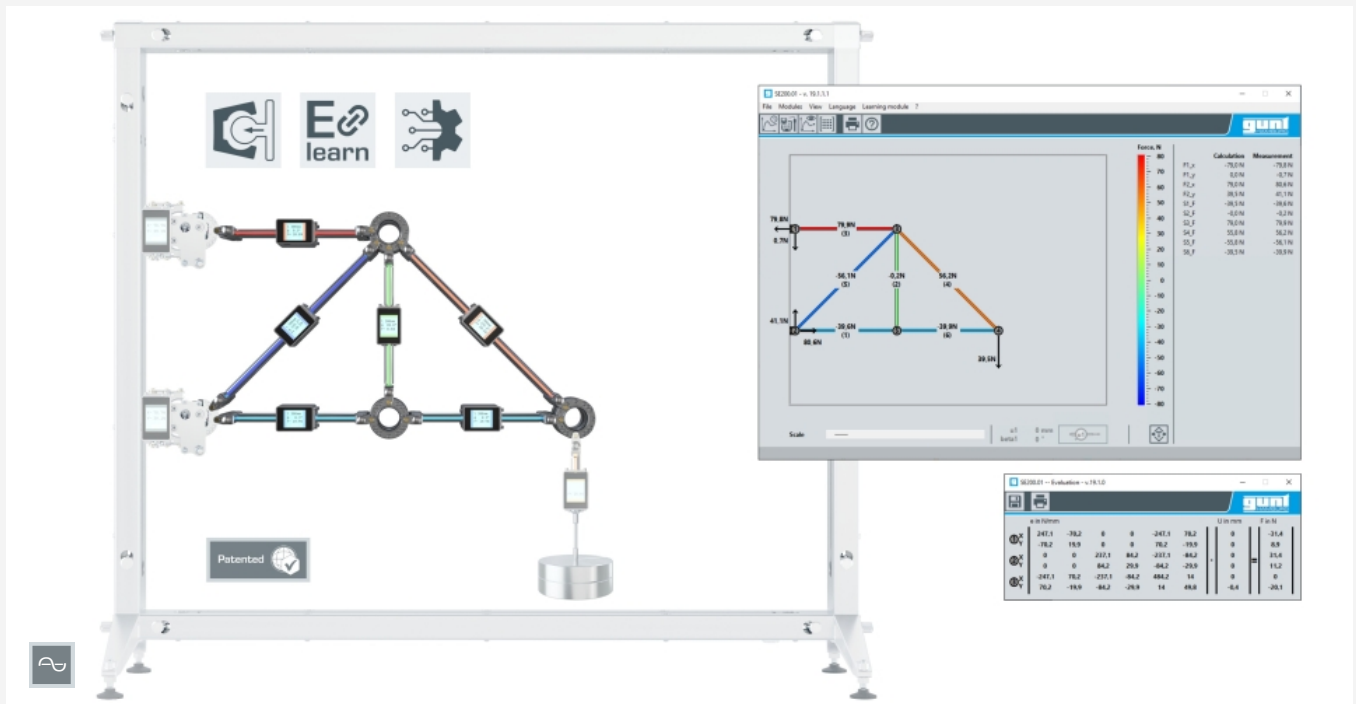


SE 200.01

MEC - Forces in trusses



Description

- **wireless setup of trusses together with smart, communication-enabled bars and accessories**
- **measured values and coloured display of the force directly on the bar and in the software**
- **click system for easy setup and reconfiguration**
- **automatic identification in the GUNT software and assignment of the bars and accessories**

Trusses are bar structures in which the bars are only subject to compressive or tensile stress, but not bending.

SE 200.01 contains various smart, communication-enabled bars, equipped with electronic modules for data acquisition and measured value display. The experimental arrangement is set up in the SE 200 mounting frame. The stainless steel mounting frame provides direct and wireless data transmission and power supply for the smart components.

The bars are hinge-connected to node disks and are only subjected to compression or tension. The click system ensures the bars easily snap into place in the node disks. Since no torques are transmitted in the node disks, they are considered frictionless. The trusses can therefore be regarded as ideal trusses.

Accessories such as supports, vertical load, load unit and additional bars are available for setup and for free experimentation. It is possible to create bridge connections, trusses across corners, larger trusses and indeterminate trusses. In experiments, all forces of the plane truss (bars, supports, loads) are measured and displayed both directly on the smart components and in the GUNT software as a measured value and as a colour. The calculated displacement can be demonstrated and amplified in the software. With the distance measurement accessory, the displacement can be measured and compared at any points.

The GUNT software identifies the position and location of the installed bars as well as the external forces and reacts dynamically to changes. The GUNT topology algorithm ensures that the visualisation in the software always corresponds to the real truss. The measured values are analysed in real time and can be directly compared with the calculated values (FEM).

All components are clearly laid out and well protected in a storage system.

Learning objectives/experiments

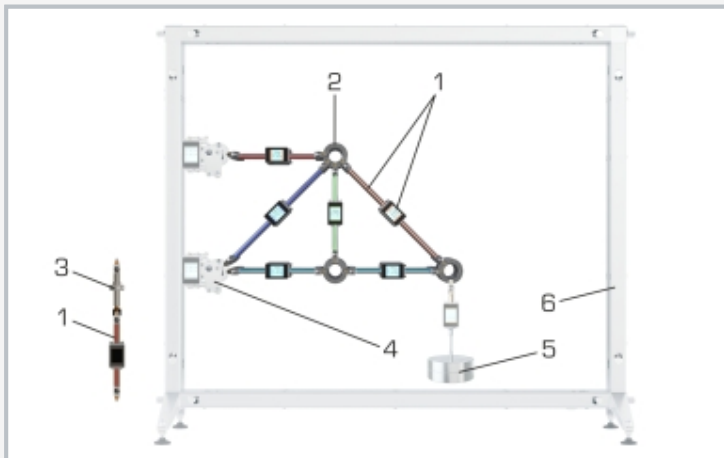
- measurement of the bar forces in a statically determinate and statically indeterminate plane truss
- dependence of the bar forces on the external force
 - ▶ quantity, direction, point of application
 - ▶ measurement and determination of support reactions
- comparison of theory and practice: comparison of measurement results with mathematical solution methods
 - ▶ method of joints
 - ▶ Ritter's method of sections
 - ▶ FEM
- basic principle: measurement of forces using strain gauges
- accessories of the MEC Line can be combined in a modular way for setup and extension of the experiments

