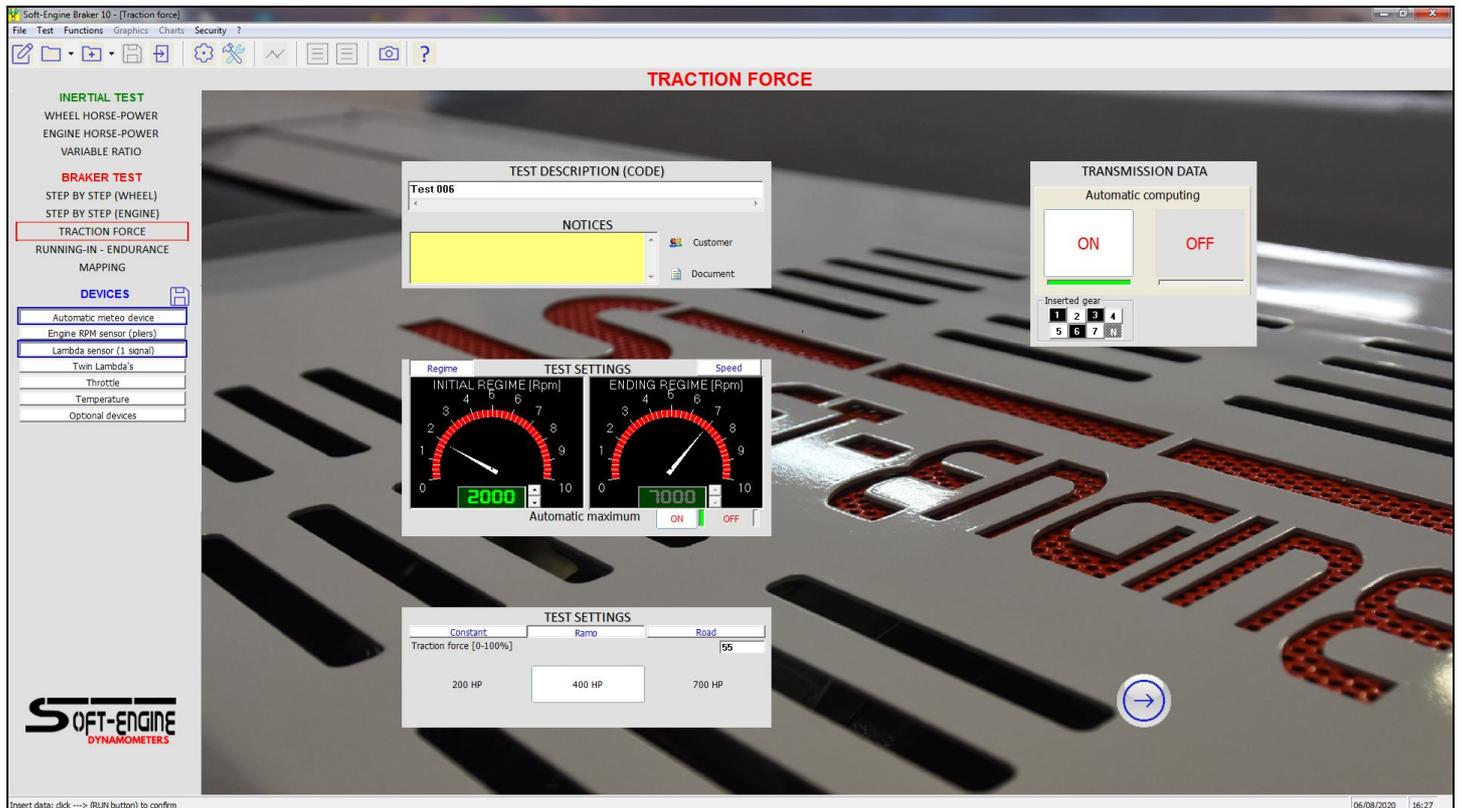


Soft-Engine - Data store software: Version 10

Software description

INERTIAL 10 – BRAKER 10 is a new generation software for **dynamometers** by **SOFT-ENGINE**. This is very a very and very performant software, but easy to use. Compared to previous versions, it has many more features, such as the ability to enter everything you need for the test in a single screen, press a button and accelerate. All in just two steps!



Braker 10: everything you need for the test in a single screen!

The features of version 10 compared to the previous ones

We have already talked about the first great innovation of version 10 compared to the other versions. Other innovations are:

1) RAMP TEST: scientific calculation of the right force to be given to the vehicle, on the basis of a simple calibration to be done just before the start of the test at the minimum operating point (or speed) in which the test. Everything is automated by the software, which tells the operator exactly what to do.

2) TEST WITH SERVO-ASSISTED ACCELERATOR (ROTOGAS): very used in dynamometers for engine, this "robot" can be combined with dynamometer and connected to the accelerator. The tests will be managed by this robot, which allows for extremely repetitive tests because the accelerator always accelerates in the same way. It is also possible to select a "control parameter" (temperature of any type among those that the user has requested or other sensors, freely calibratable - optional) within which the motor must be and which does not allow the test to be carried out if the parameter control goes out of range, in order to always guarantee the same conditions

3) DURABILITY TEST (OPTIONAL): il "Durability" is a test that can be activated on request and serves to simulate road work cycles. The user sets a speed table that during the test he must respect for a certain number of seconds. It is possible to combine these work cycles with a constant or variable traction force. It is in great demand for "green" electric vehicles, to test the efficiency and duration of the batteries.

