# Signature 1000

300 m | 6000 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

## 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 |
| 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) |

* 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 |

| Power | |
|---|---|
| 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 |

| 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 |