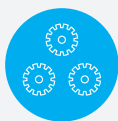


Automatic Marine Station

Marine Environmental and Weather Monitoring



Modular and scalable platform



Multimode data communication

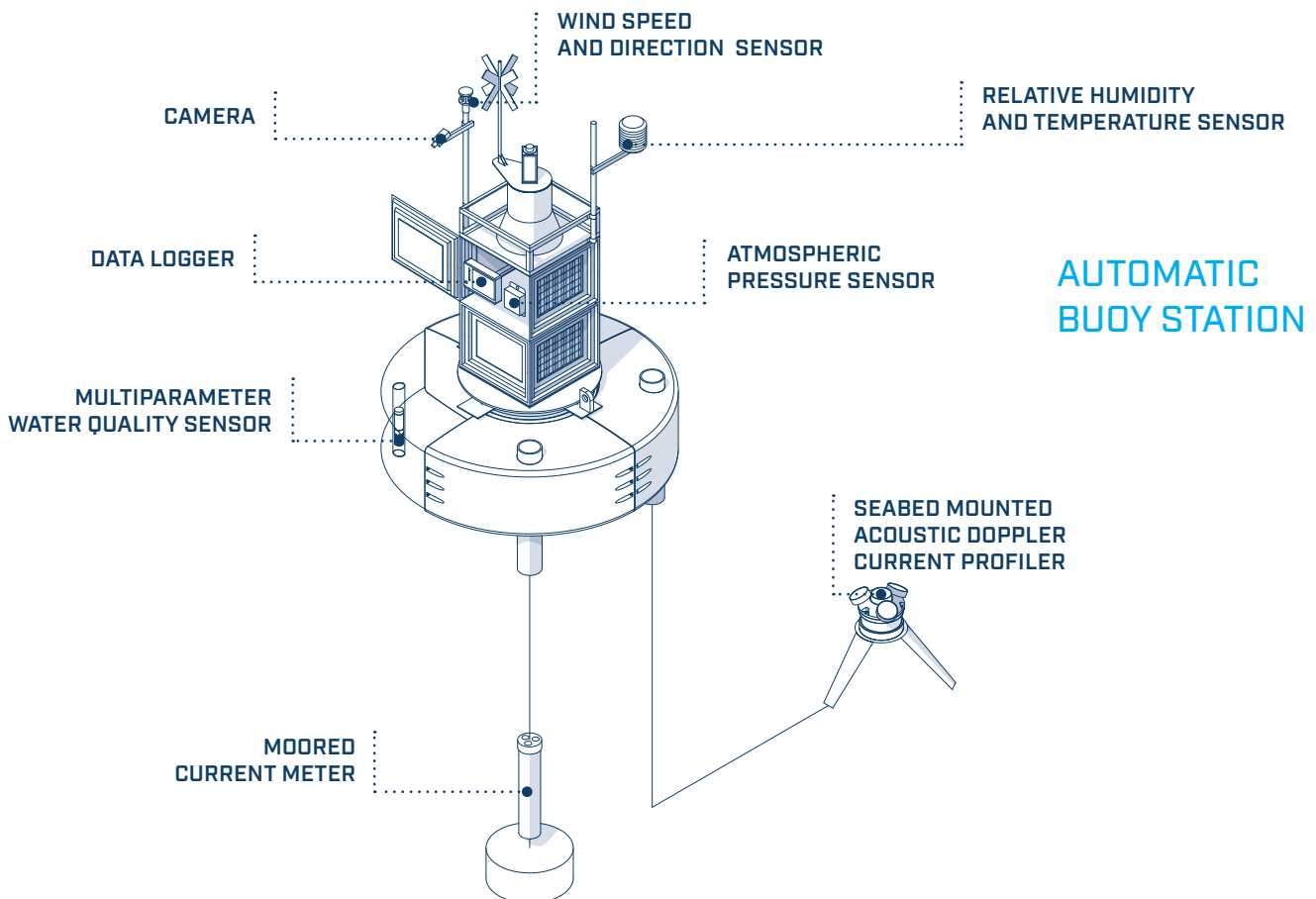
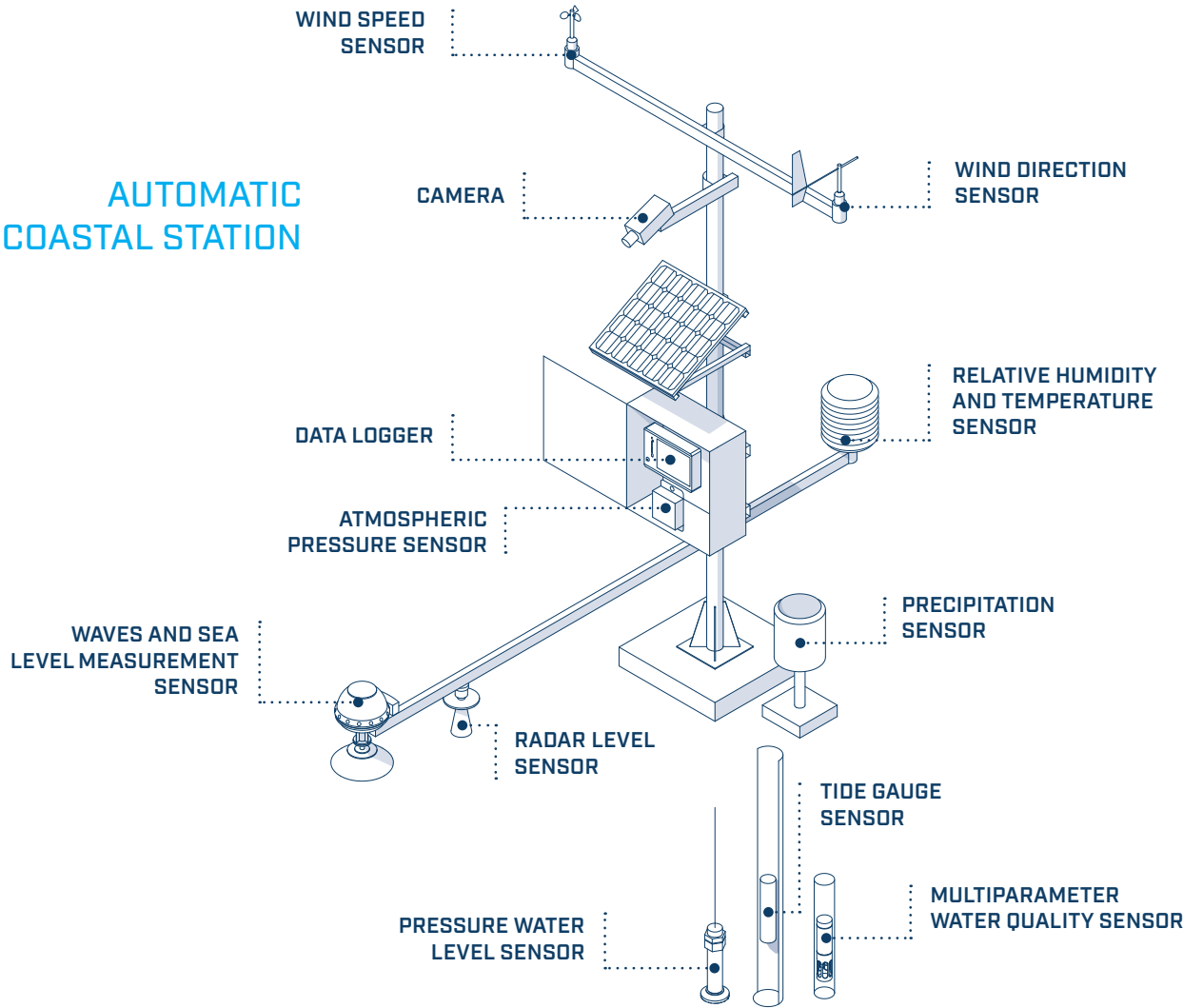


