Signature 1000

300 m | 4000 m

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



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.

Download our guide to Signature ADCPs here.

Highlights

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

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 ± 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)

*Dependent on measurement conditions

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 m2/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 µs - 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
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

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)

Sensors

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 orientation sensing. Recommended instrument orientation and allowable tilt depend on the measurement application.
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)*, ± 2° (static, tilt < 20°)
Sampling rate	Same as measurement rate (up to 16 Hz)
Power	Using AHRS draws more power than the regular compass and tilt sensor. Please refer to the Signature Deployment software.

* 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)

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 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 4000 m version, contact Nortek for specifications)

Materials	
Standard model	POM with titanium fasteners

Dimensions	
Maximum diameter	142 mm
Maximum length with room for internal batteries	212 mm
Maximum length without room for internal batteries	152 mm

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