

CT 300.01

Exhaust gas calorimeter for CT 300



Learning objectives/experiments

- determination of exhaust gas thermal output power given up
- determination of specific heat capacity of exhaust gas

Description

■ counterflow heat exchanger for calorimetric analysis of exhaust gases from internal combustion engines

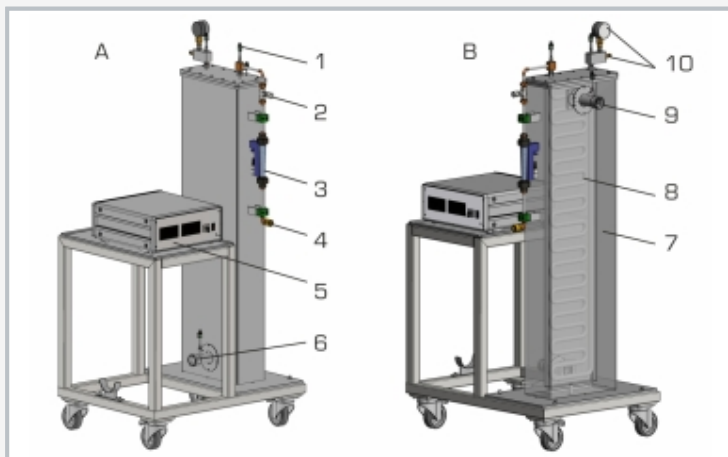
Determination of the thermal exhaust gas losses is essential when calculating an energy balance for internal combustion engines. Calorimetric measurement is an established method of doing this. It involves a largely complete and loss-free heat exchange between the exhaust gas and a cooling medium.

The exhaust gas calorimeter consists of an insulated stainless steel tank, through which the exhaust gas flows from bottom to top. While doing this, the exhaust gas gives up its heat almost completely to a finned pipe with cooling water flowing through it. The pipe is arranged in loops to achieve the maximum possible heat exchange area. Relevant temperatures (water and exhaust gas inlet and outlet) and the flow rate of the water are recorded electronically and displayed digitally using a measuring amplifier. The measured data from are stored and processed using software for data acquisition included in CT 300.

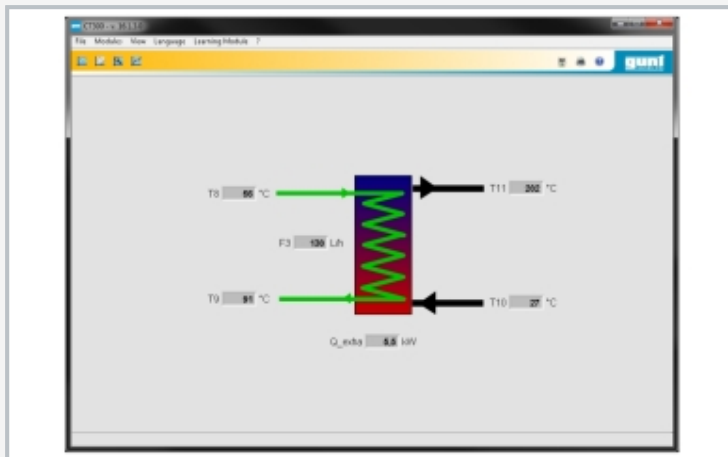
The CT 300.01 is connected to a test engine (CT 300.04 or CT 300.05) using a heat-resistant exhaust gas hose.

CT 300.01

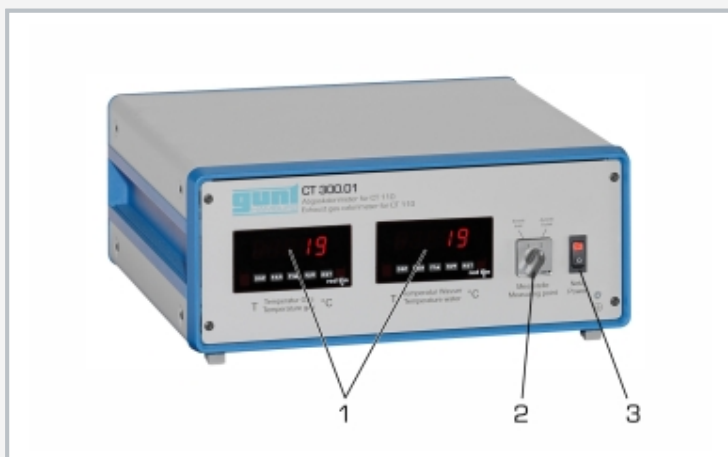
Exhaust gas calorimeter for CT 300



A: 1 thermocouple for water inlet, 2 valve for adjusting the cooling water flow rate, 3 flow meter, 4 water inlet, 5 measuring amplifier, 6 exhaust gas inlet with thermocouple
 B: 7 insulating, 8 chamber with finned pipe heat exchanger, 9 exhaust gas outlet with thermocouple, 10 water outlet with thermocouple and thermometer



Software screenshot: process schematic



Measuring amplifier: 1 digital displays for exhaust gas and cooling water temperatures, 2 inlet / outlet reversing switch, 3 power switch

Specification

- [1] determination of the amount of heat contained in the exhaust gas from test engines
- [2] calorimeter consisting of finned pipe heat exchanger and insulated tank
- [3] instrumentation: 4 temperature sensors, flow meter in CT 300
- [4] measuring amplifier with digital displays
- [5] connection between engine and calorimeter using exhaust gas hose
- [6] GUNT-software for calorimetric test included in CT 300 software

Technical data

Calorimeter

- insulated, stainless steel

Measuring ranges

- temperature:
 - ▶ 2x 0...600°C (exhaust gas)
 - ▶ 2x 0...200°C (cooling water)

230V, 50Hz, 1 phase

230V, 60Hz, 1 phase

120V, 60Hz, 1 phase

UL/CSA optional

LxWxH: 800x1000x1620mm (calorimeter)

LxWxH: 370x300x150mm (measuring amplifier)

Weight: approx. 105kg

Required for operation

cold water connection, drain

Scope of delivery

- 1 calorimeter
- 1 measuring amplifier
- 1 set of hoses
- 1 set of cables
- 1 manual

CT 300.01

Exhaust gas calorimeter for CT 300

Required accessories

CT 300	Engine test stand, 11kW
with	
CT 300.04	Two-cylinder petrol engine for CT 300
or	
CT 300.05	Two-cylinder diesel engine for CT 300