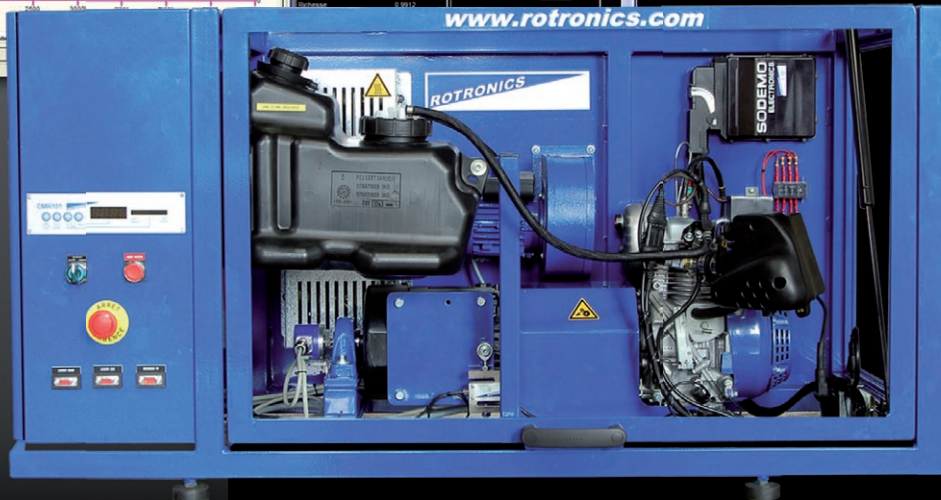
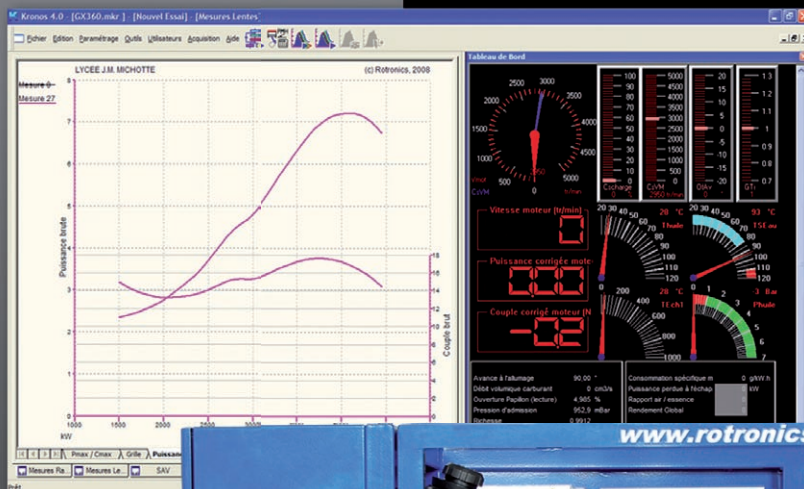


BEMP 301

THE 301 EDUCATIONAL ENGINE TEST

ROTRONICS



- Petrol engine with fuel injection
Configurable engine parameters
- Rigorous design and development.
Industrial components
Rotronics savoir-faire
- Compact test bench, ready to roll
- Low operating cost
Reduced maintenance programme
- Load and brake operating modes.
- Complete analysis of combustion
Calculation of different outputs

ENGINE TEACHING DYNAMOMETER 301

This aid's objective is to illustrate how an internal combustion engine works and to understand the parameters influencing its mode of operation. The educational operation associated with a modern technology in compliance with the procurement budgets and operating costs dictated its design.

THE CONCEPT

An educational engine test stand built around a single-cylinder 4 stroke injection gas engine, air-cooled, coupled with an asynchronous machine of equal capacity capable of braking the engine or accelerating it.

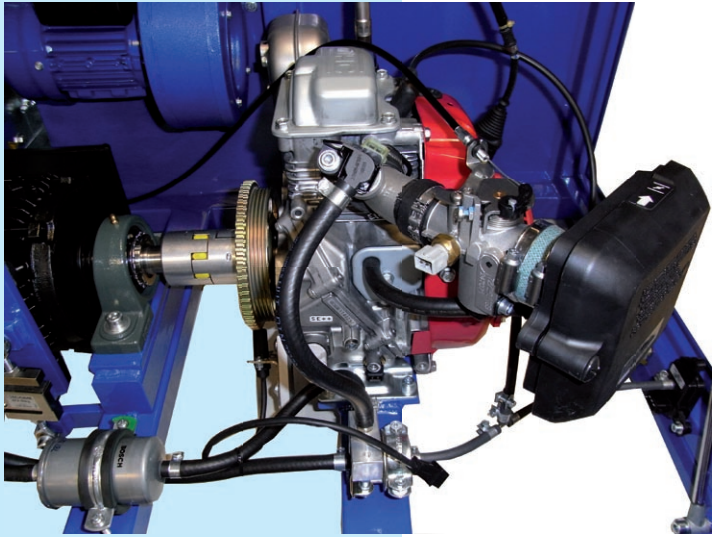
Its body is mounted on an autonomous and secured under-frame accommodating all the systems linked to the test : storage and gas routing, exhaust gas recovery and fanning of the engine zone, dispersion of the calories resulting from the operating engine and of the energy absorbed by the asynchronous machine, electrical management of the whole assembly, security systems, acquisition of data and piloting systems.

The test is linked to software operational from an office computer. This software ensures in real time the visualization of the piloting measures and parameters, allowing the posting of results in the form of curbs and diagrams, to register the data, and furthermore edit test reports. It equally ensures the test piloting management either through manual amendment of the control parameters or through the management of automatic and customized tests.