4) OBD ACQUISITION OPTION: automatically receives RPM from the car or motorcycle engine through the OBD interface. It is a very convenient option that avoids having to calibrate the tachometer every time. The search for the protocol and the optimal bitrate in order to make a dynamometer test is totally automatic and the operator only has to connect the OBD interface to a free USB port. There is a control

panel that displays the main PIDs with the possibility of recording them in an Excel table.

5) FLEX OPTION, FOR 4WD CAR “SYNCR0” DYNAMOMETERS: the front and rear rollers modules of a 4WD synchronised car dynamometers can be decoupled to test vehicles more comfortably two-wheel drive ... now this function is incorporated in the software, without the need for additional installations.

6) MOTORCYCLE TEST ON 4WD CAR DYNAMOMETERS: now the software sets the right parameters to test motorbikes on a 4x4 car bench simply by pressing a button, without the need for additional installations.

7) DISPLAYS LARGE AS DESIRED: during the test it is possible to enlarge any display to better follow the progress of the test and also the color can be varied.

8) MANAGEMENT OF 4 LAMBDA DEVICES: you can choose to combine up to four Lambda devices to dynamometer, previously up to 2.

9) CHOICE OF OTHER QUANTITIES DURING THE REAL TIME ACQUISITION: not only the power but also other quantities and of interest such as Torque and Lambda.

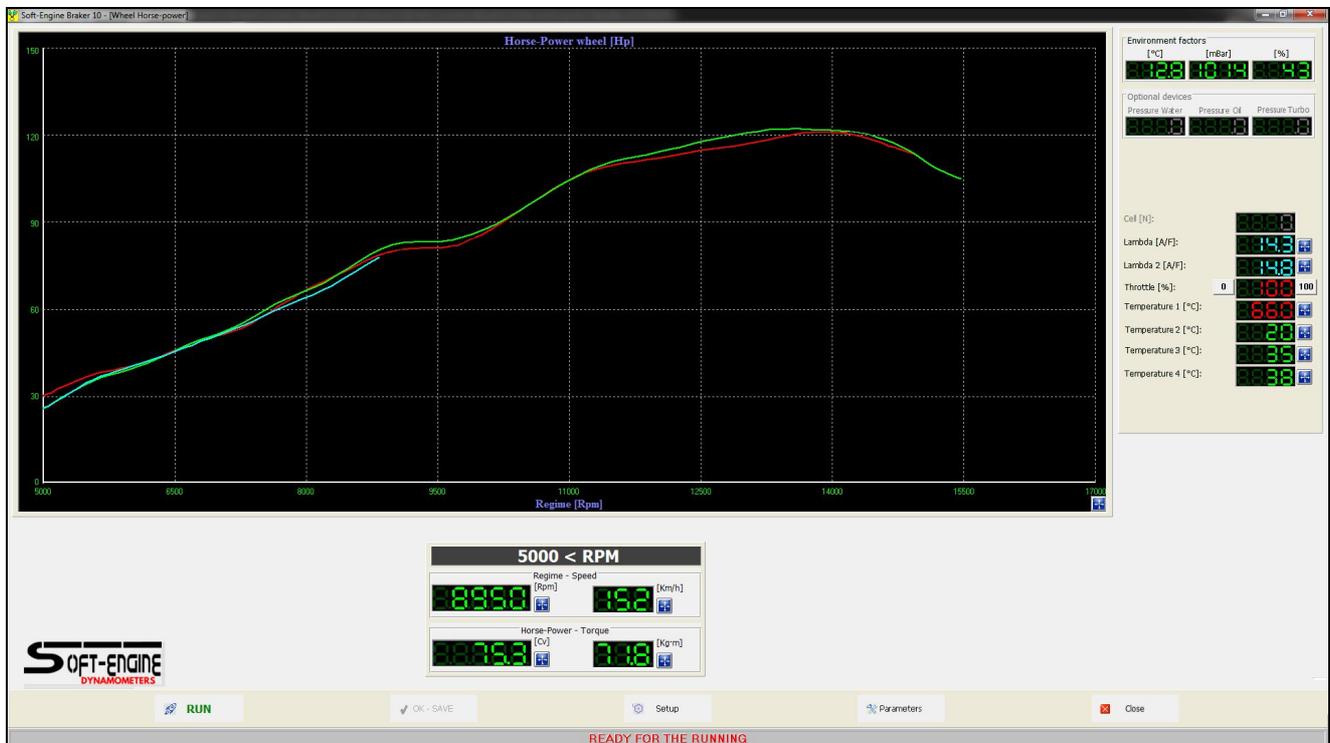
10) NEW DIAGRAM in which all the quantities can be visualised, the operator will exclude the quantities that are not of interest.

11) NEW MANAGEMENT OF THE MAXIMUM VALUE: this value can be shown directly on the top of the curve, with a font large as desired, or it can appear in a window that can be enlarged as desired or finally it can appear in full screen immediately after the end of test and before the diagram is shown.

12) HATCHING OF THE DIAGRAMS: The diagram of the same quantities (example: Wheel horse-power, Absorbed horse-power and Engine horse-power) can be distinguished with a different hatch, while the color distinguishes only different tests. You can return to the classic way to visualize at any time.

13) IMPORTABLE/EXPORTABLE MAPPING: Now it is possible to import or export the mapping table from other injection or advance management programs, to take advantage of the lambda reshaping tools (real-time or design time correction of lambda curve) of our system..

