

ACCELERATION SLIP REGULATION: **ASR**  
ANTI-LOCK BRAKE SYSTEM: **ABS**  
ELECTRONIC STABILITY PROGRAM: **ESP**





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## 1. USER AND INSTRUCTION MANUAL

### 1.1. Installation and set-up

#### Separate model components

The steering wheel unit screws onto the front of the simulator.



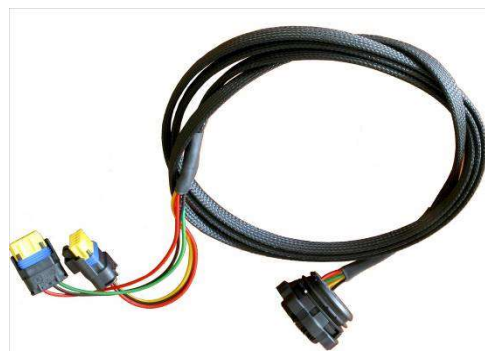
***Steering wheel unit attachment***

The wiring harness plugs into the front of the model, at the bottom (white connector).

The pedal unit (brake and accelerator) are placed on the floor below the steering wheel unit, as in a vehicle. Use the harness supplied to connect the pedal unit to the rear of the model.

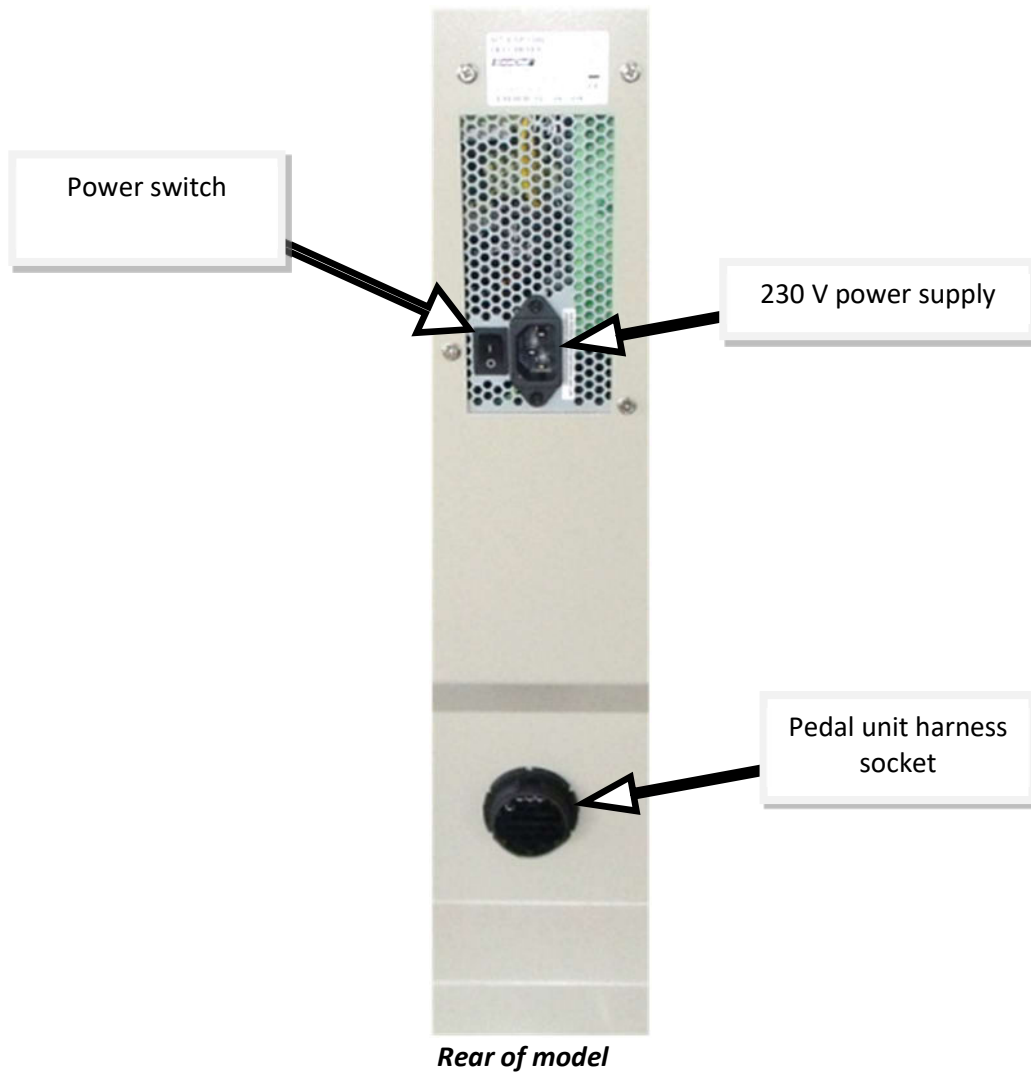


***Pedal unit: brake + accelerator***



***Pedal unit harness***

Connect the 230 V mains power cord to the rear of the model. Flick the switch to position I.



Press the ON/OFF button once on the front panel.



The PC included in the model boots up, activating the screens.  
Model MT-ESP1000 has no moving parts. The various actions are illustrated on each screen in real time, in direct connection with the electrical signals (measurement sockets).

## 1.2. User instructions

### Environment

Learning model MT-ESP1000 can be placed on a bench if you do not have the optional MT-TABLE.

It must be installed in a dry place away from dust, steam and combustion fumes.

The machine requires approximately 400–500 lux of light.

The machine may be placed in a practical exercise room. Its operating noise level does not exceed 70 decibels.

The simulator is protected against potential user error.

### Calibrating and maintaining model MT-ESP1000

Calibration: factory setting.

Maintenance frequency: none.

Cleaning: use a very soft, clean cloth with a window cleaning product.

### Number of work stations and position of user

Model MT-ESP1000 is a single work station.

The model user will stand throughout the practical exercise.

### Lockout/Tagout procedure

- Close the applications on the touch screen.
- Switch off the PC: Start menu, Power off.
- Touch one of the screens to check that the PC is not just sleeping.
- Flick the switch to 0 on the rear of the simulator
- Unplug the 230V power supply cord.
- Check there is no power by pressing the black PC on/off button next to the instrument cluster.
- Check that the rear covers are fitted.
- Store model MT-ESP1000 in a secure room while out of use.

### Residual risk

The trainer is the only person authorised to access the rear of the model.

For the entire duration of the practical session, the trainee shall work on the front of the model.

