

# FT 102

## Cutting forces during turning



### Description

#### ■ measurement of the forces acting on the lathe tool

Investigation of cutting forces during turning is fundamental to the teaching of cutting techniques. The setup comprises a transducer, which also holds the lathe tool, and an amplifier unit with digital displays. The forces that act on the lathe tool during machining are measured in three directions: cutting force, feed force and passive force.

The three-component force measurement device uses a strain gauge system. The amplifier unit supplies the strain gauge bridges and displays the measured values on three digital displays.

The experiments must be conducted in a workshop environment, as a suitable lathe is required.

### Learning objectives/experiments

- measurement of forces in turning
  - ▶ influence of rotational speed, rate of feed, feed motion, lubrication and cooling conditions
- influence of the cutting geometry of the lathe tool
- influence of the material being machined

### Specification

- [1] three-component force measuring device for cutting experiments during turning
- [2] lathe tool holder implemented as transducer with strain gauge system
- [3] strain gauge amplifier unit with 3 digital displays for forces
- [4] transducer with splash-proof housing
- [5] GUNT software for data acquisition via USB under Windows 10

### Technical data

Force sensor

- number of force axes: 3 (x,y,z)
- measuring range:  $\pm 5\text{kN}$
- overload capacity up to:  $\pm 6,5\text{kN}$
- breaking load:  $\pm 8\text{kN}$
- non-linearity:  $<1\%$
- supply: 10VDC

Strain gauge in full-bridge configuration

230V, 50Hz, 1 phase  
 230V, 60Hz, 1 phase  
 120V, 60Hz, 1 phase  
 UL/CSA optional  
 LxWxH: 360x350x160mm (measuring amplifier)  
 Weight: approx. 6kg

### Required for operation

PC with Windows recommended

### Scope of delivery

- 1 measuring device for turning experiments, comprising strain gauge amplifier and transducer
- 1 GUNT software + USB cable
- 1 set of instructional material

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Optional accessories

WP 300.09      Laboratory trolley