Finally, the graphics of the whole software have been totally modernized, according to the styles most used today. It is also possible to manage the diagram screen (colors, font of the writings, etc.) by choosing various **templates**.



Braker 10: real time horse-power acquisition!

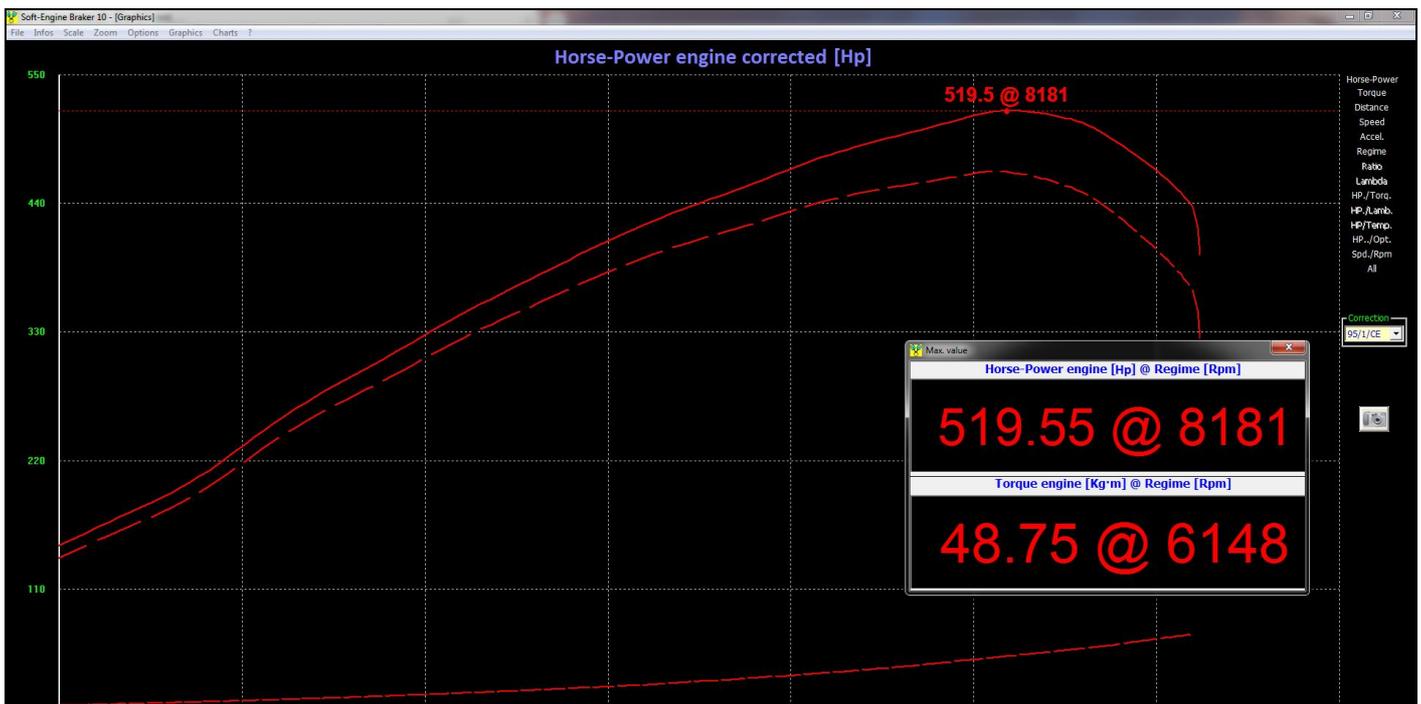
Software works in Windows[®] environment. We tried to simplify the use by putting all the analysis functions of the software in a single screen, that of the graphs. In this way, all the functions and all the screens in the program can be accessed simply by clicking with the mouse on the command buttons.

The stored quantities

The software has a lot of utilities, such as graphics, diagrams and charts. Here is a list of the most interesting operations. It measures of:

1) Horse-power and torque:

- ☞ to wheel;
- ☞ to engine;
- ☞ absorbed;
- ☞ DIN / CE / SAE / DIESEL / TURBODIESEL correction;
- ☞ HP - KW units (power) and british;
- ☞ Kg*m - N*m (torque) and british.



engine.

- 8) Displayed power and torque together.
- 9) Displayed Rpm and Speed together..
- 10) All values compared and displayed.
- 11) Management of **USB data store electronic system**
- 12) **Airbox overpressure** management (optional).
- 13) **REAL TIME DIAGRAMS** during test.

Kind of tests

1) **INERTIAL** tests:

- ☞ **Wheel horsepower** (Manual gear, constant ratio).
- ☞ **Engine horsepower** (**Deceleration test** with transmission friction measurement).
- ☞ **Sequential gear** (from initial to top speed rate).
- ☞ **Acceleration test** (the **acceleration is constant** during the test).

2) **BRAKED** tests

- ☞ **Constant speed braking**: control by RPM, the horsepower is stored step by step.
- ☞ **Constant load braking**: control by traction force. Constant traction force during all test.
- ☞ **Variable load braking**: control by traction force. Variable (linear-crescent) traction force during all test.
- ☞ **Road simulation test**: it is an "**Inertial and Braker**" test and brake simulates the road frictions.
- ☞ **Engine Running-in**: impose some RPM points, the brake stops the engine at these RPM points for a pre-imposed numbers of seconds. The cycle can be repeated.
- ☞ **Endurance**: like the running-in test, but it's possible to control also the TPS and a servo-mechanism for the automatic acceleration (optional). The cycle can be repeated (also infinite).

