HM 112
Fluid mechanics trainer

Description

- **extensive possibilities for basic experiments in fluid mechanics**
- **different pipe sections with various pipe elements**

The knowledge of flow in pipe systems has a wide range of practical applications in many fields. When water flows through a pipe system the internal friction and the pipe friction cause pressure losses. The pressure losses in the fluid are directly dependent on the resistances and the flow velocity.

The HM 112 trainer allows a variety of experiments for flow and pressure measurement and the determination of pressure losses and pressure curves in different pipe elements. The measured values are analysed using the GUNT software supplied. Characteristics can easily be recorded and analysed directly on a PC.

The trainer contains six different, horizontally arranged pipe sections, which allow the effects of pipe material, diameter and changes in cross-sectional and direction on the pressure loss to be studied. Measuring objects such as valves, strainers, a Venturi nozzle, a Pitot tube or orifice plate flow meter or measuring nozzle can be used in another pipe section. To make the functions clearly visible, some of the measuring objects are transparent. Additional measuring objects are available as a set (HM 110.01) to expand the scope of experiments.

The trainer can be operated independently from the mains water network and is equipped with a pump and a water tank. The trainer includes a rotameter to determine the flow rate. Pressure measuring points are located immediately upstream and downstream of the measuring objects. These are designed as annular chambers, ensuring a precise pressure measurement. Five different pressure gauges with analogue or digital displays are provided for pressure measurement.

Depending on the measurement method, the measured values can be read off the analogue manometer or digital displays. The measured values are transmitted directly to a PC via USB. The data acquisition software is included.

Learning objectives/experiments

- flow and pressure measurement methods
- function of nozzle, orifice, Venturi nozzle
- losses due to pipe bends and pipe angles, changes in cross-section and shut-off valves and fittings
- determining pipe friction factors and resistance coefficients
- opening characteristics in shut-off valves and fittings

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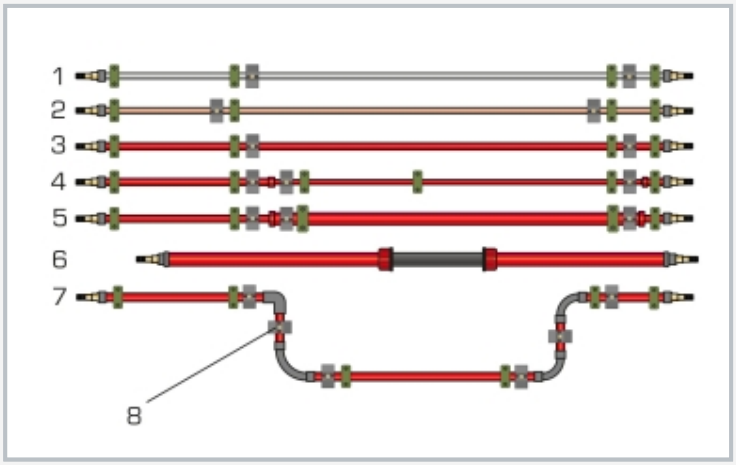
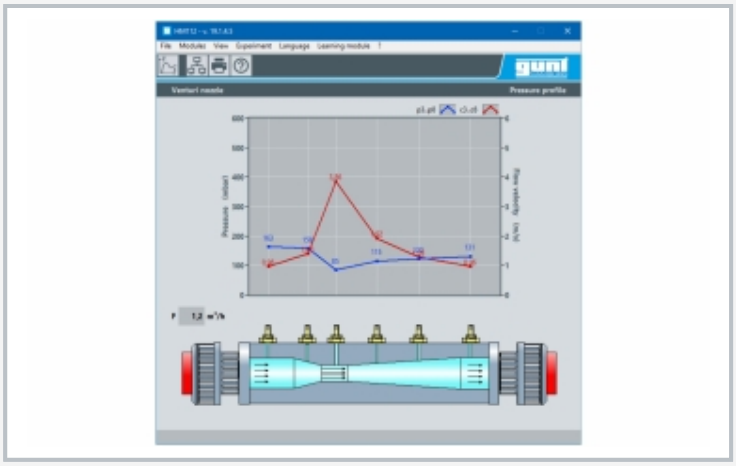
1 thermometer, 2 twin tube manometer, 3 rotameter, 4 different pipe sections, 5 pump, 6 storage tank, 7 pressure sensor, 8 differential pressure meter, 9 digital pressure indicators, 10 6 tube manometers



Representation of the pipe sections: 1 steel pipe, 2 copper pipe, 3 PVC pipe, 4 contraction in cross-section, 5 enlargement in cross-section, 6 measuring section for holding measuring objects, 7 pipe bends and pipe angles, 8 measuring point with annular chamber



Software screenshot: pressure and velocity curve in a Venturi nozzle

Specification

[1] trainer for fluid mechanics experiments
[2] interchangeable measuring objects, partly transparent: angle seat valve, diaphragm valve, ball valve, non-return valve, strainer, Pitot tube, Venturi nozzle, orifice plate flow meter and measuring nozzle
[3] different pipe sections
[4] precise pressure measurement using annular chambers
[5] differential pressure measurement using tube manometers
[6] flow rate measurement using rotameter
[7] digital displays for pressure and differential pressure
[8] GUNT software for data acquisition via USB under Windows 11
[9] additional set of measuring objects HM 110.01 available

Technical data

Pump
- power consumption: 0,37kW
- max. flow rate: 4,5m³/h
- max. head: 14,7m

Storage tank: 55L
Pipe section for interchangeable measuring objects
- 32x1,8mm, PVC

3 straight pipe sections, length: 1000mm
- ½", St, galvanised
- 18x1mm, Cu
- 20x1,5mm, PVC

Pipe section, PVC
- gradual contraction, Ø: 20x1,5...16x1,2mm
- gradual enlargement, Ø: 20x1,5...32x1,8mm
- with 90° pipe angle/ pipe bend, Ø: 20x1,5mm

Tube manometer: 2x 2 tubes, 1x 6 tubes

Measuring ranges
- differential pressure: 1x 0...200mbar
- pressure:
  - 6x 0...390mmWC
  - 4x 0...600mmWC
- flow rate: 1x 0,2...2,5m³/h
- temperature: 1x 0...60°C

230V, 50Hz, 1 phase
230V, 60Hz, 1 phase; 120V, 60Hz, 1 phase
UL/CSA optional
LxWxH: 2220x820x1980mm
Weight: approx. 250kg

Required for operation

PC with Windows recommended

Scope of delivery

1 trainer
1 set of measuring objects
1 set of accessories
1 GUNT software + USB cable
1 set of instructional material

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Optional accessories

for Remote Learning

GU 100	Web Access Box
with	
HM 112W	Web Access Software

Other accessories

HM 110.01	Set of measuring objects, brass