

Saab TransponderTech AB

R6 NEO R6 NAV NEO

System Overview



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Saab TransponderTech AB, SWEDEN

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1. Scope

This document describes the R6 NEO navigation system configurations, developed to meet the increased general demand for precision navigation, as well as the new specific Panama Canal requirements for transiting Neopanamax vessels.

The document serves as a guide for buyers and future users to make the right decision by presenting a technical overview of the R6 NEO systems' features and components.

For additional details, we refer to the R6 NEO Installation Guide and User Manual.

Saab TransponderTech provides premium AIS and GNSS products and systems to professional mariners around the globe. We conduct all sales through a global network of authorized distributors, as well as to system integrators where our products serve as subsystems in complete bridge solutions.



2. Introduction

The general use of R6 NAV NEO and specific use in the Panama Canal.

2.1 General use on open sea, ports and other waterways

The **R6 NAV NEO** system solution is meeting the increased demand for precision navigation, and is SOLAS approved for general use on any waters while also fulfilling the new Panama Canal Authority requirements for a non-portable piloting unit. With our modular design, the R6 NAV PRO Compass Sensor allows for additional configurations to meet specific needs.



General features of the R6 NAV NEO system

- Type approved DGNSS providing top of the line accuracy for position, speed, course, heading and rate of turn.
- Operator HMI available in the R6 CDU (Control and Display Unit). Additional R6 CDU may be installed in a network configuration.
- Prepared for additional SOLAS approvals as Transmitting Heading Device (THD) and Speed and Distance Measuring Equipment (SDME) and Rate of Turn Indicator (ROT).*
- Supports GNSS corrections via IALA beacon, SBAS, local RTK, and global ATLAS correction service.
- Ability to use the same system on open sea as well as in narrow waters or at docking.
- Precise ship position and movements displayed on the R6 CDU (control and display unit) as well as distributed to ECDIS, ARPA or other systems onboard the ship over standardized network and serial interfaces.

**Additional MED approvals estimated second half 2024*

Outstanding position and signal integrity

- Depending on correction source, accuracy at sub-metre (DGNSS), decimetre (Atlas) and centimetre level (Local RTK)
- Built in detection for spoofing and signal jamming, with advanced active filters to limit impact of jammers in the GNSS band.



2.2 The Panama Canal

The R6 NEO and R6 NAV NEO systems are approved by the Panama Canal Authorities (ACP) as capable of meeting the requirements for a pre-installed, non-portable piloting unit (NPPU) for vessels with a beam of 109 feet / 33.22 metres or more (NeoPanamax vessels), tested to be meeting rigorous accuracy requirements for monitoring ship movements while transiting the canal.

With the NPPU (R6 NEO or R6 NAV NEO) pre-installed on arrival, each vessel must for the first transit pass an individual testing and control of the installation.

Panama pilots are able to quickly connect portable tablets running the pilotage software of choice to the system's WiFi Access Point providing real-time data of the vessel's position, heading and movements at extreme accuracy.












Panama mode

The system features geo-fenced protection ensuring no change in approved configuration, while moving through Panama waters. When entering the Panama Canal, the system will ensure use of local RTK correction, and other external corrections will be shut down as required.

2.3 Choosing the R6 NEO vs the R6 NAV NEO

The **R6 NEO** option meets the requirements of the Panama Canal Authority, but does not include the R6 CDU (control and display unit). It does not provide an operational HMI, all configuration is done using networked Web interfaces of the I6 IMU and R6 NAV PRO Compass. The vessel's position and movements is monitored on the external piloting software/tablet only. Without the CDU it will not be SOLAS approved for general use.