### Transporting model MT-ESP1000

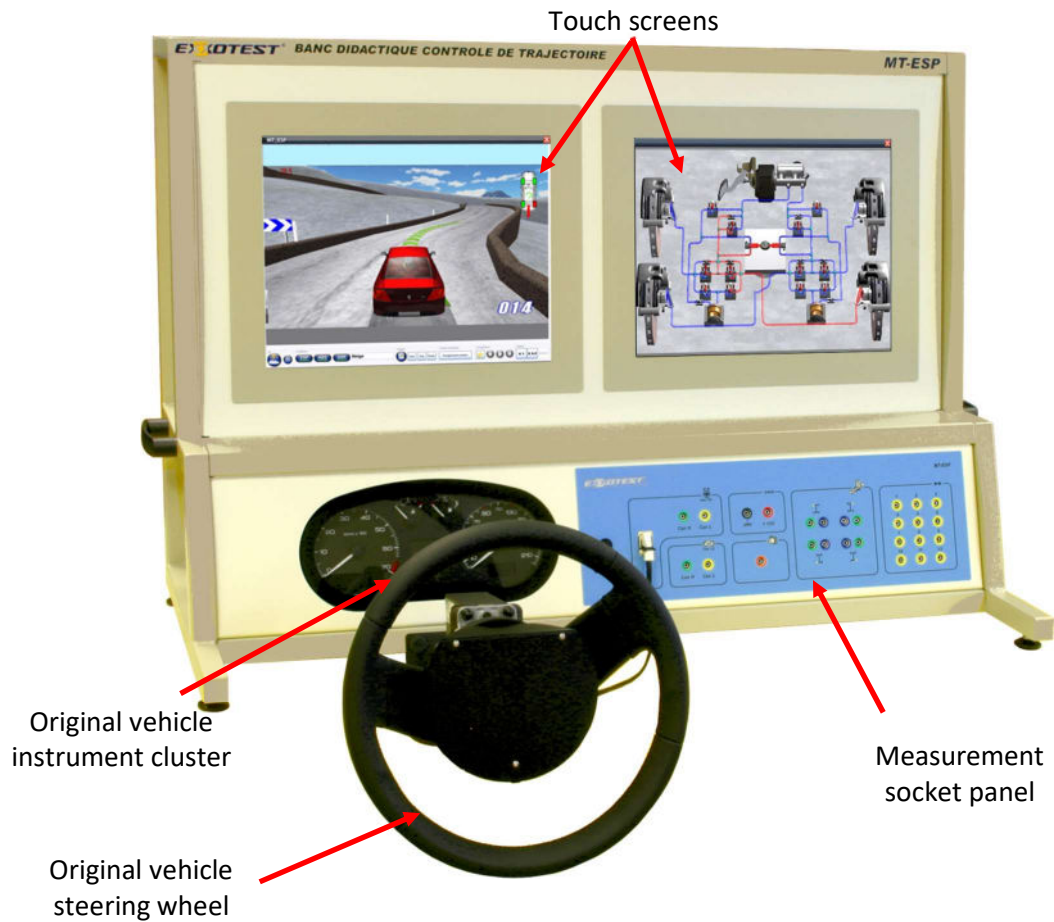
The model must be switched off and disconnected before transport. At least two people, using the handles provided, are required to carry the model.

***The model should only be opened by certified and authorised persons.***

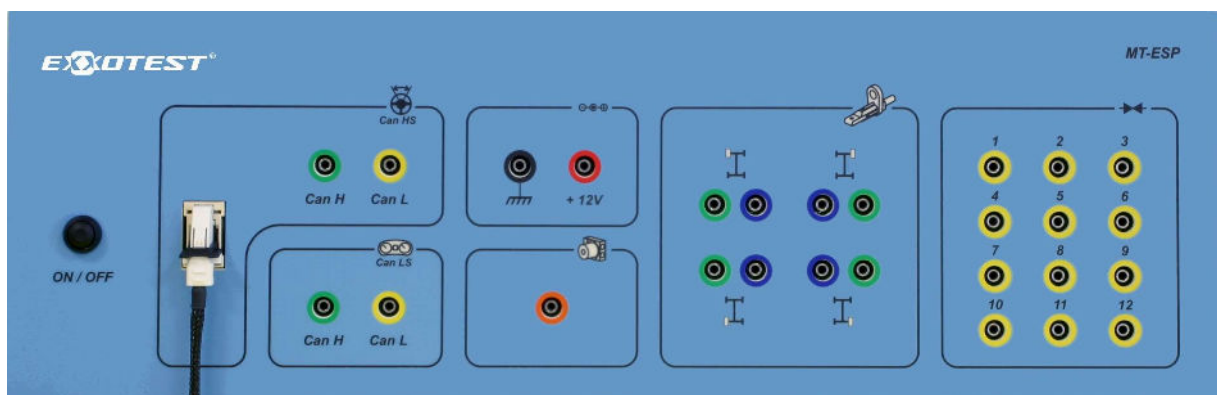


### 1.3. Using the simulator

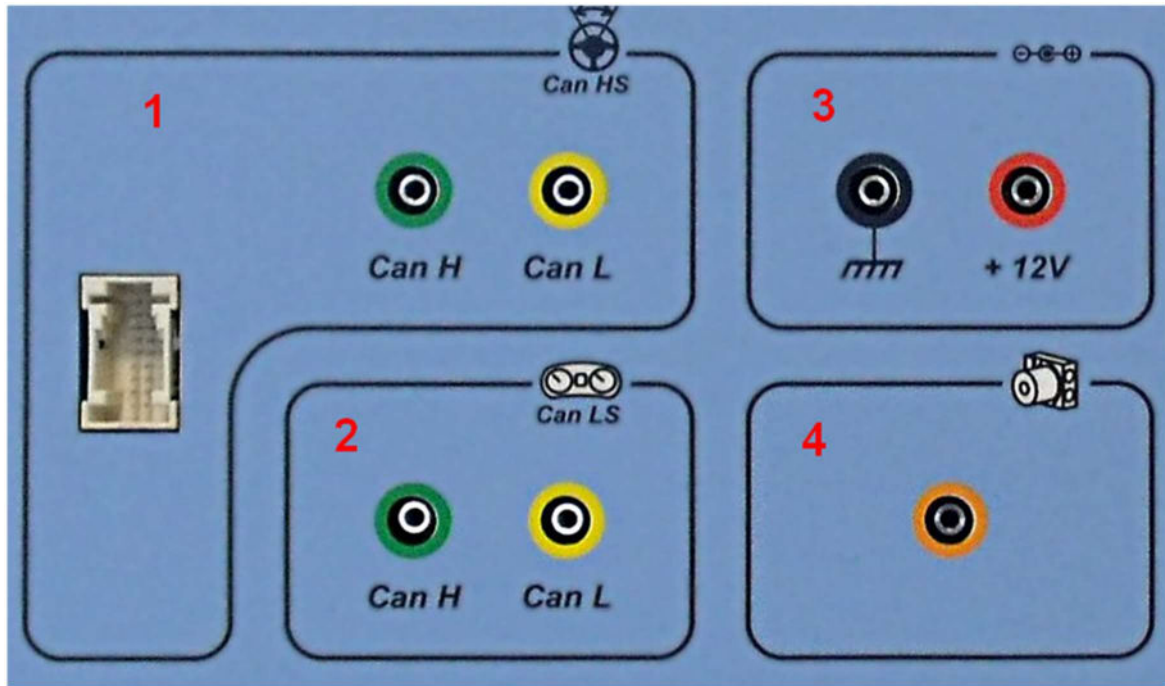
#### 1.3.1. Overall view



#### 1.4. Measurement socket panel







- 1- HS CAN + steering wheel socket
- 2- LS Comfort CAN
- 3- 12V power outputs
- 4- Pump control

Various signals are conveyed via the HS (High Speed InterSystem) CAN:

- steering angle, tri-sensor information (yaw sensor and accelerometer sensors), wheel speeds, etc.

Control signals relating to the instrument cluster in particular are conveyed via the LS (Low Speed Comfort) CAN.

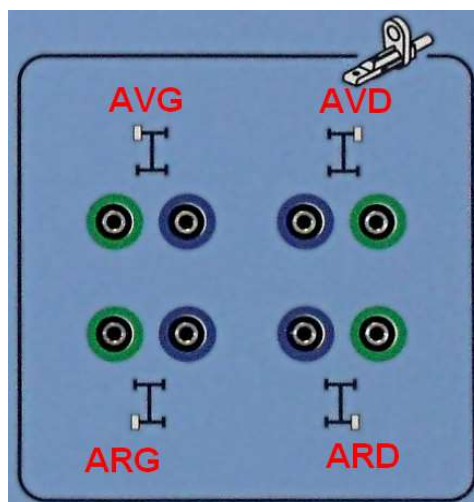
The ground and the +12V are useful as reference points for measurements.

