DynaKart
Kart Engine Test Bench

- Compatible with all engine types: 2 stroke, 4 stroke, leisure or motorsport
- Evolutionary concept
- High precision digital control system
- Integrated eddy current brake
- Transient speed tests
- Tests under controlled and scalable load depending on vehicle speed

www.rotronics.com/en
Karting is the grassroots level of motorsport. Even today, the vast majority of pilots started out in this category. Today, with the standardisation of engines, karting is a highly competitive discipline. Engine performance is very close and the smallest gain found or lost can make the difference. In this context, the advantages using an engine dynamometer are unquestionable. However, this measurement tool must be precise and repeatable. Rotronics offers its solution: DynaKart.

The dynamometer is no longer a tool for the elite, it has spread into workshops. They are fantastic measurement tools for mechanics, considerably reduce the amount of track testing and are very cost-effective.

Less travelling, less time wasted, an effective and credible workshop, an energised sales team and enhanced customer confidence: a dynamometer is a real boost to your operations.

**INTEGRATING A TEST BENCH**

**ROTRONICS KNOW-HOW**

For more than 25 years Rotronics has designed and manufactured engine dynamometers. Karting has always been an important part of its activity. All types of solution have been marketed: industrial engine dynamometers, inertial dynamometers and management system for existing test beds. Over the years, as in all mechanical sports, the challenges have been many but so have the successes. Rotronics has placed all of its expertise in the latest DynaKart dynamometer.

**SKILLED TECHNICAL SUPPORT SERVICE**

Whether you need information about the operation of the dynamometer, advice on specific measurements or want to contact our After Sales Service, our experienced technicians are at your disposal. All the people you speak to have taken part in the design and production of DynaKart, and they are always available to answer your questions.
DynaKart is an engine dynamometer equipped with an eddy current brake. It is therefore possible to control the variable load applied to the motor. Real engine running conditions can be reproduced so that an engine runs on the dynamometer just like it does on the track. Quite a helping hand when it comes to preparing an engine for a race! It also significantly reduces discrepancies between the workshop and the track. Furthermore, the results of the measurements boost the credibility of your operation. DynaKart benefits from the latest technological developments in engine test beds, while remaining easy to use.
An Efficient Load Brake

The load brake is mounted in balance and its rotation is reacted against by a mechanically mounted sensor that measures the brake torque which is directly comparable with the torque in the kart’s transmission shaft. With eddy current technology, the brake is extremely precise and has an excellent response time. It is cooled by a channelled air flow system that separates cold and hot streams and optimises the brake’s performance, thus increasing its capacity.

The 4 Characteristics of Dynakart

Filtration of Vibrations

DynaKart is equipped with an anti-vibration test platform mounted on silent-blocks and connected to the brake shaft with a flexible coupling. Engine generated vibrations are absorbed by the mounting platform and are not transmitted to the rest of the test bed (measurement part). Mounting brackets are included for fitting a water pump driven by the transmission shaft.

Data Acquisition

The Multi Peripheral Interface (IMP) is a centralised system for the acquisition of data from different sources. First, it ensures the constant measurement of the characteristics of the air: pressure, humidity and temperature. It transmits this data in real time to the software to correct the results accordingly. The IMP K also allows you to connect an air/fuel ratio probe (wide band Lambda sensor) as well as the acquisition of four temperature values with type K thermocouple sensors: engine water, air intake, exhaust and cylinder.

Engine Cooling

A powerful high-flow fan ensures the cooling of the engine and the radiator just like on a kart. An exhaust gas extraction system allows gases to be evacuated outside. And room fans are proposed in order to achieve air circulation in the test room to remove the heat produces and renew the intake air.

Remote Control

DynaKart is controlled by a remote-control box. No complicated or dangerous handling operations are necessary. The mechanical controls of the dynamometer and the software functions are managed remotely. A manual throttle control is also available. It is part of the control box chassis.
DynaKart features a test procedure in transient mode (acceleration) that is scalable under controlled load.

Specifically, the test is performed under acceleration between two engine speeds. Knowing the overall transmission ratio, the control electronics constantly calculate the speed of the kart depending on its engine speed and matches a resistance level identical to that experienced by the kart at this speed on the track. In this way, the engine undergoes a relatively small load at low revolutions and a more consistent load at higher speed. Another advantage is the possibility of varying the simulation parameters, for example; the weight of the kart and driver to perfectly adapt the load to actual category conditions or the grip of a track by adjusting wheel friction coefficients.

This unique function allows the engine to be prepared for upcoming races on different circuits. This technical assistance is very helpful for adjusting basic engine configurations, in particular for deciding which transmission ratio to adopt. So much time can be saved by arriving at the circuit with a competitive base set-up!

The transient test procedure under a road law can be also be used without making measurements. In this particular mode, it is possible to run the engine manually under realistic conditions while viewing the main useful measurements in real-time during the running-in period, e.g. temperatures, speed, torque transmitted.

You don’t have to be a computer expert to control DynaKart. A few mouse clicks are enough to use the software. The simple and user-friendly does not mean less performance. Continuous presentation of data readings updated in real time, comparisons of results, adjustment simulations... the DynaKart software is complete.

