ATP Thermal

Funded by the 'ATP Project' under the EC TRACECA Program

Release 1.0

With the collaboration of ATP Project's members.
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Part I (introduction)

Software proposes to manage an equipment temperatures in the context of the so-called tests measure and control ATP (Accord Transport Perissable), with the consequent calculation of the 'K' (overall coefficient of heat insulation). Assumes that the equipment concerned is in can handle the following accessories:

- 12 sensors internal temperature
- 12 sensors to the temperature outside
- 2 probes of auxiliary temperature
- 1 probe of current
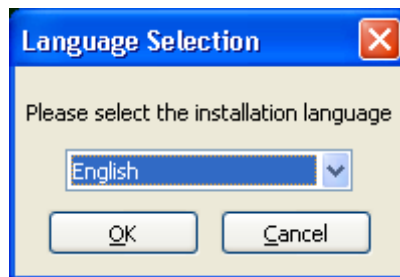- 1 output digital control one unit SSR (Solid State Relay)
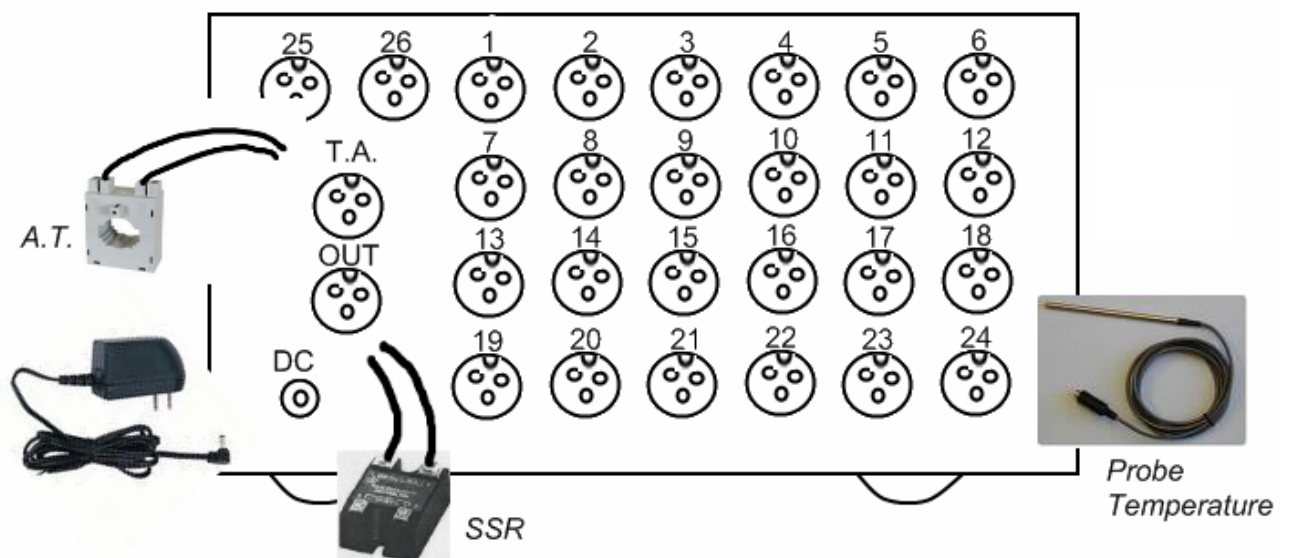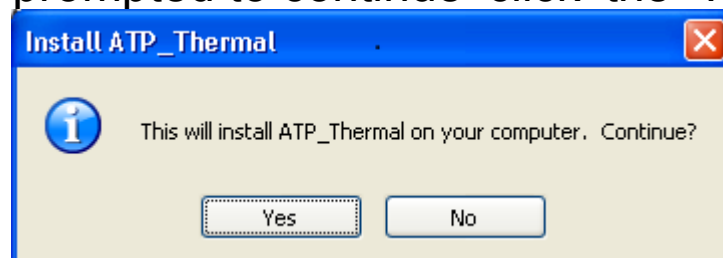
Part II (Installing)

For installing the usual program launch of 'Setup'.
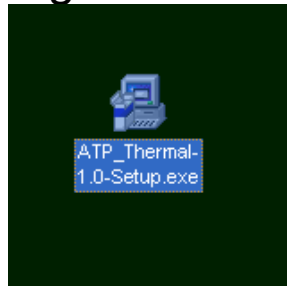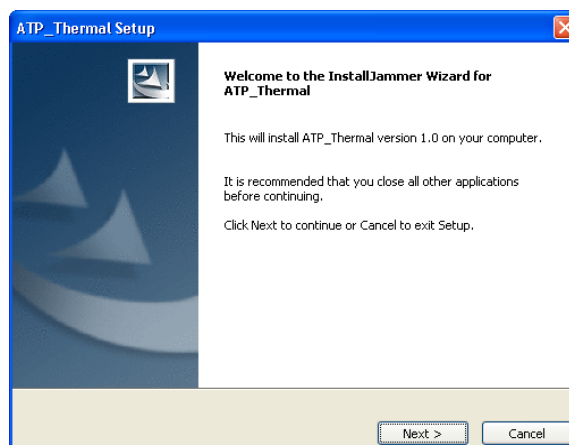

