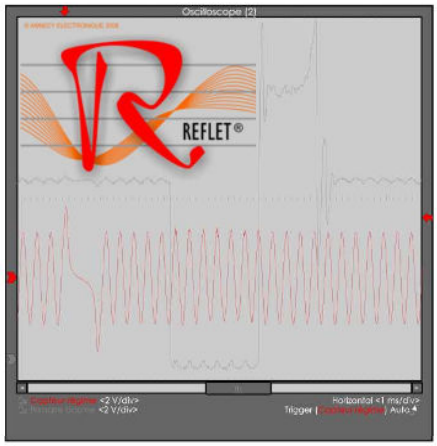
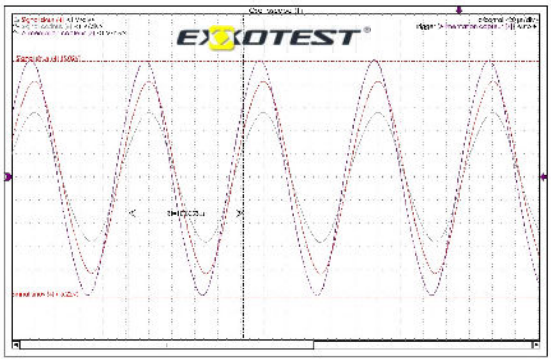
EXXOTEST EDUCATION

Vehicle training equipment





USER'S GUIDE FOR REFLET8

Measurement acquisition software

CONTENT

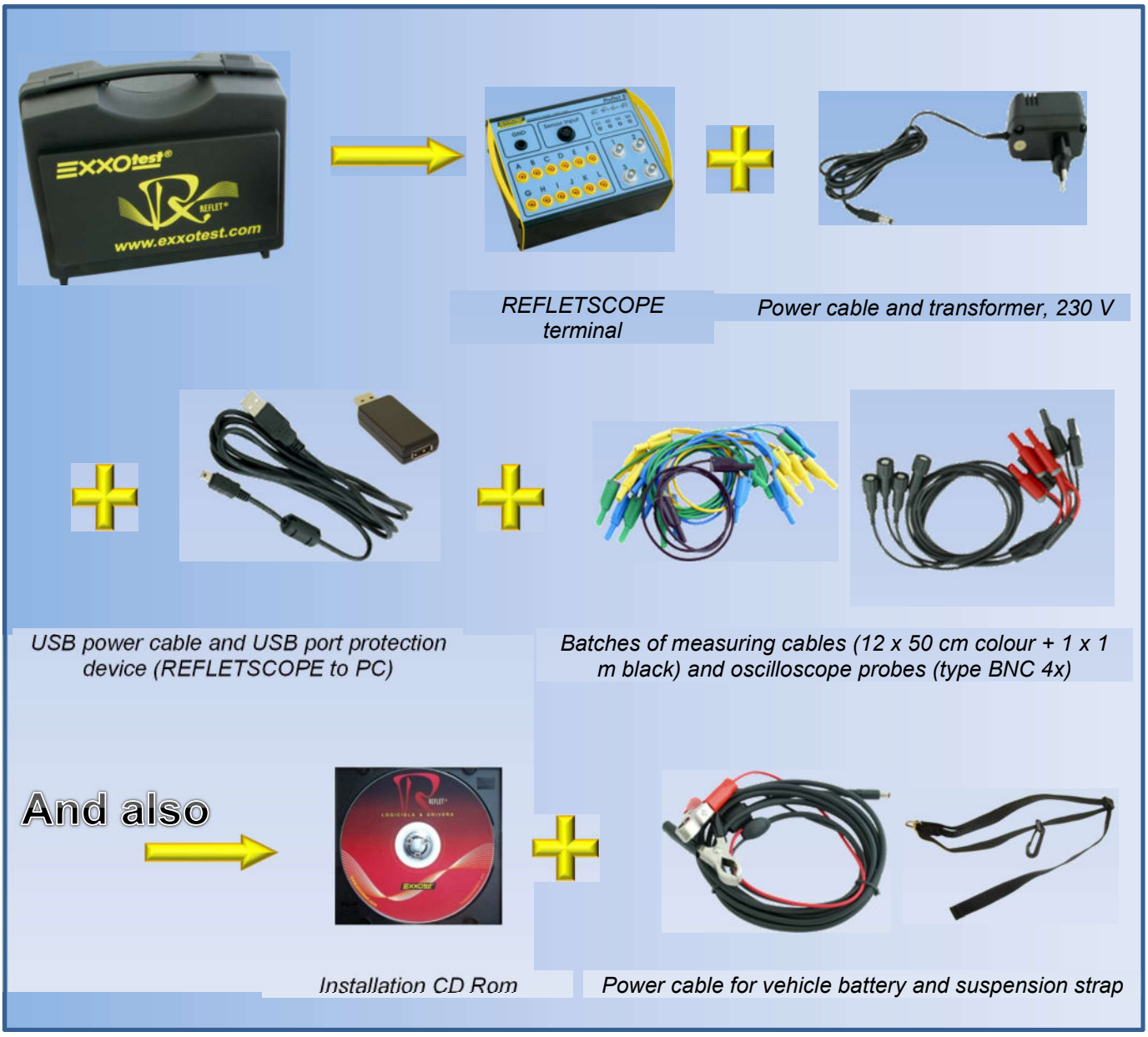
INTRODUCTION

Purpose of the document

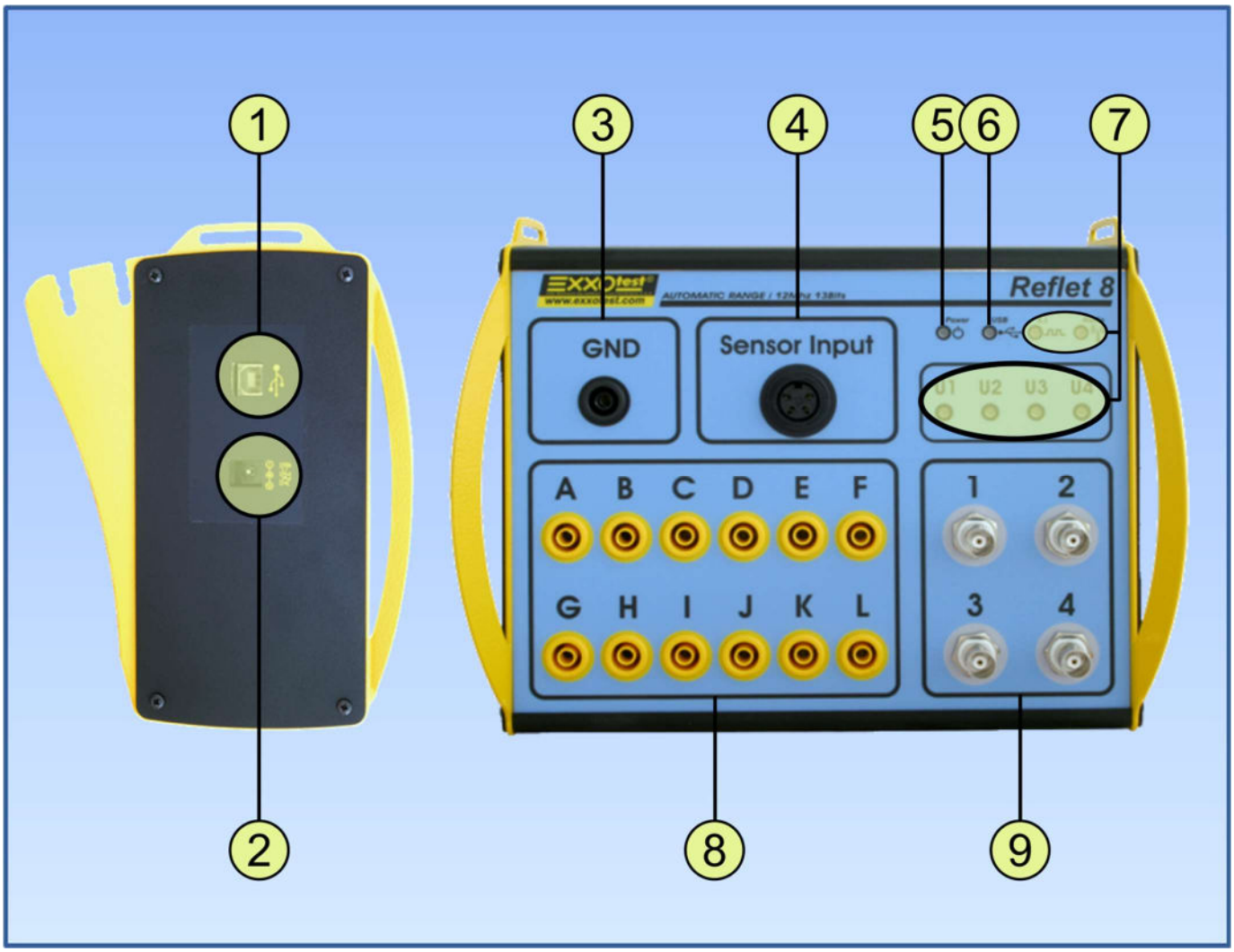
This manual provides the explanations required to install and use the REFLET and EXXOGRAPH software. No licences are required for these two complementary software applications. They can therefore be installed indifferently on all workstations, as required.

Content of the REFLET assembly

The kit includes the following:



Description of the REFLETSCOPE interface

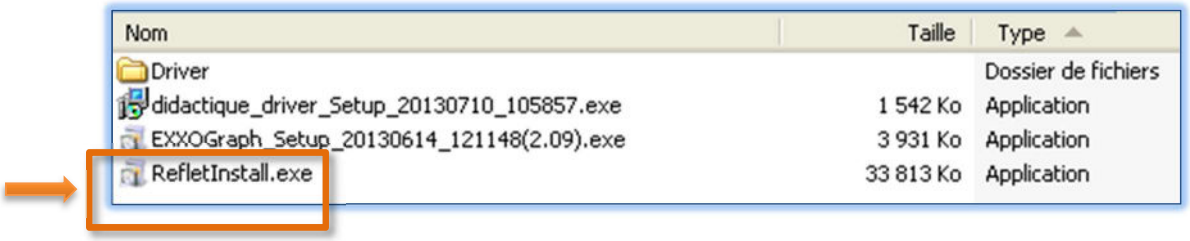


ID no.	Functions
1	USB port (for the link to the PC)
2	Power plug (mains 230 V or battery)
3	Measuring ground shared with the REFLETSCOPE terminal
4	"*Sensor"* entrance (not used)
5	Power LED: lit = power on (mains 230V or battery)
6	USB LED: lit = communication with the PC
7	LED not currently used
8	Analogue or digital measuring inputs (12 independent channels)
9	Oscilloscope measuring inputs (4 channels)

INSTALLING OR UPDATING REFLET

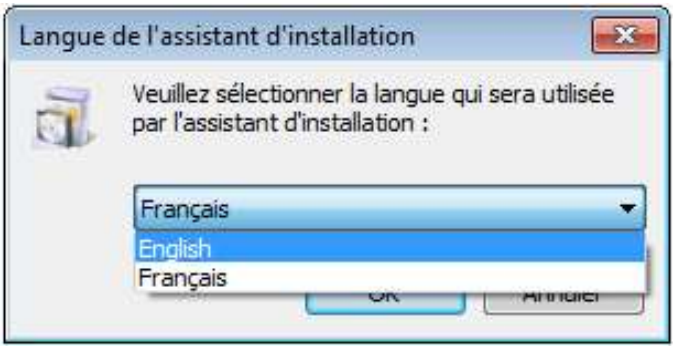
Installing the REFLET software

You must execute the 'RefletInstall.exe' application from the CD-ROM provided or using the version downloaded to your customer space on the site www.exxotest.com:



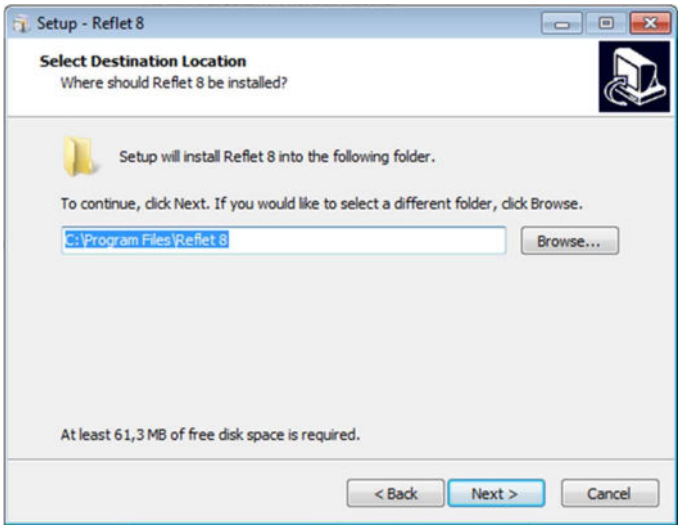
Installation/updating phases will then be executed as follows:

