NORTEK - 2019

Product catalogue

About Nortek

Nortek designs, develops and produces scientific instruments that are used to measure the movement of water in its different forms.

These instruments are utilized by scientists, researchers and engineers at renowned institutions and government agencies worldwide. They are employed in demanding environments that require state-of-the-art instrumentation that is reliable and easy to use.

Knowledge about the world's oceans is lacking – in fact the oceans are called "the great unknown". We know more about the surface of the Moon than we know about the bottom of the oceans. Yet, the oceans control the world's climate, are responsible for producing most of the oxygen we breathe and are home to an unsurpassed number of species (many with commercial value). Furthermore, a major part of the world's population lives within a one-hour drive of one of the world's oceans. Nortek makes exploratory devices – technology that enables people to understand what happens in these vast areas of the Earth's surface.

Most of Nortek's technology is based on a scientific physical principle called the Doppler effect. This principle is related to the change in frequency (or pitch) when a sound source moves with respect to an observer.

Nortek's product portfolio spans from wave measurement systems to single-point turbulence sensors and oceanic current profilers. Our product range relates to four themes: ocean waves, ocean currents, turbulent flow and subsea navigation.

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Find products by category

→ ## Ocean waves

→ ## Subsea navigation

→ ## Ocean currents

→ ## Turbulent flow

Explore water in motion

→ **Ocean waves**

Whether you are measuring large open-ocean waves or local wind-generated ones, our acoustic wave sensors will help you record wave height, period and direction with great accuracy and precision – in addition to also measuring currents.

Our instruments can be installed in shallow or deep areas and help you to fully characterize all sea state conditions. All wave systems are also capable of current measurements.
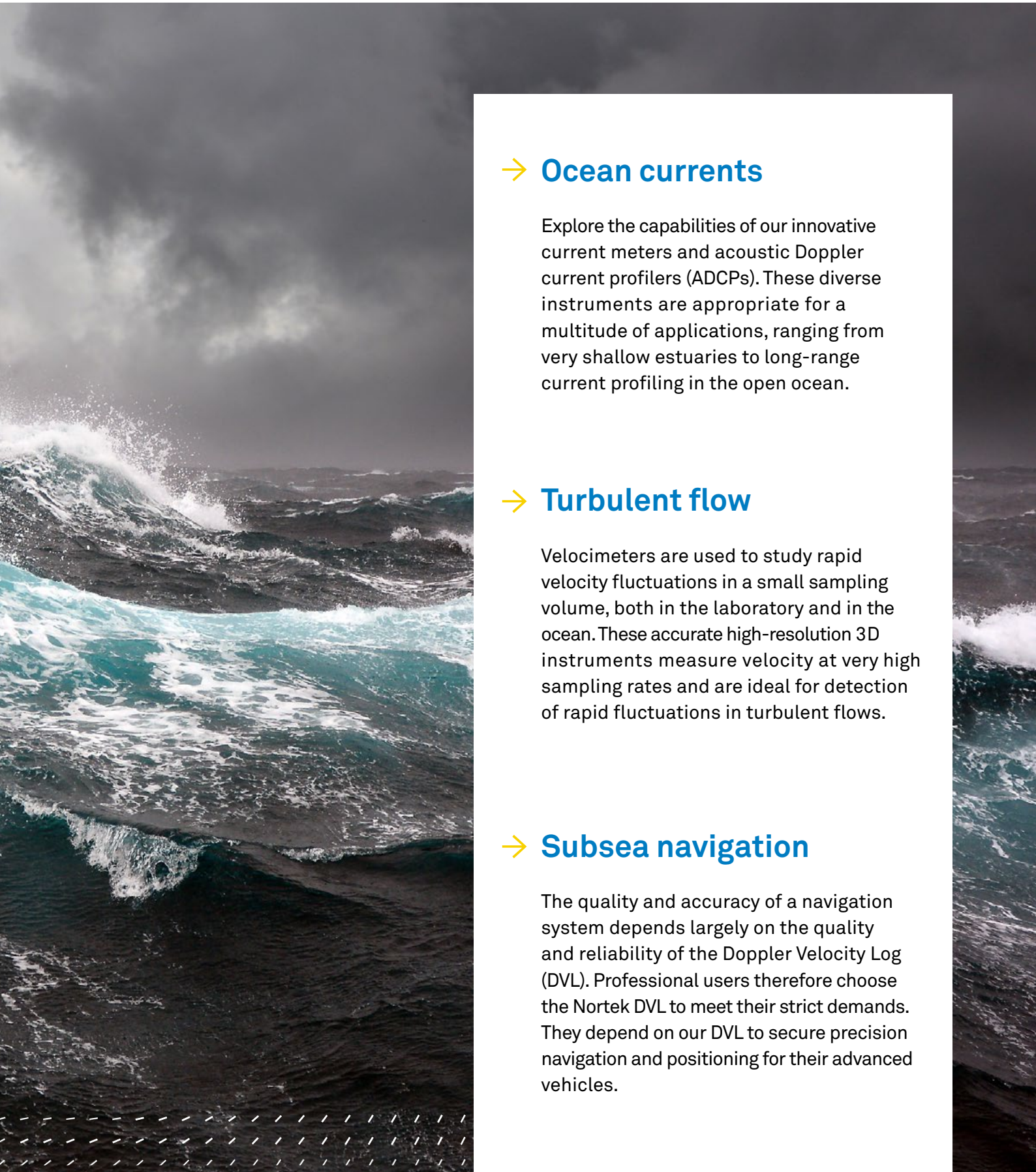
→ Ocean currents

Explore the capabilities of our innovative current meters and acoustic Doppler current profilers (ADCPs). These diverse instruments are appropriate for a multitude of applications, ranging from very shallow estuaries to long-range current profiling in the open ocean.

→ Turbulent flow

Velocimeters are used to study rapid velocity fluctuations in a small sampling volume, both in the laboratory and in the ocean. These accurate high-resolution 3D instruments measure velocity at very high sampling rates and are ideal for detection of rapid fluctuations in turbulent flows.

→ Subsea navigation

The quality and accuracy of a navigation system depends largely on the quality and reliability of the Doppler Velocity Log (DVL). Professional users therefore choose the Nortek DVL to meet their strict demands. They depend on our DVL to secure precision navigation and positioning for their advanced vehicles.

An overview of Nortek's instruments

Aquadopp, 300 m

Current meter

The Aquadopp 300 m is a compact, accurate and affordable single-point current meter for applications where a current profile is not needed. Designed for use in a number of deployment scenarios from mooring lines to bottom-mounted structures, it comes with PUV-based directional wave measurement capability as standard, making it the best value in the industry.

Raw magnetometer data can be stored for post calibration of compass when used without the inductive modem option.

Highlights

→ Single-point current meter
→ Perfect for mooring lines
→ PUV-based directional wave measurements

Applications

→ Attached to mooring lines
→ In conjunction with riser monitoring systems
→ Measurements of unaffected currents from physical structures
→ Shallow-water wave and current measurements
→ Alternative to mechanical current meters with errors due to fouling
→ Near-surface current measurements from surface buoys
→ Studies of tidal currents
→ Suitable for wave buoys

Aquadopp, 300 m

→ Water velocity measurements	
Maximum profiling range	N/A
Cell size	0.75 m
Minimum blanking	0.35 m
Maximum number of cells	1
Measurement cell position	0.35-5.0 m (user-selectable)
Default position (along beam)	0.35-1.85 m
Velocity range	±5 m/s [1]
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum sampling rate (output)	1 Hz, 4 Hz on request
Internal sampling rate	23 Hz

→ Echo intensity	
Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	2 MHz
Number of beams	3
Beam width	3.4°

→ HR option	
Maximum profiling range	N/A
Cell size	N/A
Minimum blanking	N/A
Maximum number of cells	N/A
Range/velocity limitations	N/A
Accuracy	N/A
Max. sampling rate	N/A

→ Z-Cell option	
Cell zero acoustic frequency	N/A
Maximum profiling range	N/A
Number of beams	N/A

→ Sensors	
Temperature:	Thermistor embedded in head
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2°/0.1° for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	300 m
Accuracy/precision	0.5% FS / 0.005% of full scale

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording	
Capacity	9 MB, can add 4/16 GB
Data record	40 bytes
Diagnostics record	40 bytes
Wave record	40 bytes
Mode	Stop when full (default) or wrap mode

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications	
I/O	RS-232 or RS-422
Communication baud rate	300-115,200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AquaPro" software, ActiveX® function calls, or direct commands with binary or ASCII data output

→ Connectors	
Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10 m polyurethane cable

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

→ Power	
DC input	9-15 V DC
Maximum peak current	3 A
Avg. power consumption [2]	0.01 W
Sleep current	< 100 µA
Transmit power	0.3-20 W, 3 adjustable levels

→ Batteries	
Battery capacity	• 50 Wh (alkaline or Li-ion) • 165 Wh (lithium) • Single or dual
New battery voltage	13.5 V DC (alkaline)

→ Environmental	
Operating temperature	-5 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-2
EMC approval	IEC 61000
Depth rating	300 m

→ Materials	
Standard model	POM housing with titanium fasteners

→ Dimensions	
Maximum diameter	75 mm
Maximum length	~500 mm (single battery) +110 mm (double battery) depending on head configuration

→ Weight	
Weight in air	2.3 kg
Weight in water	Neutral

→ Options	
	• Alkaline, lithium or Li-ion external batteries • Inquire for different head configurations • Inductive modem

[1]) Inquire for higher ranges, [2]) Default configuration, see instrument SW for details and other setups

Aquadopp, 3000 m

Current meter
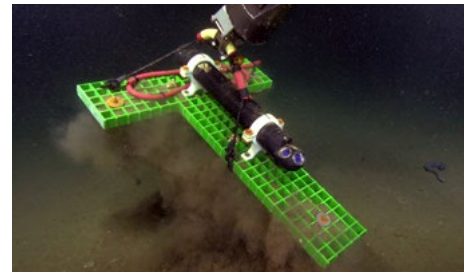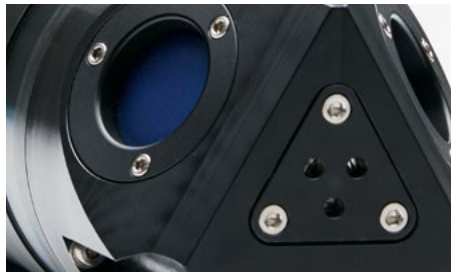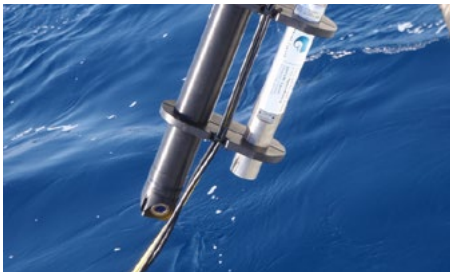
With all the features and capabilities of the standard Aquadopp, the deep-water Aquadopp 3000 m current meter has been used and proven by oceanographers around the world for almost 20 years. Thanks to innovative data diagnostic features for challenging environments, it provides exceptionally high-quality 3D currents in a form factor that is easy to install in any type of mooring line configuration, or simply attached to a bottom or surface platform.

Raw magnetometer data can be stored for post calibration of compass when used without the inductive modem option.

Highlights

→ Single-point current meter
→ Designed for very long-term deployments
→ Diagnostics mode for mooring performance evaluation

Applications

→ Studies of deep-water currents
→ Studies of tidal currents
→ Attached to mooring lines
→ In conjunction with riser monitoring systems
→ Measurements of unaffected currents from physical structures
→ Alternative to conventional current meters with errors due to fouling
→ Combination of currents and high-accuracy CTD data
→ Near-bed current measurements from landers
→ Deep ocean mining support

Aquadopp, 3000 m

→ Water velocity measurements	
Maximum profiling range	N/A
Cell size	0.75 m
Minimum blanking	0.50 m
Maximum number of cells	1
Measurement cell position	0.5-5.0 m (user-selectable)
Default position (along beam)	0.50-2.0 m
Velocity range	±5 m/s [1]
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum sampling rate (output)	1 Hz
Internal sampling rate	23 Hz

→ Echo intensity	
Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	2 MHz
Number of beams	3
Beam width	3.4°

→ HR option	
Maximum profiling range	N/A
Cell size	N/A
Minimum blanking	N/A
Maximum number of cells	N/A
Range/velocity limitations	N/A
Accuracy	N/A
Max. sampling rate	N/A

→ Z-Cell option	
Cell zero acoustic frequency	N/A
Maximum profiling range	N/A
Number of beams	N/A

→ Sensors	
Temperature:	Thermistor embedded in head
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2°/0.1° for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	3000 m
Accuracy/precision	0.5% FS / 0.005% of full scale

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording	
Capacity	9 MB, can add 4/16 GB
Data record	40 bytes
Diagnostics record	40 bytes
Wave record	N/A
Mode	Stop when full (default) or wrap mode

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications	
I/O	RS-232 or RS-422
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AquaPro" software, ActiveX® function calls, or direct commands with binary or ASCII data output

→ Connectors	
Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10 m polyurethane cable

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

→ Power	
DC input	9-15 V DC
Maximum peak current	3 A
Avg. power consumption [2]	0.015 W
Sleep current	< 100 µA
Transmit power	20 W

→ Batteries	
Battery capacity	• 50 Wh (alkaline or Li-ion) • 165 Wh (lithium) • Single or dual
New battery voltage	13.5 V DC (alkaline)

→ Environmental	
Operating temperature	-5 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-2
EMC approval	IEC 61000
Depth rating	3000 m

→ Materials	
Standard model	POM housing with titanium fasteners

→ Dimensions	
Maximum diameter	84 mm
Maximum length	~500 mm (single battery) +110 mm (double battery) depending on head configuration

→ Weight	
Weight in air	3.6 kg
Weight in water	1.2 kg

| → Options	
	• Alkaline, lithium or Li-ion external batteries • Inquire for different head configurations

[1] Inquire for higher ranges, [2] Default configuration, see instrument SW for details and other setups

Aquadopp, 6000 m

Current meter
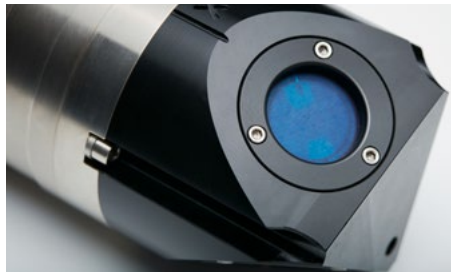
With all the features and capabilities of the standard Aquadopp, the deep-water Aquadopp 6000 m current meter has been used and proven by oceanographers around the world for almost 20 years. Thanks to innovative data diagnostic features for challenging environments, it provides exceptionally high-quality 3D currents in a form factor that is easy to install in any type of mooring line configuration, or simply attached to a bottom or surface platform.

Raw magnetometer data can be stored for post calibration of compass when used without the inductive modem option.

