Simrad Navigation Systems
ECDIS, PLECDIS, ECS and GPS
Simrad Professional Navigation Systems

SIMRAD PROFESSIONAL

The Simrad Professional portfolio offers a comprehensive range of marine electronic products spanning instruments, autosteering, gyro compasses, navigation systems, radar, communications and safety. Simrad Professional products are synonymous with sophistication and rugged reliability, providing tried and trusted solutions for a wide range of professional applications. With more than 60 years experience of developing quality products, Simrad are well positioned to meet the needs of today’s professional mariners.

SIMRAD PROFESSIONAL NAVIGATION SYSTEMS

Simrad professional products include a wide range of sophisticated, approved navigation systems, electronic chart systems and echo sounders to ensure optimal safety and performance. Simrad navigation systems are built on years of experience within steering, charting, navigation and safety. Already in 1985 Simrad collaborated with the Norwegian Hydrographic Office to develop a pre-ECDIS standard charting system. The CS68 ECDIS has been built on this 20-year charting history and developed in close cooperation with shipping companies and high speed craft navigators. The new NSE series is tailor made for smaller high speed boats, coasters and Fishing vessels.
Simrad CS68 ECDIS

The most reliable ECDIS (Electronic Chart Display and Information System) in the world. With the CS68 ECDIS system, we are the only ECDIS supplier in the world that offers an approved ECDIS that runs on 24VDC. This makes the CS68 also very suited for smaller vessels under 3000 tons, with quick access to the most important functions. We have also created a unique voice alarm system, which makes it possible to separate ECDIS alarms from other alarms on the bridge.

The Simrad CS68 ECDIS and PLECDIS systems are developed in Norway for use under the roughest conditions. The system is also approved by DNV for use on all SOLAS ships and other vessels that must carry an ECDIS system.

A cost saving ECS version for use on board vessels that want ECDIS functionalities, but are not required to carry a full ECDIS system onboard, is also available.

**CS68 KEY FEATURES**

- Hardware and software are type approved according to the IMO and the Marine Equipment Directive (Wheelmark) United States Coast Guard USCG approval pending.
- ENC/S57, S63 and C-map SENC CM93/3 support
- Chart update online or through CD/DVD/USB flash drive.
- Dynamic chart licensing.
- Radar overlay option
- AIS Class-A and Class-B support. AIS filter and two way communication
- Double trip counter
- SIMRAD Backup Manager
- Relay interface to ship’s main alarm centre.
- Dual monitor output
- 19”, 20.1”, 23” or 27” Wide approved ECDIS displays

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>000-00018-001</td>
<td>CS68 ECDIS system, 24 V DC system without monitor</td>
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<tr>
<td>000-00018-003</td>
<td>CS68 ECDIS system, 24 V DC system with monitor</td>
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<tr>
<td>000-00044-001</td>
<td>Radar overlay kit</td>
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<tr>
<td>26053231</td>
<td>COP10-CS6x Remote operator panel</td>
</tr>
<tr>
<td>26053355</td>
<td>COP20 Operator panel designed for mounting in the chair’s armrest</td>
</tr>
<tr>
<td>26053207</td>
<td>COP30 Illuminated keyboard and mouse for all CS chart systems.</td>
</tr>
<tr>
<td>26056713</td>
<td>ECDIS external ON/OFF switch</td>
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</tbody>
</table>

**Optional remote control COP20**

**Optional remote control COP10**

**COP10 mounted in the armrest of the chair.**
Simrad Paperless ECDIS solution. One of the main features of ECDIS is to be able to go paperless, using high quality ENCs (Electronic Navigational Charts) for safer navigation. Combining a CS68 ECDIS system with backup (Simrad PLECDIS™). The navigator can utilize a fully approved and redundant high class electronic navigation system that allows the ship to operate without paper charts on board. This provides crew and owners benefits in safety, cost and efficiency, and enables automatic updates of charts everywhere.

**ECDIS / PLECDIS™ Key Features**

- Seamless zooming
- Quick route function
- Preferred turn rate in every turn
- Head up display
- True Route Navigation
- Logbook with voyage play back
- AIS and ARPA target overlay
- Automatic chart scale
- Vessel shown in actual size
- Ship’s turning radius shown in route planning
- Tide calculation
- Fast vessel update rate
- Quick level change of chart clutter
- Variable range and bearing line
- Tracking of other vessels
- Man Over Board function
- Unique tracking feature

The CS68 type approval fulfills the requirements to sail “paperless”.

<table>
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<td>000-00018-002</td>
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<tr>
<td>000-00044-001</td>
<td>Radar overlay kit</td>
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<tr>
<td>26053231</td>
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</table>

Shock absorbers ensure optimal performance.
OPERATIONAL MODES
The Simrad CS60 series ECDIS/ECS systems have the unique capability of combining both a monitoring and a planning mode. All safety functions are continuously monitored even when route planning.

MONITOR MODE
In monitoring mode, the position of the vessel is displayed in real time on the chart. The ship's outline and size is displayed with actual vessel heading, a COG and SOG vector and actual track. The vessel can be displayed in relative or true motion.

HIGH PERFORMANCE MARINE COMPUTERS
All Simrad Marine Computers are made to serve the demands of the professional marine industry and are not on the shelves industry PCs which are used by most other manufacturers. Simrad believes that a vessel's primary navigation system deserves better. The computers are type approved according to IEC 60945 and the chart systems carry a 2 year warranty to back it up. All systems come standard with a total system recovery feature, so in a case of breakdown the system can be restored to its previous state after repairs have been performed.

ARPA RADAR INTERFACE
By activating the interface to an ARPA radar, moving targets and operator selected "fixed points" can be displayed. Other vessels are then shown in real time on the chart, color coded depending on possibility for collision.

PLANNING MODE
Planning of a route and the definition of waypoints is very simple using either a trackball or numeric keyboard. A pan function enables the operator to move around in the chart. To view any position in the world, the “Pan To” function can be used for viewing the chart in a specific position in Latitude, Longitude or around the vessel's own position or a waypoint. Planned routes can be stored and recalled whenever necessary.

- Zooming in the chart may be performed in numerous ways. Also as a defined zoom area.
- Fixed range markers are available to ease and secure navigation in narrow waters.
- Menu bar with icons and large characters.
- An Antigrounding feature, detecting obstacles in the chart, may be set to meet user requirements.
- AIS targets are shown in real time and in real size.
- The only ECDIS with voice warnings to separate the alarms from the swarm of other constant beeping buzzers.
Simrad CS66 ECS

Flexible ECS System with ECDIS software. Simrad is not only offering approved ECDIS systems (Electronic Chart Display and Information System) for professional users, as professional solutions are also provided by the CS66 for smaller vessels including harbour vessels and yachts. The Simrad ECS systems come with the same professional core software as our ECDIS, as well as industry grade professional computers. The flexibility around space available and monitor type and size is bigger with an ECS system than with an ECDIS.

We cover the complete range of screens from 10” to 23” Wide for commercial vessels.

**CS66 KEY FEATURES**

- Hardware approved to IEC 60945 standard
- Software complies with ECDIS standard
- Advanced route planning not found in regular chart plotters
- Flexible storage of tracks, symbols, objects and log files
- Advanced sensor filters
- Anti grounding system
- Short way to coming regulatory ECDIS
- Very low life cycle cost

**A WIDE RANGE OF NAVIGATION SYSTEMS**

- CS68 ECDIS
- CS68 PLECDIS™
- CS66 ECS

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<th>Description</th>
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<tr>
<td>000-00044-001</td>
<td>Radar overlay kit</td>
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<tr>
<td>26053231</td>
<td>COP10-CS6x Remote operator panel</td>
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Hook your ECDIS/ECS up to the internet and download Notice to Mariners wherever you are (depending on user defined service provider).

- Two modes of quick and easy route planning.
- Several display pallets available, night pallet with filled light sectors shown here.
- Always up to date tide tables.
**ELECTRONIC CHART SYSTEMS: CS68 ECDIS**

- MC50 marine computer
- Marine colour monitor
- FB200 filter box
- Chart interface unit
- Cherry keyboard
- Logitech TrackMan® wheel
- Splitter cable for TrackMan wheel and keyboard
- Loudspeaker
- Alarm reset unit

**ELECTRONIC CHART SYSTEMS: PLECDIS**

- 2 x MC50 marine computers
- 2 x Colour monitors (19”, 20.1”, 23” or 27”)
- 2 x FB200 filter boxes
- 2 x Chart interface units
- 2 x Cherry keyboards
- 2 x Logitech TrackMan® wheels
- 2 x Loudspeakers
- 2 x Alarm reset units
- 1 x 10 m crossed network cable
- 1 x PLECDIS™ plaque
NEW All-in-one ECS Simrad NSE

For sophisticated performance in network applications; the new NSE provides 8” and 12” display options and offers the ultimate compact Patrol / Navigation tool for smaller vessels and tenders.

- **Lightning Fast, All-in-one Chartplotter**
  Radar, Chart, Sonar, Autopilot controller, CCTV monitor, Instrument monitoring / The high power processing of NSE lets you zoom, pan and navigate with virtually zero chart lag time
  2D, 3D and shaded relief capability presentation modes
  All New Simrad High Performance GS15 GPS 5Hz Antenna with NMEA2000/SimNet connections

- **Award Winning Echosounder and Radar Technology**
  BSM-1 Broadband Sonar for excellent target separation and deep water penetration
  BR24 Broadband Radar & HD Digital Domes and Arrays for superior image clarity and definition

- **New Simrad NSE Control Interface for Easy Operation**
  Rotary Controller, Cursor Pad, and an Alphanumeric Keypad for flexible & solid input control
  QuickTouch for quick and easy page access and recall
  Minimal time required to learn operation with on-screen menus and prompts

- **Rotary controller:**
  Perfectly intuitive for fine or course control of gain, zoom and menu with push to enter functionality

- **Alphanumeric keypad**
  Quickly enter waypoint, route and track information with precision

- **USB and Flash Drive**
  Record under water surveillance, screen scots, camera images directly to the medium of your choice for report files

- **Programmable QuickTouch keys**
  Touch a button and make things happen...

