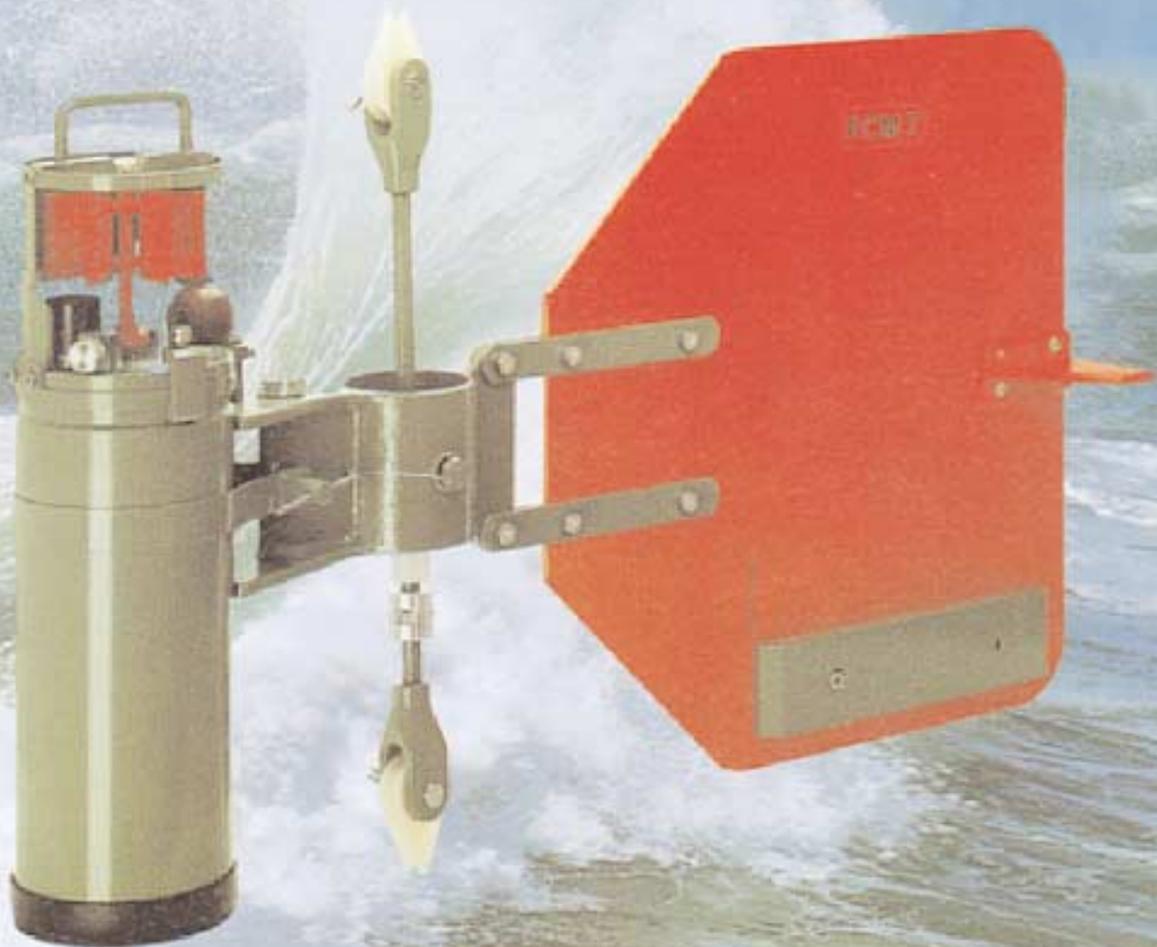


# AANDERAA INSTRUMENTS

DATA COLLECTING INSTRUMENTS FOR LAND SEA AND AIR

## RECORDING CURRENT METER RCM7 & RCM8

*Self-contained instruments for recording speed, direction,  
temperature, pressure and conductivity of ocean currents.*



*The VECTOR AVERAGING Recording Current Meter RCM7  
and RCM8 employ fully encapsulated solid state electronics  
and memory.*

## GENERAL DESCRIPTION

## RCM 7 & RCM 8

The measurement of ocean currents by a moored instrument is the standard method of obtaining information about the circulation of ocean waters. The RCM 7 is a self-contained instrument that can be moored in the sea and record ocean current, water temperature, conductivity of the water and instrument depth.

The RCM 7 consists of a recording unit and vane assembly which is equipped with a rod that can be shackled into the mooring line. This arrangement permits the instrument to swing freely and align with the current. The recording unit contains all sensors, the measuring system, battery and a detachable, reusable solid state data storage unit.

