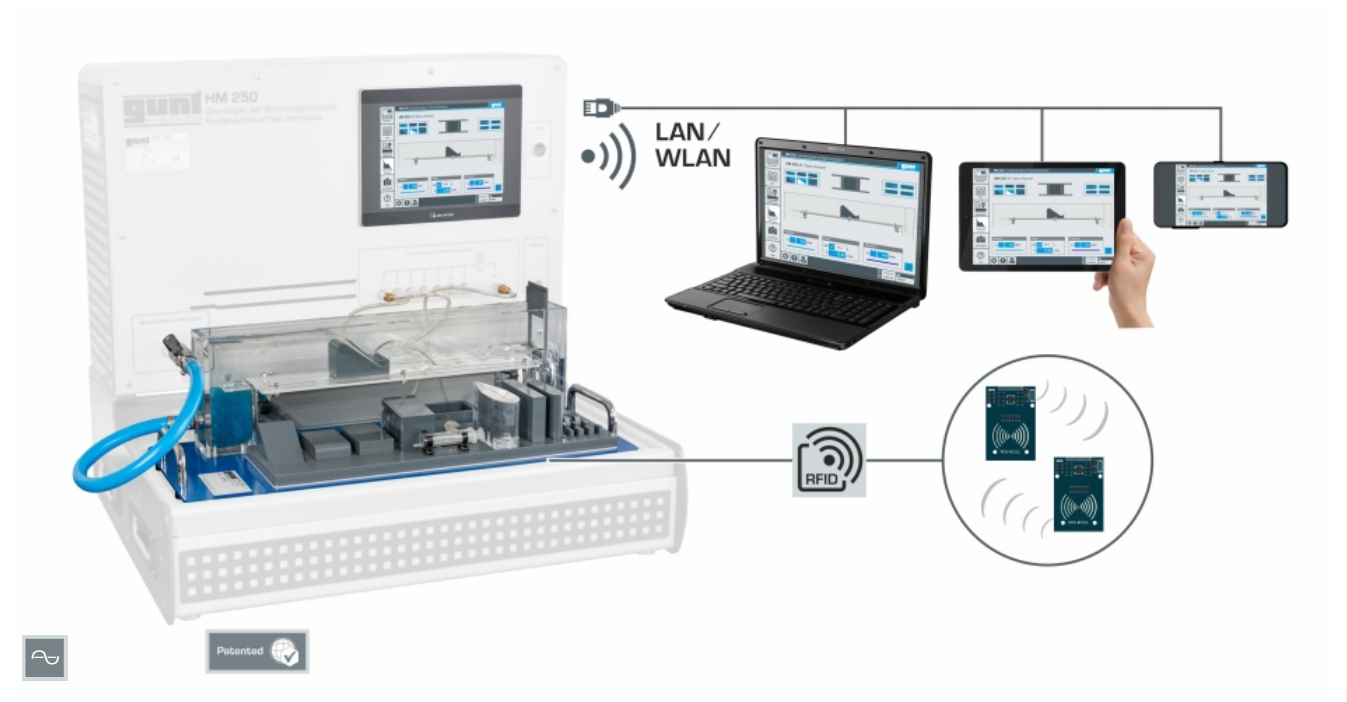
HM 250.11
Open channel



Complete experimental setup with the HM 250 base module, screen mirroring is possible on up to 10 end devices

Description

- **effects of different obstacles on open-channel flow**
- **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**

The HM 250.11 experimental unit can be used to demonstrate the effect of various obstacles on the energy level in the open-channel flow. Fundamentals required for the design of artificial shipping channels or for the regulation of rivers and barrages can be taught on a very small scale.

The experimental flume is made of transparent material so that the water levels and thus the energy levels along the flume can be observed. The effects of the various obstacles are thus clearly visible. The supplied accessories consist of various weirs, a Venturi flume, two piers and obstacles for energy dissipation. The accessories are held to the bottom of the experimental flume magnetically.

At the bottom of water inlet and outlet, the water level in the experimental flume can be determined by pressure measurement. To investigate the hydraulic jump in a supercritical flow, a nozzle is attached at the water inlet into the experimental flume. Using a syringe, water can be sprayed onto the water surface as a point-like exciter and the wave propagation can be observed.

The accessory HM 250.11 is positioned easily and securely on the worktop of the HM 250 base module. Via RFID technology the accessories are automatically identified, the appropriate GUNT software is loaded and an automatic system configuration is performed. The intuitive user interface guides through the experiments and displays the measured values graphically. For tracking and evaluation of the experiments, up to 10 external workstations can be used simultaneously using the local network via LAN connection. The base module supplies the water and is used to adjust the flow rate. The base module is also used to measure the flow rate and pressure.

Learning objectives/experiments

- energy levels of the water when flowing through a flume with different obstacles
- investigation of the hydraulic jump
- Venturi flow rate measurement
- energy dissipation in the flume
- GUNT software specifically adapted to the accessories used
  - learning module with theoretical fundamentals
  - device description
  - guided experiment preparation
  - execution of the experiment
  - graphical representation of pressure curves
  - data transfer via USB for versatile external use of measured values and screenshots e.g. evaluation in Excel
  - different user levels available

