VM Coastal

1000|500|250 kHz

The VM Coastal package is a highly versatile ADCP system that can be easily installed on a vessel of opportunity.

The VM Coastal safeguards data quality, opens up new and unprecedented opportunities to the scientific community, and offers operational convenience and reduced complexity.

The VM Coastal package includes the Signature1000, 500 or 250, allowing for great versatility in both the vessel-mounted and bottom-mounted configurations. By using a state-of-the-art and user-friendly vessel-mounted package, measurement errors and initial installation time can be greatly reduced.

Highlights

- Complete, coherent system built for high performance and quick deployment
- Straightforward data acquisition and processing software
- Intuitive discharge acquisition module and post-processing with Qrev data export
- Simultaneous current, depth and suspended particulate matter (SPM) information in one place (1000 / 500)
- Vertical echosounder beam for studying SPM down to the bottom (1000 / 500)
- Multifrequency option enables vertical beam operation at 1000, 500 and 250 kHz (1000)

Applications

- Coastal surveys, up to 200 m depth
- Port and harbor modeling
- River discharge measurements
- Large-scale mixing studies

Technical specifications

Water velocity measurements for Signature VM 1000 kHz	
Profiling range*	30 m
Cell size	0.2–2 m

Water velocity measurements for Signature VM 1000 kHz

Max no. cells	256
Min. blanking	0.1 m
Minimum accuracy	0.3% of the measured value ± 0.3 cm/s
Velocity resolution	0.1 cm/s
Maximum sampling rate	14 Hz
No. of beams	4 slanted at 25 degrees

* Maximum range depends on acoustic scattering conditions and transmit power.

Water velocity measurements for Signature VM 500 kHz

Profiling range*	70 m
Cell size	0.5–4 m
Max no. cells	256
Min. blanking	0.5 m
Minimum accuracy	0.3% of the measured value ± 0.3 cm/s
Velocity resolution	0.1 cm/s
Maximum sampling rate	6 Hz
No. of beams	4 slanted at 25 degrees

* Maximum range depends on acoustic scattering conditions and transmit power.

Water velocity measurements for Signature VM 250 kHz

Profiling range*	150-200 m
Cell size	1–8 m
Max no. cells	256
Min. blanking	0.5 m
Minimum accuracy	1% of the measured value ± 0.5 cm/s
Velocity resolution	0.1 cm/s
Maximum sampling rate	2 Hz
No. of beams	4 slanted at 20 degrees

* Maximum range depends on acoustic scattering conditions and transmit power.

Bottom velocity measurements for Signature VM 1000 kHz

Single ping std @ 3 m/s	0.5 cm/s
Long-term accuracy	± 0.1% / ± 0.1 cm/s
Minimum altitude	0.2 m
Maximum altitude	30 m
Velocity resolution	0.01 mm/s
Maximum sampling rate	4 Hz

Bottom velocity measurements for Signature VM 500 kHz

Single ping std @ 3 m/s	0.5 cm/s
Long-term accuracy	± 0.1% / ± 0.1 cm/s
Minimum altitude	0.3 m
Maximum altitude	70 m
Velocity resolution	0.01 mm/s
Maximum sampling rate	2 Hz

Bottom velocity measurements for Signature VM 250 kHz

Single ping std @ 3 m/s	TBA
Long-term accuracy	TBA
Minimum altitude	5 m
Maximum altitude	205 m
Velocity resolution	0.01 mm/s
Maximum sampling rate	1 Hz

Depth measurements for Signature VM 1000 kHz

No. of beams	1 vertical
Maximum sampling rate	2 Hz
Max. range	30 m
Vertical resolution / accuracy	0.001 m / 1% of the measured value**

** Assuming a constant speed of sound

Depth measurements for Signature VM 500 kHz

No. of beams	1 vertical
Maximum sampling rate	2 Hz
Max. range	70 m
Vertical resolution / accuracy	0.001 m / 1% of the measured value**

** Assuming a constant speed of sound

Depth measurements for Signature VM 250 kHz

No. of beams	N/A*
Maximum sampling rate	N/A
Max. range	N/A
Vertical resolution / accuracy	N/A

* Depth measurement via the 4 slanted beams.

