xylem
Let's Solve Water

HOSKIN SCIENTIFIC

SeaGuardII DCP Wave

The SeaGuardII DCP Wave is a 600kHz Doppler Current Profiler able to measure directional wave parameters and currents from a bottom mounted installation.
The Acoustic Wave software 5759 used by the DCPS implements unique features to improve the wave measurement accuracy by optimizing the signal to noise ratio.
Maximum deployment depth is 40m in normal scatter conditions.
Available as a self-recording instrument, it is easily integrable into a real-time system offering reliable two-way communication.
Redundant wave measurement for QA/QC can be implemented by adding the wave and tide sensor 5218.

Applications:

- *Navigation safety*
- *Prediction and modelling*
- *Energy assessment*
- *Infrastructure design*
- *Coastal processes, erosion*
- *Oil & Gas*

Simple solution to measure waves, currents and water quality in one instrument

- Independent measurement of waves and currents
- Field validated data-comparison with MOTUS buoy, Datawell Waverider and pressure based non directional wave sensor
- Measures wave from centimeters to 20m
- 2Hz or 4Hz wave sampling
- Processing of up to three columns in parallel, provides flexible setup with both surface referred and bottom referred cells.

Adaptive pulse technology automatically optimizes wave measurement accuracy

The transmission pulse is automatically adapted to the current sea conditions to provide best measurement achievable; a low noise broadband mode is used for smaller waves, an extended range broadband mode used for medium range waves and a narrowband mode is applied for higher waves.

Expandable platform – Multiparameter monitoring

- Wide range of additional parameters available using Aanderaa smart sensors; wave, tide, temperature, conductivity, pressure, oxygen
- 4 analog inputs and 2 serial ports for integration of third party sensors as for instance turbidity, pH, total algae, etc

Smart Data quality control

- Automatic flagging of bad data; quality status for each cell
- Redundant wave energy spectrum and other wave parameters when using the wave and tide sensor 5218 (provides time series)
- User selectable advanced autobeam algorithm; automatic selection of the best 3-beams combination in case of obstructions in one beam

Enhanced real-time functionality

- Serial port input for direct connection of modem with power control
- Support AIS, GOES, pseudo binary formats
- Independent configuration of the recording and transmission intervals
- Automatic retransmission of missing data

User friendly set up and data analysis

- Predeployment configuration software; RT Collector
- Modern post-processing software; Data Studio 3D
- Geoview web-based display for real-time application

Wave upgrade of SeaGuardII DCP

- Contact factory

Specifications

Velocity profile measurement

Acoustic frequency:	600 kHz
Typical profiling range:	Broadband: 30-70m[1)]
Narrowband	35-80m[1)]
Cell size:	0.5m - 5m
Cell overlap:	0-90%
Velocity range:	Narrowband: 0-500cm/s – (1000cm/s with max tilt ± 5°)
Broadband:	0-400cm/s
Velocity accuracy:	0.3cm/s or ±1% of reading
Velocity resolution:	0.1cm/s
Velocity precision:	<3,3cm[2)]
Ping rate:	Up to 10Hz (config. dependent)
Cell positioning:	Instrument or surface referred[3)]
Multiple columns:	3 simultaneous columns + Surface cell[3)]
Max. number of cells:	150 total, 75 for first column, 50 for second and 25 for third
Blanking zone:	1m

Wave measurement

WAVE	Range	Resolution	Accuracy
Height	0.2m - 20m	1cm	± 5cm or <1% of value
Period	3-30 sec	<0.05 sec	<1%
Direction	0-360°	0.1°	<2°(RMS)[4)]

Minimum wave period (s)	10m	20m	30m	40m
Cut-off period (H_s)	3.12	3.33	4	5
Cut-off period (Dir)	3.5	4.4	5.9	6.6

Integration time:	5-30min
Wave calculation update rate:	10min - 2h
Wave sampling rate:	2Hz, 4Hz

Output parameters:

Mean Spreading Angle:	θ_κ
First Order Spread:	σ
Energy Spectrum:	E(f)
Directional Spectrum:	DWSm(f)
Principal Directional Spectrum:	DWSp(f)
Fourier Coefficients Spectrum:	A1(f),B1(f),A2(f),B2(f)
Wave Mean Direction:	θ_{avg}
Wave Peak Direction:	θ
Significant Wave Height:	H_{m0}
Wave Mean Period:	T_{m02}
Wave Peak Period:	T_p
Wave Energy Period:	T_e

Echo intensity

Dynamic range:	> 50dB
Resolution:	< 0.01dB
Precision:	< 0.01dB

Specifications subject to change without prior notice.

Tilt and compass

Type:	Internal solid state
Pitch / roll range:	± 90°[5)] / ± 180°[5)]
Tilt accuracy:	<0.5°(RMS), ±1.5°
Heading accuracy:	<2°(RMS), ± 3.5°
Tilt / Heading resolution:	< 0.1°

Embedded temp sensor 4080 (optional, on request)

Range	-4- +40°C
Resolution	0,001°C
Accuracy	± 0,05°C
Response Time (63%):	<5 sec

Pressure sensor 4117 (needed for surface distance)

Resolution:	<0.0001% FSO
Accuracy:	±0.02% FSO standard ±0,01% FSO on request

Wave sensor 5218 (recommended)

Wave max	1000kPa
Resolution :	<0,0001% FSO
Accuracy:	±0,02% FSO standard ±0,01% FSO on request
Wave: Sampling rate:	2Hz, 4Hz
Samples:	256, 512, 1024, 2048

Communication and recording

Data storage:	2GB SD Card /remote download
Available telemetry:	Cable, radio modem, GPRS, GOES, Iridium

Configuration and real-time data software: Real Time Collector

Configuration interface:	USB / RS232 / RS422
Recording interval:	From 30 sec to 3 hrs

Power options

External power supply:	12-30V
Internal battery:	
2 batteries in the instrument:	Alkaline 3988: 9V, 15Ah[6)] Lithium 3908: 7V, 35Ah

Additional rechargeable battery 4021 for the bottom mooring frame 3448

Current drain example:	1.4W[7)]

Environmental

Depth rating:	300m
Operating temperature:	-5 to +40°C
Dimensions:	D: 160mm H: 585mm
Weight:	In Air In Water
SW	10.8 kg 3.6kg
Materials:	PET, PUR, Titanium, Stainless steel 316, polyurethane

Optional additional sensors

Temperature Sensor 4060
Tide sensor 5217
Conductivity Sensor 4319
Turbidity Sensor 4112
Oxygen Optode 4835/4330

Analog and serial inputs

Analog:	4 channels 0-5V
Serial:	2 channels with sensor and power switching one RS232 port and one RS422[8)]

[1)] Typical range with normal backscatter conditions. The measurement range is highly dependent on the scattering conditions. For waters with low amount of scatters, expect a shorter range than for waters with a high amount of scatters
[2)] Standard deviation for the horizontal velocity in broadband mode, 3m cell size
[3)] Requires information from pressure sensor 4117 / 5217 / 5218
[4)] For Wave height (H_{m0}) >0.5m
[5)] Compensation calibrated up to ± 35°
[6)] It is not recommended to use alkaline battery in the upper compartment of the instrument, as it may interfere with the compass
[7)] Typical power consumption at 30 min. interval, 20 min. for wave measurement, 10 min. current measurement, 20m depth, 20 cells, 2m cell
[8)] The serial ports may be used either as serial sensor inputs or serial real-time outputs

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