- **Elegant Design, Brutally Strong Simrad Construction**
  Classic Simrad design with flush mount option compliments any helm design
  Substantial aluminium housing, waterproof connections, and a robust bracket mount all designed for harsh environments

- **Complete Flexibility – with “Masterless” Networking**
  Share Charting, Echosounder and Radar information across multiple units
  “Masterless” system - Any networked unit can operate independently. Network switch may be required
  SimNet plug and play data networking for NMEA2000 compatible sensors & Instrumentation
  Video input and output for display of video or navigation data where you want it

- **Brilliant, Low Power LED Display Technology**
  A “no compromise”, brightest in class SunView™ LED Display
  100% night time dimmable back lighting
  NSE12 is industry first 12” MFD with high resolution XGA display
  Large readable fonts for clear visibility

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### SIMRAD NSE FEATURES

- rotary controller:
- alphanumeric keypad:
- USB and Flash Drive:
- programmable quicktouch keys:

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**Part Number** | **Description**
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AA010145 | NSE8 Multifunction Display (ROW Version)
AA010147 | NSE12 Multifunction Display (ROW Version)
000-0125-25 | GS15 Antenna with 4m Micro-C to SimNet Cable
000-0132-031 | NEP-1 Five port ethernet expansion port.

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**SIMRAD** Professional Series Navigation Systems
Emphasis is on "clear and easy to read". The position and steer screen offer concise information displayed in large fonts and simple graphics.

Pre-configured gauge displays show vessel, environmental and navigation information in digital, analogue or bar format. Optional video inputs complete your NSE system.

The Pages utility is Command Central for frequently used options and tools. Display and edit waypoints, routes and tracks as well as saved log files. AIS, Alarms and GPS status pages are easily accessed.

Pre-configured gauge displays show vessel, environmental and navigation information in digital, analogue or bar format. Optional video inputs complete your NSE system.

AIS
Integrate with Simrad AI50 or NAIS-300 Class B AIS Systems to see and be seen. Overlay AIS-equipped vessel information on chart and radar displays.

SimNet & N2K
SimNet makes data sharing and system control easier and more flexible than ever before. Integrate Simrad autopilot, instruments, VHF, sensors or any NMEA2000 engine or device to the intelligent SimNet backbone.

Video
Simrad NSE has both video input and video output capability. Two video inputs are available with the included RCA/NMEA cable. Output your Simrad NSE to any remote display or large screen via DVI connection port.
**Direct Access to Features with the Press of a Button**

**Premium Charts Embedded**
- Award-winning Navionics Charts include seamless chart detail, satellite photos and 3D
- View depths and elevations in 3-dimensions, with optional satellite photo overlay
- Port Services & Points of Interest. Detailed information, including phone numbers, for services and points-of-interest.

**Upgrade to Navionics Platinum Plus™**

**GS15 High Speed GPS Antenna**
- Advanced 5Hz performance with a true update rate of 5 times per second for best in class position data during acceleration and high speed manoeuvres
- The Simrad GS15 works with SimNet and NMEA 2000® networks for enhanced location accuracy and improved satellite-signal fix
- WAAS and EGNOS

**AutoPilot**
- NSE 2.0 software combines the world’s best performing autopilot system with brilliant, Best in Class NSE displays. Simply network an NSE8 or NSE12 display with a Simrad autopilot system and get full autopilot functionality, with or without an autopilot control display. Engineered to benefit both “space-challenged” dash layouts and multi-station expanded systems, NSE 2.0 autopilot integration offers tremendous flexibility.
- Fully control your Simrad Autopilot from an NSE8 or NSE12 display
- Alter course with the Rotary Controller or Cursor Pad
- Dedicated Standby / Auto key and Pilot Status indicators allow safe, easy Pilot operation
- The NSE performs all the functions of an AP24 or AP28
- The NSE can replace or work together with an autopilot controller
- Fully configure the Autopilot from the NSE display

**Digital Switching**
- NSE 2.0 breaks new ground with support for Czone™ digital switching from BEP Marine. Czone™ digital switching offers a new paradigm for cost effective, control and monitoring of nearly any system on virtually any vessel. The Simrad NSE can operate as a Czone™ controller. Control your lights, turn on your bilge pump, monitor tank levels – all from your NSE navigation system. NSE and Czone™ – a partnership in Innovation.
  
  *Find out more from www.bepmarine.com*
Radar improves a mariner’s situational awareness. Easy to operate Radar function allows for Navigation, Target Tracking and collision avoidance. Display both MARPA and AIS targets for the complete picture.

NSE utilises high performance Broadband Sounder™ technology to penetrate deepwater, clearly define underwater structure and “whisper” into the water to find more fish.

Simrad HD Digital Radars and the award-winning Broadband Radar™ now support True Motion Radar Display. Moving vessels are instantly distinguished from fixed objects and land masses, eliminating guesswork in PPI interpretation.

Broadband Radar near-range performance and usability is optimized with the addition of High-Speed Antenna Rotation; increased target update rates provide early detection and tracking of high-speed radar targets. Discover also the capability to show MARPA targets on your chart screen and added floating VRM's and EBL's for more effective radar piloting. Simrad NSE delivers “big-ship” radar features to your vessel.

Vessel Course Extension Line. Vector showing predicted vessel position based on time or distance.

StructureScan™ is plug and play technology allowing quick and clean installation for up to three NSE displays per transducer. You’ve never seen bottom structure like it - moorings, wrecks and other structures, on or part of the bottom, will be revealed instantly. Search for missing people and/or other objects is significantly easier with Simrad StructureScan™.

SideScan: Full-screen, top-down panoramic view of highly detailed bottom imaging on either side of the boat

DownScan Imaging™: Adds a new dimension to echosounding. High Frequency imaging gives life-like representation of water structure

TrackBack™: Scroll back simultaneously through sonar history and chartplotter trail from sonar or StructureScan™ display to easily mark waypoints

DownScan™ Overlay™: Exclusive new technology overlays DownScan™ onto Broadband Sounder™ on one display that clearly separates fish targets from surrounding structure.
Simrad BR24 Broadband Radar™

Simrad has introduced a revolutionary new radar system unlike anything else on the boating market. Utilising broadband Frequency Modulated Continuous Wave (FMCW), this breakthrough technology provides superior target detection and separation, ease of operation and a new level of navigational safety to a wide range of boats.

**BROADBAND RADAR™ KEY FEATURES**

- **Crystal clear image:** Miss none of your immediate surroundings. Fantastic for tight manoeuvres in tight/crowded areas or in conditions of limited visibility. Unparalleled performance in heavy snow conditions.
- **InstantOn™:** Solid-state technology produces an immediate, accurate on-screen image.
- **Low power consumption:** Broadband radar requires very little power: ideal for all types and sizes of boat.
- **Extremely low emissions:** This safest of radars means it can be mounted anywhere. Broadband radar has lower emissions than a mobile phone.
- **Quick installation:** No reason to open the dome, no tune or zero mile adjustment, and best of all – no radar-licensed technician required.
- **Very low life cycle cost - no maintenance required**

**ACHIEVE AMAZING TARGET DEFINITION WITH SIMRAD BR24 BROADBAND RADAR™**

- Only possible at this range as broadband radar has no main pulse suppression that a conventional radar suffers from. Possible to see targets close together and yet they are clearly shown as separate targets.

- At short ranges the Broadband Radar is showing up the individual yachts in their berths, ideal at night when visibility may be compromised. In this type of situation conventional radar would only show a merged target possibly obscured by the main pulse.

**RANGE DISCRIMINATION PERFORMANCE**

- Range discrimination is a measure of the radar’s ability to distinguish closely spaced targets on the sample bearing. FMCW technology provides unsurpassed performance for your maximum safety and precise navigation. At 16nm and less the BR24 has from 1X to 5X more the range discrimination ability to see those smaller targets than conventional 2kW pulse radars. This greatly improves your situational awareness.

**Part Number Description**

- **700-2007** BR24 Radar bundle for Simrad NSE series
  - Includes Scanner, scanner cable 20 m (65.5 ft), RI10 interface box, Yellow ethernet cable - 1.8 m (6 ft)
Simrad HD Digital Radar Systems use both Radomes and Open Array antennae, working with power levels from 2kW to 25kW via high capacity Ethernet. They ensure exceptional detection of small or distant targets using advanced Digital Signal Processing (DSP). Screen-clutter in any weather is virtually eliminated to display the full picture of your surroundings allowing a clear, accurate and easy-to-interpret image, using 10-bit digital radar video sampling and Sensitivity Time Control (STC). Adding a high speed heading input from an autopilot system or dedicated sensor allows the radar image and MARPA-targets to be accurately overlaid on the chart. Enhanced rotational mode enables you to interpret targets instantly.

Automatic Harbour and Offshore modes provide optimised radar imaging for hands-off operation. The radar provides bearing and distance, speed and course, closest point of approach and time on selected targets. Easy to use Guard Zone areas can be shaped and defined by the user, to maintain a radar watch in specific zones. Qualified radar targets that enter the active zone will trigger an alert on the radar system.

