VESSEL-MOUNTED CURRENT PROFILER

Signature VM Ocean - 100|75/55 kHz

Delivers vessel-mounted ADCP capabilities with an optional scientific echosounder for biomass measurements.

Until now, epipelagic and mesopelagic VM ADCP surveys could not deliver the resolution, precision or range to examine the ocean boundary layer in detail. To study biomass in the upper-ocean boundary layer, you had to add a separate scientific echosounder.

Nortek's vessel-mounted Signature VM Ocean in the 100 kHz version opens up new opportunities to measure currents and to study biomass simultaneously. The 55 kHz version offers long-range current profiles with a proper precision.

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Highlights

- A coherent and modern system that is quick and convenient to operate
- Automated processing
- VM or stand-alone applications
- A novel transducer design allows focusing on measurement precision (75 kHz) and a 1000 m profiling range (55 kHz)
- Four beams for current profiling with a range over 300 m (100)
- Optional scientific echosounder with multiple modes for biomass (100)

Applications

- Offshore operations
- Internal waves
- Upper-ocean boundary-layer studies (100)
- Detection of krill or plankton in the water column (100)
- Deep-water current profiles, ocean discharge (55)

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Technical specifications

⟶ Water Velocity Measurements - Signature VM 100 kHz	
Profiling range**	300-400 m
Doppler processing	Broadband & Narrowband
Cell size	3-15 m
Max no. cells	200
Min. blanking	2
Minimum accuracy	1.0% of the measured value ± 0.5 cm/s
Velocity resolution	0.1 cm/s
Maximum sampling rate	1 Hz (1/3 Hz with BT and echosounder)
Velocity range (along beam)	5 m/s
No. of beams	4 slanted at 20°
**) Depending on acoustic scattering condition.	
⟶ Water Velocity Measurements - Signature VM 75/55 kHz	
Profiling range**	685/1000 m
Doppler processing	Broadband/Broadband & Narrowband
Cell size	6-20 m
Max no. cells	200
Min. blanking	2
Minimum accuracy	1.0% of the measured value ± 0.5 cm/s
Velocity resolution	0.1 cm/s
Maximum sampling rate	1 Hz (1/3 Hz at max power)
Velocity range (along beam)	5 m/s
No. of beams	3 slanted at 20°
**) Depending on acoustic scattering condition.	
⟶ Bottom velocity measurements - Signature VM 100 kHz	
Single ping std @ 3 m/s	TBA
Long-term accuracy	TBA
Minimum altitude	5 m
Maximum altitude	560 m
Velocity resolution	0.01 mm/s
Maximum sampling rate	1 Hz (1/3 Hz with VP and echosounder)
⟶ Bottom velocity measurements - Signature VM 75/55 kHz	
Single ping std @ 3 m/s	TBA
Long-term accuracy	TBA

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⟶ Bottom velocity measurements - Signature VM 75/55 kHz	
Minimum altitude	50 m
Maximum altitude	1200 m
Velocity resolution	0.01 mm/s
Maximum sampling rate	1 Hz
⟶ Echo intensity (slanted beams) - Signature VM 100 kHz	
Sampling	Same as velocity for slanted beams
Resolution/dynamic range	0.5 dB/70 dB
Dynamic range	70 dB slanted beams
Transducer acoustic frequency	100 kHz
No. of beams	4 slanted at 20°
Beam width	6.1°
⟶ Echo intensity (slanted beams) - Signature VM 75/55 kHz	
Sampling	Same as velocity
Resolution/dynamic range	0.5 dB/70 dB
Dynamic range	70 dB slanted beams
Transducer acoustic frequency	75 and 55 kHz
No. of beams	3 slanted at 20°
Beam width	4.5°-5.5°
⟶ Echosounder option - Signature VM 100 kHz	
No. of beams	1 vertical
Transducer acoustic frequency	70-120 kHz
Sampling	1 Hz (1/3 Hz with VP and BT)
Transducer beam width	15° @ 70 kHz, 8.7° @ 120 kHz
Resolution	0.375 –4 m
Resolution/ dynamic range	0.01 dB/130 dB
Transmit pulse	Monochromatic 70 kHz, 90 kHz and 120 kHz or frequency chirp (90 kHz, 50% BW)
Transmit power	7.5-120 W adjustable
Chirp signal processing	Pulse compression or binned frequency response
⟶ Echosounder option - Signature VM 75/55 kHz	
No. of beams	N/A
Transducer acoustic frequency	N/A
Sampling	N/A
Transducer beam width	N/A
Resolution	N/A
Resolution/ dynamic range	N/A

