# AWAC 1 MHz

300 m, Generation 2

**Real-time current profiles and directional waves for shallow water**



The AWAC 1 MHz ADCP has become the standard reference technology in submerged wave-measurement applications. Thousands of these ADCPs have been deployed to capture the full wave spectrum in combination with current profiles. With a 35 m maximum range for wave measurements, 4 Hz sampling of the surface elevation and onboard wave processing for real-time applications, the AWAC 1 MHz is the optimal tool for shallow current and wave measurements.

The AWAC Generation 2 design offers future-proof electronics, improved performance and easier instrument maintenance.

**See the details of the Generation 2 AWAC updates in the release notes here.**

## Highlights

- Real-time current profiles to 30 m range; real-time directional waves to 35 m range
- Acoustic surface tracking (AST) with vertical beam
- Can be used both with fixed frames and subsurface buoys
- Onboard wave processing for real-time applications

## Applications

- Online, real-time measurements of currents and waves
- Design data for planning of new coastal structures
- Site studies for offshore wind platforms
- Coastal erosion studies
- Monitoring of transient waves for channel wall protection

## Technical specifications

| Water velocity measurements | |
|---|---|
| Maximum profiling range* | 30 m |
| Cell size | 0.25-4.0 m |
| Number of cells | 200 |
| Velocity range (along beam) | User-selectable 1.0 to 5.0 m/s |
| Accuracy | ±1% of measured value ±0.5 cm/s |
| Velocity precision | Consult instrument software |
| Maximum output rate | 1 Hz or 2 Hz |
| Internal sampling rate | 16 Hz |

*Dependent on measurement conditions

## Echo intensity (along slanted beams)

| | |
|---|---|
| Sampling | Same as velocity |
| Resolution | 0.5 dB |
| Dynamic range | 90 dB |
| Transducer acoustic frequency | 1 MHz |
| Number of beams | 3 beams 120° apart, one vertical beam (90° apart, one at 5° for platform mount) |
| Beam width | 0.725° (1.45° total) |
| Beam width vertical beam | 1.45° total |

## Wave measurement option (AST)

| | |
|---|---|
| Maximum depth | 35 m |
| Data types | Pressure, one velocity along each beam, AST |
| Max. Sampling Rate (output) | 4Hz |
| No. of samples per burst | 512, 1024 or 2048 (Contact Nortek for other burst configurations) |

## Wave estimates

| | |
|---|---|
| Range | -15 to 15 m |
| Accuracy/resolution (Hs) | < 1% of measured value / 1 cm |
| Accuracy/resolution (Dir) | 2° / 0.2° |
| Period range | 0.5-50 s |
| Cut-off period (Hs) | 5 m depth: 0.5 sec, 20 m depth: 0.9 sec |
| Cut-off period (dir) | 5 m depth: 1.5 sec, 20 m depth: 3.1 sec |

## Sensors

| | |
|---|---|
| Temperature: | Thermistor in head (sampled at meas. rate) |
| Temp. range | -4 to +40 °C |
| Temp. accuracy/resolution | 0.1 °C/0.01°C |
| Temp. time response | 2 min |
| Compass: | Solid state magnetometer (max 1Hz sample rate) |
| Accuracy/resolution | 2° for tilt <30° / 0.01° |
| Tilt: | Solid state accelerometer (max 1Hz sample rate) |
| Accuracy/resolution | 0.2° for tilt <30° / 0.01° |
| Maximum tilt | Full 3D |
| Up or Down | Automatic detect |
| Pressure: | Piezoresistive (sampled at meas. rate) |
| Range | 0-100 m (inquire for options) |
| Accuracy / precision | 0.1% FS / Better than 0.002% of full scale |

## Data Recording

| | |
|---|---|
| Capacity | 16 GB, 64 GB or 128 GB (inquire for larger capacity) |
| Data record | Consult instrument software |
| Mode | Stop when full |

## Real Time Clock

| | |
|---|---|
| Accuracy | ±1 min/year |
| Clock retention in absence of external power | 1 year. Rechargeable backup battery |

## Data Communications

| | |
|---|---|
| Ethernet | 10/100 Mbits Auto MDI-X, TCP/IP, UDP/IP, HTTP protocols, Fixed IP / DHCP client /Auto IP address assignment, UPnP and Nortek proprietary instrument, discovery over Ethernet |
| Serial | Configurable RS-232/RS-422 300-1250000 bps |
| Recorder download baud rate | 20 Mbit/s (Ethernet only) - 1 GB in 6 minutes |
| Controller interface | ASCII command interface over Telnet and serial |

## Connectors

| | |
|---|---|
| Standard* | MCBH6F (Ethernet) + MCBH8F (serial and/or battery) |
| Optional* | MCBH6F (Ethernet) + Souriau M-series metal connector for online use (10M) + MCBH2F (battery) |

*Configuration dependent

## Software

| | |
|---|---|
| Functions | Deployment planning, instrument configuration, data retrieval and conversion (for Windows®) |

## Power

| | |
|---|---|
| DC input | 12-48 V DC |
| Maximum peak current | 1.5 A |
| Max. average consumption at 1Hz | 8 W at 1 Hz, Ethernet adds 0.75 W |
| Typical average consumption | 15 mW |
| Sleep consumption | 100 µA, power depending on supply voltage |
| Transmit power per beam | 0.3-30 W, adjustable levels |
| Ping sequence | Parallel |

## Environmental

| | |
|---|---|
| Operating temperature | -4 to +40 °C |
| Storage temperature | -20 to +60 °C |
| Vibration | IEC60068-2-64 |
| EMC approval | IEC/EN 61000-6-2, 61000-6-3 |
| Depth rating | 300m |

## Materials

| | |
|---|---|
| Standard model | POM with titanium fasteners |

## Dimensions

| | |
|---|---|
| Maximum diameter | 215 mm |
| Maximum length | 175 mm |

## Weight

| | |
|---|---|
| Weight in air | TBC |
| Weight in water | TBC |

## Online cable

| | |
|---|---|
| Online cable | Polyurethane jacket, Shore D hardness, 13mm in diameter, max 500m. Inquire for longer cables |

## Batteries

| | |
|---|---|
| External | 540Wh (alkaline) or 1800 W (lithium) |