- **HD Digital Radar 2kW / 4kW / 6kW / 10kW / 25kW**

**HD DIGITAL RADARS KEY FEATURES**

- High Performance Scanners
- Networked Radar System
- Digital Signal Processing Technology
- Radar/Chart Overlay
- FIVE Scanner Options From: 2 kW/18" to 25 kW/7'
- Automatic Tune, Gain and Sea Clutter Adjustments
- Resolution 1280 x 1024 pixels
- Wide dynamic range receiver for improved sea clutter
- Modern remote keypad controller
- Digital, Analog, and multimedia inputs
- VGA output connector for second monitor
- Nav lines and trails with parallel index lines
- Optional tracking up to 50 AIS targets
- Optional Target Tracking (ATA) up to 10 user
- Selected targets - up to 5 automatic
- Optional Gyro Log interface

**Part Number**

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<tr>
<td>AA010016</td>
<td>Navico 25kW radar processor</td>
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<tr>
<td>AA010027SIM</td>
<td>10 kW Radar scanner, 6 ft</td>
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<tr>
<td>AA010015</td>
<td>Navico 10kW radar processor</td>
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<tr>
<td>AA010026SIM</td>
<td>6 kW Radar scanner with 4 ft antenna and 20 m (66 ft) cable</td>
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<tr>
<td>AA010014</td>
<td>Navico 6kW radar processor</td>
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<td>AA010025SIM</td>
<td>4kW radome, 24 In, with 15 m (49 ft) cable</td>
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<td>Navico 4kW radar processor</td>
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<td>AA010024SIM</td>
<td>2kW radome, 18 In, with 15 m (49 ft) cable</td>
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<tr>
<td>AA010012</td>
<td>Navico 2kW radar processor</td>
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- Targets can be interpreted instantly through chart information – such as navigation aids and coastlines. Heading allows Mini-ARPA operation on NSE with tracking capacity up to 10 different User-defined targets.
- Different colour palettes are provided to suit the user’s taste as well as to improve viewing in different lighting conditions.
Simrad Automatic Identification Systems

Smaller boats can easily go undetected by radar systems on larger commercial vessels, because the radar’s line-of-sight can be blocked by the superstructure of the ship or can also miss the boat due to the high placement of the radar antenna. This can easily exceed 30 meters over the sea level. The AIS is not line-of-sight and the range is typically about 20 nautical miles. This is one major reason why large commercial vessels are required to carry an AIS-transponder.

AIS focuses your awareness on all vessels in your vicinity and helps reduce the risk of collision by exchanging safety data between them, such as: Vessel Name, Size & Call sign - Maritime Mobile Service Identity number (MMSI), Vessel Type, Time to closest point of approach, Course, Speed and Heading.

Simrad is currently the only major brand that offers NMEA2000/SimNet compatible Class-B Transmit and Receive AIS transponder systems, both as an integrated standalone product with colour display (AI50) and as a black box solution (NAIS-300) designed for use with any AIS-compatible multi-function display product.

**AI50**

- **AI50 Key Features**
  - Class-B AIS transponder with integrated GPS receiver and 4” TFT colour display
  - Backlit display and keypad
  - Built-in map with range rings and 12 zoom ranges from 0.01 to 32 nm
  - Cursor ID mode allows easy readout of target vessel data
  - Target track log mode data stored and played back via SD-Card
  - Call Target. Simply place the cursor over the target you wish to contact and press the DSC button*

  * Note: This feature requires that the AI50 is connected to a Simrad RS80 series VHF radio.
  - Favourite list with “Fleet tracking”. Audible/Visual alarms for Collision, Lost vessel track, Favourite buddy alarm and Guard Zone
  - NMEA2000/SimNet/RS232 Interface

**NAIS-300N/L**

The NAIS-300 is a Class-B AIS black box transponder system with an integrated GPS receiver. It comes in two versions; the L-version with the NMEA2000 Interface and the N-version with the SimNet Interface. A CD-ROM and a RS232 PC cable are included for entering the MMSI number and other vessel data.

- **NAIS-300 Key Features**
  - Black Box Class-B AIS Transponder System with integrated GPS receiver
  - NMEA-2000/SimNet/NMEA-0183 (high Speed) Interface
  - AIS Transmit & Receive function (AIS Class-B)

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<td>000-0135-03</td>
<td>NAIS-300N Class B AIS with SimNet interface</td>
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<tr>
<td>000-0135-04</td>
<td>NAIS-300L Class-B AIS with NMEA 2000® interface</td>
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</tbody>
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▲ Move the cursor over a target to identify the vessel

▲ Set a guard zone for a target

▲ Range rings make it easy to judge distance to any target

▲ See when your colleagues / sister ships in the area and get notified when they enter your AIS range
MX535A / MX512 AIS System: Type Approved AIS Transponder System, meets the latest IMO requirement ITU-RU.1371-3 standard.

MX Marine has developed a complete solution to D/GPS and AIS System. With only one combined Control and Display unit, you can access all related information and still command full control of all D/GPS, AIS, and optional D/GPS Compass functions. The system connects directly to the ship’s navigation sensors as well as ECDIS, ARPA radar and other shipboard information systems.

Adding AIS to navigation for spontaneous ‘ship to ship’ or ‘ship to shore’ recognition greatly enhances safety at sea and provides mariners with new levels of real-time information. Designed with the deep sea commercial mariner in mind, we have created multiple configurations to suit the size and complexity of any vessel.

The MX535A transponder, is a fully IMO-compliant STDMA unit remotely controlled by MX512 Control and Display unit. Transponder system setups and controls is configured in the MX512. It can also gather the ship’s sensor data and organizes the information for transmission via AIS. The ship’s ECDIS, ARPA and Pilot’s PC all have access to both the D/GPS and the AIS information via the high-speed serial ports of the MX535/ MX512.

Password protected menus allow you to safely and simply enter all Static and Voyage related AIS information. AIS Situation Displays give you immediate and continuous graphic and/or text information about AIS-equipped ships and shore stations as they come into radio range.

**MX535A Key Features**

- Complies with the latest IMO standard ITU-RM.1371-3
- Identify other AIS enabled ships by its’ correlated UAIS identification
- Contact other ships using the Call Signs presented by the AIS Screen
- Receive an instant overview of traffic situations and the maneuvers of other ship
- Able to get detailed information on AIS enabled ships in radar blind zones
- Supplied Junction Box allows easy interconnection between MX535A, MX512 Display and other interfaces
- Built-in GPS is RAIM enabled

**Part Number** | **Description**
--- | ---
000-10037-001 | MX535A
512-100-1001 | MX512 junction box
512-000-0000 | MX512 CDU

**MX512 AIS/MKD and Navigation Control Display**

**MX512 Junction Box**
Navigation System MX500

IMO TYPE-APPROVED COMPACT NAVIGATOR

The MX500 DGPS Navigation Control and Display Unit meet the latest IMO Specification. It is a type approved marine navigator with the MX521A, MX421 or MX525A DGPS Antenna Sensors, including RAIM (Receiver Autonomous Integrity Monitoring). MX500 can also be used with MX575A DGPS Compass. MX575A is type approved for primary Navigation and secondary heading. Also, the MX500 can be used as a Single Station or in Dual-Control mode with up to four slaves via high-speed LAN interface.

**MX500 KEY FEATURES**

- Network to Integrated Bridge Systems (IBS) or to other conventional equipment via LAN or NMEA serial ports.
- Save & restore Waypoints, Routes, Plot and Configuration settings via USB or built-in Flash RAM.
- Convenient software updates via USB port.
- Multiple options for navigation data management via LAN, USB, or NMEA serial ports.
- User-friendly man-machine interface based on its renowned predecessors.
- Integrity monitoring of dual DGPS systems for automated redundancy and reliability (BRIM).
- User selectable NMEA0183 messages V1.5 to V2.3 for backward compatibility with the widest range of devices.
- Multi-port interface that can be connected to ECDIS, ARPA, Gyro and other navigation information systems.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>500-01-00</td>
<td>MX500 CDU with MX521A GPS Antenna (add cable)</td>
</tr>
<tr>
<td>500-03-00</td>
<td>MX500 CDU with MX521A DGPS Antenna (add cable)</td>
</tr>
<tr>
<td>MX-500</td>
<td>MX-500 CDU</td>
</tr>
<tr>
<td>500-100-1002</td>
<td>MX500/MX510 Junction Box</td>
</tr>
</tbody>
</table>

**OPTIONAL ACCESSORIES**

- MX500 D/GPS Navigation Control Display
- MX500 Junction Box

**MX500 Connector Configuration**

- Power/ Data Connector (12-Pin Male)
- Antenna Connector (10-Pin Male)
- Auxiliary Connector (8-Pin Male)
- LAN Connector (RJ-45)
- Grounding Stud

**Figure 3.1 MX500 Display Console Dimensions**

**Figure 3.2 MX 500 Connector Configuration**
Navigation System MX510 and MX512

THE LATEST IN IMO COMPLIANT NAVIGATION SYSTEMS

The MX510 and MX512 models are designed to be used as IMO compliant navigation systems, in conjunction with MX DGPS smart antennas and DGPS compasses, on board workboats, ferries, fishing boats and other commercial vessels.

The MX510 and MX512 are easy to use via the user-friendly MMI (Man Machine Interface) already renowned from its predecessors; these versatile navigation systems offer extraordinary capabilities, with its multi-port interface that can be connected to ECDIS, ARPA, Gyro and other navigation information systems. It can be configured as a single display or multi-unit redundant displays. The MX510 and MX512 with the MX521A smart antenna are type-approved marine navigator. Backward compatible with MX421B-10 DGPS antenna. They are also Compatible with MX575 DGPS Compass.