1. Select the language for the installation assistant:
Click on OK

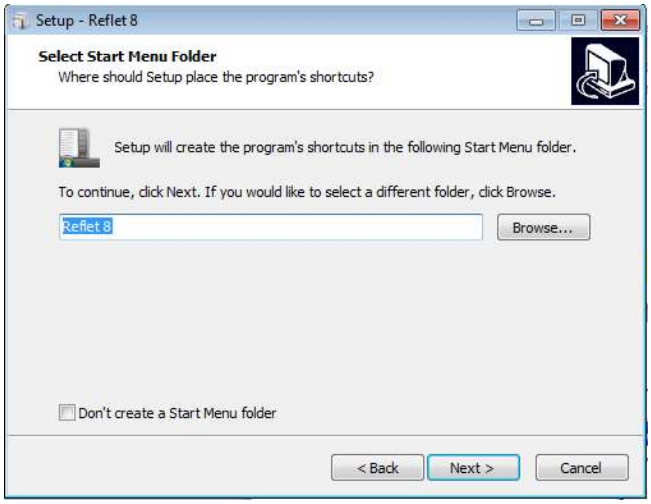


2. Homepage for the installation assistant:
Click on Next

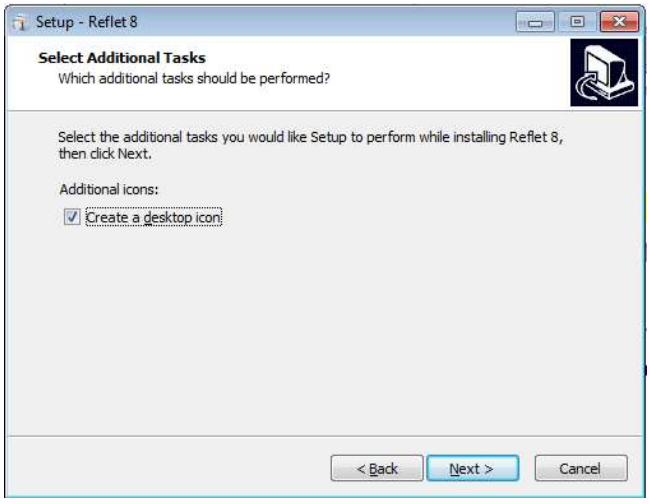
3. Select the installation folder for REFLET:
Click on Next



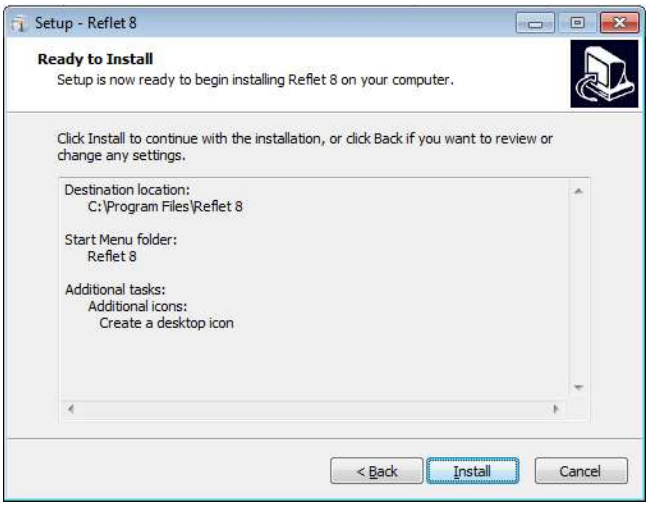
4. Select the folder in the start menu:
Click on Next



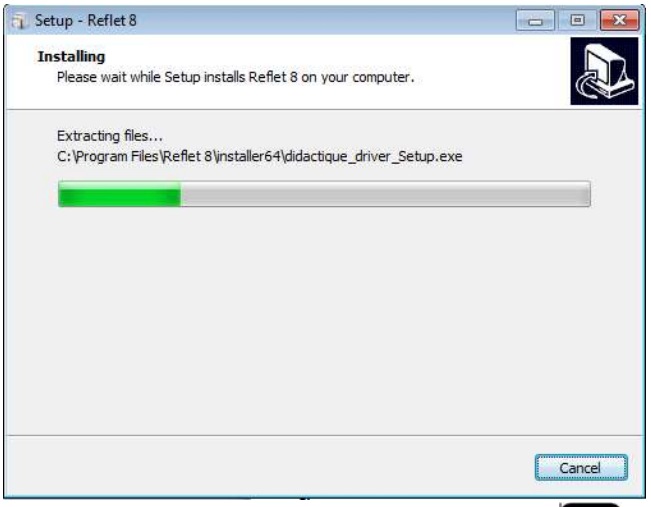
5. Create a shortcut on the desktop:
Click on Next



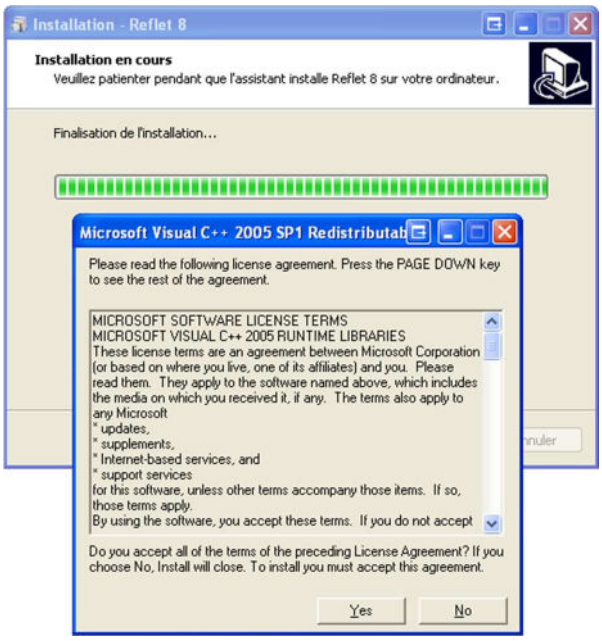
6. Installation ready to start:
Click on Install



7. Installation in progress:
Wait for a few seconds…

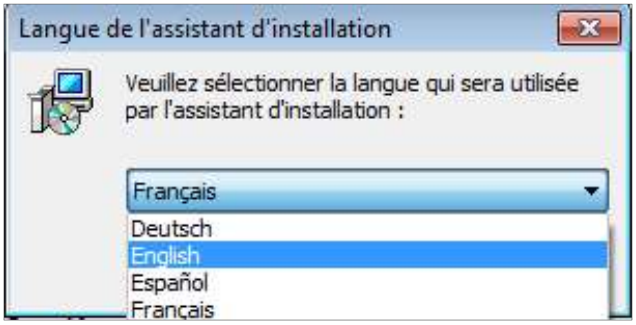


8. Accept the installation of the C++ module:
Click on Yes



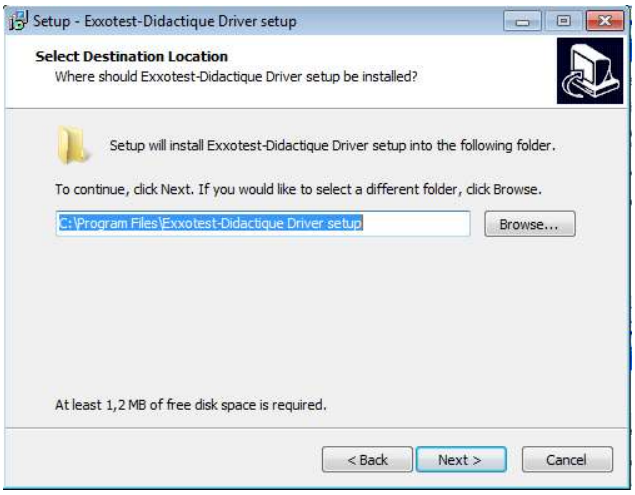
Installing the driver for the EXXOTEST peripherals

9. Select the language for the installation assistant:
Click on OK

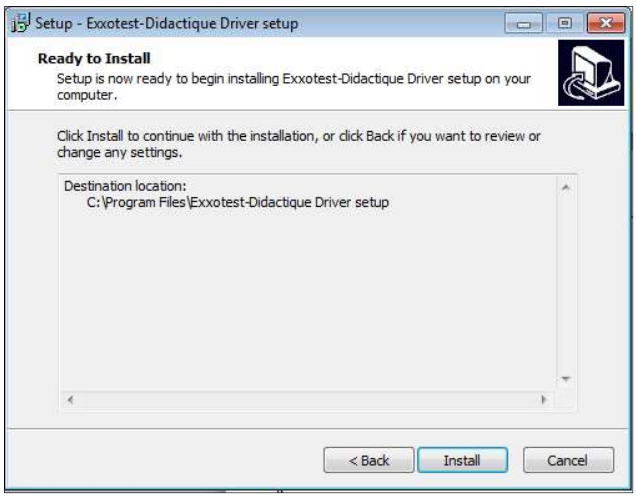


10. Homepage for the installation assistant:
Click on Next

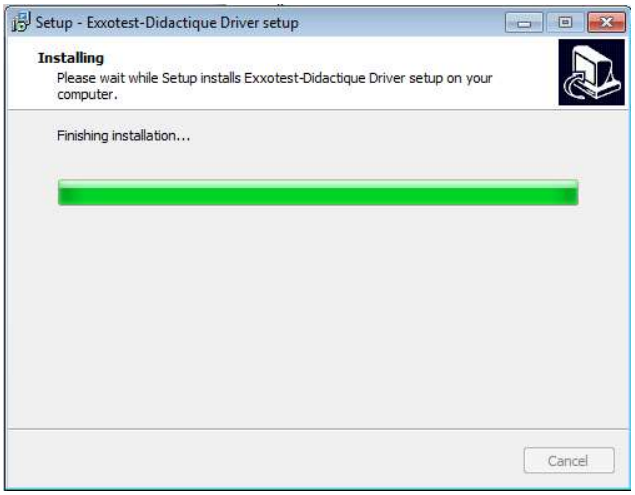
11. Select the folder in which to install the driver:
Click on Next



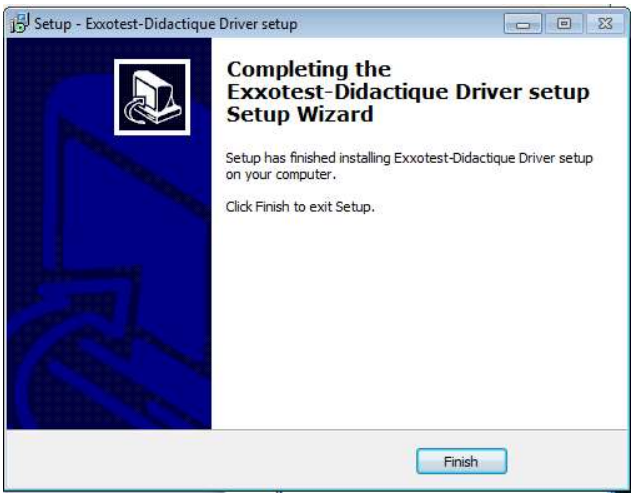
12. Installation ready to start:
Click on Install



13. Installation in progress:
Wait for a few seconds…



14. Installation complete:
Click on End

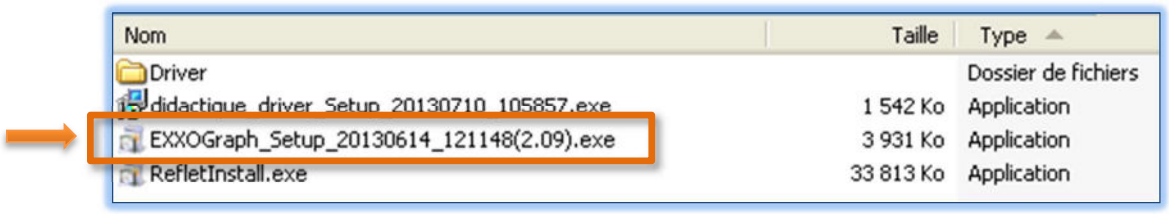


15. REFLET and its driver have been installed
Click on OK, then End.

16. You may need to restart the PC in order to integrate the new driver.
17. You are also recommended to install EXXOGRAPH now (next phases).

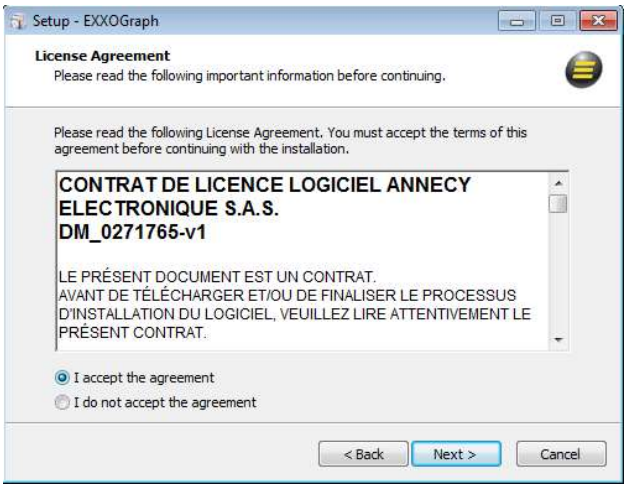
Installing the EXXOGRAPH software

You must execute the application 'EXXOGraph_Setup_-----.exe' from the CD-ROM provided or using the version downloaded to your customer space on the site [www.exxotest.com:](http://www.exxotest.com)



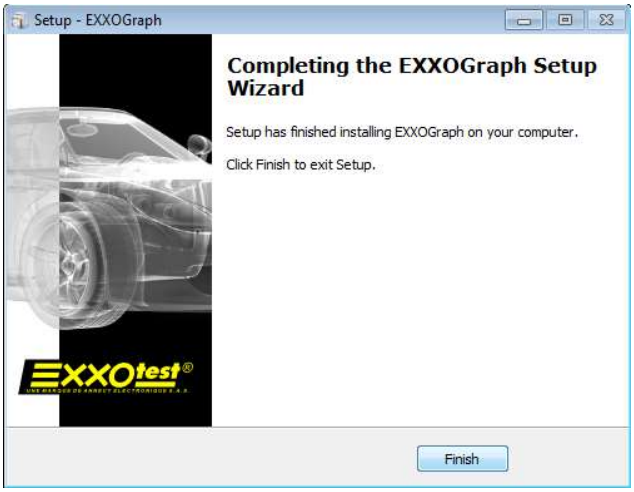
18. The welcome page will open after you have selected your installation language. *Click on Next*

19. You must then accept the licensing contract: *Check the line '…I accept…' and click on Next*



20. You will then come to the "Destination folder", "Start menu", "Create desktop icon", phases, … *Click on Next and then Install and finally End.*

21. Details on how to use EXXOGRAPH can be found later in this document



Updating of the REFLET software

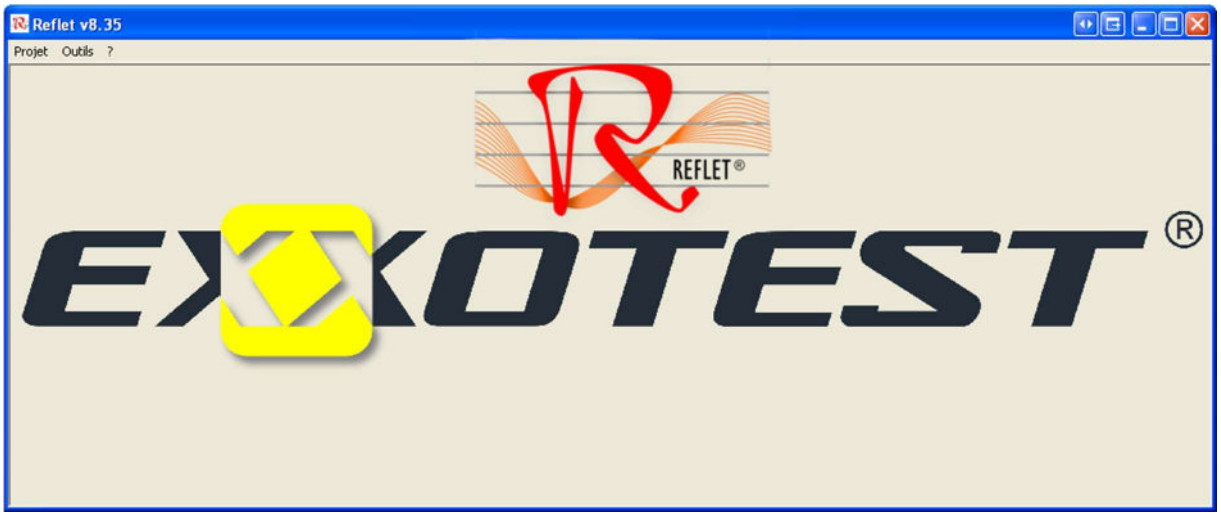
When you open REFLET, an icon will appear on the welcome page which you can use to access software updates (the PC must be connected to the Internet).