Echo intensity Signature VM 1000 and 500 kHz

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°

Echo intensity Signature VM 250 kHz

Sampling	Same as velocity for slanted beams
Resolution	0.5 dB
Dynamic range	70 dB slanted beams
No. of beams	4 slanted at 20 degrees
Beam width	2.3°

Echosounder option for Signature VM 1000 kHz

No. of beams	1 vertical
Frequency	1000 kHz; 1000, 500 and 250 kHz selectable channel(s) with MF license

Echosounder option for Signature VM 1000 kHz

Maximum sampling rate	2 Hz
Max. range	30 m
Resolution	3 mm - 0.25 m; 5 mm - 0.25 m with MF license
Number of bins	10,000
Transmit pulse length	16 µs - 0.5 ms, 64 µs - 0.5 ms
Transmit pulse	Monochromatic or pulse compressed (1000 kHz, 25% BW); Monochromatic (500, 250 kHz)
Resolution / dynamic range	0.01 dB / 70 dB

Echosounder option for Signature VM 500 kHz

No. of beams	1 vertical
Maximum sampling rate	1 Hz
Max. range	70 m
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

Echosounder option for Signature VM 250 kHz

No. of beams	N/A
Maximum sampling rate	N/A
Max. range	N/A
Resolution	N/A
Number of bins	N/A
Transmit pulse length	N/A
Transmit pulse	N/A
Resolution / dynamic range	N/A

Other, Signature VM ADCP

Temperature sensor range /accuracy	-4 °C to 40 °C / 0.1 °C
Pressure	Piezoresistive
Standard range	0-300 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	10 m Ethernet cable (inquire for options)
IO	Ethernet
DC Input	15–48 V DC

Environmental, Signature VM ADCP

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	300 m – Bottom track is limited to surface vessels

Environmental, Signature VM ADCP

Connectors	Straight fitted MCBH6F (Ethernet)
Housing	Small instrument housing
Material	POM with titanium fasteners and additional, reinforced transducer cups for VM 250

Processing unit

Processor/memory	Intel i5/8 GB
Hard disk	SSD, 500 GB
Operating system	Windows® 10
Housing	Half 19" 2 HE case
Dimensions	265x110x340 mm
Input	24 V DC, 20 W typical. (230|120 V AC adaptor supplied)
Total weight	5.75 kg
Connections	Power, Signature ADCP, AN_GNSS, 2x HDMI, 2xLAN, 3x USB

Nortek VM acquisition software

Acquisition	Signature VM - binary, AN GNSS compass - binary
Timing	< 0.6 s ZDA, IEEE1588/PTP and NTP for absolute timestamping (GNSS compass/Signature VM)
Configuration	Signature VM (partly)Advanced Navigation GNSS compass
Display	Vessel track in map, Bottom-track velocity, Depth, Speed through water, Velocity magnitude and direction, Echo amplitude, Echo correlation, Vertical depth*, Vertical echogram; corrected relative volume backscatter (1000/500)*, Discharge, Frequency spectrum analyzer
Status	Signature VM + AN_GNSS compass
Output	Online: NMEA and binary data formats (Hypack, Qinsy, Displays). Offline: CSV, ASCII VMT, MATLAB, MATLAB VMT, MATLAB QRev, KML

* Signature1000 and 500

GNSS compass

Brand and model	Advanced navigation GNSS compass v2
Position accuracy (with RTK)	Horizontal: 0.01 m, Vertical: 0.015 m
Heading accuracy	0.2°
Supported navigation systems	GPS L1_L2, GLONASS G1_G2, GALILEO E1_E5b, BeiDou B1_B2
Heave accuracy	0.05 m
Communication	Ethernet 10/100
Timing	PTP, NTP timeserver functionality
Protocol	NMEA 0183, AN Packet Protocol, TSS1 Simrad, RTCM

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 axes /0.01°

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