MX510

The MX510 with the MX521A DGPS is a type-approved marine navigator. Backward compatible with MX421B-10 sub-meter DGPS antenna. It is also compatible with MX575 D/GPS Compass. Features two independent RS-422 NMEA ports.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>510-01-00</td>
<td>MX510 CDU with MX521A GPS Antenna (add cable)</td>
</tr>
<tr>
<td>510-03-00</td>
<td>MX510 CDU with MX521A DGPS Antenna (add cable)</td>
</tr>
<tr>
<td>510-000-0000</td>
<td>MX510 CDU</td>
</tr>
<tr>
<td>510-100-1002</td>
<td>MX500/MX510 Junction Box</td>
</tr>
</tbody>
</table>

MX512

The MX512 features eight independent RS-422 and one RS-232 serial ports for two-way communication with any NMEA 0183 compatible device. Optional software updates are made through the convenient USB ports.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>512-01-JB</td>
<td>MX512 CDU with MX521A GPS Antenna and JB (add cable)</td>
</tr>
<tr>
<td>512-03-JB</td>
<td>MX512 CDU with MX521A DGPS Antenna and JB (add cable)</td>
</tr>
<tr>
<td>512-000-0000</td>
<td>MX512 CDU (also order JB P/N 512-100-1001)</td>
</tr>
<tr>
<td>512-100-1001</td>
<td>MX512 Junction Box</td>
</tr>
</tbody>
</table>

MX510 / MX512 KEY FEATURES

- IMO Type-Approved with RAIM enabled
- Choice to save and restore Waypoints, Routes and Configuration settings
- Multiple navigation data management options using LAN, USB or NMEA serial ports
- High speed LAN interface for Master/Slave operation (with Integrity Monitoring) and up to 4 slave displays
- Convenient navigation equipment interface using LAN or NMEA ports
- MX512 only: 9 independent serial data ports and one VGA port

MX512 OPTIONAL ACCESSORIES

- MX512 Navigation Control Display
- MX512 Junction Box
**MX Smart Antennas**

Navigation authorities around the world have installed DGPS radiobeacon networks that broadcast free RTCM correction information. With the use of its' built-in beacon demodulator, the MX smart antennas use these real-time corrections to deliver accurate, reliable positioning when in range of a beacon transmitter. The antennas can be controlled by the operator to accept RTCM data from external sources using the MX Control and Display Unit (MX CDU).

Receiver Autonomous Integrity Monitoring (RAIM) is a safety feature in the MX smart antennas which continuously verify the integrity of the GPS system to ascertain its' accuracy and reliability. When position error exceeds a pre-set limit, the MX CDU alerts the operator to take precautionary measures. RAIM is one of the latest requirements under IMO MSC 112 (73) regulation. This RAIM feature can be accessed by the operator using the MX CDU.

The MX smart antennas can interface directly to the MX CDU or to other NMEA0183 compatible devices.

**MX SMART ANTENNAS FEATURES**

- IMO type approved smart antennas
- RAIM enabled
- Compatible with all MX CDUs
- MX521A/MX525A WAAS compatible

**MX525A DGPS SENSOR WITH MXB5**

Precision DGPS positioning solution in a black box unit. Featuring built-in RAIM and Space Based Augmentation Systems (SBAS) and compliant to the latest IMO standards GPS/DGPS Black-box Receiver. The MX525A delivers position accuracy better than 1 meter in DGPS mode when using RTCM correction data. It also provides better than 5 meters accuracy in standard GPS mode. It is backward compatible with existing MX420 systems to make them compliant with the latest IMO requirements.

Space Based Augmentation Systems (SBAS) like the European Geostationary Navigation Overlay System (EGNOS), the US Wide Area Augmentation Service (WAAS) and the Japanese MTSAT Satellite Based Augmentation System (MSAS) are being developed throughout the world. The MX525A can be controlled to use these systems to provide accurate positions in areas not covered by DGPS beacon stations, but covered by SBAS.

**MX525A KEY FEATURES**

- IMO MSC.112(73) compliant
- RAIM (Receiver Autonomous Integrity Monitoring) enabled
- Meets Smart-Beacon specifications
- Suitable for installations with long cable requirements
- Compatible with existing MGL-3/4 combined antenna and coaxial cable
- Connects directly to MX Control and Display Unit
- Better than 1 meter DGPS Position accuracy
- Better than 5 meter GPS Position accuracy
- Integrated DGPS system including beacon and SBAS (WAAS/EGNOS)
- NMEA0183 ver. 3.0 interface

*MX CDU is required to comply as an IMO type approved system

**Part Number** | **Description**
---|---
727061 | MX525A DGPS Smart Antenna Sensor
721755 | MXB5 DGPS Antenna
9625-200-85000 | MX525A DGPS Smart Sensor with MXB5 Antenna
**MX421B-10 SMART ANTENNA**

High accuracy DGPS Smart Antenna. This antenna has sub-meter accuracy with Beacon DGPS corrections. MX421B-10 is also offered with 5 Hz position output and is used in race boats because of high accuracy. The High Accuracy MX421B-10 delivers position accuracy better than 1 meter in DGPS mode when using RTCM correction data. It also provides better than 3 meters accuracy in standard GPS mode. The MX421B-10 is available in 1 Hz or 5 Hz position update.

**PRO MX421B-10 KEY FEATURES**

- Better than 1 meter (RMS) DGPS Position accuracy and better than 3 meter (RMS) GPS Position accuracy
- NMEA0183 ver. 3.0 interface
- IMO type approved*, including RAIM (Receiver Autonomous Integrity Monitoring)
- Designed for easy upgrade of existing MX420 installations to latest IMO Standards.

*MX CDU is required to comply as an IMO type approved system

**Part Number** | **Description**
---|---
9525-200-80110 | MX421B-10 DGPS Smart Antenna 1 Hz
9525-200-78610 | MX421B-10 DGPS Smart Antenna 5 Hz

---

**MX521A SMART ANTENNA**

Precision D/GPS positioning solution in a Smart Antenna unit. Featuring built-in RAIM and Space Based Augmentation Systems (SBAS) and compliant to the latest IMO standards.

DGPS Smart Antenna Receiver. The MX521A delivers position accuracy better than 1 meter in DGPS mode when using RTCM correction data. It also provides better than 5 meters accuracy in standard GPS mode. It is backward compatible with existing MX420 systems to make them compliant with the latest IMO requirements.

Space-Based Augmentation Systems (SBAS) like the European Geostationary Navigation Overlay System (EGNOS), the US Wide Area Augmentation Service (WAAS) and the Japanese MTSAT Satellite-based Augmentation System (MSAS) are being developed throughout the world. The MX521A can be controlled to use these systems to provide accurate positions in areas not covered by DGPS beacon stations.

**PRO MX521A KEY FEATURES**

- IMO MSC.112(73) compliant*
- RAIM (Receiver Autonomous Integrity Monitoring) enabled
- Meets Smart-Beacon specifications
- Designed for easy upgrade of existing MX420 installations to latest IMO Standards
- Connects directly to MX Control and Display Unit
- Better than 1 meter DGPS Position accuracy
- Better than 5 meter GPS Position accuracy
- Built-in DGPS sources include beacon and SBAS (WAAS, EGNOS, MTSAT)
- NMEA0183 ver. 3.0 interface

*MX CDU is required to comply as an IMO type approved system

**Part Number** | **Description**
---|---
727050 | MX521A GPS Smart Antenna
727051 | MX521A DGPS Smart Antenna
MX575A DGPS Compass

The MX575A D/GPS compass is designed to provide the Simrad Professional Autopilots, MX5XX Series navigation and AIS systems with reliable heading, ROT (Rate of Turn) and position information. The MX575A delivers a heading accuracy of better than 0.5° at update rates of up to 10 Hz. It also provides sub-meter DGPS positioning accuracy at rates of up to 10 Hz when using RTCM correction data supplied from internal beacon demodulator.

To augment the GPS-derived heading, the MX575A includes other supplemental devices. The combination of inclinometer and magnetic sensing devices aid the rate at which a heading solution is computed on startup and also speeds up reacquisition. A rate gyro provides a secondary source of heading data in times when the GPS heading is not available due to temporary obstructions. These sensors improve performance and increase dependability of the MX575A. The MX575A features two independent RS-232 serial ports and one RS-422 port. The output of the RS-422 port mirrors that of one RS-232 port. It also features COAST™ technology that allows it to use old correction data for up to 40 minutes without seriously affecting positioning performance. This feature offers peace of mind and allows you to focus on more important issues than reliability of a differential signal.

**MX575A KEY FEATURES**

- Type-Approved as a Transmitting Heading Device (THD) and a Primary Positioning Device
- Compatible with MX5XX family of CDUs
- Stand-alone automatic operation
- Heading accuracy of 0.5°
- Position and Heading updates up to 10 Hz
- Integrated DGPS sources including WAAS, EGNOS, and Beacon
- Sub-meter DGPS accuracy
- Fast start-up times
- Sustained tracking during Rates of Turn up to 90°/s
- Sealed enclosure with IP 67 rating
- NMEA 0183 V3.0 interface with provision for external RTCM SC-104 corrections

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9525-200-80900</td>
<td>MX575A DGPS Compass with 15M Cable</td>
</tr>
</tbody>
</table>

**MX575A BASIC SYSTEM**

- MX500 Series Head Unit
- AT10HD Converter
- MX500 Series Junction Box

---

**SimNet**

- White
- Brown
- Yellow
- Green
- Rx+, A
- Rx-, B
- Tx+, A
- Tx-, B

From NMEA "Talker" To NMEA "Listener"