If you wish to update the software, choose the “Reflet update” link. When prompted by the assistant, click on "Yes".

In case when you ever have a last version, the message “Your software is up to date” will appear.

If not, you must disconnect any peripherals connected to the PC. And follow the onscreen instructions for an easy updating.

Opt for "Installing the REFLET software" (previous pages) at the "select language" phase, then the following phases are identical to initial installation.



USING THE REFLET SOFTWARE

The REFLET homepage will appear when the software is launched

After having double-clicked on the REFLET icon (created on the desktop of your computer during the installation process), the application will start and the welcome page will open:

A 'project' must be created for all of the measurements taken by REFLET. The first 2 icons can be used to create and manage these products.

Recently created projects will appear in this area (empty to start with).

When updating the software and configuring preferences (Internet access is required to benefit from updates).

Launch of the EXXOGRAPH application. This application can be used to create graphs for a REFLET reading.

Check (or uncheck) this box if you wish to display (or not display) this page when the software opens.

Use this icon to quit the application.

Note: if you did not create a REFLET icon on your desktop, when installing the application, you can open the software using:

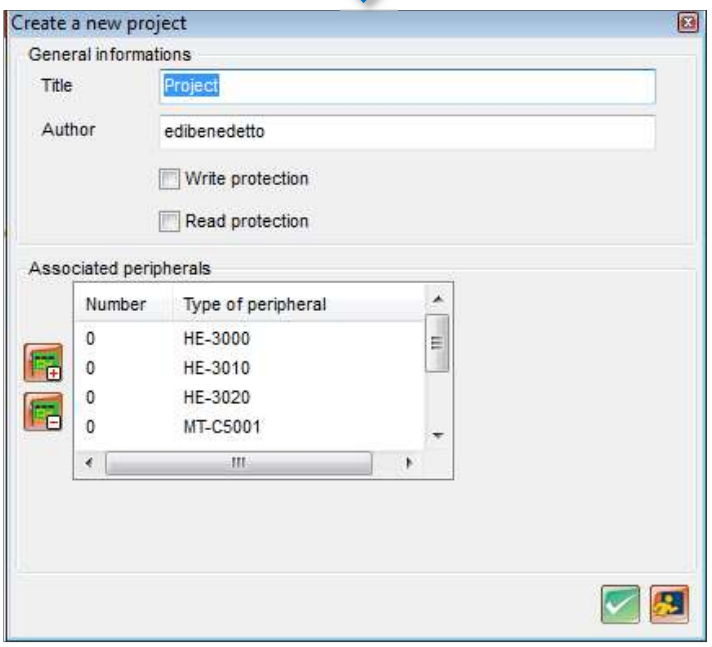
Start -> All programs -> Exxotest -> Reflet 8 -> Reflet 8.

Creating a new project

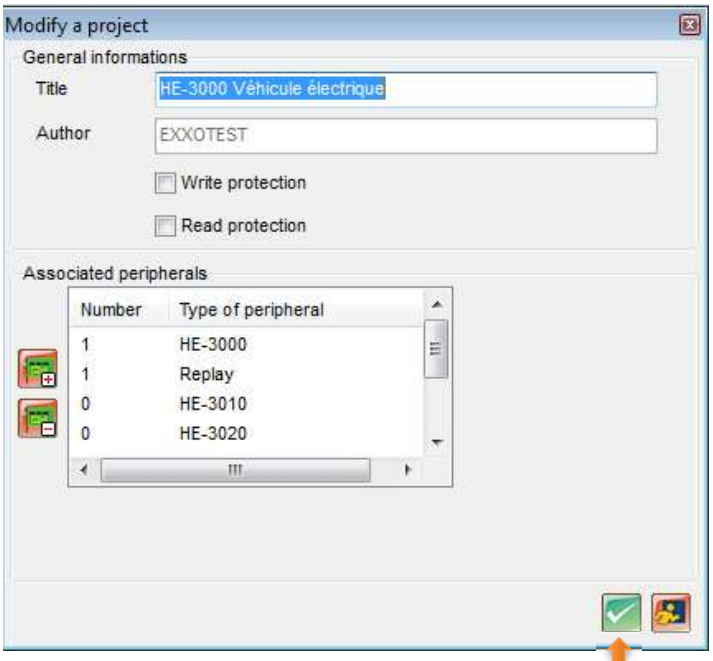
After selecting the "Create a new project" icon, a dialogue window will open asking you to enter a title for your measuring page and specify the name of the author.

You can also use this window to protect your project with a password (this option can later be activated or de-activated, make sure you remember your selected password!).

The REFLETSCOPE terminal and the Replay function will be selected in the "Associated peripherals" section by default. After selecting a model from the list, you can add this item to your project by clicking on the 'add' icon. Use the 'remove' icon to remove the model.



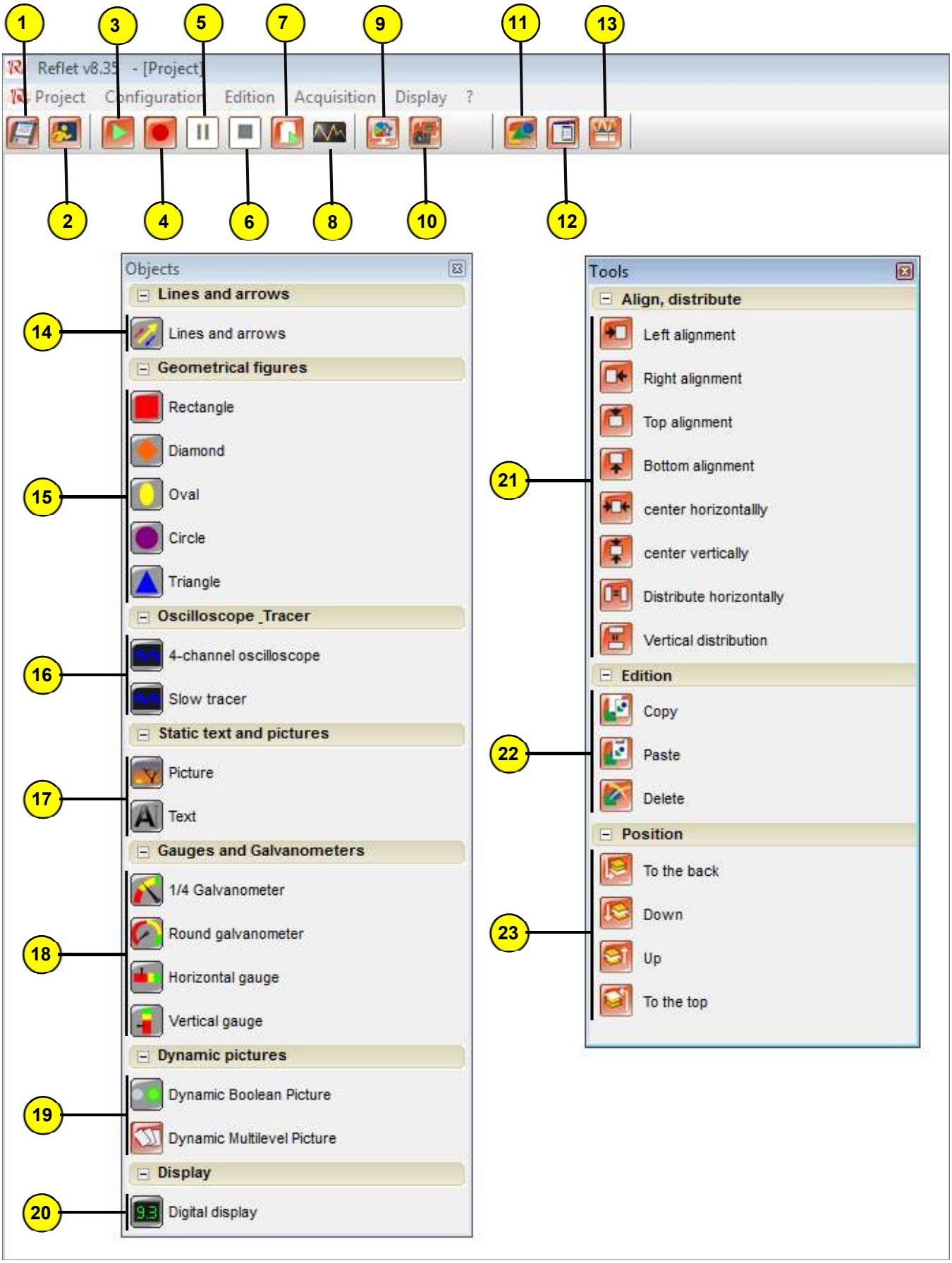
The following example shows a screen you can use to view, save and revise REFLETSCOPE signals, as well as the signals from the electrical vehicle fitted with EXXOTEST, HE-3000.



⚠ The selected models, and the REFLETSCOPE, must be connected to a USB port on your computer in view of dialogue with the software.

After naming the project and selecting the associated peripheral(s), simply click on the green icon. The newly created project will open on a blank page (see next page).

'New project' page



Presentation of the REFLET toolbar

ID no.	Function
1	Save the project in progress
2	Close the project in progress
3	Acquire measurement
4	Start saving the measurement acquisition process
5	Pause measuring
6	Stop acquisition and saving
7	Replay
8	Start *EXXOGRAPH application*
9	Configure project graphic
10	Save an image for the current page
11	Open the objects palette
12	Open the tools palette
13	Open the list of objects already used

Presentation of objects and tools palettes

ID no.	Function
14	Add a line or arrow to the measuring page
15	Add a geometric figure to the measure ng page
16	Add an oscilloscope or a marker
17	Insert a static image or text
18	Add a dial
19	Insert dynamic images
20	Add a digital display
21	Alignment and distribution tools
22	Editing tools
23	Positioning of the different planes (superposition)

OBJECT CONFIGURATION

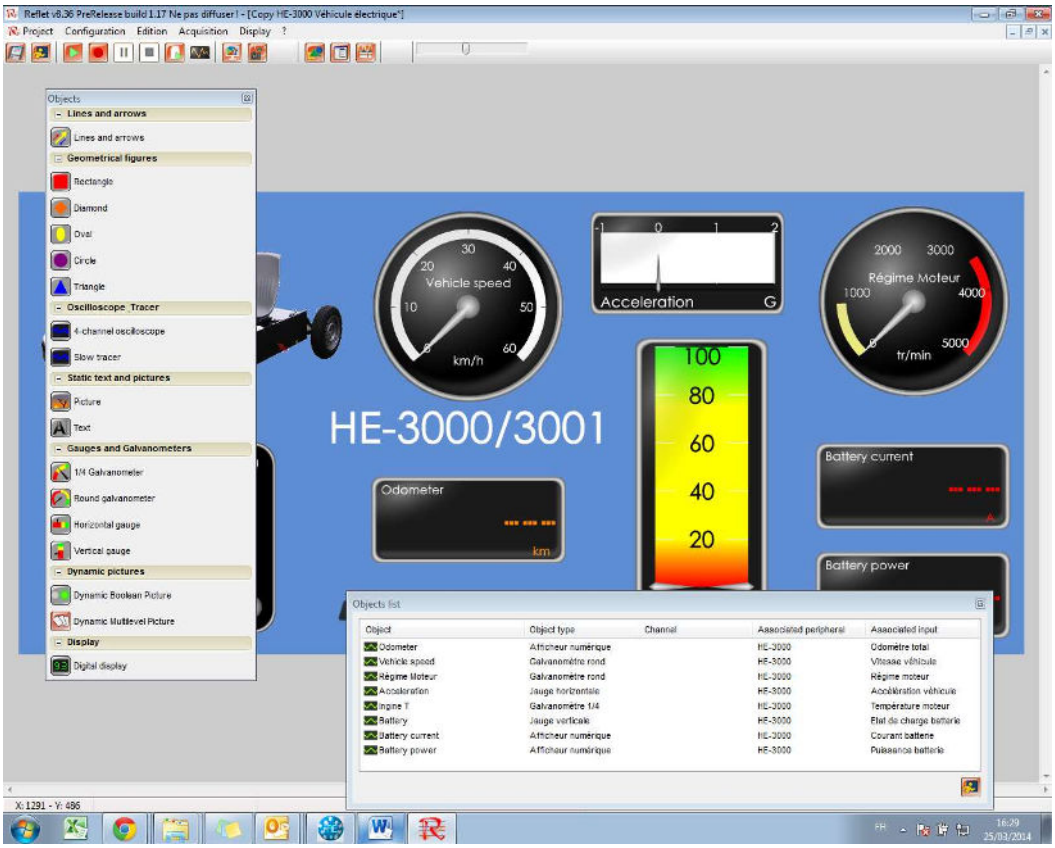
Basic principle

To use an object, simply click on the object in the palette and drag to the main page by holding the left mouse button in => *Drag and drop*.