The test analysis

When the test ends, the diagram window appears.

Values versus:

- ☞ Rpm
- ☞ Vehicle speed
- ☞ Test time

For each assessed value the following data are available:

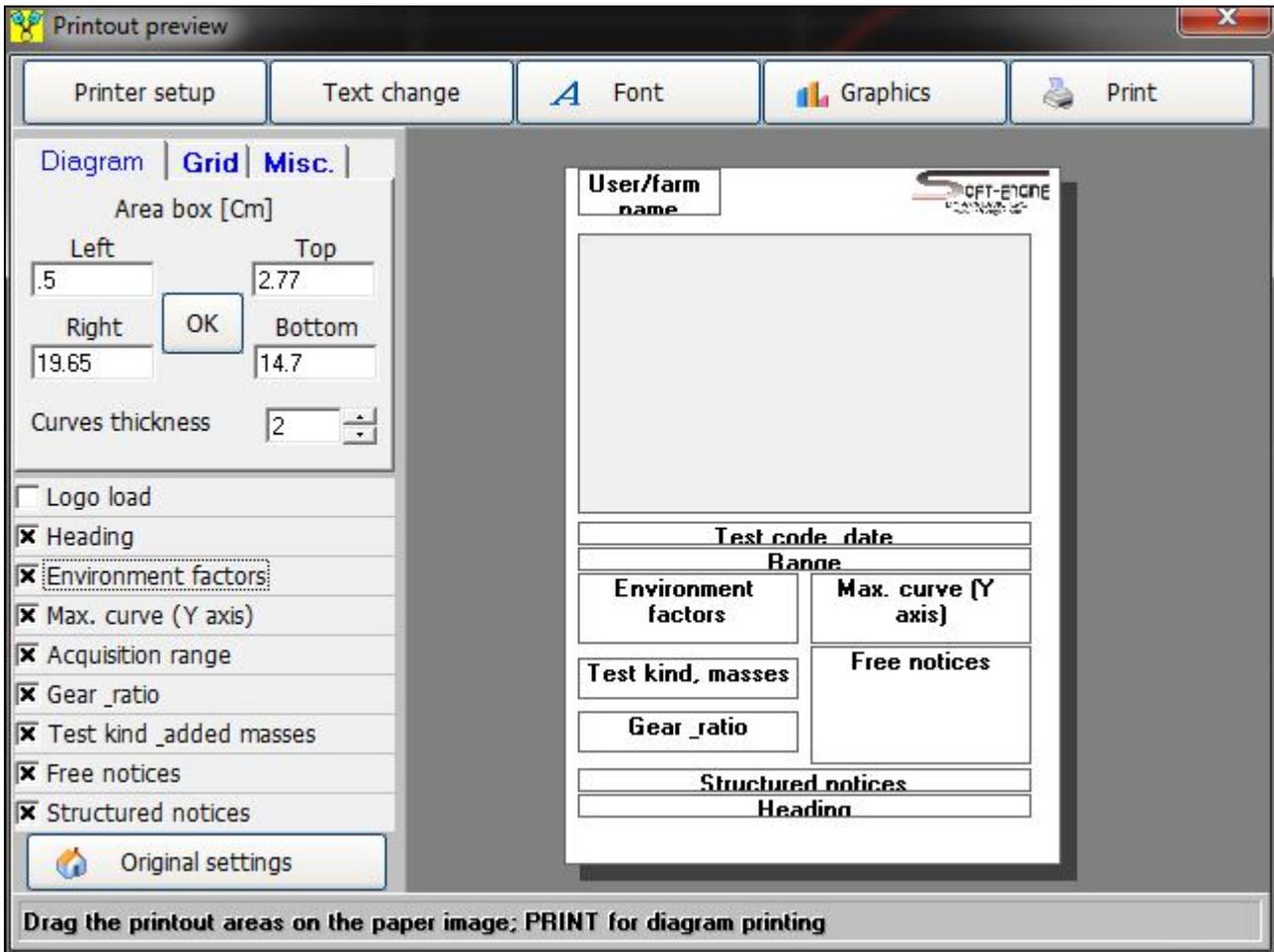
- ☞ Max., min. and mean value; **cursor** to read all curve points
- ☞ **Smooth** effect for the curves
- ☞ **Zoom**, graph scale management
- ☞ Test replay
- ☞ Sizeable graphics window with complete colour management
- ☞ **Comparison** of different test curves
- ☞ Different values of a test comparison
- ☞ File section: it is possible to create directories to classify tests in a single session
- ☞ Long filename management
- ☞ Different test compared charts
- ☞ Sensors and device management improvement
- ☞ Quick test mode choice
- ☞ Acquisition of max. 6 curves in sequence
- ☞ **Printing preview** with remarks, logo and graphics management
- ☞ Chart of all values
- ☞ Other Soft-Engine software interfaces.

THE SOFTWARE IS SUITABLE FOR ADDING PLUG-INS "RAPID-LINK" FOR "RAPID BIKE" CONTROL UNITS MAPPINGS, AND RPM DIRECT ACQUISITION BY OBD2 SYSTEM.

