

*Instrument*

## Wave height and direction meter

The wave height and direction meter features simultaneous measurement of both wave height and orbital velocity by combining two probes at the same spot. One probe measures wave height, the other probe measures orbital velocity. The main purpose of this instrument is to measure wave direction and directional spreading. Each probe is connected to a dedicated control unit by a power-signal cable. Both control units are mounted in the same universal carrying case (UCC). Output signals for surface elevation and x- and y-velocities are analogue.

### Applications

The wave height and direction meter is primarily used in (3D-wave) basins for tests and experiments on:

- wave penetration in harbours
- performance of breakwaters and dikes
- coastal protection
- load and stability of offshore structures
- determination of reflected waves

This instrument is also used in flumes to make distinction between incident and reflected waves.

### Wave height meter

The wave height meter is constructed of two parallel stainless steel rods, mounted underneath a small box. This box contains electronics for sensor excitation, signal detection, amplification and galvanic isolation. The rods act as the electrodes of an electric conduction meter. A platinum reference electrode is included to compensate the surface elevation measurement for the effect of varying electrical conductivity of the fluid. The analogue output signal is linearly proportional to the water level between the sensor rods.

### Features

- fast dynamic response
- wide range 0.7 m, other ranges optional
- automatic compensation for conductivity variation
- high linearity
- switch selectable ranges
- easy installation
- analogue wave height output indication on control unit



## Technical specifications

Wave height electrodes	<ul style="list-style-type: none"> <li>rods, stainless steel, type 316, 6 mm diameter</li> <li>electrode spacing 40 mm</li> <li>electrode length 820 mm (other lengths optional)</li> </ul>
Reference electrode	platinum, 5 mm length, 2 mm diameter
Other materials exposed to liquid	PVC-U
Liquid medium	<ul style="list-style-type: none"> <li>all liquids non-aggressive to mentioned materials</li> <li>minimum required conductivity 0.2 mS/cm</li> <li>sensitivity variation &lt; 1 % for 0.2 to 2.0 mS/cm</li> </ul>
Accuracy	0.5 % of measuring range, best straight line
Output	0.4 V/cm level variation (standard: -10 to +10 VDC for 50 cm water level change)
Dimensions	incl. electronics 1 m long (standard length)
Cable	25 m (optional up to 100 m)

## Electromagnetic velocity meter

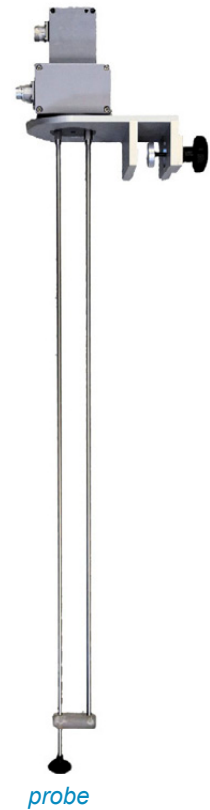
The electromagnetic velocity meter measures bi-directional water velocity in two perpendicular (horizontal) directions. Its measurement principle is based on conductive liquid moving through a magnetic field. The magnetic field is induced by electrical current in a small coil inside the body of the probe. Two pairs of diametrically opposed platinum electrodes sense the induced voltages produced by the flow past the probe. The probe has been designed in such a way that these voltages are proportional to the liquid velocity parallel to the plane of the electrodes. The electromagnetic velocity probe is mounted underneath the wave height probe.

### Features

- 0 - 1 m/s bi-axial four quadrant range
- towing tank calibration
- zero stability < 10 mm/s per 24 hours
- ellipsoid type probe for high spatial resolution and minimum flow disturbance
- low susceptibility for electrical interference achieved by galvanic isolation of electronics

## Technical specifications

Materials exposed to liquid	<ul style="list-style-type: none"> <li>stainless steel 316</li> <li>platinum</li> <li>PU finish 03-69554 Ral 9021 F9</li> </ul>
Medium	<ul style="list-style-type: none"> <li>liquids and suspensions, including slurries</li> <li>minimum required conductivity 0.2 mS/cm</li> <li>maximum temperature 40°C (water)</li> </ul>
Probe	electromagnetic, bi-axial, 4-quadrant ellipsoid 11 x 33 mm
Range	0 to +/- 1.0 m/s or +/- 2.5 m/s switch selectable
Accuracy	+/- 0.01 m/s +/- 1 % of measured value
Tilt response error	negligible for tilt angles < 10° if compensated for cosine response
Temperature influence	<ul style="list-style-type: none"> <li>medium: &lt; 1.0 mm/s per °C</li> <li>ambient: &lt; 0.3 mm/s per °C</li> </ul>
Conductivity influence	< 0.02 % of reading per mS/cm
Cables	25 m (optional up to 100 m)



probe



Control unit front view



Control unit rear view

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