

SIMRAD

GN70/MX610/MX612

Operator and Installation Manual

ENGLISH



navico.com/commercial

Preface

Disclaimer

As Navico is continuously improving this product, we retain the right to make changes to the product at any time, changes which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the equipment in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing safe boating practices.

NAVICO HOLDING AS AND ITS SUBSIDIARIES, BRANCHES AND AFFILIATES DISCLAIM ALL LIABILITY FOR ANY USE OF THIS PRODUCT IN A WAY THAT MAY CAUSE ACCIDENTS, DAMAGE OR THAT MAY VIOLATE THE LAW.

Governing Language: This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation.

This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

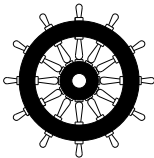
Compliance

The GN70/MX610/MX612 system complies with the following regulations:

- MED 96/98/EC as amended by directive (EU) 2015/559
- CE (2004-108 EC EMC Directive)
- C - Tick

For more information please refer to our website:

www.navico.com/commercial and www.simrad-yachting.com



The Wheelmark

The GN70/MX610/MX612 systems are produced and tested in accordance with the European Marine Equipment Directive MED 96/98/EC as amended by directive (EU) 2015/559. This means that the systems comply with the highest level of tests for nonmilitary marine electronic navigation equipment existing today.

The Marine Equipment Directive 2010/68/EC (MED), as amended by 2011/68/EC for ships flying EU or EFTA flags, applies to all new ships, to existing ships not previously carrying such equipment, and to ships having their equipment replaced.

This means that all system components covered by annex A1 must be type-approved accordingly and must carry the Wheelmark, which is a symbol of conformity with the Marine Equipment Directive.

Navico has no responsibility for the incorrect installation or use of the navigation equipment, so it is essential for the person in charge of the installation to be familiar with the relevant requirements as well as with the contents of the manuals, which cover correct installation and use.

FCC

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful

interference, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or installer technician for help.

Copyright

Copyright © 2016 Navico Holding AS.

Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to our websites:

www.navico.com/commercial and www.simrad-yachting.com

About this manual

This manual is a reference guide for operating the Simrad GN70/MX610/MX612 navigation system with software versions 1.1.42.303 and 1.1.02.00 or higher.

The manual will be continuously updated to match new software releases. The latest available manual version can be downloaded from our websites.

Important text that requires special attention from the reader is emphasized as follows:

→ **Note:** Used to draw the reader's attention to a comment or some important information.

⚠ Warning: Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/personnel.

Contents

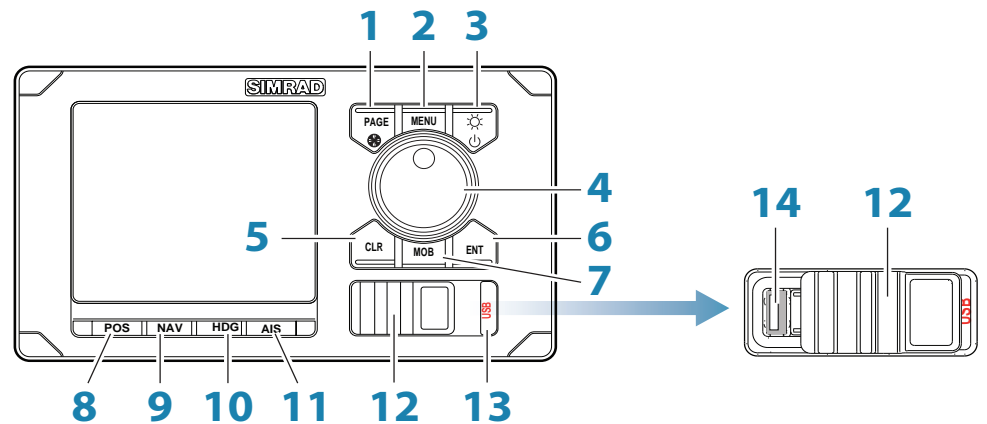
| | |
|-----------|---------------------------------------|
| 7 | Introduction |
| 7 | GN70/MX61x Front panel and keys |
| 8 | CDU pages |
| 11 | Basic operation |
| 11 | Light/Power key |
| 11 | PAGE key |
| 12 | MENU key |
| 12 | Dialog boxes |
| 13 | MOB (Man-Over-Board)/Mark key |
| 14 | Main pages |
| 16 | Menu overview |
| 16 | Quick menus |
| 17 | Settings dialog and submenus |
| 19 | Tools dialog and submenus |
| 21 | Tools page |
| 22 | AIS (Vessel info) |
| 22 | Alerts |
| 22 | Satellites |
| 22 | Waypoints/routes/tracks |
| 23 | Trip log |
| 23 | Sun/moon |
| 23 | Tides |
| 24 | System Configuration |
| 24 | General |
| 24 | The Quick menu dialog and submenus |
| 24 | Network settings |
| 39 | Waypoints, Routes & Tracks |
| 39 | Waypoints, Routes and Tracks panels |
| 39 | Waypoints |
| 40 | Routes |
| 42 | Tracks |
| 44 | Navigating with the GN70/MX61x |
| 44 | Goto menu |
| 44 | Navigate a route |
| 44 | Navigation settings panel |
| 46 | Navigation panels |
| 48 | HDG screens |
| 48 | Quick menu |
| 48 | Data source selection |
| 49 | Advanced data source selection |
| 49 | Heading reference control |
| 50 | Using AIS (PLOT) |
| 50 | Target symbols |
| 51 | Viewing information about AIS targets |
| 51 | Vessel alarms |