When the objects are in the page, you can use the mouse to position them on the grid. You can also change their dimensions using the squares in the corners of the object.

Double-click on the object to open the configuration window.

✓ *Example of a screen during the creation process:*

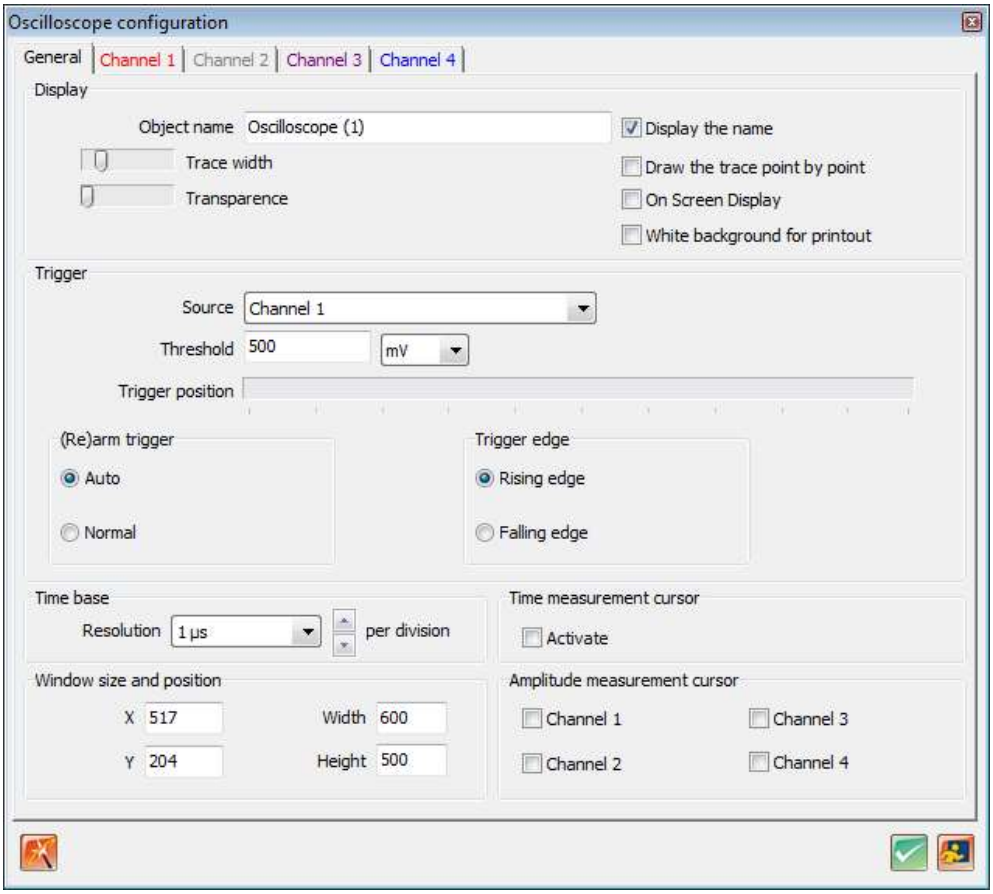


✓ *Examples of screens integrated in the software:*

You can access a series of screens created by EXXOTEST, do not hesitate to use these screens as inspiration for your own creations! You can copy these screens and then modify them as required, which is sometimes easier than starting with a blank page!

General configuration of the oscilloscope

Double-click on the "Oscilloscope" object:

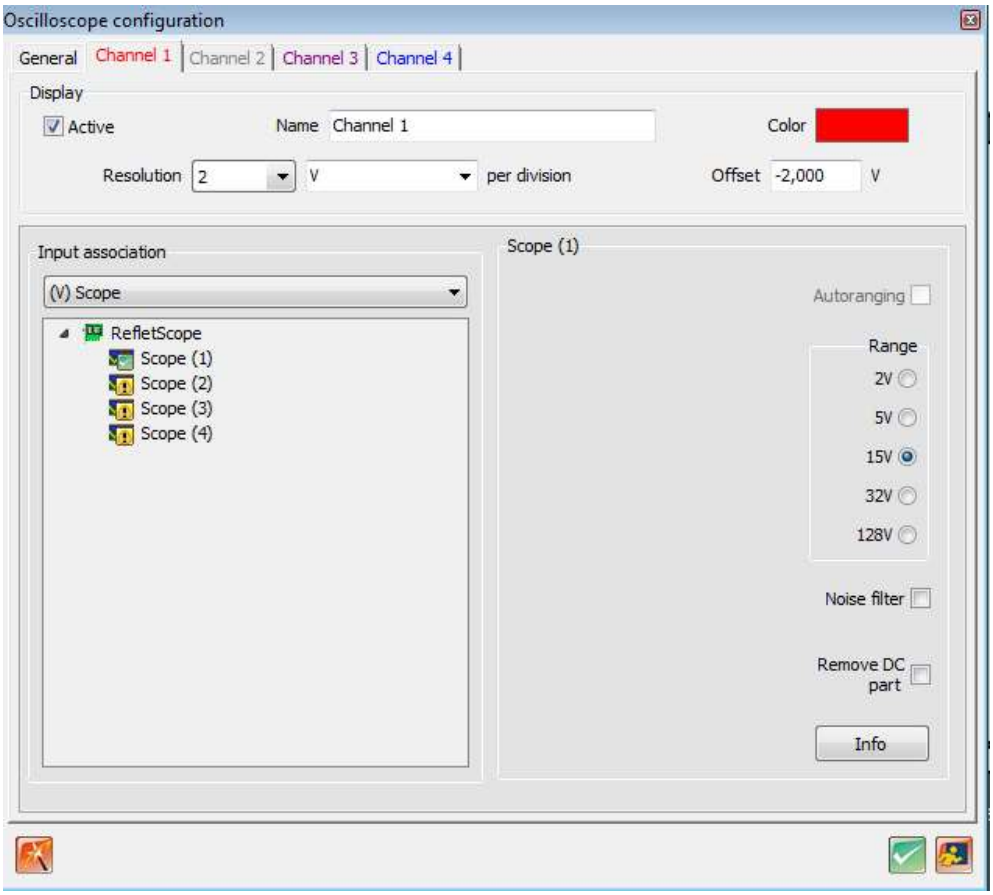


The parameters shared by the 4 available channels appear in the "General" tab. You can use this tab to:

- *Name an object, 'Oscilloscope (1)' by default, select to display (or not display) this name,*
- *Plot the graph point by point,*
- *Display general information in the oscilloscope window or outside of this window (OSD),*
- *Select a white background to simplify printing,*
- *Adjust the trigger: source and level of trigger, rising or edging edge, Normal mode (when the trigger condition is detected, the telescope will trace the curve and continue to detect new trigger conditions), Auto mode (the same operation applies, but if no trigger condition is detected, the system will define a trigger condition by default), the Trigger will stabilise the viewing of the image,*
- *Define the 'Time base' (from 1 microsecond to 5 seconds),*
- *Define 'Window size and position': these parameters can also be defined using the mouse and the oscilloscope window handles,*
- *Activate the measuring cursors: You can measure time and voltage during play, replay or a pause.*

Configuring the oscilloscope channels

The following parameters are available on the tabs for each of the 4 channels, which are all identical:



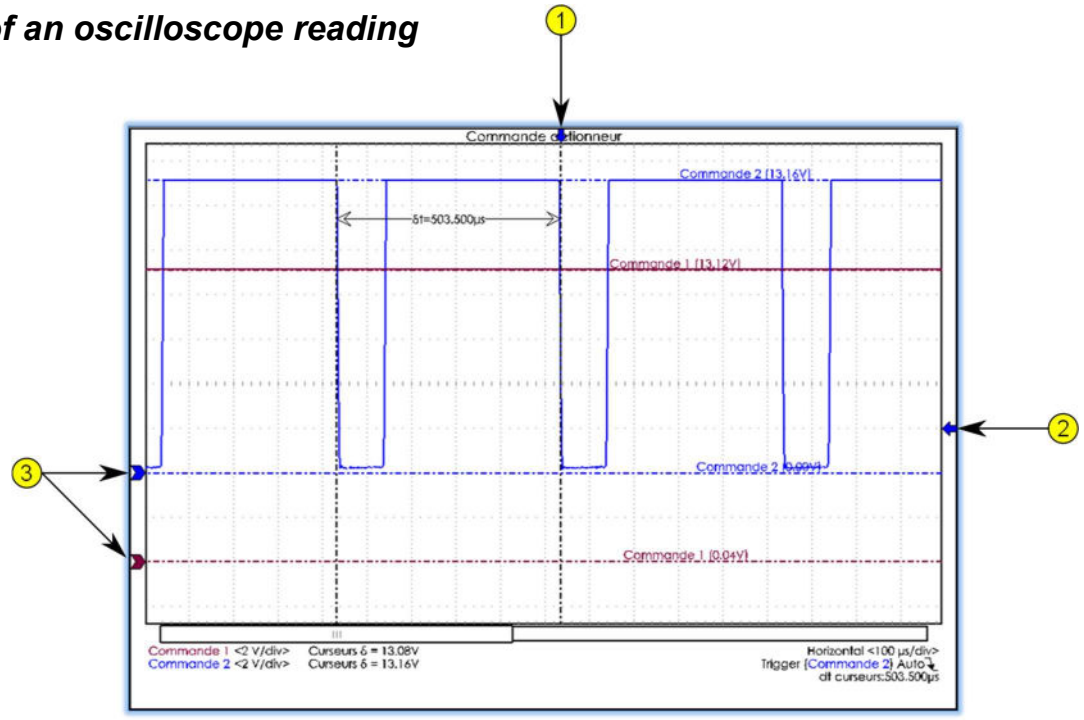
- *You can check the box to activate the channel or uncheck the box to exclude the channel (this simplifies the oscilloscope reading),*
- *You can name the voltage measured, known as 'channel 1' to 'channel 4' by default,*
- *Select the channel colour (curve and legend),*
- *Select resolution per division: scaling of resolution from 100 mV to 50V,*
- *Adjust the offset of the curve (level 0V from the centre of the oscilloscope): this represents the vertical positioning of the curve, and can also be modified using the mouse,*
- *Associate the REFLETSCOPE input with the Oscilloscope channel,*
- *Select the rating used: from 2 to 128 V,*
- *Optimise the display: add/delete a filter for "noise" (interference) and add/delete the continuous component (smoothing between the points),*
- *Delete the component: delete or retain the continuous component (smoothing between the points).*

 Apply the parameters without leaving the configuration window

 Quit the configuration window without saving the most recent changes

 Confirm the modifications and close the configuration window

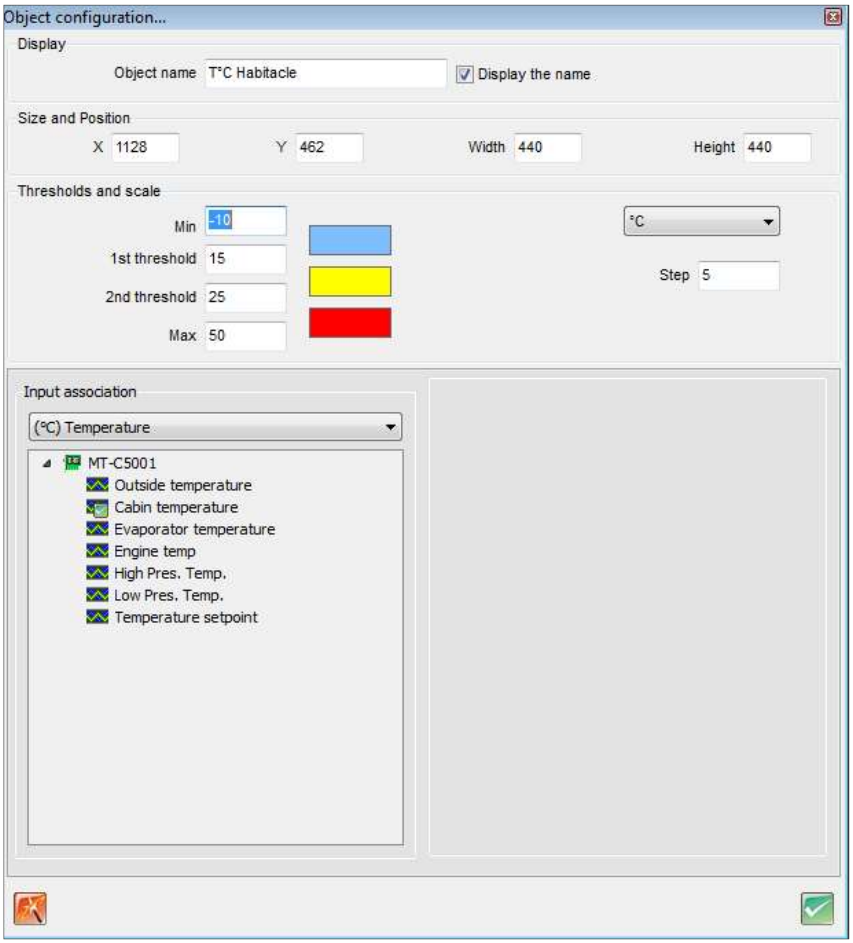
Example of an oscilloscope reading



Arrows **1** and **2** show the trigger threshold on the graphic, while the **3** arrows mark the 0 V point for each of the channels displayed.
These arrows can be moved during the acquisition process, allowing parameters to be modified without need to use the oscilloscope configuration menu.
Measuring cursors (time and amplitude) must be positioned in the same way.