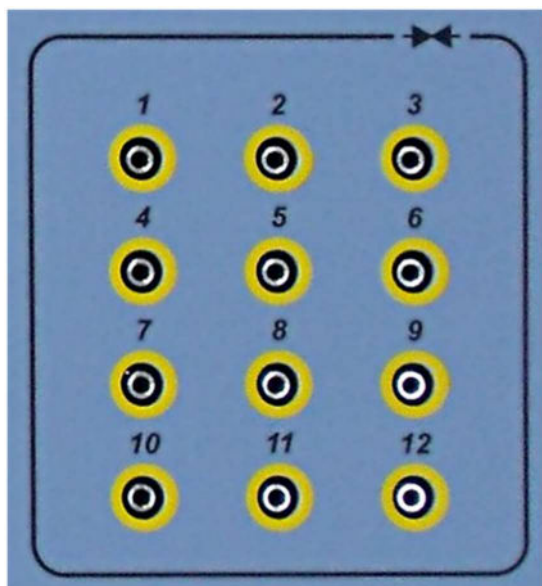
The pump control socket gives the control signal, not the power signal.

Wheel speed sensors:

Blue terminals: Analog ground

Green terminals: Magnetoresistive sensor signals



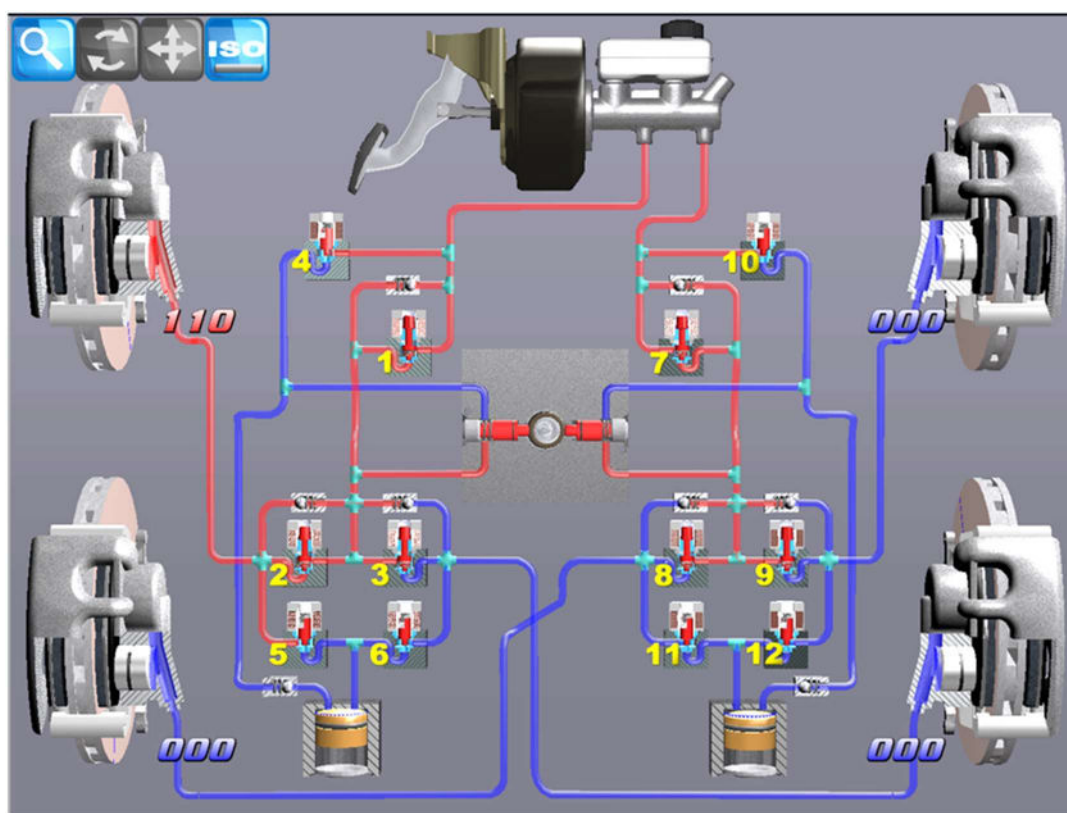


- 1 USV1 – Switch-over solenoid valve
- 2 EV1 – Front left intake solenoid valve
- 3 EV2 – Rear right intake solenoid valve
- 4 HSV1 – HP suction solenoid valve
- 5 AV1 – Front left exhaust solenoid valve
- 6 AV2 – Rear right exhaust solenoid valve
- 7 USV2 – Switch-over solenoid valve
- 8 EV3 – Rear left intake solenoid valve
- 9 EV4 – Front right intake solenoid valve
- 10 HSV2 – HP suction solenoid valve
- 11 AV3 – Rear left exhaust solenoid valve
- 12 AV4 – Front right exhaust solenoid valve

**Solenoid valve control signals**

### 1.5. Hydraulic system view (right screen)

This screen provides a view of the hydraulic system only. The setup changes according to whether the advanced driver assistance systems are on or off. The functions of the various buttons are detailed below.



**Hydraulic system viewing screen (right screen)**

The solenoid valves are numbered from 1 to 12; these numbers match those of the socket panel.

**Zoom**

Hold a finger on the area to be zoomed in on. This enlarges the image. Tap the screen briefly to return to the initial setting.

**Rotation**

To rotate about an object, tap this key then slide a finger on the screen in the required direction. Tap the screen briefly to reset.

**Move**

Slide a finger on the screen to move. Tap the screen briefly to reset.

**Switch to ISO mode (schematic view)**

Button to switch the schematic view on/off.

## 1.6. Main screen (left screen)

View of the vehicle, turns, settings, etc.

Changes to the vehicle view, choice of grip, choice of trip, etc.

### Selecting the driver assistance mode



ESP electronic stability program on/off (if ESP is on, ABS and ASR are also on)



ASR acceleration slip regulation on/off (if ASR is on, ABS is also on)



ABS anti-lock brake system on/off



Main screen (left screen)

## Road grip conditions



Dry road

The dry road setting simulates a pavement with a grip coefficient of 0.85.



Wet road

The wet road setting simulates a pavement with a grip coefficient of 0.55, which corresponds to a damp pavement (without specific rain-related phenomena, such as aquaplaning, etc.).



Snow

The snow setting simulates a grip coefficient of 0.25.



***Asymmetric grip***

The asymmetric grip setting puts snow on one side of the road on certain portions. It is compatible with the other grip options.

***Ice***

Adds patches of ice (grip 0.15) at various points. Compatible with the other grip conditions.

Start position

Switch from one start position to another. There are over ten possible start positions (loops with a radius of 100 m and 200 m, circuit with different start points, hill climbs and straights with the possibility of activating asymmetric grip). This option is very useful for repeating a scenario with the same or different settings.

Recording and playback module***Record***

The vehicle must be running to start recording. Press the button to start recording. The button is red while recording is in progress. Press again to stop recording.

A file is generated automatically on the simulator at the end of recording. If there is an SD card in the reader, the recorded measurements are saved on this card. This data can be processed using Exxograph on another PC.

**WARNING:** The data cannot be exported later. If there is no SD card in the reader, the data is lost. The files are saved in the .dat format in the C:\data folder.

***Uploading a recording***

The recordings on the model can be viewed. These functions offer detailed access.

***Play-Pause******Step-by-step playback***

## Running speed



Adjusting the running speed

This option is available in playback and driving modes.

**Beware:** In driving mode, it should be considered that running in slow motion calls for slower driver movements than at normal speed. Regulating is significantly different too. This mode nonetheless serves a purpose as it can be used to highlight driving conditions that are difficult to perform at real speed (especially avoidance manoeuvres).

## Graph management



Graph management menu

The first button switches the graph display on and off. It can therefore be used to switch the driving window to almost full-screen mode.

The Start button starts dynamic graph plotting while in driving mode. The curves to be plotted can be selected by checking the corresponding boxes (see figures below). The Stop button stops dynamic plotting.