Test setup is performed through simple dialogue boxes and just a few seconds are needed 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 readings have been taken, the results can be displayed in the form of curves, tables or statistics. Various recent or former tests can be superimposed and easily compared. The data can be saved and built into a valuable database.

The results and configurable comments make up the test reports. They can be saved, printed or exported to external systems.
Engines installation

UNIVERSAL ENGINE SUPPORT FRAME

The engine support frame is universal. It is compatible with all types of engines and allows them to be mounted with or without the kart’s original engine plate.

OPTIMIZATION OF IMPLEMENTATION

More and more engines send the transmission output to the left-hand side. DynaKart takes this evolution into account and allows easy mounting and removal the engine and fast gear ratio changes.

DD2 KIT

Rotronics offers a specific mounting kit for Rotax DD2 engines. It consists of a plate ready for affixing to the DynaKart test bench. This plate incorporates a special assembly for the transmission shaft. The kit also includes a left-side output gear and a chain.

ENGINE INSTRUMENTATION

The IMP K allows the connection of temperature sensors. Rotronics provides several types of type K thermocouples. Their installation varies depending on their use, but in the case of the most universal probe, Rotronics airtight screw-in fittings for efficient mounting. Rotronics also offers converter harnesses for connecting and reading signals already measured by sensors installed to the engine to be tested (Alfano, AIM, Unipro...).
Equipments & accessories

**KRONOS LITE**

The Kronos Lite software is based on the standard DynaKart software but offers the possibility of modifying its configuration. This makes it possible to modify an instrument for a particular use, add alarms, define new graphs, add application-specific measurement channels or perform custom test procedures (on track record playing).

The Rotronics technical team is responsible for developing the modifications according to customer specifications. In this way, customers can have software that is perfectly adapted to their needs while maintaining the reliability of the standard packaging and without having to invest in training that is often hard to exploit.

**CEA 201 - ELECTRIC THROTTLE CONTROL**

The CEA 201 is an actuator that replaces the manual gas control. It consists of an electric actuator fitted next to the engine and an industrial joystick that shows the opening position of the throttle. This actuator can be operated manually by joystick or via Kronos Lite. In addition to accuracy that would be impossible to achieve manually, the CEA 201 associated with Kronos Lite allows automated test procedures to be performed and, in particular, cycle tests. Thus, it becomes very easy to carry out performance or running-in tests in rigorous and repeatable in cycles while engaging in other tasks.

**HIGH SPEED INTAKE AIR FAN**

For technicians who need to reproduce race conditions as faithfully as possible, Rotronics offers a high-speed fan capable producing air flows of up to 110 km/h. Associated with Kronos Lite it allows an air flow to be generated that matches the kart’s speed on the track and synchronised with engine speeds. Thus, the engine tested is subjected to the same intake air pressure on the track and its cooling radiator works with a yield that is equivalent to the simulated driving conditions. This device is very useful for replicating track conditions but also for studying engine behaviour that only appears in specific track conditions.

**WATER COOLING SYSTEM**

Rotronics also offers a water cooling system for the engine. This is a specially designed water/water heat exchanger for dynamometers which entails very low pressure drop. The integrated circulation loop features a 3-way motorised by-pass valve. The system acts on the valve automatically to control the temperature of the engine tested at customer setpoint. The test bench operator no longer needs to monitor the engine temperature at all times; it is all under control and he can focus on the current measurement tasks.
Technical Specifications

**DYNAKART**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Maximum power rating to 2000 rpm</td>
<td>70 kW (95 Hp)</td>
</tr>
<tr>
<td>Constant absorption capacity to 2000 rpm</td>
<td>44 kW (60 Hp)</td>
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<tr>
<td>Maximum transmission shaft speed</td>
<td>4000 rpm</td>
</tr>
<tr>
<td>Electrical supply</td>
<td>380V 3 phase 16A</td>
</tr>
<tr>
<td>Overall Dimensions</td>
<td>L 1100 mm x l 700 mm x P 1100 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>350 kg</td>
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</tbody>
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**Standard**

- Wired Remote
- DynaKart Software
- CE Certificate

**Options**

- IMP K
- Air/fuel ratio sensor
- Manual throttle control / CEA 201
- Engine cooling fan
- Room ventilation
- Exhaust extractor
- Weather Station SML 201
- Computer
- Kit DD2
- Intake air fan
- Temperature sensors
- Data acquisition harnesses
- Coolant temp controller
- Kronos Lite Software

**Computer requirements**:
PC Computer, 22” 16/9 LCD screen with Windows 7 or 10 operating system, 2 Ethernet network cards for communication with the bench and an internet connection (remote maintenance). Optionally, this PC can be supplied by Rotronics.

**Delivery**:
A printer can be fitted to the bench. The different measuring elements included in the dynamometer are factory-calibrated. DynaKart comes with a calibrating arm so that the user can independently check the calibration at any time.

**Guarantee**:
1 year parts and labour, return to workshop.

**Free technical support during warranty period**:
by fax and email.

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**ROTTRONICS**

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