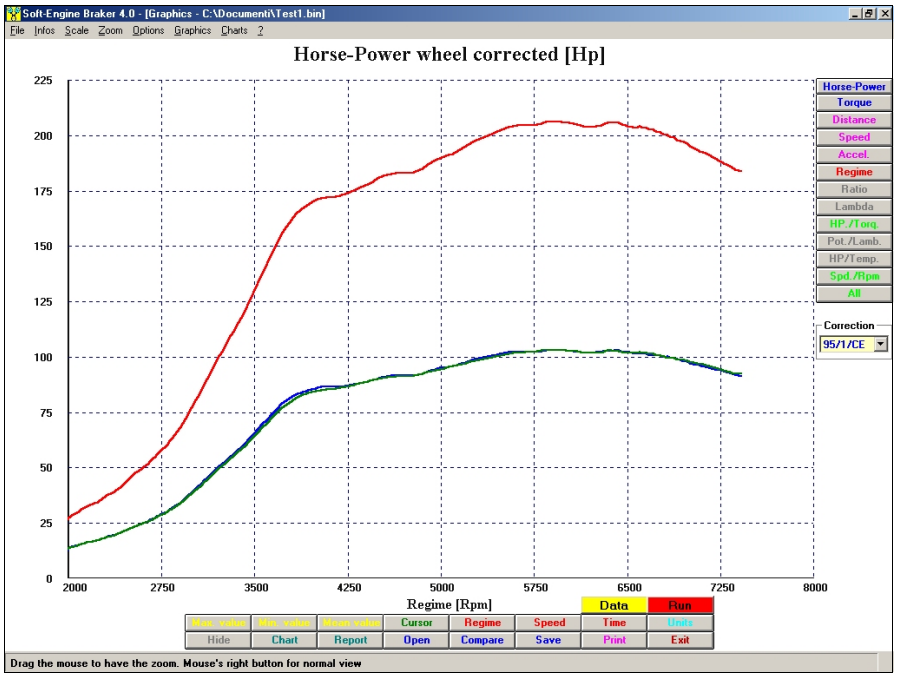
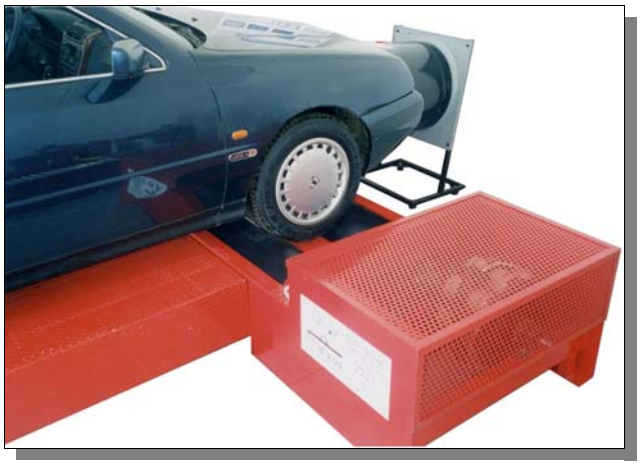
CAR DYNAMOMETERS





- Wheel, engine and friction horsepower
- Wheel , engine and friction torque
- Distance run during test
- Vehicle speed during test
- Road linear acceleration
- Instantaneous gear ratio
- Single speed accelerative tests
- Variable speed accelerative tests
- Gear in sequence tests
- Mappings option
- Engine running-in
- Constant regime braking tests
- Variable regime braking tests
- "Inertial&Braker" combined test
- Road simulation
- Mileometer test
- Lambda device: Air/Fuel ratio
- Temperatures
- Pressures
- Engine rpm direct acquisition
- Graphic zoom and charts
- DIN, SAE, EC correction...

....AND MUCH MORE!

THE SUCCESSFUL.... CHOICE!