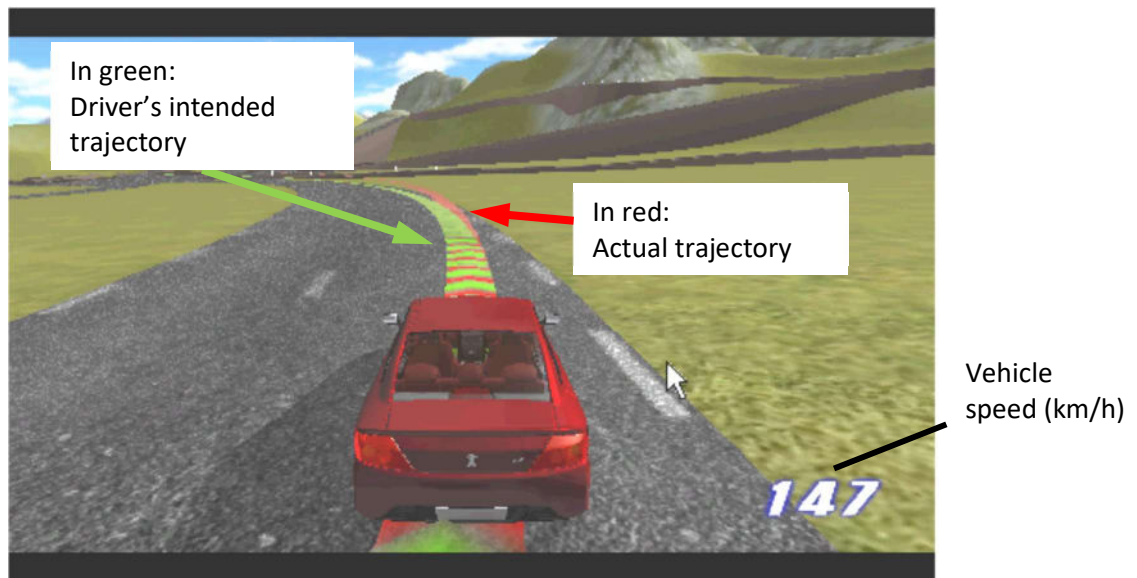
## Vehicle characteristics field

Entrées, volonté conducteur			Accéléromètre/Capteur de lacet		
Pédale accélérateur	0 %	<input checked="" type="checkbox"/>	Vitesse lacet	0.00 rad/s	<input checked="" type="checkbox"/>
Pédale frein	0 %	<input checked="" type="checkbox"/>	Vitesse lacet cible	0.00 rad/s	<input checked="" type="checkbox"/>
Angle volant	-21 °	<input checked="" type="checkbox"/>	Vitesse latérale	0.00 m/s	<input checked="" type="checkbox"/>
Ray. trajectoire voulue	104 m	<input checked="" type="checkbox"/>	Vitesse latérale cible	0.00 m/s	<input checked="" type="checkbox"/>
Ray. trajectoire réelle	105 m	<input checked="" type="checkbox"/>			
Capteurs de vitesse			Sorties, régulation		
Vitesse avant droit	0 km/h	<input checked="" type="checkbox"/>	Frein avant droit	0 %	<input checked="" type="checkbox"/>
Vitesse avant gauche	0 km/h	<input checked="" type="checkbox"/>	Frein avant gauche	0 %	<input checked="" type="checkbox"/>
Vitesse arrière droit	0 km/h	<input checked="" type="checkbox"/>	Frein arrière droit	0 %	<input checked="" type="checkbox"/>
Vitesse arrière gauche	0 km/h	<input checked="" type="checkbox"/>	Frein arrière gauche	0 %	<input checked="" type="checkbox"/>
Vitesse véhicule	0 km/h	<input checked="" type="checkbox"/>	Regulation Injection	0 %	<input checked="" type="checkbox"/>

Vehicle information, Driver's intended path, Accelerometer/Yaw sensor, Speed sensors, Brake outputs, etc. Uncheck the boxes to disable the plotting of the respective curves.

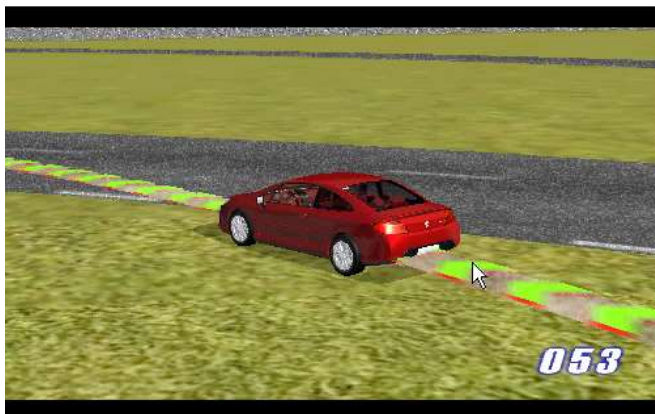
Vehicle view field

Tap the vehicle on the touch screen for a choice of vehicle views.

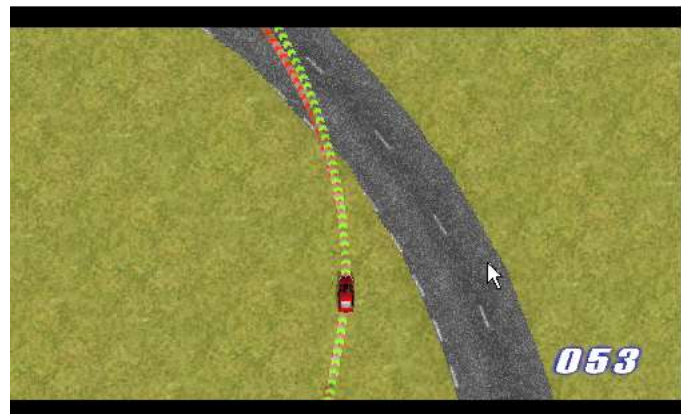


*View from behind vehicle*

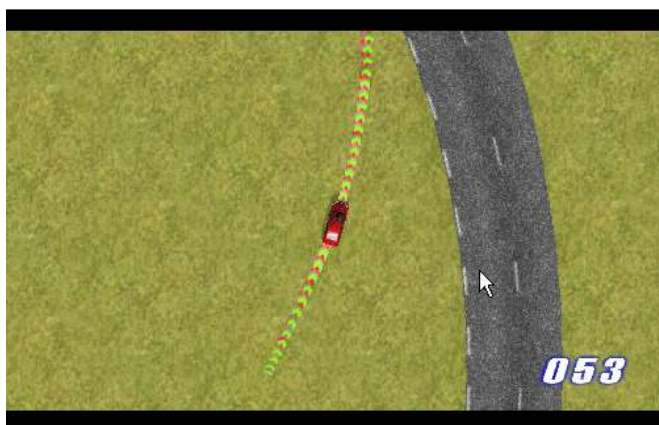
*Side view*



*Overhead view*



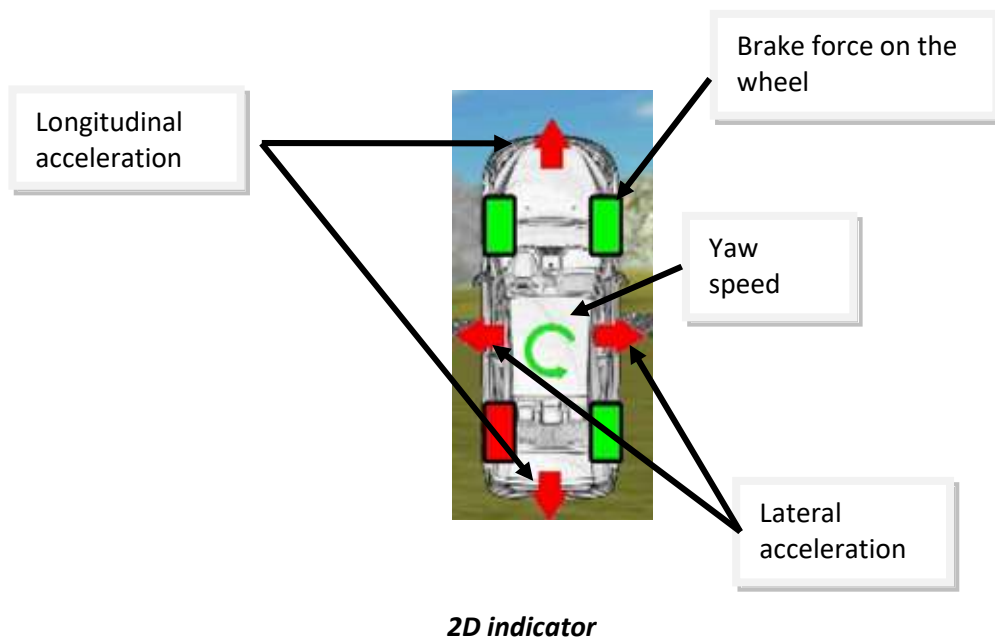
*Centred overhead view*



*Interior view*



Two-dimensional information is displayed in the top right corner.



