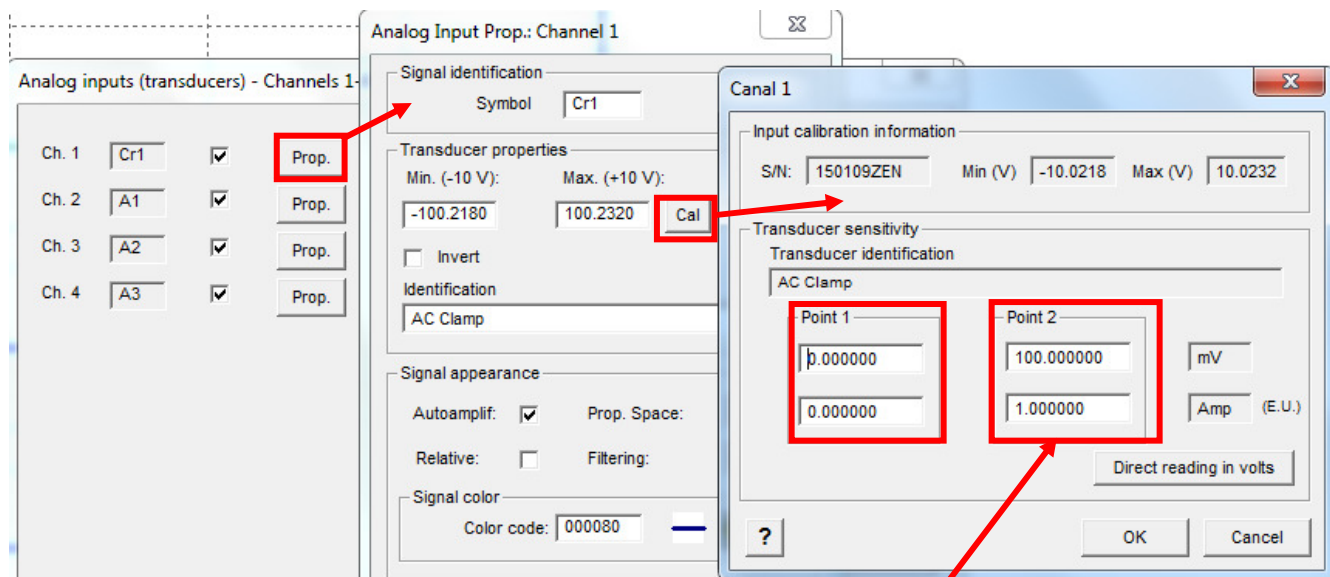
When you open a test plan, it probably has default analog values. Once you have verified the calibration in the previous step, you can scale this calibration to the real values you measure. A good habit to have is to save the test plan once our calibration data is entered, so that you won't have to do it twice.

In the properties of input #1, click on the « Cal » button and the enter the desired values into the textboxes.



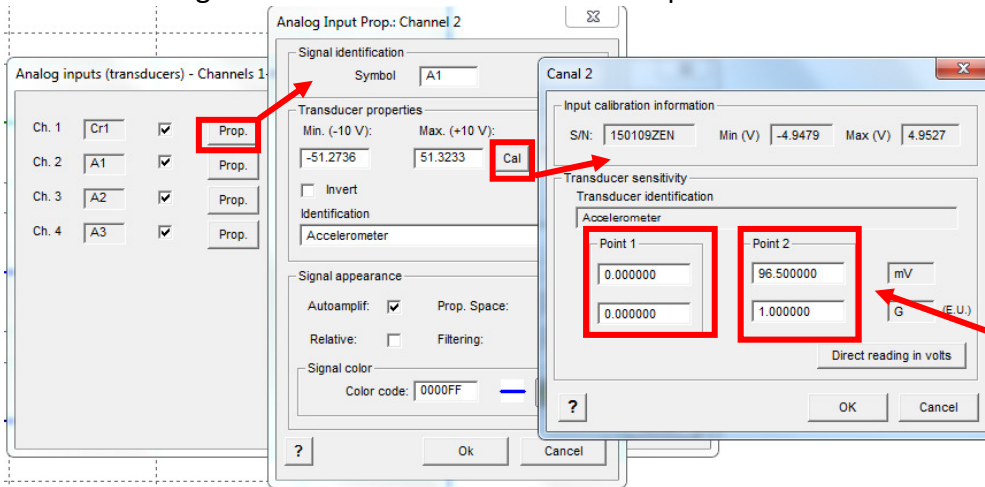
For  
this  
AC

current clamp, set on the 20A range, I would enter 100mV for 1 amp.

