# Vector

4000 m

**Investigation des vitesses 3D dans les zones limites jusqu'à des profondeurs de 4000 m**

The Vector is a high-accuracy single-point current meter that is capable of acquiring 3D velocity in a very small volume at rates up to 64 Hz. It is widely used for sediment transport applications, small-scale turbulence measurements and coastal engineering studies. It has an excellent track record of delivering outstanding data quality in a variety of applications. This titanium version of the Vector is suitable for investigating deep-water currents down to depths of 4000 m.

## Highlights

- Small-scale turbulence
- Sampling up to 64 Hz
- Small sampling volume for measurements close to boundaries

## Applications

- Studies of bottom boundary layers
- Studies of deep-water currents
- Ocean engineering projects
- Low flow measurements
- Flux measurements
- Deep ocean mining support

## Technical specifications

| Water velocity measurements | |
|---|---|
| Maximum profiling range | N/A |
| Distance from probe | 0.15 m |
| Sampling volume diameter | 15 mm |
| Sampling volume height (user-selectable) | 5-20 mm |
| Cell size | N/A |
| Velocity range | ±0.01, 0.1, 0.3,1, 2, 4, 7 m/s (software-selectable) |
| Adaptive ping interval | N/A |
| Accuracy | ±0.5% of measured value ±1 mm/s |
| Velocity precision | typ. 1% of velocity range (at 16 Hz) |
| Sampling rate (output) | 1-64 Hz |
| Internal sampling rate | 100-250 Hz |

| Distance measurements | |
|---|---|
| Minimum range | N/A |

| Distance measurements | |
|---|---|
| Maximum range | N/A |
| Cell size | N/A |
| Accuracy | N/A |
| Sampling rate | N/A |

| Echo intensity | |
|---|---|
| Acoustic frequency | 6 MHz |
| Resolution | 0.45 dB |
| Dynamic range | 90 dB |

| Sensors | |
|---|---|
| Temperature: | Thermistor embedded in end bell |
| Temp. range | -4 to +40 °C |
| Temp. accuracy/resolution | 0.1 °C/0.01 °C |
| Temp. time response | 10 min |
| Compass: | Magnetometer |
| Accuracy/resolution | 2º/0.1º for tilt < 20° |
| Tilt: | Liquid level |
| Accuracy/resolution | 0.2°/0.1° |
| Maximum tilt | 30° |
| Up or Down | Automatic detect |
| Pressure: | Piezoresistive |
| Range | 0-4000 m |
| Accuracy/precision | 0.5% FS / Better than 0.005% of full scale |

| Analog inputs | |
|---|---|
| No. of channels | 2 |
| Supply voltage to analog output devices | Three options selectable through firmware commands: 1) Battery voltage/500 mA, 2) +5 V/250 mA, 3) +12 V/100 mA |

| Data recording | |
|---|---|
| Capacity (standard): | 16 GB |
| Data record (Standard) | 24 bytes at sampling rate + 28 bytes/second |
| Data record (IMU) | 72 bytes at sampling rate |

| Real-time clock | |
|---|---|
| Accuracy | ±1 min/year |
| Backup in absence of power | 4 weeks |

| Data communications | |
|---|---|
| I/O | RS-232 or RS-422 |
| Communication baud rate | 300-115 200 Bd |
| Recorder download baud rate | 600/1200 kBd for both RS-232 and RS-422 |
| User control | Handled via ”Vector” software, ActiveX® function calls, or direct commands. |
| Analog outputs | 3 channels standard, one for each velocity component or two velocities and pressure. |

## Data communications

| | |
|---|---|
| Output range | 0–5 V, scaling is user-selectable. |
| Synchronization | TTL (5 V tolerant) sync in/sync out, start on sync, sample on sync |

## Connectors

| | |
|---|---|
| Bulkhead | MCBH-8-FS |
| Cable | PMCIL-8-MP on 10 m polyurethane cable |

## Software

| | |
|---|---|
| Functions | Deployment planning, instrument configuration, data retrieval and conversion (for Windows®). |

## Multi unit operation

| | |
|---|---|
| Software | N/A |
| I/O | N/A |

## Power

| | |
|---|---|
| DC input | 9-15 V DC |
| Maximum peak current | 3 A |
| Max. consumption | 1.5 W at 64 Hz |
| Typical consumption, 4 Hz | 0.6 - 1 W |
| Sleep consumption | < 100 µA |
| Transmit power | 2 adjustable levels |

## Batteries

| | |
|---|---|
| Battery capacity | 50 Wh (alkaline or Li-ion),165 Wh (lithium), single or dual |
| New battery voltage | 13.5 V DC (alkaline) |
| Data collection capacity | Refer to planning section in software |

## Environmental

| | |
|---|---|
| Operating temperature | -4 to +40 °C |
| Storage temperature | -20 to +60 °C |
| Vibration | IEC 60068-1/IEC60068-2-64 |
| Depth rating | 4000 m |

## Materials

| | |
|---|---|
| Standard model | Titanium housing. Titanium probe and fasteners |

## Dimensions

| | |
|---|---|
| Maximum diameter | 84 mm |
| Maximum length | 485 mm (housing only), 246 mm (fixed stem) add 110 mm for double battery |

## Weight

| | |
|---|---|
| Weight in air | 8.3 kg |
| Weight in water | 5.1 kg |

## Options

Probe mounted on fixed stem or on 2 m cable

Vertical or horizontal probes

Alkaline, lithium or Li-ion external batteries

IMU - Inertial Measurement Unit