



InterOcean systems, inc.

The Leader in Ocean Technology - Since 1946

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S4 Current Meter Family

Options

The S4 Current Meter can be configured with optional sensors that allow it to operate as a multi-use platform for operations requiring data acquisition of Currents, Waves, Tide, CTD, turbidity and more. The S4 can also provide current profiling in conjunction with many of the optional sensors available.

The standard S4 includes 64K bytes of memory expandable to 1M byte. The S4A includes 20 Megabytes of memory. The S4AH samples the current vectors and analog parameters at 5 Hz.

Options for additional parameters include: **Tilt** (mooring inclination and current velocity correction), **Conductivity** (salinity), **Temperature, Depth, Optical Back Scatter** (suspended solids), **Transmissometer** (turbidity), **Dissolved Oxygen, pH** and other water quality sensors.

S4 Mooring Tripod

[Click here for PDF brochure \(87KB\)](#)



Deployment of S4ADW on French Navy Ship (Feb. 98) Photo: ORCA instrumentation

Multi Mode Operation

The S4A provides for two completely autonomous sampling cycles operating in the same instrument simultaneously. This true multitasking allows one instrument to collect data that normally requires several instruments running different cycles. Each "mode" allows for complete and unlimited control of Sample Period, Average Period (continuous or cyclic) and Parameters to record. All of the sensors available on the S4 can be programmed to sample in either or both of the chosen sampling modes.

Adaptive Sampling

The Adaptive Sampling option permits the investigator to program the instrument to only save to memory events exceeding a preset threshold. This feature in the S4 allows burst mode recording of data over extended periods previously not possible due to memory limitations with normal burst mode recording. This has particular application for current and wave data recording where the user is only interested in recording high level occurrence events.

Directional Wave

The S4DW senses wave orbital current components and the 0-70 meter hi-resolution depth sensor provides 4 mm depth resolution for use in wave and tide analysis. The S4 can be easily moored to existing platforms, used in taut-line moorings or bottom mounted. The instrument can provide for real-time measurement or internal data storage with up to 20 megabytes (7 million samples) of solid-state, non-volatile memory.

The S4 samples at a 2 Hz (0.5 sec.) rate. The recorded current vector averaging rate and depth sampling rate can be programmed as a multiple of the 2 Hz rate. For special applications a 5 Hz sampling rate can be

provided in the S4AH for improved resolution of shorter wave periods.

Directional Wave analysis is performed by InterOcean PC based "**WAVE for Windows**" analysis software using the pressure and current velocity data from the S4DW instrument. The wave statistics are calculated by converting the pressure time series and orbital velocity components to the frequency domain using a Fast Fourier Transform (FFT). Once in the frequency domain the pressure amplitude data is corrected for attenuation versus frequency and depth. The direction of the waves is computed using the North and East orbital velocity vectors with auto and cross spectrum analysis of the time series.

With the InterOcean systems "WAVE for Windows" applications software and data from the S4DW in the Directional Wave configuration, the user can process and display all the parametric data for wave analysis. The Graphic and Tabular output includes:


- Max Wave Height
- Average Wave Height
- Significant Wave Period
- Wave Energy as a Function of Wave Frequency
- Wave Direction as a Function of Wave Frequency
- Period of Peak Energy Density
- Average Zero Crossing Periods
- Average Wave Crest Period
- Mean Water Depth



Photo courtesy of The Queensland Government Hydraulics Laboratory, Brisbane, Australia

The S4 Family of Instruments and the available Sensors/Parameters are described below. For additional information on utilizing the S4 for wave and tide measurements, see also the [Wave & Tide Gauge](#) page.

S4 Family of Instruments Defined	
The following are the standard model designations for the available S4 instruments.	
S4RT	Basic S4 current meter without memory installed, for real-time monitoring applications only. May have other options included.
S4	The basic S4 current measuring instrument, with current speed and direction sensors and internal memory from 64K to 1 megabyte of solid-state memory. May have other options included.
S4DW	S4 current meter directional wave measuring instrument. Includes 1 megabyte of memory, 70 meter high-resolution depth, adaptive sampling, and Lithium battery pack, standard. May have other options included.
S4P	S4 instrument outfitted for profiling applications. Fitted with fast response Platinum temperature sensor, inductive flow- through conductivity sensor, and high-resolution depth sensor as standard. Memory size may be from 64K to 1 megabyte. Other options may be included.
S4D	Deep water S4 instrument for use to depths of 6,000 meters. Memory may be from 64K to 1 megabyte. May have other options included.
S4A	Advanced current measuring instrument with large memory capacity, and dual-mode logging capability. Memory size may be 32-256 megabytes. Includes high speed binary down-loads using Zmodem protocol with 32 bit CRC error checking. Adaptive current sampling is standard on this instrument. May have other options included.
S4ADW	Large memory capacity S4 directional wave measuring instrument. Includes 32 to 256 megabyte memory, 70 meter high-resolution depth sensor, and Lithium battery pack, standard. May have other options included.
S4ADW-i	New generation of S4ADW directional wave measuring instrument providing internally-processed directional wave data for direct output from the instrument without the need for external analysis software. Ideal multi-purpose oceanographic instrument for

 <p>PDF Brochure 600kb</p>	<p>integrated-system applications requiring pre-processed output directly into a datalogger, PLC, modem, or other external device without need for PC computer. Used for directional wave, current, and tide measurements, with additional parameters available. Includes long-life lithium battery, and internal memory sizes from 32MB to 256MB.</p>
<p>S4AP</p>	<p>An S4A instrument outfitted for profiling applications. Fitted with fast response Platinum temperature sensor, inductive flow-through conductivity sensor, and high- resolution depth sensor, standard. Memory size may be 32-256 megabytes. May have other options included.</p>
<p>S4AD</p>	<p>Deep water S4A instrument for use to depths of 6,000 meters. Has all the same features and options as available with the standard S4A.</p>
<p>S4AH</p>	<p>Same as S4A but uses 5 Hz sampling rate instead of 2 Hz. S4AHDW, S4AHP, S4AHD are 5 Hz models of the units listed above.</p>

Choice of Sensors/Parameters	
Sensor	Range
Speed (std)	0-350 cm/sec
Speed (Opt 1)	0-50 cm/sec
Speed (Opt 2)	0-100 cm/sec
Speed (Opt 3)	0-600 cm/sec
Speed (Opt 4)	0-750 cm/sec
Compass	0-360 deg
Opt Tilt Compensation	+/- 45 deg
Pressure	0-70 m
Pressure (Opt)	0-1000 dBar
Pressure (Opt)	0-6000 dBar
Conductive Conductivity	0-70 mS/cm
Inductive Conductivity	
Conductive Conductivity (Opt)	0-5 mS/cm
Inductive Conductivity (Opt)	
Temperature (Semi Cond. Sensor)	-5 to +45 deg C
Temperature (Thermistor Sensor)	
Temperature (Platinum Sensor)	
OBS (Suspended Solids)	0-100 FTU (Options to 2000 FTU)
TR (Turbidity)	0-100%
DO (Dissolved Oxygen)	0-20 ppm
pH	0-14 pH
ROX (Redox)	-500 to +500 mv
*OPTIONAL COMPUTED PARAMETERS	
Salinity	2-42 psu
Density	995-1075 kg/m ³
Sound Velocity	1400-1600 m/sec

*Computed in Application Software

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