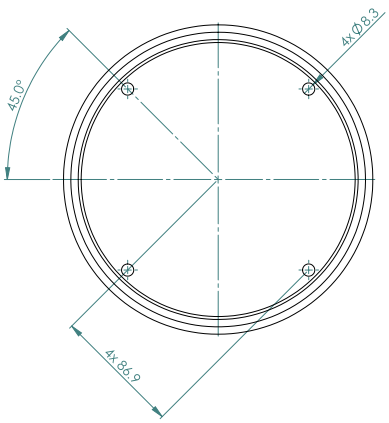
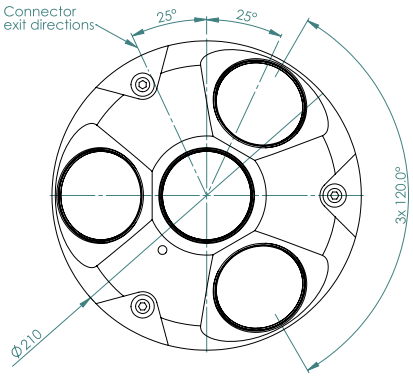
AWAC

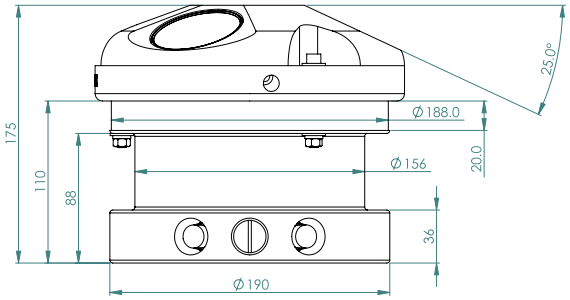
Acoustic Wave And Current Profiler

The Nortek Acoustic Wave and Current profiler (AWAC) does «triple duty»: It measures wave height, wave direction and the full current profile. The system can resolve waves from 1 to 100s, a unique capability of the Nortek AWAC.

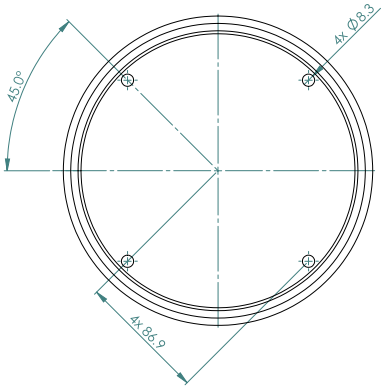
1MHz

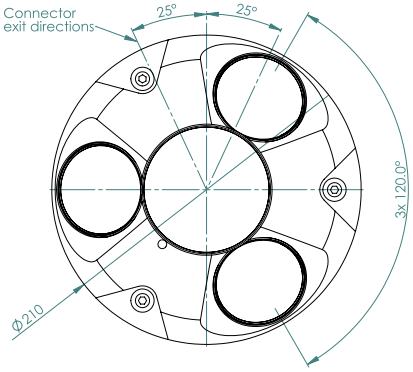


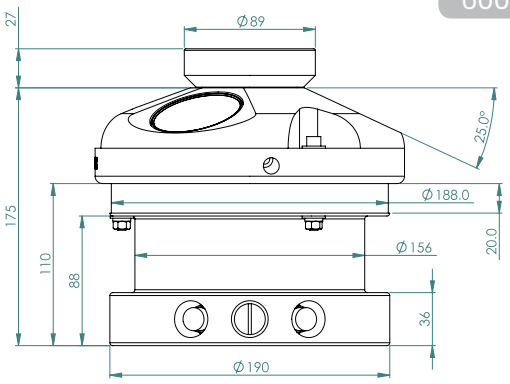




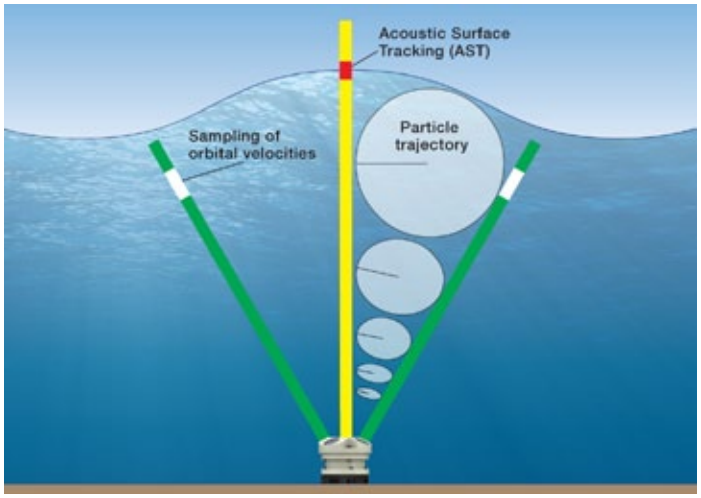
600kHz



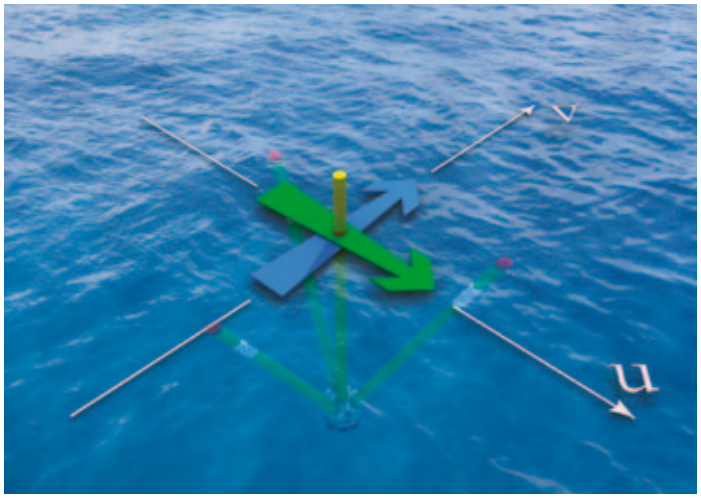




All dimensions in mm.