Diagram are upgraded with new buttons design and above-all with the possibility to watch immediately maximum value and the **cursor** (new function "References on the diagram"). The new "**Video**" function is able to generate a video in avi format while the "**Test replay**" is running. From Diagram window all stored quantities (Horse-power, Torque, Performances, Carburation. Temperatures, Pressures etc...) and all analysis, tabulation, data store and comparison function are immediately available with the pushes.

Printouts

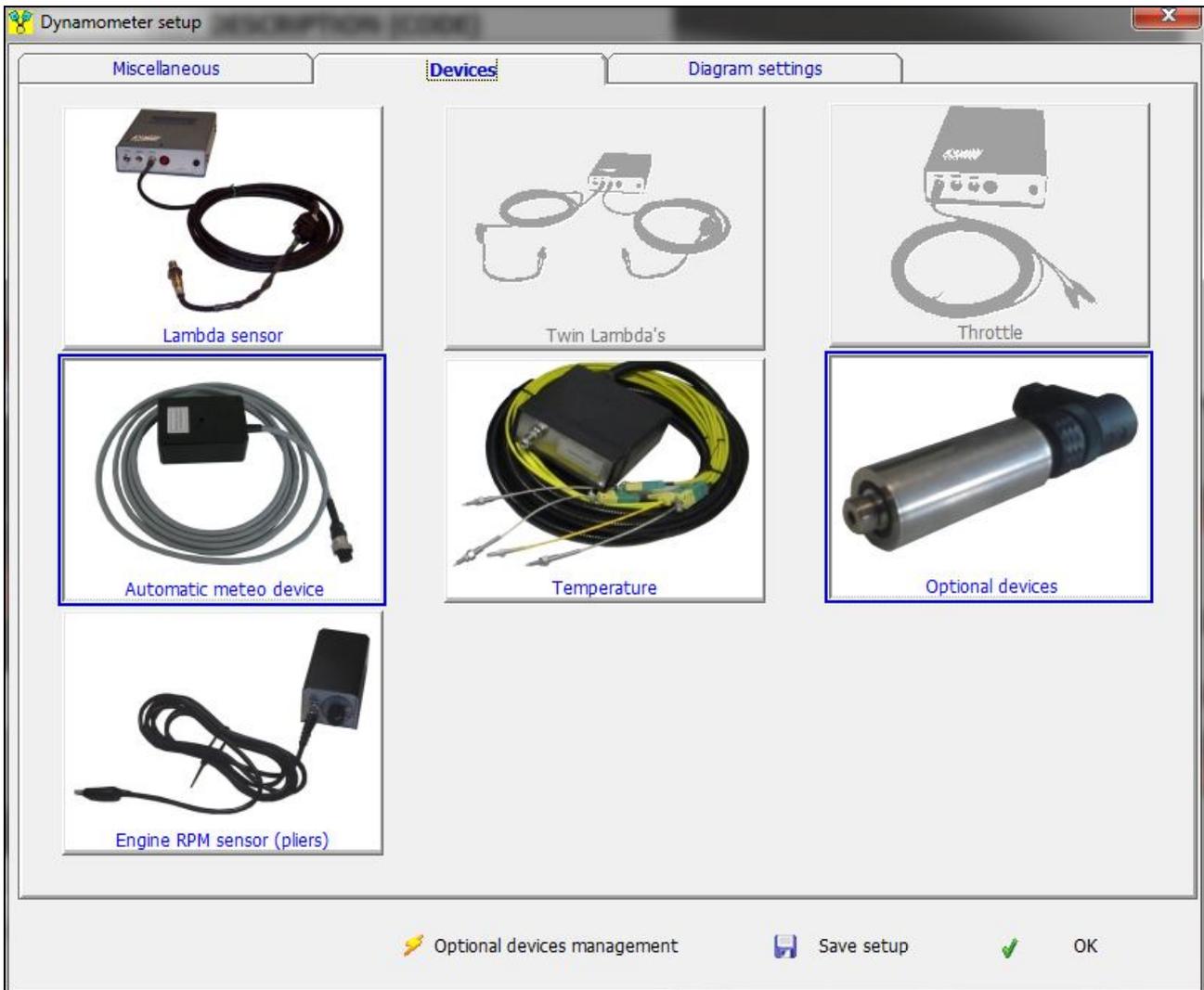
The printout page is extremely customizable, thanks to the "Printouts setup" function, by which is possible to import a logo and a printout background, to choose which notices have to be printed, to change writings fonts and colors and to set the printout boxes. During comparisons, the most important data are added to the diagram.



Printouts page setup

Optional devices management

IT IS VERY SIMPLE to enable or disable the electronic optional devices, with the dynamic test setup!



Test setup, electronic devices management

By the **setup window - "Devices" section**, it is possible to connect or not the optional devices without remove the cables. All devices are connected with the USB electronic unit.

Mappings: at real and design time

AND IT IS VERY SIMPLE the system to manipulate the mapping chart: "Real time" during a braked test, or at "design time", by correcting the lambda diagram quickly after a test!

