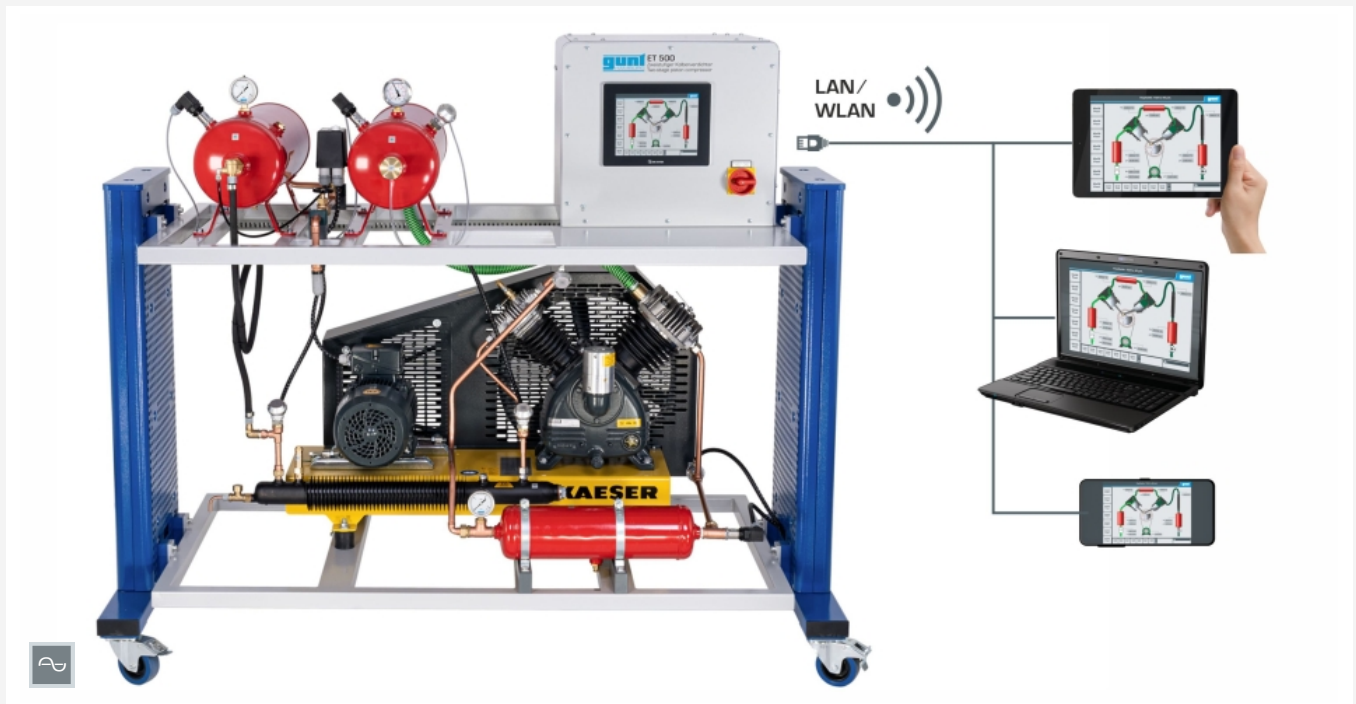


ET 500

Two-stage piston compressor



screen mirroring is possible on up to 10 end devices

Description

- **compression process on a p-V diagram**
- **integrated router for operation and control via an end device and for screen mirroring on up to 10 end devices: PC, tablet, smart-phone**

Compressed air for industry and businesses that use compressed air as an energy source is generated by means of so-called compressed air generation systems. A key component of these systems is the compressor. It converts the supplied mechanical energy into a higher air pressure. Such systems are used to drive machines in mining, for pneumatic control systems in assembly plants or tyre inflation systems at petrol stations.

ET 500 includes a complete compressed air generation system with a two-stage compressor and an additional pressure vessel as intercooler. The trainer enables the recording of compressor characteristics and representing the compression process in a p-V diagram.

The air is sucked into the intake vessel through a measuring nozzle and calmed there before it is compressed in two stages. The additional pressure vessel for intercooling is located between the first and second stage. After the second stage, the compressed air is pressed into another pressure vessel through a cooling tube. To achieve a steady state, the compressed air can be released through a blow-off valve with silencer. Safety valves and a pressure switch complete the system.

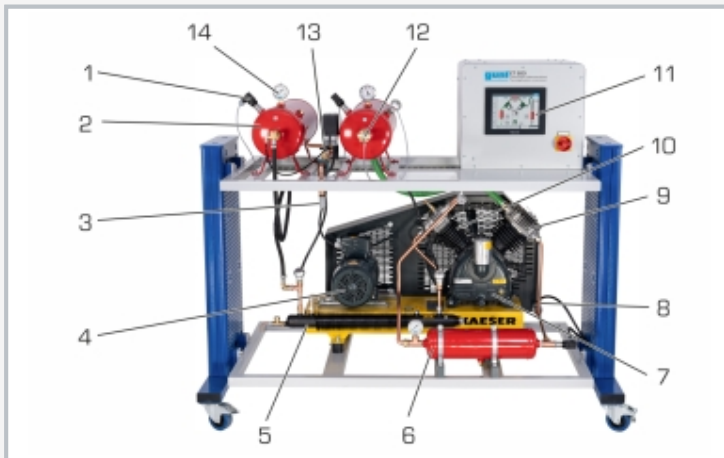
Sensors measure the pressures and temperatures in both stages as well as the electric power consumption. A nozzle at the intake vessel serves to determine the intake volumetric flow rate. The experimental unit is operated via a touch screen with intuitive user interface. By means of an integrated router, the experimental unit can additionally be operated and controlled via one end device and the user interface can be displayed on up to 10 end devices (screen mirroring). 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