SOFT-ENGINE: DYNAMOMETERS
Via del Consorzio, 2 60015 Falconara M.ma (AN) - ITALY
Phone: 0039-0719156086 - Fax: 0039-0719189118 E-mail: info@soft-engine.com

OUR COMPANY

SOFT-ENGINE is an Italian company producing dynamometers for cars, motorcycles, engine, which became first famous for having "invented" computation software for mechanical engineering, designing, and building of motors. Thanks to our commitment, everyone can find the software he/she is looking for at various levels and on many fields of application: mufflers and cams design, horsepower simulation, suspension project and others. Our deep knowledge of information technology and mechanical engineering are the key factors of our leading position in dynamometers engineering. Our wide production range consists of car dynamometers, motorcycle dynamometers, and kart dynamometers. Inertial and Braker models are, for two wheel and four wheel cars, motorcycles and engines. We are suppliers of the most important italian and foreign countries car, engine and motorcycles team and manifacturers, like Suzuki Italia, for which we make a special motorcycle dynamometer. In the recent years the company developed a R&D division, to follow continously the techonolgical innovations. A new production is now the shock-absorber dynamometer.

CAR DYNAMOMETERS

WHAT IS IT FOR?

A dynamometer is used to measure engine performances, in fact the resulting performance data, allows the engine **diagnosis**.

Various road behaviours can be simulated on the test bench. It can also be used for engine **tuning** in order to achieve the best possible performances or an excellent setting up to reach a special performance. Moreover the true revolution is to be seen in full **safety** working conditions.

WHOM IS IT FOR?

Dynamometers are for **mechanicians** to find out faults and assess repairs and show them to the vehicle owner proving the machine shop efficiency and excellent image. Dynamometers are for **tuners** too who use them as a precious tool for engine tuning.

BRAKED DYNO "SUPERCAR 500 2X2"

To test Hi competition and Formula cars!

Max HP: 500 Hp (continued) and peak 700 Hp!

Advanced electronic

TECHNICAL FEATURES	ACCELERATIVE 2x2 *INERTIAL 350 CAR 2x2*	BRAKED 2x2 *BRAKER 350 CAR 2x2*	ACCELERATIVE 4x4 *INERTIAL 700 CAR 4x4*	BRAKED 4x4 *BRAKER 700 CAR 4x4*	FRENATO 2x2 *SUPERCAR 500 2x2*
Max Accelerative HP:	More than 400 Hp	More than 400 Hp	More than 800 Hp (400 HP each set)	More than 800 Hp (400 HP each set)	500 Hp continuatives
Max braked HP:	———	Peak: 550 Hp	———	Peak: 550 Hp	Peak: 700 Hp
Max speed:	More than 280 Km/h				About 350 Km/h
Traction force:	———	16,000 N	———	16,000 N (each set)	20,000 N
Axial load:	3500 Kg				
Drums working width:	2,150 mm				
Dimensions:	3,360-1,080-420 mm		3360-1080-420 mm	(each 4 drums set)	3,200-1,300-540
Full weight:	1,300 Kg	1,400 Kg	2,600 Kg	2,800 Kg	1,800 Kg
Software:	Inertial 4.0 Car	Braker 4.0 Car	Inertial 4.0 Car	Braker 4.0 Car	Braker 5.0 Car
Eddy current brake:	———	Air cooling system (forced too)	———	Air cooling system (forced too)	Air cooling system (forced too)
Mechanics:	- Very thick sheet chassis - N° 4 drums ø = 320 mm		- Very thick sheet chassis - N° 8 drums ø = 320 mm		- N° 4 drums ø = 550 mm
Safety devices:	- Safety barriers (lateral) - Sheets to cover the moving parts - Belts to tie the vehicle				

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DYNAMOMETER

A SOLID AND WELL-DESIGNED DYNAMOMETER FOR YOUR MACHINE SHOP!

DYNAMOMETERS FOR 2x2 CARS

INERTIAL 350 CAR 2X2
BRAKER 350 CAR 2X2

SENSORS
Dynamometer is interfaced to the PC, for data store.

- Accelerative, braked and combined tests;
- More than 400 HP in total security.

CHASSIS
Its chassis is made with a thick sheet. It is covered on the top by means of corrugated sheets and it is varnished in a vivid red colour with a strong visual effect.