The AWAC measures wave height and period using the unique acoustic surface tracking (AST) feature. A short acoustic pulse is transmitted vertically toward the water surface, and the time lag between transmission and reception of the surface reflection is used to generate a time series of the surface elevation.



Wave direction is calculated by combining AST with orbital velocity measurements in an array near the surface. The four point array data can be processes with the maximum likelihood method to generate accurate directional wave spectra. For AWAC mounted on subsurface buoys, the patented SUV processing can be used to generate similar results from deep ocean moorings.

CURRENT AND WAVE MEASUREMENTS IN THE OCEAN, LAKE AND LABORATORY

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True innovation makes a difference

Technical Specifications

System	
Acoustic frequency:	1MHz or 600kHz
Acoustic beams:	4 beams, one vertical, three slanted at 25°
Vertical beam opening angle:	1.7°
Operational modes:	Stand-alone or online monitoring
Current Profile	
Maximum range:	30m (1MHz), 50m (600 kHz) (depends on local conditions)
Depth cell size:	0.25 – 4.0m (1MHz) 0.5 – 8.0m (600kHz)
Number of cells:	Typical 20–40, max. 128
Maximum output rate:	1Hz
Velocity measurements	
Velocity range:	±10 m/s horizontal, ±5 m/s along beam
Accuracy:	1% of measured value ±0.5 cm/s
Doppler uncertainty	
Current profile:	1cm/s (typical)
Wave measurements	
Maximum depth:	35m (1MHz), 60m (600 kHz)
Data types:	Pressure, one velocity along each beam
Sampling rate (output):	2 Hz velocity, 4 Hz AST* (1MHz), 1Hz velocity, 2Hz AST* (600kHz)
No. of samples per burst:	512, 1024, or 2048. Inquire for options
Wave estimates	
Range:	-10 to +10m
Accuracy/resolution (Hs):	<1% of measured value/1cm
Accuracy/resolution (Dir):	2° / 0.1°
Period range:	0.5-100s (1MHz), 1 - 100s (0.6MHz)

Depth(m)	cut-off period (Hs)	cut-off period (dir)
5	0.5 sec	1.5 sec
20	0.9 sec	3.1 sec
60	1.5 sec	5.5 sec

Sensors	
Temperature:	Thermistor embedded in housing
Range:	–4°C to 40°C
Accuracy/ Resolution:	0.1°C/0.01°C
Time constant:	<5 min
Compass	Magnetometer
Accuracy/Resolution:	2°/0.1° for tilt <20°
Tilt:	Liquid level
Maximum tilt:	30°, AST* requires <10° instrument tilt
Up or down:	Automatic detect
Pressure:	Piezoresistive
Standard range:	0–50 m (1MHz) / 0-100m (0.6MHz)
Accuracy/Resolution:	0.5% of full scale/ Better than 0.005% of full scale per sample
Transducer configurations	
Standard:	3 beams 120° apart, one at 0°
Materials	
Standard:	Delrin and polyurethane plastics with titanium screws
Connectors:	
Bulkhead (Impulse):	MCBH-2-FS
Cable:	PMCIL-8-MP
Environmental	
Operating temperature:	–4°C to 40°C
Storage temperature:	–20°C to 60°C
Shock and vibration:	IEC 721–3–2
Depth rating:	300m

Dimensions:	
	see drawing on front page
Weight in air:	6.2 kg (0.6MHz), 6.1 kg (1MHz)
Weight in water:	2.9 kg (0.6MHz & 1MHz
Analog Inputs	
Number of channels:	2
Supply voltage to analog output devices:	Three options selectable through firmware commands: • Battery voltage/500mA • +5V/250mA • +12V/100mA
Voltage Input:	0-5V
Resolution:	16 bit A/D
Data Recording	
Capacity(standard):	2 MB, can add: 32/176/352MB or 4GB (Prolog)
Profile record:	Ncells×9 + 120
Wave record:	Nsamples×24 + 46
Data Communication	
I/O:	RS 232 or RS 422
Communication baud rate:	300–115200
Recorder download baud rate:	600/1200 k.Baud for both RS232 and RS422
User control:	Handled via «AWAC» software, or ActiveX® controls
Power	
DC input:	9-18 VDC
Peak current:	3A
Power consumption:	Transmit power: 1–30W, 3 adjustable levels
Sleep consumption:	0.0003 mW (RS232) 0.005 mW (RS422)
Real time clock	
Accuracy:	± 1min/year
Backup in absence of power:	1 year

Offshore Cable

The Nortek offshore cable can, when properly deployed, withstand tough conditions in the coastal zone. In RS 422 configuration, cable communication can be achieved for distances up to 5 km.
*) AST = Acoustic Surface Tracking

Stand alone or on-line

AWACs can be deployed for long term monitoring of the local wave and current conditions. Depending on the specific circumstances, Nortek can provide long cables, radio/telephone communication equipment, acoustic modems, etc., that can meet the requirements of your specific project.

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