Signature1000



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

The Signature1000 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 Signature1000’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
- Very small size and weight

Applications

- Turbulence studies
- Sediment transport studies
- 3D profiling using a wire walker
- Surf zone dynamics
- Studies of tidal currents
- Fine-scale mixing studies
- Vessel-mounted coastal surveying
- Directional wave measurements
- Coastal studies
- Suitable for wave buoys

Technical specifications

→ Water velocity measurements	
Maximum profiling range1)	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 2.5 or 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)
→ HR option (on 5th beam only)	
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.
→ 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

→ Wave measurement option	
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	N/A
→ 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)
→ 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

→ Dimensions

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