EDDY CURRENT BRAKE
Eddy current brake is put into this box.

A STRONG AND SIMPLE MECHANIC

Car dynamometers by **Soft-Engine** have **4 drums** with an **high diameter value**, so the car tyres are submitted to the lowest possible wear. If dynamometers work exclusively as an accelerative system, the great drums inertia allows you to measure very high values, beyond 400 Hp, so that the engine works under almost quite realistic road conditions. This means that the engine can reach a good temperature and in case of an overfed engine, the turbo device works quite well. The 4 rolls system also allows you to place even very low cars on the dyno (3-4 cm from the ground), like many sports car.

DYNAMOMETERS FOR 4x4 CARS

INERTIAL 700 CAR 4X4
BRAKER 700 CAR 4X4

- Accelerative, braked and combined tests;
- More than 800 CV (400 each set of drums);
- Automatic adjustment of pitch.

THE MOST COMPLETE DYNAMOMETER
The 4WD dynamometer is the most flexible machine, because by this model accelerative and braked tests are possible, both for 2WD and 4WD cars. In this case, the front drive or the rear drive or both performances can be measured. The drum set automatic mouvement is managed by software (remote control).

EXTERNAL DYNOS

Car dynamometers are usually grounded, meaning that they are placed in a ground hole, but this solution cannot be the only one available. This is the reason why Soft-Engine wish to meet any demands! We offer an external dyno equipped with a beam-shaped platform for the car to be placed on the dyno itself. No doubt this solution has a better visual effect. Soft-Engine supplies beam-shaped platforms as an accessory on request. Their dimensions are: 2,800 x 2,000+ ramps 2,000 x 2,000 mm.

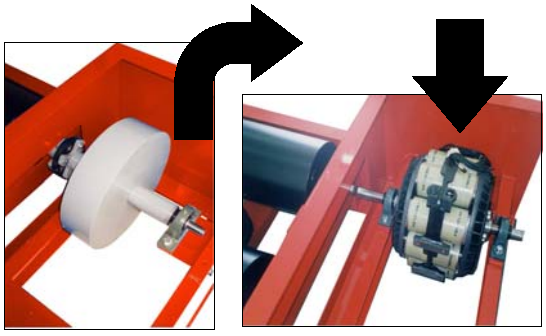
EDDY CURRENT BRAKE

A quite reliable electric air-cooled brake (eddy current). It opposes a torque to contrast the engine horsepower and measure it.
A software electronic control device supplies the brake with power and thus creates a magnetic field which produces the torque contrasting the engine. By means of a brake you can:

1) **Apply a load to the engine torque**;
2) **Simulate road conditions**, such as slopes and air friction;
3) **Mappings**, at specific rpm values;
4) **Make Accelerative and braked combined tests**, to better simulate the road vehicle performances
5) Carry out **tests duration and running-in**.

THE ACCELERATIVE DYNO CAN BECOME A BRAKED DYNO

removing the flywheel and putting the eddy current brake, with a simple upgrade of software and electronic system. In-fact Soft-Engine accelerative and braked dynos have the same structure!



1-remove the flywheel... 2-...and put in the brake!

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WORKING PRINCIPLE

ACCELERATIVE MODE

Under this setting the working principle is inertia: if we measure acceleration supplied by the engine to the roll, we obtain the instantaneous torque value. This system is based on an absolute principle and guarantees excellent precision
and resettability. It can be applied to engines of any horsepower. You can test the whole vehicle, both with automatic gear and manual gear. The 'sequential gear' test is available too: you engage all vehicle gears, from the first one to the last one, and simulate a road behaviour. In fact a vehicle behaviour, above all in case of a sports car, mainly consists in accelerating and braking. This kind of test bench can perfectly simulates this behaviour. Mechanicians and machine shops make a wide use of dynamometers in their accelerative (inertial) working setting to assess repairs and/or modifications. You can also carry out a so-called 'deceleration test' to measure gear mechanism and tyre (friction) losses to obtain the drive shaft power besides the wheel power. It is very important not to omit the fact that this setting allows a minimum wear of tyres and engine, as it is not submitted to long lasting stresses, and this is quite important for customers.