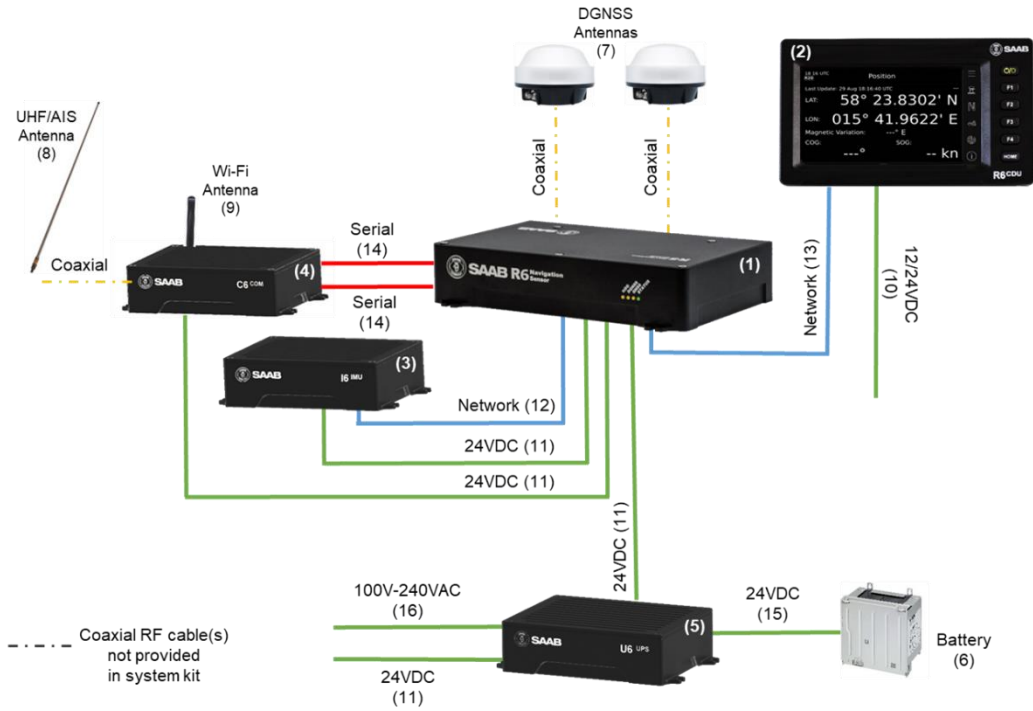
The **R6 NAV NEO** option exceeds the Panama Canal Authority requirements by inclusion of the R6 CDU (control and display unit), enabling SOLAS approval. Precise ship position and movements are displayed on the R6 CDU and may be distributed to ECDIS, ARPA or other systems on board the ship.

	R6 NEO	R6 NAV NEO
Meets Panama requirements for on board installed pilotage equipment		
SOLAS approved navigation system for any waters with type approved (D)GNSS		
Prepared for additional SOLAS approval <ul style="list-style-type: none"> • Transmitting Heading Device (THD) • Speed and Distance Measuring Equipment (SDME) • Rate of Turn Indicator (ROT) <i>(Estimated late 2024)</i>		
Precise ship position and movement displayed on the R6 CDU as well as distributed ECDIS, ARPA etc.		
Accurate longitudinal and transversal speed log system for docking and precise manoeuvring		
Outstanding position and signal integrity in any waters with built in spoofing and jamming detection		

