Driving machines

A driving machine is a machine that removes energy from a fluid and releases it in the form of mechanical work (**W**). In the process a form of energy, such as thermal or electrical energy, is converted to mechanical energy.

In practical application driving machines are mainly used to power working equipment, tools or vehicles. Depending on the energy source, we distinguish between hydraulic or thermal engines, wind power and electrical driving machines.

Driving machines
Energy is removed from the fluid

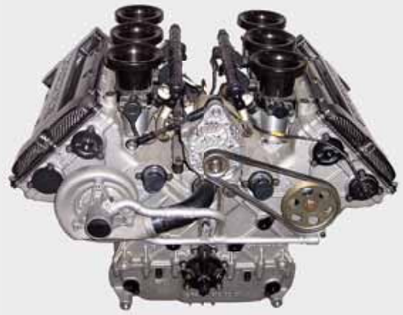
Turbomachines
Transfer of energy between the fluid and the machine by means of flow forces

Positive displacement machines
Transfer of energy between the fluid and the machine by means of a variable volume, generated by a displacement device

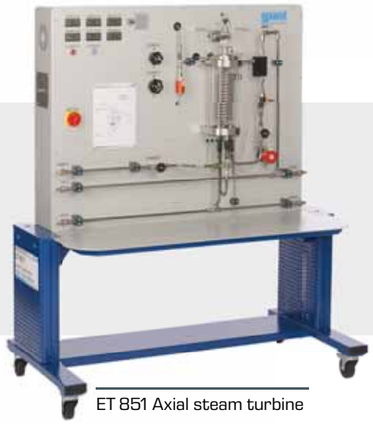
- water turbines
- wind turbines

- hydraulic engines
- internal combustion engines

Kaplan turbine



V6 engine of a racing car



ET 851 Axial steam turbine

GUNT offers a variety of trainers for studying different turbines and engines of various sizes and designs.

CT 151 Four-stroke diesel engine for cT 159

The table below shows an extract from a typical curriculum of a technical university. The syllabus for the lecture on fluid machinery looks similar to this. Depending on focus, the syllabus can be modified in line with the classification of the fluid machinery. The GUNT devices cover most of these topics.

Driving machines	GUNT products
Hydraulic driving machines	
Water turbines	HM 405
Francis turbine	HM 150.20, HM 365.31, HM 430C, HM 450.02
Kaplan turbine	HM 421
Pelton turbine	HM 150.19, HM 289, HM 365.31, HM 450.01
Wind-driven machines	
Air turbines	ET 270, ET 220, ET 220.01
Wind power plant	ET 210, ET 220, ET 220.01, ET 222
Thermal engines	
Steam turbines	ET 851, ET 830, Catalogue 3: ET 833, ET 805
Action turbine	ET 851, HM 270
Reaction turbine	HM 272
Steam power plants	ET 810, ET 813, ET 830, ET 850/851, Kat. 3: ET 805, ET 833
Gas turbines	ET 792, ET 794, ET 796
Setup incl. compressor/combustion chamber/turbine	ET 792, ET 794, ET 796
Gas turbine power plants	ET 792, ET 794
Turbine as expansion machine	ET 792, ET 794
Turbine as jet engine	ET 792, ET 796
Internal combustion engines	CT 159, Catalogue 3: CT 110-series, CT 300-series, CT 400-series
Otto engine (four-stroke)	CT 150, CT 152
Diesel engine (four-stroke)	CT 151
Two-stroke principle	CT 153

HM 289
Pelton Turbine

Driving machines

The hydroelectric power plant at the Three Gorges Dam in China is the largest power plant of its type to date and has various turbines.

In practical application driving machines are often large and powerful. Without these machines our daily lives would not be the same as they assure our energy supply and mobility. Steam and gas turbines or engines convert chemical or thermal energy into mechanical or electrical energy.

We use internal combustion engines as drive engines. Water and wind turbines are used in power plants to produce energy. In hydroelectric power plants Kaplan, Francis or free-jet turbines, like Pelton turbines, are used. Wind turbines are used in wind power plants.

Our devices reproduce industrial reality: in doing so the reduced scale is the crucial factor.

The larger the scale of a device, the better the results of the experiment. The smaller the scale, the more flexible the handling of the device. GUNT supplies devices for both cases:

Make your choice! You can select a complete trainer including accessories that is designed to carry out precise measurements and a broad range of experiments. Or maybe you prefer a compact experimental unit for basic experiments.

What makes the small, compact experimental units, such as devices from the Labline or HM 150 series, stand out is their mobility: they can be both demonstrated in a lecture and used for practical experiments at the lab.

In any case, all you need is a connection to a power supply and possibly a water connection to operate the devices. Despite their compact structural shape, the devices offer most of the same functions as a real-life large-scale device, with the corresponding restrictions regarding power and implementation.

Driving machines in real-life application

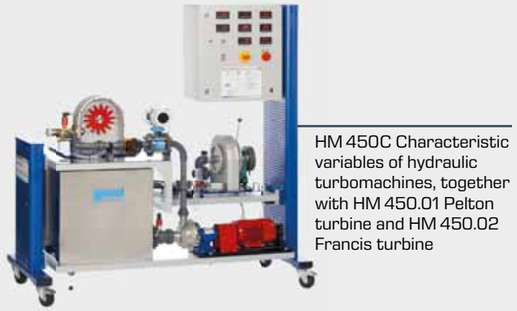
Assembly of a Pelton turbine at the Walchensee power plant in Germany (Voith Siemens Hydro Power)

Installation of a Kaplan turbine

Wind power plant

Industrial turbines with a diameter of several metres

The suitable GUNT device

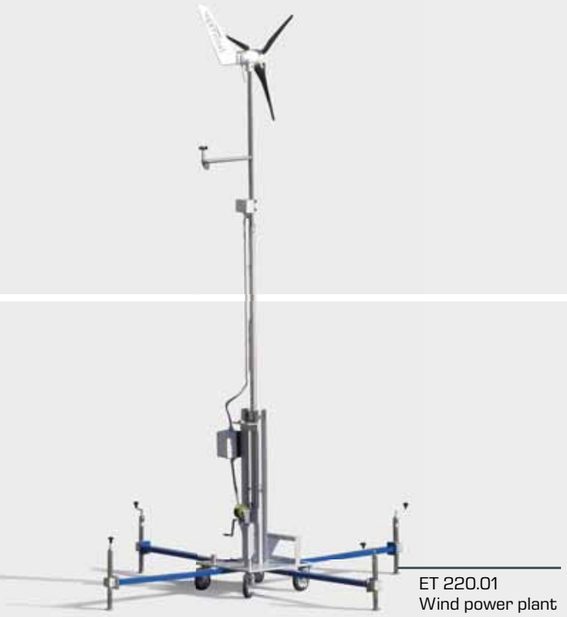


HM 450C Characteristic variables of hydraulic turbomachines, together with HM 450.01 Pelton turbine and HM 450.02 Francis turbine

HM 150.19
Operating principle of a Pelton turbine

HM 421
Kaplan turbine trainer

ET 220 Energy conversion in a wind power plant



ET 220.01
Wind power plant

The GUNT turbines: compact, easy to handle and just as functional as industrial turbines.