BRAKED MODE

Under this setting the working principle and use are quite different from the previous one. The electric brake can block engine revolutions or vehicle speed so that you can carry out any tuning operation requiring engines at fixed rpm or under stress. The typical tests you can carry out under this setting are: injection-ignition mapping, simulation of slope or caravan haulage.
You can obviously carry out the horsepower test too, but in this case it is a 'braked' power, meaning that it is obtained at preset values, compared to the accelerative mode described above. These tests are much more intensive and stressing compared to those ones you can carry out under the accelerative mode setting. A combination of both working principles makes the use of this dyno quite reliable and exhaustive.

WHAT IS OUR DYNO FOR?

DIAGNOSTIC

A dynamometer is quite necessary to all highly professional machine shops wishing to carry out precise and absolutely scientific engine tests. It is the only equipment where certain same conditions can be repeated, without any external or human influence. For example, a power loss can be due to a carburetion fault, an ignition problem or even to a clutch slip. All these problems can be observed in graphs and tables displayed by our software. In these cases the power or torque diagrams are influenced by these factors and the vehicle cannot reach its top performance. Thanks to dynamometers, a repairer can see at which precise rpm or speed the problem appears and therefore he can know how and where to make repairs.

ENGINE TUNING

A car tuner, not only on sports car, can make some changes to optimise performances. It is obviously necessary to observe the effect of such modifications. Our dyno can carry out **sequence comparative testing**. A tuner can thus measure and assess the engine performances before and after his intervention. Duration performance diagrams, such as speed, space and acceleration, show the 'dynamic effect' of modifications.

SCREENING OF REPAIRS

Thanks to our dynamometers repairers can assess the effects of a repair or intervention on an engine and thus give the customer **any kind of quality printing and tables** to avoid complaints, if any. That's a professional attitude!

ASSESSMENT OF VEHICLES

Dynamometers supply a reliable parameter for a thorough assessment of a used vehicle. A car bought 8 years ago, for example, may show a revolution counter at 90,000 Km but the future buyer must know the engine wear conditions. Through a comparison between max power data given by a dyno and the ones given by the manufacturer you can establish the engine performances decrease due to ageing factors and therefore you can make a precise assessment of this vehicle.

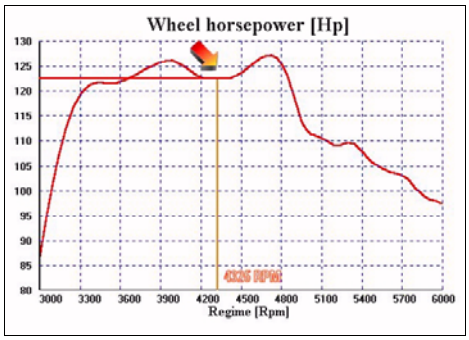
Dynamometers *by* **SOFT-ENGINE** *are the result of long studies and research carried out by our team. Our dynos are the final product of our rich experience in a decade of software development. As regards mechanics we guess on* ***solidity, functionality*** *e* ***plain construction****. The harmonious combination of these features results in a solid, precise, reliable, and well-performing product for* ***tuners*** *and* ***repairers****.*

QUITE EASY TO USE!

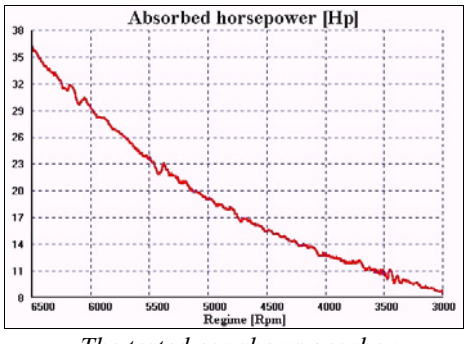
Our dynamometers are quite easy to use! We preferred to develop a highly professional product but addressed to everybody. Just place the car on the rolls following safety instructions, insert a few data in the console and accelerate. The software can carry out a **thorough engine check-up in less than ½ minute**! The program is well explained and described in each single section: a detailed on-line help is available.

