

## GUNT FEMLine Internal combustion engine training

Internal combustion engines are thermal driving machines. Internal combustion engines are used to power railway and motor vehicles, aircraft or watercraft and stationary machinery.

The GUNT FEMLine offers four different internal combustion engines in a capacity range up to 3,0kW: 4-stroke diesel and petrol engines with variable compression, and a 2-stroke petrol engine. The engines are supplied with fuel and air via a modular test stand, CT 159. The exhaust fumes are discharged to the outside via hoses. The engines are connected to the HM 365 Universal Drive and Brake Unit with a V-belt. HM 365 is first used to start the engines. While the engines are running, HM 365 is operated in generator mode, thus braking the engines.

The engines can be examined under full load or under partial load conditions. The characteristic diagram is determined with variable load and speed. The interaction of the brake and engine can also be examined in this context.

The **electronic indicating system** is a good way to gain an in-depth understanding of how an engine works. Special pressure sensors record the pressure in the cylinder chamber.

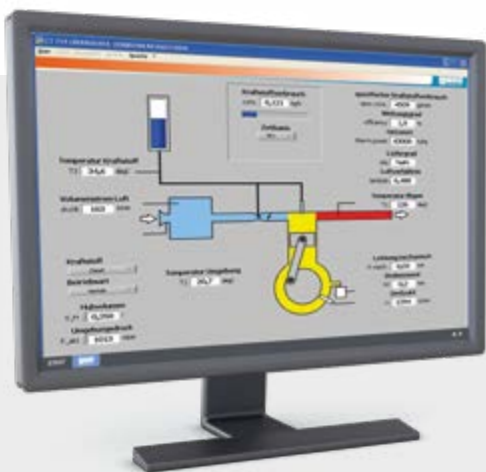
These data provide important information on the combustion process in the engine. In industrial applications, indicating systems are used to optimise the combustion process. The data are used to create the indicator diagram.

The indicating system helps identify the individual strokes of the engine. The process of ignition or an ignition attempt, and the gas exchange can be examined. Cranking without ignition can be simulated while examining the processes inside the cylinder chamber. The idling behaviour of diesel and petrol engines can be compared. The indicating system can be used to carry out a thermodynamic analysis of the engine.



### Modern GUNT software for Windows with comprehensive visualisation functions:

- process schematic for all engines with real-time display of all measured and calculated variables
- display of up to four characteristics at the same time
- representation of characteristics: select any assignment for the axes of the diagram
- storage of measuring data
- selection between four preset languages
- easy connection to a PC via USB



### HM 365 + CT 159 + test engine (CT 150 – CT 153) including PC data recording

- characteristics for full and partial load
- determination of friction loss in the engine
- comparison of diesel and petrol engines
- comparison of 2-stroke and 4-stroke engines
- 4-stroke petrol engine with variable compression

### Extended range of experiments with

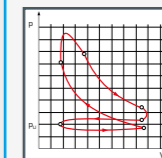
- exhaust gas analysis with CT 159.02 and / or
- electronic indication with PC-based data acquisition with CT 159.01 + engine-specific pressure sensor with TDC sensor (CT 159.03, CT 159.04 or CT 159.05)
- p-V diagram
- p-t diagram
- pressure curve during gas exchange
- determination of the indicated performance
- determination of mechanical efficiency



### CT 150 Four-stroke petrol engine

Air-cooled, single-cylinder, 4-stroke petrol engine with external carburation

CT 159.03  
Pressure sensor and TDC sensor



### CT 159.01 Electronic engine indicating system

Pressure measurement in the cylinder chamber of an internal combustion engine



### CT 159.02 Exhaust gas analysing unit

Measurement of the composition of exhaust gases (CO, CO<sub>2</sub>, HC, O<sub>2</sub>), the fuel / air ratio  $\lambda$  and the oil temperature of the engine.



### CT 151 Four-stroke diesel engine

Air-cooled, single-cylinder, 4-stroke diesel engine with direct injection

CT 159.04  
Pressure sensor and TDC sensor



### CT 153 Two-stroke petrol engine

Air-cooled, single-cylinder, 2-stroke petrol engine with diaphragm carburettor

CT 159.05  
Pressure sensor and TDC sensor