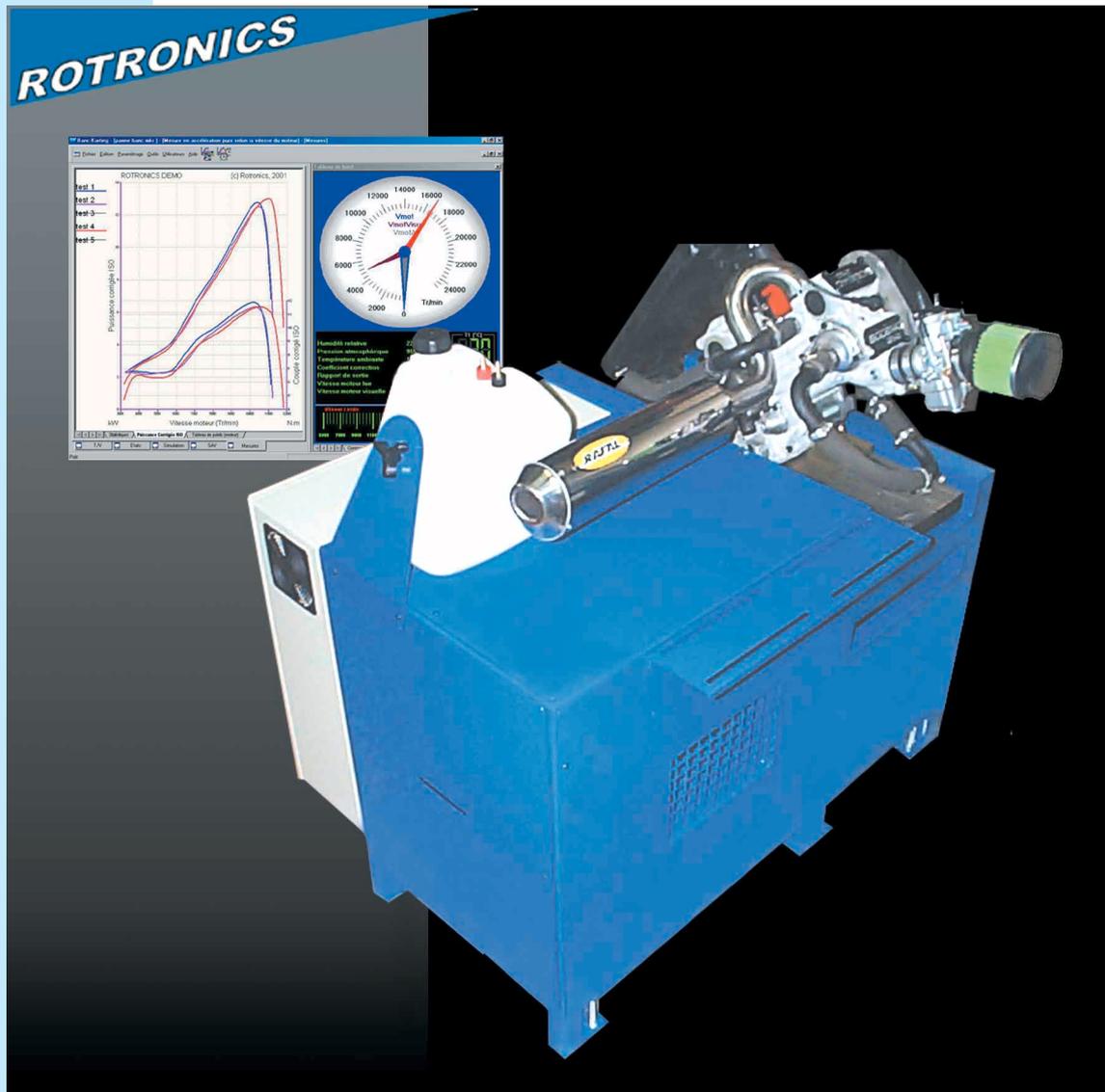


DynaKart

Engine Dynamometer for Karting



- Compatible with all engine types : 2 stroke, 4 stroke, leisure or motorsport.
- Evolutionary concept.
- High accuracy digital acquisition system
- Integrated Eddy Current brake.
- Transient and steady speed tests.
- Tests under controlled load.