REMOTE CONTROL

Soft-Engine supplies a remote control device for software and its optional utilities, such as ventilation and intake, so as to allow comfortable testing operations, without any additional operator.



This car has a clear torque and power loss, near its max rpm: at 4,325 rpm exactly.



The tested car shows gearbox vibrations

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SOFTWARE

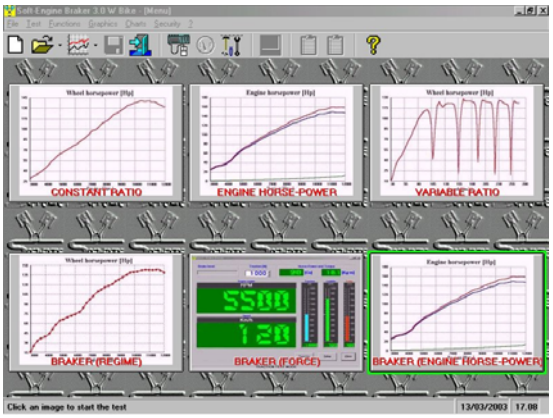
EXTREMELY EFFICIENT, RELIABLE, AND EASY TO USE. IN A WORD...: REVOLUTIONARY!

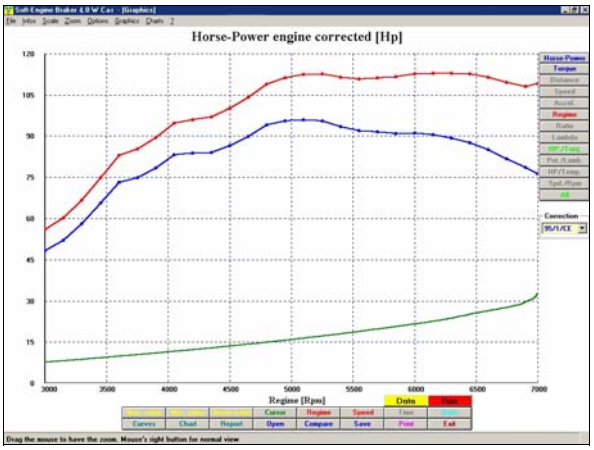
SOFTWARE DESCRIPTION

INERTIAL (BRAKER) is the acquisition and computing software of our dynos obtained through long studies and research carried out by **SOFT-ENGINE**. It is a very efficient software, a revolutionary product for data analysis and quite dynamic in tests typology. Nevertheless it is quite **easy** to use as it runs on WINDOWS©. It is equipped with an especially nice and functional graphic interface and our engineers did their best to make its use extremely easy, so that all its functionalities are displayed at one time on the screen. A simple "click" with your mouse on control buttons is sufficient to select any functions available.

Remote control

Thanks to the remote control device the software use is even more simple and immediate. You can control your software and the ventilation and intake systems, while sitting at the wheel!





Input data necessary for the software to run are quite few. Soft-Engine slogan is: "high quality and friendly products"! Input data are:

- Test identification code
- Test starting parameters
- Test setting selection

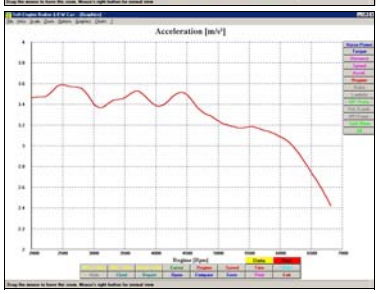
HOW TO CARRY OUT A STANDARD TEST

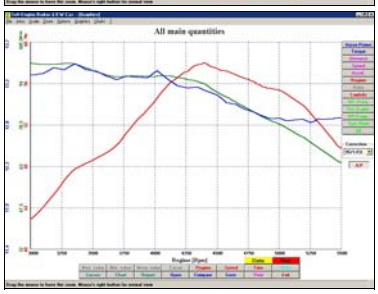
1) Start the software.
2) Insert test data.
3) Click on "Acquisition": a digital video revolution counter appears.
4) Warm up the engine, go under the minimum engine speed, then press the proper button and accelerate at full speed.
5) As soon as the software displays a message to engage the clutch, disengage the accelerator and let the vehicle decelerate on the rolls to calculate friction values.
6) The power diagram is displayed on the screen: the test is over and you can analyse the results, file them, print them, etc...