Configuring a galvanometer, gauge or display

After dragging and dropping a galvanometer from the objects palette, double-click to open its configuration window:



You can use this window to:

- *Name an object, select to display (or not display) this name,*
- *Modify the size and position of the window (use the mouse to modify these parameters graphically),*
- *Define thresholds, scales and intervals (graduation legend) and the colours associated with thresholds,*

The associated inputs

Objects must systematically be associated with measuring input for the REFLETSCOPE terminal (letter from A to L and no. 1 to 4 for oscilloscope channels). Symbols are placed in front of the names of inputs to indicate their status:

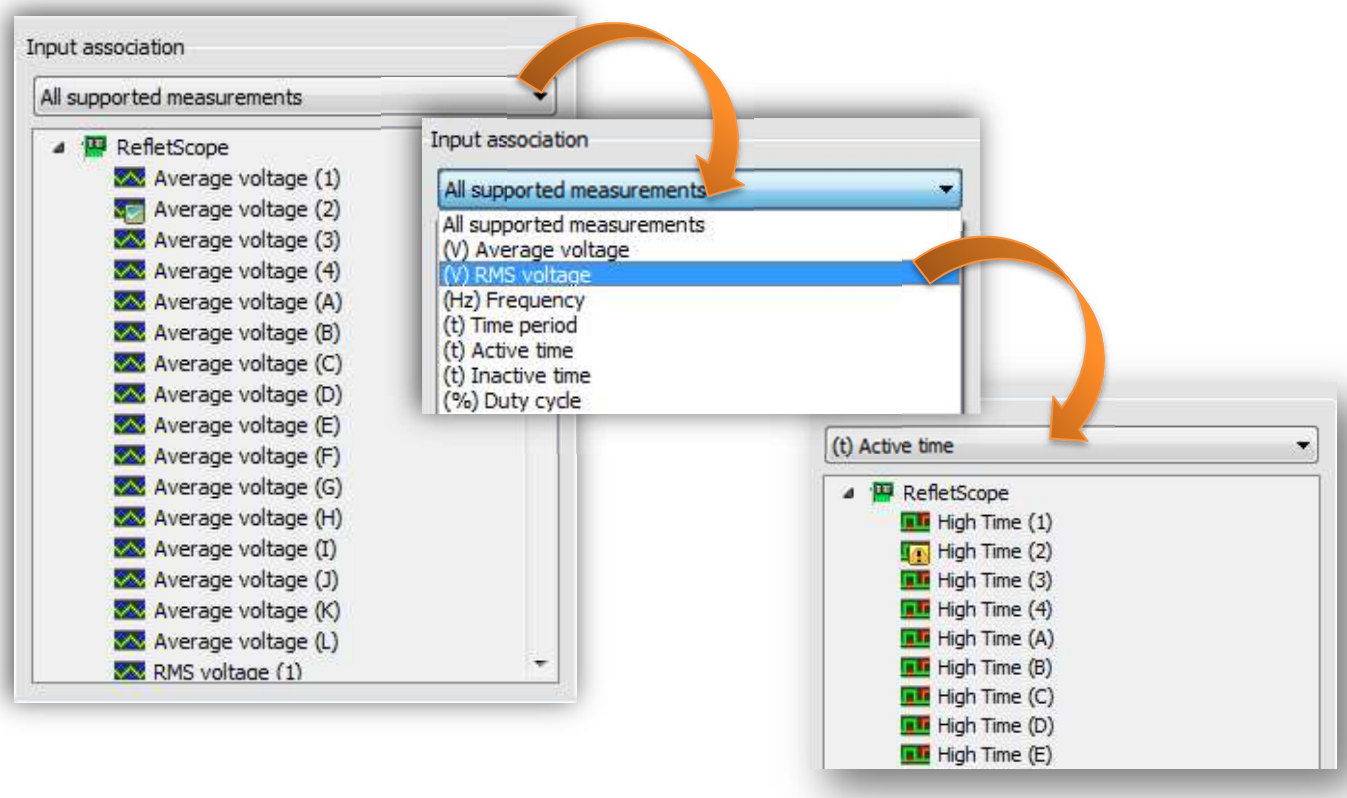

Symbol for available digital input.


Symbol for available analogue input.


This input has been associated with the object being configured (by double-clicking).


This input is already associated with another object.

<u>Note:</u> If an oscilloscope is used, inputs 1, 2, 3 and 4 will be automatically associated (channel 1, 2, 3 and 4).



You must also define the type of value measured:

Mean voltage / RMS voltage / Frequency / Period / Highest time / Lowest time / Duty cycle / Tachometer / Defined by the user / NTC thermistor.

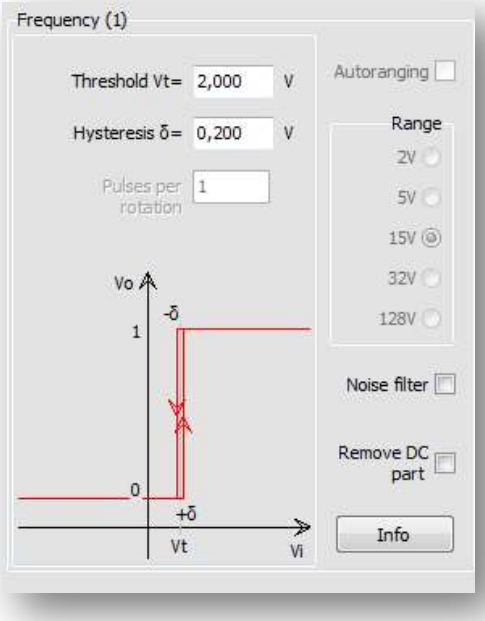
The measuring unit must also be entered for each of the possible options.

1. *Mean voltage:* Indicates mean voltage over a period of approximately 2 seconds,
2. *RMS voltage:* Indicates RMS voltage,
3. *Frequency, Period:* This function can be used to determine either the frequency or the period.

Frequencies are calculated, while periods are measured. The relationship between periods and frequencies is as follows: **f = 1/T** where ***f*** is the frequency in Hertz and **T** is the time in seconds.

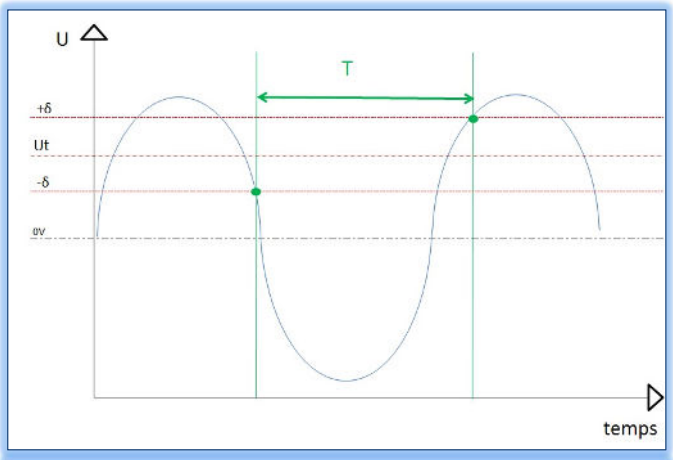
When measuring the period, Time is measured between the point when the signal crosses the threshold voltage + hysteresis up to the point when the signal crosses the voltage threshold + hysteresis for a second time.

The threshold voltage **Ut** and hysteresis **δ** must be pre-entered for this purpose:



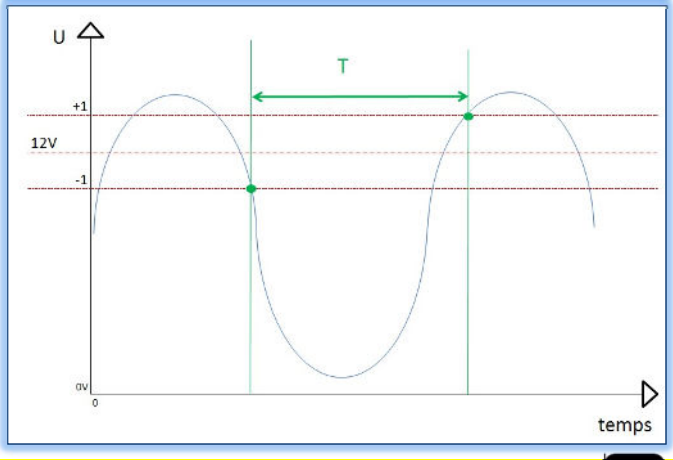
The diagram shown opposite illustrates the principle:

Period: **T**
Voltage: **U**
Threshold voltage: **Ut**
Hysteresis: **+δ** and **-δ**

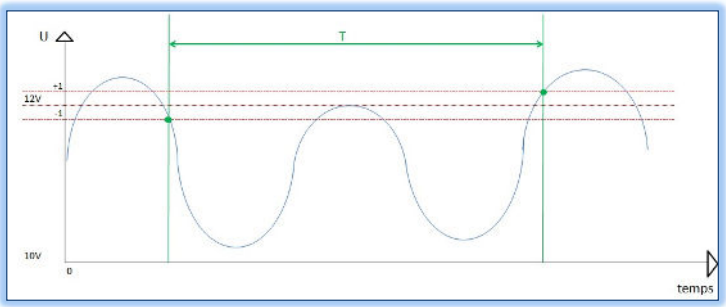


Example:

Threshold voltage **Ut = 12V**
Hysteresis **δ = 1V**

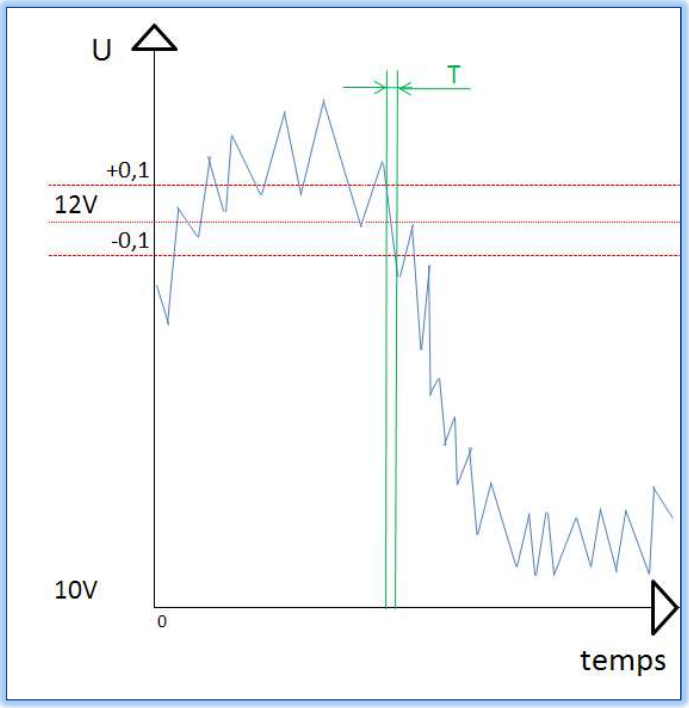


The same settings with a different signal:



Close-up on the same signal, but with interference:

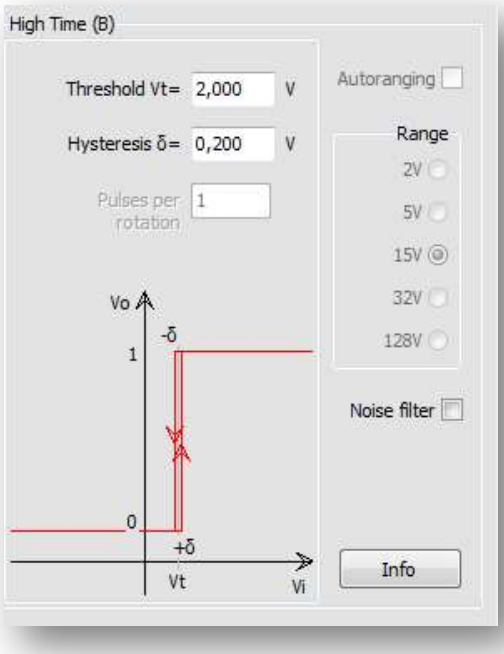
Threshold voltage **Ut = 12V**
Hysteresis **δ = 0.1V**
The system detects a far shorter period.



Note: The concepts of hysteresis and threshold voltage are critical in ensuring quality measurements. If noise exceeds the level of hysteresis, the measurements will be incorrect.

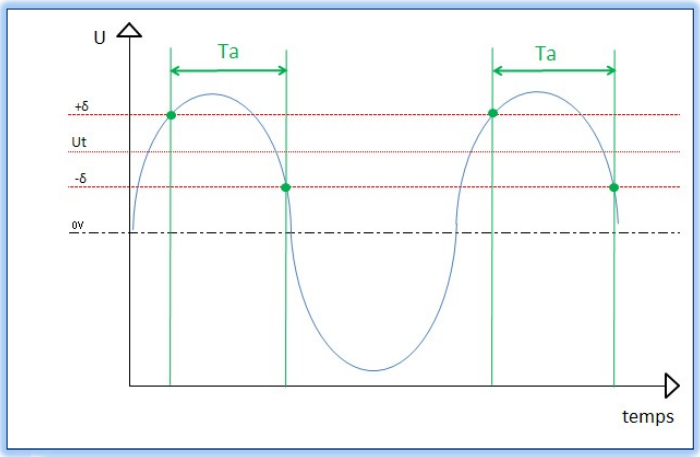
4. *Highest time:* When measuring "(t) Active time", the period is measured between the point when the signal crosses the threshold voltage + hysteresis and the point when the signal crosses the threshold voltage – hysteresis.

