

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	$\pm 0.5\%$ 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

Maximum range N/A Cell size N/A Accuracy N/A Sampling rate N/A Secontic frequency 6 MHz Resolution 0.45 dB Dynamic range 90 dB Sensors Temperature: Thermistor embedded in end bell Temp. range 4 to 4.40 °C Temp. range -4 to 4.40 °C Temp. time response 10 min Compass: Magnetometer Accuracy/resolution 2º/0.1° for tilt < 20° Tilt: Liquid level Accuracy/resolution 0.2°/0.1° Maximum tilt 30° Maximum tilt 30° Hop 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 record (IMU) 72 bytes at sampling rate + 28 bytes/second Data record (Standard) 24 bytes at sampling rate + 28 bytes/second Data record (IMU) 72 bytes at sampling rate Three policy is a 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 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.	Distance measurements	
Accuracy 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. range 10 min Compass: Magnetometer Accuracy/resolution 0.2°/0.1° 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% F5 / Better than 0.005% of full scale Analog inputs No. of channels 2 Supply voltage to analog output devices 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 record (IMU) 72 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 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	Maximum range	N/A
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Resolution 0.45 dB Dynamic range 90 dB Sensors Temperature: Thermistor embedded in end bell Temp. range -4 to +40 °C 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/0.1° for tilt < 20° Tilt: Liquid level Accuracy/resolution 0.2°/0.1° Maximum tilt 30° Up or Down Automatic detect Pressure: Plezoresistive Range 0.4000 m Accuracy/precision 0.5% F5 / 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/S00 mA, 2) +5 V/250 mA, 3) +12 V/100 mA Data record (IMU) 72 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 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	Echo intensity	
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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% F5 / 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 record (IMU) .72 bytes at sampling rate + 28 bytes/second Data record (IMU) .72 bytes at sampling rate Real-time clock Accuracy	Resolution	0.45 dB
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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	Up or Down	Automatic detect
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Capacity (standard): 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	Supply voltage to analog output devices	
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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	Data record (Standard)	24 bytes at sampling rate + 28 bytes/second
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Backup in absence of power 4 weeks Data communications /O RS-232 or RS-422	Real-time clock	
Data communications	Accuracy	±1 min/year
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	Backup in absence of power	4 weeks
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	Data communications	
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User control Handled via "Vector" software, ActiveX® function calls, or direct commands. Analog outputs 3 channels standard, one for each velocity component or two	Communication baud rate	300-115 200 Bd
Analog outputs commands. 3 channels standard, one for each velocity component or two	Recorder download baud rate	600/1200 kBd for both RS-232 and RS-422
Analog outputs 3 channels standard, one for each velocity component or two	User control	
	Analog outputs	3 channels standard, one for each velocity component or two

Data communications	
	0. E.V. scaling is user calcatable
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 1.5 W at 64 Hz
Max. consumption Typical consumption, 4 Hz	0.6 - 1 W
Sleep consumption	< 100 μA
Transmit power	2 adjustable levels
Batteries	
	50 Wh (alkaline or Li-ion),165 Wh (lithium), single or dual
Battery capacity 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