

GUNT experimental flumes Instrumentation

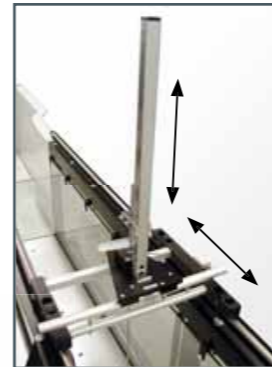
Instrument carrier for HM 162, HM 163 and HM 161

The experimental flumes HM 162, HM 163 and HM 161 extend above the side wall guide rails. An instrument carrier can be placed on the rails and moved. The different instruments are mounted on the instrument carrier, for example a level gauge or a pitotstatic tube. Using the carrier, the instruments can be moved to nearly every point of the flow. The carrier can be locked during the measurements with fixing devices. The position of the carrier along the experimental section is read on a scale (see photo). On the carrier itself is another scale, used to determine the position transverse to the direction of flow.

In the small experimental flume HM 160 no instrument carrier is necessary. The instruments are placed directly on the top of the experimental section and clamped in place.



Scale along the experimental section



Instrument carrier with level gauge



Setup of the instrument carrier



Pitotstatic tube HM 162.50 with instrument carrier

Flow velocity

GUNT offers two methods of measuring the flow rate in all experimental flumes: the traditional pitotstatic tube or a digital velocity meter. The pitotstatic tube HM 16x.50 measures the static pressure and the total pressure at any point of the flow. A digital pressure gauge displays the difference between the two pressures. The pressure difference corresponds to the dynamic pressure, from which the flow velocity can be calculated.

The core element of the velocity meter HM 16x.64 is an impeller that is rotated by the flow. The speed of the impeller is proportional to the flow velocity. The flow velocity is read directly from the digital display.



Velocity meter HM 16x.64



Level gauge HM 162.52 with instrument carrier

Discharge depth

To measure the discharge depth, the level gauge HM 16x.52 or HM 16x.91 with digital display is used. The tip of the probe is moved to the surface of the water from above.

Pressure measurement

All experimental flumes are equipped with pressure measuring points in the flume bottom. The pressure measuring points are evenly distributed over the length of the experimental section. To read these pressures, the pressure measuring points are connected to the optional manometer panel HM 16x.53 via hoses. This allows directly reading a profile of discharge depth over the entire length of the experimental section on the manometer panel.



Tube manometers HM 162.53

Measuring methods in your laboratory

Of course, you can also use your own laboratory measuring methods to determine the flow velocity, such as PIV (Particle

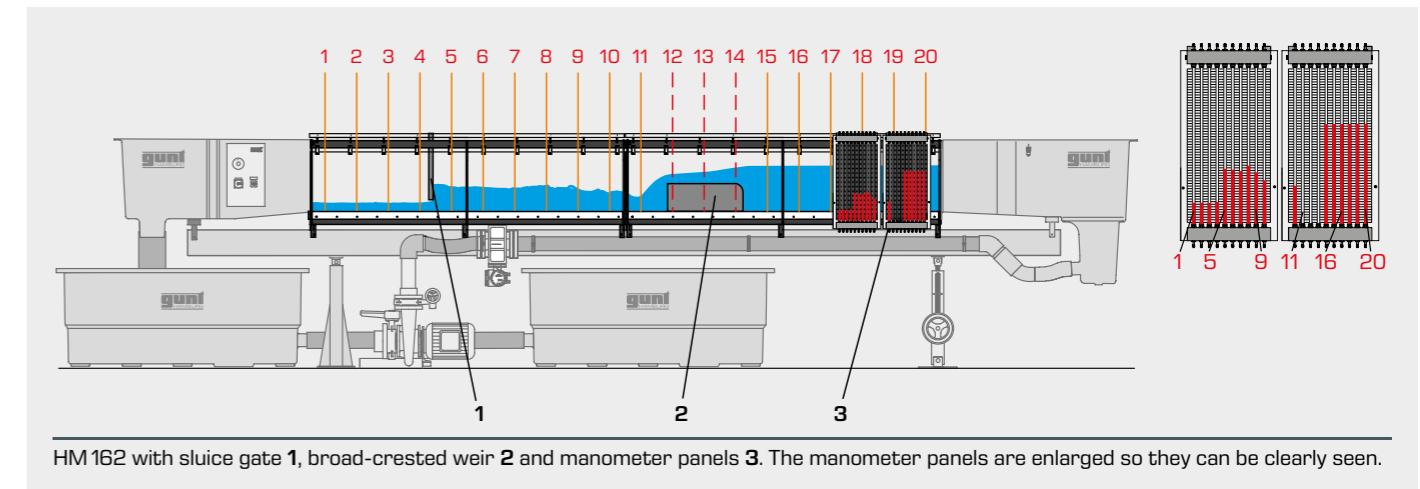
Image Velocimetry) or LDA (Laser Doppler Anemometry) and ultrasound to determine the discharge depth.