Highlights

→ Full ocean-depth single-point current meter
→ Titanium housing
→ Diagnostics mode for mooring performance evaluation

Applications

→ Studies of deep-water currents
→ Studies of tidal currents
→ Attached to mooring lines
→ In conjunction with riser monitoring systems
→ Measurements of unaffected currents from physical structures
→ Alternative to conventional current meters with errors due to fouling
→ Combination of currents and high-accuracy CTD data
→ Near-bed current measurements from landers
→ Deep ocean mining support

Aquadopp, 6000 m

→ Water velocity measurements	
Maximum profiling range	N/A
Cell size	0.75 m
Minimum blanking	0.50 m
Maximum number of cells	1
Measurement cell position	0.5-5.0 m (user-selectable)
Default position (along beam)	0.50-2.0 m
Velocity range	±5 m/s [1]
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum sampling rate (output)	1 Hz
Internal sampling rate	23 Hz

→ Echo intensity	
Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	2 MHz
Number of beams	3
Beam width	3.4°

→ HR option	
Maximum profiling range	N/A
Cell size	N/A
Minimum blanking	N/A
Maximum number of cells	N/A
Range/velocity limitations	N/A
Accuracy	N/A
Max. sampling rate	N/A

→ Z-Cell option	
Cell zero acoustic frequency	N/A
Maximum profiling range	N/A
Number of beams	N/A

→ Sensors	
Temperature:	Thermistor embedded in head
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2°/0.1° for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	6000 m
Accuracy/precision	0.5% FS / 0.005% of full scale

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording	
Capacity	9 MB, can add 4/16 GB
Data record	40 bytes
Diagnostics record	40 bytes
Wave record	N/A
Mode	Stop when full (default) or wrap mode

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications	
I/O	RS-232 or RS-422
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AquaPro" software, ActiveX® function calls, or direct commands with binary or ASCII data output

→ Connectors	
Bulkhead (Impulse)	MCBH-8-FS titanium
Cable	PMCIL-8-MP on 10 m polyurethane cable

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

→ Power	
DC input	9-15 V DC
Maximum peak current	3 A
Avg. power consumption [2]	0.015 W
Sleep current	< 100 µA
Transmit power	20 W

→ Batteries	
Battery capacity	• 50 Wh (alkaline or Li-ion) • 165 Wh (lithium) • Single or dual
New battery voltage	13.5 V DC (alkaline)

→ Environmental	
Operating temperature	-5 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-4
EMC approval	IEC 61000
Depth rating	6000 m

→ Materials	
Standard model	Titanium and POM

→ Dimensions	
Maximum diameter	84 mm
Maximum length	~500 mm (single battery) +110 mm (double battery) depending on head configuration

→ Weight	
Weight in air	7.6 kg
Weight in water	4.8 kg

| → Options	
	• Alkaline, lithium or Li-ion external batteries • Inquire for different head configurations • Inductive modem

[1] Inquire for higher ranges, [2] Default configuration, see instrument SW for details and other setups

Aquadopp Profiler, 2 MHz

Current profiler

The Aquadopp Profiler is a highly versatile Acoustic Doppler Current Profiler (ADCP) available in four profiling range options, from < 1 m to > 85 m. Designed for simple yet powerful operation, this current profiler is packed with features used by engineers and researchers to enable accurate and effective hydrodynamic data collection in a variety of environmental conditions.

Highlights

→ Up to 10 m current profiling range
→ Optional right-angle head
→ PUV-based directional wave measurements
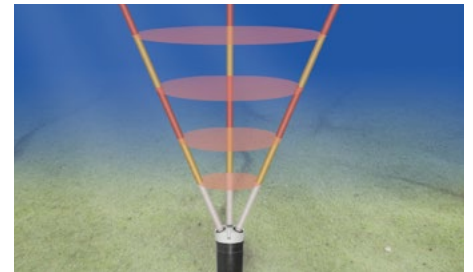
Applications

→ Near-bed current profiles with fine vertical resolution
→ Mean flow measurements with high focus on ease of use and simplicity
→ Measurements in flow regimes with strong variations in flow speeds
→ Projects with needs for both high-resolution and normal-range current measurements
→ Measurements of combinations of waves and currents
→ Studies of deep-water currents
→ Studies of tidal currents
→ Mounted on surface buoys
→ Suitable for wave buoys

Aquadopp Profiler, 2 MHz

→ Water velocity measurements	
Maximum profiling range [1]	4-10 m
Cell size	0.1-2 m
Minimum blanking	0.05 m
Maximum number of cells	128
Measurement cell position	N/A
Default position (along beam)	N/A
Velocity range	±10 m/s [2]
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum sampling rate (output)	1 Hz
Internal sampling rate	23 Hz

→ Echo intensity (along slanted beams)	
Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	2 MHz
Number of beams	3
Beam width	1.7°

→ HR option	
Maximum profiling range	3 m
Cell size	7-150 mm
Minimum blanking	0.03 m
Maximum number of cells	128
Range/velocity limitations	Product of profiling range and velocity should not exceed 0.5 m²/s (2 MHz system)
Accuracy	±1% of measured value ±0.5 cm/s
Max. sampling rate	1 Hz (continuous mode) 8 Hz (burst mode)

→ Z-Cell option	
Cell zero acoustic frequency	N/A
Maximum profiling range	N/A
Number of beams	N/A

→ Sensors	
Temperature:	Thermistor embedded in head
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2°/0.1° for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	0-100 m (inquire for options)
Accuracy/precision	0.5% FS / 0.005% of full scale

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording	
Capacity	9 MB, can add 4/16 GB
Data record	9*Ncells + 32 bytes
Diagnostics record	N/A
Wave record	Nsamples * 24 + 60 bytes
Mode	Stop when full (default) or wrap mode

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications	
I/O	RS-232 or RS-422
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AquaPro" software, ActiveX® function calls, or direct commands with binary or ASCII data output

→ Connectors	
Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10 m polyurethane cable

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

→ Power	
DC input	9-15 V DC
Maximum peak current	3 A
Avg. power consumption [3]	0.03 W
Sleep current	< 100 µA
Transmit power	0.3-20 W, 3 adjustable levels

→ Batteries	
Battery capacity	• 50 Wh (alkaline or Li-ion) • 165 Wh (lithium) • Single or dual
New battery voltage	13.5 V DC (alkaline)

→ Environmental	
Operating temperature	-5 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-8
EMC approval	IEC 61000
Depth rating	300 m 3000 m and 6000 m option

→ Materials	
Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions	
Maximum diameter	75 mm
Maximum length	~550 mm (single battery) +110 mm (double battery) depending on head configuration

→ Weight	
Weight in air	2.2 kg
Weight in water	0.2 kg

→ Options	
	• Alkaline, lithium or Li-ion external batteries • Inquire for different head configurations

[1] Depends on local scattering conditions, [2] Inquire for higher ranges, [3] Default configuration, see instrument SW for details and other setups

Aquadopp Profiler, 1 MHz

Current profiler
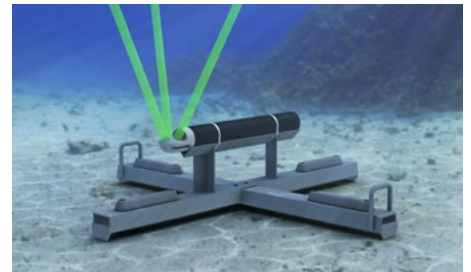
Courtesy of Julia Mullarney, University of Waikato

**The Aquadopp Profiler is a highly versatile Acoustic Doppler Current Profiler (ADCP) available in four profiling range options, from < 1 m to > 85 m. Designed for simple yet powerful operation, this current profiler is packed with features used by engineers and researchers to enable accurate and effective hydrodynamic data collection in a variety of environmental conditions.**

Highlights

→ Up to 25 m current profiling range
→ Optional right-angle head
→ PUV wave measurements

Applications

→ Mean flow measurements with high focus on ease of use and simplicity
→ Measurements in flow regimes with strong variations in flow speeds
→ Projects with needs for both high-resolution and normal-range current measurements
→ Studies of deep-water currents
→ Studies of tidal currents
→ Measurements of combinations of waves and currents
→ Suitable for wave buoys

Aquadopp Profiler, 1 MHz

→ Water velocity measurements

Maximum profiling range [1]	12-25 m
Cell size	0.3-4 m
Minimum blanking	0.20 m
Maximum number of cells	128
Measurement cell position	N/A
Default position (along beam)	N/A
Velocity range	±10 m/s [2]
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum sampling rate (output)	1 Hz
Internal sampling rate	7 Hz

→ Echo intensity (along slanted beams)

Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	1 MHz
Number of beams	3
Beam width	3.4°

→ HR option

Maximum profiling range	6 m
Cell size	20-300 mm
Minimum blanking	0.2 m
Maximum number of cells	128
Range/velocity limitations	Product of profiling range and velocity should not exceed 1.0 m²/s
Accuracy	±1% of measured value ±0.5 cm/s
Max. sampling rate	1 Hz (continuous mode) 8 Hz (burst mode)

→ Z-Cell option

Cell zero acoustic frequency	N/A
Maximum profiling range	N/A
Number of beams	N/A

→ Sensors

Temperature:	Thermistor embedded in head
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2°/0.1° for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	0-100 m (inquire for options)
Accuracy/precision	0.5% FS / 0.005% of full scale

→ Analog inputs

No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16 bit A/D

→ Data recording

Capacity	9 MB, can add 4/16 GB
Data record	9*Ncells + 32 bytes
Diagnostics record	N/A
Wave record	Nsamples * 24 + 60 bytes
Mode	Stop when full (default) or wrap mode

→ Real-time clock

Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications

I/O	RS-232 or RS-422
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AquaPro" software, ActiveX® function calls, or direct commands with binary or ASCII data output

→ Connectors

Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10 m Polyurethane cable

→ Software

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

→ Power

DC input	9-15 V DC
Maximum peak current	3 A
Avg. power consumption [3]	0.05 W
Sleep current	< 100 µA
Transmit power	0.3-20 W, 3 adjustable levels

→ Batteries

Battery capacity	• 50 Wh (alkaline or Li-ion) • 165 Wh (lithium) • Single or dual
New battery voltage	13.5 V DC (alkaline)

→ Environmental

Operating temperature	-5 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-7
EMC approval	IEC 61000
Depth rating	300 m 3000 m option

→ Materials

Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions

Maximum diameter	75 mm
Maximum length	~550 mm (single battery) +110 mm (double battery) depending on head configuration

→ Weight

Weight in air	2.2 kg
Weight in water	0.2 kg

→ Options

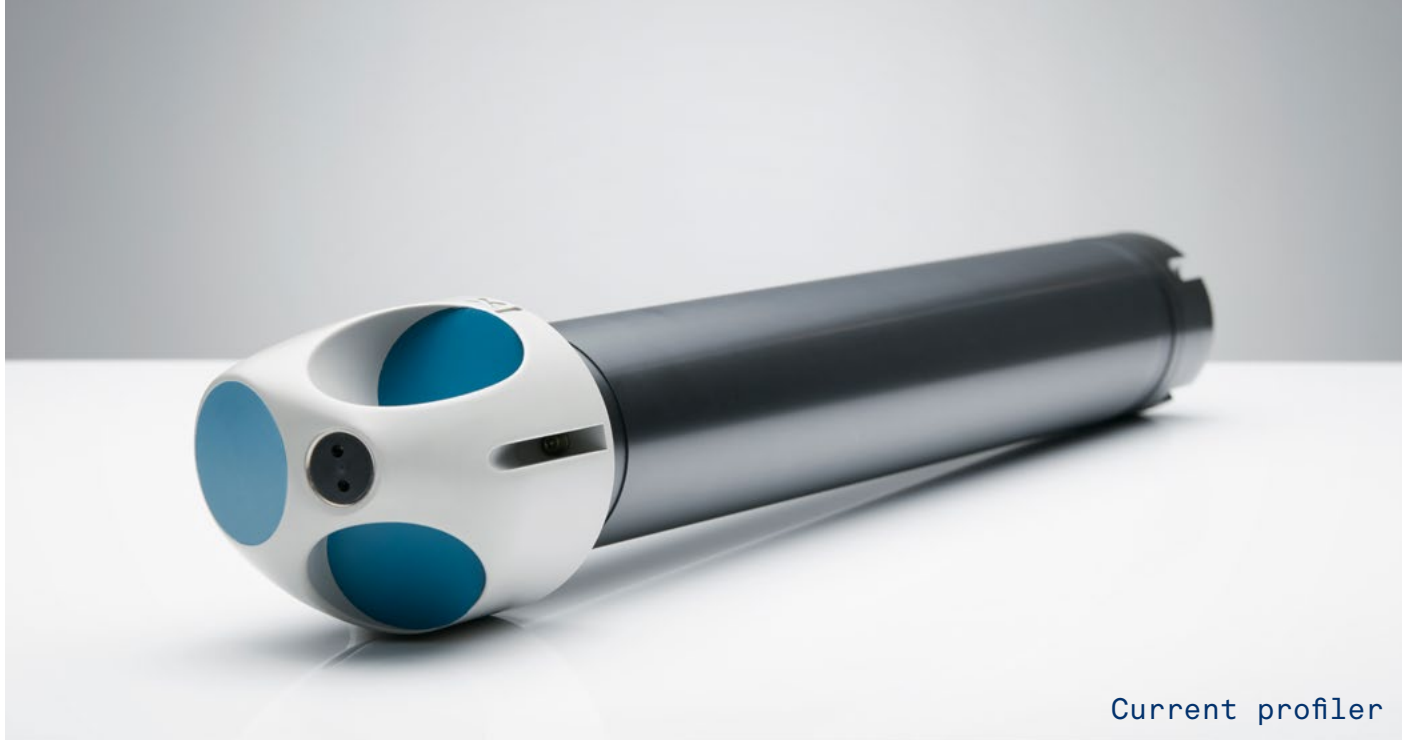|	
	• Alkaline, lithium or Li-ion external batteries • Inquire for different head configurations

[1] Depends on local scattering conditions, [2] Inquire for higher ranges, [3] Default configuration, see instrument SW for details and other setups

Aquadopp Profiler, 600 kHz

Current profiler

The Aquadopp Profiler is a highly versatile Acoustic Doppler Current Profiler (ADCP) available in four profiling range options, from < 1 m to > 85 m. Designed for simple yet powerful operation, this current profiler is packed with features used by engineers and researchers to enable accurate and effective hydrodynamic data collection in a variety of environmental conditions.

