Vector
Velocimeter
High Resolution 3D
Current Meter

The Vector is an integrated 3D current meter designed for use in the ocean. The core of the Vector is an acoustic Doppler velocimeter, used to achieve accurate and nonintrusive velocity data at rates as high as 64 Hz. The system comes standard with compass, tilt, pressure, and temperature sensors and it can be used both in self-contained and online mode.

Leading oceanographers, coastal engineers, and hydraulic engineers all over the world commonly use the Vector for a wide range of high-resolution applications. The most common uses are:
- Studies of surf-zone dynamics.
- Turbulence studies in rivers, estuaries, and coastal areas.
- Combined wave and current monitoring.

The Vector was designed from the outset as an integrated open water system. This gives the Vector some unique advantages:
- Single-canister system with internal memory and batteries.
- Small and light weight.
- Titanium probe and plastic canister provides mechanical strength and prevents corrosion.
- High resolution pressure sensor for PUV wave measurements.
- Two analog input lines permit easy integration with external OBS, conductivity or other analog sensors.

In most cases, the Vector is deployed as a self-contained instrument with internal recorder, or operated from an on-line PC. It can also be operated from any third-party controller using RS 232 or RS 422 communication.

For integration with other data acquisition systems the three analog outputs (one for each velocity component or two velocity components and pressure) can be used.

Wave directional spectra
The Vector can be configured to sample the high-resolution pressure sensor and the three velocity components at a rapid rate in user specified burst intervals. This type of data, known as wave triplet data, can be used to calculate the wave height, period, and direction.

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### Specifications

#### Water Velocity Measurement
- **Range**: ±0.01, 0.1, 0.3, 2, 4, 7 m/s (software selectable)
- **Accuracy**: ±0.5% of measured value ±1 mm/s
- **Sampling rate (output)**: 1–64 Hz
- **Internal sampling rate**: 100–250 Hz

#### Sampling Volume
- **Distance from probe**: 0.15 m
- **Diameter**: 15 mm
- **Height (user selectable)**: 5–20 mm

#### Doppler Uncertainty (noise)
- **Typ. uncertainty at 16Hz**: 1% of velocity range

#### Echo Intensity
- **Acoustic frequency**: 6 MHz
- **Resolution**: 0.45 dB
- **Dynamic range**: 90 dB

#### Sensors
- **Temperature**: Thermistor embedded in end bell
- **Range**: –4°C to 40°C
- **Accuracy/Resolution**: 0.1°C / 0.01°C
- **Time response**: 10 min
- **Compass**: Flux-gate with liquid tilt
- **Maximum tilt**: 30°
- **Accuracy/Resolution**: 2°/0.1°
- **Tilt**: Liquid level
- **Accuracy/Resolution**: 0.2°/0.1° for tilt < 20°
- **Up or down**: Automatic detect
- **Pressure**: Piezoresistive
- **Range**: 0–20 m (standard)
- **Accuracy/Resolution**: 0.25% / Better than 0.005% of full scale

#### Data Communication
- **I/O**: RS232 or RS422. Software supports most commercially available USB−RS232 converters.
- **Baud rate**: 300–115200
- **User control**: Handled via Vector Win32® software, ActiveX® function calls, or direct commands.
- **Analog outputs**: 3 channels standard, one for each velocity component or two velocities and pressure. Output range is 0–5V, scaling is user selectable.

#### Analog Inputs
- **No. of channels**: 2
- **A/D converter**: 16 bit
- **Voltage output**: Battery voltage, 5 VDC or 12 VDC (Specify on order)

#### Software (“Vector”)
- **Operating system**: Windows®2000, Windows®XP
- **Functions**: Deployment planning, start with alarm, data retrieval, ASCII conversion. Online data collection and graphical display. Test modes

#### Data Recording
- **Capacity (standard)**: 2MB, expandable to 26, 82, or 154MB
- **Data record**: 24 bytes at sampling rate + 28 bytes/second

#### Power
- **DC Input**: 9–16 VDC
- **Peak current**: 2.5 A at 12 VDC (user selectable)
- **Max consumption, 64Hz**: 1.5 W
- **Typ. consumption, 4Hz**: 0.6–1.0 W
- **Battery capacity**: 50 Wh
- **New battery voltage**: 13.5 VDC
- **Data collection capacity**: Refer to planning section in software

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

#### Materials
- **Standard model**: Delrin® housing, Titanium probe and screws

#### Environmental
- **Operating temperature**: –5°C to +45°C
- **Storage temperature**: –20°C to +60°C
- **Shock and vibration**: IEC 721-3-2
- **Pressure rating**: 300 m for canister.

#### Dimensions
- **Cylinder**: Ø 75 mm
- **Length**: 500 mm
- **Weight in air**: 5.0 kg
- **Weight in water**: 1.5 kg

#### Options
- **Acoustic beams**: Probe mounted on fixed stem or on 2-m cable (see drawing)
- **Battery**: See battery brochure
- **Pressure sensor**: Specify range. Inquire for deep water version

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**Pressure case dimensions**: Ø = 75 mm, l = 500 mm

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