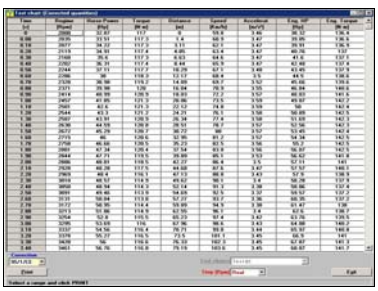
DYNO TEST RESULTS

Our software measures:

- **Power and torque**
  Power and torque acquisition is on the wheel, but it is also possible to measure engine horsepower through the acquisition of the friction torque.
- **Performances**
  Speed, acceleration, and distance run on the rolls during the test.
- **Air-fuel ratio and temperatures store**
  By means of the proper sensors.
- **Gear ratio**
  By means of the rpm sensor for automatic gear vehicles and other ones.







CORRECTION

This software allows Power and Torque values adjustment according to DIN, SAE, CE 95/01rules in force. This features is absolutely necessary to balance environmental variations.

THOROUGH DATA ANALYSIS!

Our programme supplies an excellent data analysis. All these useful utilities are available:

- **Graphs** of any sizes for **Rpm**, **Speed** and **Time**.
- Quick computation of **maximum**, minimum and mean values of each parameter
- **Comparison** among the various tests
- **Reading** of each parameter displayed as a point contour: a useful utility for comparing different tests.
- **Units** (technical and Anglo-Saxon ones).
- **Zoom** on each graph up to the max degree to display even the smallest details
- **Tables** of any sizes with a variable selectable range.
- **Quality printing**

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ACCELERATIVE TESTS

ALL MOTOR PERFORMANCE PARAMETERS IN ONE SINGLE ACCELERATION!

IMPOSED GEAR TEST

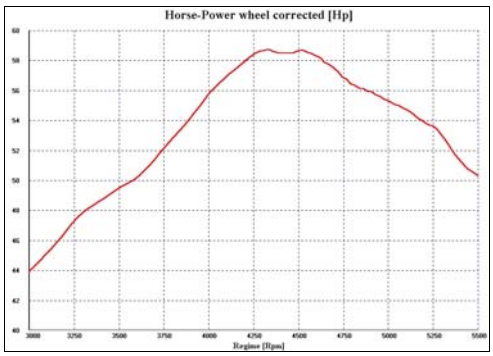
This kind of test is usually simple and quick. Place the car on the dyno, according to safety norms, insert data, change into the selected gear (the fourth or the fifth one) and accelerate at full speed. Rpm and speed values are displayed on the screen to show progression till the maximum rpm value. Then the word STOP appears and the test is over. The imposed gear test provides the wheel power and torque values and all other parameters too.

VARIABLE GEAR TEST - SEQUENTIAL GEAR

This test is carried out in case of gear ratio modification during the test, for cars equipped with **automatic gear change** or even in case of sequential ratio modification during the test. This test is called **sequential gear**. You can select the most suitable option in our software. It is also possible to observe the rpm evolution and thus know the instantaneous gear ratio by means of a special device which allows you to assess the rpm value directly through the ignition system. The sequential gear test must be carried out starting from a quite low speed rate (i.e. 20 Km/h, the bottom gear) and accelerating to reach the maximum speed rate, shifting up into a higher gear each time, as if you were on the road! In this case the power diagram will be displayed for each single gear. The other available diagrams show sequential gear time, rpm decrease, and all other values representing a road performance projection, such as: distance run, speed and acceleration.