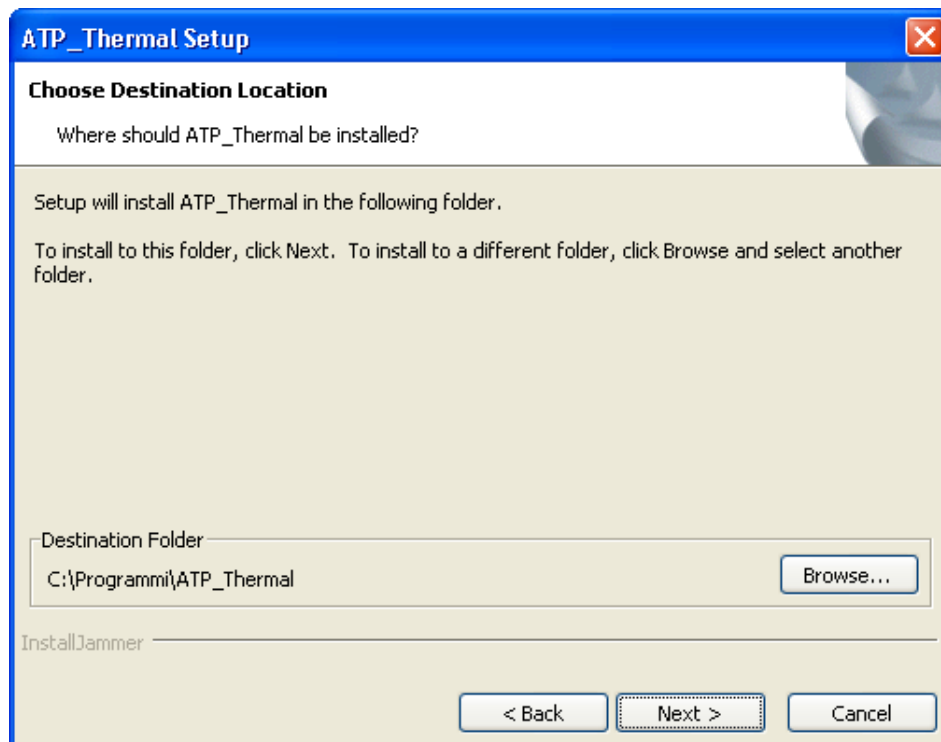that prompts you to choose the language for the installation itself.

When you are prompted to continue 'click' the 'Yes' button
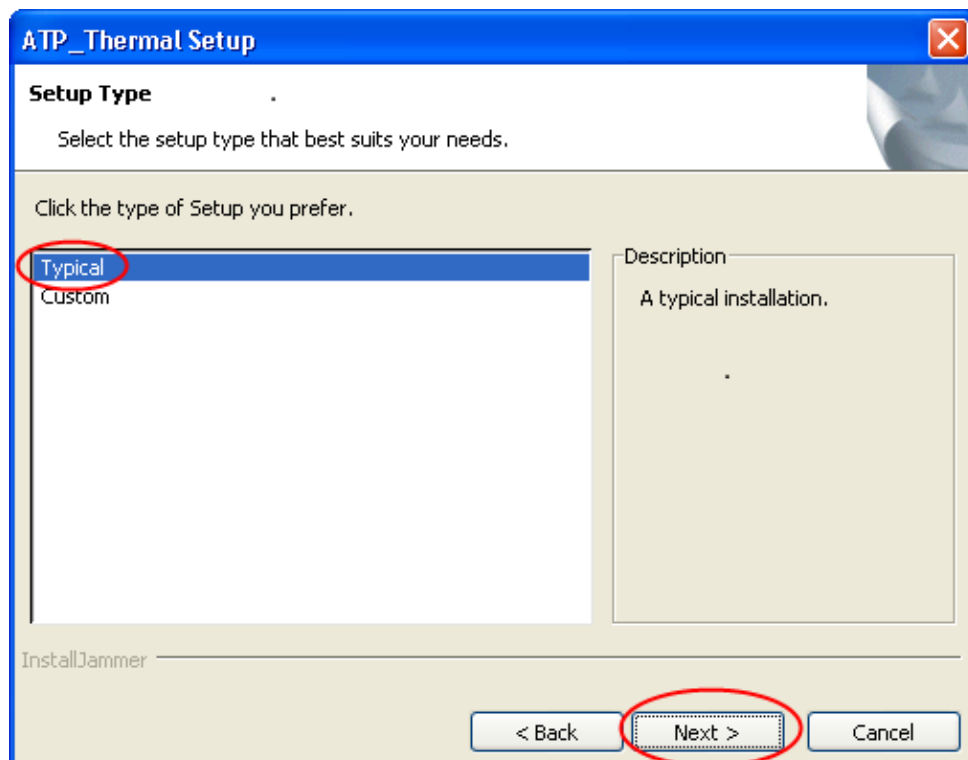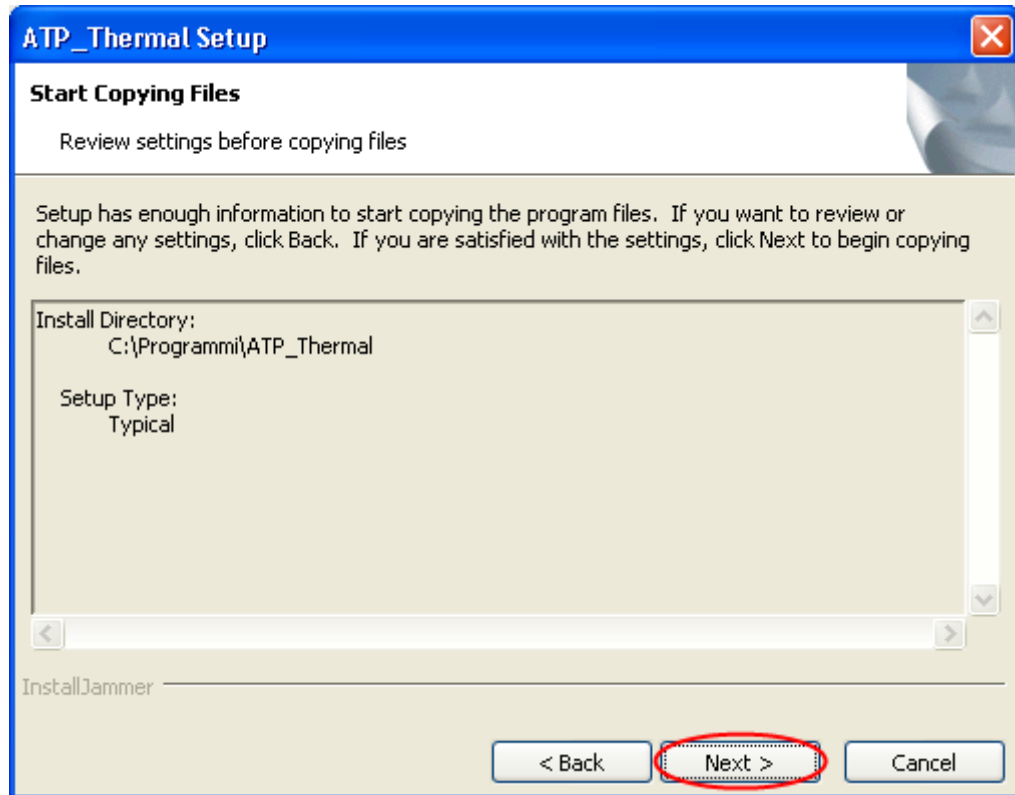

and then 'next'.