Highlights

→ Up to 40 m current profiling range
→ Ideal for mean current measurements
→ Easy to operate and deploy

Applications

→ Mean flow measurements with high focus on ease of use and simplicity
→ Measurements in flow regimes with strong variations in flow speeds
→ Studies of tidal currents
→ Measurements of combinations of waves and currents
→ Suitable for wave buoys

Aquadopp Profiler, 600 kHz
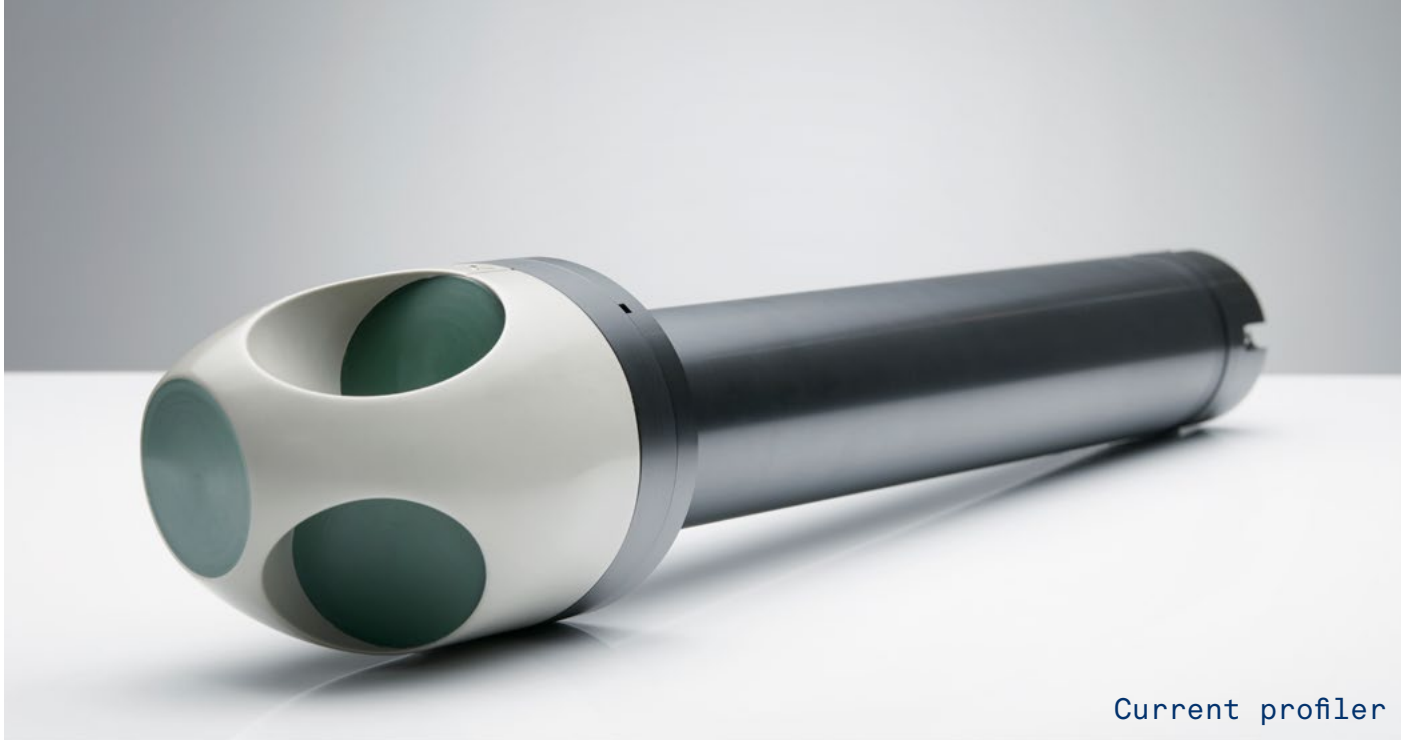
→ Water velocity measurements	
Maximum profiling range [1]	30-40 m
Cell size	1-4 m
Minimum blanking	0.50 m
Maximum number of cells	128
Measurement cell position	N/A
Default position (along beam)	N/A
Velocity range	±10 m/s [2]
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum sampling rate (output)	1 Hz
Internal sampling rate	4 Hz

→ Echo intensity (along slanted beams)	
Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	600 kHz
Number of beams	3
Beam width	3.0°

→ HR option	
Maximum profiling range	N/A
Cell size	N/A
Minimum blanking	N/A
Maximum number of cells	N/A
Range/velocity limitations	N/A
Accuracy	N/A
Max. sampling rate	N/A

→ Z-Cell option	
Cell zero acoustic frequency	N/A
Maximum profiling range	N/A
Number of beams	N/A

→ Sensors	
Temperature:	Thermistor embedded in head
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2°/0.1° for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	0-100 m (inquire for options)
Accuracy/precision	0.5% FS / 0.005% of full scale

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording	
Capacity	9 MB, can add 4/16 GB
Data record	9*Ncells + 32 bytes
Diagnostics record	N/A
Wave record	Nsamples * 24 + 60 bytes
Mode	Stop when full (default) or wrap mode

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications	
I/O	RS-232 or RS-422
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AquaPro" software, ActiveX® function calls, or direct commands with binary or ASCII data output

→ Connectors	
Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10m polyurethane cable

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

→ Power	
DC input	9-15 V DC
Maximum peak current	3 A
Avg. power consumption [3]	0.06 W
Sleep current	< 100 µA
Transmit power	0.3-20 W, 3 adjustable levels

→ Batteries	
Battery capacity	• 50 Wh (alkaline or Li-ion) • 165 Wh (lithium) • Single or dual
New battery voltage	13.5 V DC (alkaline)

→ Environmental	
Operating temperature	-5 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-6
EMC approval	IEC 61000
Depth rating	300 m

→ Materials	
Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions	
Maximum diameter	100 mm
Maximum length	~550 mm (single battery) +110 mm (double battery) depending on head configuration

→ Weight	
Weight in air	2.9 kg
Weight in water	0.4 kg

→ Options	
	• Alkaline, lithium or Li-ion external batteries • Inquire for different head configurations

[1] Depends on local scattering conditions, [2] Inquire for higher ranges, [3] Default configuration, see instrument SW for details and other setups

Aquadopp Profiler, 400 kHz

Current profiler

The Aquadopp Profiler is a highly versatile Acoustic Doppler Current Profiler (ADCP) available in four profiling range options, from < 1 m to > 85 m. Designed for simple yet powerful operation, this current profiler is packed with features used by engineers and researchers to enable accurate and effective hydrodynamic data collection in a variety of environmental conditions.

Highlights

→ Up to 90 m current profiling range
→ Ideal for mean current measurements
→ Easy to operate and deploy

Applications

→ Mean flow measurements with high focus on ease of use and simplicity
→ Measurements in flow regimes with strong variations in flow speeds
→ Studies of tidal currents
→ Measurements of combinations of waves and currents
→ Mounted on surface buoys
→ Suitable for wave buoys

Aquadopp Profiler, 400 kHz

→ Water velocity measurements	
Maximum profiling range [1]	60-90 m
Cell size	2-8 m
Minimum blanking	1 m
Maximum number of cells	128
Measurement cell position	N/A
Default position (along beam)	N/A
Velocity range	±10 m/s [2]
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum sampling rate (output)	1 Hz
Internal sampling rate	2 Hz

→ Echo intensity (along slanted beams)	
Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	400 kHz
Number of beams	3
Beam width	3.7°

→ HR option	
Maximum profiling range	N/A
Cell size	N/A
Minimum blanking	N/A
Maximum number of cells	N/A
Range/velocity limitations	N/A
Accuracy	N/A
Max. sampling rate	N/A

→ Z-Cell option	
Cell zero acoustic frequency	N/A
Maximum profiling range	N/A
Number of beams	N/A

→ Sensors	
Temperature:	Thermistor embedded in head
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2°/0.1° for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	0-100 m (inquire for options)
Accuracy/precision	0.5% FS / 0.005% of full scale

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording	
Capacity	9 MB, can add 4/16 GB
Data record	9*Ncells + 32 bytes
Diagnostics record	N/A
Wave record	Nsamples * 24 + 60 bytes
Mode	Stop when full (default) or wrap mode

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications	
I/O	RS-232 or RS-422
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AquaPro" software, ActiveX® function calls, or direct commands with binary or ASCII data output

→ Connectors	
Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10m polyurethane cable

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

→ Power	
DC input	9-15 V DC
Maximum peak current	3 A
Avg. power consumption [3]	0.1 W
Sleep current	< 100 µA
Transmit power	0.3-20 W, 3 adjustable levels

→ Batteries	
Battery capacity	• 50 Wh (alkaline or Li-ion) • 165 Wh (lithium) • Single or dual
New battery voltage	13.5 V DC (alkaline)

→ Environmental	
Operating temperature	-5 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-4
EMC approval	IEC 61000
Depth rating	300 m

→ Materials	
Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions	
Maximum diameter	117 mm
Maximum length	~600 mm (single battery) +110 mm (double battery) depending on head configuration

→ Weight	
Weight in air	3.4 kg
Weight in water	0.2 kg

→ Options	
	• Alkaline, lithium or Li-ion external batteries • Inquire for different head configurations

[1] Depends on local scattering conditions, [2] Inquire for higher ranges, [3] Default configuration, see instrument SW for details and other setups

Aquadopp Profiler Z-Cell, 1 MHz

Current profiler

Need to collect accurate 3D currents very near the seabed or sea surface, in addition to a full water-column profile?

The Z-Cell (Zero Cell) Aquadopp Profiler allows current measurement to start right at the instrument's level through an innovative approach: it has side-looking beams fully integrated into the instrument's head, effectively removing the blanking distance normally applicable to ADCPs.

Highlights

→ Up to 25 m current profiling range
→ Capable of measuring surface or bottom currents
→ PUV-based directional wave measurements
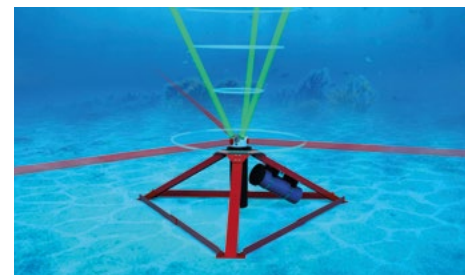
Applications

→ Mounted on bottom frames, with ability to measure also near-bed currents
→ Mean flow measurements with high focus on ease of use and simplicity
→ Measurements in flow regimes with strong variations in flow speeds
→ Projects with needs for both high-resolution and normal-range current measurements
→ Studies of tidal currents
→ Measurements of combinations of waves and currents
→ Mounted on surface buoys, with the ability to measure also surface currents

Aquadopp Profiler Z-Cell, 1 MHz

→ Water velocity measurements

Maximum profiling range [1]	12-25 m
Cell size	0.3-4 m
Minimum blanking	0.20 m when profiling; 0 m when Z-Cell enabled
Maximum number of cells	128
Measurement cell position	N/A
Default position (along beam)	N/A
Velocity range	±10 m/s [2]
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum sampling rate (output)	1 Hz
Internal sampling rate	6 Hz

→ Echo intensity (along slanted beams)

Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	1 MHz
Number of beams	3
Beam width	3.4°

→ HR option (Z-Cell will be disabled)

Maximum profiling range	6 m
Cell size	20-300 mm
Minimum blanking	0.2 m
Maximum number of cells	128
Range/velocity limitations	Product of profiling range and velocity should not exceed 1.0 m²/s
Accuracy	±1% of measured value ±0.5 cm/s
Max. sampling rate	1 Hz (continuous mode) 8 Hz (burst mode)"

→ Z-Cell option

Cell zero acoustic frequency	2 MHz
Maximum profiling range	0.4-0.9 m
Number of beams	3

→ Sensors

Temperature:	Thermistor embedded in head
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2°/0.1° for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	0-100 m (inquire for options)
Accuracy/precision	0.5% FS / 0.005% of full scale

→ Analog inputs

No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording

Capacity	9 MB, can add 4/16 GB
Data record	9*Ncells + 32 bytes
Diagnostics record	N/A
Wave record	Nsamples * 24 + 60 bytes
Mode	Stop when full (default) or wrap mode

→ Real-time clock

Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications

I/O	RS-232 or RS-422
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AquaPro" software, ActiveX® function calls, or direct commands with binary or ASCII data output

→ Connectors

Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10 m polyurethane cable

→ Software

Functions	Deployment planning, instrument configuration, data retrieval and conversion (for Windows®).

→ Power

DC input	9-15 V DC
Maximum peak current	3 A
Avg. power consumption [3]	0.05 W
Sleep current	< 100 µA
Transmit power	0.3-20 W, 3 adjustable levels

→ Batteries

Battery capacity	• 50 Wh (alkaline or Li-ion) • 165 Wh (lithium) • Single or dual
New battery voltage	13.5 V DC (alkaline)

→ Environmental

Operating temperature	-5 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-7
EMC approval	IEC 61000
Depth rating	300 m

→ Materials

Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions

Maximum diameter	75 mm
Maximum length	~550 mm (single battery) +110 mm (double battery) depending on head configuration

→ Weight

Weight in air	2.2 kg
Weight in water	0.2 kg

→ Options

	• Alkaline, lithium or Li-ion external batteries • Inquire for different head configurations

[1] Depends on local scattering conditions, [2] Inquire for higher ranges, [3] Default configuration, see instrument SW for details and other setups

Aquadopp Profiler Z-Cell, 600 kHz
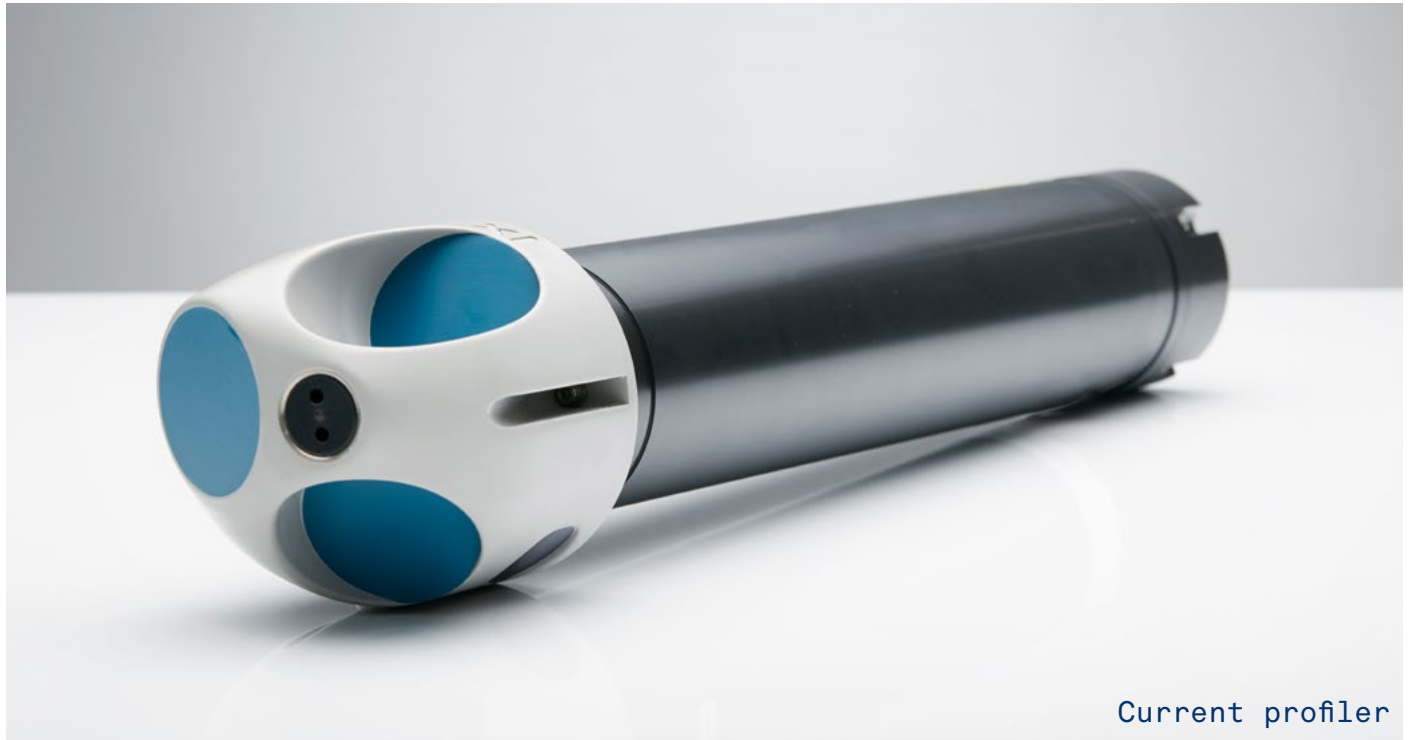
Current profiler

Need to collect accurate 3D currents very near the seabed or sea surface, in addition to a full water-column profile?

The Z-Cell (Zero Cell) Aquadopp Profiler allows current measurement to start right at the instrument's level through an innovative approach: it has side-looking beams fully integrated into the instrument's head, effectively removing the blanking distance normally applicable to ADCPs.