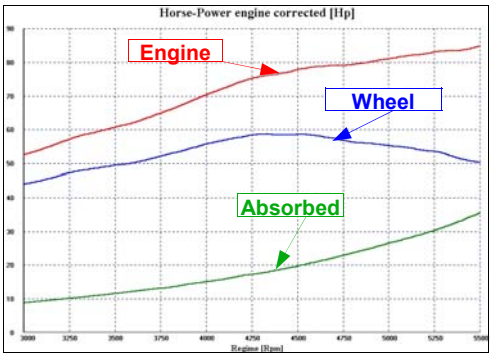
ENGINE HORSEPOWER TEST - GEAR MECHANISM LOSSES

This test provides the biggest number of information and it is the most commonly carried out by car dyno owners. After the acceleration measuring the wheel power, the software displays an instruction to engage the clutch, the vehicle decelerates on the rolls without braking down until the STOP message appears. During deceleration the software measures power and torque values lost by the vehicle in the gear ratio. The sum between wheel power (torque) and friction loss is equal to the engine power (torque). The various diagrams (wheel, friction, engine) can be displayed all together or separately to obtain a very detailed test result. A very high loss value may be due to some transmission faults.



Imposed gear test

Variable gear test: sequential gear



Deceleration test: engine horsepower

GEAR RATIO CALCULATION

If the rpm ignition sensor is not working, the program needs the full gear ratio of the engaged gear for the test to be carried out. It is an extremely technical value and present in the vehicle's manual. Nevertheless our program **can calculate the ratio** of the engaged gear **automatically**, by means of a simple preliminary test.!

LAMBDA SENSOR: CARBURATION DATA STORE

This device is very important for tunings. The **lambda device** gives the air/fuel ratio value during mappings. The lambda diagram is drawn by software, the rich or poor carburation status is marked. So, user can have immediately a valid parameter suitable for engine setup.

The lambda sensor

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BRAKED MODE TESTS

LOADS, MAPPING, AND ROAD SIMULATION EVERYTHING CAN BE DONE!

MAPPINGS - CONSTANT SPEED BRAKING

Under this test mode we can block the engine rpm or the vehicle's speed on the selected points, e. g. at 5,000 rpm or 90 Km/h. Points blocking can be done on more than one point to study the engine. This test is to be carried out for power packs or ignitions **mapping**. An acquisition range value and a fixed range (i.e.: 2,000—6,000 rpm; range: 500) can be set too, in order to develop a power diagram.

RUNNING-IN TEST

By this test you made the vehicle engine running-in. User input a series of rpm (or speed) values, and eddy current brake works at the imposed values automatically, like in the mapping test; but this procedure can be repeated several times, to create a **running-in cycle**. Obviously, the user can decide how many cycles software must manage. So, by Soft-Engine dynamometers, a tecnician can make the running-in staying into his workshop.

CONSTANT LOAD BRAKING

This test mode simulates an engine loading. You can simulate the effect of a trailer hooked to the vehicle or a slope on horsepower. In fact the software asks for a 'Traction' value. This test is useful for applying a constant load on the engine and therefore for carrying out essays and strength tests.

VARIABLE LOAD BRAKING

This test is used to simulate in the best possible way the real road behaviour, including drag resistance. Insert a value for drag resistance and rolls. The braking system will allow a braking which takes into account the drag resistance quadratic pattern. You can briefly obtain acceleration time and real max speed rate of the tested vehicle on the road.

COMBINED "INERTIAL & BRAKER" TEST

The "inertial & braker" combined test is the real peculiarity of Soft-Engine braked dynamometers. This kind of test allow a truthful road simulation; in-fact it is possible to input a force real value corresponding to a particular vehicle speed value. In this way the software can create a quadratic resistant power, so the eddy current brake works following this resistance. User must only to accelerate the vehicle over the drums, like in a normal accelerative test, but eddy current brake loads the engine while test: the resulting horse-power comprises the frictions and the aereo-dynamics loads, because the resistant power is a quadratic law, giving the horsepower and torque diagrams.

The Inertial or Braker setup mode is selectable

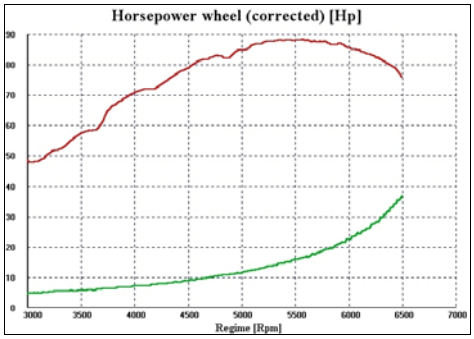
SETUP MODE

The program set up is a very performing control mode to customise the software use.

