ET 202

Principles of solar thermal energy

Description

- **demonstration model of a solar thermal system**
- **lighting unit for operation in the laboratory**
- **hot water tank with electrical auxiliary heater**
- **inclinable flat collector with replaceable absorbers**

Solar thermal systems convert solar energy into usable thermal energy. ET 202 allows you to demonstrate solar thermal heating of domestic water in an illustrative manner.

A lighting unit simulates natural solar radiation and allows a range of experiments to be carried out in the laboratory. The light is converted into heat in an absorber and transferred to a heat transfer fluid. A pump conveys the heat transfer fluid through a hot water tank. The heat is released to the water by an integrated heat exchanger in the tank.

ET 202 can be used to study a variety of angles of incidence and different illuminance. The pre-installed absorber with selective coating can be replaced for a more simple blackened absorber, so as to obtain comparative measurements of collector losses. External heat consumers can be attached to the tank via two connectors.

The trainer is fitted with sensors to detect the relevant temperatures (collector inlet, collector outlet, ambient air and tank) and the illuminance.

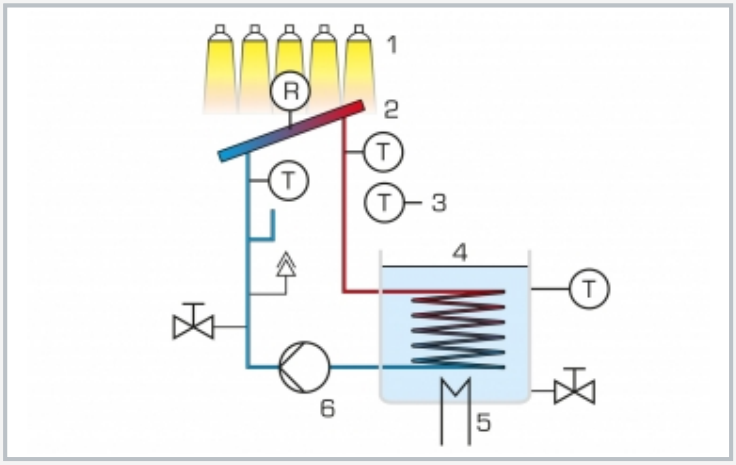
The measured values are displayed on the device and can simultaneously be transferred to a PC via USB. Using the PC, the data can be clearly displayed in the software provided and analysed further.

Learning objectives/experiments

- design and operation of a simple solar thermal system
- determining the net power
- energy balance on the solar collector
- influence of illuminance, angle of incidence and flow rate
- determining efficiency curves
- influence of various absorbing surfaces

ET 202
Principles of solar thermal energy

1 lighting unit, 2 control cabinet, 3 illuminance sensor, 4 flat collector with spacing and tilt adjustment, 5 temperature sensor, 6 storage tank, 7 electrical auxiliary heater



Main components: 1 lighting unit, 2 flat collector, 3 temperature sensor ambient air, 4 storage tank, 5 electrical auxiliary heater, 6 pump;
R illuminance, T temperature

Specification

[1] functional demonstration model of a solar thermal system
[2] lighting unit with 25 halogen bulbs
[3] spacing and tilt adjustable collector
[4] 2 replaceable absorbers with different coating
[5] solar circuit with pump and variable flow
[6] hot water tank with tube coil as heat exchanger and electrical auxiliary heater
[7] sensors detect temperature and illuminance
[8] GUNT software for data acquisition via USB under Windows 7, 8.1, 10

Technical data

Flat collector
- absorbing surface: 320x330mm
- tilt angle: 0...60°

Lighting unit
- lamp field: 25x 50W

Pump
- adjustable flow: 0...24L/h

Measuring ranges
- temperature: 4x 0...100°C
- flow rate: 0...30L/h
- illuminance: 0...3kW/m²

230V, 50Hz, 1 phase
230V, 60Hz, 1 phase
230V, 60Hz, 3 phases
UL/CSA optional
LxWxH: 1840x800x1500mm
Weight: approx. 167kg

Required for operation

PC with Windows recommended

Scope of delivery

1 trainer
1 measuring beaker
1 absorber
1 CD with GUNT software + USB cable
1 set of instructional material