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## SEAGUARD® Recording Current Meter

*The SeaGuard RCM series is based on the SeaGuard data logger platform and the ZPulse Doppler Current Sensor. Modern computer technology combined with advanced digital signal processing provides accurate and detailed measurements with almost unlimited resolution. Optional parameters are available through a wide range of smart sensors that include temperature, pressure, conductivity, oxygen, wave and tide. The SeaGuard RCM series come in 300m, 3000m and 6000m depth ranges. 7000m and 10000m versions available on request.*

### Advantages:

- *Large storage capacity on SD card*
- *Broadband ZPulse multi-frequency technology reduces power consumption and improves quality*
- *Down to 2 second recording interval*
- *Low current drain*
- *Smart sensor topology based on a reliable semi-high speed CANbus interface (AiCaP)*
- *Up to 4 Analog sensor input (0-5V)*
- *Windows CE based datalogger with TFT based color touch panel for local configuration*
- *SeaGuard Studio visualization software*
- *For use in sea and fresh water*
- *Real-Time XML Output (optional)*

The SeaGuard RCM series replaces the industry standard RCM 9 and RCM 11 series. It has been completely redesigned from bottom up and employs modern technology in the datalogger section and in the different sensor solutions.

The SeaGuard architecture is based on a general data logger unit and a set of autonomous smart sensors. The data logger and the smart sensors are interfaced by means of a reliable CANbus interface(AiCaP), using XML for plug and play capabilities. During power-up, each of the sensors that are connected to the bus will report their capabilities and specifications to the data logger. The data logger then assembles the information and provides the user with the possibility to configure the instrument based on the present nodes. The solution provides for great flexibility in both use and design of the different elements within the system.

The autonomous sensor topology also gives the sensor designer flexibility and opportunities where each sensor type may be optimized with regard to its operation, each sensor may now provide several parameters without increasing the total system load. Data storage takes place on a Secure Digital (SD) card. The current capacity for this card type is up to 2GBytes, is more than adequate for most applications.The SeaGuard also has a built-in power calculator which gives an etsimated deployment lenght bases on selected interval, battery type and current drain information, obtained from each smart sensor.

The SeaGuard RCM comes standard with the ZPulse multi-frequency Doppler current sensor. The current sensor comprises acoustic pulses of several frequency components to lower the statistical variance in the Doppler shift estimate. The advantage of this is reduced statistical error with fewer pings, providing increased sampling speed and lower power consumption.

The Doppler Current Sensor also incorporates a robust fully electronic compass and a tilt sensor.
The SeaGuard RCM may also be delivered with new smart sensor solutions for Temperature, Pressure, Conductivity and Oxygen. All sensors have increased resolution compared with the older models. The temperature sensor also has decreased settling time to utilize the increased sampling speed provided by the SeaGuard platform. There is also an analog Turbidity Sensor available for direct connection on the top end plate.

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# Specifications

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|---|---|
| **Top-end Plate capability:** | Up to 6 sensors can be fitted onto the Top-end Plate, of which 4 can be analog sensors (0-5V) |
| **Recording System:** | Data Storage on SD card |
| **Storage Capacity:** | ≥ 2GB |
| **Battery:** | |
| Alkaline 3988: | 9V, 15Ah (nominal 12.5Ah; 20W down to 6V at 4°C) |
| or Lithium 3908: | 7V, 35Ah |
| **Recording Interval:** | From 2s, depending on the node configuration for each instrument |
| **Recording settings:** | Fixed interval settings or Customized Sequence setting |
| **Protocol:** | AiCaP CANbus based protocol |
| **Depth Capacity:** | 300m/3000m/6000m, 7000m and 10000m on request |
| **Platform Dimensions:** | |
| 300m version (SW): | H: 356mm OD: 139mm |
| 2000m version (IW): | H: 352mm OD: 140mm |
| 6000m version (DW): | H: 368mm OD: 143mm |
| **External Materials:** | |
| 300m version: | PET, Titanium, Stainless Steel 316, Durotong DT322 polyurethane |
| 3000/6000m version: | Titanium, Stainless steel 316, Durotong DT322 polyurethane |

| **Weight:** | In Air | In Water |
|---|---|---|
| 300m version (SW): | 7.6 kg | 2.0 kg |
| 3000m version (IW): | 11.5 kg | 5.2 kg |
| 6000m version (DW): | 12.4 kg | 7.2 kg |

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| **Supply Voltage:** | 6– 14 Volts |
| **Operating Temperature:** | -5 to +50°C |