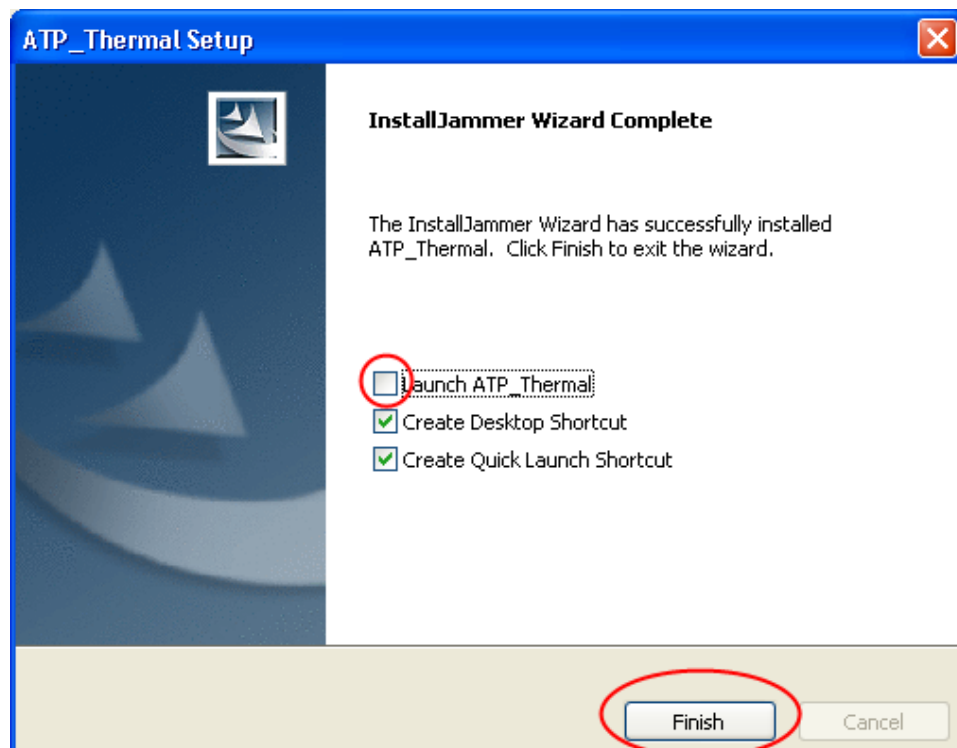At this point, click the destination folder (or leave the default) and continue with 'Next':

At the request on the typology of installation choose 'Typical' and 'Next':

and then still 'Next'.

Last window proposes for default the common link options to the newly installed program. Remove the option 'Run ATP_Thermal' and then click 'Finish'.

Part III (Main interface description)
a) Introduction

Software presents as a common application interactive dialogs with the central part built with a cards system that enables you to change (with various labels belonging to the tabs) between display modes.

The default tab proposed by the program is to with the representation of the vehicle.

All around the Group of tabs are always present (also changing tab) all realtime information that relate to the system test and in particular:
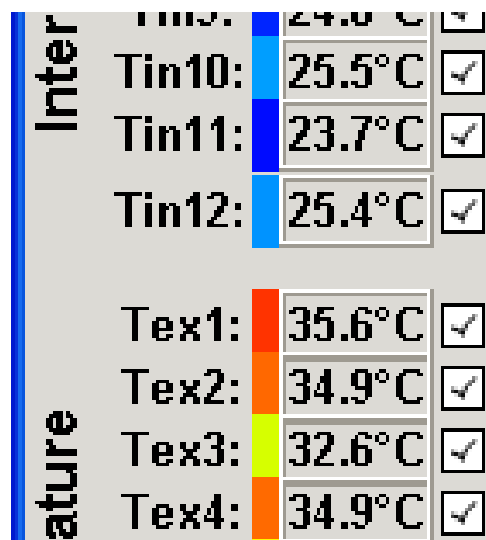
- grouped internal and external temperatures
- average temperatures
- maximum difference temperature internal and external
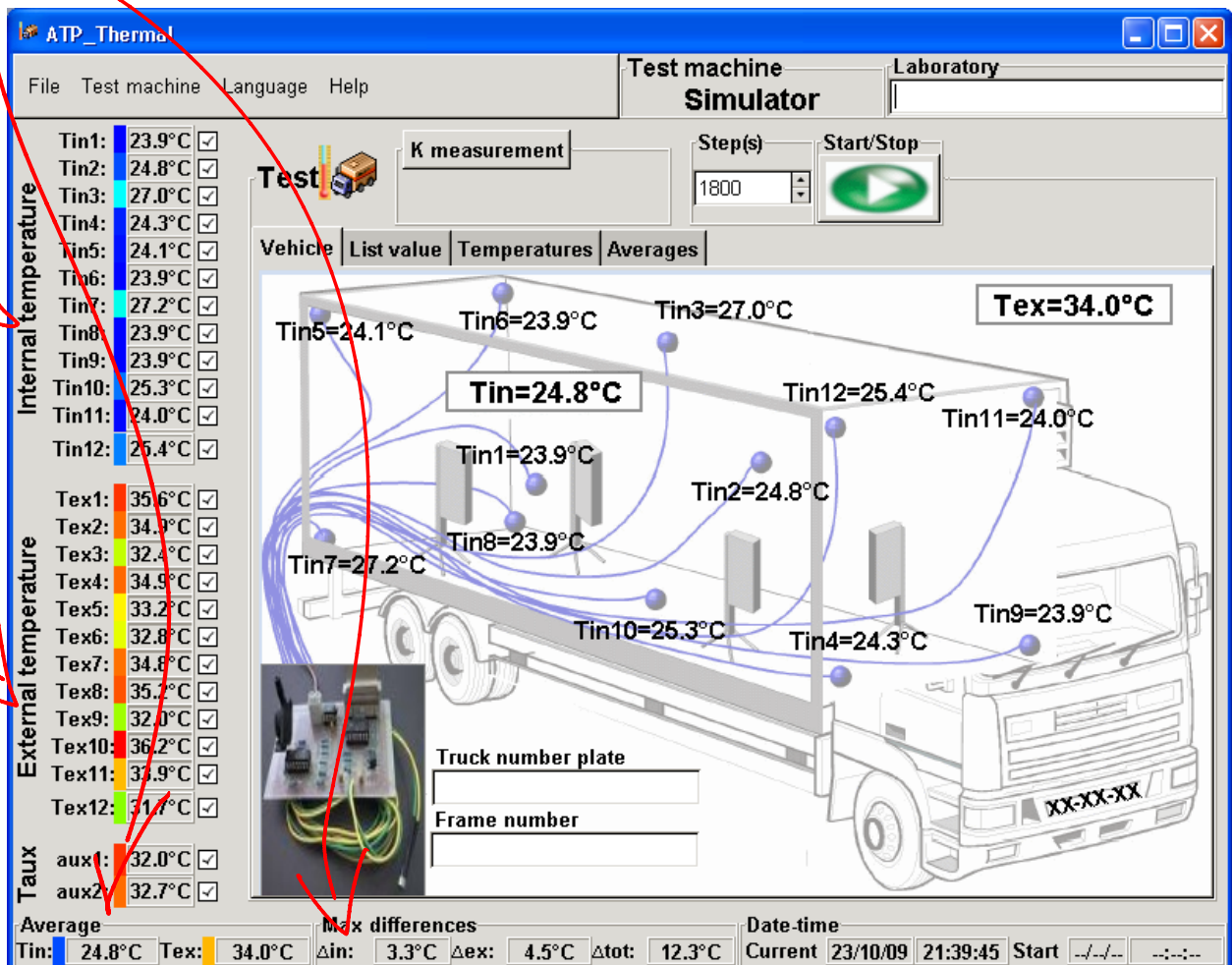
b) Field to the left of the cards

