

# TM 163

## Torsional vibrations



### Description

#### ■ vibrations of different torsion bars

In torsional vibrations, a restoring moment is produced by the twisting of a bar in the oscillating system. The restoring moment strives to return the rotating mass to the resting position.

The TM 163 unit can be used to study torsional vibration on torsion bars with different diameters and different lengths. At the top end, the torsion bars are clamped in a quick-action chuck.

A solid circular disk or a circular ring is fixed at the bottom end of the bar using a quick-action chuck. They have the same mass and the same diameter, but different moments of inertia due to their shape.

The torsion bars can be quickly and easily exchanged and their length varied. The oscillation period is measured.

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

### Learning objectives/experiments

- determine the oscillation period as a function of
  - ▶ the length of the torsion bar
  - ▶ the diameter of the torsion bar
  - ▶ the rotating mass and its shape

### Specification

- [1] torsional vibrations on different torsion bars
- [2] 5 aluminium torsion bars with different diameters
- [3] adjustable effective length of the torsion bars
- [4] quick-action chucks to swap components
- [5] generate torsional vibration via a circular disk or circular ring
- [6] stopwatch to measure the oscillation period
- [7] bracket for wall mounting

### Technical data

Five torsion bars

- aluminium
- length: 1100mm
- diameter: 2mm, 3mm, 4mm, 5mm, 6mm

Circular ring

- outer diameter: 160mm
- inner diameter: 100mm
- height: 31mm
- moment of inertia: 0,01335kgm<sup>2</sup>

Circular disk

- diameter: 160mm
- height: 19mm
- moment of inertia: 0,0096kgm<sup>2</sup>

Stopwatch: 1/100s

LxWxH: 700x200x200mm

Weight: approx. 12kg

### Scope of delivery

- 1 experimental unit
- 1 set of instructional material