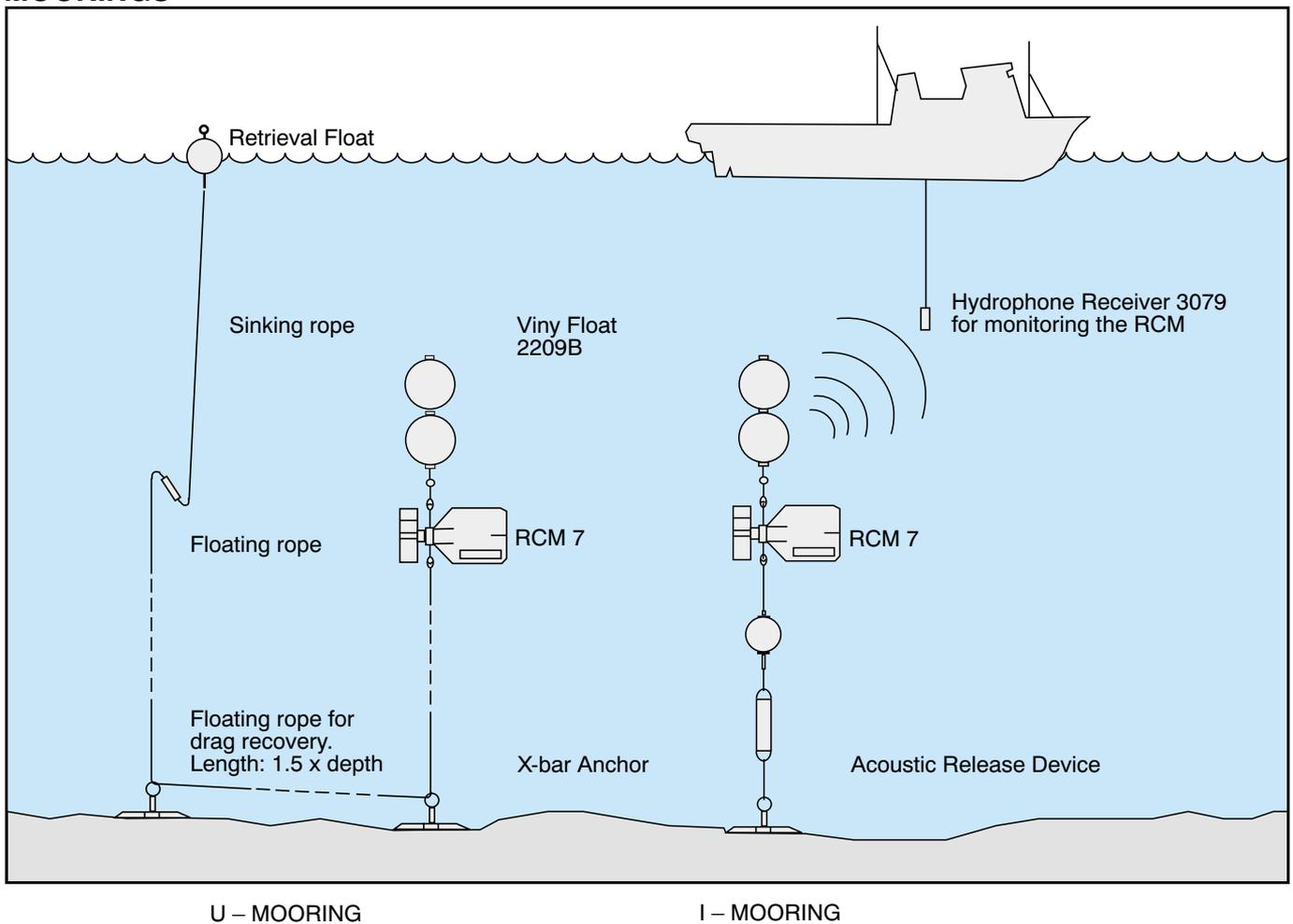
A built-in clock triggers the instrument at preset intervals and a total of six channels are sampled in sequence. The first channel is a fixed reference reading for control purposes and data identification. Channels 2, 3 and 4 represent measure-

ment of temperature, conductivity and depth respectively. Channels 5 and 6 represent the vector averaged current speed and direction since the previous triggering of the instrument. The data is sequentially fed to the Data Storage Unit (DSU) 2990 or 2990E. Simultaneously as the reading takes place, the output pulse keys on and off an acoustic carrier emitted by an acoustic transducer. This allows monitoring of the performance of moored instruments from the surface by a hydrophone.