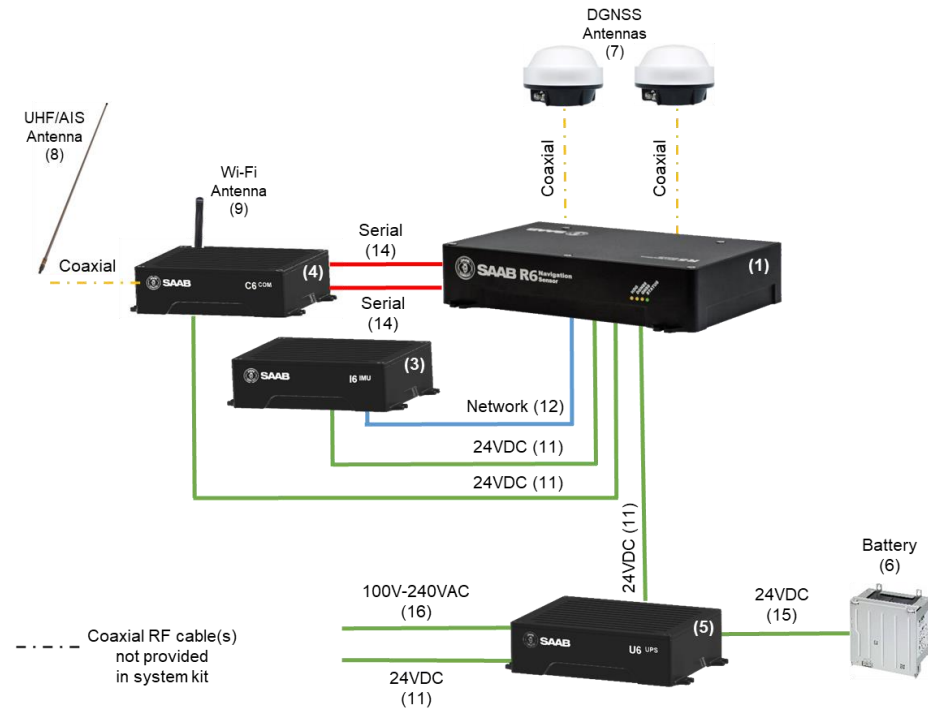


3. System Overview

Example interconnection of R6 NAV NEO (with the R6 CDU)



Example interconnection of R6 NEO (without the R6 CDU)





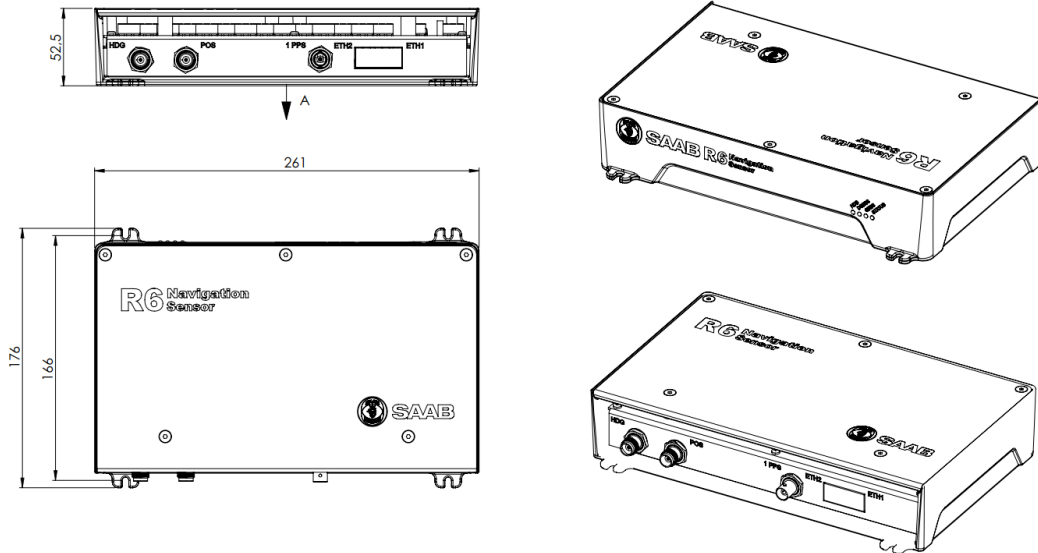
4. R6 NEO and R6 NAV NEO System kits

			7001 000-750	7001 000-751
Part No.	Description	Wiring diagram Ref. No	R6 NEO	R6 NAV NEO
7000 125-500	R6 NAV PRO compass	(1)	1	1
7000 123-500	R6 CDU	(2)		1
7000 123-140	R6 CDU Gimbal mount kit			1
7000 123-142	R6 CDU Flush mount kit			1
7000 125-602	I6 IMU	(3)	1	1
7000 125-702	C6 COM	(4)	1	1
7000 125-800	U6 UPS	(5)	1	1
7000 000-856	Battery 24VDC 12 Ah	(6)	1	1
7000 000-651	DGNSS antenna (A43)	(7)	2	2
7000 000-855	UHF/AIS Combined antenna	(8)	1	1
7000 000-857	Wi-Fi antenna SMA 9dB	(9)	1	1
7000 000-858	Wi-Fi antenna SMA 4.1 dBi		1	1
7000 118-077	Power cable 2m	(10)		1
7000 000-849	Power cable M12 to open 2m	(11)	4	4
7000 000-848	Ethernet cable M12 to RJ45 2m	(12)	2	2
7000 000-525	Ethernet cable, 5 m	(13)		1
7000 000-851	Serial cable M12 to open 2m	(14)	2	2
7000 000-850	UPS Battery cable M12 to open 2m	(15)	1	1
7000 000-102	Power cable UK black	(16)	1	1
7000 000-103	Power cable SE/EU black		1	1
7000 000-104	Power cable US/CA black		1	1
7000 125-303	R6 NAV NEO Document Set		1	1

