

# HM 250

## Fundamentals of fluid mechanics



The illustration shows the HM 250 base module on the left and the HM 250.09 accessory on the right, screen mirroring is possible on up to 10 end devices

### Description

- **intuitive experiment execution via touch screen (HMI)**
- **integrated router for operation and control via an end device and for screen mirroring on up to 10 end devices: PC, tablet, smartphone**
- **network capability: access to ongoing experiments from external workstations via the local network**
- **automatic identification of accessories via RFID technology**
- **water and energy saving technics, space-saving setup**

The series HM 250 "GUNT Fluid Line" offers a versatile experimental introduction to the fundamentals of fluid mechanics. The HM 250 base module provides the basic supply via energy and water-saving technics for each of the individual experiments: a closed water circuit with integrated heater, a worktop for the individual experimental units and drip water collection. Connections for water cooling are included, which are connected to a water supply provided by the laboratory. The base module also provides the measurement and control equipment as well as the communication systems.

An extensive selection of optionally available accessories provides a complete course in the fundamentals of fluid mechanics. The accessories are simply and safely positioned on the worktop of

the base module. After positioning, the base module identifies the respective accessory via RFID technology, automatically selects the appropriate software in the PLC and performs an automatic system configuration.

The experimental unit is operated via a touch screen with intuitive user interface. It includes a guided experimental setup for the connection of the individual elements of the accessories as well as an automatic bleeding of the experimental sections and pressure measurement connections. In addition, learning modules are displayed with theoretical fundamentals adapted to the specific topics of the accessories. For the execution of the experiments a detailed help function is available, which visualises the execution in individual steps. The measured values are graphical represented on the user interface of the touch screen. Via a USB interface the measured values can be transferred to a PC and stored there (e.g. via MS Excel). By means of an integrated WLAN 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). For tracking and evaluation of the experiments, up to 10 external workstations can be used simultaneously using the local network via LAN connection.

### Learning objectives/experiments

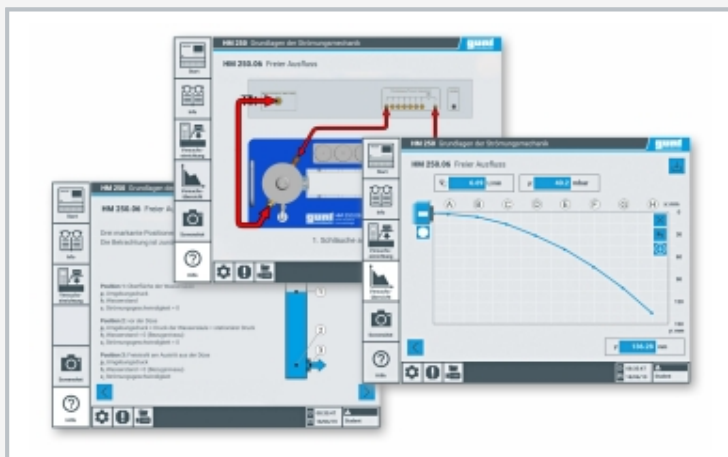
- **GUNT software content adapted to the specific accessories with**
  - ▶ info: device description and learning module with theoretical fundamentals
  - ▶ experiment preparation: guided experimental setup
- and automatic bleeding of the experimental section
  - ▶ experiment overview: digital recording of measured values with graphical representation
  - ▶ taking screenshots
  - ▶ detailed help function for execution of the experiments
  - ▶ data transfer via USB for versatile external use of measured values and screenshots
- **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

# HM 250

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1 water connection for accessories, 2 storage tank with foam inlay, 3 connections for pressure measurement, 4 touch screen, 5 USB port



User interface offers: learning modules adapted to the specific accessories, guided experiment preparation, experiment overview for digital recording of measured values with graphical representation, screenshots, detailed help function



The illustration shows the HM 250.06 accessory on the worktop of the HM 250 base module

### Specification

- [1] base module for experimental setup of basic experiments in fluid mechanics
- [2] automatic identification and configuration of accessories via a contactless, electronic RFID interface
- [3] automatic bleeding of the experimental sections
- [4] plant control with PLC, operation via touch screen or an end device
- [5] screen mirroring: possible to mirror the user interface on up to 10 end devices
- [6] network capability: access to ongoing experiments and their results from up to 10 external workstations simultaneously via the local network
- [7] water and energy saving technology, space-saving setup
- [8] closed water circuit with integrated heater and storage tank, submersible pump and measurement and control equipment
- [9] storage tank with foam insert for calming the water movement
- [10] connections for water cooling available, water supply provided by the laboratory required
- [11] worktop with internal edge for safe positioning of the individual accessories and for collecting dripping water
- [12] extensive accessories available

### Technical data

PLC: Weintek cMT3092X

#### Pump

- power consumption: 50W
- max. flow rate: 15L/min
- max. head: 12m

#### Pump, bleeding

- power consumption: 25W
- max. flow rate: 10L/min
- max. head: 5m

#### Heater

- power consumption: 800W

#### Storage tank

- content: approx. 10L

#### Measuring ranges

- flow rate: 0...15L/min
- temperature: 0...70°C
- pressure: 1x 0...1bar, 1x 0...200mbar, 1x 0...50mbar

230V, 50Hz, 1 phase; 230V, 60Hz, 1 phase

120V, 60Hz, 1 phase; UL/CSA optional

LxWxH: 730x610x680mm; Weight: approx. 42kg

### Required for operation

PC with Windows recommended

### Scope of delivery

- 1 base module
- 1 set of hoses
- 1 set of instructional material

# HM 250

## Fundamentals of fluid mechanics

### Optional accessories

#### Flow in pipes

HM 250.01	Visualisation of pipe flow
HM 250.02	Measurement of flow profile
HM 250.03	Visualisation of streamlines

#### Laws of hydrodynamics

HM 250.04	Continuity equation
HM 250.05	Measurement of jet forces
HM 250.06	Free discharge
HM 250.07	Bernoulli's principle

#### Friction losses

HM 250.08	Losses in pipe elements
HM 250.09	Fundamentals of pipe friction
HM 250.10	Pressure curve along the inlet section

#### Open-channel flow

HM 250.11	Open channel
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#### Other accessories

HM 250.90	Laboratory shelf
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