Example of a pressure measurement along the experimental section

A broad-crested weir (HM 162.31) and a sluice gate (HM 162.29) have been inserted in the 5m long experimental section of HM 162. The elements of the experimental section of HM 162 each contain ten pressure measuring points, which are uniformly distributed over the length of the 2,5m element. The pressure at these measuring points is called the pressure head and corresponds to the discharge depth. The pressure heads are displayed on the manometer panel HM 162.53. When the

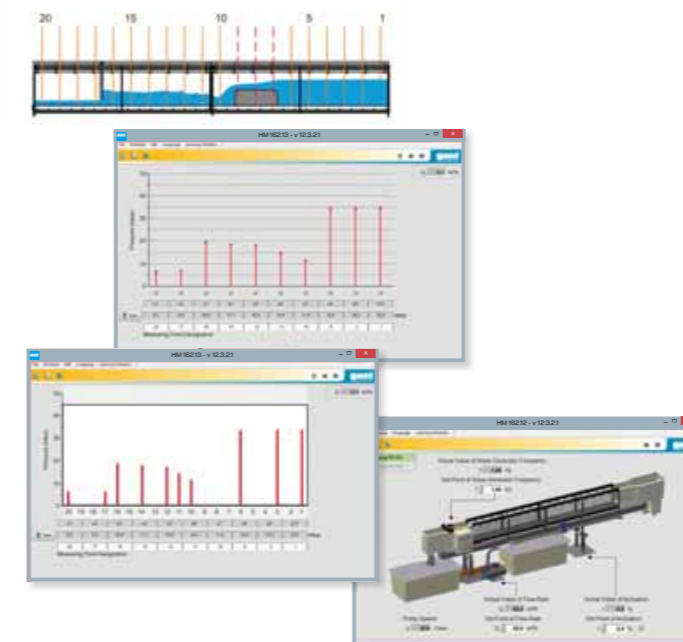
experimental section is inclined, i.e. open-channel flow with a slope, it is more accurate to measure the discharge depth via the pressure head than via a level gauge.

The manometer panel HM 162.53 contains ten tubes. Depending on the length of the experimental section, we can either represent selected points on a panel or use multiple panels to show all pressures.



HM 162 with sluice gate 1, broad-crested weir 2 and manometer panels 3. The manometer panels are enlarged so they can be clearly seen.

The elements of the experimental section in the experimental flume HM 160 contain ten pressure measuring points over a length of 2,5m. The manometer panel HM 160.53 contains ten tubes.



In the experimental flume HM 161, 48 pressure measuring points are evenly distributed over the experimental section with 16m length. The manometer panel HM 161.53 contains 20 tubes.

Automated operation and data acquisition for HM 162 / HM 163 and HM 161

Automated operation and data acquisition for HM 162 / HM 163 and HM 161

Using HM 162.12, the experimental flume HM 162 or HM 163 can be operated by a PC. Flow rate, inclination adjustment and frequency of the wave generator HM 162.41 / HM 163.41 are set by the GUNT software. Measured values are recorded and saved. The software detects automatically if the electronic pressure measurement HM 162.13 is also used. In this case, both softwares are operated in HM 162.12 including the selection of the corresponding windows.

HM 161 includes a control with PLC via two touch panels and a GUNT software for acquisition of the measured values.