**SimNet**

- UP
- AT10HD Converter

**Professional Series Navigation Systems**
Technical Specifications

**ECDIS AND PLECDIS™ AND ECS SYSTEMS**

**MC50 MARINE COMPUTER**

**COP10 REMOTE CONTROL**

**NSE8**

**NSE12**
**NSE8 AND NSE12 SPECIFICATIONS**

### DISPLAY

<table>
<thead>
<tr>
<th>Feature</th>
<th>NSE8</th>
<th>NSE12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>8&quot; Colour TFT LCD</td>
<td>12.1&quot; Colour TFT LCD</td>
</tr>
<tr>
<td>Screen Size</td>
<td>8 inch diagonal viewing</td>
<td>12 inch diagonal viewing</td>
</tr>
<tr>
<td>Screen Resolution</td>
<td>800 x 600</td>
<td>1024 x 768</td>
</tr>
<tr>
<td>Screen Brightness</td>
<td>1500 Nits</td>
<td>1500 Nits</td>
</tr>
<tr>
<td>Contrast Ratio</td>
<td>850:1</td>
<td>600:1</td>
</tr>
<tr>
<td>Viewing Angle</td>
<td>60 Deg above and below normal axis with &gt;75% nominal brightness &gt; 100:1</td>
<td>60 Deg above and below normal axis with &gt;75% nominal brightness &gt; 100:1</td>
</tr>
<tr>
<td>Languages (31)</td>
<td>English (UK), English (US), German, French, Spanish, Italian, Portuguese, Croatian, Finnish, Icelandic, Dutch, Norwegian, Polish, Swedish, Slovenian, Russian, Ukrainian, Bulgarian</td>
<td>English (UK), English (US), German, French, Spanish, Italian, Portuguese, Croatian, Finnish, Icelandic, Dutch, Norwegian, Polish, Swedish, Slovenian, Russian, Ukrainian, Bulgarian</td>
</tr>
<tr>
<td>Unit Dimensions</td>
<td>212.0 x 285.0 x 111.3 mm</td>
<td>266.0 x 356.0 x 122.7 mm</td>
</tr>
<tr>
<td>Pack Dimensions (H x W x D)</td>
<td>220 x 300 x 390 mm</td>
<td>260 x 340 x 435 mm</td>
</tr>
<tr>
<td>Pack Weight</td>
<td>6.3 kg/12.6 lbs</td>
<td>8.5 kg/17 lbs</td>
</tr>
<tr>
<td>Case Pack Weight (2 Per Case)</td>
<td>12.7 kg/25.4 lbs</td>
<td>17.1 kg/34 lbs</td>
</tr>
</tbody>
</table>

### MECHANICAL

<table>
<thead>
<tr>
<th>Feature</th>
<th>NSE8</th>
<th>NSE12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housing Construction</td>
<td>Die Cast Aluminium Rear housing, Snap-fit front bezel</td>
<td>Die Cast Aluminium Rear housing, Snap-fit front bezel</td>
</tr>
<tr>
<td>Heat Sinking</td>
<td>Direct heat transfer from processor to housing</td>
<td>Direct heat transfer from processor to housing</td>
</tr>
<tr>
<td>Screen</td>
<td>Direct Bonded</td>
<td>Direct Bonded</td>
</tr>
<tr>
<td>Processor/RAM/Hard Drive</td>
<td>1.6 GHz / 512 MB / 80 GB</td>
<td>1.6 GHz / 512 MB / 80 GB</td>
</tr>
<tr>
<td>Interface</td>
<td>Direct Access Keys (DAK's), Alphanumeric Keypad, Rotary knob with Push-to-Enter</td>
<td>Direct Access Keys (DAK's), Alphanumeric Keypad, Rotary knob with Push-to-Enter</td>
</tr>
</tbody>
</table>

### PLOTTER CHARACTERISTICS

<table>
<thead>
<tr>
<th>Feature</th>
<th>NSE8</th>
<th>NSE12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Modes</td>
<td>Head-up, Course-up*, North-up*, Relative Motion (*Heading input required)</td>
<td>Head-up, Course-up*, North-up*, Relative Motion (*Heading input required)</td>
</tr>
<tr>
<td>Latitude Limit</td>
<td>83° North, 85° South</td>
<td>83° North, 85° South</td>
</tr>
<tr>
<td>Cartography</td>
<td>Embedded: Navico Insight HD US/Navionics Platinum Rest of World: Navionics / Platinum Plus via SD Card</td>
<td>Embedded: Navico Insight HD US/Navionics Platinum Rest of World: Navionics / Platinum Plus via SD Card</td>
</tr>
</tbody>
</table>

### RADAR CHARACTERISTICS

<table>
<thead>
<tr>
<th>Feature</th>
<th>NSE8</th>
<th>NSE12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radar Compatibility</td>
<td>Broadband: Simrad BR24; Simrad HD Digital Series 2kW to 25kW</td>
<td>Broadband: Simrad BR24; Simrad HD Digital Series 2kW to 25kW</td>
</tr>
<tr>
<td>Display Modes</td>
<td>Head-up, Course-up*, North-up*, Relative Motion (*Heading input required)</td>
<td>Head-up, Course-up*, North-up*, Relative Motion (*Heading input required)</td>
</tr>
<tr>
<td>Echo Trail</td>
<td>Intervals: 15 sec, 30 sec, 1 min, 3 min, Continuous. Clear Trails</td>
<td>Intervals: 15 sec, 30 sec, 1 min, 3 min, Continuous. Clear Trails</td>
</tr>
<tr>
<td>VRM/EBL's</td>
<td>2: User Configurable</td>
<td>2: User Configurable</td>
</tr>
</tbody>
</table>

### INTERFACE

<table>
<thead>
<tr>
<th>Feature</th>
<th>NSE8</th>
<th>NSE12</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN</td>
<td>3 Ports 10/100 Base</td>
<td>3 Ports 10/100 Base</td>
</tr>
<tr>
<td>Interface (NMEA 0183)</td>
<td>Input: GLL, GGA, RMG, RMB, GSA, GSV, APB, BWC, DBT, DPT, MTW, VLW, VHW, HDG</td>
<td>Output: GLL, GGA, GSA, GSV, VTG, ZDA, AAM, APB, B00, BWC, BWR, RMG, RMB, XTE, DBT, DPT, MTW, VLW, VHW, HDG, MWT, TTM</td>
</tr>
<tr>
<td>Interface (NMEA 2000)</td>
<td>Input: 59904, 60928, 65285, 65292, 65293, 65303, 65305, 65323, 65325, 65480, 126028, 126092</td>
<td>Output: 59904, 60928, 65285, 65292, 65293, 65303, 65305, 65323, 65325, 65480, 126028, 126092</td>
</tr>
<tr>
<td>USB Port (2)</td>
<td>(2) - 1 Front, 1 Rear</td>
<td>(2) - 1 Front, 1 Rear</td>
</tr>
<tr>
<td>Video Output</td>
<td>DVI x (1)</td>
<td>DVI x (1)</td>
</tr>
<tr>
<td>Video Input</td>
<td>Composite Video x (2) (multiplexed)</td>
<td>Composite Video x (2) (multiplexed)</td>
</tr>
<tr>
<td>Video Compatibility</td>
<td>NTSC type N and 4.4.3, PAL type B, G, H, I, M, N</td>
<td>User selectable</td>
</tr>
<tr>
<td>SD Card Slot</td>
<td>Single</td>
<td>Single</td>
</tr>
</tbody>
</table>

### PLOTTER CHARACTERISTICS

<table>
<thead>
<tr>
<th>Feature</th>
<th>NSE8</th>
<th>NSE12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Modes</td>
<td>Head-up, Course-up*, North-up*, Relative Motion (*Heading input required)</td>
<td>Head-up, Course-up*, North-up*, Relative Motion (*Heading input required)</td>
</tr>
<tr>
<td>Latitude Limit</td>
<td>83° North, 85° South</td>
<td>83° North, 85° South</td>
</tr>
<tr>
<td>Cartography</td>
<td>Embedded: Navico Insight HD US/Navionics Platinum Rest of World: Navionics / Platinum Plus via SD Card</td>
<td>Embedded: Navico Insight HD US/Navionics Platinum Rest of World: Navionics / Platinum Plus via SD Card</td>
</tr>
</tbody>
</table>

### ENVIROMENT

<table>
<thead>
<tr>
<th>Feature</th>
<th>NSE8</th>
<th>NSE12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-15 Deg C to +55 Deg C (+5 Deg F to +131 Deg F)</td>
<td>-15 Deg C to +55 Deg C (+5 Deg F to +131 Deg F)</td>
</tr>
<tr>
<td>Waterproofing</td>
<td>IPx6</td>
<td>IPx6</td>
</tr>
</tbody>
</table>

### POWER

<table>
<thead>
<tr>
<th>Feature</th>
<th>NSE8</th>
<th>NSE12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>12.0 VDC-24.0 VDC (9.0 - 32.0 VDC Min-Max)</td>
<td>12.0 VDC-24.0 VDC (9.0 - 32.0 VDC Min-Max)</td>
</tr>
<tr>
<td>Current Draw (in Watts) at 24VDC</td>
<td>21.6W or 1.8A @ 12.0 VDC or 21.6W or 0.9A @24VDC</td>
<td>21.6W or 1.8A @ 12.0 VDC or 21.6W or 0.9A @24VDC</td>
</tr>
<tr>
<td>Certificates of Conformity</td>
<td>CE/EN60945:2002/CTick</td>
<td>CE/EN60945:2002/CTick</td>
</tr>
</tbody>
</table>
**BR24 SPECIFICATIONS**

**GENERAL**
- Compliance: FCC/IC/R&TTE/AUS Type Certification pending
- FCC ID: RAYBR24
- IC ID: 4697A-BR24
- Human Exposure General Public Safety Limit – touch dome anywhere.