## **1.7. Software**

### **1.7.1. Exxograph**

The MT-ESP1000 simulator offers the possibility of exporting measurement data. When recording is stopped, the data is automatically saved as an .asc file on the card in the ESP simulator card reader.

The card reader is compatible with the SD-card format.

Exxograph is an application that decodes frame records. It can read the trace files exported from the MT-ESP simulator which are saved in a compatible format.

### **1.7.2. Installing Exxograph**

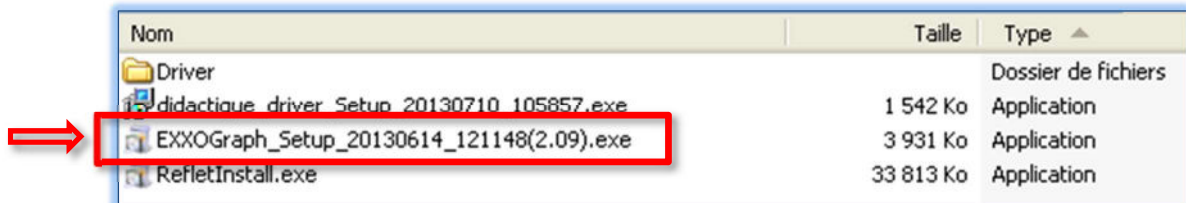
Exxograph is part of the MuxUtilities package supplied on the CD accompanying the model.

Install MuxUtilities.

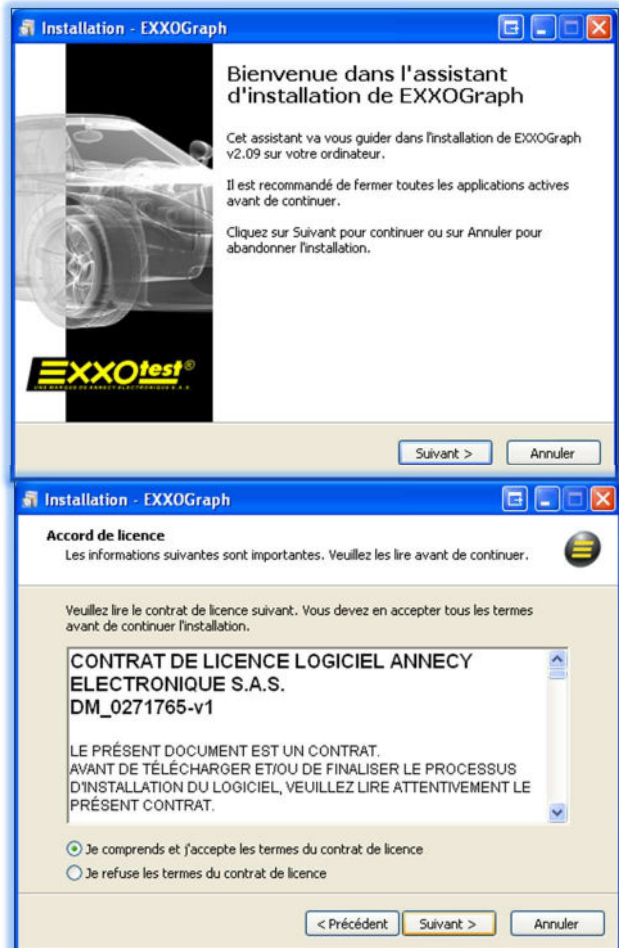
A licence supplied in the form of a USB dongle with the MT-ESP simulator must be used. This dongle provides access to all Exxograph functions (including manufacturers' database support, etc.).

From the CD-Rom provided or from the version downloaded from your customer space at [www.exxotest.com](http://www.exxotest.com), run the 'EXXOGraph\_Setup\_-----.exe' application.





After choosing the installation language, the welcome screen is displayed: Click Next.



1. Now accept the licence agreement: Check the line 'I understand and agree to...' and click Next.

2. In the following 'Destination folder', 'Start menu', 'Create desktop shortcut' steps, *click Next, then Install and finally Done.*



3. You will find a section describing the use of EXXOGraph in the Reflet instructions.

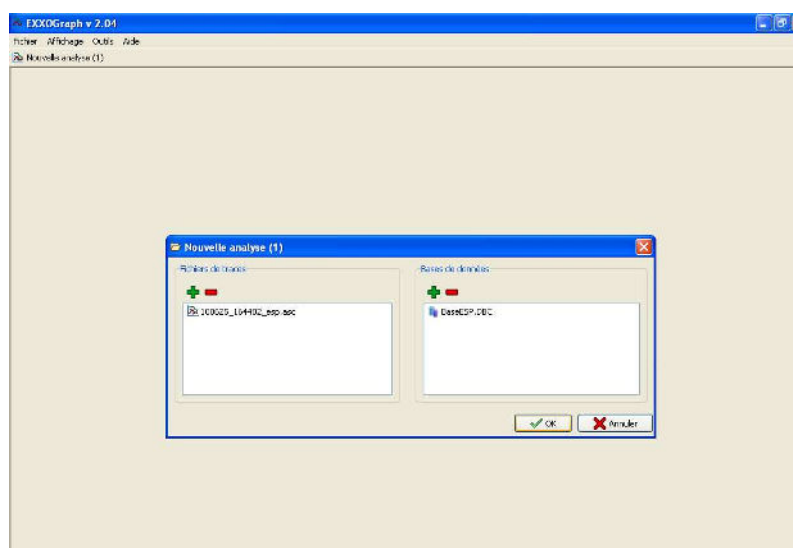
### 1.7.3. Analysing a record

Run Exxograph, then select File, New analysis

Load a trace file (.asc) and a database (.dbc) in the new window:

Select the trace file:

- Click +
- Open the desired .asc file (a sample file is provided on the CD)
- Select the database:
- Click +
- Load file BaseESP.dbc supplied on the CD.



Once the files have been selected, confirm by clicking OK.

#### Selecting the parameters to be analysed

The following window proposes all the database settings grouped into frames.

Select the parameters to be studied (double-click or select them and click +).



**Signal preselection**

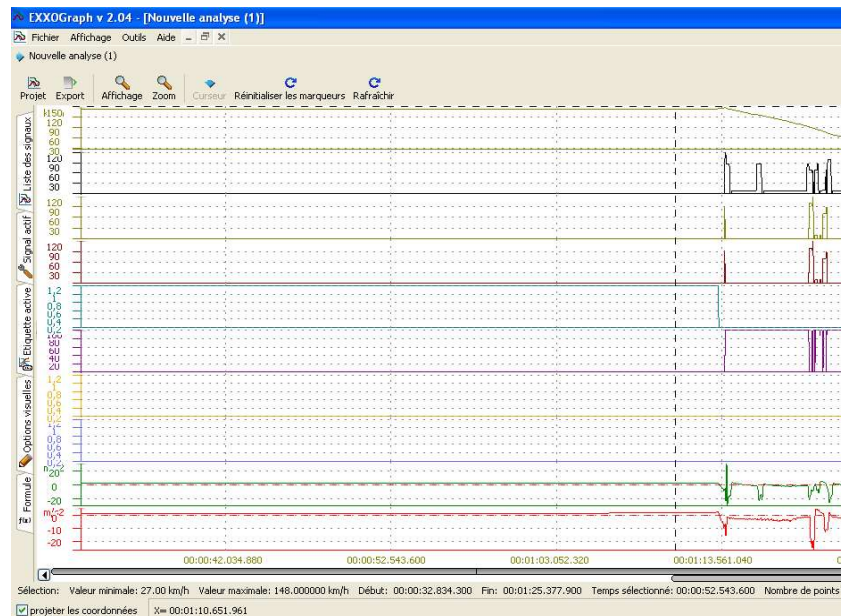
By default, you can select them all and sort them later.