On the lines of each group of temperatures, you may easily recognise from left to right:

- A synthetic name that represents (the prefix 'Tin' is for internal while 'Tex' is for external)

- A colored box (with the technique of colors frequency map) highlights the numeric value of the temperature itself in real-time. A tint from the blue (the minimum possible) to red (the maximum possible) report highlights the temperature of that point with the overall minimum between both all temperatures internal and external then associated with blue.

- A 'checkbox' that allows to disable the representation of the temperature that so is excluded from the related calculations such as medium etc. This is particularly useful when you want to use the equipment control with a number of probes less than the total 26 (for example when any of the probes failed).

c) Card 'Vehicle'

The vehicle represented on the first tab (of default), offers the opportunity to observe the probes temperatures that are physically applied on the inside.

To facilitate the match between the probe used in a certain location and the name/role that you have chosen to assign them, you can drag from any line of the Group of the internal temperatures, the name or the value pane colored, towards an any labels placed close to the related probe on the drawing of the vehicle.
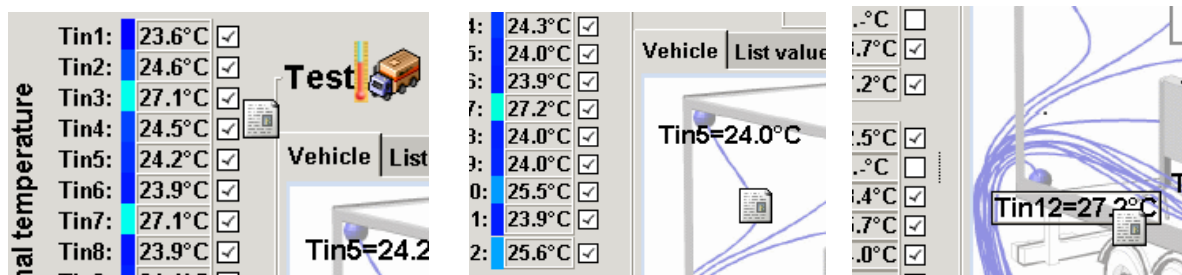
In this way will become the same temperature internal identification number and the corresponding measured value. In the sample, probe number 3 was placed on the truck instead of the 12 and the 12 in this case naturally ended on instead of 3.
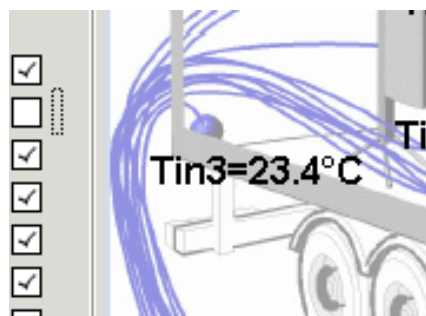

By repeating the operation up to place them all also without considering where end those that on the drawing are replaced, you can quickly update the software on the physical location of the probes.

