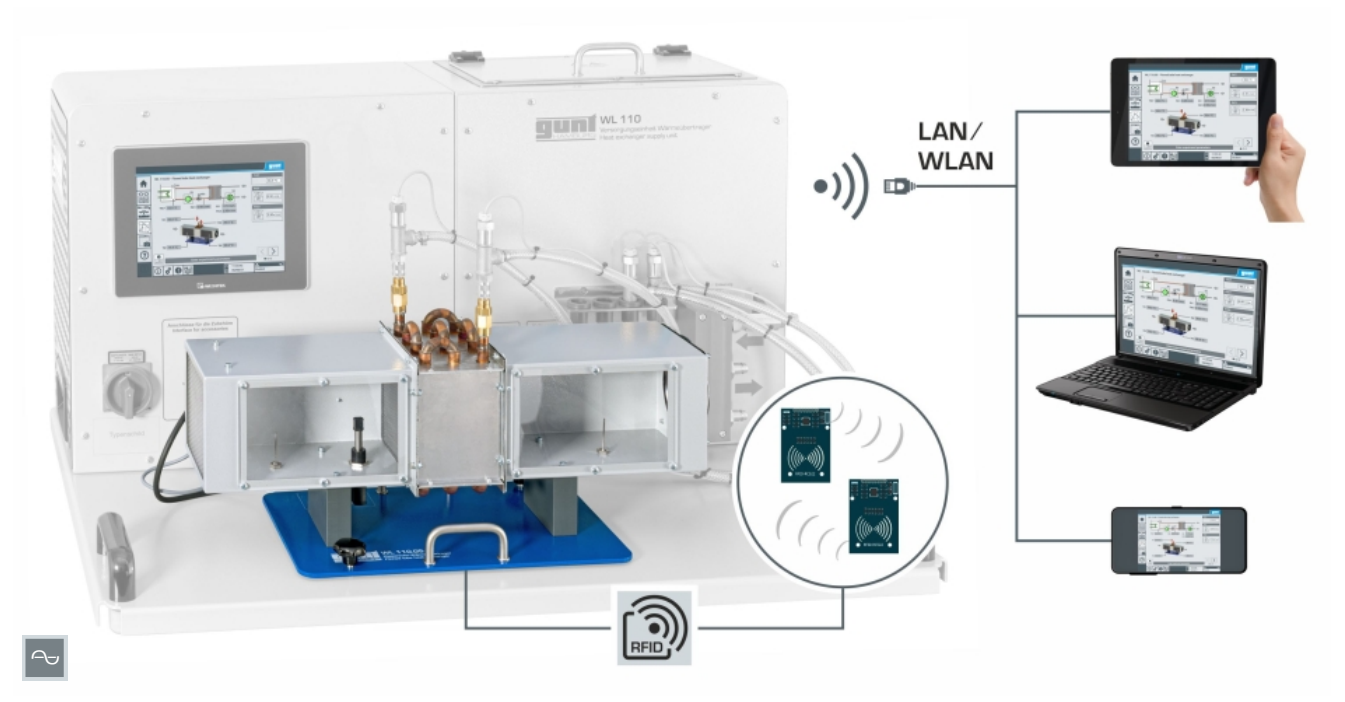
WL 110.05
Finned tube heat exchanger



Complete experimental set-up with supply unit WL 110, screen mirroring is possible on up to 10 end devices

Description

- **heat transfer between water and air in cross-flow**
- **intuitive experiment execution via touch screen**
- **integrated router for operation and control via an end device and for screen mirroring on up to 10 end devices: PC, tablet, smartphone**
- **automatic identification of accessories via RFID technology**

The heat transfer surface of a heat exchanger can be effectively increased by attaching fins. This principle is used in the finned tube heat exchanger primarily to cool or heat a closed circuit using the ambient air. One typical application example is the air cooler for combustion engines.

The WL 110.05 consists of a box shaped profile through which air flows and which is traversed several times by the pipe section carrying hot water. This creates a cross-flow of the heat-transferring media. The hot water emits part of its thermal energy to the air. Fins are applied to the pipe section to increase the heat-transferring surface.

Temperature curves are plotted in experiments and displayed graphically.

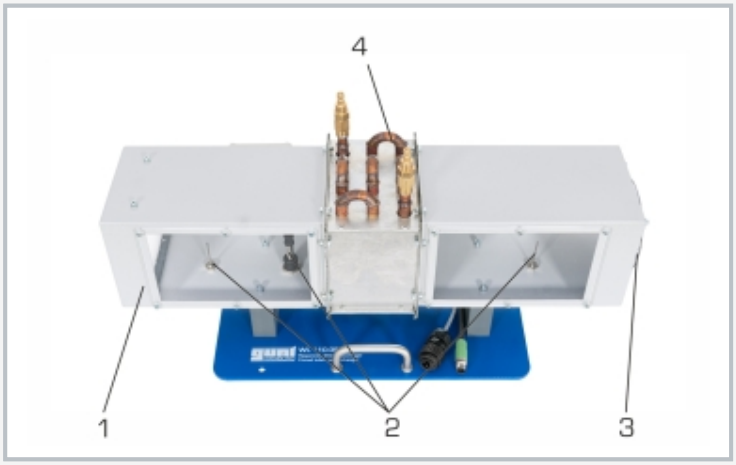
The accessory WL 110.05 is positioned easily and securely on the work surface of the WL 110 supply unit. The accessories are identified automatically using RFID technology. The appropriate GUNT software is then loaded and the system is configured automatically. The intuitive user interface guides you through the experiments and displays the measured values graphically. Up to ten external workstations can be used simultaneously to follow and analyse the experiments via the local network using a LAN connection.