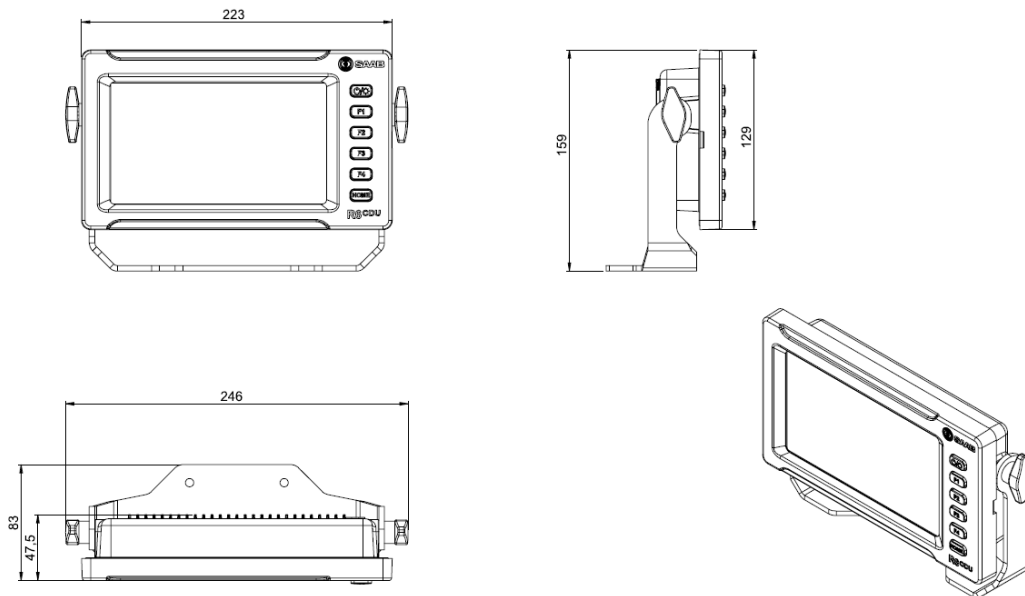


5. Drawings

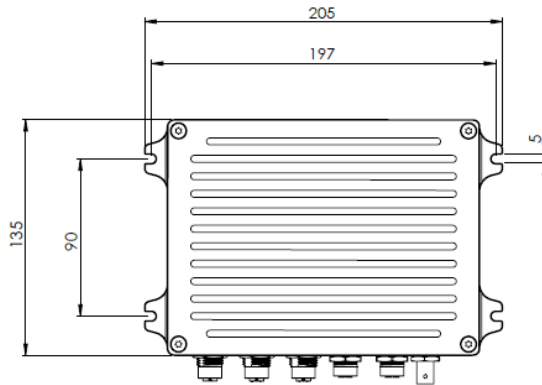
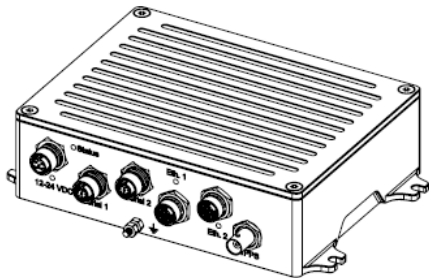
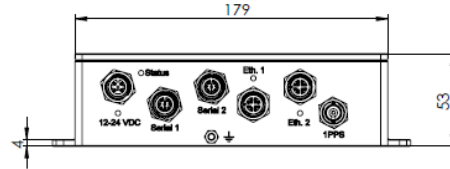
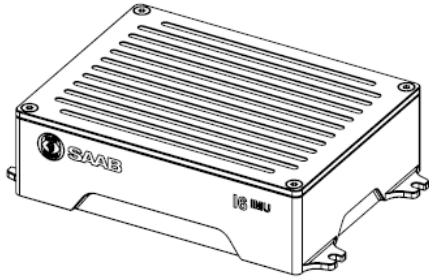
7000 125-500, R6 NAV PRO Compass