The fields on the drawing vehicle that as 'Truck number plate' and 'Frame number', allows the insertion of the respective codes for the vehicle. The plate in particular becomes immediately visible on the front of the same, in his usual position.
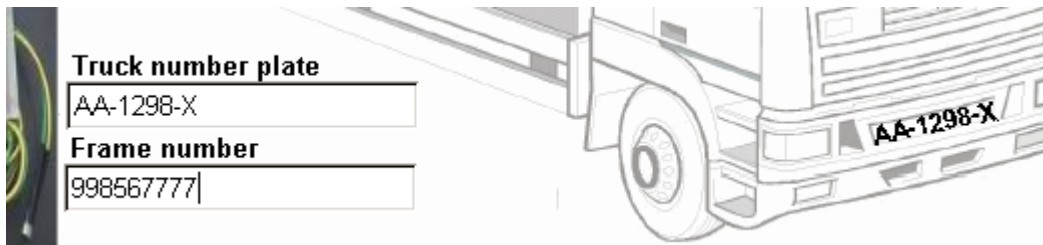
These codes are then used for printing the final report of the test, along with other information such as the its date and start time, equivalent of end and the name of the laboratory so how it is inserted in the field at the top right it dedicated.
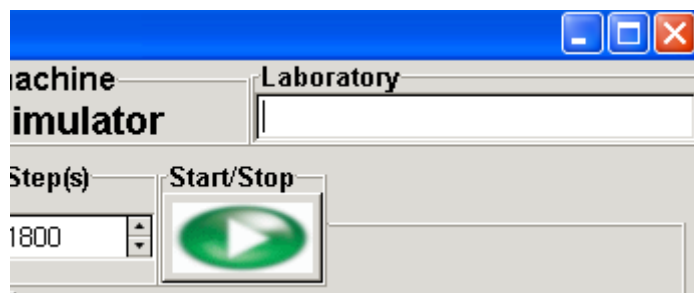
Finally in the 'Vehicle' tab, you can observe featured and 'realtime' calculated averages value internal and external.
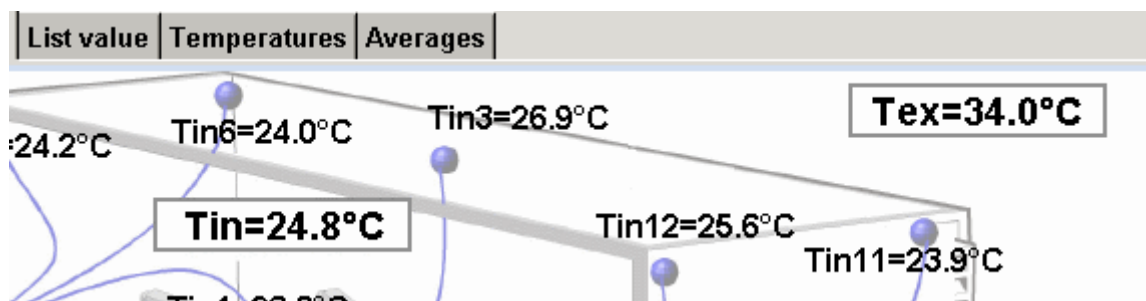
d) Field at the bottom under tabs

From left to right under the tabs area to tab, are represented respectively:

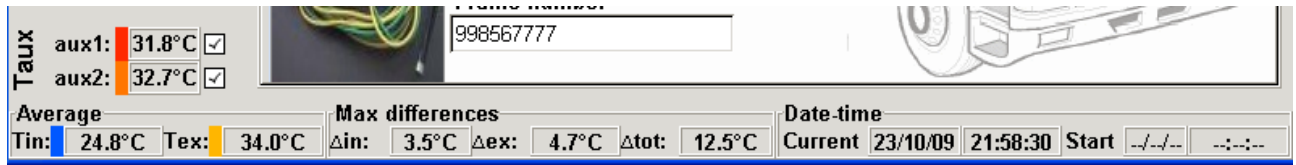- The two 'realtime' calculated values of the average temperatures internal and external (the same visible on the main tab). The colour of the dedicated pane is always related to the minimum and absolute maximum of all the both temperatures internal and external.
- Two maximum temperature's excursions respectively internal and external and at last total excursion that not is the sum of the earlier but represents precisely the maximum distance of temperature that can be found.
- The date and time snapshots (functional then to the storage of the time of 'Start' test).
- The date and time of the test starts. Up to the test starts naturally indication is nothing.

e) Field in high above the tabs

At the top of the program window in addition to the entry of the laboratory (that we have seen), there are panes that we will see further in parts to them dedicated:
- The pane dedicated to the extent of the 'K' activation
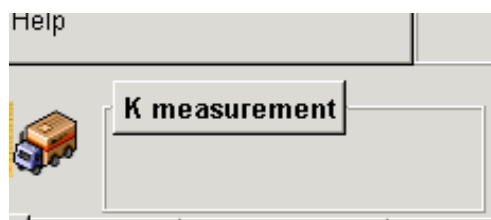
- The management of the timing of the testing with its pane storage of the information collected.
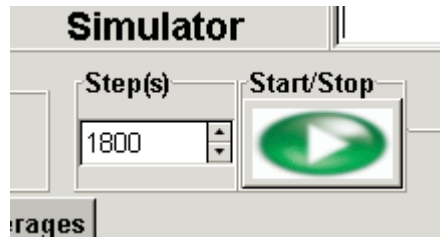
- The field that displays the type of equipment used for tests (that as we'll see may also be simulated, with an automatic and random generation of temperature around pre-established averages, useful for educational purposes)
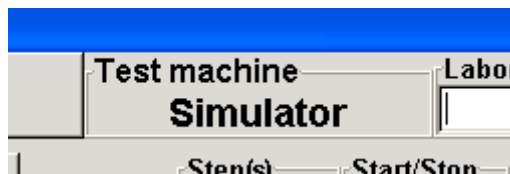
- Area in the usual applications menu windows with which its possible take choices that do not require frequent interaction (i.e. the language in use).
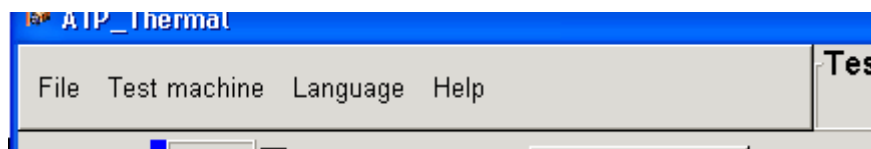
Part IV (Menu description)

The grouping of the menu options is divided into four areas: *File*, *Test machine*, *Language* and *Help.*
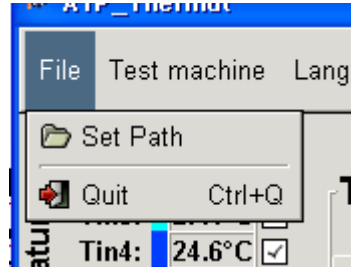
- *File* contains two entries:
    - *Set Path* clicking on which, the usual window of choice of the name of a directory (or that will become the same building), from that choice in then the container for the data produced during test **.**

    - *Exit* uses to exit the program.

