

## VMP 750 and VMP 2000 Vertical Microstructure Profiler

### Description:

The VMP750/2000 is a vertical microstructure turbulence profiler for the measurement of dissipation-scale turbulence in coastal or open ocean environments. It is equipped with microstructure velocity probes (shear probes), high-resolution temperature sensors (thermistors), and high-accuracy CTD sensors. Other sensors (e.g., micro conductivity, micro-fluorometer, dissolved oxygen) can be added.

The VMP 750/2000 is a modular design. The instrumentation pressure case (forward half of the instrument) can be separated from drag and flotation elements. This makes it possible to use the instrument package in other deployment configurations, such as moored or towed applications.

### Features:

- Pressure case rated to 750m or 2000m depth
- Pressure sensor
- Three-axis, high-accuracy accelerometers
- SPM-38-1 shear probes
- FP07-38-1 fast thermistors
- SBE7-38 microstructure conductivity sensor\*
- SBE-3F / SBE-4C temperature and conductivity sensors
- Bottom landing guard
- Signal conditioning and telemetry electronics
- Deck unit for data communication
- ODAS4-RT real-time data acquisition software
- DISS 2.0 data processing library for Matlab\*
- Training in Victoria, 2 days.



### Specifications:

Sampling rate up to 2048 Hz  
Depth rating 0 – 750 m / 0 – 2000 m  
Weight (in air) 41 kg (approximate)  
Length overall 200 cm

#### Water temperature (SBE 3F)

Range -5 – 35 °C  
Accuracy  $1 \times 10^{-3}$  °C (NIST traceable)  
Resolution  $1 \times 10^{-4}$  °C  
Time response 0.070 s ± 0.010

#### Conductivity (SBE 4C)

Range 0 – 7 S/m  
Accuracy 0.0003 S/m  
Resolution 0.00004 S/m at 24 Hz  
Time response 0.060 seconds

#### Micro Temperature (FP07)

Range -5 – 35 °C  
Accuracy N/A  
Stability  $1 \times 10^{-5}$  °C (using signal+derivative technique)  
Time response 0.007 s ± 0.003

#### Accelerometers (IC Sensors)

Range ±2 g  
Accuracy 0.5°  
Resolution  $3 \times 10^{-5}$  g (1 – 20 Hz)  
Stability ±0.5°, ±0.01g  
Frequency response 0 – 300 Hz

#### Analog/Digital Converter

Number of channels 16  
Resolution 16 bits (true)  
Linearity 15 ppm

#### Velocity shear

Range  $10^{-10}$  to  $10^{-4}$  W kg<sup>-1</sup>  
Accuracy 5%  
Resolution  $3 \times 10^{-3}$  s

**Dissipation noise level**  $\epsilon < 3e-10$  W/kg

\* optional

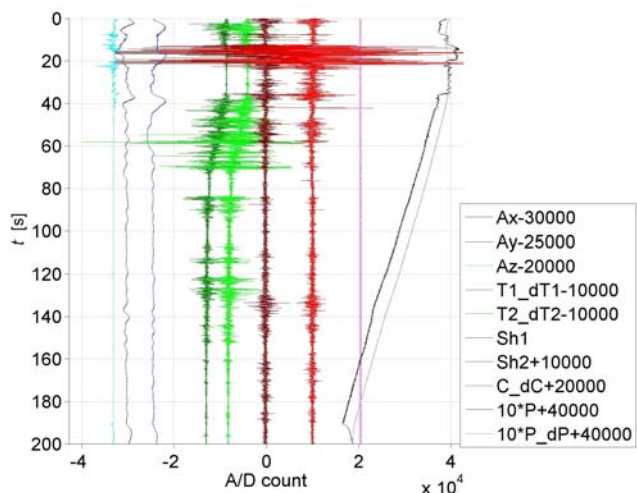
## System components:

### Mechanical Components

- | Qty. | Description  |
|------|--|
| 1    | Composite pressure case for electronics and sensors, two end-caps and tapered nose cone with six positions of turbulence sensors, drag elements, bottom landing guard. |
| 6    | Proprietary probe holders machined from SS316, to hold 3/8 inch probes with o-ring seals rated to 10000 PSI.   |

### Sensors

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|---|---|
| 3 | IC-Sensors 3140: accelerometers mounted with axes along horizontal x-, y-, and z directions   |
| 1 | PA-11: Keller Pressure Transducer. Sensor calibrated with dead weight tester, 0.1%.   |
| 2 | SPM-38-1: turbulence microstructure shear probes, with Teflon water protection, mounted on 3/8" diameter SS316 sting. Pressure rated to 1000 m. |
| 2 | FP07-38-1: Thermometric fast microstructure thermistor, mounted on 3/8" diameter SS316 sting. Pressure rated to 1000 m.                         |
| 1 | SBE7-38 micro-conductivity sensor, mounted (optional)   |
| 1 | SBE-3F, Seabird temperature probe, including cables and mounting brackets (optional).   |
| 1 | SBE-4C, Seabird conductivity probe, including cables and mounting brackets (optional).  |
| 1 | SBE43 Dissolved oxygen sensor (optional).   |



### Electronics

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|---|---|
| 1 | ASTP analog board: Supports two (2) shear probes, two (2) FP07DA202K thermistors, three (3) accelerometers and one (1) pressure transducer. Outputs are $du_1/dt$ , $du_2/dt$ , $T_1+dT_1/dt$ , $T_1$ , $T_2+dT_2/dt$ , $T_2$ , $P$ , $P+33dP/dt$ . Full-scale is -2 to 40°C and 6000 dBar. |
| 1 | 16-channel anti-aliasing filter board. Cutoff at 150 Hz for $du_1/dt$ , $du_2/dt$ , and $T_1+dT_1/dt$ $T_2+dT_2/dt$ .   |
| 1 | Premium Analog-to-Digital converter (16 channels, 16-bits, 15 ppm linearity, +/-2.5V) to support microstructure, accelerometers and pressure sensors.   |
| 1 | Two-channel frequency-to-number converter for SBE3F and SBE4C or other frequency output sensors. Accuracy +/- 1 count or 1.5 ppm, whichever is greater.   |
| 1 | MC-1 Micro-conductivity electronics board to support one SBE7 sensor. (optional)  |
| 1 | Shipboard transceiver (deck-unit) for serial communication with remote instrument(s) (RTRANS) and USB2.0 communication with shipboard recording computer. Also used as data I/O interface for internally recording instruments.   |
| 1 | RTRANS Remote transceiver for serial data communication with ship-board transceiver (UTRANS), using 2 conductors on tether cable.   |

### Software

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|---|---|
| 1 | ODAS4-RT real time data acquisition and display software (for Windows XP)   |
| 1 | DISS 2.0 function library for Matlab, designed for processing and display of turbulence microstructure data. (optional) |

### Miscellaneous

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| 1 | Frequency response and noise testing, component validation, system integration, telemetry testing, documentation, etc. |
| 1 | Hands-on training in Victoria (2 days)   |
| 1 | Plywood shipping case with foam cushions   |
| 1 | Set of manuals and full technical documentation  |

(June 2006) Specifications are subject to change without notice.