



# SAAB



## R4 NAVIGATION SYSTEM

IMO require SOLAS class ships to carry type approved GPS equipment. Saab can offer a number of IMO-compliant GPS and DGPS solutions, either as stand-alone Navigation Systems or as a additions to existing Saab AIS systems.

The navigation products from Saab are self-monitoring and extremely user friendly. They perform continuous RAIM (Receiver Autonomous Integrity Monitoring) calculations. This allows the Officer Of the Watch (OOW) to set the required navigation accuracy for any stage of the journey. The R4 Navigation System from Saab will give continuous feedback and alarm if the accuracy limit is exceeded.

### R4 GPS NAVIGATION SENSOR

The R4 GPS Navigation Sensor is a high-precision GPS receiver, capable of receiving SBAS (e.g. WAAS and EGNOS) differential corrections. The unit performs continuous RAIM calculations, which enhance the integrity of the position data.

### R4 DGPS NAVIGATION SENSOR

The R4 DGPS Navigation Sensor is the ultimate sensor for any Commercial Marine application. This product has all the features of the GPS Sensor and a dual channel beacon receiver for reception of IALA beacon DGPS corrections.

### R4 CONTROL AND DISPLAY UNIT

The R4 Control and Display Unit performs a multitude of navigation functions. The traffic-light LEDs are used to continuously indicate the status of the RAIM calculations. Green light tells the OOW that the position accuracy is within the required value.

In combined DGPS/AIS configurations, the R4 Control and Display Unit will display and control Navigation data, in addition to the AIS information. Saab's R4 GPS/DGPS products will of course be ideal to connect to existing or future AIS systems, ensuring that the ship operates in full compliance with all relevant regulations. GPS information is becoming extremely vital for many systems onboard and hence critical to overall safety.

## SYSTEM CONFIGURATIONS



Stand-alone GPS or DGPS System



Redundant DGPS System



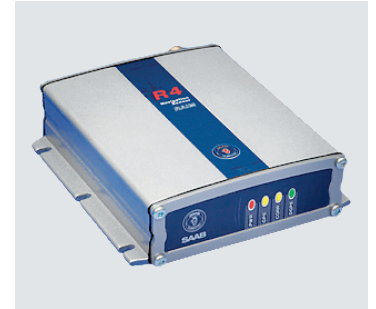
R4 Control and Display Unit



Combined AIS/DGPS System



Combined AIS/Redundant DGPS System



R4 Navigation Sensor

## TECHNICAL SPECIFICATIONS

### General

Waypoints	2000 waypoint memory.
Routes	100 routes, using a total of 2000 points.
Functions	Navigation (rhumb line and great circle), Position, Route, Waypoint, Event Mark, Plot, Sail To, MOB, GPS/DGPS, Alarms, Time Alerts, Trip Logs, Anchor Watch Alarm, Configuration.
Integrity	The product performs RAIM calculations in accordance with IEC 61108-1 Ed. 2.
Supply	22 - 30 V DC, 12.5 W.
Display	High Resolution 6 inch, ¼ VGA monochrome, Sunlight Readable.
LEDs	1 Power and 3 RAIM status (R/Y/G) Yoke or flush mounting of Display Unit.

### GPS Receiver

L1, C/A-code with carrier phase smoothing	
12 channels (2 channels dedicated to SBAS)	
DGPS by SBAS or externally input RTCM corrections.	
Update rate	1 Hz default, 5 Hz max
Position accuracy	GPS*: 5 m, DGPS** 1 m (2D RMS)
Cold start	1 min typical.

Specifications subject to change without notice

### DGPS Beacon Receiver

Dual receiver	Manual or Automatic tuning
Frequency	283.5 to 325.0 kHz
MSK Bit Rates	50, 100, and 200 bps
Cold Start Time	<1 minute typical
Reacquisition	<2 seconds typical
Sensitivity	25 µV/m for 6 dB SNR @ 200 bps

### Interface

2 bi-directional user ports RS422.  
1 output port RS422.  
Ports are configurable 4,800 - 38,400 bps.  
Alarm output for relay activation.  
Alarm acknowledge input discrete.  
Log pulse output.

### Dimensions (WxHxD)

Control and Display unit	270 x 207 x 102 mm
Navigation Sensor	128 x 39 x 137 mm

### Weight

Control and Display unit	1.1 kg (2.4 lb)
Navigation Sensor	0.5 kg (1lb)

### Cables

Power/Data Cable to Navigation Sensor  
2 m (7 ft). 18 pin MaxiCon - pigtail.  
Data Cable to Control and Display Unit  
2 m (7 ft). 18 pin MaxiCon - pigtail.  
Power Cable to Control and Display Unit  
2 m (7 ft). 3 pin MaxiCon - pigtail.  
GPS Antenna Cable (recommended)  
RG214 and RG213: Max length 45 m  
TNC connector

### NMEA Messages

APB, BOD, BWC, DBT, DPT, DTM, GBS, GGA, GLL, GNS, GSV, HDG, HDT, HSC, RMB, RMC, Rnn, RTE, VHW, VTG, WPL, XTE, ZDA.

### Proprietary Messages

For RAIM control and display.

### Environmental data

Protected environment (IEC 60945)  
Operating temperature -15 °C to +55 °C

### Compliance with the following Standards

IMO Resolution MSC.112(73)  
IMO Resolution A.694(17)  
IMO Resolution MSC.191(79)  
IEC 61108-1 Ed.2.0  
IEC 60945 Ed.4.0  
IEC 62288 Ed.1.0  
IEC 61162-1 Ed.3.0

### Type approvals

Wheelmark  
USCG

\* Dependent upon ionospheric activity and multipath.

\*\* SVs >5, HDOP <2, RTCM SC-104 correction data from a dual frequency reference station, short baseline, and low multipath environment.