- **Test Machine** *contains three items:* **Simulator**, **26PT100USB** *and* **Calibrate 26PT100USB**

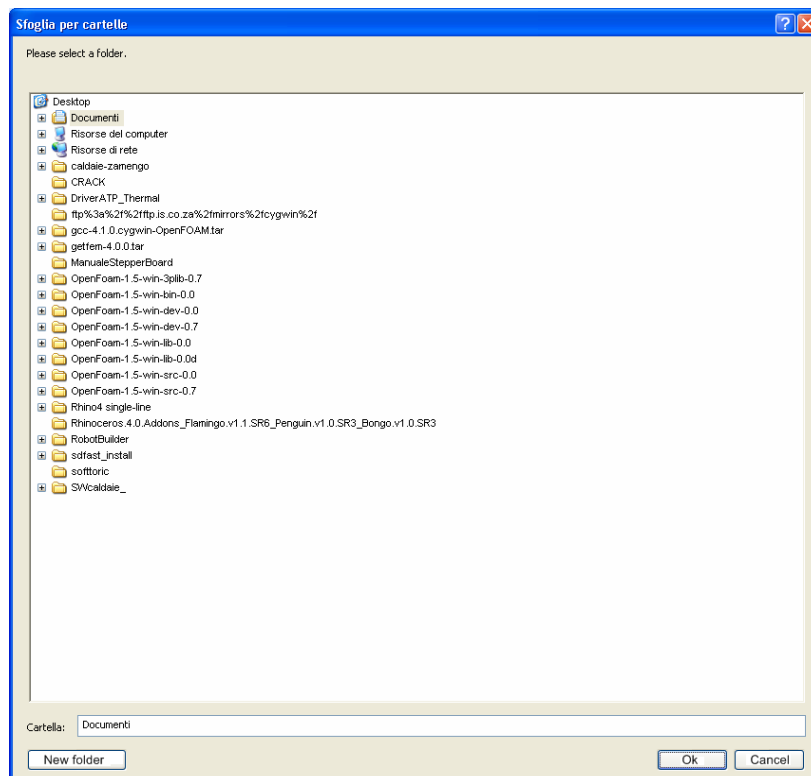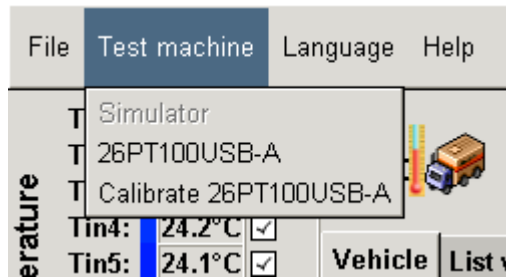- o **Simulator** allows you to test the functionality of the software by simulating the connection with a physical machine. Temperatures are generated as pseudorandom numbers vary within a range of +-3 °C around at a reference temperature that inside is 25 °C while outside is 35 °C.
- o **Calibrate 26PT100USB** shall initiate the procedure of calibration according to a schema that is described in the previous section dedicated to the calibration.

- **Language** allows you to choose between languages and change all entries immediately switching of application on the language chosen.

- **Help** contains the entry **About** with which you get information about the application.

Part V (Card 'List values')

This tab shows *realtime* the file of storage of data during the test.

According to the step chosen with the input field to the left of the Start button, appear rows each of the which contains the order:

- The time of acquisition in day, hour, minutes, and seconds.
- Groups of temperatures respectively: internal, external, auxiliary and averages.
- The measured power (if presen appliance for the current measurement).
- K measurement derived from the previous.

| ID	t(s)	Tin1(°C)	Tin2(°C)	Tin3(°C)	Tin4(°C)	Tin5(°C)	Tin6(°C)	Tin7(°C)	Tin8(°C)	Tin!
1	23/10/09 22:38:02	23.6	24.6	27.0	24.6	24.2	24.0	27.1	24.1	24.
2	23/10/09 22:38:04	23.8	24.8	26.9	24.5	24.0	23.8	27.0	23.9	23.
3	23/10/09 22:38:06	23.6	24.8	26.8	24.5	24.0	24.0	27.1	23.9	24.
4	23/10/09 22:38:08	23.9	24.9	26.9	24.2	24.2	24.1	27.0	24.0	23.
5	23/10/09 22:38:10	23.6	24.6	27.0	24.5	24.0	24.0	27.1	23.9	24.
6	23/10/09 22:38:12	23.8	24.7	27.0	24.3	24.1	23.9	27.3	24.1	23.

All the products data are saved in a file of formatted text (readable without the need for a particular software) and compatible with the import into Excel.

The name of the file is automatically built with the moment of starting test, ending test (in Date__Hour, with data format such as day_month_year and time as hours_minutes_seconds) and the 'atp' suffix. Is then placed in the folder established from the file menu.
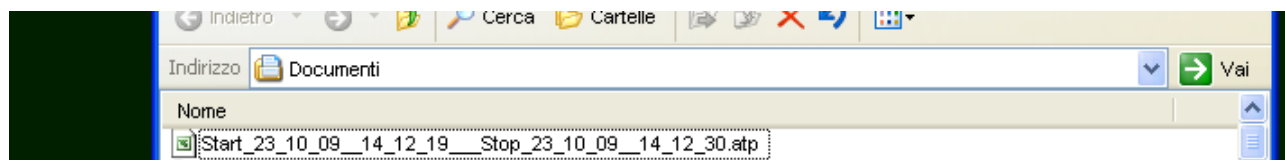
Part VI (Card Temperatures, Averages and K measurement)

