AANDERAA INSTRUMENTS

DATA COLLECTING INSTRUMENTS FOR LAND SEA AND AIR

DOPPLER CURRENT SENSOR 3820R

(Data output in RS 232 format)

A rugged, true vector averaging sensor for measuring current speed and direction in the sea.

Features:

- *High resolution output through RS-232 communication*
- *Customizable through RS-232 communication*
- *Can operate in both polled and non-polled mode*
- *Selectable ping rates from 4 to 1200 pings per minute*
- *The high speed mode can output ping data 4 times a second*
- *Function test easily carried out with Test Unit 3731*

The DCS 3820R is intended for commercial reasons as well as for research purposes. It can be used to monitor the water current in harbors, along the coast, near offshore oil platforms etc. The In-line Doppler Current Sensor DCS 3820R is a rugged and reliable sensor that offers users great flexibility to obtain accurate current measurements.

The sensor uses the Doppler Shift principle as the basis for its measurements. The sensor transmits acoustic pulses into the surrounding water. As the sound propagates, small particles or air bubbles in the water reflect a portion of the energy.

The transducers pick up the back-scattered energy from the area 0.4 to 2.2 meters from the sensor and analyzes it to find any frequency change (known as the Doppler Shift). An upward shift signifies that the particles are moving towards the sensor and vice-verse.

After reading the internal compass circuit (Hall effect compass), the sensor is able to determine the current speed and direction. The sensor will ping towards the water current. It is however also possible to set it to ping the transducers in a cylindrical sequence around the sensor. The current measurements are compensated for tilt by the use of an electrolytic tilt sensor.

The measurement accuracy is proportional to the square root of the number of pings in a measuring interval. To obtain good accuracy at short intervals e.g. 1 minute, it is possible to choose a higher ping rate. The current consumption will, however, also be greater with increasing ping rates.

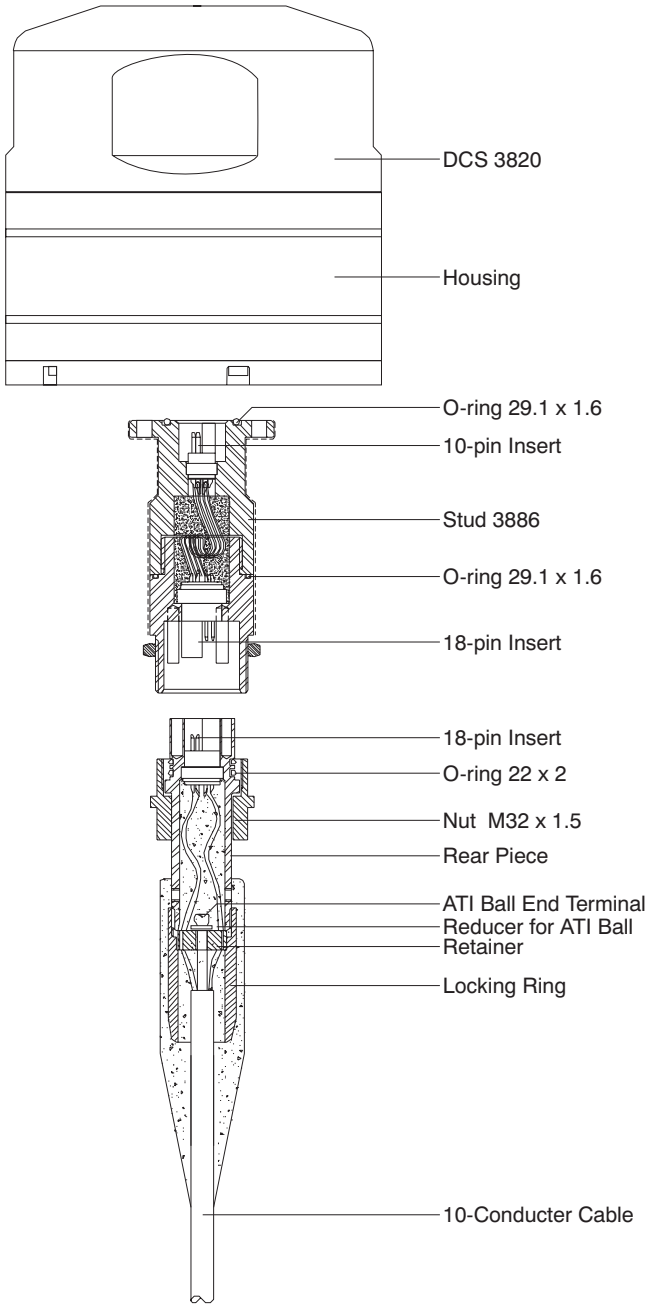
The temperature is measured using a temperature dependent crystal-oscillator-circuit.