**Environmental**
- Operating Temperature: -25¡ to +55¡C
- Relative humidity: +35¡C, 95% RH
- Waterproof: IPx6
- Relative wind velocity 51 m/sec (Max:100 Knots)

**Power consumption**
- Operating: 17W (Typ.) @ 13.8Vdc
- Standby: 1.6W (Typ.) @ 13.8Vdc ~ 110ma
- Power input (at end of radar cable) 9V to 31.2Vdc (12/24 Volt systems).
- Reverse polarity protection

**Transmitter Source (pre-heating time)**
- No magnetron – Instant On™

**Outside dimensions**
- Height 280mm x Diameter 488mm

**Weight (no cable)**
- 7.4 kg

**RADAR AND ANTENNA PARAMETERS**
- **Radar Ranges**
  - 1/32 to 24nm with 15 range settings (nm/sm/km)
- **Rotation**
  - 24 rpm +/- 10%
- **Frequency**
  - 36 rpm at less than 2nm range
- **Transmitter frequency**
  - X-band - 9.3 to 9.4Ghz
- **Transmitter source (warm-up time)**
  - No Magnetron – all solid state. Instant On™
- **Plane of polarization**
  - Horizontal Polarization

**RADAR AND ANTENNA PARAMETERS CONTD.**
- Transmitter peak power output
  - 100mW nominal
- Main Bang Dead Zone & Tuning
  - None – not a pulse radar
- Sea and Rain Clutter
  - 5X less than a pulse radar
- Sweep Repetition Frequency
  - 200Hz
- Sweep Time
  - 1ms
- Sweep Bandwidth
  - 65MHz max
- Horizontal Beam width (Tx and Rx antenna)
  - 5.2¡ +/- 10% (~3dB width)
- Vertical Beam width (Tx and Rx antenna)
  - 30¡ +/- 20% (~3dB width)
- Side lobe level (Tx and Rx antenna)
  - Below -18dB (within ±10¡); Below -24dB (outside ±10¡)
- Noise figure
  - Less than 6dB

**COMS/CABLING/MOUNTING**
- Com Protocol
  - High Speed Ethernet and Serial
- Heading
  - NMEA2000/Simnet (with RI-10 interface box)
- Inter Connecting cable length
  - 10m standard with RJ45 thin custom connector – Display model dependent
- Maximum Inter Connecting cable length
  - 30m
- Bolts (4)
  - M8x30 - 304 stainless steel
- Footprint
  - W235mm (port/starboard) x L141.5mm (matches Garmin GMR18HD/Raymarine RD218 footprint)
## HD Digital Radars Specifications

<table>
<thead>
<tr>
<th></th>
<th>25 kW</th>
<th>10 kW</th>
<th>6 kW</th>
<th>4 kW</th>
<th>2 kW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight with antenna</strong>&lt;br&gt;- no cable</td>
<td>54kg / 119lbs</td>
<td>35kg / 77lbs</td>
<td>29kg / 64lbs</td>
<td>10 kg / 22 lbs</td>
<td>4.2kg / 9lbs</td>
</tr>
<tr>
<td><strong>Cable Length</strong>&lt;br&gt;- standard</td>
<td>20 meters</td>
<td>20 meters</td>
<td>20 meters</td>
<td>15 meter standard</td>
<td>15 meter standard</td>
</tr>
<tr>
<td>- optional</td>
<td>30 meters</td>
<td>30 meters</td>
<td>20 meters</td>
<td>15 meter standard</td>
<td>20 meters</td>
</tr>
<tr>
<td><strong>Dimensions</strong>&lt;br&gt;- Height</td>
<td>2254 x 458 x H536 mm</td>
<td>1880 x 344 x H448 mm</td>
<td>740 x 135 x H17.6&quot;</td>
<td>620 diameter x H280 mm</td>
<td>450 diameter x H227 mm</td>
</tr>
<tr>
<td>- Width</td>
<td>6 ft / 1.88 meters</td>
<td>6 ft / 1.88 meters</td>
<td>4 ft / 1.28 meters</td>
<td>24.4 diameter x H17.6&quot;</td>
<td>17.7 diameter x H110&quot;</td>
</tr>
<tr>
<td>- Depth</td>
<td>20&quot;</td>
<td>72 mm</td>
<td>64 mm</td>
<td>48 mm</td>
<td>24 mm</td>
</tr>
<tr>
<td><strong>Max. Range Scale (nm)</strong></td>
<td>96 nm</td>
<td>72 nm</td>
<td>64 nm</td>
<td>48 nm</td>
<td>24 nm</td>
</tr>
<tr>
<td><strong>Horizontal beam width</strong></td>
<td>1.0°</td>
<td>1.2°</td>
<td>1.8°</td>
<td>4.0°</td>
<td>5.2°</td>
</tr>
<tr>
<td><strong>Vertical beam width</strong></td>
<td>20°</td>
<td>20°</td>
<td>20°</td>
<td>25°</td>
<td>30°</td>
</tr>
<tr>
<td><strong>Noise Figure (average)</strong></td>
<td>6 dB</td>
<td>6 dB</td>
<td>6 dB</td>
<td>6 dB</td>
<td>7 dB</td>
</tr>
<tr>
<td><strong>DC Voltage</strong></td>
<td>21.6 V - 31.2 V</td>
<td>21.6 V - 41.6 V</td>
<td>10.8 V - 42 V</td>
<td>10.8 V - 42 V</td>
<td>10.8 V - 15.6 V</td>
</tr>
<tr>
<td><strong>Power Consumption</strong></td>
<td>180 W (Max)</td>
<td>250 W (Max)</td>
<td>120 W (Max)</td>
<td>30 W</td>
<td>25 W</td>
</tr>
<tr>
<td><strong>Rotation Speed</strong></td>
<td>24 RPM</td>
<td>27 RPM</td>
<td>27 RPM</td>
<td>27 RPM</td>
<td>27 RPM</td>
</tr>
<tr>
<td><strong>Wind Speed (max)</strong></td>
<td>0.07 μs/2250 Hz</td>
<td>0.08 μs/2250 Hz</td>
<td>0.08 μs/2250 Hz</td>
<td>0.08 μs/2250 Hz</td>
<td>0.08 μs/2250 Hz</td>
</tr>
<tr>
<td><strong>Pulse Length / PRF</strong></td>
<td>0.05 μs/2250 Hz</td>
<td>0.25 μs/700 Hz</td>
<td>0.5 μs/1200 Hz</td>
<td>1.0 μs/650 Hz</td>
<td>1.0 μs/650 Hz</td>
</tr>
<tr>
<td><strong>Sidelobe Levels</strong>&lt;br&gt;(less than +/-10° from main lobe)</td>
<td>-26 dB max</td>
<td>-26 dB max</td>
<td>-23 dB max</td>
<td>-21 dB max</td>
<td>-21 dB max</td>
</tr>
<tr>
<td><strong>Receiver Type and Bandwidth</strong></td>
<td>LOG</td>
<td>LOG</td>
<td>LOG</td>
<td>LOG</td>
<td>LINEAR</td>
</tr>
<tr>
<td><strong>Processor Weight</strong></td>
<td>0.9kg / 1.9lb</td>
<td>0.9kg / 1.9lb</td>
<td>0.9kg / 1.9lb</td>
<td>0.9kg / 1.9lb</td>
<td>0.9kg / 1.9lb</td>
</tr>
<tr>
<td><strong>Processor Dimensions</strong>&lt;br&gt;- Height</td>
<td>L197 x W141 x H57mm</td>
<td>L197 x W141 x H57mm</td>
<td>L197 x W141 x H57mm</td>
<td>L197 x W141 x H57mm</td>
<td>L197 x W141 x H57mm</td>
</tr>
<tr>
<td>- Width</td>
<td>L7.77 x W5.55 x H24&quot;</td>
<td>L7.77 x W5.55 x H24&quot;</td>
<td>L7.77 x W5.55 x H24&quot;</td>
<td>L7.77 x W5.55 x H24&quot;</td>
<td>L7.77 x W5.55 x H24&quot;</td>
</tr>
<tr>
<td>- Depth</td>
<td>18&quot;</td>
<td>18&quot;</td>
<td>18&quot;</td>
<td>18&quot;</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

* The 25 kW radar scanner uses less power than the 10 kW because the 25 kW uses a more efficient motor that operates over a narrower voltage range. For 2kW/4kW/6kW order a kit; for 10kW/25kW order a radar and processor unit separately. 2kW: DX42S-1 radar kit; 4kW: DX64S-1 radar kit; 6kW: TX66S-1 radar kit.
**HD DIGITAL RADARS SPECIFICATIONS**

### 25KW SCANNER
- Dimensions with bracket: 225.4 cm (88.7")
- Dimensions without bracket: 141 cm (5.6")
- Weight: 1 kg
- EMC: IEC60945
- Temperature range: -15°C to +55°C
- Waterproof: IP67
- Display type: VGA TFT 102mm (4"
- Connectors: VHF Antenna PL259 / GPS Antenna SMB
- Interfaces: NMEA0183 Out: 38kbaud VDM, VDO, RMC, ARL

### 10KW SCANNER
- Dimensions with bracket: 188 cm (74")
- Dimensions without bracket: 34.4 cm (13.5")
- Weight: 0.65 kg
- EMC: IEC60945
- Temperature range: -15°C to +55°C
- Waterproof: IP67
- Display type: Keypad LED (red or white)

### 6KW SCANNER
- Dimensions with bracket: 128.5 cm (50.6")
- Dimensions without bracket: 34.4 cm (13.5")
- Weight: 0.65 kg
- EMC: IEC60945
- Temperature range: -15°C to +55°C
- Waterproof: IP67
- Display type: Keypad LED (red or white)

### 4KW SCANNER
- Dimensions with bracket: 28 cm (11")
- Dimensions without bracket: ø 62 cm (24.4")

### 2KW SCANNER
- Dimensions with bracket: 22.7 cm (8.9")
- Dimensions without bracket: ø 45 cm (17.7")

**AI50 AND NAIS-300 SPECIFICATIONS**

### AI50
- Power supply: 10.8V to 15.6V
- Power consumption: <1A
- Receiver type: Dual TDMA (shared DSC)
- Receiver sensitivity: <-107dBm for 20% PER
- Transmit power: 2 W
- Type approval: IEC60945
- AIS Class: Class B for use on non-SOLAS craft
- GPS: Integral 16 channel receiver
- Dimensions with bracket: 20 x 133 x 77 mm / 7.9 x 5.2 x 3"
- Dimensions without bracket: 172 x 115 x 77 mm / 6.8 x 4.5 x 3"
- Weight: 1 kg
- EMC: IEC60945
- Temperature range: -15°C to +55°C
- Waterproof: IP67
- Backlighting: Keypad LED (red or white)
- Display type: VGA TFT 102mm (4"
- Connectors: VHF Antenna PL259 / GPS Antenna SMB
- Interfaces: NMEA0183 Out: 38kbaud VDM, VDO, RMC, ARL
- Network load: 1