BRING A TEST BENCH INTO YOUR OPERATION

Karting represents the first taste motorsport for many of today's professional drivers. Now, because of the arrival of 4 stroke engines, karting is changing, but the objective is the same : Victory! But how ? Current 2 stroke engines are so optimized that it is almost impossible to see improvements on the circuit, leisure engines are equipped with many ancillaries, 4 stroke running and reliability are difficult to predict and what about future evolutions such as fuel injection ?

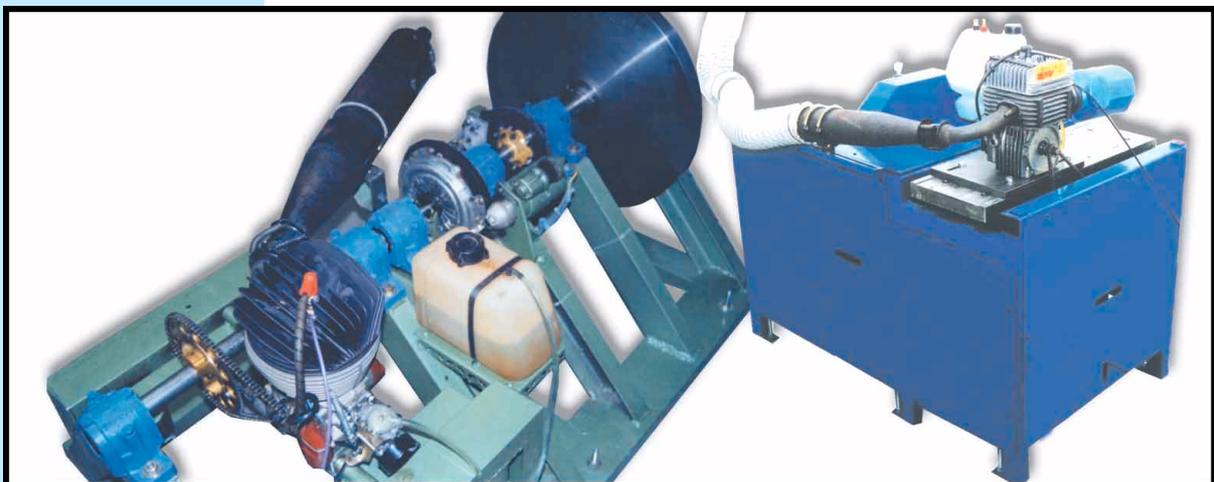


An objective, repeatable and precise measurement tool is needed to move into the future of successful Karting. Rotronics propose their solution : Dynakart.

The engine test bench is not only a tool reserved for the elite competitor - more and more dynamometers are used in workshops and commercial premises. They are fantastic measurement tools for mechanics, considerably reduce the amount of track testing and are very effective commercially. Less moving your kart around, less time wasted, an effective and credible workshop, giving a great impression to your customers. A Rotronics test bench really improves your operation.

ROTRONICS AND KARTING

Rotronics has 15 years experience in the design and manufacture of engine dynamometers, and the Karting sector represents an important part of their activity. All types of solution have been produced by Rotronics over the years : industrial engine dynamometers, inertial dynamometers and management system for existing dynamometers. Over the years, challenges and successes have built up great expertise - and Rotronics uses all of this in DynaKart - the new engine dynamometer.



DYNAKART TECHNOLOGY

DynaKart is an engine dynamometer equipped with an Eddy current brake. This allows the load on the engine to be controlled, whereas with inertia brake, there is no such control. Real engine running conditions can be reproduced so that an engine runs on the dynamometer just like it does on the track. This is exactly what is needed to prepare an engine before a race, and although it is easy to use, DynaKart uses the very latest test bed technology.



DETAIL DESCRIPTION

DynaKart is equipped with an anti-vibration engine support mounted on silent-blocks and linked to the brake shaft with a flexible coupling. Engine generated vibrations are absorbed by the mounted bracket and are not transmitted to the measurement part of the test bed.



The brake is mounted in balance and its rotation is reacted against by a sensor which, measures the brake torque. This is directly comparable with the transmitted torque in the transmission shaft of a kart. With Eddy current technology, the brake is extremely precise and has an excellent response time. It is cooled by 'channelled' air flows in which cold and warm air is separated. This allows increased brake capacity and longer running times.



The mounting bracket is universal. It is compatible with all engine types and engines can be mounted with or without the original kart brackets. An integrated water pump mounting can also be included.