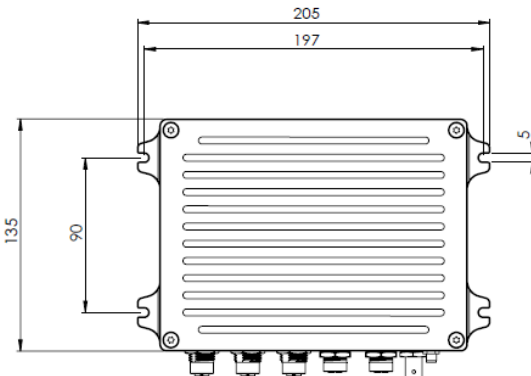
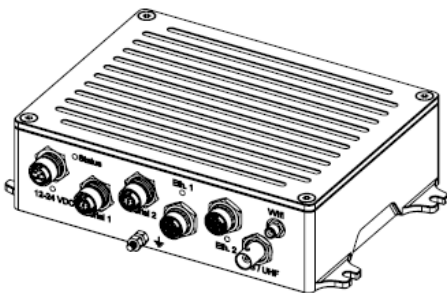
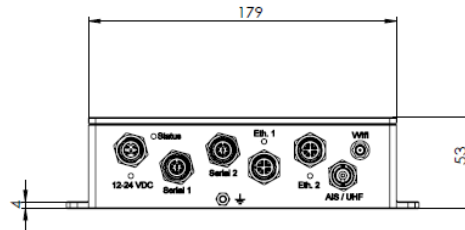
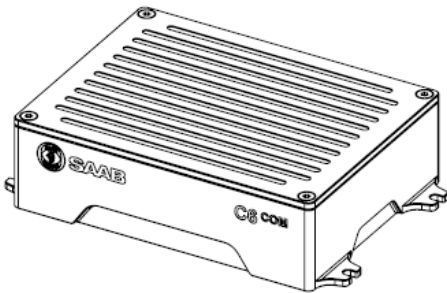
7000 123-500, R6 CDU, control and display unit (with Gimbal Mount kit)



7000 125-600, I6 IMU

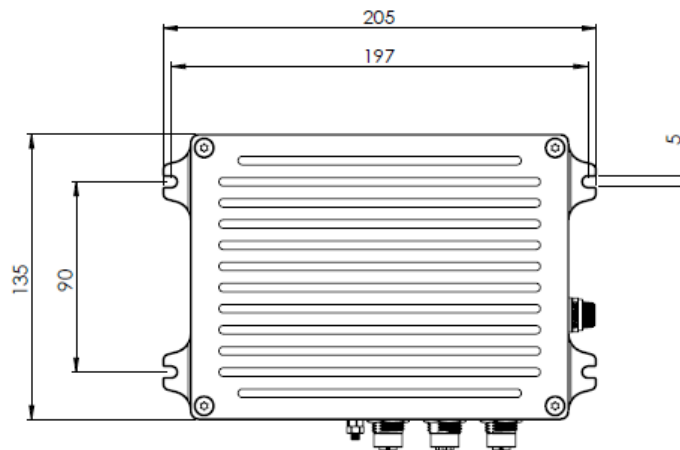
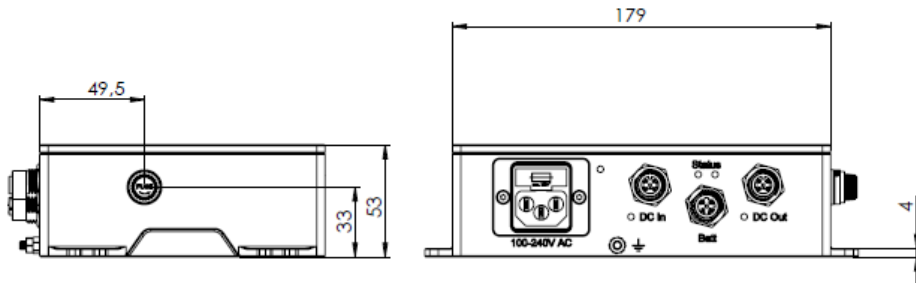
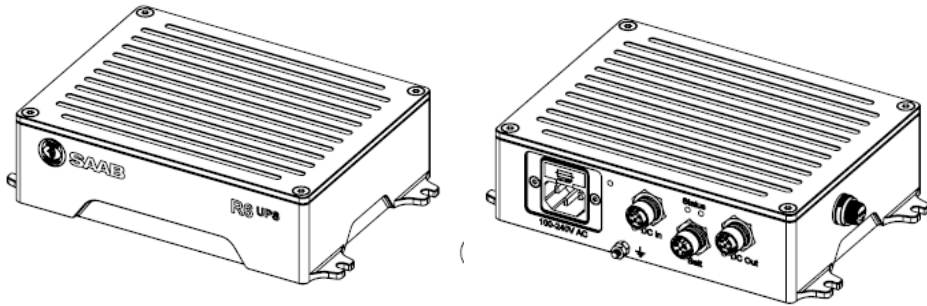