The threshold voltage **Ut** and hysteresis **δ** must be pre-entered for this purpose:

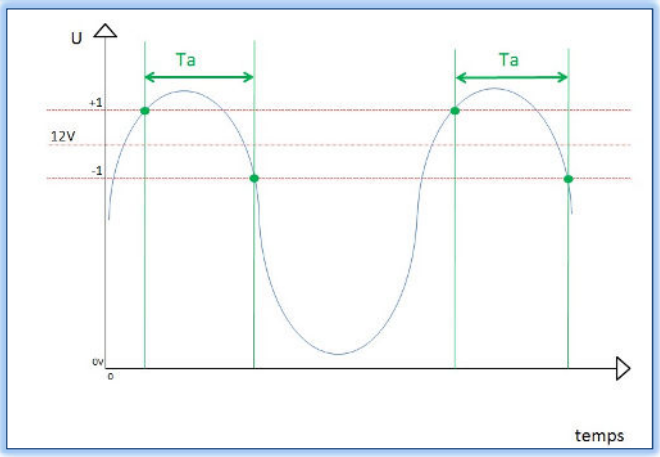


The diagram shown below explains the principle:

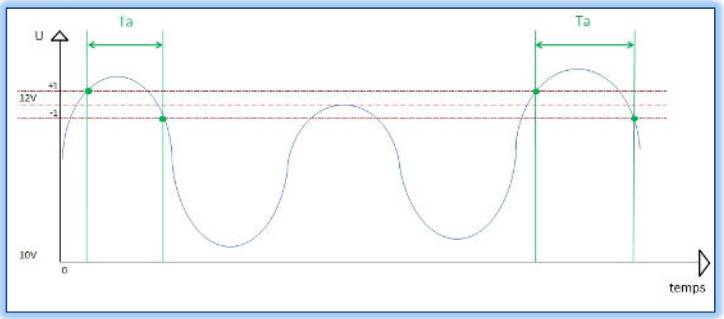
Active time: **Ta**
Voltage: **U**
Threshold voltage: **Ut**
Hysteresis: **+δ** and **-δ**



Example:
Threshold voltage **Ut = 12V**
Hysteresis **δ = 1V**



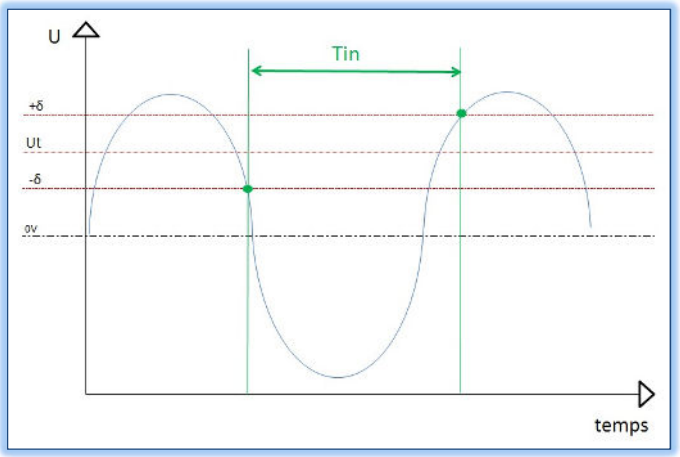
The same settings with a different signal:



<u>*Note:*</u> The concepts of hysteresis and threshold voltage are critical in ensuring quality measurements. If noise exceeds the level of hysteresis, the measurements will be incorrect.

5. *Inactive time:* inactive time is measured in exactly the same way as active time.Time is measured between the point when the signal crosses the threshold voltage - hysteresis and the point when the signal crosses the threshold voltage + hysteresis.

Inactive time: **Tin**
Voltage: **U**
Threshold voltage: **Ut**
Hysteresis: **+δ** and **-δ**



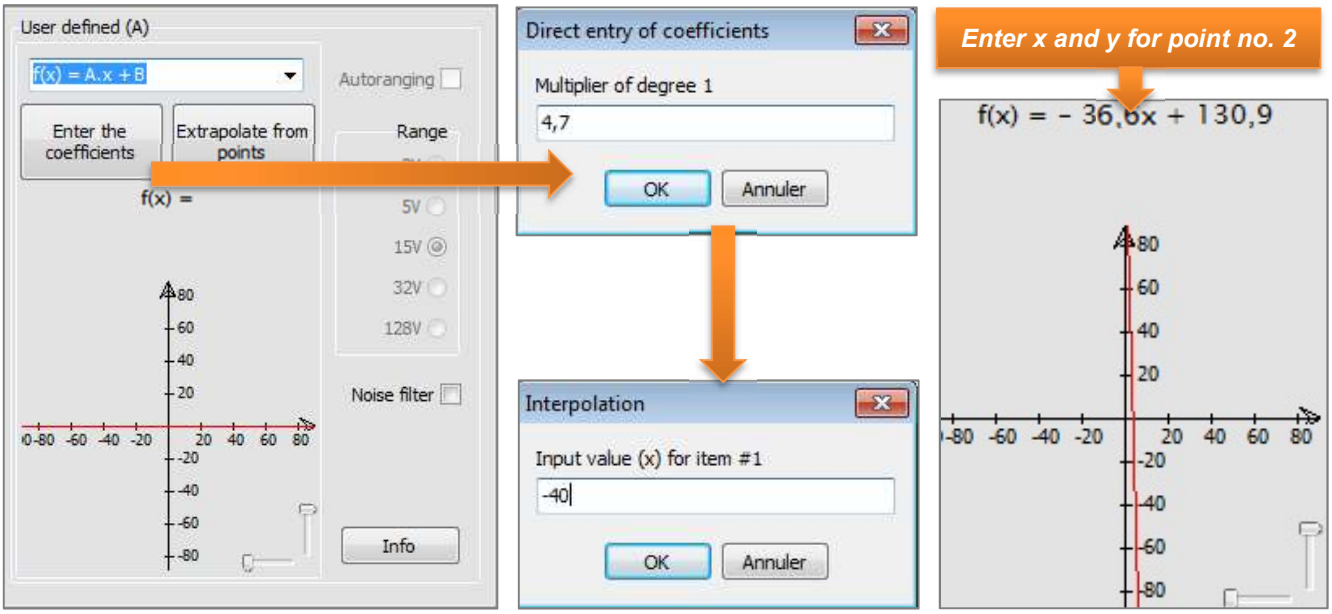
6. *Duty cycle:* The duty cycle is calculated using the measurements for "Active time" and "Inactive time". The following equation applies:

Rco = [**Ta** / (**Ta**+**Tin**)] x100

It is therefore necessary to determine active time (see previous pages).

7. *Tachometer:* Measurements are based on the same period as for periods. The system counts one rotation for several periods. The user must fill in the number of pulses per rotation.

8. *Defined by the user:* This function can be used to plot graphs using characteristic points.



Example of a car NTC:

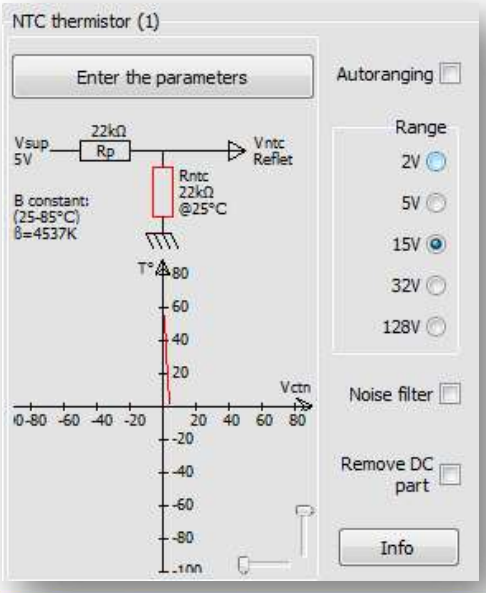
After taking measurements, the following values are obtained: 4.7 V at -40 °C and 0.3 V at 120 °C.

Select the unit in the window provided for this purpose, then click on "Extrapolate based on the points" and enter the characteristic values (voltage on the x-axis, temperature on the y-axis).

The system will execute the function and the display will indicate the temperature directly depending on the voltage measured.

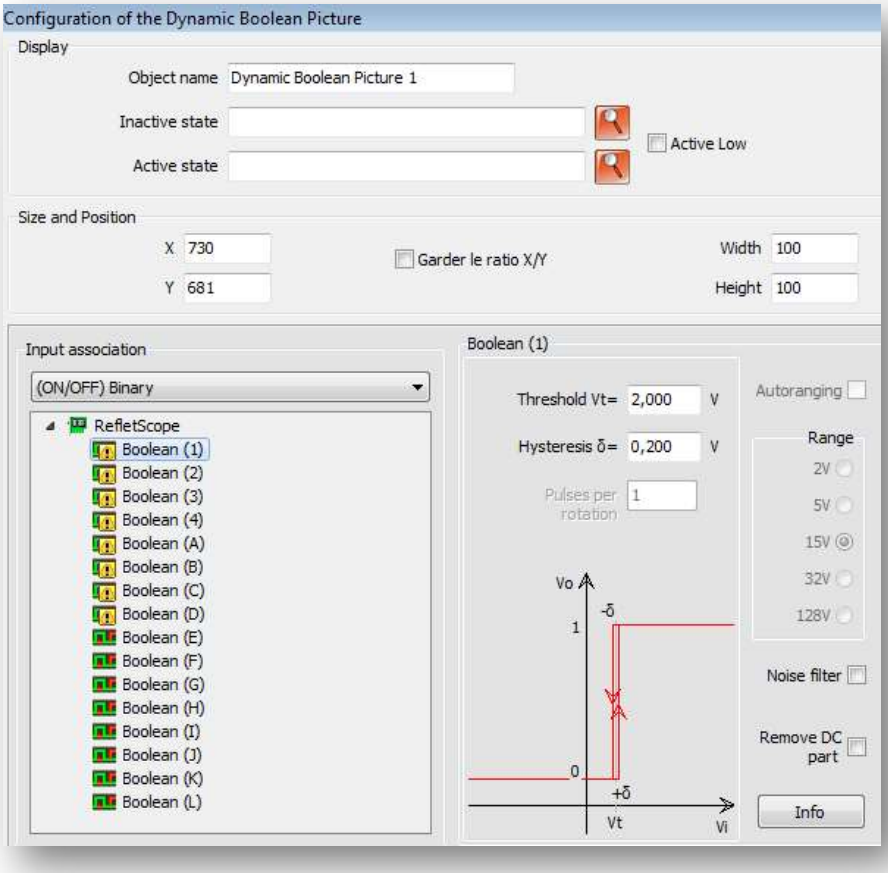
The same plot can be obtained using "Enter coefficients".

9. *NTC type thermistor:* If you hold characteristic data for the manufacturer of the NTC sensor, you can use "Enter parameters" to define the measurement. As shown in the previous example, the system will execute the function and the display will indicate the temperature directly depending on the voltage measured.



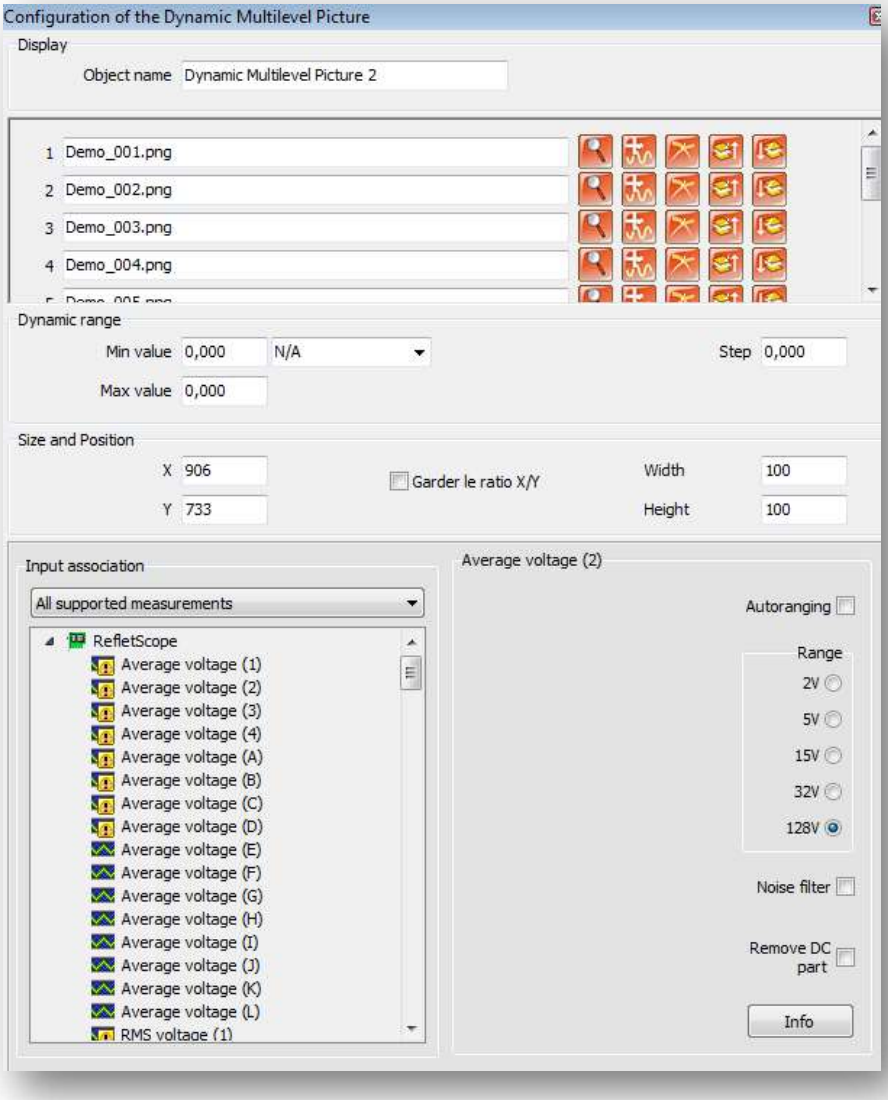
Dynamic binary images

The threshold voltage and hysteresis can be configured in the same way as for displays, gauges or galvanometers (see previous pages). It is also necessary to associate an input with the object and select one image for the "Active status" and a second image for the "Inactive status".



Multi-threshold dynamic images

Images are associated with a measuring level. The type of signal measured is defined using the selection list under "Dynamic span". Select the "Min. value" and the "Max. value". The interval will be calculated automatically based on the number of associated images. Associate the object with an input by double-clicking.



