

Signature VM Ocean - 100 kHz

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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.

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)

Technical specifications

[arrow] Water Velocity Measurements - Signature VM 100 kHz

Profiling range**	300-400 m
Doppler processing	Broadband & Narrowband
Cell size	3-15 m

[arrow]

Water Velocity Measurements - Signature VM 100 kHz

Max no. cells	200
Min. blanking	2
Minimum accuracy	1.0% of the measured value \pm 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.

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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 \pm 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.

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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)

[arrow]

Bottom velocity measurements - Signature VM 75/55 kHz

Single ping std @ 3 m/s	TBA
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Bottom velocity measurements - Signature VM 75/55 kHz

Long-term accuracy	TBA
Minimum altitude	50 m
Maximum altitude	1200 m
Velocity resolution	0.01 mm/s
Maximum sampling rate	1 Hz

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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°

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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°

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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

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Echosounder option - Signature VM 100 kHz

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

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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
Transmit pulse	N/A
Transmit power	N/A
Chirp signal processing	N/A

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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

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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

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Other - Signature VM 75/55 kHz

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

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Dimensions - Signature VM 100 kHz

Maximum diameter	460 mm
Maximum length without room for internal batteries	350 mm

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Dimensions - Signature VM 75/55 kHz

Maximum diameter	650 mm
Maximum length without room for internal batteries	314 mm

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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
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

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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

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Processing unit

Total weight 5.75 or 3.80 kg
Connections Power, Signature ADCP, AN_GNSS, 2x HDMI, 2xLAN, 3x USB, 1x RS-232 (optional)

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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

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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 $\pm 250^\circ/\text{sec}$

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AHRS option

Magnetometer dynamic range ± 1.3 Gauss

Pitch and roll range/resolution $\pm 90^\circ$ (pitch), $\pm 180^\circ$ (roll)/ 0.01°

Pitch and roll accuracy $\pm 2^\circ$ (dynamic), $\pm 0.5^\circ$ (static, $\pm 30^\circ$)

Heading range / resolution 360° , all axes/ 0.01°

Heading accuracy $\pm 3^\circ$ (dynamic), $\pm 2^\circ$ (static, tilt $< 20^\circ$)

Sampling rate Same as measurement rate