## Viewing the signals

To zoom, place the cursor near the part to be viewed and use the mouse wheel.

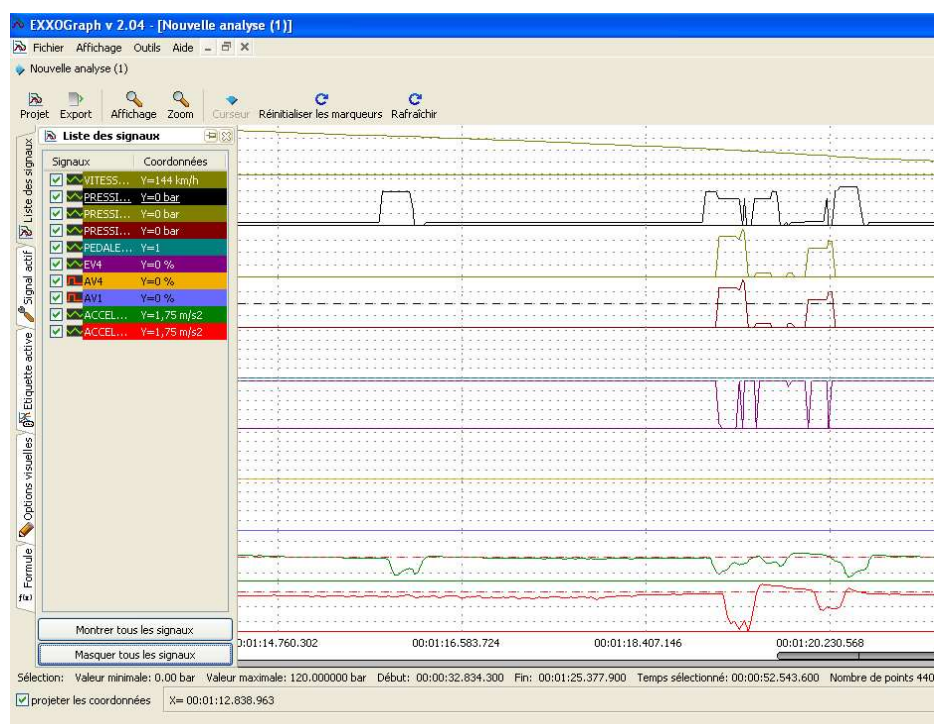
Alternatively, place the cursor at the beginning of the period to be studied, and then click and drag to the end of the period.

Click Zoom, then “Zoom between the cursors” to zoom in on the greyed section.



## Selecting signals

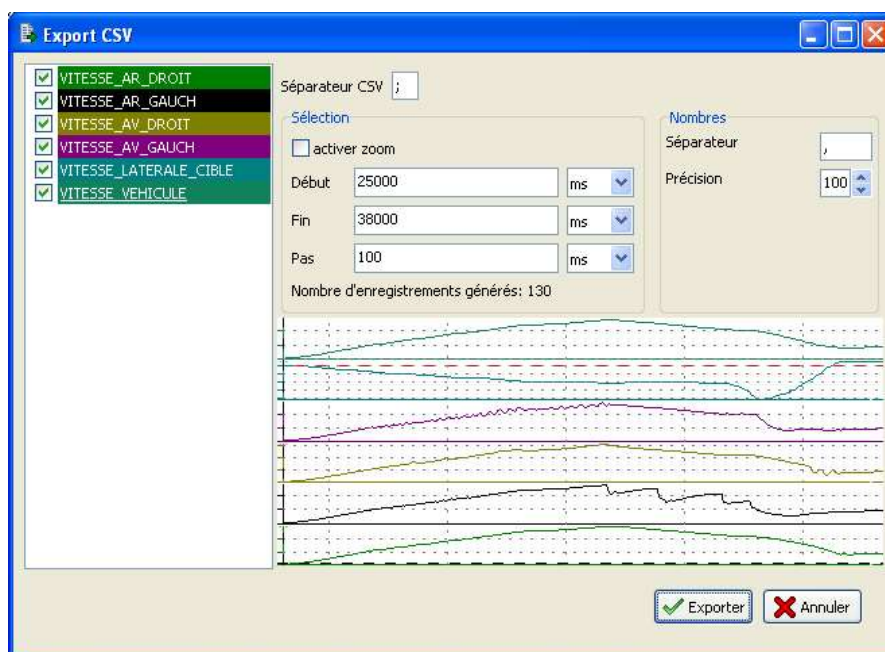
The “List of signals” label (top left) is used to readjust the selection of curves to be viewed without leaving the analysis.



*Displayed signal selection*

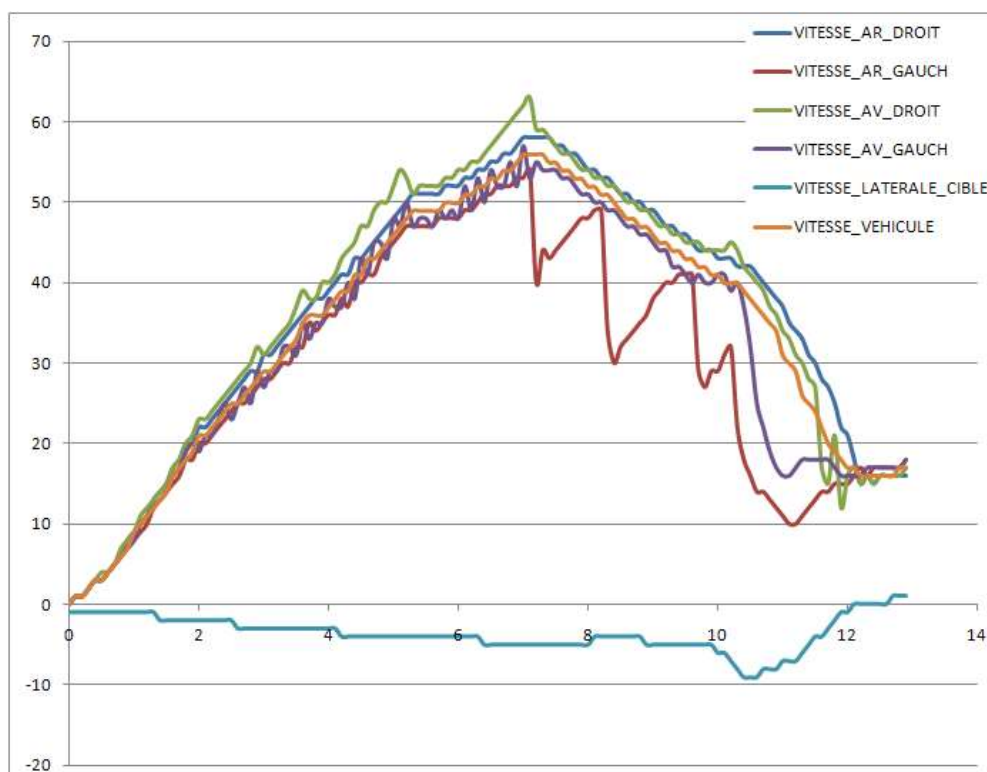
## Exporting to Excel

For a more detailed analysis, the data can be exported to Excel using the Export/Export CSV function. Choose a step of 100 ms and a precision of 100.



**Export window**

The data is exported in a .csv format which can be imported directly into Excel. To plot a graph, simply add a time column with the same 100 ms step.