Highlights

→ Up to 40 m current profiling range
→ Capable of measuring surface or bottom currents
→ Ideal for mean current measurements

Applications

→ Mounted on bottom frames, with ability to also measure near-bed currents
→ Mean flow measurements with high focus on ease of use and simplicity
→ Measurements in flow regimes with strong variations in flow speeds
→ Studies of tidal currents
→ Measurements of combinations of waves and currents
→ Mounted on surface buoys, with the ability to also measure surface currents

Aquadopp Profiler Z-Cell, 600 kHz

→ Water velocity measurements	
Maximum profiling range [1]	30-40 m
Cell size	1-4 m
Minimum blanking	0.50 m when profiling; 0 m when Z-Cell enabled
Maximum number of cells	128
Measurement cell position	N/A
Default position (along beam)	N/A
Velocity range	±10 m/s [2]
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum sampling rate (output)	1 Hz
Internal sampling rate	3 Hz

→ Echo intensity (along slanted beams)	
Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	600 kHz
Number of beams	2
Beam width	3.0°

→ HR option	
Maximum profiling range	N/A
Cell size	N/A
Minimum blanking	N/A
Maximum number of cells	N/A
Range/velocity limitations	N/A
Accuracy	N/A
Max. sampling rate	N/A

→ Z-Cell option	
Cell zero acoustic frequency	2 MHz
Maximum profiling range	0.4-0.9 m
Number of beams	3

→ Sensors	
Temperature:	Thermistor embedded in head
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2°/0.1° for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	0-100 m (inquire for options)
Accuracy/precision	0.5% FS / 0.005% of full scale

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording	
Capacity	9 MB, can add 4/16 GB
Data record	9*Ncells + 32 bytes
Diagnostics record	N/A
Wave record	Nsamples * 24 + 60 bytes
Mode	Stop when full (default) or wrap mode

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications	
I/O	RS-232 or RS-422
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AquaPro" software, ActiveX® function calls, or direct commands with binary or ASCII data output

→ Connectors	
Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10 m polyurethane cable

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

→ Power	
DC input	9-15 V DC
Maximum peak current	3 A
Avg. power consumption [3]	0.06 W
Sleep current	< 100 µA
Transmit power	0.3-20 W, 3 adjustable levels

→ Batteries	
Battery capacity	• 50 Wh (alkaline or Li-ion) • 165 Wh (lithium) • Single or dual
New battery voltage	13.5 V DC

→ Environmental	
Operating temperature	-5 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-6
EMC approval	IEC 61000
Depth rating	300 m

→ Materials	
Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions	
Maximum diameter	100 mm
Maximum length	~550 mm (single battery) +110 mm (double battery) depending on head configuration

→ Weight	
Weight in air	2.9 kg
Weight in water	0.4 kg

→ Options	
	• Alkaline, lithium or Li-ion external batteries • Inquire for different head configurations

[1] Depends on local scattering conditions, [2] Inquire for higher ranges, [3] Default configuration, see instrument SW for details and other setups

2D Horizontal Profiler, 400 kHz

Horizontal current profiler
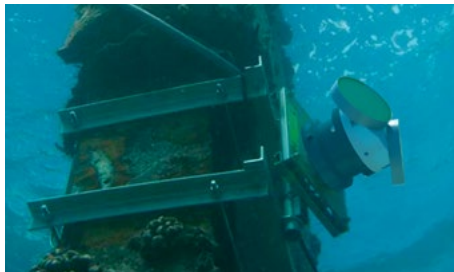
The 2D Horizontal Profiler is the ideal tool for current measurements from a physical structure in, for example, port entrances. This ADCP provides the two horizontal flow components at multiple distances from the mounting and is commonly used in online applications where immediate access to current data is critical.
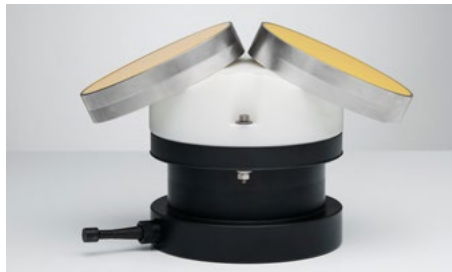
Highlights

→ Up to 130 m horizontal profiling range
→ Ideal for wall-mounted applications
→ Corrosion-free housing
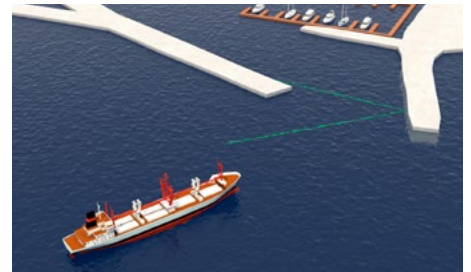
Applications

→ Port entrances with challenging flow conditions
→ Flow measurements upstream and downstream of tidal turbines
→ Flow measurements from marine structures at draft depth

2D Horizontal Profiler, 400 kHz

→ Water velocity measurements	
Maximum profiling range [1]	100-130 m
Cell size	1.0-8.0 m
Number of cells	Typical 20-40, max. 128
Velocity range	±10 m/s horizontal, ±5 m/s along beam
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum output rate	1 Hz
Internal sampling rate	3 Hz

→ Echo intensity (along slanted beams)	
Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	400 kHz
Number of beams	2, slanted at 25°
Beam width	1.7°
Beam width vertical beam	N/A

→ Wave measurement option (AST)	
Maximum depth	N/A
Data types	N/A
Sampling rate velocity (output)	N/A
Sampling rate AST (output)	N/A
No. of samples per burst	N/A

→ Wave estimates	
Range	N/A
Accuracy/resolution (Hs)	N/A
Accuracy/resolution (Dir)	N/A
Period range	N/A
Cut-off period (Hs)	N/A
Cut-off period (dir)	N/A

→ Sensors	
Temperature:	Thermistor embedded in housing
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	< 5 min
Compass:	Magnetoresistive
Accuracy/resolution	2°/0.1° for tilt <15°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	0-100 m
Accuracy	0.5% of full scale (optional 0.1% of full scale)
Resolution	0.005% of full scale

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording	
Capacity	9 MB, can add 4/16 GB
Profile record	Ncells*9 + 120 bytes
Wave record	N/A
Mode	Stop when full (default) or wrap mode

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	1 year

→ Data communications	
I/O	RS-232 or RS-422. Software supports most commercially available USB–RS-232 converters
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AWAC" software, or ActiveX® controls. "Seastate" for online systems
Output formats	NMEA, Binary. Prolog provides same types also for processed wave and current data

→ Connectors	
Bulkhead (Impulse)	MCBH-2-FS, MCBH-8-FS, optional Souriau M-series metal connector for online use
Cable	PMCIL-8-MP on 10 m polyurethane cable

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

→ Power	
DC input	9-18 V DC
Maximum peak current	3 A
Avg. power consumption [2]	Typical 1 W when sampling
Sleep current	< 100 µA
Transmit power	1-30 W, 3 adjustable levels

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-2
EMC approval	IEC 61000
Depth rating	300 m

→ Materials	
Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions	
Maximum diameter	306 mm
Maximum length	203 mm

→ Weight	
Weight in air	8.8 kg
Weight in water	3.2 kg

→ Online cable	
	Polyurethane jacket, Shore D hardness, 13 mm in diameter, max 2 km. Inquire for longer cables

[1] Depends on local scattering conditions and depth; [2] Default configuration, see instrument SW for details and other setups.

AWAC, 1 MHz

Wave systems

The AWAC 1 MHz ADCP has become the standard reference technology in submerged wave-measurement applications. Thousands of these ADCPs have been deployed to capture the full wave spectrum in combination with current profiles. With a 35 m maximum range for wave measurements and 4 Hz sampling of the surface elevation, the AWAC 1 MHz is the optimal tool for shallow current and wave measurements.

Highlights

→ Real-time current profiles to 30 m range
→ Real-time directional waves to 35 m range
→ Acoustic surface tracking (AST) with vertical beam
→ Can be used both with fixed frames and subsurface buoys

Applications

→ Online measurements of currents and waves
→ Design data for planning of new coastal structures
→ Site studies for offshore wind platforms
→ Coastal erosion studies
→ Measurement campaigns where the full wave spectrum is needed
→ Monitoring of transient waves for channel wall protection
→ Studies of tidal currents

AWAC, 1 MHz

→ Water velocity measurements	
Maximum profiling range [1]	30 m
Cell size	0.25-4.0 m
Number of cells	Typical 20-40, max. 128
Velocity range	±10 m/s horizontal, ±5 m/s along beam
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum output rate	1 Hz
Internal sampling rate	7 Hz

→ Echo intensity (along slanted beams)	
Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	1 MHz
Number of beams	3 beams 120° apart, one vertical beam (90° apart, one at 5° for platform mount)
Beam width	1.7°
Beam width vertical beam	1.7°

→ Wave measurement option (AST)	
Maximum depth	35 m
Data types	Pressure, one velocity along each beam, AST [2]
Sampling rate velocity (output)	2 Hz
Sampling rate AST (output)	4 Hz
No. of samples per burst	512, 1024 or 2048 [3]

→ Wave estimates	
Range	-15 to 15 m
Accuracy/resolution (Hs)	< 1% of measured value / 1 cm
Accuracy/resolution (Dir)	2° / 0.1°
Period range	0.5-50 s
Cut-off period (Hs)	5 m depth: 0.5 sec 20 m depth: 0.9 sec 60 m depth: 1.5 sec
Cut-off period (dir)	5 m depth: 1.5 sec 20 m depth: 3.1 sec 60 m depth: 5.5 sec

→ Sensors	
Temperature:	Thermistor embedded in housing
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	< 5 min
Compass:	Magnetoresistive
Accuracy/resolution	2°/0.1° for tilt <15°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°, AST requires < 10° instrument tilt
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	50 m
Accuracy	0.5% of full scale (optional 0.1% of full scale)
Resolution	0.005% of full scale

[1]) Depends on local scattering conditions, [2]) Acoustic surface tracking,
[3]) Inquire for options, [4]) Default configuration, see instrument SW for details and other setups

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V /250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording	
Capacity	9 MB standard, 4/16 GB (Prolog)
Profile record	Ncells*9 + 120 bytes
Wave record	Nsamples*24 + 1k bytes
Mode	Stop when full (default and Prolog) or wrap mode

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	1 year

→ Data communications	
I/O	RS-232 or RS-422. Software supports most commercially available USB–RS-232 converters
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AWAC AST" software, or ActiveX® controls. "Seastate" for online systems
Output formats	NMEA, Binary. Prolog provides same types also for processed wave and current data

→ Connectors	
Bulkhead (Impulse)	MCBH-2-FS, MCBH-8-FS, optional Souriau M-series metal connector for online use
Cable	PMCIL-8-MP on 10m polyurethane cable, metal connector optional

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

→ Power	
DC input	9-18 V DC
Maximum peak current	3 A
Avg. power consumption [4]	0.65 W
Sleep current	< 100 µA
Transmit Power	1-30 W, 3 adjustable levels

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-2
EMC approval	IEC 61000
Depth rating	300 m

→ Materials	
Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions	
Maximum diameter	210 mm
Maximum length	175 mm

→ Weight	
Weight in air	6.1 kg
Weight in water	2.9 kg

→ Online cable	
	Polyurethane jacket, Shore D hardness, 13 mm in diameter, max 2 km. Inquire for longer cables

AWAC, 600 kHz

Wave systems

Courtesy of Alex Costa da Silva, UFPE, Brazil

The AWAC 600 kHz ADCP has become the standard reference technology in submerged wave-measurement applications. Thousands of these ADCPs have been deployed to capture the full wave spectrum in combination with current profiles. With a 60 m maximum range for wave measurements and 2 Hz sampling of the surface elevation, the AWAC 600 kHz is the optimal tool for medium water-depth current and wave measurements.

Highlights

→ Real-time current profiles to 50 m range
→ Real-time waves to 60 m range
→ Acoustic surface tracking (AST) with vertical beam
→ Can be used both with fixed frames and subsurface buoys

Applications

→ Online measurements of currents and waves
→ Design data for planning of new coastal structures
→ Site studies for offshore wind platforms
→ Coastal erosion studies
→ Measurement campaigns where the full wave spectrum is needed
→ Monitoring of transient waves for channel wall protection
→ Studies of tidal currents
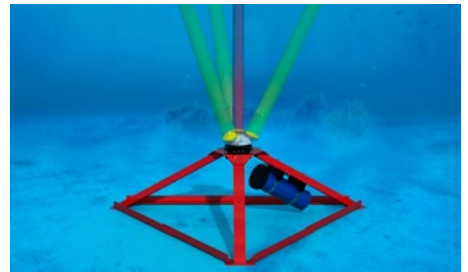
Technical specifications

AWAC, 600 kHz

→ Water velocity measurements

Maximum profiling range [1]	50 m
Cell size	0.5-8.0 m
Number of cells	Typical 20-40, max. 128
Velocity range	±10 m/s horizontal, ±5 m/s along beam
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum output rate	1 Hz
Internal sampling rate	4 Hz

→ Echo intensity (along slanted beams)

Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	600 kHz
Number of beams	3 beams 120° apart, one vertical beam (90° apart, one at 5° for platform mount)
Beam width	3.1°
Beam width vertical beam	1.7°

→ Wave measurement option (AST)

Maximum depth	60 m
Data types	Pressure, one velocity along each beam, AST [2]
Sampling rate velocity (output)	1 Hz
Sampling rate AST (output)	2 Hz
No. of samples per burst	512, 1024 or 2048 [3]

→ Wave estimates

Range	-15 to 15 m
Accuracy/resolution (Hs)	< 1% of measured value / 1 cm
Accuracy/resolution (Dir)	2° / 0.1°
Period range	1-50 s
Cut-off period (Hs)	5 m depth: 0.5 sec 20 m depth: 0.9 sec 60 m depth: 1.5 sec
Cut-off period (dir)	5 m depth: 1.5 sec 20 m depth: 3.1 sec 60 m depth: 5.5 sec

→ Sensors

Temperature:	Thermistor embedded in housing
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	< 5 min
Compass:	Magnetoresistive
Accuracy/resolution	2°/0.1° for tilt < 15°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°, AST requires < 10° instrument tilt
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	100 m
Accuracy	0.5% of full scale (optional 0.1% of full scale)
Resolution	0.005% of full scale

→ Analog inputs

No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording

Capacity	9 MB standard, 4/16 GB (Prolog)
Profile record	Ncells*9 + 120 bytes
Wave record	Nsamples*24 + 1k bytes
Mode	Stop when full (default and Prolog) or wrap mode

→ Real-time clock

Accuracy	±1 min/year
Backup in absence of power	1 year

→ Data communications

I/O	RS-232 or RS-422. Software supports most commercially available USB–RS-232 converters
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AWAC AST" software, or ActiveX® controls. "Seastate" for online systems
Output formats	NMEA, Binary. Prolog provides same types also for processed wave and current data

→ Connectors

Bulkhead (Impulse)	MCBH-2-FS, MCBH-8-FS, optional Souriau M-series metal connector for online use
Cable	PMCIL-8-MP on 10m polyurethane cable

→ Software

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

→ Power

DC input	9-18 V DC
Maximum peak current	3 A
Avg. power consumption [4]	0.76 W
Sleep current	< 100 µA
Transmit Power	1-30W, 3 adjustable levels

→ Environmental

Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-2
EMC approval	IEC 61000
Depth rating	300 m

→ Materials

Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions

Maximum diameter	210 mm
Maximum length	203 mm

→ Weight

Weight in air	6.2 kg
Weight in water	2.9 kg

→ Online cable

	Polyurethane jacket, Shore D hardness, 13 mm in diameter, max 2 km. Inquire for longer cables

[1] Depends on local scattering conditions, [2] Acoustic surface tracking,
[3] Inquire for options, [4] Default configuration, see instrument SW for details and other setups

AWAC, 400 kHz

Wave systems

The AWAC 400 kHz ADCP has become the standard reference technology in submerged wave-measurement applications. Thousands of these ADCPs have been deployed to capture the full wave spectrum, in combination with current profiles. With a 100 m maximum range for wave measurements and 1.5 Hz sampling of the surface elevation, the AWAC 400 kHz is the optimal tool for deeper-water current and wave measurements.