The recording interval of the instrument is set by an interval selector switch. When a 10 minute interval is used, the operating period of the instrument will be 2 months.

The RCM 8 is a high pressure model for measurement down to 6000 meters depth. Other performance data are as for the RCM 7. The Acoustic transducer for this version is optional and must be ordered separately.

## MOORINGS



The above drawing shows two ways of mooring the RCM. The arrangement on the left shows a U-mooring which is best suited for use in relatively shallow water. The arrangement on the right shows an I-mooring involving the use of an acoustic release device and is suitable for use at any depth. It is essential that a subsurface float is used to avoid wave induced

motion on the mooring line. A sub-surface float with sufficient buoyancy and the thinnest possible mooring line should be used to avoid unacceptable tilt of the mooring line due to drag. It is possible to deploy several RCMs at different depths along the same mooring line, in which case several distributed floats should be used, preferably above each instrument.

# SPECIFICATIONS

# RCM 7 & RCM 8

## Measuring system:

Self balancing bridge with sequential measuring of 6 channels, and a solid state memory. 10-bit binary word for each channel. The channels are:

**Ch. 1. Reference:** A fixed reading to check the RCM's performance and to identify individual instruments.

## Ch. 2. Temperature:

Sensor type: Thermistor (Fenwall GB32JM19).

Resolution: 0.1% of selected range.

Accuracy:  $\pm 0.05^\circ\text{C}$ .

Response time: 12 seconds (63%).

### Selectable Ranges:

Low range:  $-2.4$  to  $21.4^\circ\text{C}$ .

Wide range:  $-0.3$  to  $32.1^\circ\text{C}$ .

High range:  $10.1$  to  $36.0^\circ\text{C}$ .

### Optional:

Arctic range:  $-2.6$  to  $5.6^\circ\text{C}$  in channel 4.

## Ch. 3. Conductivity: (optional)

Part Number RCM 7: 2994, RCM 8: 3994

Sensor Type: Inductive Cell

Ranges: 0 – 74 mmho/cm (standard).  
24 – 68 mmho/cm (on request).  
24 – 36 mmho/cm (on request).

Accuracy:  $\pm 0.1\%$  of range.

Resolution: 0.1% of range.

## Ch. 4. Pressure: (optional)

Part number: RCM 7: 3239 or RCM 8: 3249

Sensor Type: silicon piezoresistive bridge.

Ranges: 700, 3500, 7000 KPa,  
14, 20, 35 and 60 MPa.  
35 and 60 MPa is for RCM 8 only.

Accuracy:  $\pm 0.5\%$  of range.

Resolution: 0.1% of range.

## Ch. 5. Direction:

Sensor Type: Magnetic compass with needle clamped onto potentiometer ring.

Resolution:  $0.35^\circ$ .

Accuracy:  $\pm 5^\circ$  for speeds from 5 to 100 cm/s.  
 $\pm 7.5^\circ$  for current speeds 2.5 to 5 and 100 to 200 cm/s.

## Ch. 6. Speed:

Sensor Type: Rotor with magnetic coupling.

Range: 2 to 295 cm/s.

Accuracy:  $\pm 1$  cm/s or  $\pm 4\%$  of actual speed whichever is greater.

Starting Velocity: 2 cm/s.

### Note.

#### Vector Averaging of Current Speed and Direction

The number of rotor revolutions and the direction are sampled every 12 seconds and broken up into North and East components. Successive components are added and recorded as speed and direction. For recording intervals longer than 10 minutes, speed and direction are sampled every  $1/50$  of the recording interval.

## Clock:

Type: Quartz crystal.

Accuracy: Better than  $\pm 2$  s/day within  $0$  to  $20^\circ\text{C}$ .

Recording Intervals: 0.5, 1, 2, 5, 10, 20, 30, 60 or 120 min.

External Triggering: A 6 volt pulse to terminal activates instrument.

## Recording System:

Type: Data Storage Unit 2990 or 2990E.

Data Format: PDC-4. (Pulse Duration Code 4 s).

Storage Capacity:

DSU 2990: 10 900 records of all channels.

DSU 2990E: 43 600 records of all channels.

## Telemetry:

Acoustically: Acoustic carrier keyed on and off.

Frequency: 16.384 KHz  $\pm 5$  Hz.

Detection Range: Up to 800m with Hydrophone 3079.