7000 125-700, C6 COM





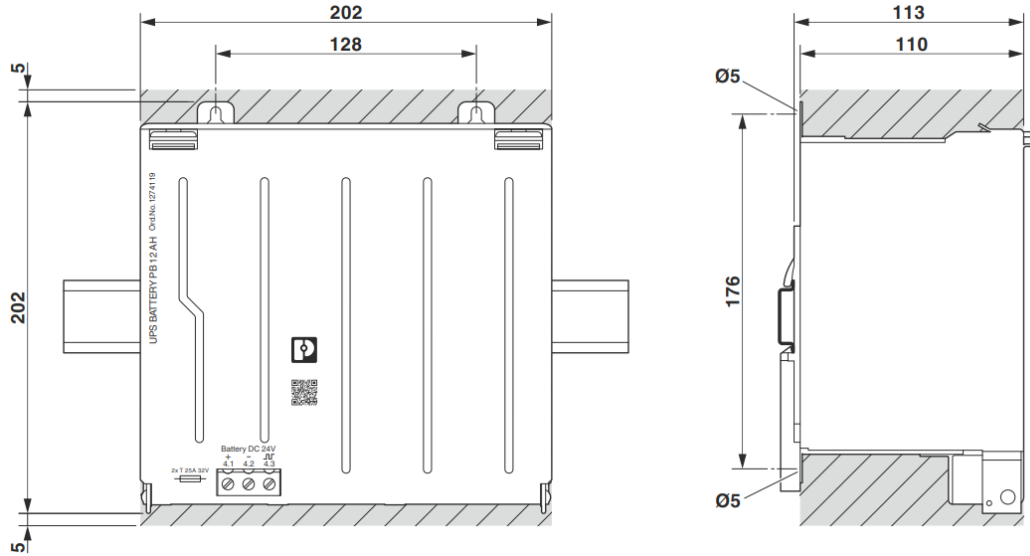
7000 125-800, U6 UPS





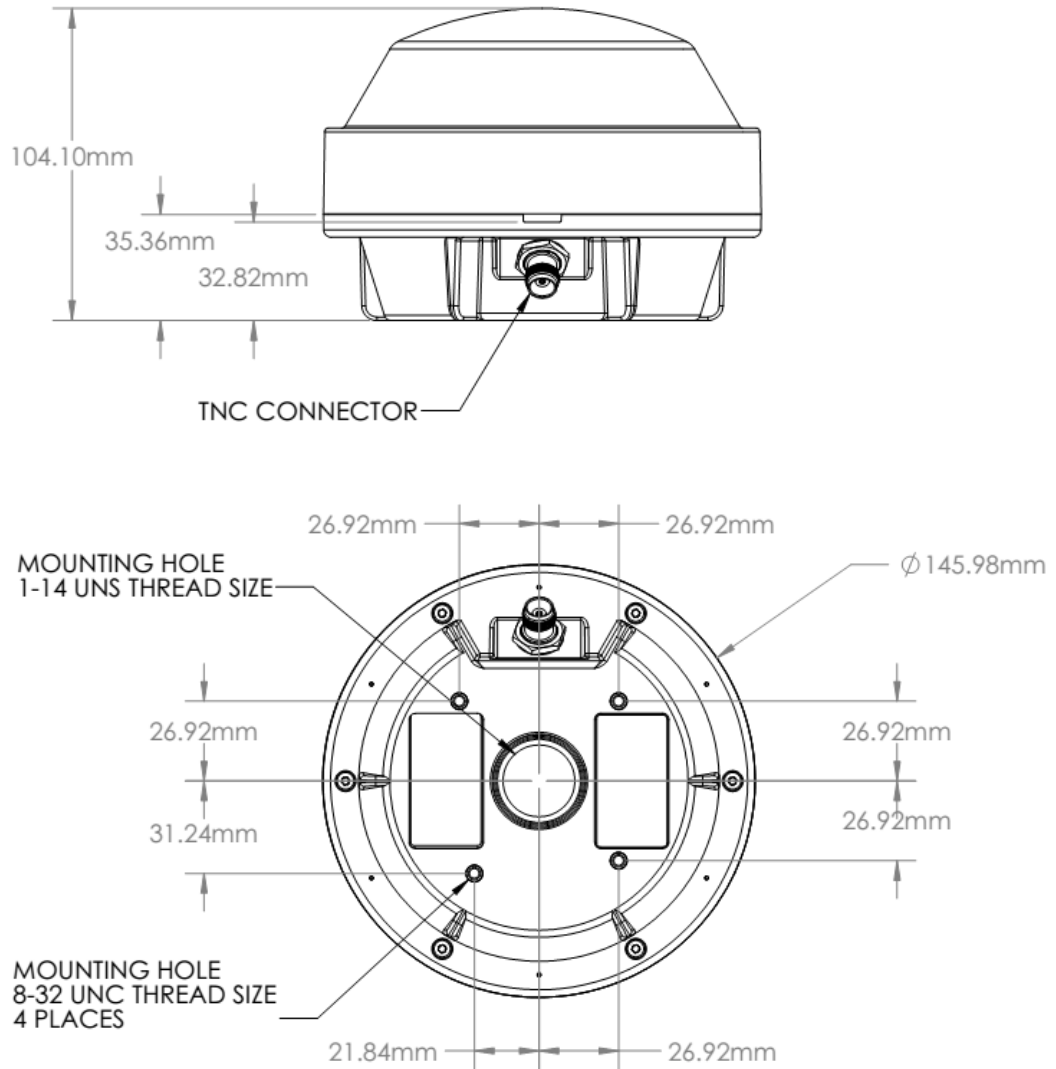
7000 000-856, Battery UPS-BAT/PB/24DC/12AH

