

## Signature 1000 - 300 m



### **High-performance mean currents and turbulence, wave height and direction**

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The Signature 1000 ADCP is the optimal tool for turbulence measurements. With a maximum sampling frequency of 16 Hz, it gives the scientific community an unprecedented opportunity to study a part of the turbulence spectrum that has never been accessible before. Vertical resolution current profiles of 2 cm over a range of up to 8 m further increase the Signature 1000's versatility, as does its ability to measure wave height and direction. The center beam also functions as a biological echosounder, enabling high-resolution measurements of biomass in the water column.

## Highlights

- ✓ Five beams for mean currents and turbulence
- ✓ Wave height and direction
- ✓ Ice thickness and ice drift
- ✓ Very small size and weight

## Applications

- ✓ Simultaneous current and turbulence studies up to 30m range
- ✓ Sediment transport studies or biomass estimates using optional scientific echosounder
- ✓ Buoy-mounted measurements in high-energy areas with optional AHRS for motion correction
- ✓ Wave measurements and ice monitoring using acoustic surface tracking (AST)

## Technical specifications

### → Water velocity measurements

Maximum profiling range	25 m (burst mode), 30 m (average mode)
Cell size	0.2-2 m
Minimum blanking	0.1 m
Maximum number of cells	256 (burst)/200 (average)
Velocity range (along beam)	User-selectable 1.0 to 5.0 m/s
Minimum accuracy	0.3% of measured value $\pm$ 0.3 cm/s
Velocity precision	Broadband processing, consult instrument software
Velocity resolution	0.1 cm/s
Max sampling rate	16 Hz (8 Hz using 5 beams)

### → HR option

Velocity range	3 cm/s - 1.4 m/s
Cell size	2-25 cm
Profiling range	10 cm - 8 m
Range velocity limitations	Product of profiling range and velocity should not exceed 3.0 m <sup>2</sup> /s.
Minimum blanking	10 cm

### → AD2CP measurement modes (US patent 8223588)

Single	Burst or average
Concurrent	Burst and average
Alternate	Single and/or concurrent

### → Echo intensity (along slanted beams)

Sampling	Same as velocity
Resolution/ dynamic range	0.5 dB / 70 dB
Transducer acoustic frequency	1 MHz
Number of beams	5; 4 slanted at 25°, 1 vertical
Beam width	2.9°

### → Echo sounder option

Resolution	3 mm - 0.25 m
Number of bins	10,000
Transmit pulse length	16 $\mu$ s - 0.5 ms
Transmit pulse	Monochromatic or pulse compressed (25% BW)
Resolution / dynamic range	0.01 dB / 70 dB

### → Wave measurement option

AST frequency	1 MHz
AST max distance	34 m
Maximum wave measurement depth	30 m

### → Wave measurement option

Height range	-15 to +15 m
Accuracy/resolution (Hs)	< 1% of measured value / 2 cm
Accuracy/resolution (Dir)	2° / 0.1°
Period range	0.5-50 s
Cut-off period (Hs)	5 m depth; 0.6 sec, 20 m depth; 1.1 sec
Cut-off period (dir)	5 m depth; 1.5 sec, 20 m depth; 3.1 sec
Sampling rate (velocity and AST)	8 Hz

### → Ice measurement option

Parameters	Acoustic ranging to ice, speed and direction, echosounder
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### → 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 1 Hz samplerate)
Accuracy/resolution	2° for tilt < 30°/0.01°
Tilt:	Solid State accelerometer (max 1 Hz 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)
Standard range	0-100 m (inquire for options)
Accuracy/precision	0.1% FS / Better than 0.002% of full scale

### → AHRS option

Accelerometer dynamic range	± 2 g
Gyro dynamic range	± 250°/sec
Magnetometer dynamic range	± 1.3 Gauss
Pitch and roll range / resolution	± 90° (pitch) ± 180° (roll) /0.01°
Pitch and roll accuracy	± 2° (dynamic)*, ± 0.5° (static, ±30°)
Heading range / resolution	360°, all axis /0.01°
Heading accuracy	± 3° (dynamic)4), ± 2° (static, tilt < 20°)
Sampling rate	Same as measurement rate (up to 16 Hz)

\* Dynamic specifications depends on the type of motion.

### → 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

Depending on configuration	MCBH6F (Ethernet), MCBH8F (serial), MCBH2F-G2 (pwr), optional Souriau M-series metal connector for online use (10M)
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### → Software

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

DC input	12-48 V DC
Maximum peak current	1.5 A
Max. average consumption at 1 Hz	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

### → Batteries

Internal	90 Wh alkaline
Duration	Depending on configuration, consult software

### → 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	300 m (for 6000 m version, contact Nortek for specifications)

### → Materials

Standard model	POM with titanium fasteners
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### → Dimensions

Maximum diameter	142 mm
Maximum length with room for internal batteries	212 mm

## → Dimensions

Maximum length without room for internal batteries	152 mm
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## → Weight

In air, no battery	2.21 kg (1.9 kg short)
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In water, no battery	-0.09 kg (0.3 kg short)
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Battery	0.71 kg
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