OBSERVATOR
instruments

OMC-7018 data buoy wave & current option

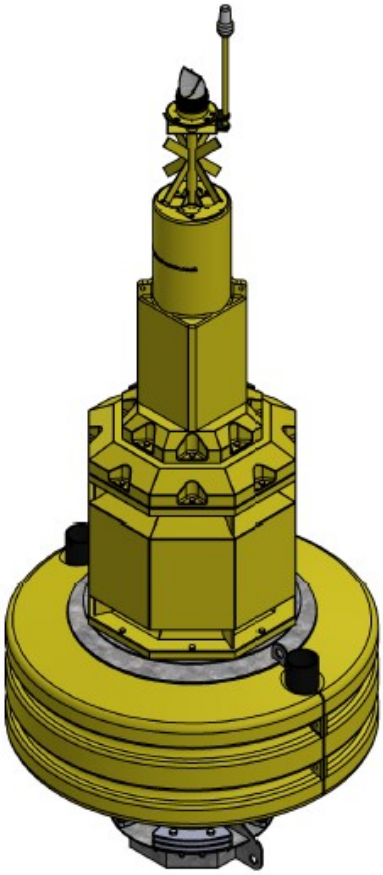
The OMC-7018 is a 1.8 m diameter buoy for measuring water quality, water current, waves, and meteorological parameters. It can be used in open sea, in coastal areas, in harbors or even in large lakes. Applications can range from short term monitoring for supporting marine engineering projects, to long term monitoring for vessel guidance, harbor operations, flood protection or environmental studies.

One platform, modular payload

The basic platform of the OMC-7018 is a yellow polyethylene float with a diameter of 1.8 m and an instrument tower on top. Based on the user requirements, a modular payload of sensors, data processing, communications and power supply is added. These modules are common to all Observator OMC-70xx buoys. The modular approach allows the user to select only the components he needs.

Features

- Hull molded from UV resistant polyethylene, filled with high density polyurethane foam.
- Diameter: 1.8 m, total height 4.3 m, weight 600 kg (all without payload).
- Solar powered, max 150 Ah /12V battery capacity.
- Meteorological parameters including wind speed & direction, barometric pressure & temperature, solar radiation and more.
- Water quality sensors including turbidity, dissolved oxygen, conductivity (salinity), chlorophyll and more.
- Water current profiler (ADCP), measuring current speed and direction at multiple depths simultaneously.
- Wave measurement using inertial motion sensor. Measures wave height, period and direction.
- On board data logging.
- Communication to internet server by mobile phone network, radio or satellite (multiple systems supported). Direct radio communication to a nearby ship is also possible.
- Radar reflector, AIS, St. Andrews Cross and signal light to prevent collisions.



The basic platform of the OMC-7018 buoy. Depending on the requirements, solar panels, sensors, antennas and so on are added.

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General description
The disk-shaped float contains two tubes on opposite sides. Hydrological sensors can be deployed and recovered through the tubes without recovering the buoy. If required, a protective cage ('deployment tube') can be fitted below the buoy, allowing the sensor to be installed at, for example, 1 m below the surface.

The removable instrument tower is fitted on top of the mid-section, which is in turn fitted on top of the float. The mid-section can contain up to 8 solar panels of 20 Wp each. The instrument tower contains four solar panels of 20 Wp. Batteries and electronics (data logger, modem, radio and so on) are inside the instrument tower which can be removed in one piece for servicing

The radar reflector is inside the tower. The optional St. Andrews cross and signal light are fitted on top of the tower.

Antennas and meteorological sensors are fitted at convenient locations to the tower. The wave sensor is inside the tower, together with the other electronics. The hydrological sensors are mounted in the tubes in the hull.

A data logger will log all measured parameters and transmit them to internet (or to a nearby ship) by using the mobile phone network or by radio or by satellite. Several satellite systems are supported. The logger has a large number of inputs supporting all common sensor interfaces.

Meteorological sensors
The main meteorological parameters to be measured on a buoy are wind speed & direction, barometric pressure and temperature. For some studies, solar radiation or other parameters may be needed as well. The standard sensors are described below. Additional sensors can be added.

For wind speed & direction, we use the OMC-116 ultrasonic sensor. This sensor was developed for marine and offshore applications. It is a very robust sensor for use in harsh environments.

Range	: 0-75 m/s
Accuracy	: ± 0.2 m/s (speed)
Threshold	: 0.1 m/s (speed)
Accuracy	: 2° (direction)
Threshold	: 0.1 ° (direction)

The instrument tower of the OMC-7018 mounted on a larger (2.4 m) float with 4 tubes for hydrological sensors.

OMC-116 ultrasonic wind speed & direction sensor

OMC-406 temperature & humidity sensor

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Temperature and humidity are measured by the OMC-406 sensor with radiation shield.
Range : -40 to +60 °C
Accuracy : ± 0.3 °C

Atmospheric pressure is measured by the OMC-506.
Range : 800..1100 hPa
Accuracy : ± 0.3 hPa

Water quality sensors
A large range of parameters can be covered by sensors from the standard range offered by Observator. Third party sensors can be integrated on request. The most common parameters are:

- Conductivity (salinity) and temperature
- Turbidity
- Dissolved oxygen
- Chlorophyll and Algae

All offered sensors, like the multi-parameter EXO2 from Xylem or our own NEP5000 turbidity sensor, have been designed for long term monitoring in sea water. Various levels of anti-fouling can be added.

EXO multiparameter sonde from Xylem.

Analite NEP5000 turbidity sensor.