Highlights

→ Real-time current profiles and waves to 100 m range
→ Acoustic surface tracking (AST) with vertical beam
→ Can be used both with fixed frames and subsurface buoys

Applications

→ Online measurements of currents and waves
→ Design data for planning of new coastal structures
→ Site studies for offshore wind platforms
→ Coastal erosion studies
→ Measurement campaigns where the full wave spectrum is needed
→ Monitoring of transient waves for channel wall protection
→ Studies of tidal currents

AWAC, 400 kHz

→ Water velocity measurements

Maximum profiling range [1]	100 m
Cell size	1.0-8.0 m
Number of cells	Typical 20-40, max. 128
Velocity range	±10 m/s horizontal, ±5 m/s along beam
Accuracy	±1% of measured value ±0.5 cm/s
Velocity precision	Consult instrument software
Maximum output rate	1 Hz
Internal sampling rate	2 Hz

→ Echo intensity (along slanted beams)

Sampling	Same as velocity
Resolution	0.45 dB
Dynamic range	90 dB
Transducer acoustic frequency	400 kHz, 600 kHz for vertical beam
Number of beams	3 beams 120° apart, one vertical beam (90° apart, one at 5° for platform mount)
Beam width	2.4°
Beam width vertical beam	1.7°

→ Wave measurement option (AST)

Maximum depth	100 m
Data types	Pressure, one velocity along each beam, AST [2]
Sampling rate velocity (output)	0.75 Hz
Sampling rate AST (output)	1.5 Hz
No. of samples per burst	512, 1024 or 2048 [3]

→ Wave estimates

Range	-15 to 15 m
Accuracy/resolution (Hs)	< 1% of measured value / 1 cm
Accuracy/resolution (Dir)	2° / 0.1°
Period range	1-50 s
Cut-off period (Hs)	20 m depth: 0.9 sec 60 m depth: 1.5 sec 100 m depth: 2 sec
Cut-off period (dir)	20 m depth: 3.1 sec 60 m depth: 5.5 sec 100 m depth: 7.1 sec

→ Sensors

Temperature:	Thermistor embedded in housing
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	< 5 min
Compass:	Magnetoresistive
Accuracy/resolution	2°/0.1° for tilt < 15°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°, AST requires < 10° instrument tilt
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	100 m
Accuracy	0.5% of full scale (optional 0.1% of full scale)
Resolution	0.005% of full scale

[1]) Depends on local scattering conditions, [2]) Acoustic surface tracking,
[3]) Inquire for options, [4]) Default configuration, see instrument SW for details and other setups

→ Analog inputs

No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA
Voltage input	0-5 V
Resolution	16-bit A/D

→ Data recording

Capacity	9 MB standard, 4/16 GB (Prolog)
Profile record	Ncells*9 + 120 bytes
Wave record	Nsamples*24 + 1k bytes
Mode	Stop when full (default and Prolog) or wrap mode

→ Real-time clock

Accuracy	±1 min/year
Backup in absence of power	1 year

→ Data communications

I/O	RS-232 or RS-422. Software supports most commercially available USB–RS-232 converters
Communication baud rate	300-115200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "AWAC AST" software, or ActiveX® controls. "Seastate" for online systems
Output formats	NMEA, Binary. Prolog provides same types also for processed wave and current data

→ Connectors

Bulkhead (Impulse)	MCBH-2-FS, MCBH-8-FS, optional Souriau M-series metal connector for online use
Cable	PMCIL-8-MP on 10 m polyurethane cable

→ Software

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

→ Power

DC input	9-18 V DC
Maximum peak current	3 A
Avg. power consumption [4]	0.23 W
Sleep current	< 100 µA
Transmit Power	1-30 W, 3 adjustable levels

→ Environmental

Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-2
EMC approval	IEC 61000
Depth rating	300 m

→ Materials

Standard model	POM and polyurethane plastics with titanium fasteners

→ Dimensions

Maximum diameter	306 mm
Maximum length	203 mm

→ Weight

Weight in air	7.3 kg
Weight in water	3.6 kg

→ Online cable

	Polyurethane jacket, Shore D hardness, 13 mm in diameter, max 2 km. Inquire for longer cables

DVL1000, 300 m
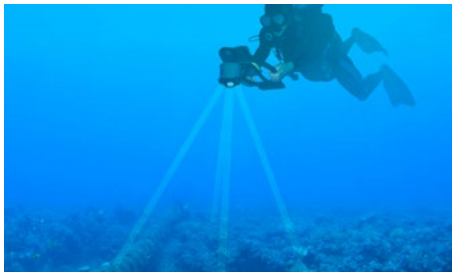
Underwater navigation

The DVL1000 is the world's smallest commercially available Doppler Velocity Log. It combines compact design with unprecedented functionality, being able to fly higher in the water column and closer to the seabed than similar equipment. This version has a maximum operational depth of 300 m and is ideally suited for subsea navigation where size and weight are a concern. This 1 MHz Doppler Velocity Log is used by industry leaders in the subsea market because of its high accuracy and state-of-the-art technology.

Highlights

→ Industry's smallest DVL
→ Bottom track from 0.2-75 m range
→ Quality estimates - per beam and ping
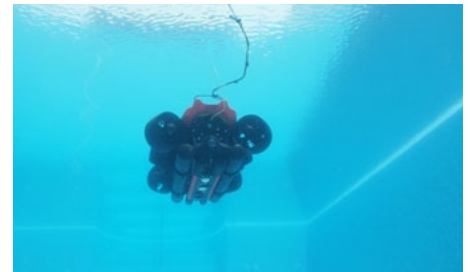
Applications

→ Diver navigation systems
→ Hand-portable unmanned underwater vehicles (UUVs)
→ Shallow-water UUVs

DVL1000, 300 m

→ Bottom velocity	
Single ping std @ 3 m/s	0.5 cm/s
Long-term accuracy[1]	±0.1% / ±0.1 cm/s
Minimum altitude	0.2 m
Maximum altitude	75 m
Velocity resolution	0.01 mm/s
Maximum ping rate[2]	8 Hz max
→ Water tracking	
Minimum accuracy	0.3% of measured value ± 0.3 cm/s
Minimum range	2.0 m
→ Current profiling	
Minimum accuracy	0.3% of measured value ± 0.3 cm/s
Velocity resolution	0.1 cm/s
Interval	User-specified N^{th} ping
Maximum range	30 m
Blanking	0.1 m
Cell size	0.2-2.0 m
Max # cells	150
→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C

→ Mechanical	Head & electronics	Complete DVL
Depth rating	300 m	300 m
Weight	0.84 kg	1.30 kg
Weight in water	-	0.15 kg
Height	(contact Nortek)	158 mm
Diameter	(contact Nortek)	ø 114 mm

[1] Following standard calibration procedures, [2] Inquire for more options

| → Hardware	
Frequency of operation	1 MHz
Beam width	2.9°
Configuration	4-beam Janus array convex transducer, 25° beam angle
Internal memory	16 GB / 64 GB optional
→ Interfaces	
Serial (either serial or Ethernet)	Configurable RS-232 or RS-422 Subconn connector, 8-pin male
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. IEEE1588/PTP and NTP for absolute time stamping. Multiple simultaneous data format transmission possible.
Data formats	Nortek proprietary w/ 1 ms time stamp accuracy NMEA0183 Variants of PDx
Trigger	Internal 1, 2, 3, 4, 5, 6, 7 or 8 Hz or Trigger In. Trigger option through command (Ethernet or serial) External TTL or 485 lines: (configurable Rising/Falling/Edges)
→ Sensors	
Pressure	0.1% FS /precision better than 0.002% of full scale per sample
Temperature	-4° to +40 °C ± 0.1 °C
→ Power	
DC input	12-48 V
Maximum peak current	1.5 A
Average power	1.3 W
→ Materials	
Standard models	POM housing

DVL1000, 4000 m

Underwater navigation

The DVL1000 is the world's smallest commercially available Doppler Velocity Log. It combines compact design with unprecedented functionality, being able to fly higher in the water column and closer to the seabed than similar equipment. It has a maximum operational depth of 4000 m and is ideally suited for subsea navigation where size and weight are a concern. This 1 MHz Doppler Velocity Log is used by industry leaders in the subsea market because of its high accuracy and state-of-the-art technology.

Highlights

→ Industry's smallest DVL
→ Bottom track from 0.2-75 m range
→ Quality estimates - per beam and ping

Applications

→ Observation-class ROVs and AUVs
→ Near-bottom operations
→ Highly accurate subsea surveys
→ Easy integration with high-grade INS

DVL1000, 4000 m

→ Bottom velocity	
Single ping std @ 3 m/s	0.5 cm/s
Long-term accuracy[1]	±0.1% / ±0.1 cm/s
Minimum altitude	0.2 m
Maximum altitude	75 m
Velocity resolution	0.01 mm/s
Maximum ping rate[2]	8 Hz max

→ Water tracking	
Minimum accuracy	0.3% of measured value ± 0.3 cm/s
Minimum range	2.0 m

→ Current profiling	
Minimum accuracy	0.3% of measured value ± 0.3 cm/s
Velocity resolution	0.1 cm/s
Interval	User-specified N^{th} ping
Maximum range	30 m
Blanking	0.1 m
Cell size	0.2-2.0 m
Max # cells	150

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C

→ Mechanical	Head & electronics	Titanium DVL
Depth rating	4000 m	4000 m
Weight	1.7 kg	2.7 kg
Weight in water	-	1.7 kg
Height	(contact Nortek)	164 mm
Diameter	(contact Nortek)	ø 114 mm

[1] Following standard calibration procedures, [2] Inquire for more options

→ Hardware		
Frequency of operation	1 MHz	
Beam width	2.9°	
Configuration	4-beam Janus array convex transducer, 25° beam angle	
Internal memory	16 GB / 64 GB optional	

→ Interfaces	
Serial (either serial or Ethernet)	Configurable RS-232 or RS-422 Subconn connector, 8-pin male
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. IEEE1588/PTP and NTP for absolute time stamping. Multiple simultaneous data format transmission possible.
Data formats	Nortek proprietary w/ 1 ms time stamp accuracy NMEA0183 Variants of PDx
Trigger	Internal 1, 2, 3, 4, 5, 6, 7 or 8 Hz or Trigger In. Trigger option through command (Ethernet or serial) External TTL or 485 lines: (configurable Rising/Falling/Edges)

→ Sensors	
Pressure	0.1% FS /precision better than 0.002% of full scale per sample
Temperature	-4° to +40 °C ± 0.1 °C

→ Power	
DC input	12-48 V
Maximum peak current	1.5 A
Average power	1.3 W

→ Materials	
Standard models	POM and titanium housing

DVL500, 300 m

Underwater navigation

The DVL500 is a universal Doppler Velocity Log that combines compact design with unprecedented functionality. It can fly higher in the water column and closer to the seabed than similar equipment. This 500 kHz Doppler Velocity Log is used by industry leaders in the subsea market because of its high accuracy and state-of-the-art technology.
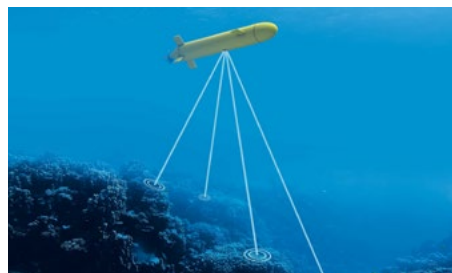
Highlights

→ Bottom track from 0.3-200 m range
→ Per-ping and per-beam data quality estimates
→ 300 m operational depth

Applications

→ Highly accurate subsea surveys
→ AUVs with long missions or high accuracy requirements
→ Easy integration with leading inertial navigation systems (INS)

DVL500, 300 m

→ Bottom velocity	
Single ping std @ 3 m/s	0.5 cm/s
Long-term accuracy[1]	±0.1% / ±0.1 cm/s
Minimum altitude	0.3 m
Maximum altitude	200 m
Velocity resolution	0.01 mm/s
Maximum ping rate[2]	8 Hz max

→ Water tracking	
Minimum accuracy	0.3% of measured value ± 0.3 cm/s
Minimum range	4.0 m

→ Current profiling	
Minimum accuracy	0.3% of measured value ± 0.3 cm/s
Velocity resolution	0.1 cm/s
Interval	User-specified N^{th} ping
Maximum range	70 m
Blanking	0.5 m
Cell size	0.5-4.0 m
Max # cells	140

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C

→ Mechanical	Head & electronics	Complete DVL
Depth rating	300 m	300 m
Weight	2.25 kg	3.5 kg
Weight in water	-	0.5 kg
Height	(contact Nortek)	203 mm
Diameter	(contact Nortek)	ø 186 mm

[1] Following standard calibration procedures, [2] Inquire for more options

→ Hardware	
Frequency of operation	500 kHz
Beam width	2.9°
Configuration	4-beam Janus array convex transducer, 25° beam angle
Internal memory	16 GB / 64 GB optional

→ Interfaces	
Serial (either serial or Ethernet)	Configurable RS-232 or RS-422 Subconn connector, 8-pin male
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. IEEE1588/PTP and NTP for absolute time stamping. Multiple simultaneous data format transmission possible.
Data formats	Nortek proprietary w/ 1 ms time stamp accuracy NMEA0183 Variants of PDx
Trigger	Internal 1, 2, 3, 4, 5, 6, 7 or 8 Hz or Trigger In. Trigger option through command (Ethernet or serial) External TTL or 485 lines: (configurable Rising/Falling/Edges)

→ Sensors	
Pressure	0.1% FS /precision better than 0.002% of full scale per sample
Temperature	-4° to 40 °C ± 0.1 °C

→ Power	
DC input	12-48 V
Maximum peak current	1.5 A
Average power	3.0 W

→ Materials	
Standard models	POM housing

DVL500, 6000 m

Underwater navigation

The DVL500 is a universal Doppler Velocity Log that combines compact design with unprecedented functionality. It can fly higher in the water column and closer to the seabed than similar equipment, and maximum operational depth is 6000 m. This 500 kHz Doppler Velocity Log is used by industry leaders in the subsea market because of its high accuracy and state-of-the-art technology.

