

# TM 161

## Rod and gravity pendulum



### Description

- investigation of pendulum swings
- comparing physical and mathematical pendulums

Pendulums perform oscillations. Gravity produces the restoring moment. We distinguish between mathematical and physical pendulums. A mathematical pendulum describes an idealised gravity pendulum. In physical pendulums, the shape and size of the pendulum body is taken into account. Both are theoretical models for the description of a real pendulum.

The TM 161 unit is used to study pendulum swings. A gravity pendulum (mathematical pendulum) and a rod pendulum (as a physical pendulum) are compared to each other. The unit contains a metal rod with a movable auxiliary mass as the rod pendulum. The suspension point can be adjusted on the knife-edge bearing of the pendulum. The length of the gravity pendulum can be easily changed using a clamping device.

The experimental unit is designed to be fixed to a wall.

### Learning objectives/experiments

- oscillation period of gravity and rod pendulum
- determine centre of gravity on the rod pendulum
- reduced pendulum length and centre of inertia of the rod pendulum

### Specification

- [1] experiments on pendulum swings, comparison of physical and mathematical pendulums
- [2] rod pendulum as physical pendulum, made of metal and mounted on knife-edge bearing
- [3] knife-edge bearing mounted to slide on the rod to effectively vary the pendulum length
- [4] weight for the rod pendulum, sliding
- [5] gravity pendulum as a mathematical pendulum
- [6] adjustable length of the gravity pendulum
- [7] stopwatch to measure the oscillation period
- [8] bracket for wall mounting

### Technical data

- Gravity pendulum
- length: up to 2000mm
  - nylon rope
  - weight
    - ▶ diameter: 50mm
    - ▶ mass: 0,52kg

- Rod pendulum
- length: 1000mm
  - diameter: 8mm
  - mass: 0,39kg
  - pendulum weight
    - ▶ diameter: 50mm
    - ▶ mass: 0,49kg

Stopwatch: 1/100s

LxWxH: 250x80x2000mm  
Weight: approx. 5kg

### Scope of delivery

- 1 experimental unit
- 1 set of instructional material