The acoustic transducer for RCM 8 is optional

## Battery:

Non-magnetic.  
Li. Battery 3382: 7.2V, 10–14 Ah (depending on load), sufficient for 30835 records (214 days) of all channels at 10 minute intervals (one record is a measuring cycle of all six channels).

## Depth Capability:

RCM 7: 2000 m; RCM 8: 6000 m.

## Weight (kg):

	Recording Unit		Vane Assembly	
	in air	in water	in air	in water
RCM 7 Nett:	13.6	8.8	12.2	9.5
RCM 7 Gross:	18.5		20.0	
RCM 8 Nett:	15.2	10.9	14.1	11.8
RCM 8 Gross:	20.5		22.0	

## Dimensions (mm):

RCM 7:	495 x 128	485 x 500
RCM 8:	520 x 128	485 x 500

## Packing:

Plywood case (mm): 190 x 250 x 600      140 x 520 x 770

## Mooring:

Thimbles: Maximum 15 mm diameter rope.

Gimbal Rings: Permits  $27^\circ$  tilt.

Spindle: Breaking load 4000 kg.

## External Materials:

Pressure Case: CuNiSi alloy (OSNISIL) and stainless, acid proof steel. Epoxy coated.

Other Metal Parts: Nickel plated bronze and stainless, acid proof steel. Epoxy coated.

## Spares:

A set of recommended spares is delivered free of charge with each instrument (rotor, bearings, O-rings etc).

## Warranty:

Two years against faulty materials and workmanship.



**DATA STORAGE UNIT (DSU) 2990.**

is the standard data storage unit for all Aanderaa recording instruments. This portable, watertight unit stores up to 65500 ten bit, PDC-4 coded words in a set of EEPROMs. The data stored in the DSU is transferred to a computer via a DSU Reader 2995. The real-time clock and LCD display are powered by a built-in battery when the unit is removed from the instrument. An extended version, designated 2990E, storing up to 262000 datawords is also available.

**DSU READER 2995**

This unit provides a full duplex communication between a computer and the Data Storage Unit 2990. It converts the 0 to -5 volt serial signals associated with the DSU to dual-polarity signals in accordance the RS-232C standard. It also supplies the control voltage for powering the DSU during the read-out process.

**DATA READING PROGRAM 5059**

is a new software program that may be used to download DSU 2990 data to a Personal Computer. The program is based on the latest software technology and is designed to be used with Windows 95, Windows 98 and Windows NT.

In addition to enable for downloading and exporting DSU data, it may also be used for data analysis. The 5059 include extensive charting and analysis facilities, and the resulting analysis graphs may be exported for use with other programs such as Microsoft Word and Microsoft Excel.

The modern user interface, including drag & drop facilities combined with an extensive built-in Help system makes the 5059 easy to use. A sensor, station and instrument library allows you to build up a library holding configuration and calibration sets for all your instruments. A limited version is supplied free of charge. The full version is available at a moderate cost. Please contact the factory or visit our web site to obtain a 30 day fully functional trial version.

**DECK UNIT 3127**

This battery or mains powered unit is recommended to users for checking instrument performance as well as for calibrating purposes. An LCD display shows the decimal number corresponding to the ten bit binary output signal. The unit has an RS-232C output and is furnished with a push button that will trigger one measuring cycle of the instrument.

**HYDROPHONE RECEIVER 3079**

The hydrophone receiver is used to monitor the acoustic signals transmitted by a moored instrument. The Hydrophone is connected to and powered by Deck Unit 3127 which displays the acoustic signals as a decimal reading. Sensitivity to echoes has been reduced by an echo discriminator and to noise by a noise suppression circuit.

**SUBSURFACE FLOATS.**

Two types can be supplied from Aanderaa Instruments:

1. Viny Float set 2209B, buoyancy: 40 kg, depth capability: 200 m.  
Use one set for each RCM in currents up to 3 knots.
2. Glass Float 3421, buoyancy: 25 kg, Depth Capability: 6000m. Use two floats for each RCM in currents up to 3 knots.

**CROSSBAR ANCHOR 2855.**

This cast iron anchor has a basic weight of 40 kg which can be increased by adding bars (each 19 kg).

Representative's Stamp

**ORDERING INFORMATION:**

Orders can be placed by fax, letter or telephone and will be acknowledge by return mail. Delivery time is normally 4 to 6 weeks. Spares will normally be delivered from stock. Terms of payment is net 30 days.

—Latest version is on the Internet—

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