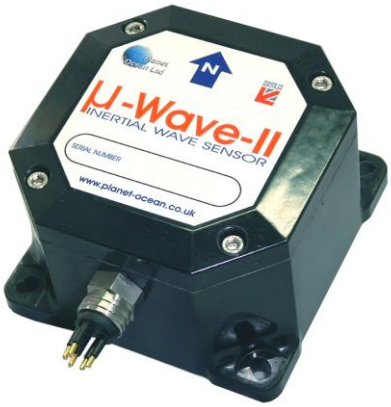
µ-Wave-II
9DOF Inertial Wave Sensor



The µ-Wave-II Inertial Wave Height Sensor is a +5v to 30v ,low powered (150mW@12v) wave system that reports heading, significant wave height, dominant wave period, dominant wave direction, maximum wave height and maximum period via RS-232. Also available by user selection is, pitch and roll, the first 5 Fourier coefficients and accelerations.

The µ-Wave-II is powered by the SeaView Systems SVS-603 9DOF Inertial Wave sensor and is available from Planet Ocean as an OEM device at PCB level if required.

µ-Wave-II represents a new generation in accuracy and capability for buoy based wave sensing. µ-Wave-II is also available with inbuilt data logger, satellite, cell phone or radio telemetry to turn any existing buoy into a wave measurement buoy.

Features include:

- Very low power consumption; fits the smallest power budget
- 9 DOF Sensor compensates for 3-D motion, rotation and compass heading in all dimensions to cover nine degrees of freedom
- Sophisticated on board electronics provide near-real-time wave statistics
- On-board temperature compensation for highest accuracy
- Easy configuration to match your exact sensing rate and output requirements
- Readily interfaced with transmitter using NMEA or other configurable data output
- Outputs First-5 wave coefficients for NOAA compliant data logging/transmission
- Output can free run or be polled.

µ-Wave-II can be used to replace existing sensors, to upgrade existing buoys, or to add wave sensing capabilities to even the most compact buoys. Among the wave data that are available as outputs from the sensor are:

- Significant wave height in meters (Hs)
- Dominant wave period in seconds (Omega P)
- Dominant wave direction in degrees from north
- First-5 wave coefficients
- Maximum wave height (Hmax)
- Maximum wave period at (Pmax)
- Full wave spectrum (raw or processed)
- Heading in degrees (used for correcting wind vanes)
- Custom outputs as required

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How are wave parameters calculated?

The system provides 12 bit measurements at a sample rate of typically 2Hz (user selectable). Wave analysis is then computed via an embedded controller using a custom discrete Fast Fourier Transform algorithm. Data are post processed to extract wave statistics which are then transmitted via RS-232 to the user.

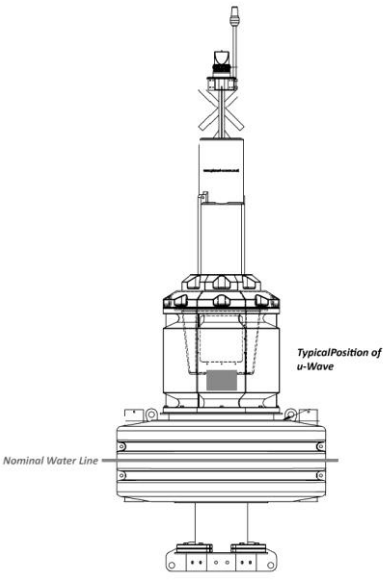
The sensor takes a sample set of buoy accelerations and resolves the buoy axis movement into North and East components. FFTs are computed for each axis and the acceleration spectra is converted to displacement.

The vertical spectra can then be searched in order to determine the dominant period. The on-board microprocessor then computes the wave direction for the dominant period wave and using the spectral data, calculates the directional spreading function in order to determine additional wave characteristics including significant wave height.

The µ-Wave sensor takes a sample set consisting of a time series of 2048 buoy accelerations including accelerations in 3 dimensions, rotation along 3 axes, and magnetometer compass readings along 3 axes. This information allows the position and orientation of the sensor as well as the buoy rotation to be determined as a function of time. By calculating an FFT of the resulting data, the wave spectra is determined. Depending on the input configuration, a buoy hull response filter is applied.

The Z (vertical) spectra is searched for the largest magnitude, which is marked as the dominant period. The system computes the wave direction for that dominant period wave and the four spectral parameters for the dominant wave period (a1, b1, a2, b2) from which one can calculate the directional spreading function for that period only.

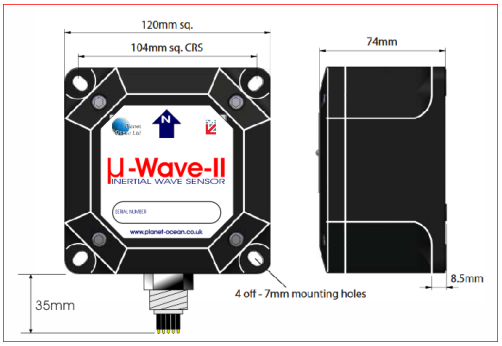
Significant wave height is computed over the entire spectra.
Maximum wave height and the corresponding period are also calculated



What type of buoy does the u-Wave work in?

The µ-Wave sensor can best capture wave details when the buoy in which it is mounted moves freely in response to the waves. A large heavy buoy may not react well to smaller short period waves, for example. Because the sensor has nine degrees of freedom, the sensor can be located anywhere on the buoy, above or below the waterline. Ideally the sensor should be located at the centre of rotation of the buoy. Users may input corrections for sensor height above water line and magnet compass declination.

µ-Wave is housed in an IP-68 enclosure with a 5 pin Impulse connector for power and data.



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