Mounting: Wall or DIN mount





7000 000-651, DGNSS Antenna A43



7000 000-855, UHF/AIS Combined Antenna

- Connector: Type N-female
- Height: Approx. 1260 mm
- Mounting: 1" threaded pole (G1"-11 thread) with Revolving Nut Kit or on optionally brackets

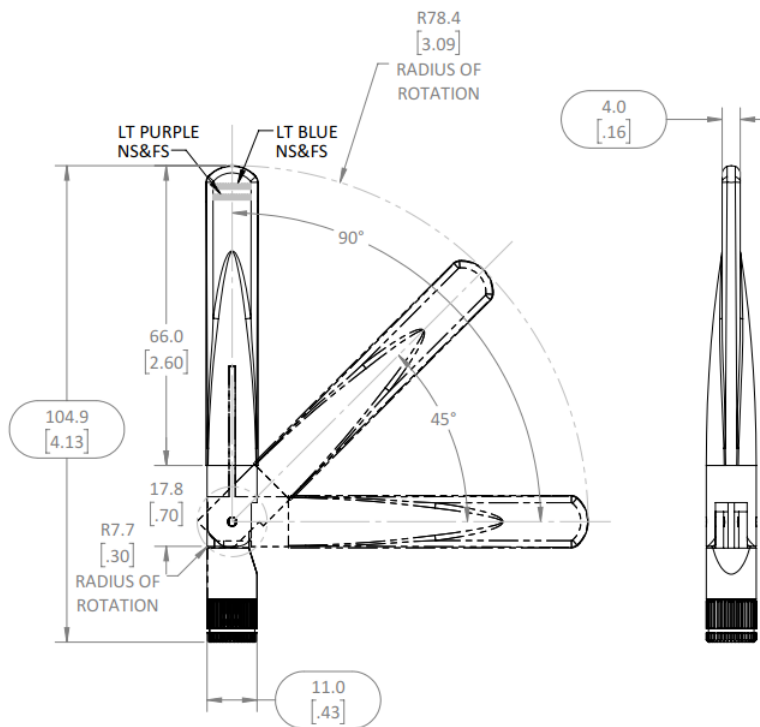


7000 000-857, Wi-Fi antenna SMA, 9dBi

- Antenna Length 295mm



7000 000-858, Wi-Fi antenna SMA, 4.1 dBi





6. Technical Specifications

Dimensions/Weight	
Navigation Sensor	261x53x177 mm / 1900 g
CDU	220x125x45 mm / 1500 g
IMU Unit	205x150x53 mm / 1100g
Com Unit	205x150x53 mm / 1100g
U6 UPS	205x150x53 mm / 1400g
Battery	202x202x110 mm / 9200g
Environmental	
Operation temperature	-15°C to +55°C
Storage temperature	-30°C to +80°C
Positioning / Heading	
Supported systems	GPS/GLONASS/ GALILEO/ BeiDou QZSS*, NavIC* and Atlas L-band
Signals supported	GPS L1CA/L1P/L1C/L2P/L2C/L5 GLONASS G1/G2/G3, P1/P2 BeiDou B1i/B2i/B3i/B1C/B2a/B2b/AceBOC GALILEO E1BC/E5a/E5b/E6BC/AltBOC QZSS L1CA/L2C/L5/L1C/L6 NavIC (IRNSS) L5, Atlas L-band
Differential modes	SBAS, RTCM-SC104 IALA Beacon, RTK
Rate of Turn accuracy	< 0.1°/min
Speed Accuracy	< 1 cm/sec
Sensitivity	-142 dBm
Channels	1.100+
Update rate	Up to 10 Hz
Accuracy (RMS 67% / 95%)	Uncorrected: 1.2 m / 2.5 m SBAS/RTCM-SC104: 0.3 m / 0.6 m Atlas L-band subscription: 4 cm / 8 cm RTK: 8 mm + 1 ppm / 15 mm + 2 ppm
Heading Fix	10s typical (Hot Start)
Heading (RMS)	< 0.02° RMS @ 5.0 m antenna separation
Pitch/Roll (RMS)	< 0.5°
Heave (RMS)	< 5 cm RMS (RTK)
Timing (1PPS) accuracy	20 ns
GNSS Fix	60s/30s typical (Cold/Warm)
Gyro Bias Instability	≤ 1.2°/hr
Angular Random Walk	≤ 0.08°/√hr



Data interfaces	
IEC 61162-1/2 IEC 61162-450	RS-422 Input output Ethernet RJ45
Alert Relay	0.1-5A, 30VDC, 150W
GNSS	2x 50 Ohm (TNC), 5 VDC
1PPS	5 VDC (BNC)
UHF/AIS	N-Type