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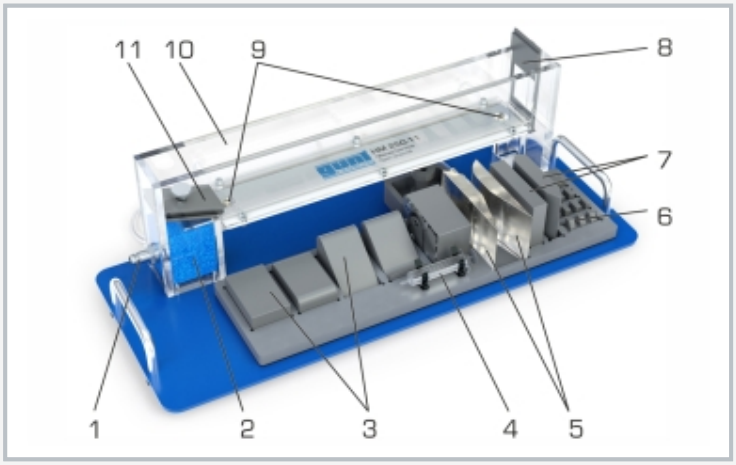
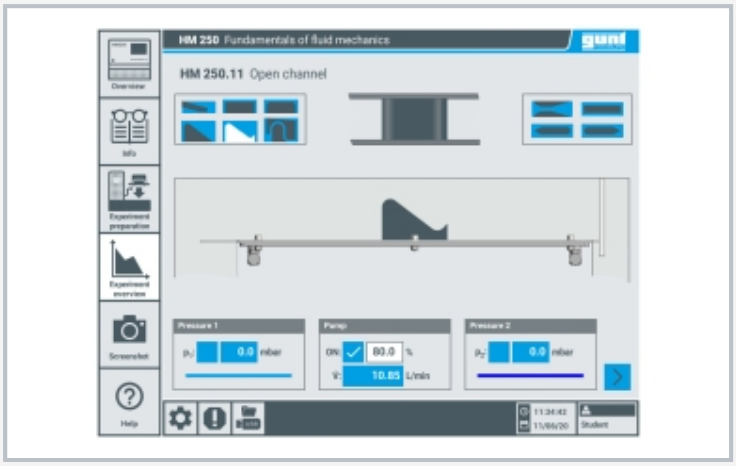
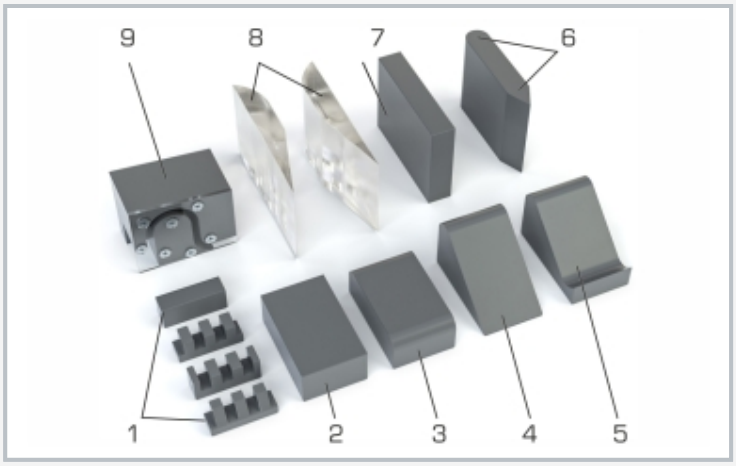
Open channel



1 water supply, 2 foam insert for settling the water at the inlet, 3 weirs, 4 syringe for excitation of waves on the water surface, 5 Venturi flume, 6 obstacles for energy dissipation, 7 piers, 8 weir at water outlet, 9 pressure connections for determination of the water level, 10 experimental flume, 11 nozzle for generating supercritical flow



Intuitive user interface in the HM 250 touch screen: pressure measurement during discharge over the ogee-crested weir with ski jump



1 obstacles for energy dissipation, 2 broad-crested weir, sharp-edged, 3 broad-crested weir, with rounded edges, 4 ogee-crested weir, 5 ogee-crested weir with ski jump, 6 round/pointed pier, 7 rectangular pier, 8 obstacles as Venturi flume, 9 siphon weir

Specification

[1] open flume with different magnetic obstacles for demonstration of the flow
[2] transparent experimental flume
[3] demonstration of energy levels and losses with different weirs and piers
[4] demonstration of energy dissipation in the stilling basin with end sill and dentated sill as well as ogee-crested weir with ski jump
[5] water level regulation with siphon weir
[6] determination of flow rates with Venturi flume
[7] flow rate in experimental flume can be adjusted via HM 250 base module
[8] determination of water levels (energy levels) via digital pressure measurement
[9] automatic identification of accessories via RFID technology and use of the corresponding GUNT software
[10] experiment execution and display of the measured values via touch screen (HMI)
[11] network capability: access to ongoing experiments and their results from up to 10 external workstations simultaneously via the local network
[12] water supplied via HM 250 base module

Technical data

Experimental flume
- WxH: 50x75mm
- length between measuring points: 390mm
- nozzle, open cross-section: 50x3mm

5x Weirs, magnetic, LxW 50x80mm
- broad-crested weir, sharp-edged, H 30mm
- broad-crested weir, rounded edges, H 30mm, R 10mm
- ogee-crested weir, 37°, R 10mm
- ogee-crested weir with ski jump, 37°, R 10mm
- siphon, 5°, H 58mm

2x Piers, magnetic
- rounded end R 10mm / pointed end 53°
- both ends rectangular

4x Obstacles for energy dissipation, magnetic
- LxWxH: 50x20x15mm
- 1x end sill
- 3x dentated sills

1x Venturi flume, magnetic
- length: 130mm
- narrowest cross-section: 12mm
- inlet contour: L 37,3mm, R 20mm
- outlet angle: 16° each

Measuring ranges
- indicated measuring range pressure: 0...80mmWC
- indicated measuring range flow rate: 0...15L/min

LxWxH: 650x260x210mm
Weight: approx. 9,7kg

Scope of delivery

experimental flume, 1 set of obstacles, 1 syringe, set of instructional material

HM 250.11
Open channel

Required accessories

HM 250	Fundamentals of fluid mechanics

Optional accessories

HM 250.90	Laboratory shelf