Statistics, alerts and notifications



Customizable web interface

AUTOMATIC COASTAL STATION



Sensor configuration modules

	BUOY STANDARD	BUOY EXTENDED	HARBOUR STANDARD	HARBOUR EXTENDED
Air Temperature	✓	✓	✓	✓
Antivandalism system	x	✓	x	✓
Atmospheric pressure	✓	✓	✓	✓
Buoy impact sensor	x	✓	x	x
Camera	x	✓	x	✓
Precipitation	x	x	x	✓
Relative humidity	✓	✓	✓	✓
Water level and tide				
• pressure	✓	✓	✓	✓
• radar	x	x	✓	✓
Wind	x	✓	✓	✓
Water quality				
• sound velocity	x	✓	x	✓
• conductivity temperature	x	✓	x	✓
• temperature	x	✓	x	✓
• pressure	x	✓	x	✓
• turbidity	x	✓	x	✓
• chlorophyl	x	✓	x	✓
• pH	x	✓	x	✓
• dissolved oxygen	x	✓	x	✓
• blue-green algae	x	✓	x	✓
Wave and current	x	✓	x	✓

Technical specifications

Data logger AMS 111 IV

Memory and RTC

Internal 128 MB Flash memory

Internal 128 MB DRAM memory

Secure digital card up to 64 GB

External USB mass storage up to 256 GB

Real time clock (backup with Lithium battery)

Communication I/O ports

3x RS-232 port (baud rate: 300 to 115200), 1x UART

2x RS-485 port

Interface for GSM / Wifi / Radio module

Ethernet 10/100 Mbit

USB master, USB slave

2x SDI-12

Supported Protocols: FTP server, FTP client, HTTP server, telnet, SMTP, SMTPS, MODBUS RS-485, MODBUS, NTP Ethernet



P4-4G modem

Data rates

- LTE-FDD Max 100 Mbps (DL) Max 50 Mbps (UL)
- LTE-TDD Max 61 Mbps (DL) Max 18 Mbps (UL)
- DC-HSPA+ Max 42 Mbps (DL) Max 5.76 Mbps (UL)
- UMTS Max 384 Kbps (DL) Max 384 Kbps (UL)
- TD-SCDMA Max 4.2 Mbps (DL) Max 2.2 Mbps (UL)
- CDMA Max 5.4 Mbps (DL) Max 14.7 Mbps (UL)
- EDGE Max 236.8 Kbps (DL) Max 236.8 Kbps (UL)
- GPRS Max 85.6 Kbps (DL) Max 85.6 Kbps (UL)

Operating temperature range

-40 °C to +85 °C

Environmental conditions

Operating temperature range: -40 °C to +70 °C
 Operating humidity range: 0 to 100 %

P4-GSM modem

Specification

- Quad Band GSM/GPRS/3G modem E-GSM 850/900/1800/1900
- Class 4 (2 W at 900 MHz)
- Class 1 (1W at 1800 MHz)
- Data, SMS
- Fax and data transmission without extra hardware

Operating temperature range

-40 °C to +85 °C

Environmental conditions

Operating temperature range: -40 °C to +70 °C
 Operating humidity range: 0 to 100 %

Air temperature sensor

Measurement range	-65 °C to +70 °C
Accuracy	±0.2 (-40 to +60) °C

Atmospheric pressure sensor

Pressure range	500 to 1100 hPa (or custom)
Measurement principle	piezoresistive transducer
Accuracy	±0.3* hPa (-40 °C to +60°C) *custom range or accuracy available upon request
Long-term stability	±0.2 hPa / year

Precipitation sensor

Catch area	200 cm ²
Output	pulses - switching contact
Resolution	0.1 mm 0.2 mm 0.5 mm
Measuring range	0 to 600 mm/h 0 to 900 mm/h 0 to 2500 mm/h
Measurement error for different rainfall	intensity < 20 mm/h → measurement error < 1 % intensity 20 to 600 mm/h → measurement error < 2 %

