

AWAC - 400 kHz



Real-time current profiles and directional waves with up to 100 m range

The AWAC 400 kHz 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 100 m maximum range for wave measurements and 1.5 Hz sampling of the surface elevation, the AWAC 400 kHz is the optimal tool for deeper-water current and wave measurements.

Highlights

- ✓ Real-time current profiles and waves to 100 m range
- ✓ Acoustic surface tracking (AST) with vertical beam
- ✓ Can be used both with fixed frames and subsurface buoys

Applications

- ✓ Online measurements of currents and waves at long ranges
- ✓ Site studies for offshore wind platforms
- ✓ Measurement campaigns where the full wave spectrum is needed
- ✓ Monitoring of transient waves for channel wall protection

Technical specifications

→ Water velocity measurements

| | |
|-------------------------|---|
| Maximum profiling range | 100 m |
| Cell size | 1.0-8.0 m |
| Number of cells | Typical 20-40, max. 128 |
| Velocity range | ± 10 m/s horizontal, ± 5 m/s along beam |
| Accuracy | $\pm 1\%$ of measured value ± 0.5 cm/s |
| Velocity precision | Consult instrument software |
| Maximum output rate | 1 Hz |
| Internal sampling rate | 2 Hz |

→ Echo intensity (along slanted beams)

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|-------------------------------|--|
| Sampling | Same as velocity |
| Resolution | 0.45 dB |
| Dynamic range | 90 dB |
| Transducer acoustic frequency | 400 kHz, 600 kHz for vertical beam |
| Number of beams | 3 beams 120° apart, one vertical beam, (90° apart, one at 5° for platform mount) |
| Beam width | 1.2° (2.4° total) |
| Beam width vertical beam | 1.7° total |

→ Wave measurement option (AST)

| | |
|---------------------------------|---|
| Maximum depth | 100 m |
| Data types | Pressure, one velocity along each beam, AST |
| Sampling rate velocity (output) | 0.75 Hz |
| Sampling rate AST (output) | 1.5 Hz |
| No. of samples per burst | 512, 1024 or 2048 |

→ Wave estimates

| | |
|---------------------------|--|
| Range | -15 to 15 m |
| Accuracy/resolution (Hs) | < 1% of measured value / 1 cm |
| Accuracy/resolution (Dir) | 2° / 0.1° |
| Period range | 1-50 s |
| Cut-off period (Hs) | 20 m depth: 0.9 sec, 60 m depth: 1.5 sec, 100 m depth: 2 sec |
| Cut-off period (dir) | 20 m depth: 3.1 sec, 60 m depth: 5.5 sec, 100 m depth: 7.1 sec |

→ Sensors

| | |
|---------------------------|--------------------------------|
| Temperature: | Thermistor embedded in housing |
| Temp. range | -4 to +40 °C |
| Temp. accuracy/resolution | 0.1 °C/0.01 °C |
| Temp. time response | < 5 min |
| Compass: | Magnetoresistive |

→ Sensors

| | |
|---------------------|--|
| Accuracy/resolution | 2°/0.1° for tilt < 15° |
| Tilt: | Liquid level |
| Accuracy/resolution | 0.2°/0.1° |
| Maximum tilt | 30°, AST requires < 10° instrument tilt |
| Up or Down | Automatic detect |
| Pressure: | Piezoresistive |
| Range | 100 m |
| Accuracy | 0.5% of full scale (optional 0.1% of full scale) |
| Resolution | 0.005% of full scale |

→ Analog inputs

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|---|---|
| No. of channels | 2 |
| Supply voltage to analog output devices | Three options selectable through firmware commands: 1) Battery voltage/500 mA, 2) +5 V/250 mA, 3)+12 V/100 mA |
| Voltage input | 0-5 V |
| Resolution | 16-bit A/D |

→ Data recording

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|----------------|--|
| Capacity | 9 MB standard, 4/16 GB (ProLog) |
| Profile record | Ncells*9 + 120 bytes |
| Wave record | Nsamples*24 + 1k bytes |
| Mode | Stop when full (default and Prolog) or wrap mode |

→ Real-time clock

| | |
|----------------------------|-------------|
| Accuracy | ±1 min/year |
| Backup in absence of power | 1 year |

→ Data communications

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|-----------------------------|--|
| I/O | RS-232 or RS-422. Software supports most commercially available USB- RS-232 converters |
| Communication baud rate | 300-115200 Bd |
| Recorder download baud rate | 600/1200 kBd for both RS-232 and RS-422 |
| User control | Handled via "AWAC AST" software, or ActiveX® controls. "Seastate" for online systems |
| Output formats | NMEA, Binary. Prolog provides same types also for processed wave and current data |

→ Connectors

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|----------|--|
| Bulkhead | MCBH-2-FS, MCBH-8-FS, optional Souriau M-series metal connector for online use |
| Cable | PMCIL-8-MP on 10 m polyurethane cable |

→ Software

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

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|------------------------|-----------------------------|
| DC input | 9-18 V DC |
| Maximum peak current | 3 A |
| Avg. power consumption | 0.23 W |
| Sleep current | < 100 µA |
| Transmit Power | 1-30 W, 3 adjustable levels |

→ Environmental

| | |
|-----------------------|---------------|
| Operating temperature | -4 to +40 °C |
| Storage temperature | -20 to +60 °C |
| Shock and vibration | IEC 721-3-2 |
| EMC approval | IEC 61000 |
| Depth rating | 300 m |

→ Materials

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|----------------|--|
| Standard model | Delrin® and polyurethane plastics with titanium screws |
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→ Dimensions

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|------------------|--------|
| Maximum diameter | 306 mm |
| Maximum length | 203 mm |

→ Weight

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|-----------------|--------|
| Weight in air | 7.3 kg |
| Weight in water | 3.6 kg |

→ Online cable

Polyurethane jacket, Shore D hardness, 13 mm in diameter, max 2 km. Inquire for longer cables