| | |
|-----------|----------------------------------------------------------|
| 52 | Vessel settings panel |
| 53 | Alert system |
| 53 | Type of messages |
| 53 | Alert indications |
| 56 | Using the simulator |
| 56 | Simulator mode |
| 56 | Simulation setup |
| 57 | Maintenance |
| 57 | Preventive maintenance |
| 57 | Simple maintenance procedures |
| 57 | Troubleshooting |
| 59 | Software upgrades |
| 62 | List of components |
| 65 | Mounting |
| 65 | General |
| 65 | Mounting location |
| 65 | GN70/MX61x control unit |
| 67 | Antenna systems |
| 68 | MX61xJB junction box |
| 69 | GN70/MX610/MX612 display unit (mechanical dimensions) |
| 70 | GS70 antenna unit |
| 70 | MX521B smart D/GPS antenna unit |
| 71 | HS80A/MX575D D/GPS compass unit |
| 71 | MX610JB smart junction box unit |
| 72 | MX612JB smart junction box unit |
| 73 | Wiring |
| 73 | Wiring guidelines |
| 73 | GN70 or MX61x navigation system; basic wiring principles |
| 74 | CAN bus |
| 75 | Power supply |
| 77 | NMEA 2000 and SimNet devices |
| 77 | IEC61162-1/2 (NMEA 0183) Devices |
| 78 | Alarm interface |
| 86 | Specifications |
| 86 | Technical specifications |
| 86 | GN70/MX61x control unit |
| 87 | MX61xJB junction box |
| 90 | GN70/MX61x connector pinouts |
| 91 | Supported data |
| 96 | List of abbreviations |
| 97 | Index |

1

Introduction

GN70/MX61x Front panel and keys

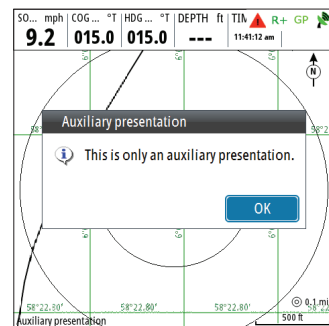
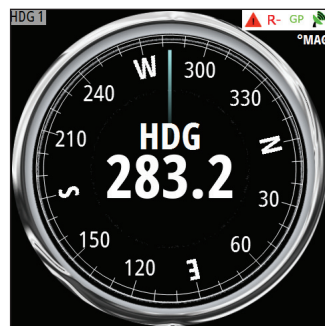


| No. | Description |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | PAGE key: Brings up different screen page every time this key is pressed or to change tab in the Tools and Settings menu. |
| 2 | MENU key: Brings up the quick menu dialog box. |
| 3 | POWER/LIGHT key Short press will turn ON the unit. Momentary press brings up the backlight and night view controls. Series of short presses will cycle through 4 levels of display brilliance. Long press will turn power off. |
| 4 | ROTARY KNOB : Rotate to scroll through menu icons or numbers in the virtual keypad. Press the center of the knob to select menu item or accept entry. Same entry action when you press the ENT key. |
| 5 | CLR key: Press to clear, escape or back out of the menu or data entry. |
| 6 | ENT key: Press to accept menu selection or data entry. Same entry action when you press the center of the rotary knob. |
| 7 | MOB key: Short press will save the present position L/L into the next vacant waypoint. Press and hold for 3 seconds will activate the Man-Over-Board (MOB) function. |
| 8 | POS hot key: Position page will display the present position Latitude, Longitude, COG, SOG, Date and Time. Press repeatedly to show POS1, POS2 or POS3 pages *. |
| 9 | NAV hot key: Navigation page will display the navigation information. Press repeatedly to show NAV1, NAV2 or NAV3 pages *. |
| 10 | HDG hot key: Heading page will show the compass rose, Pitch, ROT and Yaw information coming from a gyro or a GPS compass. Press repeatedly to show HDG1 or HDG2 pages. |
| 11 | AIS hot key: AIS page will display the PLOT screen showing your vessel, waypoints, route and other navigational information. Will also show AIS targets when connected to an AIS receiver via the NMEA 2000 network. |
| 12 | USB* door: To open, lift the right tab and slide the cover to the right. To close, slide cover to left and push the tab down. Close USB door at all times to prevent moisture intrusion. |
| 13 | USB* key: Press to view the files contained in the USB memory stick. |
| 14 | USB* Connector |