Notes:

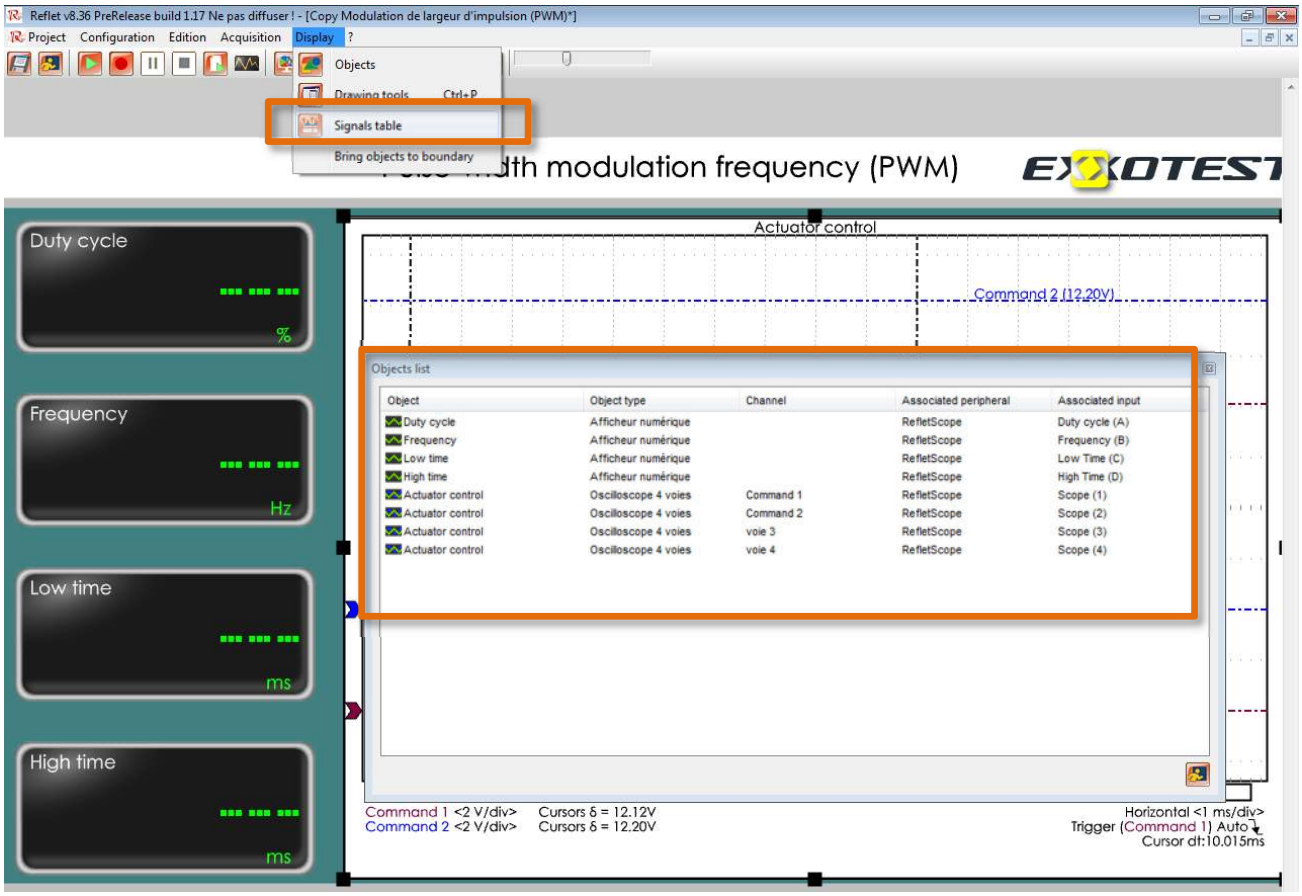
- *The hysteresis is automatic and equal to zero.*
- *If the number of associated images is modified, the "Max. value" will be modified, rather than the "Interval" .*

Other functions of the object palettes. To insert an object using the palette, drag on the screen. You can use:

- *One or several segments and/or arrows:* to modify the object, (colour, arrow, position, thickness) go to "Object configuration" by double-clicking (or using the F2 key).
- *One or several geometric figures:* to modify the object, open its configuration page by double-clicking (or using the F2 key).
- *Text and static images:* You can insert images and/or text in screens. For images, you can browse your PC hard disk. For text, after selecting and dragging to the screen, double-click on "Enter your text here". You can then enter your required text and modify its size and colour.

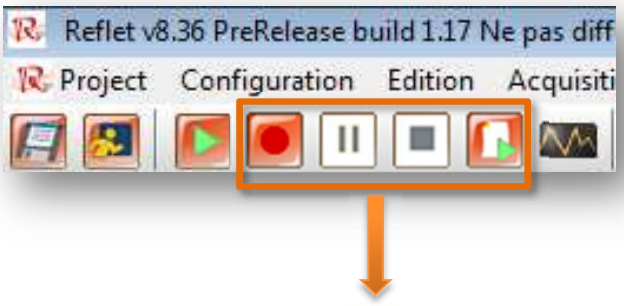
Obtaining cabling help

A window summarising all inputs is available to help with cabling when continuing with a project. Click on "Display", "Signal table" or the corresponding icon in the menu:



Saving acquired measurements

Measurements can be saved, or replayed, using the following group of icons:



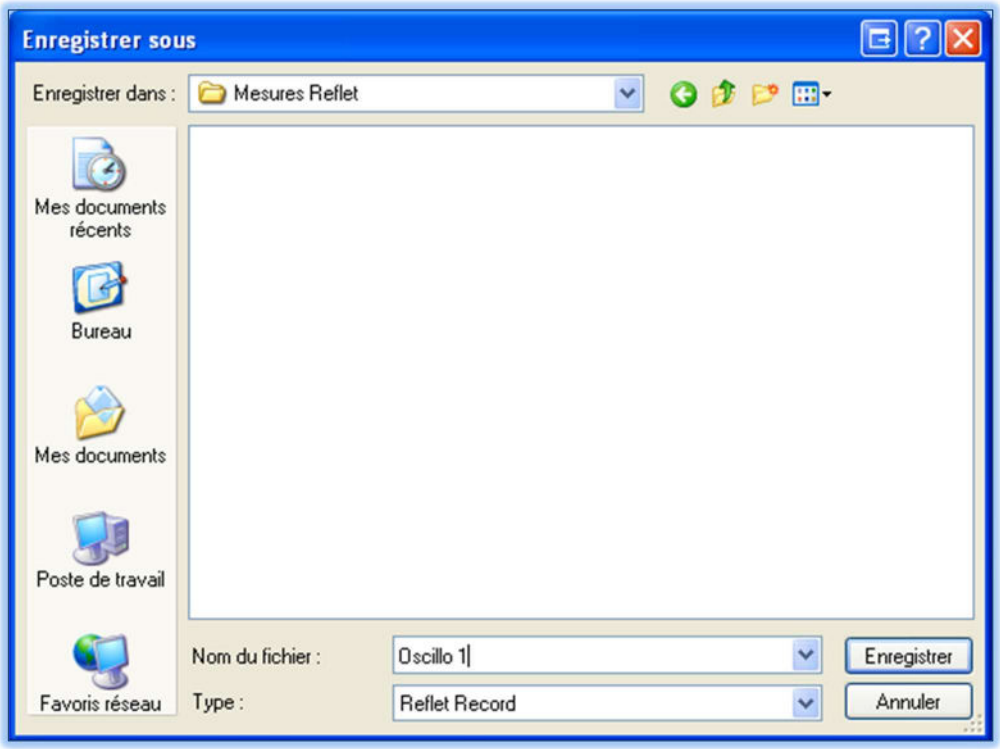
Save: start the acquisition process and save the measurements in the preferred directory (see window below).

Pause: During saving, pause to stop saving measurements (the time will continue to be taken into consideration).

Stop: stop measurements and the saving process.

Replay: replay saved measurements (Important: you must be on the screen used to save the data in order to replay).

After clicking on ***'Save'***  , a dialogue window will open:



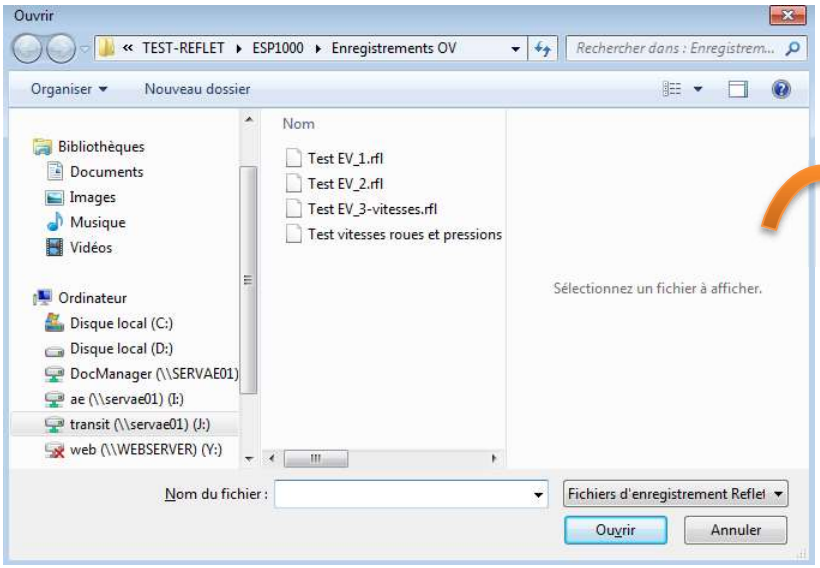
Select or create your target directory for the measurements saved.
Name the file and click on save.

To stop saving, press (Stop):

The file will be created in the selected directory, and may be replayed using REFLET and/or used with EXXOGRAPH (see next chapter).

Replaying recordings

Saved measurements can be replayed using from the screen used to save the measurements. In the example given in the above paragraph, the "Oscillo 1" file was saved in the "Reflet measurements" folder created previously.



The following window will open after clicking on "Open":

Traditional saving functions are available:

Pause:
Temporarily stop the replay.

Stop:
Stop the replay.

Pause:
Temporarily stop the replay.

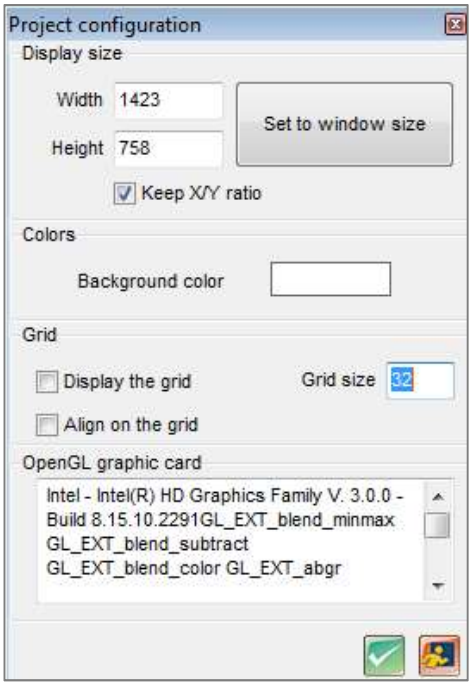
Stop:
Stop the replay.

IMPORTANT

Recordings cannot be replayed with another project, other than that originally used when saved.

Configuring the project

This menu can be used to configure display options such as window size to match your PC screen, the display of the grid, or even to select a background colour for your screen.



Exporting a screen or an object as an image

The REFLET software application can be used to recover an image or object from your project during the acquisition progress in order to print off or import into a document. To achieve this, click on one of the cameras in the toolbar:

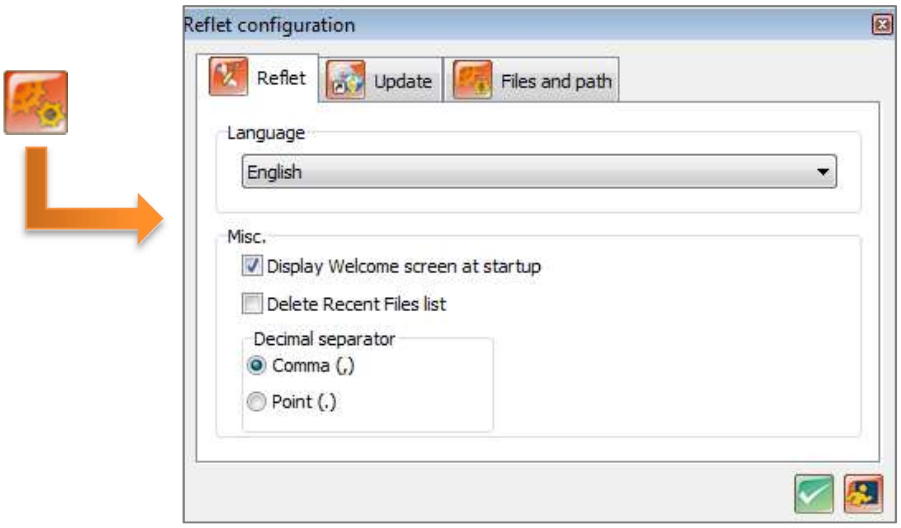
Export the screen to an image:
After selecting the degree of zoom, a "Save as" window will open. Select a folder and name for the image.

Export the object to an image:
This option is available after selecting an object, then follow the same procedure as previously.

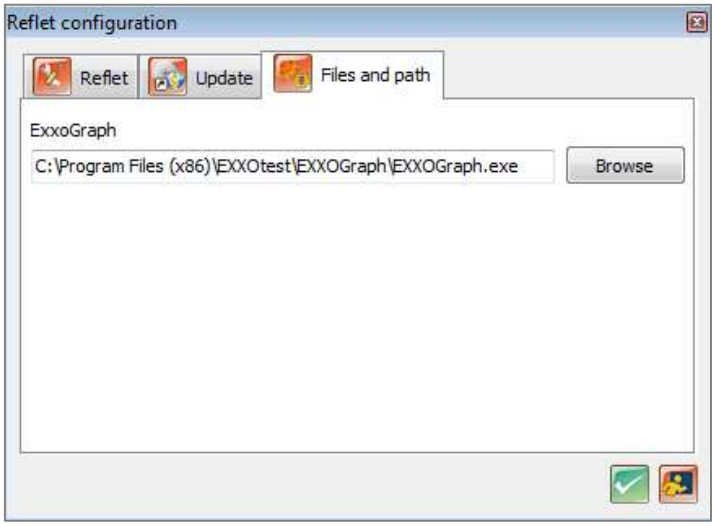
The project manager

You can access the project manager from the software welcome page: you can use this manager to open, modify, delete, copy, and export/import your measuring screens.

