

# ET 202.01

## Parabolic trough collector



1 parabolic trough mirror, 2 illuminance sensor (scope of delivery of ET 202), 3 absorber tube, 4 suspension, 5 sensor cable and connection (scope of delivery of ET 202), 6 connection to solar circuit in ET 202, 7 scale



### Description

- pivoting parabolic trough collector with highly reflective mirror
- absorber tube with selective coating
- evacuated double-walled glass tube to reduce heat losses

Parabolic trough collectors contain parabolically shaped mirrored surfaces to reflect and concentrate solar radiation onto an absorber. A heat transfer fluid flows in the absorber tube at the focal point of the parabolic trough and transports the absorbed heat away for further use.

ET 202.01, together with the ET 202 trainer allows you to investigate fundamental aspects of concentrating solar thermal energy use.

The light from the lighting unit in ET 202 is focused onto the absorber tube by means of the parabolic mirror. The absorber tube is fitted with a double-walled glass casing to reduce heat losses. The heat is transferred through a pipe in the absorber to a heat transfer fluid in the solar circuit of the ET 202 trainer, where it enters the storage tank.

In the experiments, it is possible to directly compare the temperature response and efficiency of the concentrating parabolic trough collector to a classic flat-plate collector. The distance to the ET 202 lighting unit and the angle of inclination can be changed. Measured data are captured, displayed and analysed with the help of the GUNT software in ET 202.

### Learning objectives/experiments

- focusing solar radiation with a parabolic trough mirror
- optical concentration factor
- conversion of radiant energy into heat
- losses in thermal solar collectors
- efficiency characteristics

### Specification

- [1] thermal solar collector with parabolic trough mirror and selectively absorbing absorber tube for operation with the ET 202 trainer
- [2] evacuated double-walled glass tube to reduce heat losses
- [3] pivoting collector with angular scale
- [4] adjustable collector mount for the ET 202 trainer
- [5] connection to the solar circuit in ET 202 with pump, heat exchanger and storage tank
- [6] temperature, illuminance and flow rate measured by ET 202

### Technical data

#### Collector

- parabolic mirror
  - ▶ trough length: 415mm
  - ▶ aperture width: 415mm
  - ▶ mirror surface area: 0,17m<sup>2</sup>
  - ▶ focal length: 0,1m
- absorber
  - ▶ selectively coated absorber tube
  - ▶ double-walled glass casing to reduce heat losses

LxWxH: 546x620x180mm

Weight: approx. 16kg

### Scope of delivery

- 1 experimental unit
- 1 set of accessories
- 1 set of instructional material

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Required accessories

ET 202                    Principles of solar thermal energy