

Signature VM Coastal - 1000|500|250 kHz



The Signature VM package delivers vessel-mounted AD2CP capabilities based on present-day technology

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

The Signature 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.

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Highlights

- ✓ A coherent system that is quick and convenient to operate
- ✓ Fifth echosounder beam for sediment measurements down to the bottom (1000/500)
- ✓ Ethernet ADCP and GNSS hardware, offering tight network timing
- ✓ Simultaneous current and depth information in one place (1000/500)
- ✓ Outstanding bottom-track performance, even under challenging conditions
- ✓ Straightforward data-acquisition and processing software

Applications

- ✓ Coastal surveys, up to 200 m depth
- ✓ Port and harbor mapping
- ✓ Studies of tidal currents
- ✓ Sediment transport studies
- ✓ Large-scale mixing studies



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Technical specifications

→ Water velocity measurements for Signature VM 1000 KHZ

| | |
|-----------------------|---|
| Profiling range* | 30 m |
| Cell size | 0.2–2 m |
| Max no. cells | 128 |
| Min. blanking | 0.1 m |
| Minimum accuracy | 0.3% of the measured value \pm 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 | 128 |
| Min. blanking | 0.5 m |
| Minimum accuracy | 0.3% of the measured value \pm 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* | 200 m |
| Cell size | 1–8 m |
| Max no. cells | 200 (average) |
| Min. blanking | 0.5 m |
| Minimum accuracy | 1% of the measured value \pm 0.5 cm/s |
| Velocity resolution | 0.1 cm/s |
| Maximum sampling rate | 2 Hz |



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→ Water velocity measurements for Signature VM 250 KHZ

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 |



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→ 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° |



Signature VM Coastal - 1000|500|250 kHz

→ 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 |
| Maximum sampling rate | 2 Hz |
| Max. range | 30 m |
| Resolution | 3 mm - 0.25 m |
| Number of bins | 10,000 |
| Transmit pulse length | 16 μ s - 0.5 ms |
| Transmit pulse | Monochromatic or pulse compressed (25% BW) |
| 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 μ s - 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 |



Signature VM Coastal - 1000|500|250 kHz

→ Echosounder option for Signature VM 250 kHz

| | |
|----------------------------|-----|
| Transmit pulse length | N/A |
| Transmit pulse | N/A |
| Resolution / dynamic range | N/A |

→ Other

| | |
|------------------------------------|--|
| Temperature sensor range /accuracy | -4 °C to 40 °C / 0.1 °C |
| Pressure | Piezoresistive |
| Standard range | VM 1000/ VM 500: 0-100 m (inquire for options), VM 250: 0-300m (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 |
| Vibration | IEC 60068-1/IEC60068-2-64 |
| 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 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 or 19" rack-mountable 1 HE |
| Dimensions | 265x110x340 mm or 480x45x325 mm |

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→ Processing unit

| | |
|--------------|--|
| 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 timestamping (GNSS compass/Signature VM) |
| Configuration | Signature VM (partly)Advanced Navigation GNSS compass |
| Display | Vessel track in map, Bottom-track velocity, Bottom-track depth, Velocity magnitude and direction, Echo amplitude, Echo correlation, Vertical depth*, Vertical echogram; corrected volume backscatter* |
| Status | Signature VM + AN_GNSS compass |
| Output | Online: NMEA data formats and AD2CP format. Off-line CSV, ASCII VMT, MATLAB, MATLAB VMT, MATLAB QRev, KML |

*) Signature1000 and 500

→ 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 |

→ AHRS option

| | |
|-----------------------------|------------|
| Accelerometer dynamic range | ± 2 g |
| Gyro dynamic range | ± 250°/sec |

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→ AHRS option

| | |
|-----------------------------------|--|
| 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 |