

# CT 300

## Engine test stand, 11kW



### Description

- test stand for industrial two-cylinder engines up to 11kW
- asynchronous motor used as load unit, also as starter motor

This test stand measures the power output of internal combustion engines delivering up to 11kW. The complete test stand consists of two main elements: The CT 300 as the control and load unit and a choice of engine: two-cylinder petrol engine (CT 300.04, air-cooled) and two-cylinder diesel engine (CT 300.05, water-cooled).

The main function of the CT 300 is to provide the required braking power. The brake unit is an air-cooled asynchronous motor with an energy recovery unit. The braking speed and torque can be precisely adjusted using a frequency converter. The 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 base plate and connected to the asynchronous motor. The base plate is vibration-insulated, so no vibrations are transmitted

to the surrounding environment. 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 for applying a load to the engine. The braking power is fed back into the electrical system.

The lower section of the mobile frame contains fuel supply tanks and a stabilisation tank for the intake air. Two separate fuel gauge systems allow the quick change between diesel and petrol operation.

The switch cabinet contains digital displays for the speed, torque, air consumption and temperatures (engine cooling water inlet and outlet, exhaust gas, fuel and intake air). The fuel consumption and cooling water flow rate in the engine and the CT 300.01 calorimeter available as an option are displayed in analogue form. The measured values are transmitted directly to a PC via USB. The data acquisition software is included.

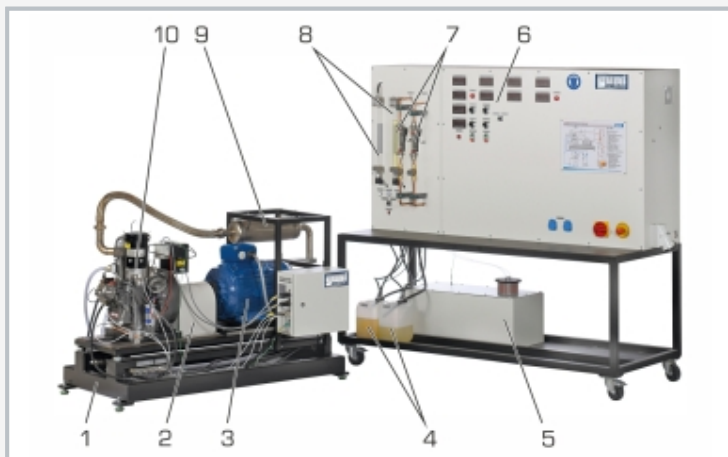
Lifting gear is required to exchange the engines.

### Learning objectives/experiments

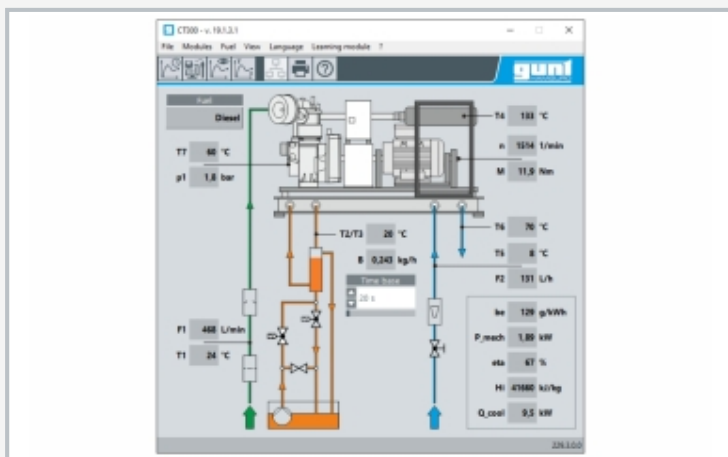
- in conjunction with an engine (CT 300.04 – CT 300.05)
  - ▶ plotting of torque and power curves
  - ▶ determination of specific fuel consumption
  - ▶ determination of volumetric efficiency and lambda (fuel-air ratio)
  - ▶ determination of the frictional power (in passive mode)
  - ▶ energy balances (for water-cooled engines)