The page offers substantially the *realtime* display of a chart with all temperatures selected with related checkboxes.
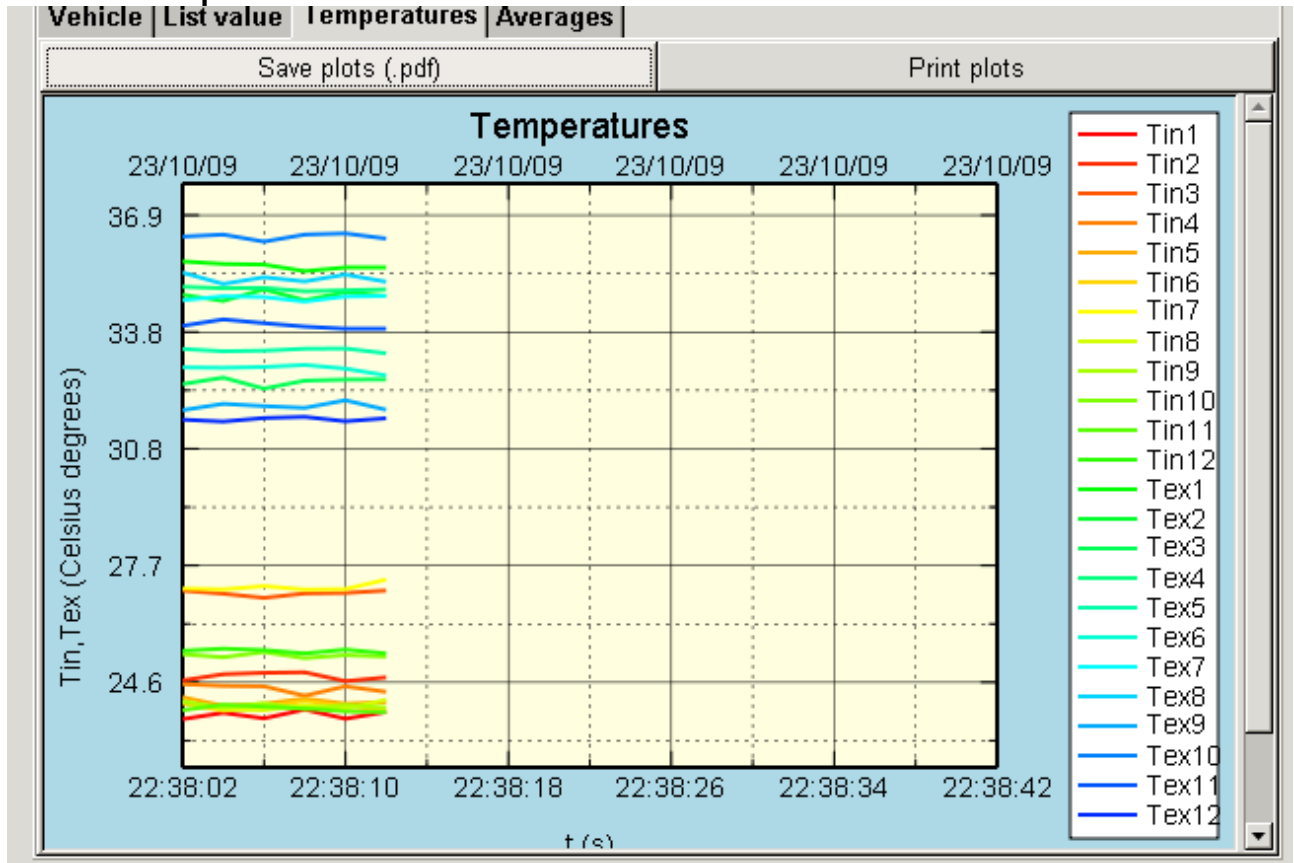

There are two buttons in the top that display: *Save plots* and *Print plots.*


With them you can begin printing or the production of a pdf file containing the graph with all available information on the tests.

Before reaching the point for choose the name and location to save pdf file or the printer from the list of those available, introduces two preview that allow you to easily determine