With the increase of engines using a left hand output, DynaKart has been designed to take this change into account. Mounting and removal of the engine and quick changes of transmission ratio are made easy with the universal mounting bracket.

The Environment Monitor (SME) constantly measures intake characteristics : pressure, temperature and humidity. The SME transmits these values in real time to the software for automatic measurement correction. The SME 301 is a data acquisition system too, with 4 temperature inputs and 4 analog inputs for all data acquisition types, for example pressure, flow, lambda sensor signal etc.



A powerful electrical motor linked through a gear and freewheel system is used to enable electric starting of all engine types.

There are also various universal fixing points to enable battery, exhaust system, radiator, overflow tanks, oil tanks and other ancilliaries to be securely mounted along with the engine.



Engine cooling : A high flow cooling fan ensures the engine and radiator cooling is just like it is in the vehicle.

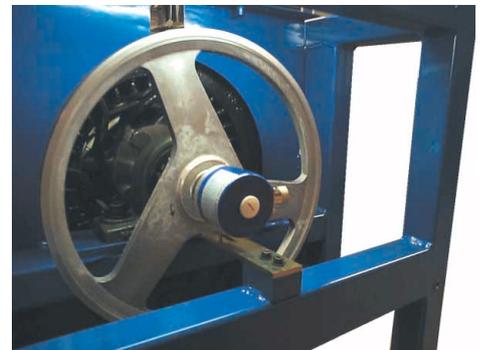
Remote control system : DynaKart is driven by a remote control box - there is no complicated or dangerous handling. The mechanical controls of the dynamometer and the software functions are managed remotely.

Proportional Air / Fuel ratio measurement : Only for use on 4 stroke engines, the CMR 101 manages a wide-band O2 sensor (UEGO) and allows easy and direct measurement of the Air / Fuel ratio value. With no more guesses and approximations, this option clearly and precisely displays the mixture ratio.



PRECISE MEASUREMENT

A speed sensor mounted on the brake shaft ensures accurate speed and acceleration measurement due to its 360 pulses per revolution. The digital data acquisition system treats the information in real time with very high precision (less than 0.1 % errors). Powerful and easy to use software (no need for detailed IT knowledge) ensures great results that are easy to manage.



DYNAKART INSTALLATION

DynaKart has been developed to be used in a standard karting workshop. A fresh air input and an exhaust gas extraction system (available as an option) must be planned, as well as the working space needed.

For greater ease of use, DynaKart can be installed in a specific 'cell' where the test bench and engine are separated from the desk and computer display . This type of installation has to include ventilation, exhaust gas extraction, sound insulation etc and is an area where Rotronics can use its comprehensive experience to give straight forward help and advice.

A QUALIFIED ENGINEERING DEPARTMENT

We have qualified technicians who can answer any queries you may have, and you can even speak to the designers who created the DynaKart - whatever questions you have will be answered.

EASY AND REPRESENTATIVE TESTS

A realist and performant test procedure

A test in transient mode (acceleration) under controlled load and define by a road law is the most representative procedure of the track reality : the engine support the same resistant loads. in that mode, it is possible to draw power and torque characteristics curves based on the engine speed and to use the results in points tables or statistics presentation.

What about running-in ?

The transient test procedure under a road law can be used without making measurements. In this particular mode, it is possible to subject an engine to realistic conditions and view the measurements necessary during the running-in period, eg temperatures, speed, transmitted torque.

Why test an engine in transient mode ?

On the track, an engine installed in a well adjust frame works in transient mode (acceleration or braking) almost constantly. That is why it is necessary to reproduce this mode on the dynamometer to produce representative data. Thanks to the weak inertia or the tuning elements, DynaKart ensures a big reactivity in the management of the resistant load in acceleration.

Why use a load that replicates real road conditions ?

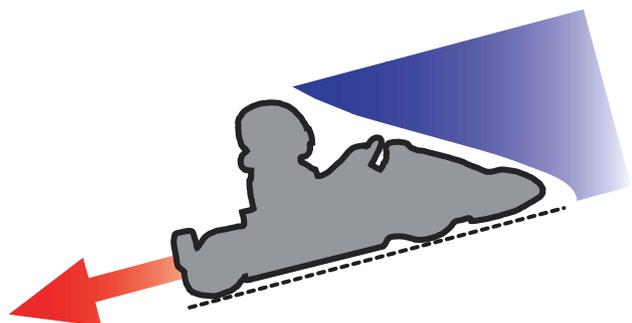
A kart on a road uses power to move forward, but is also subject to resistance. The most important are : The total mass of the vehicle, the wheel friction on the road, the aerodynamic drag generated as speed increases, and the gradient of the road. In plain language, a heavy and bulky vehicle has more difficulty on rough ground and on hills compared to a light and small vehicle on a smooth and flat road. To make it more difficult, these resistance loads are not constants : they vary with the speed of the kart and are not linear.