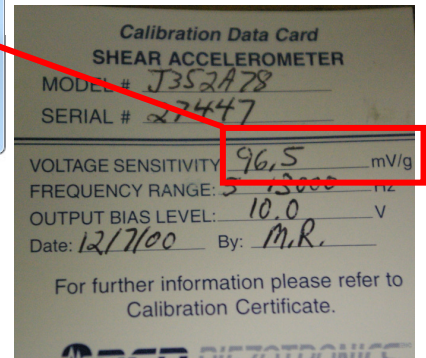


- Accelerometer inputs

The same thing is done with the accelerometers inputs. The unit of measurement is in "G".

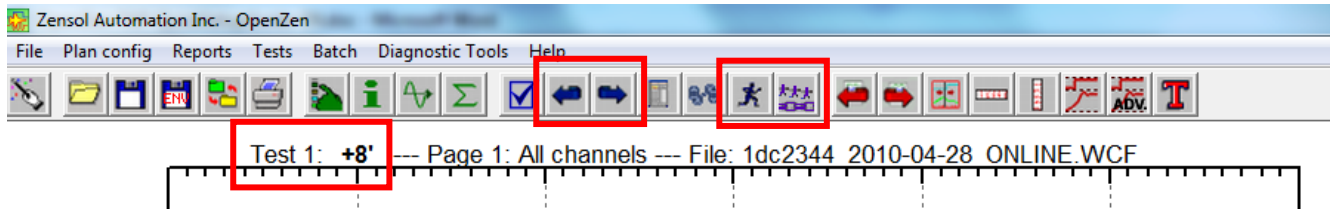


From here, you can change the name of the signal (A1) and the sensitivity of each accelerometer using the calibration card shown below.



Note: If you don't know precisely the calibration value, we recommend writing 100 mv/g for a +-50g max scale.


## Step 5h – Executing a test




You are now ready to make data acquisitions.

To launch a test, all you need to do is to click on the icon . In the shown example, the test launched would be +8'.

If you have configured your tests with the TRIG, once the test is launched, you can change taps on your tap changer when you see the “Measure” LED light up on the front panel of the TAP-4.

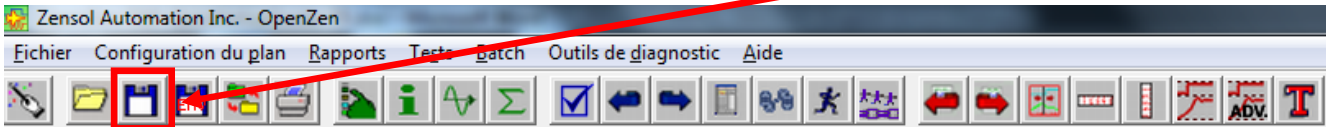
Then, you can simply change tests with the blue arrows and click again on this icon .

Once you will be used with the testing sequence, you can use the batch button . It can execute all the tests automatically while you only have to change taps when the hardware is ready.

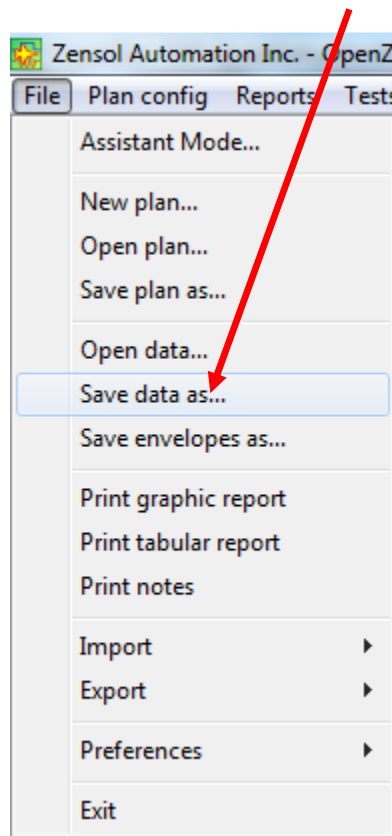



## Step 5i – Saving the tests

To save your data once all your tests are complete, click on the **Save** button in the main window's button bar:



It is also possible via the menu under **File→Save Data as...:**

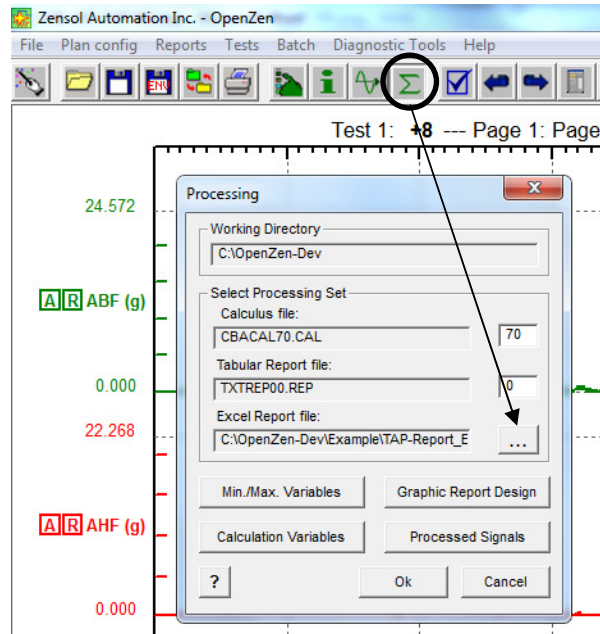


To save only the envelopes (smaller files), you only have to choose the option “**Save envelopes as...**” or use the icon 

**Tip:** after each test, save the current test (keeping the same file name). This way, you will be sure not to lose any precious data if an unexpected problem occurs.

### Step 5j – Excel export example

1. Load the file “ABB UCBRN\_env.wdt” that is located in the folder \examples\ of OpenZen-TAP.
2. In the window “Processing”, load the excel report that you want as shown below:



3. Click on the last red button to do the export.



4. Excel file specified in the processing window is automatically filled with results.

#### FICHIER EXCEL VIDE

1st page

| Test Summary - TAP-4      |         |      |                             |                                     |
|---------------------------|---------|------|-----------------------------|-------------------------------------|
| @LR0                      | @LR1    | @LR2 | @LR3                        | @LR4                                |
| @LR1                      | @LR5    | @LR6 | @LR7                        | @LR8                                |
| Length Summary            |         |      |                             |                                     |
| Average operation length: | #DIV/0! | ms   | Total number of operations: | 0                                   |
| Fastest operation:        | #N/A    | 0    | ms                          | Operations 30% faster then average: |
| Slowest operation:        | #N/A    | 0    | ms                          | Operations 30% slower then average: |
| Current average Summary   |         |      |                             |                                     |
| Current Average:          | #DIV/0! | Amp  | Total number of operations: | 0                                   |
| Lowest current:           | #N/A    | 0.00 | Amp                         | Currents 30% lower then average:    |
| Highest current:          | #N/A    | 0.00 | Amp                         | Currents 30% higher then average:   |
| Inrush Summary            |         |      |                             |                                     |
| Inrush Average:           | #DIV/0! | Amp  | Total number of operations: | 0                                   |
| Lowest inrush:            | #N/A    | 0.00 | Amp                         | Inrushs 30% lower then average:     |
| Highest inrush:           | #N/A    | 0.00 | Amp                         | Inrushs 30% higher then average:    |
| End of operation Summary  |         |      |                             |                                     |

#### FICHIER DE DONNÉES EXPORTÉ

| Test Summary - TAP-4      |      |       |                             |                                     |
|---------------------------|------|-------|-----------------------------|-------------------------------------|
| @LR0                      | @LR1 | @LR2  | @LR3                        | @LR4                                |
| @LR1                      | @LR5 | @LR6  | @LR7                        | @LR8                                |
| Length Summary            |      |       |                             |                                     |
| Average operation length: | 0238 | ms    | Total number of operations: | 32                                  |
| Fastest operation:        | -2   | 8495  | ms                          | Operations 30% faster then average: |
| Slowest operation:        | +10  | 11105 | ms                          | Operations 30% slower then average: |
| Current average Summary   |      |       |                             |                                     |
| Current Average:          | 1.30 | Amp   | Total number of operations: | 32                                  |
| Lowest current:           | +3   | 1.30  | Amp                         | Currents 30% lower then average:    |
| Highest current:          | +10  | 1.31  | Amp                         | Currents 30% higher then average:   |
| Inrush Summary            |      |       |                             |                                     |
| Inrush Average:           | 4.54 | Amp   | Total number of operations: | 32                                  |
| Lowest inrush:            | +7   | 4.33  | Amp                         | Inrushs 30% lower then average:     |
| Highest inrush:           | -16  | 4.70  | Amp                         | Inrushs 30% higher then average:    |
| End of operation Summary  |      |       |                             |                                     |

Exemple: “@R1” sera remplacé par “T6”

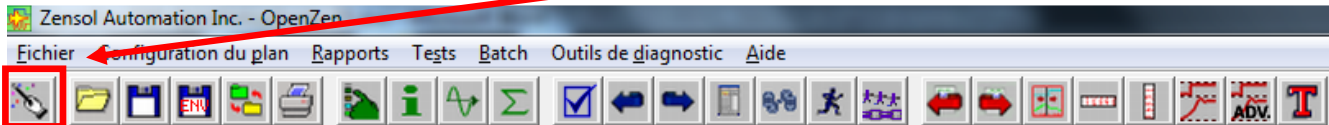
**Note:** If you need a customized TAP model, contact us and we will be glad to help you.