Temperature sensors for measuring the inlet and outlet temperature are located at the supply connections of WL 110. Two additional temperature sensors measure the air temperature. The flow velocity of the air is also recorded. The hot water is supplied via the supply unit, which is also used to configure the settings for the flow rate of water and air and for the measurement of inlet and outlet temperatures.

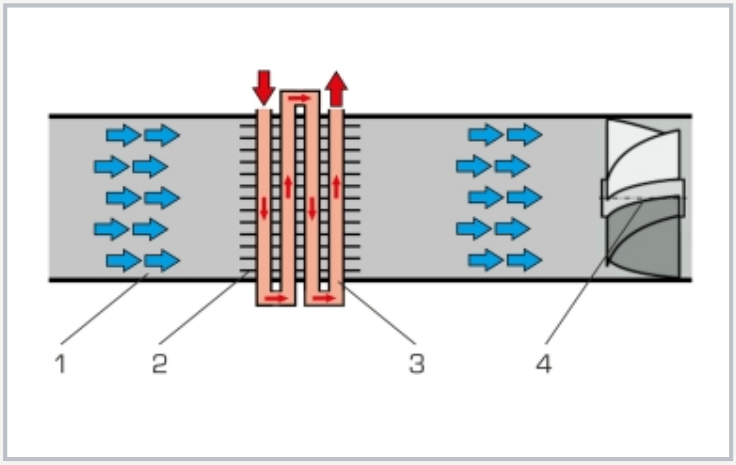
Learning objectives/experiments

- in conjunction with WL 110 supply unit
  - function and behaviour of a finned tube heat exchanger
  - determine the mean heat transfer coefficient
  - influence of heat capacity
  - compare with other heat exchanger types
- PLC software specifically adapted to the accessories used
  - learning module with theoretical fundamentals
  - device description
  - guided experiment preparation
  - execution of the experiment
  - graphical representation of: experimental section with measured values for temperature, heat fluxes on both sides of the heat exchanger
  - data transfer via WLAN/LAN for versatile external use of the measured values and screenshots, e.g. evaluation in Excel

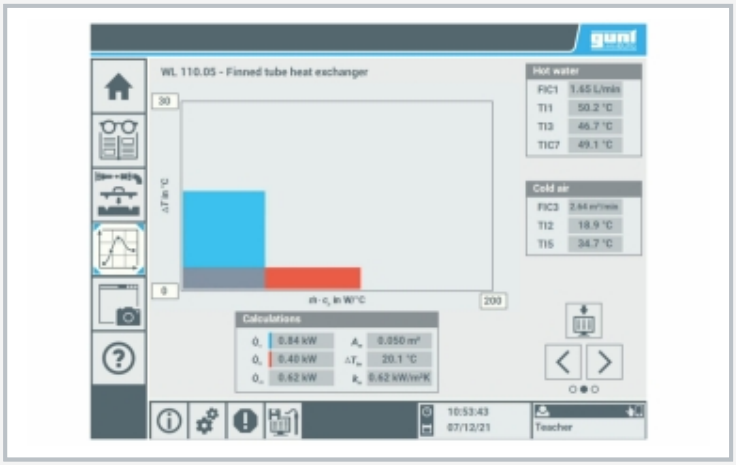
WL 110.05
Finned tube heat exchanger



1 flow straightener, 2 air duct with measuring points for temperature and flow velocity, 3 axial fan, 4 water pipe section



1 air duct, 2 fins, 3 water pipe section, 4 axial fan, blue: cold air, red: hot water



User interface on the touch screen: visualisation of heat fluxes on both sides of the heat exchanger represented as areas in a combined diagram, x-axis: temperature difference, y-axis: product of mass flow and specific heat capacity

Specification

[1] finned tube heat exchanger for connection to WL 110
[2] heat transfer between water and air in cross-flow
[3] supply and exhaust air duct with transparent front wall for a clear view of the heat exchanger
[4] air flow generated by axial fan
[5] water temperature recorded via WL 110 and additionally 2 temperature sensors for recording the air temperature and 1 sensor for recording the flow velocity
[6] automatic identification of accessories via RFID technology and provision of the appropriate PLC software
[7] experiments execution and display of the measured values via touch screen (HMI)
[8] screen mirroring: access to ongoing experiments and experimental results from up to 10 terminals simultaneously via the local network
[9] hot water supplied via WL 110

Technical data

Finned tube heat exchanger
- pipe section
  - Ø inner: 12mm
  - material: copper
- fins
  - number: 33

Axial fan
- max. volumetric flow rate:: 170m^3/h
- power consumption: 6,5W

Measuring ranges
- temperature: 2x 0...100°C
- flow velocity: 0...2,5m/s

LxWxH: 617x243x307mm
Weight: approx. 6kg

Scope of delivery

1 finned tube heat exchanger

WL 110.05
Finned tube heat exchanger

Required accessories

060.11000	WL 110	Heat exchanger supply unit