**Excel graph**

### 1.7.4. Installing the Reflet program

Run the 'RefletInstall.exe' application from the CD-Rom provided or from the version downloaded from your customer area at [www.exxotest.com](http://www.exxotest.com).

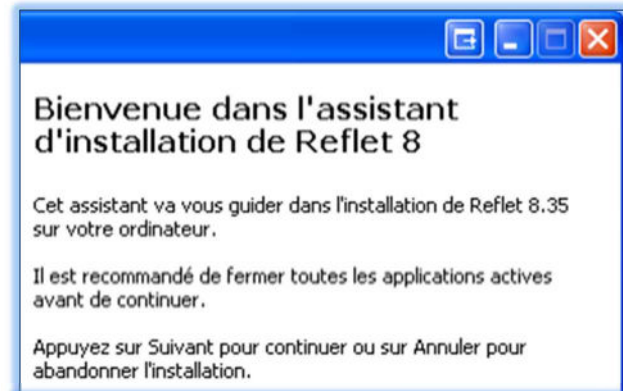


The installation/updating operation will then proceed as follows:

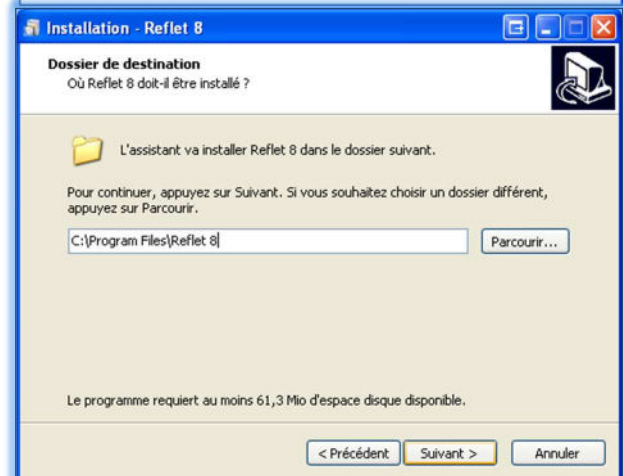
4. Choose the installation wizard language: click OK.



5. Installation wizard welcome screen: click Next.



6. Choose the folder where **REFLET** is to be installed: click Next.



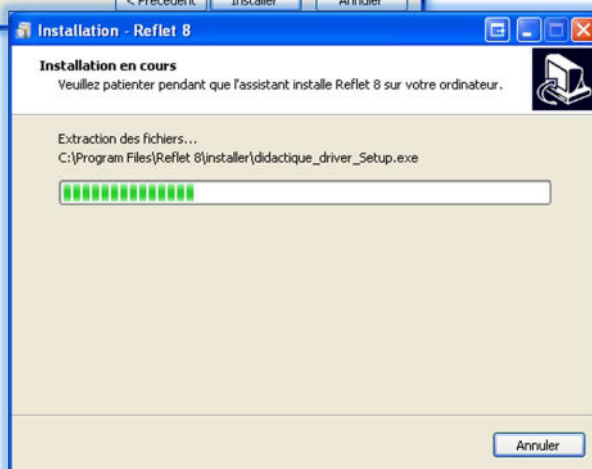
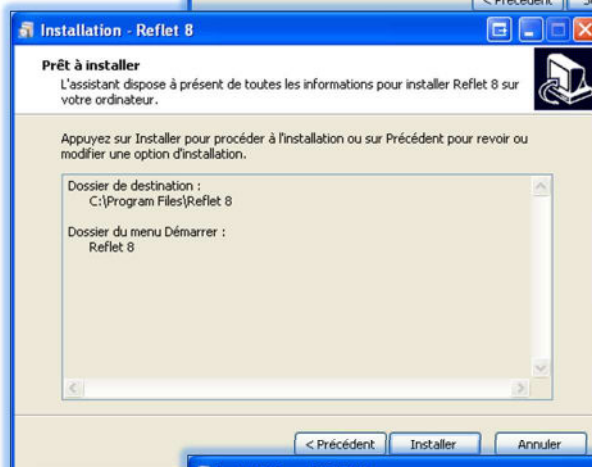
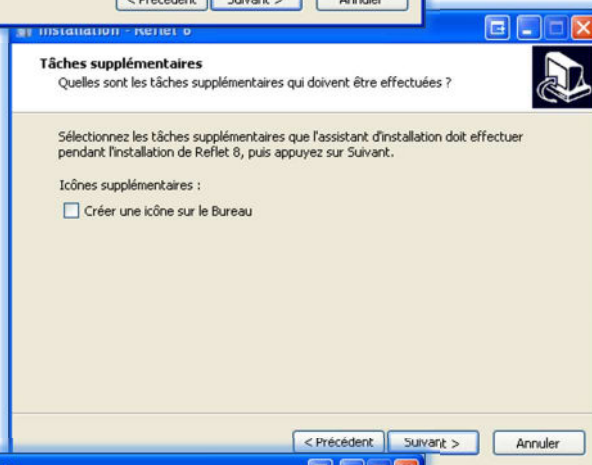


7. Choose the Start menu folder:  
click Next.

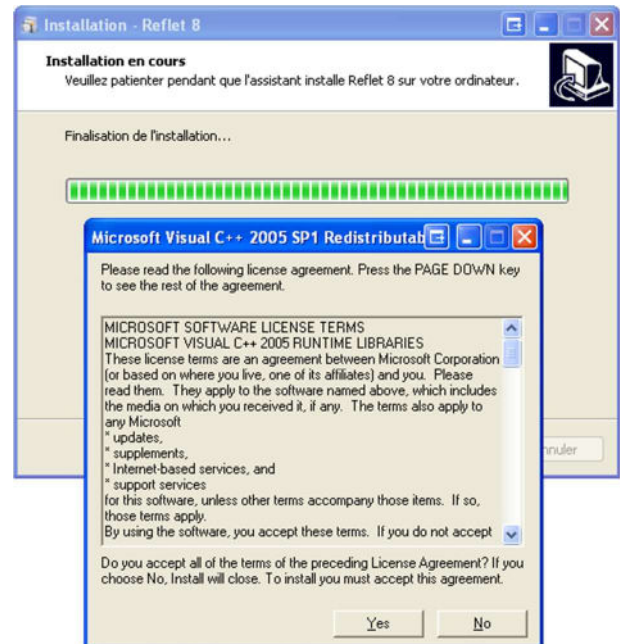
8. Create a shortcut  
on the Desktop: click Next.