## STEP 6 – TEST PLAN EXAMPLE: CHECK\_TAP.wcf

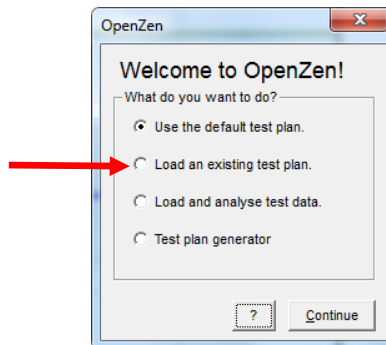
### Hardware Verification Tests

-Use this test plan if you want to verify your hardware before real tests.

In the main window's button bar, click the **Assistant Mode** button



The welcome window will appear, asking what you want to do:



Select "Load an existing test plan" and click **Continue**.

In the file open dialog, select the test plan "**CHECK\_TAP.wcf**".

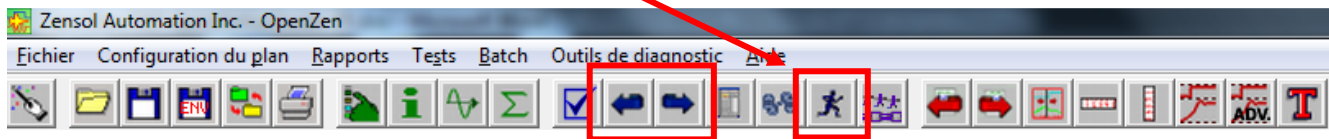
### Requirements for this test plan:

- TAP-4
- AC/DC Clamp with BNC cable.
- Accelerometer with BNC cable.

## How to use this plan:

The test plan has only 4 activated tests. They all verify one input at the time.

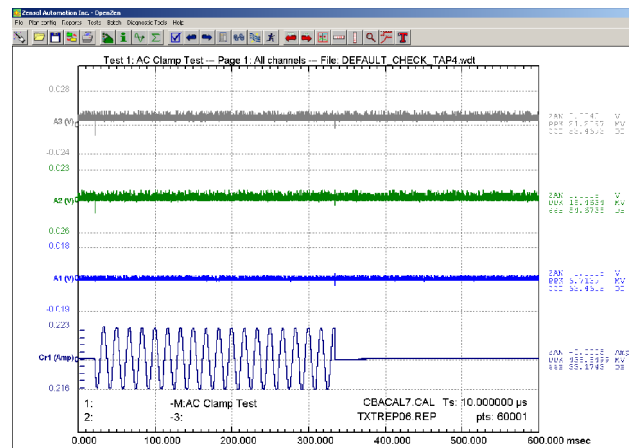
To execute the tests, click the **Execute Test** button. To change tests, use the **blue arrows**:



### Test 1– AC Clamp Test.

Plug a small wire between the two “Current” connectors. The AC clamp must pass through the wire and be plugged in the input #1, as seen in the image below.

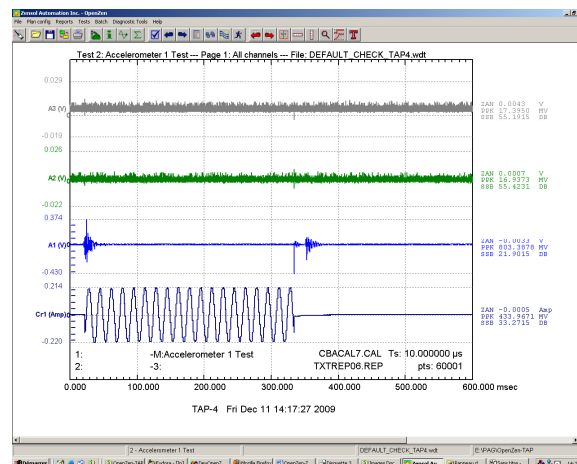
You are now ready to execute the test.



### Test 2, 3 and 4 – Accelerometer Tests.

Screw an accelerometer to the chassis of the TAP-4 to the designated area. Then, plug the accelerometer cable into the corresponding input you want to test.

You are now ready to execute the test.



STEP 7 – SYMBOLIC CIRCUIT DIAGRAM