The benchmark overall size: L 1300 mm x W 600 mm x H 700 mm.
Mass: 200 kg approximately.



THE ENGINE

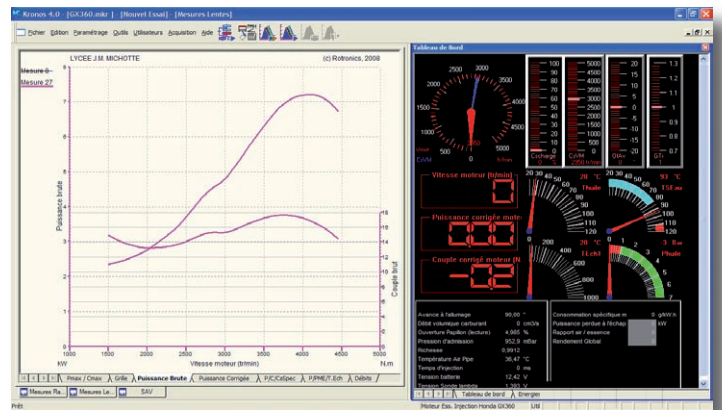


It is a four stroke, one cylinder , petrol engine with fuel injection :

Capacity :..... 98 cc.
 Compression ratio : 8,5 : 1
 Fuel supply : indirect injection, An ECU manage the injection and the ignition.
 Maximum power : 2 kW
 Maximum torque : 4.5 N.m
 Maximum speed : 4200 rpm
 Noise level : 85 dB
 Air Cooling , with integrated fan.
 Engine starting with the asynchronous motor.

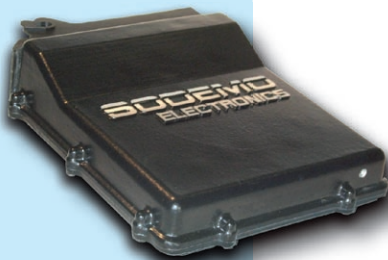
STUDY SCALES (MEASURES AND CALCULATIONS)

- Engine rpm
- Engine torque
- Gross power and corrected power
- BMEP: Brake Mean Effective Pressure
- Oil temperature
- Intake stroke temperature
- Exhaust temperature
- Intake stroke pressure
- Air / fuel Ratio
- Fuel flow
- Combustion air flow
- Specific fuel consumption
- Global efficiency
- Volumetric efficiency



CONTROLS SCALES

- Intake stroke throttle valve position; via shifted electrical control.
- Asynchronous machine : constant speed sepoint.
- Engine management: two variables playing on the injection time and ignition advance, modifiable via the system software. It is then possible and easy to amend the concentration of the blend.



THE TESTS

The tests uroll :

- Manually :

The user acts directly on the parameters of command. The study sizes are displayed in real time.

- Automatically :

The software takes over on the operator and realize the procedure for test. The user acts on the siez of control to set the test before his progress.

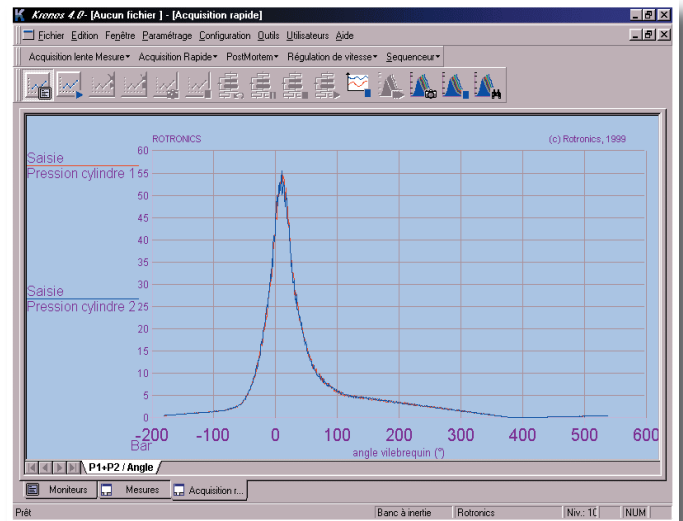
The tests occur using a stabilized horsepower in accordance with the constant speed order.

The tests take place in braking mode (The asynchronous machine brakes the engine in order to reach the value of constant speed order) and in acceleration mode (The asynchronous machine accelerates the engine to reach the value of the constant speed order).

OPTION IMPACT AIR PRESSURE MEASURE IN THE COMBUSTION CHAMBER

The engine is instrumented with a piezo pressure sensor measuring the instant pressure in the combustion chamber. The acquisition string and the software dedicated module allow the operation of the following scales:

- Pressure diagrams = f (Volume) & Pressure = f (Angle) – in combustion mode and in non-combustion mode.(A compressor's cycle.)
- Power loss resulting from friction.
- Average frictions pressure.
- Compression efficiency, mechanical efficiency.
- IMEP (Indicated mean effective pressure), IMPEP negative loop, IMEP positive loop, IMEP low pressure, IMEP high pressure.
- Maxi & mini combustion pressure, maxi pressure angle.
- Filling work, exhaust work, indicated work.



Please make note that the engine is pre-instrumented (Cylinder block machining) even though the option (pressure measurement in the combustion chamber) is not bought. It is therefore easier to integrate this option after the initial activation.

ROTRONICS

39, impasse de l'étang - ZI des Dragiez
F 74800 LA ROCHE SUR FORON

ROTRONICS

<http://www.rotronics.com>
e-mail: info@rotronics.com
tel: 04.50.03.08.59 Fax: 04.50.03.05.97