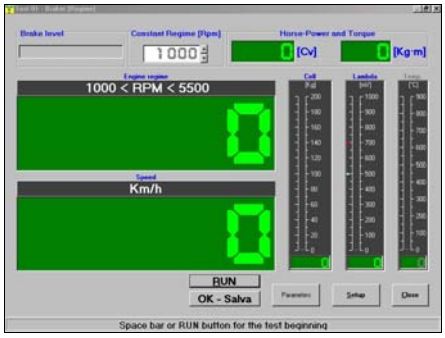
Utilities available:

1) Select the test mode:
   - imposed gear change
   - variable gear change
   - sequential gear test
   - deceleration test
   - constant speed braking
   - constant load braking
   - variable load braking
2) Sensors on/off
3) Automatic meteo device on/off
4) Speed testing
5) Select display mode (digital or analogic)
6) Select the graph to be displayed at test end
7) Set a permanent graph scale.

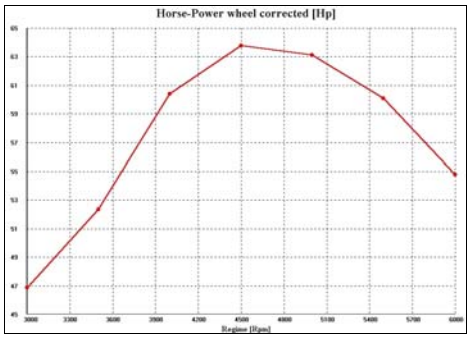
IN A FEW WORDS THIS SETUP OPTION ALLOWS YOU TO CUSTOMISE YOUR SOFTWARE !



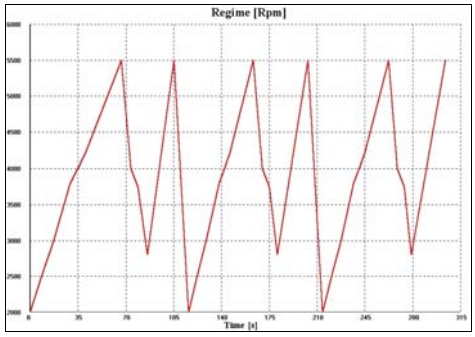
A combinated test example: on the top, the wheel horsepower; on the bottom, the quadratic resistant load by eddy current brake.



Horsepower and torque store window



Braked horsepower diagram



Running-in test

FAST SERIAL ELECTRONIC & SOFTWARE VERSION 5.0

The serial electronic is linked to 5.0 software version, it can store the data at real time, also for accelerative (very fast) tests. Moreover, all the devices can be added at the same system. The data communication to PC is by serial cable (EIA 232 port). A lot of sensors (temperatures, pressures etc…) furnished. **Included in in "Supercar 500 2x2" dynamometer model.**

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MODELS AND ACCESSORIES

Accessories can be purchased at any time, even after you already bought your dyno. **SOFT-ENGINE** *dynamometers are* **SECTIONAL** *and* **ADJUST-ABLE** *to meet all your needs!*

INERTIAL 350 CAR 2X2 (ACCELERATIVE DYNO)

BRAKER 350 CAR 2X2 (BRAKED DYNO)

SUPERCAR 500 2X2 (BRAKED DYNO - HI COMPETITION CARS)

INERTIAL 700 CAR 4X4 (ACCELERATIVE DYNO)
BRAKER 700 CAR 4X4 (BRAKED DYNO)

Computer cupboard

ACCESSORIES

Remote control

EIA 232 serial electronic data store device

Automatic meteo device

Temperatures and lambda device

RPM direct store system

Eddy current brake for accelerative models

Double air speed centrifugal fan system

Ramps for external dynamometers

Our Agents

The Manufacturer reserves the right to modify the accessories and attachments mentioned above without prior notice.

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