## ZPULSE DOPPLER CURRENT SENSOR (DCS) SPECIFICATIONS

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|---|---|
| **Current Speed:** | (Vector averaged) |
| Range: | 0-300 cm/s, higher range on request |
| Resolution: | 0.1 mm/s |
| Mean Accuracy: | ± 0.15 cm/s |
| Relative: | ± 1% of reading |
| Statistic variance (std): | 0.3 cm/s (ZPulse mode), 0.45 cm/s [1] |
| **Current Direction:** | |
| Range: | 0 – 360° magnetic |
| Resolution: | 0.01° |
| Accuracy: | ±3° 0-15° tilt<br>±5° 15-35° tilt |
| **Tilt Circuitry:** | |
| Range: | 0-90° |
| Resolution: | 0.01° |
| Accuracy: | ±1.5°[2] |
| **Acoustics:** | |
| Frequency: | 1.9 to 2.0 MHz |
| Power: | 25 Watts in 1ms pulses |
| Beam angle (main lobe): | 2° |
| **Installation distance:** | |
| From surface: | 0.75m |
| From bottom: | 0.5m |
| **Accessories Included:** | SeaGuard Studio<br>SD card: 2 GB<br>Alkaline Battery 3988<br>Documentation on Memory stick<br>Carry handle 4132 |

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| **Optional Accessories:** | Carry handle 4032,3965 |
| Mooring frame: | In-line 4044[3]/3824A[3]<br>Clamp on frame<br>Bottom 3448R<br>Protecting Rods 3783<br>Sub-surface floats 2211,2212 |
| Battery/Power: | Internal Lithium 3908<br>Internal Alkaline 3988<br>Internal Battery Shell 4513<br>Electrical terminal 4784C<br>AC/DC adapter, lab. use 4908 |
| Other: | Real Time Collector<br>Analog cable 4564<br>Maintenance Kit 3813/3813A<br>Tools kit 3986A<br>Vane Plate 3781,3681<br>Hardcopy Documentation |

## OPTIONOL SENSORS:

| | |
|---|---|
| **Temperature Sensor 4060** | |
| Range: | -4-36°C (32-96.8°F)[4] |
| Resolution: | 0.001°C (0.0018°F) |
| Accuracy: | ±0.03°C (0.054°F) |
| Response Time 63%): | < 2 seconds |
| **Conductivity Sensor 4319** | |
| Range: | 0-7.5 S/m |
| Resolution: | 0.0002 S/m |
| Accuracy | |
| 4319 A: | ±0.005 S/m |
| 4319 B: | ±0.0018 S/m |
| Response Time: | <3s[5] |
| **Wave and Tide Sensor 5217/5218** | |
| Tide: | Range: 0-60MPa (0-8700psia) |
| wave max: | 1000kPa (145psia) |
| Resolution : | <0,0001% FSO |
| Accuracy: | ±0,02% FSO |
| Wave: | Sampling rate:2Hz, 4Hz |
| No. of samples: | 256, 512, 1024, 2048 |
| **Pressure Sensor 4117** | |
| Resolution: | <0.0001% FSO |
| Accuracy: | ±0.02° FSO |
| 4117A Range: | 0 – 1000kPa (0 – 145 psia)[6] |
| 4117B Range: | 0 – 4000kPa (0 – 580 psia) |
| 4117C Range: | 0 – 10000kPa (0 – 1450 psia)[6] |
| 4117D Range: | 0 – 20000kPa (0 – 2900 psia) |
| 4117E Range: | 0 – 40000kPa (0 – 5800 psia)[6] |
| 4117F Range: | 0 – 60000kPa (0 – 8700 psia) |
| **Turbidity Sensor 4112:** | 0-5V Analog Output |
| 4112 Range: | 0-25 FTU |
| 4112A Range: | 0-125 FTU |
| 4112B Range: | 0-500 FTU |
| 4112C Range: | 0-2000 FTU[7] |

| **Oxygen Optode 4835/4330:** | $O_2$-Concentration | Air Saturation |
|---|---|---|
| Measurement Range: | 0 – 500 mM | 0 - 150% |
| Resolution: | < 1 mM | 0.4 % |
| Accuracy: | <8 mM or 5%[8] whichever is greater | <5 %[9] |
| Response Time (63%): | 4330F (with fast response foil) <8 sec<br>4835/4330 (with standard foil) <25 sec | |

[1] Based on 300 pings
[2] Calibrated range 0-35°
[3] Breaking strength 4044: 800 kg, 3824A: 8000kg
[4] Extended range available on request.
[5] Dependent on flow through cell bore
[6] Available on request
[7] Sensor is non-linear above 750 FTU
[8] Requires salinity compensation for salinity < 1mS/cm
[9] Within calibrated range 0-120%

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Aanderaa Data Instruments AS
Sanddalsringen 5b
P.O. Box 103 Midtun
5843 Bergen, Norway
Tel +47 55 60 48 00
Fax +47 55 60 48 01