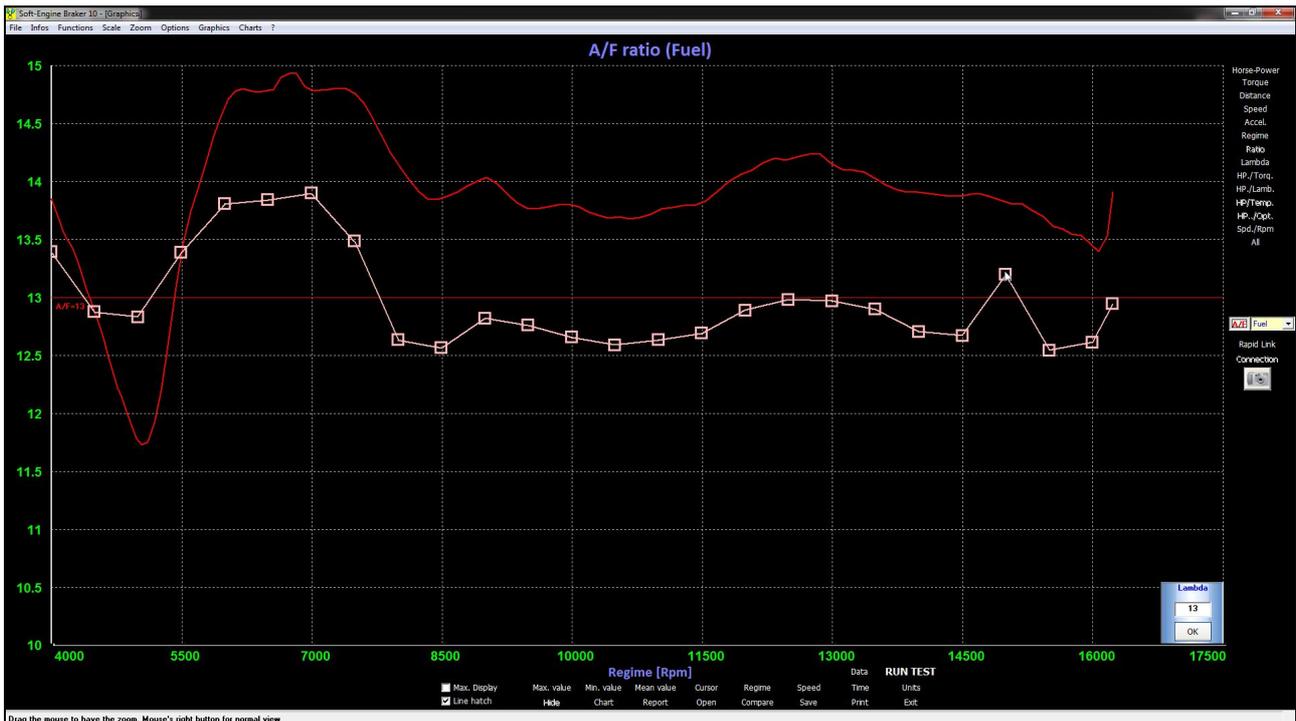
The optional device "**Mappings - Rapid Link**" it is possible to modify and correct the lambda carburation curve both at "real time" (during a braked test) and at a "design time", redrawing the lambda diagram as shown in the picture. In this case you can adjust the lambda diagram after a test (also inertial).

	[2] Anticipo Advance		[2] Iniezione Injection				[2] Iniezione 2 Injection 2		
TPS	0	5	10	20	40	60	80	100	
RPM	1	2	3	4	5	6	7	8	
1302	-1	0	0	0	0	0	0	0	
1634	-2	-2	-3	-3	0	0	0	0	
1938	-2	-2	-3	-3	-2	0	0	0	
2252	-2	-2	-3	-3	-2	-1	0	0	
2525	-2	-2	-3	-3	-2	-1	-2	0	
2874	-1	-2	-3	-3	-2	-1	-2	-4	
3205	-1	-2	-3	-3	-2	-1	-2	-4	
3472	0	-2	-3	-3	-2	-1	-2	-4	
3788	0	-2	-3	-3	-2	-1	-2	-4	
4167	0	-2	-3	-3	-2	-1	-2	-4	
4386	0	-2	-3	-3	-2	-1	-2	-4	
4630	0	-2	-3	-3	-2	-1	-2	-5	
4902	0	-2	-3	-3	-2	-1	-2	-5	
5208	0	-2	-3	-3	-2	-1	-2	-4	
5510	0	-2	-3	-3	-2	-1	-2	-4	
5772	0	-2	-3	-3	-2	-1	-1	-4	
6144	0	-2	-3	-3	-2	-1	-1	-4	
6410	0	-2	-3	-3	-2	-1	-1	-4	
6768	0	-2	-3	-3	-2	-1	-1	-4	
7055	0	-2	-3	-3	-2	-1	-1	-4	
7286	0	-2	-3	-3	-2	-1	-1	-4	
7619	0	-2	-3	-3	-2	-1	-1	-4	
7890	0	-2	-3	-3	-2	-1	-1	-4	
8282	0	-2	-3	-3	-2	-1	-1	-4	
8547	0	0	-3	-3	-2	-1	-1	-4	
8889	0	0	0	-3	-2	-1	-1	-4	
9070	0	0	0	0	-2	-1	-1	-4	
9390	0	0	0	0	0	-1	-1	-5	
9804	0	0	0	0	0	0	-1	-5	