Water current profiler
Current profiling is normally done using the Aquadopp® Acoustic Doppler Current Profiler (ADCP) from, Nortek AS. Using three vertical acoustic beams, the instrument can determine the speed and direction of the water flow underneath the buoy in 128 layers (or 'cells').

Depth range : 60 m below the buoy, depending on model
Cells : 128 (max value)
Cell size : 0.1 to 8 m, depending on the model
Max velocity: ± 10 m/s
Accuracy : 1% of measured value ±0.5cm/s

Aquadopp ADCPs for various ranges.

Wave measurement
Waves are measured by measuring the motion of the buoy using an inertial motion sensor. This sensor is located inside the buoy, at the base of the instrument tower.

Using advanced calculations, the wave statistics (significant wave height, wave period, wave direction and so on) are derived from the motion. The statistics are calculated over a measurement interval of around 20 minutes typically.

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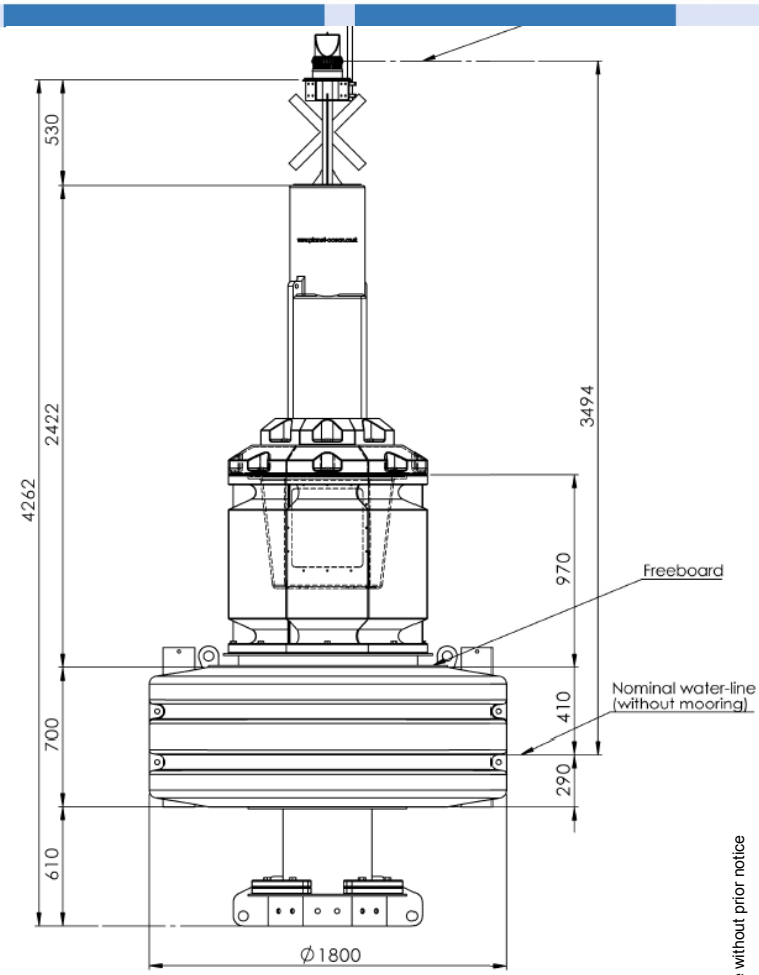
Electronics
The electronics are located inside the instrument tower. This includes one or two 75 Ah /12 V batteries and a charge controller. The battery voltage is monitored by the logger.

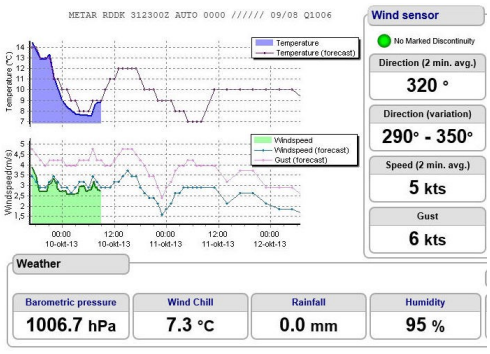
The data logger has inputs for RS232/422/485, ModBus, analog voltage/current and more. It interfaces to all common sensors. Sample and transmission rates are user-configurable. Power to the sensors can be switched on/off by the logger, to minimize power consumption. On the output side, the logger supports different modems, including cellular (mobile phone), radio and satellite.

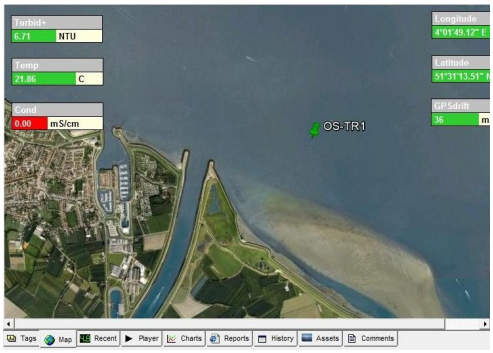
To reduce the risk of being run-over by a ship, the buoy can be equipped with an AIS/AtoN ('Aids to Navigation ') transceiver. This transceiver will transmit the buoy's location and ID by AIS to nearby ships.

Data processing
One the data from the buoy is received on a server, the OMC-DATA-OnLine software package can be used to manage the data. OMC-Data-online allows you to collect data from all your monitoring sites into a single data base. The data can subsequently be viewed in tables, graphs and reports in a very user-friendly way. In addition to directly viewing the data, it is also possible to perform calculations on the data, test for (complex) alarm conditions, and so on. Finally, OMC-Data-Online allows you to view the data with a normal browser from any computer or smart phone.



OMC-7018 Dimensions





OMC-Data-Online example screenshots (fully customizable).

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