9. Installation ready to begin:  
click Install

10. Installing:  
Wait a few minutes...

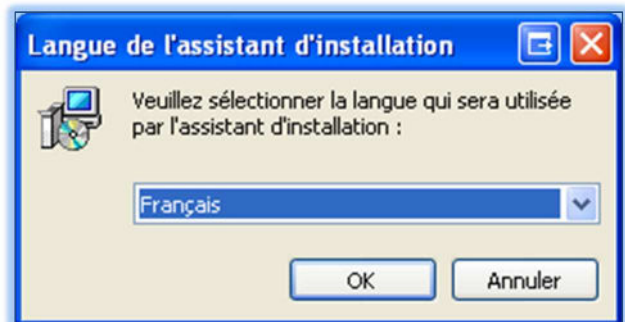


11. Accept the installation of the C++ module: click Yes.

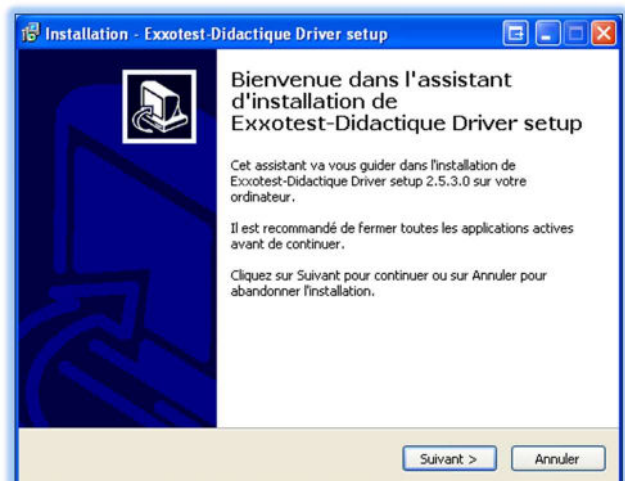


#### 1.7.5. Installing the EXXOTEST device driver

12. Choose the installation wizard language: click OK.



13. Installation wizard welcome screen: click Next.

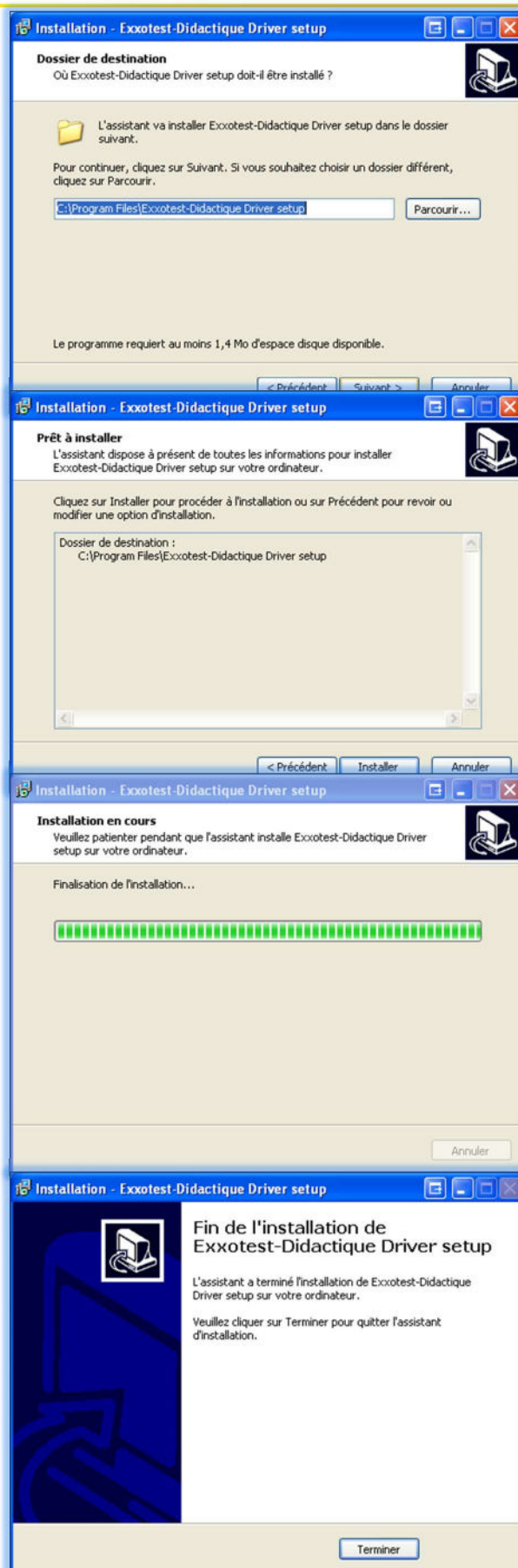


14. Choose the folder where the driver is to be installed: click Next.

15. Installation ready to begin: click Install

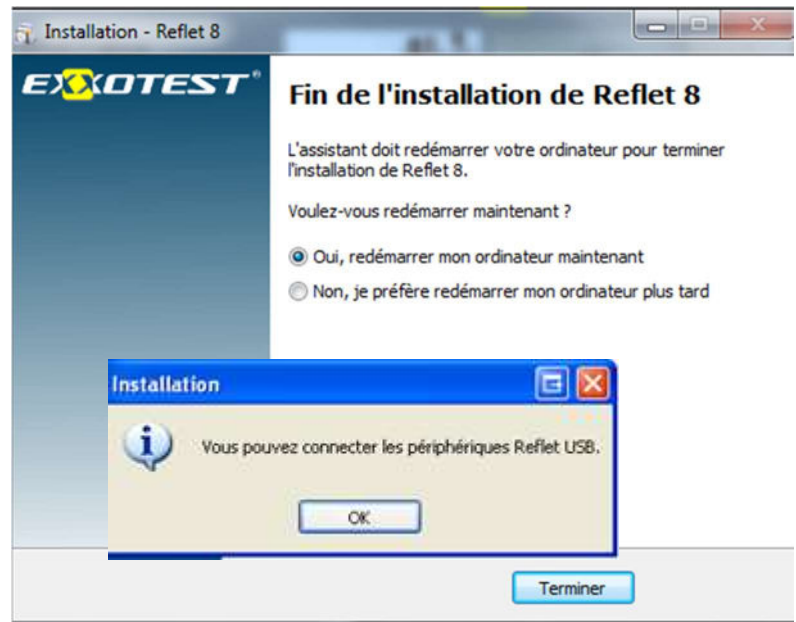
Installing:  
Wait a few minutes...

16. Installation complete:  
click Done





- 17.** Reflet and the driver are now installed.  
Click OK, then Done.



- 18.** The computer may need to be rebooted to finish loading the new driver.  
**19.** It is also advisable to install EXXOGRAPH now.

#### 1.7.6. Connecting to the model

Connect model MT-ESP1000 to the computer via the USB cable.



You will find further information in our Reflet instruction manual supplied with the model or in the Download area of our website [www.exxotest.com](http://www.exxotest.com)

Manufacturer      Name:            **ANNECY ELECTRONIQUE SAS**  
                         Street:        **1, rue Callisto - Parc Altaïs**  
                         Town:        **74650 CHAVANOD**  
                         Country:    **France**

Represented by the signatory below, declares that the following product:

Product reference	Description	Make
<b>MT-ESP1000</b>	<b>3D Benchtop Learning Model – Vehicle Stability Control: ABS, ASR and ESP</b>	<b>EXXOTEST</b>

**complies with all requirements of European directives relating to the design of Electrical & Electronic Equipment (EEE) and the management of Waste Electrical & Electronic Equipment (WEEE) in the EU:**

- Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE)
- Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS)
- Electromagnetic Compatibility Directive 2004/108/EC of the European Parliament and of the Council of 15 December 2004.

**The product has been manufactured in accordance with the requirements of European directive:**

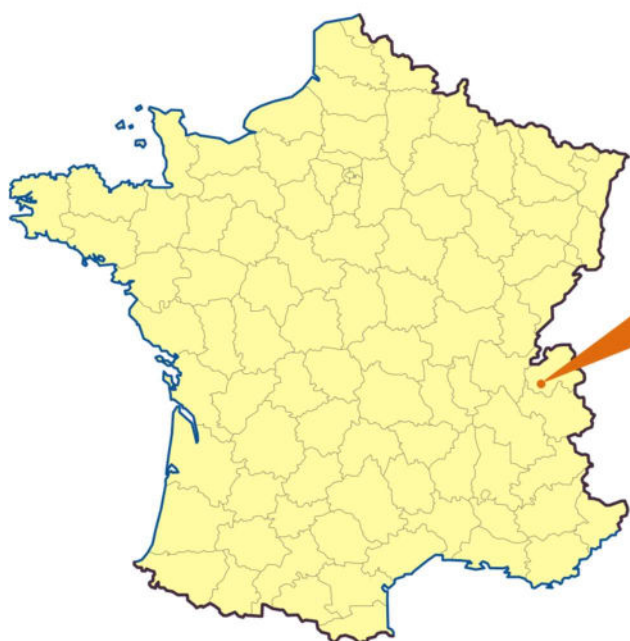
- Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.

Signed in Chavanod on 20 July 2015

Stéphane Sorlin, Chairman







**Visit our website [www.exxotest.com](http://www.exxotest.com)**  
***This document is available in the Download Area.***



***Register now!***



Original Instructions

Document No. 00309358-V1

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