Highlights

→ Bottom track from 0.3-200 m range
→ Per-ping and per-beam data quality estimates
→ 6000 m operational depth

Applications

→ Highly accurate subsea surveys
→ AUVs with long missions or high accuracy requirements
→ Easy integration with leading inertial navigation systems (INS)

DVL500, 6000 m

→ Bottom velocity	
Single ping std @ 3 m/s	0.5 cm/s
Long-term accuracy[1]	±0.1% / ±0.1 cm/s
Minimum altitude	0.3 m
Maximum altitude	200 m
Velocity resolution	0.01 mm/s
Maximum ping rate[2]	8 Hz max

→ Water tracking	
Minimum accuracy	0.3% of measured value ± 0.3 cm/s
Minimum range	4.0 m

→ Current profiling	
Minimum accuracy	0.3% of measured value ± 0.3 cm/s
Velocity resolution	0.1 cm/s
Interval	User-specified N^{th} ping
Maximum range	70 m
Blanking	0.5 m
Cell size	0.5-4.0 m
Max # cells	140

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C

→ Mechanical	Head & electronics	Titanium DVL
Depth rating	6000 m	6000 m
Weight	3.5 kg	5.9 kg
Weight in water	-	3.1 kg
Height	(contact Nortek)	203 mm
Diameter	(contact Nortek)	ø 186 mm

[1] Following standard calibration procedures, [2] Inquire for more options

→ Hardware	
Frequency of operation	500 kHz
Beam width	2.9°
Configuration	4-beam Janus array convex transducer, 25° beam angle
Internal memory	16 GB / 64 GB optional

→ Interfaces	
Serial (either serial or Ethernet)	Configurable RS-232 or RS-422 Subconn connector, 8-pin male
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. IEEE1588/PTP and NTP for absolute time stamping. Multiple simultaneous data format transmission possible.
Data formats	Nortek proprietary w/ 1 ms time stamp accuracy NMEA0183 Variants of PDx
Trigger	Internal 1, 2, 3, 4, 5, 6, 7 or 8 Hz or Trigger In. Trigger option through command (Ethernet or serial) External TTL or 485 lines: (configurable Rising/Falling/Edges)

→ Sensors	
Pressure	0.1% FS /precision better than 0.002% of full scale per sample
Temperature	-4° to 40 °C ± 0.1 °C

→ Power	
DC input	12-48 V
Maximum peak current	1.5 A
Average power	3.0 W

→ Materials	
Standard models	POM and titanium housing

Signature1000

Current profiler
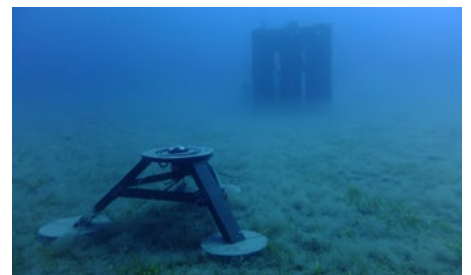
The Signature1000 ADCP is the optimal tool for turbulence measurements. With a maximum sampling frequency of 16 Hz, it gives the scientific community an unprecedented opportunity to study a part of the turbulence spectrum that has never been accessible before. Vertical resolution current profiles of 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

Signature1000

→ Water velocity measurements	
Maximum profiling range[1]	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[2]	
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°

→ Echosounder 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[3] frequency	1 MHz
AST max distance	34 m[3]
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	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 sample rate)
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

[1] Maximum range depends on transmit power and acoustic scattering conditions. [2] US Patent 8223588. [3] Acoustic surface tracking. [4] Dynamic specifications depends on the type of motion. [5] 10 min. avg. profile, 1 cm/sec hor. Prec., Max cell size, max power, long range mode. Consult SW for other configurations.

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)[4], ± 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)

→ 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), MCB-H2F-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[5]	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
Shock and vibration	IEC 60068-1/IEC60068-2-64
EMC approval	IEC 61000
Depth rating	300 m

→ 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

Signature500

Current profiler

The Signature500 ADCP is designed for flexibility. It measures current profiles at up to 8 Hz sampling frequency. It can also measure direct vertical velocity profiles, wave height and direction, and ice thickness and drift.

The center beam also functions as a biological echosounder, enabling high-resolution measurements of biomass in the water column. All these features can be combined using Nortek's patented concurrent mode technology.

Highlights

→ Five beams for mean currents and turbulence
→ Wave height and direction
→ Ice thickness and ice tracking

Applications

→ Turbulence studies
→ Tidal turbine operations
→ Studies of tidal currents
→ Sediment transport studies
→ Ice drift and draft studies
→ Vessel-mounted coastal surveying
→ Plankton migration studies
→ Biomass measurements
→ Directional wave measurements
→ Suitable for wave buoys

Signature500

→ Water velocity measurements	
Maximum profiling range[1]	60 m (burst mode), 70 m (average mode)
Cell size	0.5-4 m
Minimum blanking	0.5 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	8 Hz (4 Hz using 5 beams)

→ HR option (on 5th beam only)	
Velocity range	N/A
Cell size	N/A
Profiling range	N/A
Range velocity limitations	N/A

→ AD2CP measurement modes[2]	
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	500 kHz
Number of beams	5; 4 slanted at 25°, 1 vertical
Beam width	2.9°

→ Echosounder option	
Resolution	6 mm - 0.5 m
Number of bins	11,000
Transmit pulse length	32 μs - 1 ms
Transmit pulse	Monochromatic or pulse compressed (25% BW)
Resolution / dynamic range	0.01 dB / 70 dB

→ Wave measurement option	
AST[3] frequency	500 kHz
AST max distance	75 m [3]
Maximum wave measurement depth	60 m
Height range	-15 to +15 m
Accuracy/resolution (Hs)	< 1% of measured value / 2 cm
Accuracy/resolution (Dir)	2° / 0.1°
Period range	1-50 s
Cut-off period (Hs)	5 m depth: 0.6 sec, 20 m depth: 1.1 sec, 60 m depth: 1.9 sec
Cut-off period (dir)	5 m depth: 1.5 sec, 20 m depth: 3.1 sec, 60 m depth: 5.5 sec
Sampling rate (velocity and AST)	4 Hz

→ Ice measurement option	
Parameters	Ice thickness, speed and direction, echosounder data

→ 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 sample rate)
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)[4], ± 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 8 Hz)

→ 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[5]	25 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	180 Wh alkaline, 540 or 1800 Wh with long canister
Duration	Depending on configuration, consult software

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 60068-1/IEC60068-2-64
EMC approval	IEC 61000
Depth rating	300 m

→ Materials	
Standard model	POM with titanium fasteners

→ Dimensions	
Maximum diameter	228 mm
Maximum length with room for internal batteries	274 mm (180 Wh), 464 mm (540 Wh or 1800 Wh Li)
Maximum length without room for internal batteries	184 mm

→ Weight	
In air, no battery	6.4 kg (5.2 kg short)
In water, no battery	-0.35 kg (0.6 kg short)
Battery	1.8 kg

[1] Maximum range depends on transmit power and acoustic scattering conditions. [2] US Patent 8223588. [3] Acoustic surface tracking. [4] Dynamic specifications depends on the type of motion. [5] 10 min. avg. profile, 1 cm/sec hor. Prec., Max cell size, max power, long range mode. Consult SW for other configurations.

Signature250

Current profiler

The Signature250 ADCP is a medium-range current profiler with a suite of extra features. It has a current profiling range of 200 m, and can measure wave height, period and direction at depths as great as 150 m. The Signature250 ADCP can also measure ice thickness, as well as the speed and direction of drifting ice. Its compact design and low power consumption make it an ideal tool for long-term deployments in all waters.

Highlights

→ 200 m current profiling range
→ Wave height and direction from 150 m installation depth
→ Ice thickness and ice tracking

Applications

→ Ice drift and draft measurements
→ Directional wave measurements
→ Mid-depth current profiles
→ Studies of tidal currents
→ Plankton migration studies
→ Upwelling and downwelling studies
→ Large-scale mixing studies
→ Suitable for wave buoys

Technical specifications

Signature250

→ Water velocity measurements	
Maximum profiling range[1]	200 m
Cell size	1-8 m
Minimum blanking	0.5 m
Maximum number of cells	200 (average)
Velocity range (along beam)	User-selectable 2.5 or 5.0 m/s
Minimum accuracy	1% of measured value ± 0.5 cm/s
Velocity precision	Broadband processing, consult instrument software
Velocity resolution	0.1 cm/s
Max sampling rate	3 Hz (1 Hz at max power)

→ HR option (on 5th beam only)	
Velocity range	N/A
Cell size	N/A
Profiling range	N/A
Range velocity limitations	N/A

→ AD2CP Measurement modes[2]	
Single	Average
Concurrent	Average and waves/ice
Alternate	N/A

→ Echo Intensity (along slanted beams)	
Sampling	Same as velocity
Resolution/dynamic range	0.5 dB / 70 dB
Transducer acoustic frequency	250 kHz
Number of beams	5; 4 slanted at 20°, 1 vertical at 500 kHz (optional)
Beam width	2.3° (slanted), 2.2° (vertical)

→ Echosounder option	
Resolution	N/A
Number of bins	N/A
Transmit pulse length	N/A
Transmit pulse	N/A
Resolution / dynamic range	N/A

→ Wave measurement option	
AST[3] frequency	500 kHz
AST max distance	170 m [3]
Maximum wave measurement depth	150 m
Height range	-15 to +15 m
Accuracy/resolution (Hs)	< 1% of measured value / 2 cm
Accuracy/resolution (Dir)	2° / 0.1°
Period range	2-50 s
Cut-off period (Hs)	25 m depth: 2 sec, 50 m depth: 2 sec, 100 m depth: 2.2 sec, 150 m depth: 2.7 sec
Cut-off period (dir)	Please inquire
Sampling rate (velocity and AST)	1 Hz

→ Ice measurement option	
Parameters	Ice thickness, speed and direction, echo sounder data

→ 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 sample rate)
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	0-300 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)[4], ± 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 3 Hz)

→ 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	15-48 V DC
Maximum peak current	1.5 A
Max. average consumption at 1 Hz	15 W
Typical average consumption[5]	400 mW
Sleep consumption	100 µA, power depending on supply voltage
Transmit power per beam	4-200 W, adjustable levels
Ping sequence	Multiplexing or parallel

→ Batteries	
Internal	540 Wh alkaline or 1800 Wh lithium
Duration	Depending on configuration, consult software

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 60068-1/IEC60068-2-64
EMC approval	IEC 61000
Depth rating	300 m

→ Materials	
Standard model	POM with titanium fasteners. Reinforced polyurethane transducer cups

→ Dimensions	
Maximum diameter	464 mm
Maximum length with room for internal batteries	523 mm
Maximum length without room for internal batteries	308 mm

→ Weight	
In air, no battery	18.5 kg (17.1 kg short)
In water, no battery	1.5 kg (5.2 kg short)
Battery	5.0 kg (540 Wh), 2.9 kg (1800 Wh)

[1] Maximum range depends on transmit power and acoustic scattering conditions. [2] US Patent 8223588. [3] Acoustic surface tracking. [4] Dynamic specifications depends on the type of motion. [5] 10 min. avg. profile, 1 cm/sec hor. Prec., Max cell size, max power, long range mode. Consult SW for other configurations.

Signature100

Current profiler

The Signature100 combines a four-beam current profiler operating at 100 kHz with an optional scientific echo sounder.

Both the current profiler and the biomass measurements have an effective range of 300-400 m providing unprecedented insight into the dynamics of zooplankton, krill or even schools of fish. Likewise, acoustic tracer material can give new insight into small-scale physical processes.

Highlights

→ 300–400 m current profiling range
→ Optional center beam with 70–120 kHz echo sounder

Applications

→ Detection of krill in the water column
→ Cost-effective current profile measurements at mid-range
→ Plankton migration studies
→ Upwelling and downwelling studies
→ Internal waves
→ Suitable for buoy mounting with internal AHRS

Signature100

→ Water velocity measurements	
Maximum profiling range	300–400 m[1]
Cell size	3–15 m
Minimum blanking	TBA
Maximum number of cells	200
Velocity range (along beam)	User-selectable 2.5 or 5.0 m/s
Minimum accuracy	1% of measured value ± 0.5 cm/s
Velocity precision	Broadband processing, consult instrument software
Velocity resolution	0.1 cm/s
Max sampling rate	1 Hz (1/2 Hz at max output power)

→ HR option (on 5th beam only)	
Velocity range	N/A
Cell size	N/A
Profiling range	N/A
Range velocity limitations	N/A

→ AD2CP Measurement modes[2]	
Single	Average
Concurrent	Average and echosounder
Alternate	N/A

→ Echo Intensity (along slanted beams)	
Sampling	Same as velocity
Resolution/dynamic range	0.5 dB/70 dB
Transducer acoustic frequency	100 kHz
Number of beams	4 slanted at 20°, optional vertical beam for echosounder
Beam width	6.1° (slanted)

→ Echosounder option	
Transducer acoustic frequency	70–120 kHz
Transducer beam width	15° @ 70 kHz, 8.7° @ 120 kHz
Resolution	0.375 –4 m
Number of bins	1800
Transmit pulse length	0.5 –6 ms
Transmit pulse	Monochromatic 70 kHz, 90 kHz and 120 kHz or frequency chirp (90 kHz, 50% BW)
Transmit power	1.2–120 W, adjustable
Chirp signal processing	Pulse compression or binned frequency response
Raw complex data storage	Configurable rate
Resolution/dynamic range	0.01 dB / 130 dB
Linearity	TBA

→ Wave measurement option	
AST frequency	N/A
AST max distance	N/A
Maximum wave measurement depth	N/A
Height range	N/A
Accuracy/resolution (Hs)	N/A
Accuracy/resolution (Dir)	N/A
Period range	N/A
Cut-off period (Hs)	N/A
Cut-off period (dir)	N/A
Sampling rate (velocity and AST)	N/A

→ 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 sample rate)
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	0–1500 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)[3], ± 0.5° (static, ±30°)
Heading range/resolution	360°, all axis / 0.01°
Heading accuracy	± 3° (dynamic)[2], ± 2° (static, tilt < 20°)
Sampling rate	Same as measurement rate (up to 1 Hz)

→ 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, HTTP protocols Fixed IP/DHCP client/AutoIP, UPnP
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 (14M)

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

→ Power	
DC input	15–48 V DC
Maximum peak current	1.5 A
Max. average consumption at 1 Hz	15 W
Typical average consumption[4]	2 W
Sleep consumption	100 µA, power depending on supply voltage
Transmit power per beam	4–200 W, adjustable levels
Ping sequence	Multiplexing or parallel

→ Batteries	
Internal	One or two 540 Wh alkaline or 1800 Wh lithium
Duration	Depending on configuration, consult software

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 60068-1/IEC 60068-2-64
EMC approval	IEC 61000
Depth rating	1500 m

→ Materials	
Standard model	POM with titanium fasteners. Titanium/POM transducer cups

→ Dimensions	
Maximum diameter	460 mm
Maximum length with room for internal batteries	765 mm (2 batteries)
Maximum length without room for internal batteries	N/A

→ Weight	
In air, no battery	37.5 kg
In water, no battery	13 kg
Battery	10.0 kg (2x540 Wh), 5.8 kg (2x1800 Wh)

[1] Depending on acoustic scattering condition. [2] US Patent 8223588. [3] Dynamic specifications depends on the type of motion. [4] 10 min. avg. profile, 1 cm/sec hor. prec., max cell size, max power, long range mode. Consult SW for other configurations.

Signature55

Current profiler

The Signature55 ADCP is a current profiler that combines an ultra-long range with a compact layout. Novel ADCP transducer design allows 1000 m profiles concurrent with slightly shorter-range, finer-resolution measurements using two different frequencies in the same instrument. The more than 90% lower power consumption (compared to similar ADCPs) also permits long-duration deployments operating on internal batteries only.