### NAIS-300
- Power supply: 10.8V to 15.6V
- Power consumption: <0.5A
- Receiver type: Dual TDMA (shared DSC)
- Receiver sensitivity: <-107dBm for 20% PER
- Transmit power: 2 W
- Type approval: IEC60945
- AIS Class: Class B for use on non-SOLAS craft
- GPS: Integral 16 channel receiver
- Dimensions with bracket: 210 x 167 x 73.5 mm / 8.27 x 6.6 x 2.9"
- Dimensions without bracket: 141 x 72.5 x 115 mm / 5.55 x 2.85 x 4.5"
- Weight: 0.65 kg
- EMC: IEC60945
- Temperature range: -15°C to +55°C
- Waterproof: IP67
- Display type: Keypad LED (red or white)
- Connectors: VHF Antenna PL259 / GPS Antenna SMB
- Interfaces: NMEA0183 Out: 38kbaud VDM, VDO, RMC, ARL
- Network load: 1

**POWER SUPPLY**
- 10.8V to 15.6V
- <1A

**RECEIVER TYPE**
- Dual TDMA (shared DSC)
- <-107dBm for 20% PER

**TRANSMIT POWER**
- 2 W

**AIS CLASS**
- Class B for use on non-SOLAS craft

**GPS**
- Integral 16 channel receiver

**DIMENSIONS WITH BRACKET**
- 20 x 133 x 77 mm / 7.9 x 5.2 x 3"

**DIMENSIONS WITHOUT BRACKET**
- 172 x 115 x 77 mm / 6.8 x 4.5 x 3"

**WEIGHT**
- 1 kg

**EMC**
- IEC60945

**TEMPERATURE RANGE**
- -15°C to +55°C

**WATERPROOF**
- IP67

**BACKLIGHTING**
- Keypad LED (red or white)

**DISPLAY TYPE**
- VGA TFT 102mm (4"

**CONNECTORS**
- VHF Antenna PL259 / GPS Antenna SMB

**INTERFACES**
- NMEA0183 Out: 38kbaud VDM, VDO, RMC, ARL
- Network load: 1
MX535A SPECIFICATIONS

VHF
- Frequency Range: 156 MHz - 162 MHz
- Channel Spacing: 12.5 or 25 kHz
- Number of RF channels: 3 Receive / 1 Transmit
- Number of AIS Channels: 2 Receive
- Number of DSC Channels: 1 Receive

VHF TRANSMITTER
- Output Power: 2 Watt (low) or 12.5 Watt (high)
- Rx to Tx Switching Time: < 1 ms
- Transmit Release Time: < 1 ms
- Channel Switching Time: < 25 ms
- Attack Time: < 1 ms

VHF RECEIVER
- Max. Usable Sensitivity: < -110 dBm
- Co-Chan Rejection: > -3 dB (25 kHz)
- Adjacent Channel Selectivity: > 70 dB (25 kHz)
- Inter-modulation Rejection: > 65 dB
- Spurious Response Rejection: > 70 dB
- Blocking: > 84 dB

VHF MODEM
- Bit Rate GMSK: 9600 bps
- RF Baud Rate (DSC): 1200 bps
- Modulation: GMSK/FSK

BUIT-IN GPS
- Receiver Type: 12 Channel, (L1)
- Tracking Capability: 12 Satellites (sim.)
- Accuracy (Horizontal): < 10 m / 2 drms
- Accuracy (Vertical): < 15 m / 2 drms
- DGPS Accuracy: < 5 m / 2 dms*

POWER SUPPLY
- Supply Voltage: 24 VDC (+/- 10%) (galvanic isolated)
- Input Current: min. 7 Amp. (24V)

INTERFACES
- Number of Data Ports: 3 input / 4 I-O/1 Out
- IEC 61162-1/2 (RS422 / NMEA 0183)
- ITU-R M.823-2 (RS422 / RTCM SC104)

BIT RATES
- CH1, 2 & 3: 4800 bps/38400 bps
- CH4 (ECDIS): 38400 bps
- CH5 (Pilot Port): 38400 bps
- CH8 (Long Range): 38400 bps
- CH9 (diff. correction): 9600 bps
- CH10 (Alarm circuit): Dry relay contact

OPTIMAL INTERFACES
- Number of data ports: RS232 up to 5
- Bit Rate: up to 115 000 bps
- Simplex/Duplex: Duplex
- Number of Data Ports IEC: 1 x 61162-3 CAN (RS485)
- Bit Rate: Up to 1 Mbps

PHYSICAL
- Size: (h): 201.26 mm/7.92”
- (d): 60 mm/2.36”
- (w): 281.26 mm/10.07”
- Operating Temp: -15°C to 55°C (5°F to 131°F)
- Connectors: N-Type (Female) VHF
- TNC (Female) GPS

SPECFIED STANDARDS
- MO MSC.74(69) Annex 3
- ITU-R M.1371-3
- IALA Tech. Clar. of ITU-R M.1371-1
- (Ed. 1.3)
- IEC 61162-1 (2000) - NMEA 0183-3
- IEC 61162-2 (1998) - NMEA 0183
- IEC 61162-3 ------- NMEA 0183
- (2000)
- ITU-R M.825-3
- IEC 61106-1 (1996)
- IEC 60 945 (1996)
- ITU-R M.1084-3
- For MX420, see separate specifications
**MX500 SPECIFICATIONS**

**GENERAL**

- **Position presentation**: Lat/Lon, UTM and user-defined GRID (option)
- **Position Resolution**: 4 decimal places (Lat/Lon)
- **Waypoints**: 2000 waypoints with 20-character alphanumeric names and icon
- **Routes**: 100 routes with a dynamic number of waypoints; up to 2000 waypoints between all routes
- **Special Features**: GOTO, Mark and MOB, 3-D Panoramic steering display, Tide, Speed Graph, Sun & Moon Almanac, and Wind Calculations.
- **Display**: 3.8 inch B/W STN, 320 x 240 pixels, back-lit LCD display
- **Dual Control**: Master/Slave/Repeater configuration with up to 4 Slaves/Repeaters via high-speed LAN
- **Languages**: English, Danish, Dutch, French, Finnish, German, Italian, Spanish, Swedish
- **CPU**: Intel PXA255 XScale Processor
- **Memory Size**
  - Data: 32MB RAM
  - Program: 32MB (FLASH)
- **Data Storage**: Stores waypoints, routes, configurations and track memory in USB memory stick (FAT32 format), or built-in Flash RAM

**POWER**

- **Input Voltage**: 10.5 to 32 VDC, 10 watts
- **Grounding**: Chassis isolated from electrical ground

**PHYSICAL**

- **Dimensions**: 198mm (w) x 102mm (h) x 96mm (d)
  - 7.7”(w) x 4.0”(h) x 3.8”(d)
- **Mounting**: Yoke or optional flush mount

**ELECTRICAL INTERFACE**

- **Ports**: 2-EN-61162-1 compliant user programmable I/O NMEA data ports and 2 I/O. Ports dedicated to smart antenna or black box receiver, USB and LAN port

**CONNECTORS**

- **NMEA Input**
  - DPT, DBS, DBT, DBK, GLL, HCC, HDM, HDT, MMB, MWA, RGA, RMC, VHW, VTG, WVR, WPL, XDR, GSA, GST, GRS, GSV, GBS*, RTE, ROT, DTM, GNS & WPT
  - NMEA 0183 V2.3: APA, APB, BOD, BWC, BWR, GGA, GLL, GRS, HSC, MSK, MSS, RMB, RMC, RNN, RTE, SNU, VDR, VHW, VPR, VTG, WCV, WPL, XTE, ZDA, ZTG, GBS, HDT, ROT, DTM, GNS, GST, GSV & WPT

- **NMEA Output**
  - Pulse Log Emulation: 1 - 30,000 pulse per NM
  - Reprogramming: Field programmable flash ROM using the USB port

**ENVIRONMENTAL**

- **Operating Temperature**: -21°C to +55°C
- **Storage Temperature**: -30°C to +70°C
- **Humidity/EMI/Vibration**: IEC/EN 60945 ed4
- **Housing**: Splash proof
- **Compliance**: IMO: MSC 112 (73), IEC 61108-1, IEC, 61162-1, IEC 61162-1, IEC, 60945 Ed. 4
- **FCC**: Meets FCC Part 15, Subpart B
- **Type Approval**:
  - CE, USCG, Wheelmark

**GPS - DGPS RECEIVER**

The MX500 connects to the MX421-10, MX421B-10 or MX521A smart antennas, MX525A Black Box DGPS receiver or MX575A DGPS Compass

*Navico Proprietary RAIM message ($PMVXG, GBS)*
**MX510 AND MX512 SPECIFICATIONS**

**GENERAL**
- Position presentation: Lat/Lon, UTM and user-defined GRID (option)
- Position Resolution: 4 decimal places (Lat/Lon)
- Waypoints: 2000 waypoints with 20-character alphanumeric names and icon
- Routes: 100 routes with a dynamic number of waypoints; up to 2000 waypoints between all routes
- Special Features: GOTO, Mark and MOB, 3-D Panoramic steering display, Tide, Speed Graph, Sun & Moon Almanac, and Wind Calculations.
- Display: 5.7inch B/W STN, 320 x 240 pixels, back-lit LCD display
- Dual Control: Master/Slave/Repeater configuration with up to 4 Slaves/Repeaters via high-speed LAN
- Languages: English, Danish, Dutch, French, Finish, German, Italian, Spanish, Swedish (Some screens may still be in English)
- CPU: Intel PXA255 XScale Processor
- Memory Size: Data: 32MB RAM Program: 32MB (FLASH)
- Data Storage: Stores waypoints, routes, configurations and track memory in USB memory stick (FAT32 format), or built-in Flash RAM