DynaKart follows a 'road law' to drive the loading of the engine and to simulate the resistance that would be found on the circuit. This mathematical law takes into account the different parameters and their relationship to the speed of the kart. This way, the tested engine undergoes the same types of load on the dynamometer as it would on the track.

Light kart on a smooth and flat track, head down :
For the same speed, the kart needs less power.

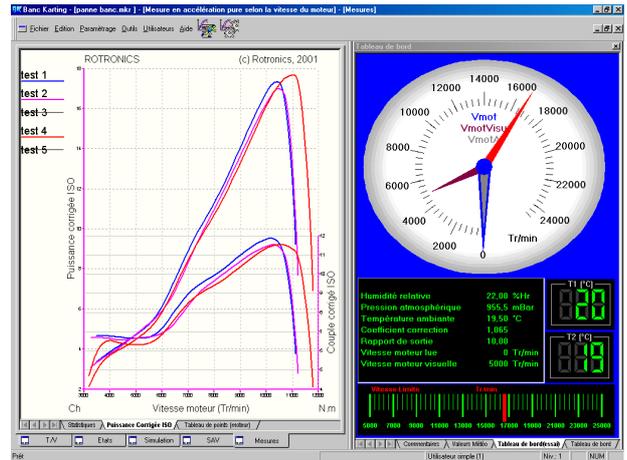
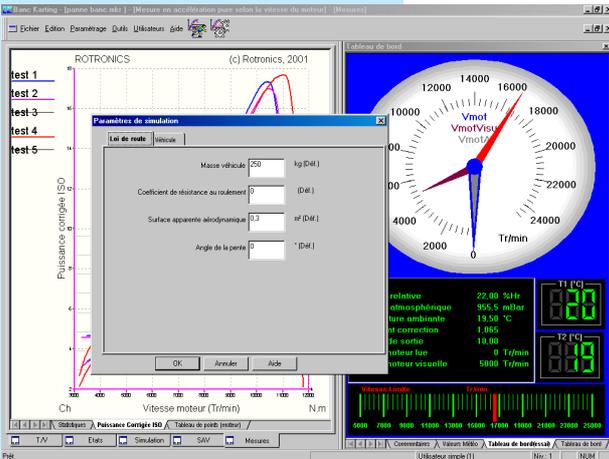


Heavy kart on hill, on rough track, raised head :
For the same speed, the kart needs more power.



THE DYNAKART SOFTWARE SOLUTION

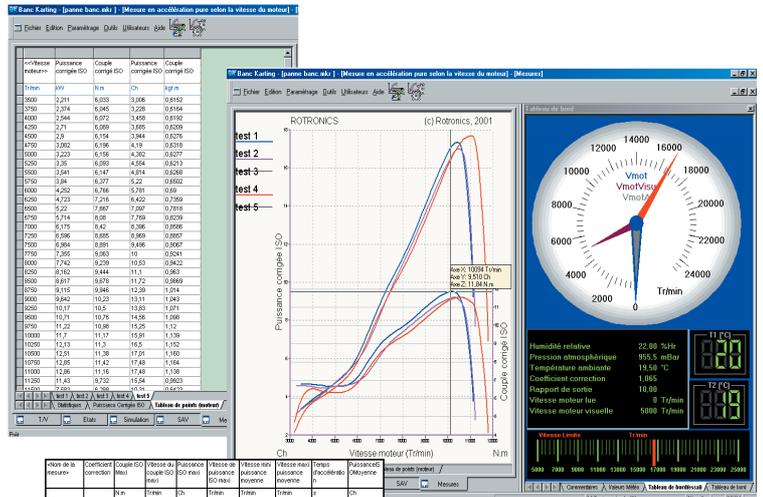
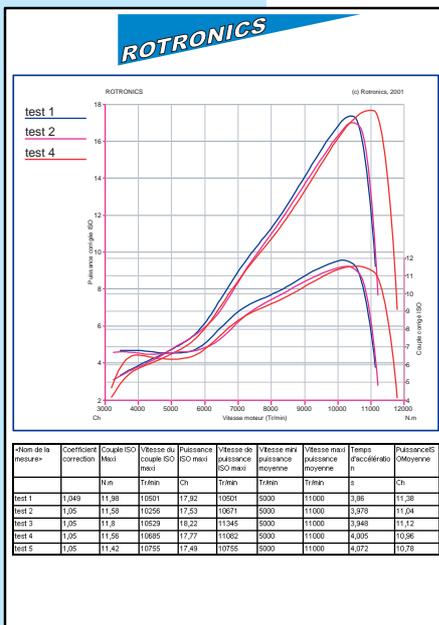
It is not necessary to be an expert in computers to use DynaKart. With a simple and user-friendly interface, a few clicks are enough to use this high performance software. All the measured values are displayed in real time, and can be easily compared.