Highlights

→ > 1000 m current profiling range
→ Stand-alone and online applications
→ Concurrent high-resolution and long-range measurements

Applications

→ Protecting infrastructure from cross currents using real-time monitoring
→ Observing deep-ocean current profiles
→ Fine and coarse deep-water current profiles
→ Current measurements for deep-water meteorological buoys
→ Suitable for wave buoys

Signature55

Signature55

→ Water velocity measurements	
Maximum profiling range[1]	1000 m (55 kHz), 600+ (75 kHz)
Cell size	5-20 m
Minimum blanking	2 m
Maximum number of cells	200
Velocity range (along beam)	User-selectable 1 or 5.0 m/s
Minimum accuracy	1% of measured value ± 0.5 cm/s
Velocity precision	Broadband processing, consult instrument software
Velocity resolution	0.1 cm/s
Max sampling rate	1 Hz (1/3 Hz at max power)

→ HR option (on 5th beam only)	
Velocity range	N/A
Cell size	N/A
Profiling range	N/A
Range velocity limitations	N/A

→ AD2CP measurement modes[2]	
Single	Average
Concurrent	N/A
Alternate	Single (coarse/fine)

→ Echo intensity (along slanted beams)	
Sampling	Same as velocity
Resolution/ dynamic range	0.5 dB / 70 dB
Transducer acoustic frequency	55 and 75 kHz
Number of beams	3, slanted at 20°
Beam width	4.5°-5.5°

→ Echosounder option	
Resolution	N/A
Number of bins	N/A
Transmit pulse length	N/A
Transmit pulse	N/A
Resolution / dynamic range	N/A

→ Wave measurement option	
AST frequency	N/A
AST max distance	N/A
Maximum wave measurement depth	N/A
Height range	N/A
Accuracy/resolution (Hs)	N/A
Accuracy/resolution (Dir)	N/A
Period range	N/A
Cut-off period (Hs)	N/A
Cut-off period (dir)	N/A
Sampling rate (velocity and AST)	N/A

→ 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 sample rate)
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	0-1500 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)[3], ± 0.5° (static, ±30°)
Heading range / resolution	360°, all axis /0.01°
Heading accuracy	± 3° (dynamic)[3], ± 2° (static, tilt < 20°)
Sampling rate	Same as measurement rate (up to 1 Hz)

→ 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), MCB-H2F-G2 (pwr), optional Souriau M-series metal connector for online use (14M)

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

→ Power	
DC input	15-48 V DC
Maximum peak current	1.5 A
Max. average consumption at 1 Hz	15 W
Typical average consumption[4]	2 W
Sleep consumption	100 µA, power depending on supply voltage
Transmit power per beam	4-250 W, adjustable levels
Ping sequence	Multiplexing or parallel

→ Batteries	
Internal	One or two 540 Wh alkaline or 1800 Wh lithium
Duration	Depending on configuration, consult software

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 60068-1/IEC 60068-2-64
EMC approval	IEC 61000
Depth rating	1500 m

→ Materials	
Standard model	POM with titanium fasteners. Reinforced polyurethane transducer cups

→ Dimensions	
Maximum diameter	648 mm
Maximum length with room for internal batteries	547 mm (1 battery), 747 mm (2 batteries)
Maximum length without room for internal batteries	314 mm

→ Weight	
In air, no battery	65.5 kg
In water, no battery	25.1 kg
Battery	10.0 kg (2 x 540 Wh), 5.8 kg (2 x 1800 Wh)

[1] Maximum range depends on transmit power and acoustic scattering conditions. [2] US Patent 8223588. [3] Dynamic specifications depends on the type of motion. [4] 10 min. avg. profile, 1 cm/sec hor. Prec., Max cell size, max power, long range mode. Consult SW for other configurations.

Vector, 300 m

3D Acoustic velocimeter
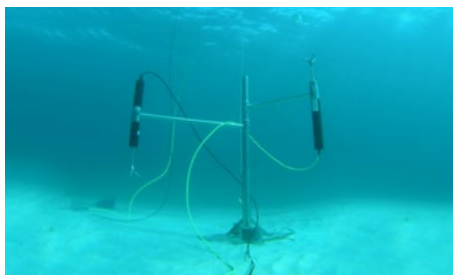
Courtesy of Dennis Darnell, SIO

The Vector is a high-accuracy single-point current meter that is capable of acquiring 3D velocity in a very small volume at rates up to 64 Hz. It is widely used for sediment transport applications, small-scale turbulence measurements and coastal engineering studies. It has an excellent track record of delivering outstanding data quality in a variety of applications. This version is suitable for use down to a depth of 300 m. The Vector's titanium version is suitable for investigating deep-water currents.

Highlights

→ Small-scale turbulence
→ Sampling up to 64 Hz
→ Small sampling volume for measurements close to boundaries
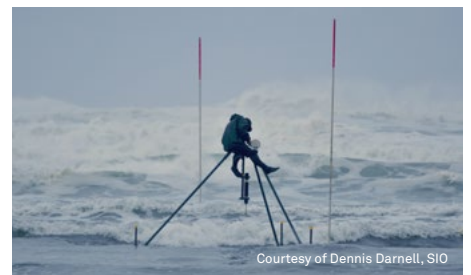
Applications

→ Wave orbital studies
→ Studies of bottom boundary layers
→ Ocean engineering projects
→ Coastal studies
→ River turbulence
→ Low flow measurements
→ Flux measurements

Vector, 300 m

→ Water velocity measurements

Maximum profiling range	N/A
Distance from probe	0.15 m
Sampling volume diameter	15 mm
Sampling volume height (user-selectable)	5-20 mm
Cell size	N/A
Velocity range	±0.01, 0.1, 0.3, 1, 2, 4, 7 m/s (software-selectable)
Adaptive ping interval	N/A
Accuracy	±0.5% of measured value ±1 mm/s
Velocity precision	typ. 1% of velocity range (at 16 Hz)
Sampling rate (output)	1-64 Hz
Internal sampling rate	100-250 Hz

→ Distance measurements

Minimum range	N/A
Maximum range	N/A
Cell size	N/A
Accuracy	N/A
Sampling rate	N/A

→ Echo intensity

Acoustic frequency	6 MHz
Resolution	0.45 dB
Dynamic range	90 dB

→ Sensors

Temperature:	Thermistor embedded in end bell
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2º/0.1º for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Standard range	0-20 m (inquire for options)
Accuracy/precision	0.5% FS / Better than 0.005% of full scale

→ Analog inputs

No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA

→ Data recording

Capacity (standard):	9 MB, can add 4/16 GB
Data record (Standard)	24 bytes at sampling rate + 28 bytes/second
Data record (IMU)	72 bytes at sampling rate

→ Real-time clock

Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications

I/O	RS-232 or RS-422
Communication baud rate	300-115 200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "Vector" software, ActiveX® function calls, or direct commands.
Analog outputs	3 channels standard, one for each velocity component or two velocities and pressure.
Output range	0–5 V, scaling is user-selectable.
Synchronization	TTL (5 V tolerant) sync in/sync out, start on sync, sample on sync

→ Connectors

Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10 m polyurethane cable

→ Software

Functions	Deployment planning, instrument configuration, data retrieval and conversion (for Windows®).

→ Multi unit operation

Software	N/A
I/O	N/A

→ Power

DC input	9-15 V DC
Maximum peak current	3 A
Max. consumption	1.5 W at 64 Hz
Typical consumption, 4 Hz	0.6 - 1 W
Sleep consumption	< 100 µA
Transmit power	2 adjustable levels

→ Batteries

Battery capacity	50 Wh (alkaline or Li-ion), 165 Wh (lithium), single or dual
New battery voltage	13.5 V DC (alkaline)
Data collection capacity	Refer to planning section in software

→ Environmental

Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-2
Depth rating	300m

→ Materials

Standard model	POM housing, titanium probe and fasteners

→ Dimensions

Maximum diameter	75 mm
Maximum length	468 mm (housing only), 246 mm (fixed stem) add 110 mm for double battery

→ Weight

No batteries	Weight in air: 2.32 kg, in water: buoyant
2 batteries	Weight in air: 3.20 kg, in water: 0.54 kg

→ Options

| |
|---|
| Probe mounted on fixed stem or on 2 m cable |
| Vertical or horizontal probes |
| Alkaline, lithium or Li-ion external batteries |
| IMU – Inertial Measurement Unit |

Vector, 4000 m

3D Acoustic velocimeter

The Vector is a high-accuracy single-point current meter that is capable of acquiring 3D velocity in a very small volume at rates up to 64 Hz. It is widely used for sediment transport applications, small-scale turbulence measurements and coastal engineering studies. It has an excellent track record of delivering outstanding data quality in a variety of applications. This titanium version of the Vector is suitable for investigating deep-water currents down to a depth of 4000 m.

Highlights

→ Small-scale turbulence
→ Sampling up to 64 Hz
→ Small sampling volume for measurements close to boundaries
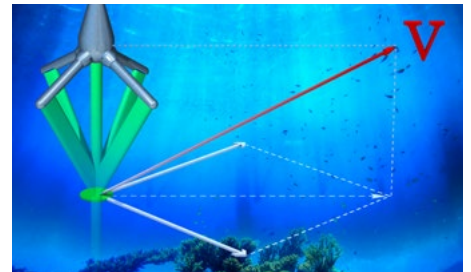
Applications

→ Studies of bottom boundary layers
→ Studies of deep-water currents
→ Ocean engineering projects
→ Low flow measurements
→ Flux measurements
→ Deep ocean mining support

Vector, 4000 m

→ Water velocity measurements	
Maximum profiling range	N/A
Distance from probe	0.15 m
Sampling volume diameter	15 mm
Sampling volume height (user-selectable)	5-20 mm
Cell size	N/A
Velocity range	±0.01, 0.1, 0.3,1, 2, 4, 7 m/s (software-selectable)
Adaptive ping interval	N/A
Accuracy	±0.5% of measured value ±1 mm/s
Velocity precision	typ. 1% of velocity range (at 16 Hz)
Sampling rate (output)	1-64 Hz
Internal sampling rate	100-250 Hz

→ Distance measurements	
Minimum range	N/A
Maximum range	N/A
Cell size	N/A
Accuracy	N/A
Sampling rate	N/A

→ Echo intensity	
Acoustic frequency	6 MHz
Resolution	0.45 dB
Dynamic range	90 dB

→ Sensors	
Temperature:	Thermistor embedded in end bell
Temp. range	-4 to +40 °C
Temp. accuracy/resolution	0.1 °C/0.01 °C
Temp. time response	10 min
Compass:	Magnetometer
Accuracy/resolution	2º/0.1º for tilt < 20°
Tilt:	Liquid level
Accuracy/resolution	0.2°/0.1°
Maximum tilt	30°
Up or Down	Automatic detect
Pressure:	Piezoresistive
Range	0-4000 m
Accuracy/precision	0.5% FS / Better than 0.005% of full scale

→ Analog inputs	
No. of channels	2
Supply voltage to analog output devices	Three options selectable through firmware commands: • Battery voltage/500 mA • +5 V/250 mA • +12 V/100 mA

→ Data recording	
Capacity (standard):	9 MB, can add 4/16 GB
Data record (Standard)	24 bytes at sampling rate + 28 bytes/second
Data record (IMU)	72 bytes at sampling rate

→ Real-time clock	
Accuracy	±1 min/year
Backup in absence of power	4 weeks

→ Data communications	
I/O	RS-232 or RS-422
Communication baud rate	300-115 200 Bd
Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
User control	Handled via "Vector" software, ActiveX® function calls, or direct commands.
Analog outputs	3 channels standard, one for each velocity component or two velocities and pressure.
Output range	0–5 V, scaling is user-selectable.
Synchronization	TTL (5 V tolerant) sync in/sync out, start on sync, sample on sync

→ Connectors	
Bulkhead (Impulse)	MCBH-8-FS
Cable	PMCIL-8-MP on 10 m polyurethane cable

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

→ Multi unit operation	
Software	N/A
I/O	N/A

→ Power	
DC input	9-15 V DC
Maximum peak current	3 A
Max. consumption	1.5 W at 64 Hz
Typical consumption, 4 Hz	0.6 - 1 W
Sleep consumption	< 100 µA
Transmit power	2 adjustable levels

→ Batteries	
Battery capacity	50 Wh (alkaline or Li-ion), 165 Wh (lithium), single or dual
New battery voltage	13.5 V DC (alkaline)
Data collection capacity	Refer to planning section in software

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-20 to +60 °C
Shock and vibration	IEC 721-3-2
Depth rating	4000 m

→ Materials	
Standard model	Titanium housing, titanium probe and fasteners

→ Dimensions	
Maximum diameter	84 mm
Maximum length	485 mm (housing only), 246 mm (fixed stem) add 110 mm for double battery

→ Weight	
Weight in air	8.3 kg
Weight in water	5.1 kg

| → Options	
	Probe mounted on fixed stem or on 2 m cable
	Vertical or horizontal probes
	Alkaline, lithium or Li-ion external batteries
	IMU - Inertial Measurement Unit

Vectrino

3D Acoustic velocimeter

Courtesy of Julia Mullarney, University of Waikato

The Vectrino is a high-resolution acoustic velocimeter used to measure 3D water velocity fluctuations within a very small sampling volume and at sample rates of up to 200 Hz. It can be applied in a variety of environments, from hydraulic labs – where it is regarded as standard equipment – to the ocean. It is ideal for near-boundary flow measurements or to capture any highly dynamic phenomena in a hydraulic tank.

Highlights

→ Hydraulic models and flumes
→ Inexpensive alternative to laser Doppler velocimeter
→ 200 Hz maximum sampling rate

Applications

→ 3D flow measurements in laboratory flumes
→ Flow measurements near boundaries and in areas that are difficult to access
→ Flow measurements in physical models in hydraulic laboratories
→ Measurements of laboratory flume bottom changes as a function of time

Vectrino

→ Water velocity measurements	
Maximum profiling range	N/A
Distance from probe	0.05 m, 0.1 m (field probe)
Sampling volume diameter	6 mm
Sampling volume height (user-selectable)	3-15 mm
Cell size	N/A
Velocity range[1]	±0.03, 0.1, 0.3, 1, 2.5, 4 m/s (software-selectable)
Adaptive ping interval	N/A
Accuracy	±0.5% of measured value ±1 mm/s
Velocity precision	N/A
Sampling rate (output)	1-25 Hz (Std firmware),1-200 Hz (Plus firmware)
Internal sampling rate	N/A

→ Distance measurements	
Minimum range	N/A
Maximum range	N/A
Cell size	N/A
Accuracy	N/A
Sampling rate	N/A

→ Echo intensity	
Acoustic frequency	10 MHz
Resolution	Linear scale
Dynamic range	25 dB

→ Sensors	
Temperature:	Thermistor embedded in probe
Temp. range	-4 to +32 °C
Temp. accuracy/resolution	1 °C/0.1 °C
Temp. time response	5 min
Compass:	N/A
Accuracy/resolution	N/A
Tilt:	N/A
Accuracy/resolution	N/A
Maximum tilt	N/A
Up or Down	N/A
Pressure:	N/A
Standard range	N/A
Accuracy/precision	N/A

→ Analog inputs	
No. of channels	N/A
Supply voltage to analog output devices	N/A

→ Data recording	
Capacity (standard):	N/A
Data record	N/A

→ Real-time clock	
Accuracy	N/A
Backup in absence of power	N/A

[1] The velocity range is not the same in the horizontal and vertical direction. Please refer to the configuration software.