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⟶ Echosounder option - Signature VM 75/55 kHz	
Transmit pulse	N/A
Transmit power	N/A
Chirp signal processing	N/A
⟶ Other - Signature VM 100 kHz	
Temperature sensor range / accuracy	-4 °C to 40 °C / 0.1 °C
Pressure	Piezo resistive
Standard range	0-1500 m (inquire for options)
Accuracy/precision	0.1% FS / Better than 0.002% of full scale
Compass and tilt	Solid-state magnetometer and accelerometer
Data recording	16 GB (inquire for options)
Data cable	30 m Ethernet cable (inquire for options)
IO	Ethernet
DC input	15-48 V DC
⟶ Other - Signature VM 75/55 kHz	
Temperature sensor range / accuracy	-4 °C to 40 °C / 0.1 °C
Pressure	Piezo resistive
Standard range	0-1500 m (inquire for options)
Accuracy/precision	0.1% FS / Better than 0.002% of full scale
Compass and tilt	Solid-state magnetometer and accelerometer
Data recording	16 GB (inquire for options)
Data cable	30 m Ethernet cable (inquire for options)
IO	Ethernet
DC input	48 V DC
⟶ Dimensions - Signature VM 100 kHz	
Maximum diameter	460 mm
Maximum length without room for internal batteries	350 mm
⟶ Dimensions - Signature VM 75/55 kHz	
Maximum diameter	650 mm
Maximum length without room for internal batteries	314 mm
⟶ Environmental	
Operating temperature	-4 °C to 40 °C
Storage temperature	-20 °C to 60 °C
Vibration	IEC 60068-1/IEC60068-2-64
EMC approval	IEC 61000

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⟶ Environmental	
Depth rating	1500 m – Bottom track is limited to surface vessels
Connectors	Straight fitted MCBH6F (Ethernet)
Housing	Small instrument housing
Material	POM with titanium fasteners
⟶ Processing unit	
Processor/memory	Intel i5/8 GB
Hard disk	SSD, 500 GB
Operating system	Windows® 10
Housing	Half 19" 2 HE case or 19" rack-mountable 1 HE
Dimensions	265x110x340 mm or 480x45x325 mm
Input	24 V DC, 20 W typical
Total weight	5.75 or 3.80 kg
Connections	Power, Signature ADCP, AN_GNSS, 2x HDMI, 2xLAN, 3x USB, 1x RS-232 (optional)
⟶ Nortek Signature VM acquisition software	
Acquisition	Signature VM - binary, GNSS compass - binary
Timing	< 0.6 s, IEEE1588/PTP for absolute time stamping (GNSS/Signature VM)
Configuration	Signature VM (partly) GNSS Advanced navigation
Display	Vessel track in map, Bottom-track velocity, Bottom-track depth, Velocity magnitude and direction, Echo amplitude (slanted beams), Echo correlation (slanted beams), corrected relative volume backscatter (100)
Status	Signature VM + AN_GNSS compass
Output	NMEA data strings online CSV, ASCII VMT, MATLAB VMT, MATLAB, KML
⟶ GNSS compass option	
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	NMEA 0183, AN Packet protocol, TSS1, Simrad

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⟶ AHRS option	
Accelerometer dynamic	± 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 axes/0.01°
Heading accuracy	± 3° (dynamic)3), ± 2° (static, tilt < 20°)
Sampling rate	Same as measurement rate