

SWALE OCEANOGRAPHIC

Wave buoys – Wave height, period and direction Inertial measurement unit with Attitude and Heading Reference

Features

- Max Wave height 20m, Wave Period 1.43s to 33s
- Calculated heading (±0.8°), pitch (±0.2°) and roll (±0.2°) •
- Real-time data transmission •
- High linearity, low background noise •
- Kalman algorithm on 1kHz processor ٠
- **Rejection of spurious vibrations** •
- MEMS based IMU/AHRS •
- Low power consumption
- Separate module or various buoy designs
- Temperature sensor, 3 accelerometers, 3 axes gyroscope, 3 axes magnetometer
- 3rd party sensor may be installed (CTD, ADCP, Meteo etc)

Several models of buoy are available, which are roto-moulded polyethylene and filled with closed cell polyurethane foam with a polycarbonate dome. They have a modular design so are suitable for multiple applications and capable of withstanding the toughest sea conditions. Renewable power systems consist of solar panels and 12v lead-acid batteries (or optional LifePo4 batteries). They have autonomous navigation lights, with 2 nautical miles range, and a passive radar reflector.

The new "Bares" wave sensor measures directional swell accurately and reliably with 5 Hz sampling. The inertial measurements come from a three-axis gyroscope, controlled by a low-power microcontroller. More than two years of wave data can be stored in the 5GB internal memory. Real-time data can be transmitted via a 4G modem and the data stream includes GPS position and time & date stamps, whilst the operational parameters can be remotely configured via SMS also.

Analysis of the wave spectra from the buoy is performed on secure remote, which provided the following standard values:

On-board data processing:

- Maximum Wave Height (Hmax)
- Significant Wave Height (Hsig)
- Average Height (Havg)
- Significant Wave Period (Tsig)
- Mean Height (H10)
- Mean Period (T10)
- Peak Period (Tp)
- Mean Direction (MD)
- Directional Spectra







Parameter	Range	Resolution	Precision
Wave height	20m	0.01m	<1%
Wave period	1.43s - 33.33s	0.1s	<1%
Direction	0 - 360°	1°	± 1°
Sample rate	5Hz		
Sampling time	5 – 35 minutes (configurable)		
Frequency range	0.03 – 0.7 Hz		
Frequency separation	0.005 Hz		
Frequency band	135		

SENSOR:

Accelerometer, gyroscope and three-axis magnetometer. Pitch and roll precision: 0.2°; heading: 0.8°. Processor 0.5 GHz 8-bit microcontroller. Calibrated and tested over -40 to 85°C. Cryptographic co-processor. MicroSD data storage capacity > 5 years. Local sensor mode interface.

PHYSICAL:

Monobloc enclosure: Sensor, position and comms Status indicator LED IP68 seal rating (hatch for SIM card access and micro SD) Working temperature: -10 to 60°C Dimensions: Ø225 x H 216 mm Weight: 2.8 Kg.

POSITION:

Multisystem: GPS, GLONASS, GALILEO, BIEDOU, QZSS 72 channels -167 dBm Antenna nautical IP68

ELECTRIC:

Input range: 8 – 20 Vdc Protection: overvoltage with resettable fuse Daily energy consumption: 36 Wh [3 Ah @ 12.0V] Average power (hourly): 1.5 W Power at rest: 40 mW [3mA @ 12.0V]

COMMUNICATIONS:

Dual Band + Tri band 3G / 4G phone modem P. Transmission: 2W Sensitivity: -112 dBm Omni-directional nautical antenna Gain = 1.7 dB at 3.9 dB

OTHER FEATURES:

Electromagnetic compatibility and CE marking Electronic design for remote equipment in oceanic conditions

SWALE TECHNOLOGIES Ltd

Unit 51G, Rm48 Whitehill & Bordon Enterprise Park, Budds Lane, Bordon, GU35 0FJ, UK Tel: +44 (0)1420 473334 Email: Sales@swaletechnologies.com <u>www.swaleocean.co.uk</u>