Rpm: 00000 TPS [%]: 000 Injection [T]: 0000

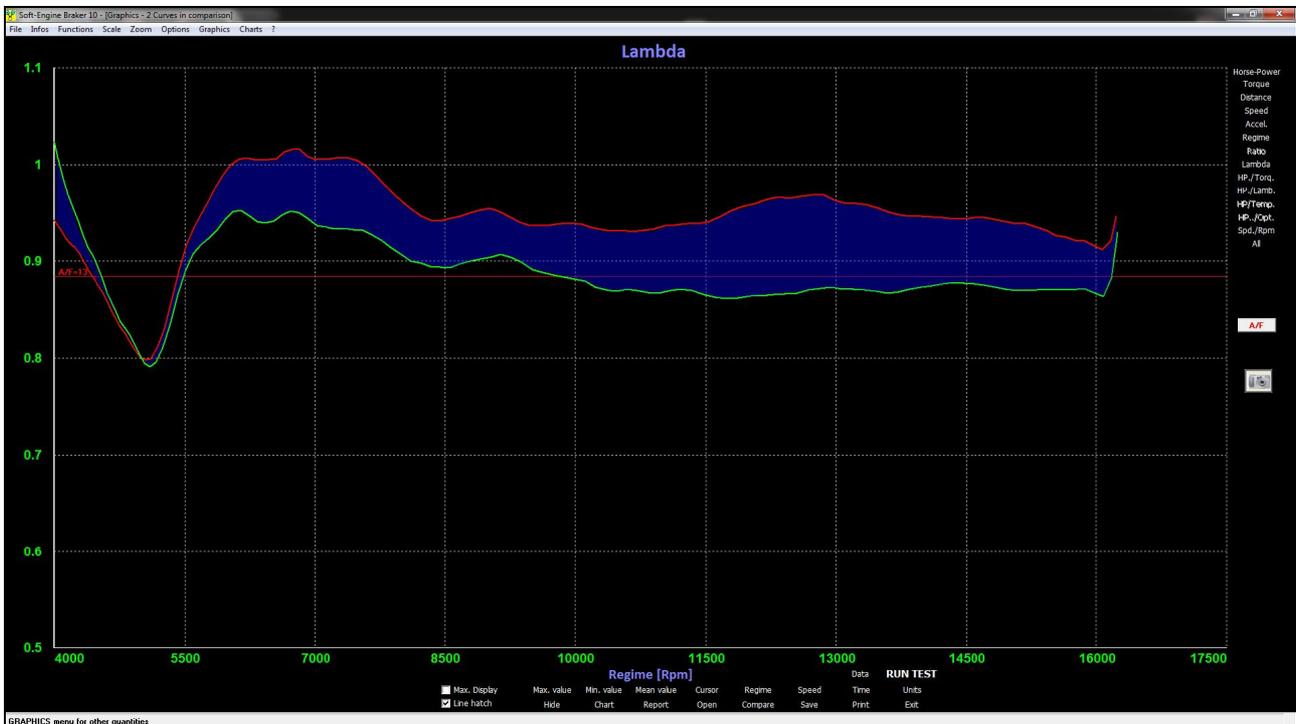
The mapping chart...

Soft-Engine dynamometers – software version 10



...And graphical Lambda correction

Now, in the last version (10) the graphical lambda corection method generates an exportable mapping chart in Excel format, indicating the right correction to do in a mapping chart, for any electronic unit. This correction method is direct when the electronic unit is a "Rapid Bike".



Rapid link module: lambda "reacts" according with the correction

Free calibration and personalization of devices

Now, **in the last version (10)** is possible to freely calibrate the optional acquisition device giving the values vs voltage or current. There are up to four calibrable channels. There are also two (optional: four) calibrable lambda devices (vs voltage only). All optional devices can have a customized name and it is possible to select its visibility in all the software (diagrams, chart and tools).

SIGNAL TEMPERATURE

Device name: Temperature 1
 Temperature 2
 Temperature 3
 Temperature 4

Exhaust gas temperature

Temperature spark-plug

Temp. Spark-plug

Temp. Water

Temperature water engine

Temp. Oil

Temperature oil

Diagram title: Horse-Power | Temperature

SIGNAL LAMBDA

Device name:
 Referring quantity: Units:
 CALIBRATION Dec

Lambda sensor (signal 1)

Device name:
 Referring quantity: Units:
 CALIBRATION Dec

Lambda sensor (signal 2)

Normal carburation upper border
 Normal carburation lower border

Diagram title: Horse-Power | Lambda

OPTIONAL DEVICES

Device name: Units:
 Referring quantity: Units:
 CALIBRATION Dec

Water press.

Device name: Units:
 Referring quantity: Units:
 CALIBRATION Dec

Oil press.

Device name: Units:
 Referring quantity: Units:
 CALIBRATION Dec

Turbo press.

