

# MT 173

## Test stand for gears



The illustration shows MT 173 together with MT 123 Spur and worm gear, screen mirroring is possible on different end devices

### Description

- investigation of mechanical efficiency of gears
- part of GUNT-DigiSkills
- three-phase motor as the drive unit and magnetic particle brake as the brake unit
- plant control using an integrated PLC operated via touch screen
- integrated router for operation and control via an end device and for screen mirroring on additional end devices: PC, tablet, smart-phone

The MT 173 unit is used to investigate the functionality of different gears. The test stand consists of a drive unit and a brake unit. Four different gears are available as accessories. Driving and braking power are calculated to determine the efficiencies. The components used are common in drive systems and therefore have a high level of practical relevance.

A three-phase motor with variable speed via frequency converter serves as the drive unit. An air-cooled magnetic particle brake is used as the brake unit. The constant braking effect can be very finely adjusted via the exciting current; it then serves as a tunable load.

The following gear types are available separately as accessories: spur and worm gear, spur gear, bevel gear and planetary gear. Jointed shafts connect the gears to the motor and brake.

Motor and brake are attached to a fixed torque sensor in order to determine the torques. The speed of the motor is detected contact-free by means of inductive sensors and is displayed digitally.

The trainer is controlled by the PLC via touch screen. By means of an integrated router, the trainer can alternatively be operated and controlled via an end device. The user interface can also be displayed on additional end devices (screen mirroring). Measured values are graphical represented on the user interface. Via the PLC, the measured values can be stored internally. Access to stored measured values is possible from end devices via WLAN with integrated router/ LAN connection to the customer's own network.

### Learning objectives/experiments

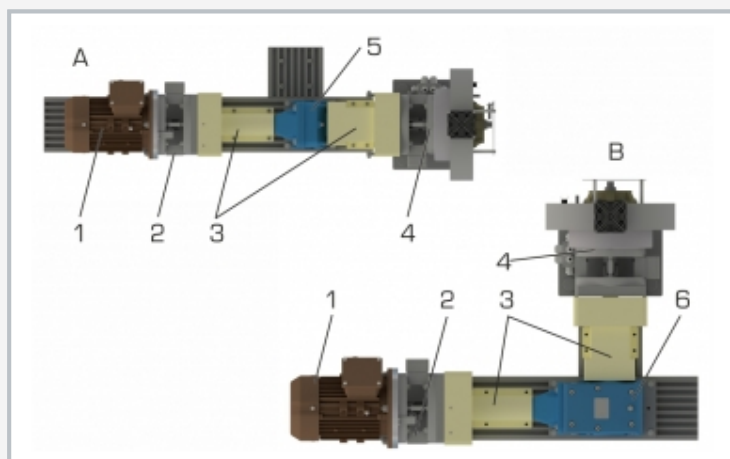
- together with a gear (MT 120, MT 121, MT 122, MT 123)
  - ▶ determination of the mechanical efficiency of gears by comparing the mechanical driving and braking power for:
    - spur and worm gears,
    - spur gears,
    - bevel gears,
    - planetary gears
  - ▶ efficiency dependent on speed
  - ▶ efficiency dependent on torque
- screen mirroring: mirroring of the user interface on end devices
  - ▶ menu navigation independent of the user interface shown on the touch screen
  - ▶ different user levels available on the end device: for observing the experiments or for operation and control

# MT 173

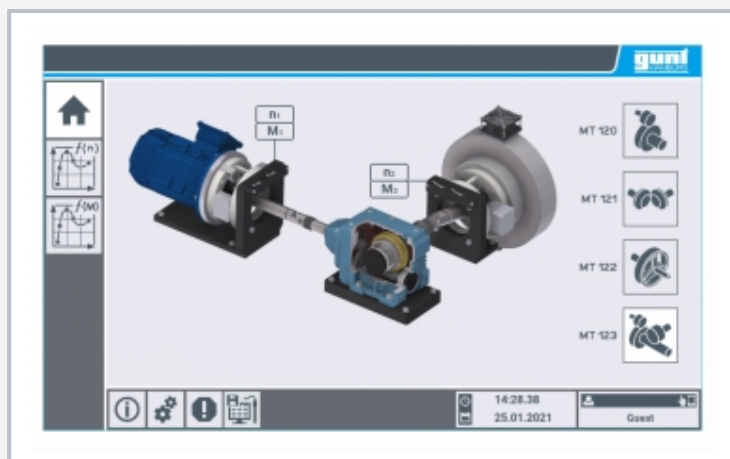
## Test stand for gears



1 touch screen for operation, 2 drive motor, 3 protective cover, 4 base plate for holding motor and gear, 5 tools, 6 brake, pivoted, 7 MT 123 Spur and worm gear



A setup for MT 122 Planetary gear and MT 120 Spur gear accessories  
 B setup for MT 123 Spur and worm gear and MT 121 Bevel gear accessories  
 1 drive motor, 2 torque sensor, 3 protective cover for jointed shafts, 4 brake, 5 spur gear, 6 spur and worm gear



Touch screen: welcome screen

### Specification

- [1] determination of mechanical efficiency of gears
- [2] spur and worm gear, spur gear, bevel gear, planetary gear available as accessories
- [3] plant control with PLC via touch screen
- [4] integrated router for operation and control via an end device and for screen mirroring: mirroring of the user interface on up to 5 end devices
- [5] three-phase motor with variable speed via frequency converter
- [6] air-cooled magnetic particle brake with adjustable braking torque
- [7] inductive speed sensor on the motor and brake
- [8] display of speed and torques
- [9] data acquisition via PLC on internal memory, access to stored measured values via WLAN with integrated router/ LAN connection to customer's own network

### Technical data

PLC: Eaton XV-303

Three-phase motor with variable speed

- power output: 0,75kW
- speed: 0...1400min<sup>-1</sup>

Magnetic particle brake, air-cooled

- braking torque: 0...80Nm

Measuring ranges

Drive

- torque: 0...10Nm

Brake

- torque: 0...100Nm

230V, 50Hz, 1 phase

230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase

UL/CSA optional

LxWxH: 1682x790x1460mm

Weight: approx. 250kg

### Scope of delivery

- 1 experimental unit
- 1 set of accessories

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### Optional accessories

|           |        |                                       |
|-----------|--------|---------------------------------------|
| 051.12000 | MT 120 | Assembly exercise: spur gear          |
| 051.12100 | MT 121 | Assembly exercise: mitre gear         |
| 051.12200 | MT 122 | Assembly exercise: planetary gear     |
| 051.12300 | MT 123 | Assembly exercise: spur and worm gear |