

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 7, 8.1, 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: 365x315x150mm (measuring amplifier)
 Weight: approx. 7kg

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 CD + USB cable
- 1 set of instructional material

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Optional accessories

020.30009 WP 300.09 Laboratory trolley