

CT 110

Test stand for single-cylinder engines, 7,5kW



The illustration shows the CT 110 with the CT 100.22

Learning objectives/experiments

- in conjunction with an engine (CT 100.20 – CT 100.23)
 - ▶ plotting of torque and power curves
 - ▶ determination of specific fuel consumption
 - ▶ determination of volumetric efficiency and lambda (fuel-air ratio)
 - ▶ determination of the frictional power of the engine (in passive mode)

Description

- control and load unit for single-cylinder internal combustion engines up to 7,5kW
- asynchronous motor used as load unit, also as starter motor
- vibration-insulated base plate for engine mounting

This test stand measures the power output of internal combustion engines delivering up to 7,5kW. The complete test stand consists of two main elements: The CT 110 as the control and load unit and a choice of engine: four-stroke petrol engine (CT 100.20), two-stroke petrol engine (CT 100.21) and two four-stroke diesel engines (CT 100.22, air-cooled with direct injection; CT 100.23, water-cooled with indirect injection).

The main function of the CT 110 is to provide the required braking power.

The brake unit is an air-cooled asynchronous motor with an energy recovery unit. The torque and speed are generated by way of a frequency converter. The energy recovery of the braking energy into the system provides for highly energy-efficient operation of the test stand. The torque is measured by means of a suspended brake unit and force sensor.

The engine is mounted on a vibration-insulated base plate and connected to the asynchronous motor. The mass of the base plate in conjunction with the soft bearing support ensures that the test stand runs very smoothly.

The asynchronous motor is initially used to start the engine. As soon as the engine is running, the asynchronous motor and energy recovery unit act as a brake unit for applying a load to the engine.

The braking power is fed back into the electrical system. In passive mode of the engine the asynchronous motor is also used to determine the frictional power of the engine.

The lower section of the mobile frame contains fuel tanks and a stabilisation tank for the intake air.

The air consumption is measured by way of a measuring nozzle. The fuel consumption is measured by way of the level in a vertical pipe.

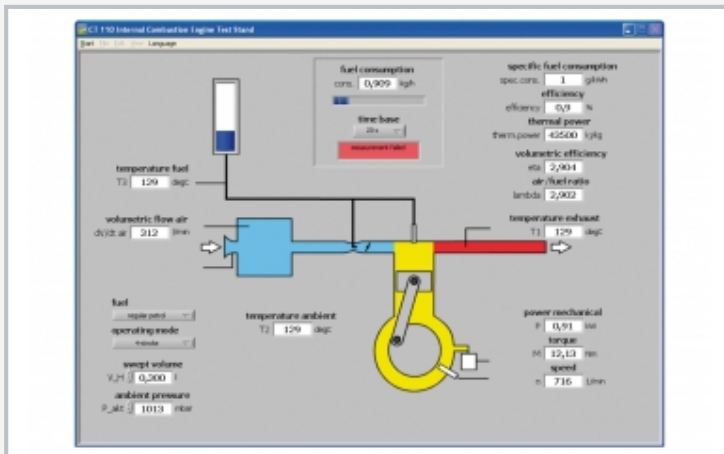
The switch cabinet contains digital displays for the speed, torque and temperatures. Pressure gauges indicate negative intake pressure and air consumption. The measured values are transmitted directly to a PC via USB. The data acquisition software is included.

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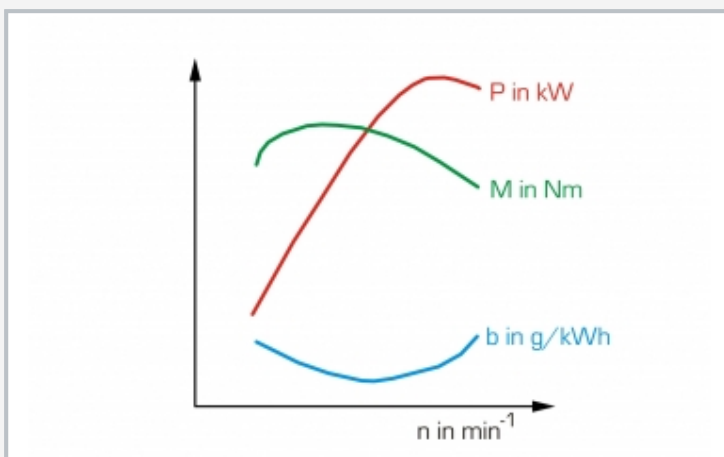
Test stand for single-cylinder engines, 7,5kW



1 display and control panel, 2 asynchronous motor, 3 force sensor (torque), 4 base plate, 5 fuel tank with pump, 6 stabilisation tank with air filter and air hose, 7 exhaust gas connection, 8 shelf, e.g. for CT 100.13



Software screenshot: process schematic



Characteristics of a four-stroke petrol engine:
n speed, M torque, P power, b specific fuel consumption

Specification

- [1] control and load unit for prepared single-cylinder engines (two-stroke and four-stroke) with a maximum power output of 7,5kW
- [2] asynchronous motor with energy recovery unit as brake generates engine load
- [3] engine started and experiments in passive mode by asynchronous motor
- [4] force transmission from engine to brake via elastic claw coupling
- [5] vibration-insulated base plate for engine mounting
- [6] stabilisation tank for intake air
- [7] potentiometer for continuous adjustment of braking torque
- [8] potentiometer for continuous adjustment of braking speed
- [9] measurement and display of torque, air temperature, air intake quantity, negative intake pressure, speed, fuel consumption, fuel temperature
- [10] measured value displays for engine: exhaust gas temperature and cooling water temperatures
- [11] GUNT software for data acquisition via USB under Windows 7, 8.1, 10

Technical data

Asynchronous motor as brake
 ■ power output: approx. 7,5kW at 2900min⁻¹

- Measuring ranges
- torque: -50...50Nm
 - temperature: 0...900°C
 - speed: 0...5000min⁻¹
 - fuel consumption: 50cm³/min
 - engine intake pressure: -400...0mbar
 - air consumption: 0...690L/h

400V, 50Hz, 3 phases
 400V, 60Hz, 3 phases, 230V, 60Hz, 3 phases
 UL/CSA optional
 LxWxH: 1450x850x1880mm
 Weight: approx. 245kg

Required for operation

ventilation, exhaust gas routing
 PC with Windows recommended

Scope of delivery

- 1 test stand (without CT 100.22)
- 1 set of tools
- 1 set of accessories
- 1 GUNT software CD + USB cable
- 1 set of instructional material

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Required accessories

Engines

063.10020	CT 100.20	Four-stroke petrol engine for CT 110
or		
063.10021	CT 100.21	Two-stroke petrol engine for CT 110
or		
063.10022	CT 100.22	Four-stroke diesel engine for CT 110
or		
063.10023	CT 100.23	Water-cooled four-stroke diesel engine for CT 110

Optional accessories

Indication system

063.10013 CT 100.13 Electronic engine indicating system for CT 110

with

063.10014 CT 100.14 Pressure transducer for CT 100.20

or

063.10017 CT 100.17 Pressure transducer for CT 100.21

or

063.10016 CT 100.16 Pressure transducer for CT 100.22

or

063.10015 CT 100.15 Pressure transducer for CT 100.23

Exhaust gas analysis

063.15902 CT 159.02 Exhaust gas analysing unit

063.10011 CT 100.11 Exhaust gas calorimeter for CT 110