Relative humidity measurement

Measurement range	0 to 100 %RH
Accuracy (@ 25 °C)	±1 %RH
Short term hysteresis	< 0.6 %RH
Accuracy over temperature range	$1 + t - 25 * (0.008 + 0.00052 * RH)$
Typical long-term stability	±1.0* % per year
Calibration traceability	MBW calibration
Response time at +25 °C in still air with a sintered filte	63 % to < 40 s
Sensor type	thin film capacitive
Upgrade to ISO 17025 accredited calibration	optional

** dependent on operating environment*

Water level and tide sensor**Pressure sensor**

Measure type	overpressure, liquid column
Measuring range	0 to 0.25 m up to 800 m
Accuracy	0.25 % only for ranges ≥ than 10 m 0.5 %; 1 % FS (optional)

Radar sensor

Measurement range	0.4 - 35 m
Resolution - SDI-12 interface	0.001 m
Measurement accuracy (SDI-12)	0.4 - 2.0 m : ± 9.1 mm 2.0 - 30.0 m : ± 3.0 mm 30.0 - 35.0 m : ± 9.1 mm

Measurement accuracy (4 to 20 mA)	± 0.1 % full scale
Measurement time	20 s
Beam angle of antenna	12°
Sensor technology	pulse radar
Transmitting frequency	25.2 GHz pulse radar

Wind sensor

Wind speed

Range	0 to 60 m/s (116 knots)
Accuracy	±2 % @ 12 m/s
Resolution	0.01 m/s (0.02 knots)
Response time	0.25 seconds
Threshold	0.01 m/s

Wind direction

Range	0 to 359° (no dead band)
Accuracy	±2° @ 12 m/s
Resolution	1°
Response time	0.25 seconds

Water quality sensor

Sound velocity

Range	1375 - 1625 m/s 1100 - 2000 m/s 500 - 2000 m/s
Accuracy (+/-)	0.025 m/s 0.5 m/s 1.0 m/s
Resolution	0.001 m/s

Conductivity temperature

Range	CND: 0 - 90 mS/cm TMP: -5 - 45 °C
Accuracy (+/-)	CND: 0.01 mS/cm TMP: 0.005 °C
Resolution	CND: 0.001 mS/cm TMP: 0.001 °C

Temperature

Range	-5 - 45 °C
Accuracy (+/-)	0.005 °C
Resolution	0.001 °C

Pressure

Range	0 - 6000 dBar
Accuracy (+/-)	0.05 % FS
Resolution	0.02 % FS

Turbidity

Range	0 - 3000 NTU
Accuracy (+/-)	2 % reading or 0.2 NTU
Resolution	0.01 NTU

Dissolved oxygen

Oxygen	O ₂ - concentration	air saturation
Measurement range	0 – 1000 µM	0 - 300 %
Accuracy	< 2 µM or 1.5%	<1.5 %
Resolution	< 0.1 µM	0.05 %
Output parameters	O ₂ - concentration in µM air saturation in % oxygen raw data	

Other sensors available upon request

pH, chlorophyl, blue-green algae etc.

Wave and current sensor**System**

Acoustic frequency	1 MHz, 600 kHz or 400 kHz
Acoustic beams	4 beams, one vertical, three slanted at 25°
Vertical beam opening angle	1.7°

Current profile

Maximum range (depends on local conditions)	30 m (1 MHz), 50 m (600 kHz), 100 m (400 kHz)
Depth cell size	0.25 – 4.0 m (1 MHz) 0.5 – 8.0 m (600 kHz) 1.0 – 8.0 m (400 kHz)
Number of cells	typical 20 – 40, max. 128

Velocity measurements

Velocity range	± 10 m/s horizontal, ± 5 m/s along beam
Accuracy	1% of measured value ± 0.5 cm/s

Wave measurements

Maximum depth	35 m (1 MHz), 60 m (600 kHz), 100 m (400 kHz)
Data types	pressure, one velocity along each beam, AST

Wave estimates

Range	15 to +15 m
Accuracy / resolution (Hs)	< 1% of measured value / 1cm
Accuracy / resolution (Dir)	2° / 0.1°
Period range	0.5 - 100 s (1 MHz), 1 - 100 s (0.6 MHz), 1.5 - 100 s (0.4 MHz)