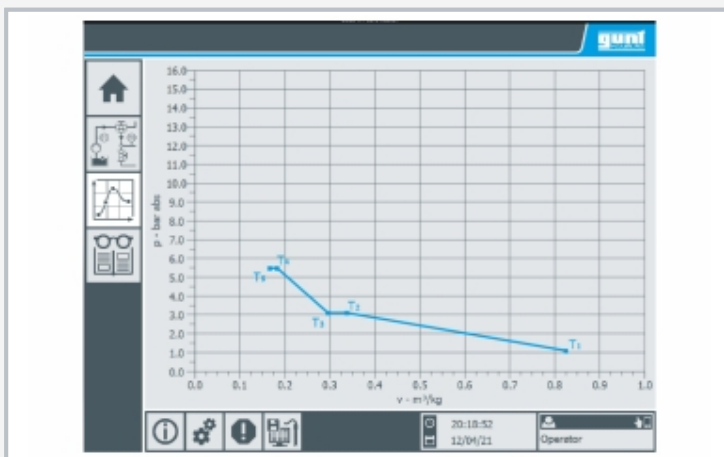
- design and function of a two-stage compressor
- measurement of relevant pressures and temperatures
- determination of the intake volumetric air flow rate
- compression process on a p-V diagram
- determination of the efficiency
- screen mirroring: mirroring of the user interface on up to 10 end devices
 - ▶ 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

ET 500

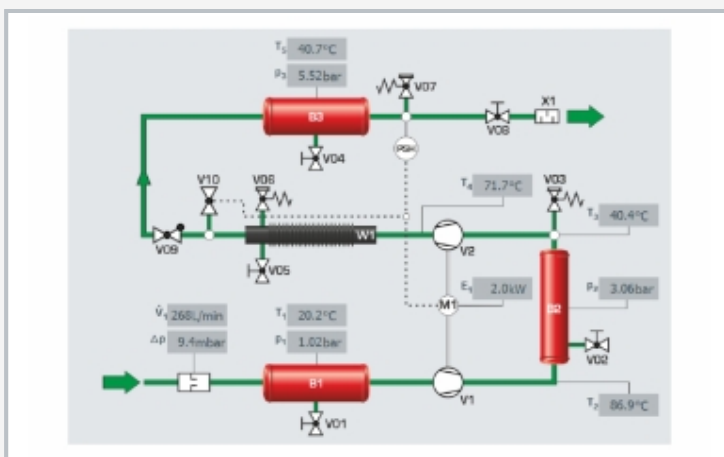
Two-stage piston compressor



1 pressure sensor, 2 pressure vessel after 2nd compressor stage, 3 outlet valve with silencer, 4 drive motor, 5 intercooler, 6 pressure vessel after 1st compressor stage (intermediate reservoir), 7 piston compressor, 8 temperature sensor, 9 compressor (1st stage), 10 compressor (2nd stage), 11 switch cabinet, 12 intake vessel with measuring nozzle, 13 safety valve, 14 manometer



Touch screen: p-V diagram



Process schematic: two-stage piston compressor

Specification

- [1] recording the characteristic of a two-stage compressor
- [2] piston compressor with 2 cylinders in V-arrangement
- [3] plant control with PLC, operation via touch screen
- [4] integrated router for operation and control via an end device and for screen mirroring: possible to mirror the user interface on up to 10 end devices
- [5] intake vessel with nozzle to measure the intake volumetric flow rate, pressure sensor and additional manometer
- [6] pressure vessel after the first stage as intercooler
- [7] pressure vessel after the second stage with safety valve, blow-off valve and silencer as well as an additional manometer and a pressure switch
- [8] sensors for pressures, temperatures and electric power output
- [9] data acquisition via PLC on internal USB memory, access to stored measured values via WLAN/LAN with integrated router/LAN connection to customer's own network or direct LAN connection without customer network

Technical data

PLC: Weintek cMT3092X

Compressor, two-stage

- with 2 cylinders in a V-arrangement
- power consumption: 3kW
- speed: 710min⁻¹
- intake capacity: 250L/min
- quantity delivered: 202L/min (at 12bar)
- operating pressure: 12bar, max. 35bar

Intake vessel: 20L

Pressure vessels, 16bar; capacity:

- after 1st stage: 5L
- after 2nd stage: 20L

Safety valve: 16bar

Measuring ranges

- differential pressure: 0...25mbar
- pressure: 1x 0...1,5bar; 2x 0...16bar
- temperature: 4x 0...200°C
- power: 0...3500W

400V, 50Hz, 3 phases; 400V, 60Hz, 3 phases

230V, 60Hz, 3 phases; UL/CSA optional

LxWxH: 1770x800x1520mm

Weight: approx. 304kg

Required for operation

PC with Windows

Scope of delivery

- 1 trainer
- 1 set of instructional material