the orientation of the chart by clicking directly on the chosen.
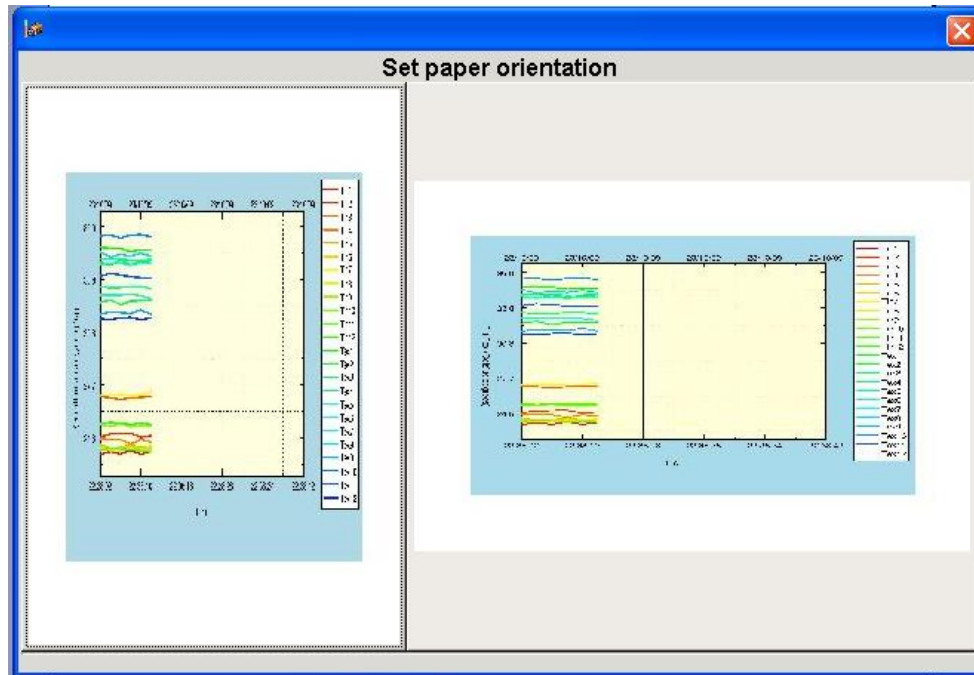
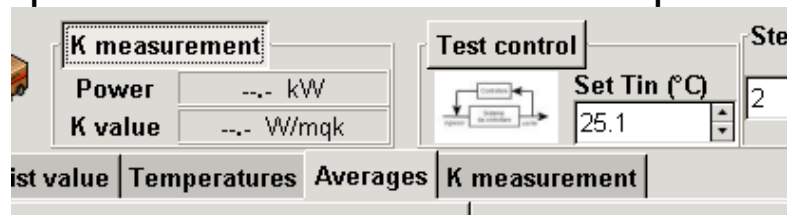In the case of the 'Save' the result is the pdf document.
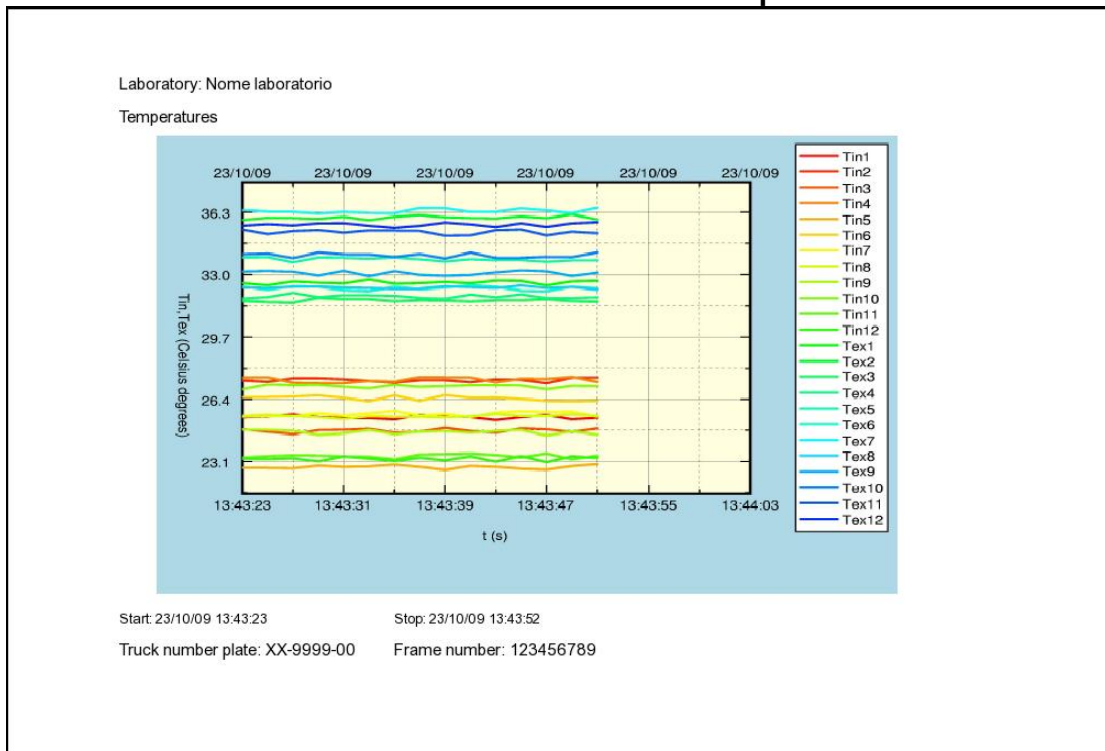
The tab '*K measurement'* is only available if you chose the option of the k calculation, by pressing the '*K measurement'* button to the left of the start .

Part VII (K measurement)

a) Introduction

Button located above the tabs group activates the estimate of K, realtime power measurement and temperature control.
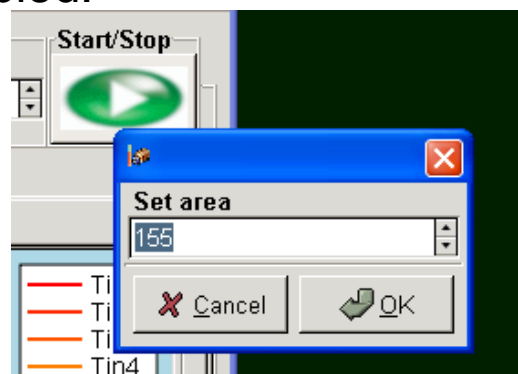

b) Power

The power is calculated using for the voltage the used electrical reference value in the country and for the current the measured value using an A.T. (Amperometric Transformer) properly connected (if the equipment of measure provides this appliance).
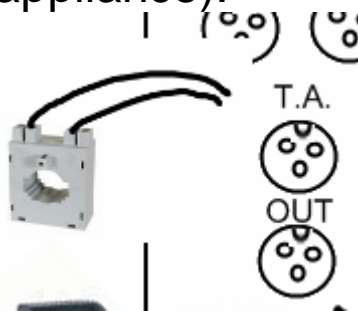

c) K measurement

The estimate of the K takes place with the usual formula using the average values of the temperatures, the physical measuring of the electrical power and the exchange area that is required at the start of the test if the button 'K measurement' is enabled.

d) Test control

The pressure of the button that shows 'Test control', puts a PID controller in action for the appropriate output of test equipment (when is planned), for control power.

The controller parameters are dimensioned for reach and stabilise the desired value in less time can compatible with the physical dimensions of the Tunnel-Vehicle-Power system available.
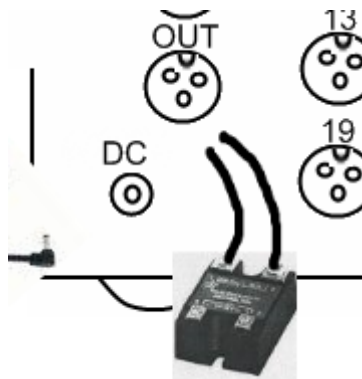
The control acting with the objective of maintaining constantly the internal temperature set point value that
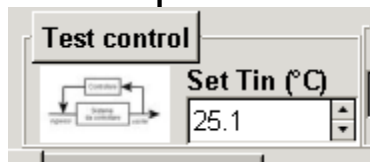
appears in the input box 'Set Tin(°C)'.