Device name: Units:
 Referring quantity: Units:
 CALIBRATION Dec

Air-Box Pressure

Diagram title: Horse-Power | Pressure

OK

Save setup

Names default

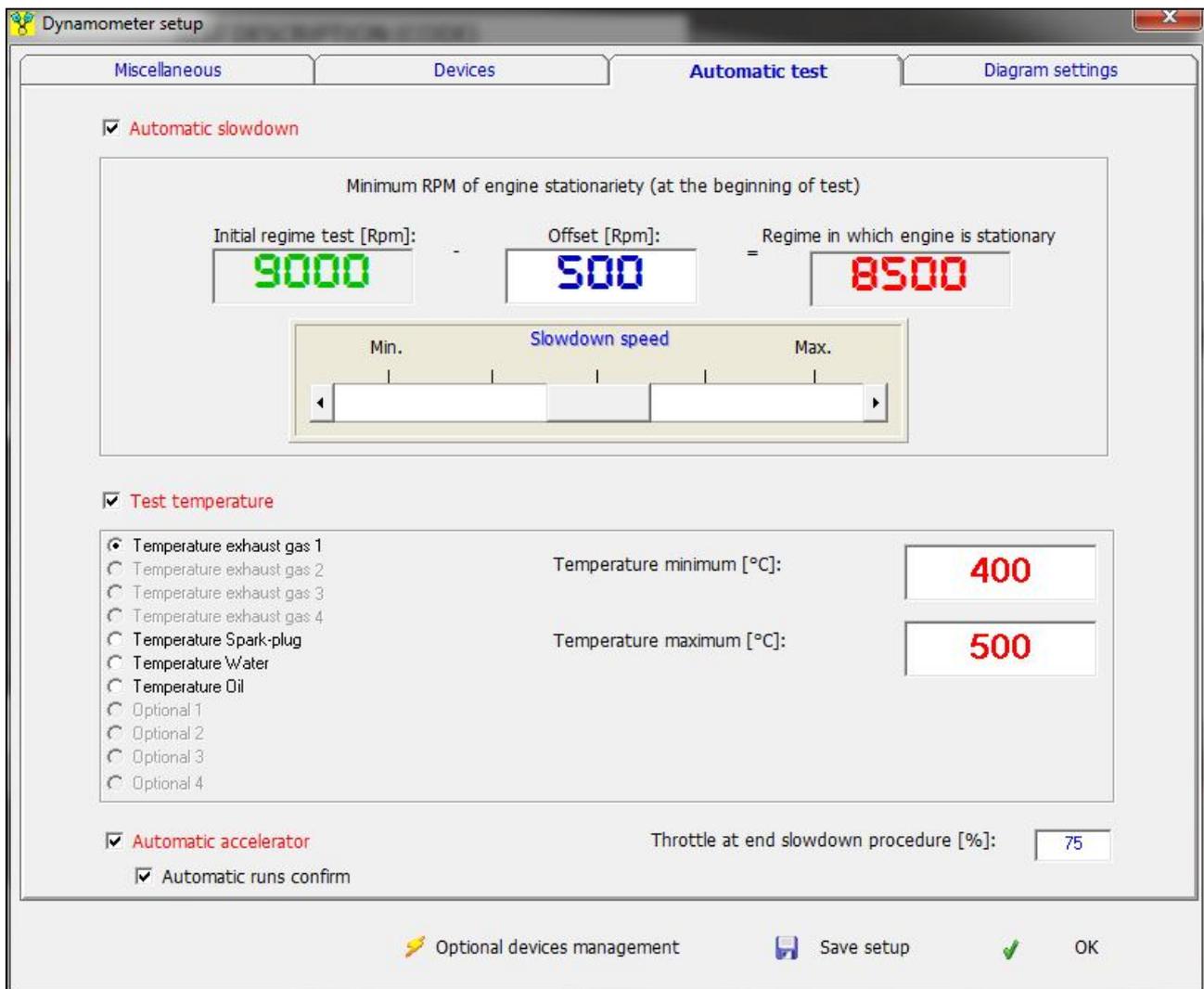
Close

Select one or more sensors among the activated ones for visualization. It is possible to change the names 07/08/2020 10:45

Customize management of optional and free calibrables devices (temperatures, lambdas and free sensors)

Automatic slowdown test

This function is also a characteristic of **version 10** and is enabled for engine dynamometers. It is an optimization of tests in sequence, designed to make the most possible repetitive testing. After launch, the eddy current brake is applied to slow the engine until an initial regimen planned RPM. The slowdown can be controlled by temperature, that means if this control is active, the system allows the new launch only if the temperature (exhaust gas, engine cooling water, or even more) value is inside a planned range. This type of testing, combined with "Rotogas" system automates and streamlines the entire process of acceleration / deceleration of the motor during tests in sequence.



Automatic slowdown test management

Other features of version 10

Other features specific for version 10 are

- ☞ Lambda values scale choice (Fuel, Diesel, E85 blend, Methanol, LPG);
- ☞ Improved tools for diagrams (curve cursor, diagrams elements customization, diagram scale management ecc...);
- ☞ Self-translating, to generate reports in other languages.
- ☞ Maximizable displays and possibility to move them in the screen during real-time tests;
- ☞ Fast repetition of test: multiple runnings.

PC minimum configuration

Feature	Description
Processor:	Personal computer, processors i3-2120 (3.3 GHz), i5-3230 (2.6 GHz), i7-4510 (2.0 GHz) or more.
System:	Windows ME, NT, Xp, Vista, Seven, Eight, Ten - 32 or 64 bit systems.
Memory RAM and Hard Disk:	At least 4 GB RAM and 60 GB free in the hard disk (for best Windows performances).
CDrom or Dvdrom device:	Speed at least 52X.
Graphic card:	VGA, SVGA and compatible cards, set at least 32 bit, Min. resolution: 1360x768.
Miscellaneous:	Keyboard, mouse, at least 3 USB ports free (to connect the data store electronic unit, the USB hardware key and the printer).
Printer:	Any ink-jet printer. Total compatibility with laser printers.
We suggest:	<ol style="list-style-type: none"> 1) To remove the internet connection and the antivirus systems; 2) To remove the Blue-tooth connection; 3) To add an UPS to PC and data store electronic unit; 4) To make periodically the saved tests backup.
Total compatibility with notebooks and cases minitower PC.	