The DCS 3820R can output data using the RS232 standard. The sensor output is set up using the DCS 3820R command system. The sensor can be set up to output data automatically (non-polled) or the sensor will output the data only when polled via the RS232 line.

Various system parameters can be altered using the command system listed in the table on page 3. The sensor can be set to 4 modes: Normal, comprehensive, high speed and 3500. The differences between these modes are shown in the table on page 3.

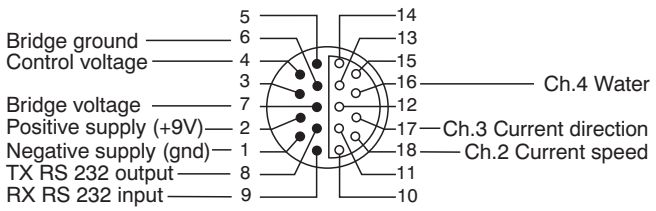
When the 3820R sensor is in **3500 compatible mode**, it will act as the former version of this sensor, the DCS3500R.

SPECIFICATIONS FOR DOPPLER CURRENT SENSOR 3820R



PIN CONFIGURATION (Upper and Lower Receptacle)

External view. Pin = ●; Bushing = ○



All connections wired through from upper to lower receptacle

Current Speed:

(Vector averaged)

Available ranges:	
P/N 3820R	0 - 300 cm/s standard
P/N 3820RA	0 - 500 cm/s .on request
Resolution:	0.03 cm/s
Accuracy:	
Absolute:	±0.15 cm/s
Relative:	±1% of reading
Statistic precision:	0.55 cm/s (Standard deviation)

Current Direction:

(Vector averaged)

Range:	0-360° magnetic.
Resolution:	0.35°
Accuracy:	±5° for 0-15° tilt. ±7.5° for 15-35° tilt.

Temperature:

Range:	-10 to +43°C
Accuracy:	±0.16°C with 600/min. pings Better than ±0.32°C for other ping rates.
Resolution:	0.01°C

Tilt Circuit:

Range:	-35 to +45°
Accuracy:	±1.5°
Resolution:	0.1°

Compass Circuit:

Range:	0 to 360°
Accuracy:	±3°
Resolution:	0.35°
RS 232 Output signal:	4800 Baud, 8 data bit, No parity, 2 stop bits
Acoustic Frequency:	2MHz
Acoustic Power:	25W in 1ms pulses
Beam Angle:	±1° (Main lobe)
Installation distance:	Minimum 0.5m from the bottom
(to the DCS head)	Minimum 0.75m from the surface
Current consumption:	5mA · Ping rate (ping rate in pings per second)
Supply Voltage:	7-14VDC
Operating Temp.:	-10 to +50°C
Depth Capability:	6000 meters
Electrical Connection:	18-pin Strain-proof Plug
Breaking Load:	300kg
Material and Finish:	Durotong, titanium
Net. Weight:	800 grams
Warranty:	Two years against faulty materials and workmanship

Note! Re. Subsurface cables

Our standard warranty (2 years) is not applicable in cases where breakage or malfunction occurs to the cable during installation or when caused by excessive wear or other external forces.