Configuring preferences



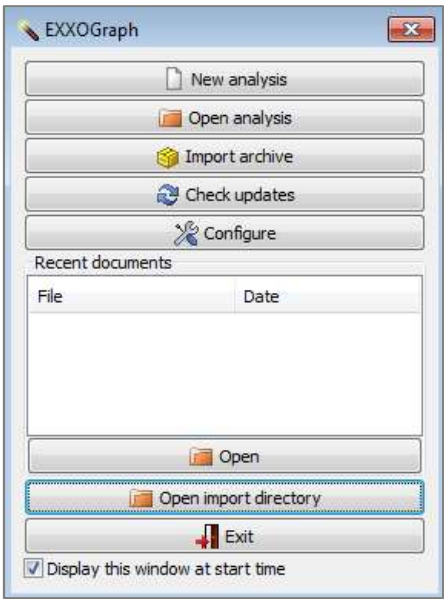
Select the language, 'Welcome' page display, etc.
Configuring updates: you can use the parameters of Internet Explorer or configure PROXY parameters if using a private network; also indicate if you would prefer for the program to check the availability of updates whenever REFLET is started. The third tab indicates the path to the EXXOGRAPH software, to be completed if installed in a specific folder:



Using EXXOGRAPH

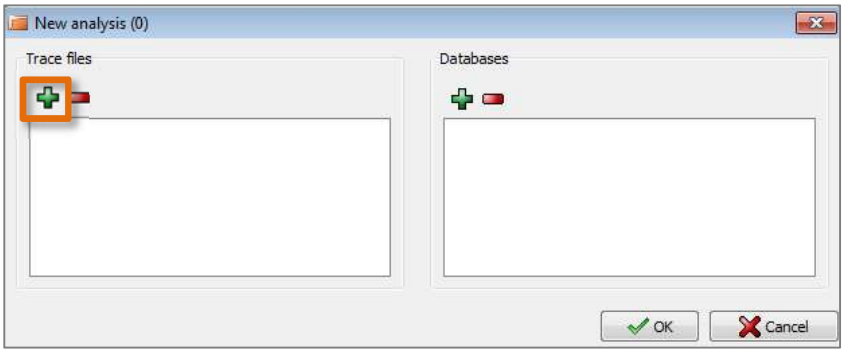
(To install the software, see the "Installing or updating" chapter at the start of this manual)

Start-up window



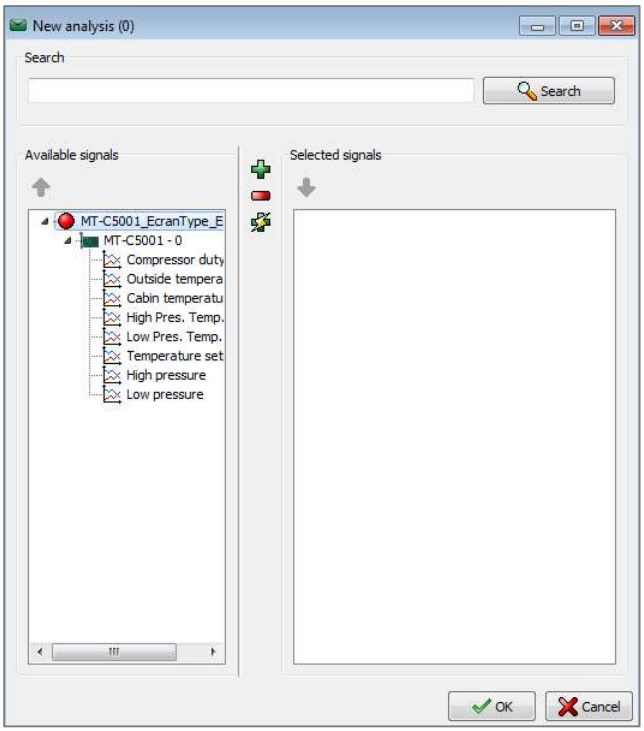
The window shown opposite shows all of the functions available when starting EXXOGRAPH:
Start a new analysis or continue with an analysis created previously, configuration, etc.

New analysis



In this window, you must click on  in the 'Plot file' section:

- REFLET recordings are in **.rfl** format, select the file for the recording you wish to analyse.
- You will not need the right-hand window when using **.rfl** files.

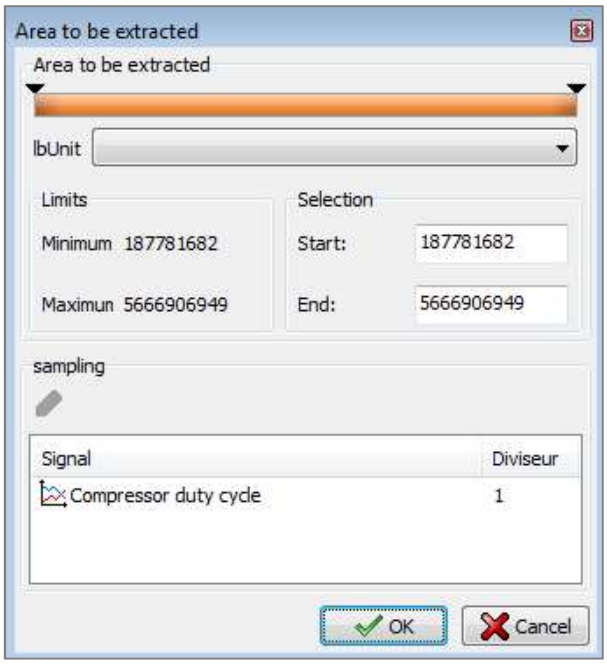


The above window lists the signals available in the recording opened previously (***HE-3020_1.rfl*** in this case). The signals are shown in the left-hand window. Transfer those you wish to study to the right-hand "Selected signals" window using  ( selects all of the signals listed at once).

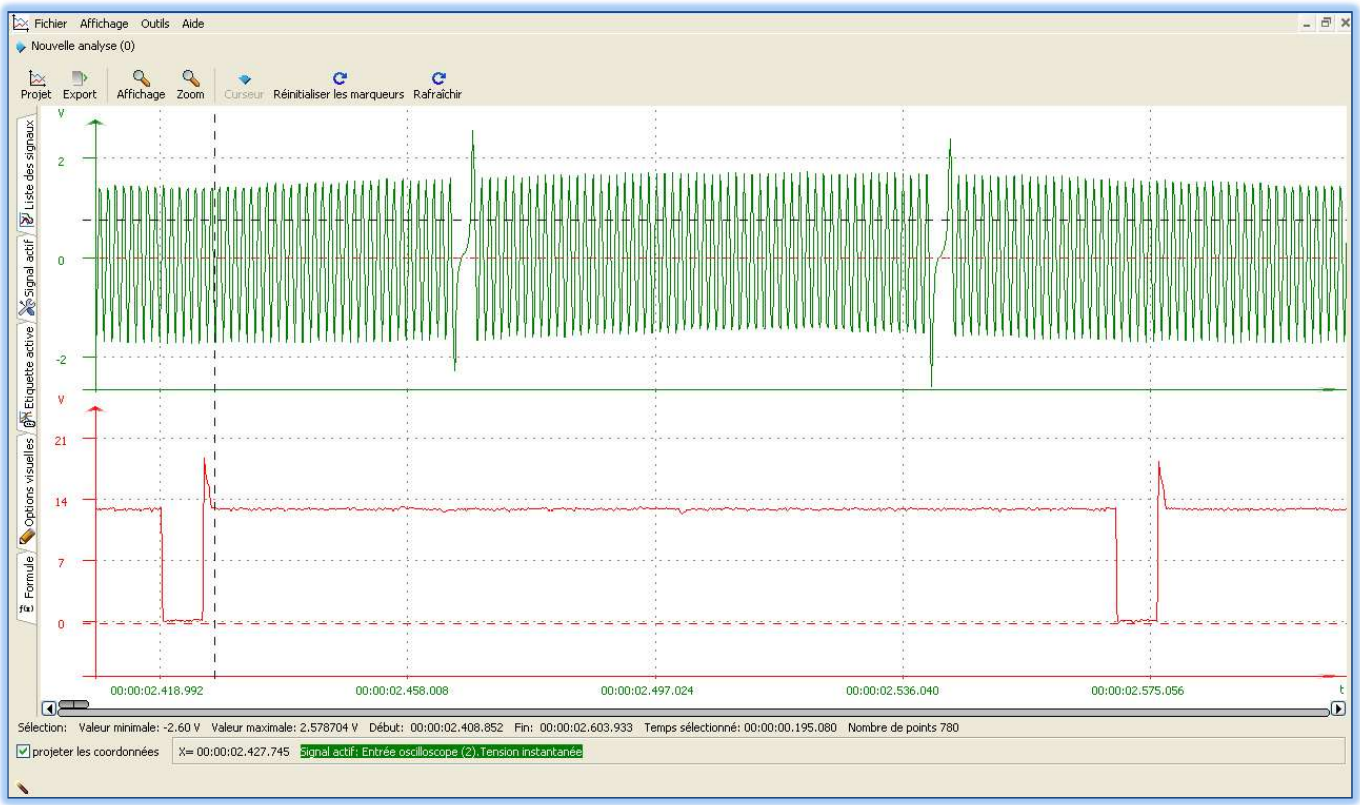
 can be used to remove a selected signal from the right-hand list.

After clicking on "OK", the 'Select export' window will open:

You can use this window to select a specific part of the recording



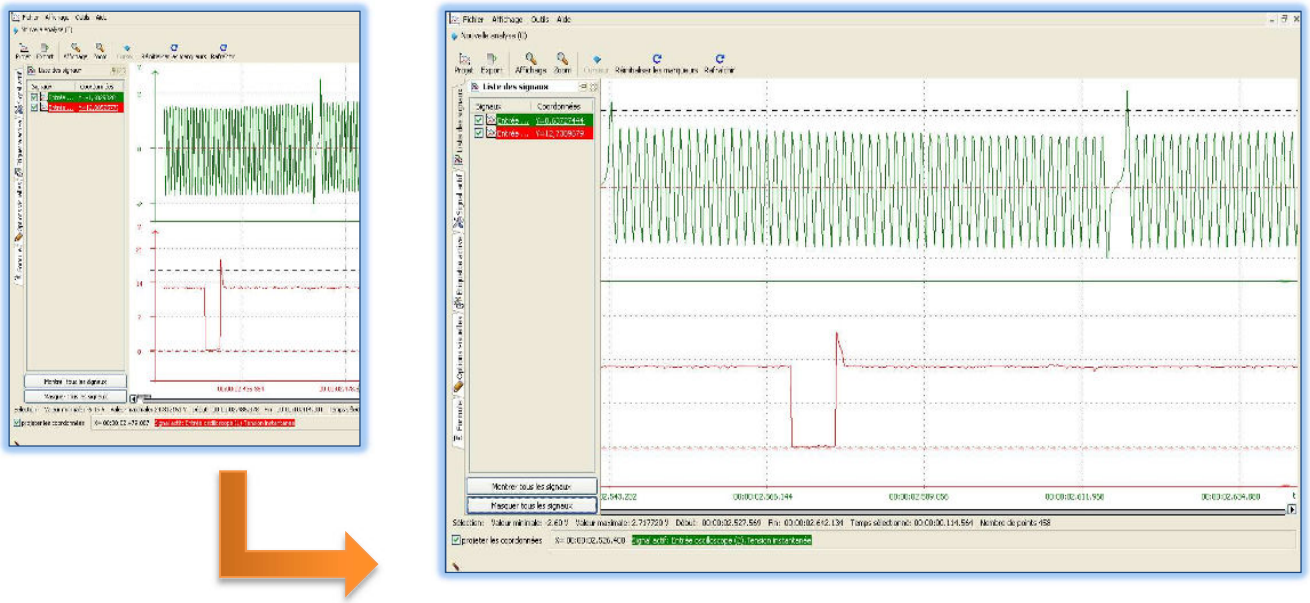
The graphs will appear after clicking on "OK":



The red signal is measured between an injector command and the vehicle ground in the following example. The green signal is measured between an engine speed sensor terminal and the ground.

You can now work on and analyse the signals, for example:

- Position the cursor near to the area you wish to view and rotate the mouse wheel



Use this action to zoom in on the signal(s) displayed:

EXXOGRAPH offers various data processing and display options. You can also export data to another software application in **.csv** format or to an image (BMP export) to illustrate a document, etc.

DECLARATION CE OF CONFORMITY

By means of this declaration of conformity, as defined by the European Directive on Electromagnetic Conformity 2004/108/EC, the company:

S.A.S. ANNECY ELECTRONIQUE
Parc Altaïs – 1, rue Callisto
F-74650 CHAVANOD

Declares that the following product:

Brand	Model	Description
EXXOTEST	**REFLET8**	**Measurement acquisition system intended for use in cars**

I - Has been manufactured in accordance with the requirements of the following European Directives:

- LV Directive 2006/95/EC - 12 December 2006
- Machinery Directive 98/37/EC - 22 June 1998
- EMC Directive 2004/108/EC - 15 December 2004

and satisfies the requirements of the following standard:

- NF EN 61326-1 dated 07/1997 +A1 of 10/1998 +A2 of 09/2001
Electrical measurement, control and laboratory equipment, EMC-related requirements.

II - Has been manufactured in accordance with the requirements of the European Directives relating to EEE design and WEEE management for the EU. :

- Directive 2002/96/EC dated 27 January 2003 on Waste Electronic and Electrical Equipment (WEEE)
- Directive 2002/95/EC dated 27 January 2003 on the limitations for the use of certain hazardous substances in the construction of Electronic and Electrical Equipment (EEE).

Drawn up in Chavanod on 28 June 2008,

CEO - Stéphane SORLIN