The test settings is done using simple dialog boxes. A few seconds are enough to prepare a procedure.

During the test, the curves are drawn on the screen in real time, allowing the user to stop the test in case of any problems.

Once the measurement is done, results can be displayed using curves, tables or statistical forms. Current or older tests can be displayed together and easily compared. The data can be saved and build into a valuable database.



The test reports are composed of results and user comments. They can be saved, printed or exported to other external systems in various formats.

OPTIONS AND ACCESSORIES

The Cooling Unit : Assures engine temperature is correct giving safe and stable results when testing engines.

Exhaust gas extraction unit : This is fixed to the frame of the dynamometer unit and removes exhaust fumes.

The Environment Monitor Light SML101 : A simple environment monitor measures the temperature, humidity and ambient pressure with three high accuracy sensors. It sends the values to the software for automatic measurement correction.

The Environment Monitor SME301 : This has the same functions as the SML 101, but in addition uses four inputs for K type thermocouple temperature sensors and four 0 -10V analog inputs for complementary measurements (pressure, lambda etc...).

Proportional Air / Fuel Ratio Measurement CMR101: This Air / Fuel ratio measurement system uses a wide-band O₂ sensor (UEGO) for digital display of values such as richness, Air / Fuel Ratio, air excess (lambda) or O₂ rate. These values are transmitted to the software and allow it to draw the corresponding curves.

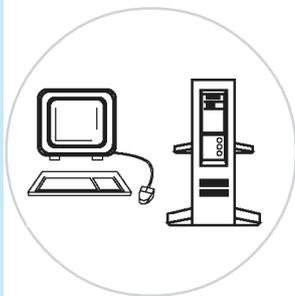
Temperature measurement : This allows complete temperature measurement of the engine. Sensors are connected directly to the Environment monitor (SME 301). Four sensor types are available : "temperature beneath the spark plug within the cylinder", "crocodile clamp" "sensor", "banjo fitting" sensor and standard sensor (cylindrical sheath).

Engine speed measurement : This system uses the signal from either the ignition or the injection system to measure engine speed. The software can use the information to display engine speed, and in conjunction with gear ratio information, it can detect clutch slippage.



TECHNICAL CHARACTERISTICS

Maximum Power (at 2000 rpm)	70kW (94 BHP) for 2 minutes.
Constant absorption capacity (at 2000rpm)	44kW (59 BHP)
Maximum transmission shaft speed	4000 rpm
Maximum transmission shaft torque	650 Nm (479 lb/ft)
Brake Rotational Inertia	0.55 m ² kg
Electrical System	380v 3 phase, 16A
Overall Dimensions	1100x1700x1100 mm
Weight	350 kg
Computer Hardware	Optional
Engine Speed Kit	Optional
Environmental Monitor	Optional
Temperture Sensor	Optional
Air/Fuel Ratio Measurement Kit	Optional
Loading Brake	Included
Engine Cooling fans	Optional
Exhaust Gas Extraction	Optional
Starter System	Included



Minimum Compuoter Specification:

Computer PC type Pentium III 800 MHz - 1 network card - 1 free serial port for the CMR 101 - colour ink jet printer and Windows 2000 or XP system.

The computer can be ordered from Rotronics as an option.

The different measurement elements of the dynamometer are calibrated in our workshop.

Guarantee : 1 year (return to workshop).

Free technical assistance during the guarantee period : Fax and email.

ROTRONICS

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