Directional Waverider 4

The Directional Waverider that integrates wave and current measurements

The wave sensor of the Directional Waverider equipped with the Acoustic Current Meter option (DWR4/ACM for short) is identical to the sensor in the well-known Directional Waverider MkI, II and III. Processing of the measured data is now performed at the doubled sample frequency of 2.56 Hz. The high frequency limit of the heave and direction signals is shifted from 0.58 to 1.0 Hz. With this choice, the high frequency limit of the wave buoy is determined by the hydrodynamic response of the hull, not by the onboard instrumentation.

In addition, the DWR4 transmission protocol allows for a superior heave and horizontal displacement resolution. Easy comparison of the new DWR4 output to the familiar DWR-MkIII results is facilitated in the accompanying Waves5 software suite.

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Key Features

- **Sensor**
  wave motion sensor based on a stabilised platform, accelerometers, and magnetic compass
- **Measures**
  – wave height for wave periods of 1 to 30 seconds, accuracy 0.5 % of measured value
  – wave direction
  – surface current
  – water temperature
- **Additional features**
  – GPS for buoy monitoring and tracking through HF link
  – internal logger
  – power switch
  – LED flash antenna
  – 0.9 m (0.7 m) diameter spherical hull of AISI 316 including eccentric mooring eye
  – optional Cunifer hull, excellent against bio-fouling
  – 1.6 years (10 months) battery life

Specifications

Current Meter

General	Method:	Doppler
	Cell size:	0.4 m to 1.1 m from surface
	Update rate:	every 10 minutes
	Sensors:	Three 2 MHz acoustic transducers
Speed	Range:	0 to 3 m/s, resolution 1 mm/s
	Accuracy:	1% of measured value ± 2 cm/s
	Std. (1σ):	1 to 3 cm/s (depending on wave height)
Direction	Range:	0° to 360°, resolution 0.1°
	Accuracy:	0.4° to 2° (depending on latitude), typically 0.5°
	Reference:	magnetic north

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Wave Sensor

Type and processing	Type: Sampling: Data output rate: Processing:	Datawell stabilized platform sensor 8-channel, 14 bit @ 5.12 Hz 2.56 Hz 32 bits microprocessor system
Heave	Range: Sampling: Period:	-20 m to +20 m, resolution: variable, 1 mm smallest step < 0.5% of measured value after calibration < 1.0% of measured value after 3 years 1.0 s to 30 s
Direction	Range: Heading error: Period: Reference:	0° to 360°, resolution: 0.1° 0.4° to 2° (depending on latitude), typically 0.5° 1.0 s to 30 s (free floating) 1.0 s to 20 s (moored) magnetic north

Other

Water temperature	Range: Sensor accuracy: Measurement accuracy:	-10 °C to +50 °C, resolution: 0.01 °C 0.1 °C 0.2 °C
Integrated data logger	Compact flash module 1024 Mb to 2048 Mb:	
LED flashlight	Antenna with integrated LED flasher, colour yellow (590 nm), standard length 35 cm, “Standard pattern”: 5 flashes every 20 s, “Increased pattern”: 5 flashes every 15 s.	
GPS position	50 channel, update every 10 minutes, precision < 5 m	
Datawell HF link	Frequency range 25.5 to 35.5 MHz (35.5 to 45.0 MHz on request)	

General

Power consumption	522 mW
Material	Stainless steel AISI 316 or Cunifer 10
Hull diameter	0.7 m or 0.9 m (excluding fender)
Weight	Approx 109 kg 0.7 m AISI 316, 113 kg 0.7 m Cunifer 10 Approx 192 kg 0.9 m AISI 316, 201 kg 0.9 m Cunifer 10
Batteries	0.7 m operational life 11 months 0.9 m operational life 23 months Type: Datacell RC27B (270 Wh black)

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Power switch	Data files are closed and secured
Temperature range	Operating: -5 °C to +35 °C Storage: -5 °C to +40 °C (+55 °C short term, weeks only)
Hull painting	Brantho-Korrux “3 in 1” paint system (no anti-fouling)

Operational features

Air Temperature	Measuring height: Temperature range: Resolution: Exposed accuracy:	2 m above sea surface -20 °C to +70 °C 0.01 °C ±0.5 °C (±1.0 °C when solar induced uncertainty detected)
Power switch	Data files are closed and secured	
Solar power system	Solar panel combined with BOOSTCAP capacitors Peak power: 5 W, Capacity: 2 Wh	
Transmission	Iridium SBD, Iridium internet, GSM internet and Argos	

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