Wi-Fi	SMA
Power input	
Input Voltage, U6 UPS	12-24VDC / 90 - 240ADC
Consumption, System	< 40w average (I6 IMU,C6 COM,R6 NAV Sensor)
IALA Beacon Receiver	
Dual receiver	Manual- or Automatic- tuning
Frequency	283.5 to 325.0 kHz
MSK Bit Rates	50, 100, 200 bps
Cold Start Time	< 1 minute typical
Reacquisition	< 2 seconds typical
Sensitivity	25 μ V/m for 6 dB SNR @ 200 bps
UHF Receiver	
Frequency	403 to 473 MHz (default 454.325 MHz)
Bandwidth	12,5/20/25 KHz
Modulation	GMSK/4FSK/8FSK/16FSK)
Protocol	TrimTalk 450S (configurable)
Sensitivity	< -115dBm
AIS Receiver	
Frequency	161.975 / 162.025 MHz
Sensitivity	< -116dBm at 20% packet error rate
Wi-Fi	
Access Point	IEEE 802.11 a/b/g/n, 2.4 GHz
Number of Clients	4
Security	WPA2
Output Power	18 dBm
Sensitivity	< -82 dBm

7. Installation Guide and User Manual

These are provided separately

8. Customization based on the R6 NAV NEO

The new R6 NAV PRO Compass is possible to use for a large variety of applications where high precision is required, also where the Panama Canal requirements do not need to be fulfilled. The system can be configured with or without the C6 COM, I6 IMU or the U6 UPS unit.

9. Integration with Other Systems

All Saab R6 NAV systems are possible to combine with R6 Supreme AIS by sharing CDU (control and display unit) to save space on the bridge.

Please note that the built-in AIS receiver in the C6 COM unit only receives and displays AIS targets as required for use in the Panama Canal but does not transmit AIS data, and doesn't replace the requirement for a Class-A AIS system.

10. Sales and Support

Saab TransponderTech conducts all sales through a global network of authorized distributors. Please visit our website for the latest distributor list.

Saab TransponderTech Maritime website:

<https://www.saab.com/maritime>