GUNT Science Media Center, develop digital skills

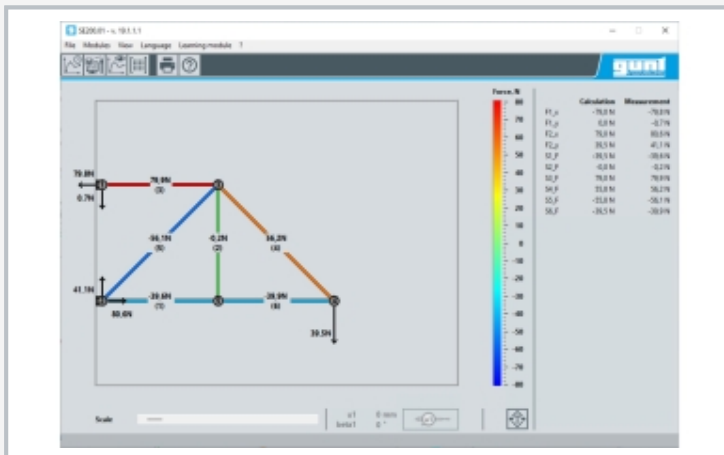
- retrieve information from digital networks
- E-Learning course with fundamental knowledge and detailed presentation of the experiment procedure and engaging animations
- assured learning success through digital worksheets

SE 200.01

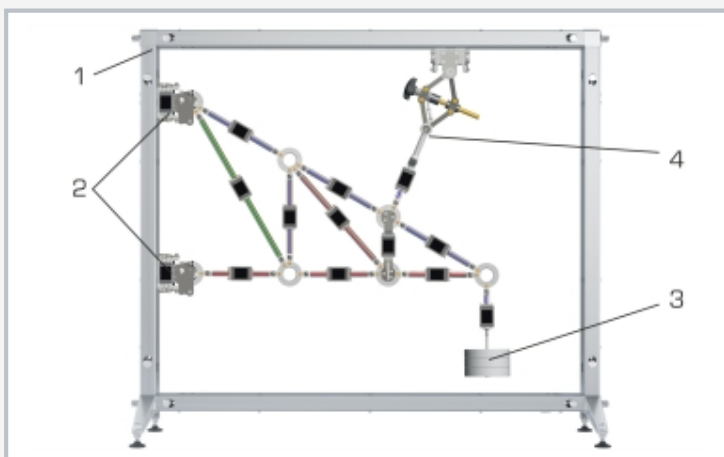
MEC - Forces in trusses



1 bar with electronic module, 2 node disk, 3 bar extension; accessories: 4 support SE 200.21, 5 vertical load SE 200.24, 6 mounting frame SE 200



Screenshot of the GUNT software: automatically transmitted experimental setup and display of measured and calculated forces; colour scale for dynamic adaptation to the current range of measured values



Setup example: 1 mounting frame SE 200, 2 two supports SE 200.21, 3 one vertical load SE 200.24, 4 one load unit SE 200.22

Specification

- [1] bar and support forces in various plane trusses
- [2] smart, communication-enabled bars with electronic modules for data acquisition and display of measured values
- [3] node disks hinge-connected to bars
- [4] setup experiment in the SE 200 mounting frame
- [5] click system for simple, quick experimental setup without cabling
- [6] supports, vertical load, load unit, distance measurement, additional bars available as accessories
- [7] setup variants across corners and with bridge connection, as well as free experimentation possible
- [8] bar extension for setting up indeterminate trusses
- [9] automatic identification and assignment of the bars during setup and experimentation
- [10] GUNT topology algorithm: visualisation in the software corresponds to the real assembled truss
- [11] display of measured values and visual representation of forces by colour directly on the bars and in the GUNT software
- [12] calculated displacement can be demonstrated and amplified in the GUNT software
- [13] distance measurement for measuring displacement at any points available as accessory
- [14] GUNT software via USB under Windows 10
- [15] digital multimedia teaching material online in the GUNT Science Media Center: E-Learning course, worksheets

Technical data

Bars with electronic modules

- 1x bar extension, adjustable length
- 2x 424mm
- 4x 300mm
- 1x 259mm
- per bar: 2x LED for coloured display of force
- per bar: display for measured force and angular position

Node disks

- quantity: 3
- outer connection positions: 16
- inner connection positions: 1

Measuring ranges

- force: 0...200N
- angle: 0...180°

LxWxH: 600x400x200mm (storage system)

Weight: approx. 8kg (total)

Required for operation

Accessories from the GUNT MEC Line series, PC with Windows recommended

Scope of delivery

set of bars, set of node disks, GUNT software, set of instructional material and online access to GUNT Science Media Center, storage system with foam inlay

SE 200.01

MEC - Forces in trusses

Required accessories

SE 200 2x	MEC - Frame digital & smart
SE 200.21 min. 1, max. 2	MEC - Support
SE 200.24	MEC - Vertical load

Optional accessories

SE 200.27 max. 2	MEC - Bar set
SE 200.22 max. 1	MEC - Load unit
SE 200.23	MEC - Distance measurement