**POWER**
- Input Voltage: 10.5 to 32 VDC, 10 watts
- Grounding: Chassis isolated from electrical ground

**PHYSICAL**
- Dimensions: 295mm (w) x 150mm (h) x 105mm (d)
- Mounting: Yoke or optional flush mount

**MX510 AND MX512**

**ELECTRICAL INTERFACE.**
- 2-EN-61162-1 compliant user programmable I/O NMEA data ports
- 2 I/O Ports dedicated to smart antenna or black box receiver, USB and LAN port
- MX510 Ports
  - MX510 Ports
  - 2 I/O Ports
  - 9-EN-61162-1 compliant NMEA Ports
  - NMEA Input: DPT, DBS, DBT, DBK, GLL, HCC, HDM, HDT, MMB, MWV, RMA, RMC, VHW, VIG, VWR, WPL, XDR, GSA, GST, GRX, GSV, GBS*, RTE & ROT
  - NMEA Output: NMEA 0183 V3.0: APA, APB, BOD, BWC, BW, GGA, GLL, GRS, HSC, MSK, MSS, RMB, RMC, Rnn, RTE, SNU, VDR, VH,W, VPW, VIG, WPL, XTE, ZDA, ZTG, GBS, HDT & ROT
- Pulse Log Emulation: 1 - 30,000 pulse per NM
- Reprogramming: Field programmable flash ROM using the USB port

**CONNECTORS**
- MX510/MX512: 1x -12-pin connector for power and data
- MX512 (only): 1x -10-pin connector for antenna
- MX512 Ports: 8-pin connector for auxiliary data
- 1x - RJ-45 for LAN
- 2 x - USB
- 1 VGA Connector
- 1 44-Pin DATA I/O Connector

**ENVIRONMENTAL**
- Operating Temperature: -21°C to +55°C
- Storage Temperature: -30°C to +70°C
- Humidity/EMI/Vibration: IEC/EN 60945 ed4
- Housing: Splash proof
- Compliance: IMO: MSC 112 (73), IEC 61108-1, IEC 61162-1, IEC 60945 Ed. 4
- FCC: Meets FCC Part 15, Subpart B
- Type Approval: CE, USCG, CCS, Wheelmark

**PROFESSIONAL SERIES NAVIGATION SYSTEMS**
### MX525A and MXB5 Specifications

#### General
- **Receiver Type**: L1, C/A code, 1.575 GHz Frequency
- **Channels**: 12-channel, parallel tracking (10-channel when tracking WAAS/EGNOS/MTSAT)
- **Position Update Rate**: 1 Hz default, 5-10 Hz (optional)
- **Horizontal Accuracy**: <1 m 2D-RMS* (DGPS)
- **Cold Start**: 60 s (no almanac)
- **Satellite Reacquisition**: <10 s (Typical)
- **Antenna Input Impedance**: Antenna Input Impedance

#### Beacon Sensor Specifications
- **MSK Bit Rates**: 50, 100 and 200 bps
- **Channels**: 2-channel, parallel tracking
- **Frequency Range**: 283.5 to 325 kHz
- **Operating Modes**: Automatic using smart beacon feature or manual
- **Sensitivity**: 250 μV/m for 6 dB SNR @ 200 bps
- **Dynamic Range**: 100 dB
- **Adjacent Channel Rejection**: 61 dB @ f° ± 400 Hz

#### Communications
- **Serial Port**: 2 duplex NMEA 0183 Ports
- **Baud Rates**: 4800 (default), 9600, 19200
- **Data I/O Protocol**: NMEA 0183 V3.0
- **NMEA Sentences**: GGA, GSA, GST, GSV, RMC, VTG, GRS, ZDA, GBS***
- **Correction I/O Protocol**: RTCM SC-104

#### Environmental
- **Operating Temperature**: -30°C to +55°C
- **Storage Temperature**: -40°C to +85°C
- **Humidity (MX525A Console)**: 95% non-condensing, protected category
- **Splashproof DGPS Combined Antenna (MXB5)**: "Exposed Category" IEC 60945 ed4

### MX525A Console
- **Dimensions**: 13.5 cm (l) x 11.4 cm (w) x 3.7 cm (h)
- **Weight**: 0.8 kg
- **Power/Data Connector**: 10 pin (male)
- **Antenna Connector**: TNC (female)
- **Mounting**: U-Bracket

### Mechanical MX525 A Console
- **Dimensions**: 14 cm (d) x 10.2 cm (h)
- **Weight**: 0.9 kg
- **Antenna Connector**: TNC (female)
- **Mounting**: U-bracket mount for the MX525 Console, 1”-14 TPI for MXB5 antenna

### Certification
- BSH and Wheelmark approval IMO MSC 112(73) CE and FCC

* Depends on multipath environment, number of satellites in view, baseline length (for local services), and ionospheric activity
** Dependent upon ionospheric activity and multipath
*** NAVICO Proprietary RAIM message ($PMVXG, GBS)
### MX421B-10 and MX521A Specifications

#### General
- **Receiver Type**: L1, C/A code, 1.575 GHz Frequency
- **Channels**: 12-channel, parallel tracking
- **Position Update Rate**: 1 Hz default, 5 Hz (optional)
- **Horizontal Accuracy**: <1 m RMS* (DGPS), <3m RMS** (GPS no S/A)
- **Cold Start**: 60 s (Typical-no almanac)
- **Satellite Reacquisition**: <10 s (Typical)

#### Beacon Sensor Specifications
- **MSK Bit Rates**: 50, 100 and 200 bps
- **Channels**: 2-channel, parallel tracking
- **Frequency Range**: 283.5 to 325 kHz
- **Operating Modes**: Automatic and manual
- **Sensitivity**: 2.5μV/m for 6 dB SNR @ 200 bps
- **Dynamic Range**: 100 dB
- **Adjacent Channel Rejection**: 61 dB @ f° ± 400 Hz

#### Communications
- **Serial Port**: 2 duplex NMEA 0183 Ports
- **Baud Rates**: 4800 (default), 9600, 19200
- **Data I/O Protocol**: NMEA 0183 V3.0
- **NMEA Sentences**: GGA, GSA, GST, GSV, RMC, VTG, GRS, ZDA, GBS***
- **Correction I/O Protocol**: RTCM SC-104

#### Environmental
- **Operating Temperature**: -25°C to +60°C
- **Storage Temperature**: -40°C to +85°C
- **Splash Proof**: “Exposed Category”
  - IEC 60945 ed4

#### Electrical
- **Input Voltage**: 10.5 to 32 VDC
- **Reverse Polarity Protection**: YES
- **Power Consumption**: < 3 W
- **Current Consumption**: < 230 mA @ 12 VDC

#### Mechanical
- **Dimensions**: Height 8.9 cm (3.5”), Diameter 18.2 cm (7 1/8”)
- **Weight**: 660 g (MX421B-10), 200 g (MX421-10)
- **Power/Data Cable**: 10-wire Shielded twisted pair (not included) available in 20, 40, 60, 80 and 90 meter
- **Antenna Connector**: 10 pin (male)
- **Mounting**: 1 inch - 14 TPI Pole Mount

#### Certification
- **BSH and Wheelmark approval IMO MSC 112(73) CE and FCC Compliant, CCS
- **FCC Compliant, CCS

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* Depends on multipath environment, number of satellites in view, baseline length (for local services), and ionospheric activity
** Dependent upon ionospheric activity and multipath
*** NAVICO Proprietary RAIM message ($PMVXG, GBS)
**MX575A SPECIFICATIONS**

**GENERAL**
- Receiver Type: L1, C/A code, with carrier phase smoothing
- Channels: 12-channel, parallel tracking (10-channel when tracking SBAS)
- Position Update Rate: 1 Hz default (Position) up to 10 Hz heading and position output (optional)
- Horizontal Accuracy: < 1 m 95% (DGPS)*
- Heading Accuracy: < 0.5 degrees rms.
- Rate of Turn: 90°/s max
- Pitch / Roll Accuracy: < 1 degree rms
- Start-Up Time: < 60 s typ.
- Heading Fix: < 20 s
- Satellite Reacquisition: < 1 s

**DIFFERENTIAL BEACON SENSOR SPECIFICATIONS**
- Channels: 2-channel, parallel tracking
- Frequency Range: 283.5 to 325 kHz
- Operating Modes: Automatic and Manual
- Sensitivity: 2.5μV/m for 6 dB SNR @ 200 bps
- Dynamic Range: 100 dB
- Adjacent Channel Rejection: 61 dB @ f° ± 400 Hz offset

**COMMUNICATIONS**
- Serial Ports: 3 full duplex RS-232 & 2 half-duplex RS-422
- Isolation: All serial ports optically isolated from power supply
- Baud Rates: 4800, 9600, 19200
- Data I/O Protocol: NMEA 0183 V3.0
- Correction I/O Protocol: RTCM SC-104,
- NMEA Heading Messages: GPHDT, GPROT, PSAT, HPR, GGA, VTG, ZDA, GSA, GSV, GST, GBS***, GRS

**ENVIRONMENTAL**
- Operating Temperature: -30°C to +70°C
- Storage Temperature: -40°C to +85°C
- Humidity: 100% condensing
- Dimensions: 60 cm (l) x 16 cm (w) x 18 cm (h) (Not including mounts)
- Weight: 1.5 kg \ 3.31 lbs

**POWER**
- Input Voltage: 10.5 to 32 VDC
- Isolated: Power supply isolated from serial ports
- Reverse Polarity Protection: Yes (but not reverse polarity operation)
- Power Consumption: < 4.5 W
- Current Consumption: < 360 mA @ 12.0 VDC

**MECHANICAL**
- Dimensions: 60 cm (l) x 16 cm (w) x 18 cm (h) (Not including mounts)
- Weight: < 1.5 kg
- Power Data Connector: 18-pin, Environmentally sealed

**MOUNTING OPTIONS**
- 1”-14 TPI Pole Mount or Fixed Mount
- Brackets (mounting brackets are provided)

* Depends on multipath environment, number of satellites in view, satellite geometry, baseline length (for local services), and ionospheric activity
** Depends on multipath environment, number of satellites in view, and satellite geometry
*** NAVICO Proprietary RAIM Message ($PMVXG, GBS)
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