→ Data communications	
I/O	RS-232
Communication baud rate	300-115 200 Bd
Recorder download baud rate	N/A
User control	Handled via "Vectrino" software, ActiveX® function calls, or direct commands
Analog outputs	3 channels standard, one for each velocity component
Output range	0–5 V, scaling is user-selectable
Synchronization	RS-485, start on sync, sample on sync, transmit on sync (Plus Firmware)

→ Connectors	
Bulkhead (Impulse)	MCBH-12-FS, bronze (Impulse)
Cable	PMCIL-12-MP – see also options below

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

→ Multi unit operation	
Software	Polysync
I/O	RS 232–USB support for devices with 1, 2, 4, and 8 serial ports

→ Power	
DC input	12-48 V DC
Maximum peak current	2.5 A at 12 V DC (user-selectable)
Max. consumption	1.5 W at 200 Hz
Typical consumption, 4 Hz	N/A
Sleep consumption	N/A
Transmit power	N/A

→ Batteries	
Battery capacity	N/A
New battery voltage	N/A
Data collection capacity	N/A

→ Environmental	
Operating temperature	-4 to +40 °C
Storage temperature	-15 to +60 °C
Shock and vibration	IEC 721-3-3
Depth rating	20 m

→ Materials	
Standard model	POM housing. Stainless steel (316) probe and fasteners

→ Dimensions	
Maximum diameter	66 mm
Maximum length	350 mm (housing only) 365 mm (fixed stem)

→ Weight	
Weight in air	1.2 kg (1.3 kg with field probe)
Weight in water	Neutral (0.1 kg with field probe)

→ Options	
	4-beam down-looking probe or side-looking probe. Fixed stem or 1 m flexible cable
	10, 20, 30 or 50 m cable with Impulse underwater connector
	RS 232–USB converter (one-to-one, four-to-one or eight-to-one)
	Standard or Vectrino Plus firmware
	Combined transportation and storage case

Vectrino Profiler

3D Acoustic velocimeter

As the name suggests, this velocimeter is the profiling version of the Vectrino system. The Vectrino Profiler's strength lies in collecting a small profile of up to 30 cells that are only 1 mm in height. It is globally used as the standard flow-measuring tool for hydraulic laboratory applications.

Highlights

→ Boundary profile measurements
→ 1 mm vertical resolution
→ 100 Hz maximum sampling rate

Applications

→ Projects highlighting the effect of vegetation on near-bed flows
→ Simulated bed changes in flumes
→ Measurements of high-resolution flow profiles in laboratory flumes
→ Turbulence measurements in laboratory flumes

Vectrino Profiler

→ Water velocity measurements	
Maximum profiling range	Up to 30 mm
Distance from probe	40-70 mm from probe
Sampling volume diameter	7 mm
Sampling volume height (user-selectable)	N/A
Cell size	1-4 mm (user-selectable)
Velocity range	Increments of 0.1 m/s, maximum 3.0 m/s
Adaptive ping interval	Once, or at 1 second to 1 hour interval
Accuracy	±1% of measured value ±1 mm/s
Velocity precision	N/A
Sampling rate (output)	1-100 Hz
Internal sampling rate	N/A

→ Distance measurements	
Minimum range	20 mm
Maximum range	Up to 2 meters depending on signal strength
Cell size	1-4 mm (user-selectable)
Accuracy	0.5 mm at 1 mm cell size
Sampling rate	1-10 Hz

→ Echo intensity	
Acoustic frequency	10 MHz
Resolution	Linear & Log scale
Dynamic range	60 dB

→ Sensors	
Temperature:	Thermistor embedded in probe
Temp. range	-4 to +32 C
Temp. accuracy/resolution	1 °C/0.1 °C
Temp. time response	5 min
Compass:	N/A
Accuracy/resolution	N/A
Tilt:	N/A
Accuracy/resolution	N/A
Maximum tilt	N/A
Up or Down	N/A
Pressure:	N/A
Standard range	N/A
Accuracy/precision	N/A

→ Analog inputs	
No. of channels	N/A
Supply voltage to analog output devices	N/A

→ Data recording	
Capacity (standard)	N/A
Data record	N/A

→ Real-time clock	
Accuracy	N/A
Backup in absence of power	N/A

→ Data communications	
I/O	RS-422
Communication baud rate	Up to 1.25 Mbps
Recorder download baud rate	N/A
User control	Handled via "Vectrino Profiler" configuration and collection software.
Analog outputs	N/A
Output range	N/A
Synchronization	RS-485 sync in or sync out

→ Connectors	
Bulkhead (Impulse)	MCBH-12-FS, bronze (Impulse)
Cable	PMCIL-12-MP – see also options below

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

→ Multi unit operation	
Software	Vectrino Profiler software allows multiple Vectrino Profiler to be run within a single instance of the program
I/O	RS 485–USB support for devices with 1, 2, 4, and 8 serial ports.

→ Power	
DC input	12-48 V DC
Maximum peak current	2.5 A at 12 V DC
Max. consumption	4 W at 100 Hz
Typical consumption, 4 Hz	N/A
Sleep consumption	N/A
Transmit power	N/A

→ Batteries	
Battery capacity	N/A
New battery voltage	N/A
Data collection capacity	N/A

→ Environmental	
Operating temperature	-4 to +32 °C
Storage temperature	-15 to +60 °C
Shock and vibration	IEC 721-3-4
Depth rating	20 m

→ Materials	
Standard model	POM housing. Stainless steel (316) probe and fasteners

→ Dimensions	
Maximum diameter	66 mm
Maximum length	350 mm (housing only) 365 mm (fixed stem)

→ Weight	
Weight in air	1.2 kg
Weight in water	Neutral

| → Options	
	4-beam down-looking probe. Fixed stem or 1 m flexible cable.
	10, 20, 30 or 50 m cable with Impulse underwater connector
	RS 232–USB converter (one-to-one, four-to-one or eight-to-one)

Signature VM

Vessel-mounted current profiler



Nortek's vessel-mounted ADCP current survey package – called Signature VM – opens up new and unprecedented opportunities to the community, while offering operational convenience and reduced complexity. Data quality can be safeguarded, and both errors and initial installation time can be substantially reduced by using an integrated system where each module is pre-qualified.
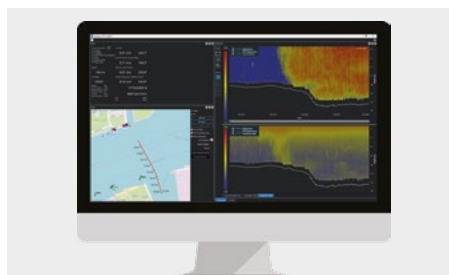
Highlights

→ Five beams for current and depth
→ Outstanding bottom-track performance
→ A coherent system that is quick and convenient to operate
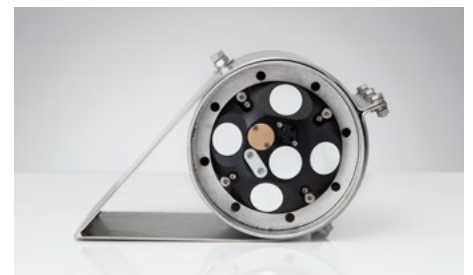
Applications

→ Coastal surveys
→ Port and harbor mapping
→ Studies of tidal currents
→ Sediment transport studies

Signature VM

→ Signature VM[1]	→ VM1000	→ VM500
Water velocity measurements		
Profiling range[2]	30 m	70 m
Cell size	0.2–2 m	0.5–4 m
Max no. cells	128	128
Min. blanking	0.1 m	0.5 m
Minimum accuracy	0.3% of the measured value ± 0.3 cm/s	0.3% of the measured value ± 0.3 cm/s
Velocity resolution	0.1 cm/s	0.1 cm/s
Maximum sampling rate	14 Hz	6 Hz
No. of beams	4 slanted at 25 degrees	
→ Bottom velocity measurements		
Single ping std @ 3 m/s	0.5 cm/s	0.5 cm/s
Long-term accuracy	± 0.1% / ± 0.1 cm/s	± 0.1% / ± 0.1 cm/s
Minimum altitude	0.2 m	0.3 m
Maximum altitude	30 m	70 m
Velocity resolution	0.01 mm/s	0.01 mm/s
Maximum sampling rate	4 Hz	2 Hz
→ Depth measurements		
No. of beams	1 vertical	
Maximum sampling rate	2 Hz	2 Hz
Max. range	30 m	70 m
Vertical resolution / accuracy	0.001 m / 1% of the measured value[3]	
→ Echo intensity		
Sampling	Same as velocity for slanted beams	
Resolution	0.5 dB	
Dynamic range	70 dB slanted beams	
No. of beams	4 slanted at 25 degrees	
Beam width	2.9°	
→ Other		
Temperature sensor range/ accuracy	-4 °C to 40 °C / 0.1 °C	
Pressure	Piezoresistive	
Standard range	0–100 m (inquire for options)	
Accuracy/precision	0.1% FS / better than 0.002% of full scale	
Compass and tilt	Solid-state magnetometer	
Data recording	16 GB (inquire for options)	
Data cable	20 m Ethernet cable (inquire for options)	
IO	Ethernet	
DC Input	12–48 V DC	
→ Environmental		
Operating temperature	-4 °C to 40 °C	
Storage temperature	-20 °C to 60 °C	
Shock and vibration	IEC 60068-1 / IEC 60068-2-64	
EMC approval	IEC 61000	
Depth rating	300 m – Bottom track is limited to surface vessels	
Connectors	Straight fitted MCBH6F (Ethernet)	
Housing	Small instrument housing	
Material	POM with titanium fasteners	

→ Rack-mount processing unit	
Processor/memory	Intel i7, 8 GB
Hard disk	SSD 240 GB
Operating system	Windows® 10
Housing	19" rack-mountable 1 HE
Dimensions (PC)	480x45x220 mm (19" rack-mountable 1 HE)
PC input	100–240 V AC, max. 25 W
Interface box input	100–240 V AC as standard or 12–34 V DC. Max. 15 W
Dimensions (interface box)	240x45x300 mm (0.5x19" rack-mountable 1 HE)
Total weight	4 kg PC, 3 kg interface box
Connections	Power, Signature VM, GNSS, Ethernet, USB, HDMI, VGA
Operator control	Optional 19" rack mount
LCD panel	Optional 19" rack mount
→ Nortek Signature VM acquisition software	
Acquisition	Signature VM - binary GNSS compass - binary
Timing	< 0.6 s, IEEE1588/PTP for absolute time stamping (GNSS compass/Signature VM)
Configuration	Signature VM (partly) Advanced navigation GNSS compass
Display	Vessel track in map Bottom-track velocity Velocity magnitude and direction Echo amplitude Echo correlation Vertical depth
Status	Signature VM + GNSS compass
Output	NMEA data string online (velocity and depth) CSV, ASCII VMT, MATLAB VMT, KML
→ GNSS compass	
Brand and model	Advanced navigation GNSS compass
Position accuracy (with dGNSS)/ post-processed	Horizontal: 0.6 m / 0.01 m Vertical: 1.0 m / 0.02 m
Heading accuracy/ post-processed	0.2°/ 0.09°
Supported navigation systems	GPS L1, GLONASS G1, GALILEO E1, BeiDou B1
Optional high-accuracy RTK variant	GPS L1_L2, GLONASS G1_G2, GALILEO E1_E5b, BeiDou B1_B2
Motion	9-axis IMU
Communication	Ethernet 10/100
Timing	PTP, NTP timeserver functionality
Protocol	NMEA0183, AN Packet protocol, TSS1, Simrad

[1] See technical specifications for Signature1000/500 for detailed specifications.
[2] Maximum range depends on acoustic scattering conditions and transmit power.
[3] Assuming a constant speed of sound.

Nortek products
Selection guide

Product family	SIGNATURE55	SIGNATURE100	SIGNATURE250	SIGNATURE 1000/500	AWAC	AQUADOPP
	Long-range current profiler	Combined current profiler and biomass sensor	Profiler for medium-range current, waves and ice measurements	Advanced current profiling and turbulence system	Wave and current profiler with AST	Single-point current meter

→ Application

	SIGNATURE55	SIGNATURE100	SIGNATURE250	SIGNATURE 1000/500	AWAC	AQUADOPP
Oil and gas surveys	●	●	●		●	●
Vessel surveys				●		
Renewable energy				●	●	●
Oceanographic research	●	●	●	●	●	●
Natural resource mgmt.				●	●	●
Aquaculture					●	●
Ports and harbors					●	
MetOcean engineering	●	●	●		●	●
Online monitoring	●	●	●		●	●
Laboratory						
Navigation						

→ Product specifications

	SIGNATURE55	SIGNATURE100	SIGNATURE250	SIGNATURE 1000/500	AWAC	AQUADOPP
Transducer frequency (kHz)	75/55 Dual frequency	100 (70-120 kHz opt. 5th transducer)	250 (500 kHz opt. 5th transducer)	500/1000	1000/600/400	2000
Measurement range (m)	10-1000+	350	200	70/30	0.5-100	0.35-5
Sampling rate - typical (maximum)	1-60 min (1 Hz)	1-60 min (1 Hz)	1-60 min (1 Hz)	4/8 (8/16) Hz	1-60 min (4 Hz)	1-60 min (4 Hz)
Cell size - typical (minimum) (m)	15 (5)	15 (3)	8 (1)	1/0.5 (0.5/0.2)	1 (0.25)	N/A (single cell)
Typical / maximum deployment life	3 months > 5 years	3 months > 5 years	3 months > 5 years	3 months > 5 years	3 months > 2 years	6-12 months / > 5 years
Maximum installation depth (m)	1500	1500	300	300	300	300/3000/6000
Standard sensors, no. of beams	Temp/press/HPR, 3	Temp/press/HPR, 4	Temp/press/HPR, 4	Temp/press/HPR, 5	Temp/press/HPR, 4	Temp/press/HPR, 3
Available upgrades	64 GB recorder. AHRS option	5th beam, echosounder, 64 GB recorder. AHRS option	5th beam, waves, ice, 64 GB recorder. AHRS option	Vertical profilers. Waves, ice (Sig500 only). 64 GB recorder. Echosounder. AHRS option	Analog inputs, platform head, on-board wave calculations. Metal connector	AOS, analog inputs, Li-ion batteries, custom transducer head geometry, IMM

→ Method and deployment

	SIGNATURE55	SIGNATURE100	SIGNATURE250	SIGNATURE 1000/500	AWAC	AQUADOPP
Bottom-mounted	●	●	●	●	●	●
Moving vessel				●		
Mooring line	●	●	●		●	●
Fixed structure	●	●	●	●	●	●
Laboratory flume						

AQUADOPP PROFILER	AQUADOPP HR PROFILER	2D PROFILER	DVL 1000/500	VECTOR 4000/300 m	VECTRINO	VECTRINO PROFILER
Multi-purpose current profiler and PUV wave measurements	High-resolution short-range current profiler	Horizontal current profiler for cross-channel measurements	Doppler Velocity Logs for underwater navigation	Stand-alone high-resolution single-point velocimeter	Online high-resolution single-point velocimeter	Online high-resolution profiling velocimeter
●			●			
			●			
●		●	●	●		
●	●			●	●	●
●		●		●		
●				●		
●		●				
●	●	●		●		
●		●				
					●	●
			●			
2000/1000/600/400	2000/1000	400	1000/500	6000	10000	10000
0.2-90	0.05-6	130	75/200	0.15	0.05	0.03-0.07
1-60 min (1 Hz)	1 min (8 Hz)	1 Hz	1-2 Hz (8 Hz)	1 s (64 Hz) (fixed)	25 Hz/200 Hz ("plus" firmware)	100 Hz
1 (0.2)	0.05 (0.007)	5 (1)	1/0.5 (0.5/0.2)	N/A (single point)	N/A (single point)	2 (1) mm
30-60 days / > 1 year	5-10 days / > 6 months	Real time	Real time	Real time / > 2 years	Real time	Real time
300/3000/6000	300	300	300/4000/6000	300/4000	50	50
Temp/press/HPR, 3	Temp/press/HPR, 3	Temp/press/HPR, 2	Temp/press, 4	Temp/press/HPR	Temp	Temp
AOS, analog inputs, Li-ion batteries, side-looking head, Z-Cell, 6000 m housing	Analog inputs, Li-ion batteries, 4 GB recorder	AOS, metal connector, 4 GB recorder	Current profile	IMU, analog inputs, Li-ion batteries, cable probe, 4000 m housing, 16 GB recorder	Vectrino+ firmware, side-looking probe, flexible cable probe	Flexible cable probe
●	●			●		
			●			
●						
●	●	●		●		
	●				●	●

Photo: Rokas Kubilius

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