Table of possible DCS 3820R outputs

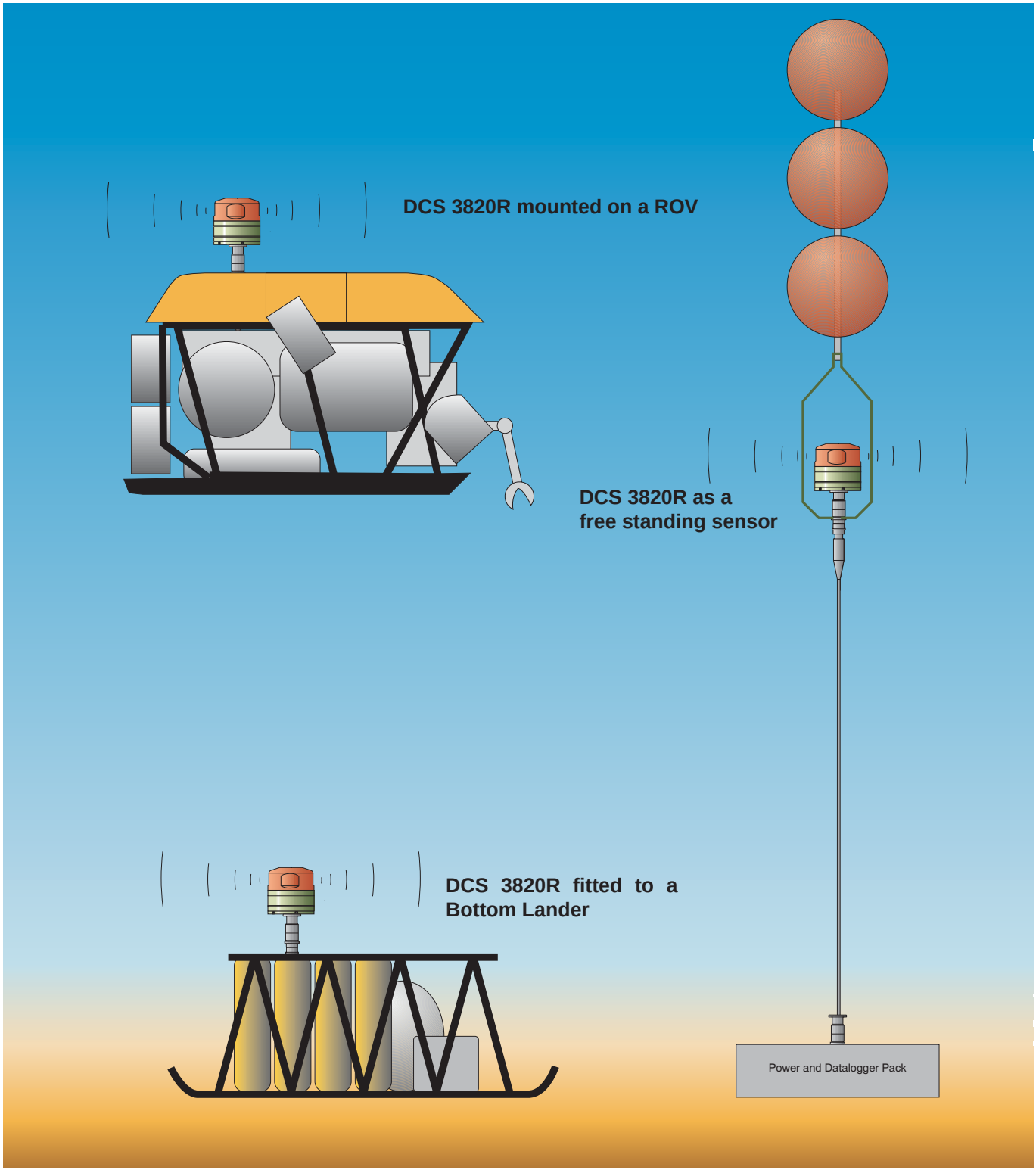
Parameters that can be altered via the DCS3820R RS232 line	Available output parameters from the DCS3820R RS232 line	Output Mode									
		Comprehensive				Normal				High speed	3500 *)
		Compass comp. On		Compass comp. Off		Compass comp. On		Compass. comp. Off			
		R	P	R	P	R	P	R	P		
Ping Rate (4 to 1200 ping/min)	Current speed along the X-axis			•				•		•	•
Average Base (1 to 300 ping sets)	Current speed along the Y-axis			•				•		•	•
Sound Speed (Default = 1500 m/s)	Current speed North	•				•					•
Compass Compensation (On/Off)	Current speed East	•				•					•
Tilt Compensation (On/Off)	Absolute current speed		•		•		•		•		
Upstream Compensation (On/Off)	Current direction ref. to North		•				•				
Polled Output (On/Off)	Current direction ref. to the X-axis				•				•		
Output Format (Raw/Engineering)	Signal Strength	•	•	•	•						
Current Type (Polar/Rectangular)	Compass direction	•	•	•	•					•	•
Output Mode	Tilt along the X-axis			•	•					•	•
	Tilt along the Y-axis			•	•					•	•
	Tilt along the North-axis	•	•								
	Tilt along the East-axis	•	•								
	Ping count	•	•	•	•						
	Water temperature	•	•	•	•	•	•	•	•	•	
	Time series from A/D converter	*This is available in polled mode using a poll command*									

R - Rectangular output

P - Polar output

*) - If backward compatibility to DCS 3500R is not necessary, it is recommended that the new outputs in DCS 3820R are used.

COMMON APPLICATIONS FOR THE DOPPLER CURRENT SENSOR, DCS 3820R



DCS 3820R and High speed mode

In comprehensive mode and normal mode, the DCS will collect a number of ping sets and then perform an averaging of this data. When using the highspeed mode, the DCS outputs uncompensated data from each ping set (Current speed X/Y, Compass direction, Tilt X/Y, and water temperature). This data can be output at a rate of 4 times a second.

Representatives's Stamp

Latest version is on the Internet

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