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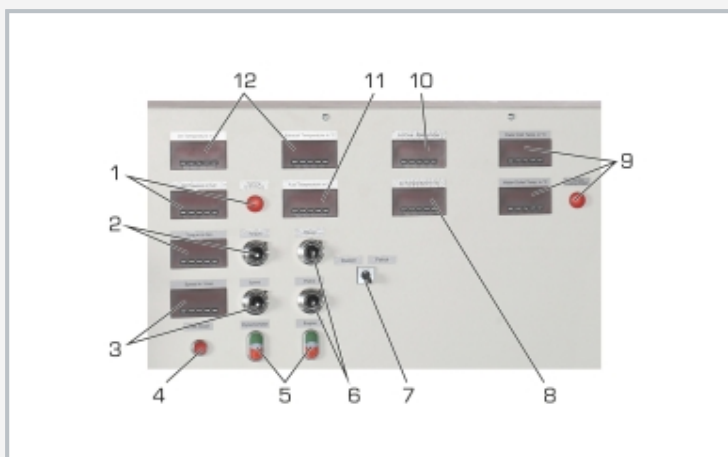
## Engine test stand, 11kW



1 base plate vibration-insulated, 2 elastic coupling, 3 asynchronous motor, 4 fuel tank, 5 stabilisation tank, 6 display and control panel, 7 fuel consumption, 8 cooling water flow measurement (engine and CT 300.01 calorimeter), 9 exhaust, 10 experimental engine



Software screenshot: process schematic



Instrumentation: 1 oil pressure with warning lamp, 2 torque with adjustment, 3 speed with adjustment, 4 reset frequency converter, 5 switch for motor and brake, 6 engine accelerator, 7 switch petrol/engine operation, 8 air temperature, 9 cooling water temperatures with alarm lamp, 10 intake air consumption, 11 fuel temperature, 12 exhaust gas and oil temperatures

### Specification

- [1] control and load unit for prepared four-stroke engines with a maximum power output of 11kW
- [2] vibration-insulated base plate for mounting of the engine and the asynchronous motor
- [3] asynchronous motor with energy recovery unit as brake generates engine load
- [4] engine and passive mode started by asynchronous motor
- [5] force transmission from engine to brake via elastic claw coupling
- [6] 2 separate fuel gauge systems
- [7] stabilisation tank for intake air 75L
- [8] potentiometer for continuous adjustment of braking speed and torque
- [9] measurement and display of temperatures (oil, fuel, air), engine load, engine speed, fuel consumption, air intake quantity, oil pressure
- [10] measured value displays for engine: exhaust gas temperature and cooling water temperatures
- [11] GUNT software for data acquisition via USB under Windows 10

### Technical data

Asynchronous motor as brake

- nominal power output: 11kW at 3000min<sup>-1</sup>

Measuring ranges

- torque: -200...200Nm
- speed: 0...5000min<sup>-1</sup>
- volumetric flow rate: 0...938L/min (intake air)
- flow rate: 0...250L/h (cooling water)
- temperature:
  - ▶ 4x 0...120°C
  - ▶ 1x 0...150°C (oil)
  - ▶ 1x 0...900°C (exhaust gas)
- pressure: 0...6bar (oil)

400V, 50Hz, 3 phases

400V, 60Hz, 3 phases

230V, 60Hz, 3 phases

UL/CSA optional

LxWxH: 1900x795x1800mm (switch cabinet)

LxWxH: 1450x680x750mm (base plate)

Weight: approx. 350kg

### Required for operation

water connection: 350L/h, min. 2bar  
 ventilation 60m<sup>3</sup>/h, exhaust gas routing 120m<sup>3</sup>/h  
 PC with Windows recommended

### Scope of delivery

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

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### Required accessories

#### Engines

CT 300.04 Two-cylinder petrol engine for CT 300

or

CT 300.05 Two-cylinder diesel engine for CT 300

### Optional accessories

#### Indication system

CT 300.09 Electronic engine indicating system for CT 300

with

CT 300.17 Pressure transducer for CT 300.04

or

CT 300.18 Pressure transducer for CT 300.05

#### Exhaust gas analysis

CT 159.02 Exhaust gas analysing unit

CT 300.01 Exhaust gas calorimeter for CT 300

#### for Remote Learning

GU 100 Web Access Box

with

CT 300W Web Access Software