*) Not for GN70

CDU pages

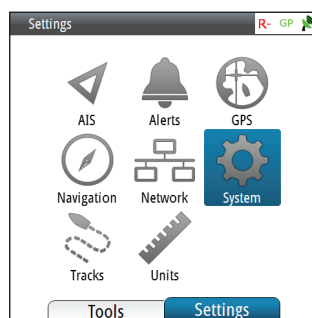
Main pages



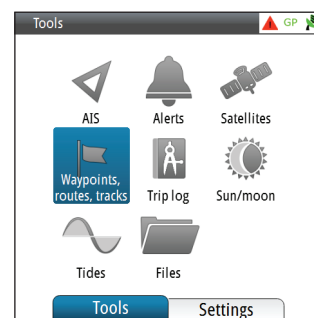
To view a main page, press the appropriate hot key at the bottom of the display, or toggle between the pages by pressing the **PAGE** key repeatedly. The page number indicator in the top left corner is also a “screen alive” indicator, fading slowly, sharp and weak. Top right corner is a status indicator.

→ **Note:** See detailed information in “Main pages” on page 14

Tools and Settings pages



Settings Menu



Tools Menu

Press the **MENU** key to open the Quick menu, then select Tools and Settings. The Settings have two tabs: Tools and Settings. Press the **PAGE** key to toggle between the Tools and Settings tabs.

Status Bar

Appears on all navigation screens. It indicates the GPS and RAIM status or if an alert is present

Mode Indicator



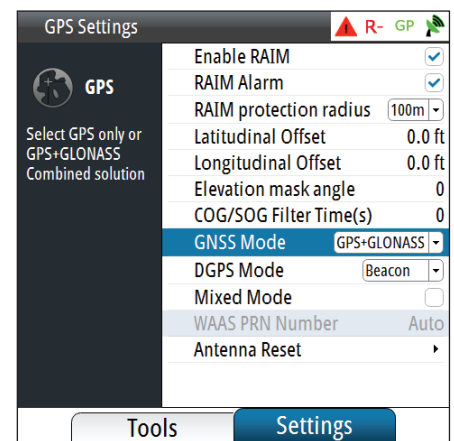
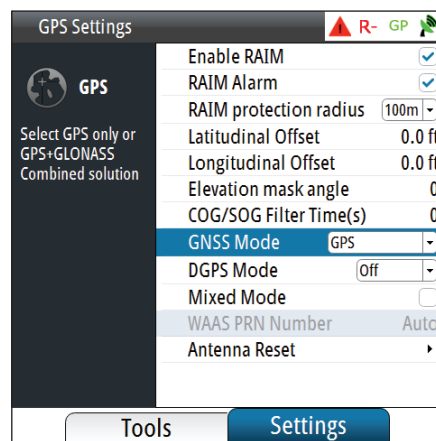
| Icon | Description | Definition |
|-----------|-----------------------|---------------------------------------------------------------------------|
| GP | GPS Position | Position displayed is calculated using GPS satellites |
| GN | GPS +GLONASS Position | Position displayed is calculated from combined GPS and GLONASS satellites |

GPS/GLONASS selection

By default, the SIMRAD CDU is set to navigate using the GPS satellite system. When using the MX521B smart antenna or the HS80A/MX575D smart GPS compass models, the SIMRAD CDU can be controlled to navigate using combined solutions from GPS and GLONASS satellites.

Setup procedure to use GPS and GLONASS satellites:

1. Press the **MENU** key.
2. Scroll to Tools & Settings menu, press **ENT**.
3. Scroll to GPS icon under the Settings page, press **ENT**.
4. Scroll to GNSS Mode, press **ENT**.
5. Scroll to GPS+GLONASS, press **ENT**.
6. Press the **CLR** key repeatedly or press any hot key to exit.



D/GPS Indicator

| Icon | Description | Definition |
|------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | No Position fix | Not tracking satellites (no position update). This is normal the very 1st time you turn on the unit. It takes a few seconds to get a fix. |
| | DGPS Position | Position Fix is differentially corrected using RTCM corrections from beacon stations. This is the normal operating condition. Position accuracy is better than 1 meter. |
| | DGPS Position | Position Fix is augmented using the SBAS (WAAS, EGNOS or MSAS) signal correction. Position accuracy is better than 5 meters. Note: SBAS correction is not an IMO compliant system. |
| | Good GPS position | GPS Position is good but selected DGPS correction is temporarily not available. When DGPS mode menu is set to either Beacon or WAAS. |
| | Good GPS position | Good GPS position fix indication when GN70/MX61x is operated in autonomous GPS only mode DGPS mode setting is OFF. |

RAIM Status





RAIM (Receiver Autonomous Integrity Monitoring) is a fault-detection feature required by IMO for type-approved GPS units. It is another layer of safety that alerts the operator that a condition may exist in the GPS positioning solution that reduces the desired accuracy of the ship's position. This feature requires at least five GPS satellites to operate properly, four satellites or less will indicate a RAIM caution condition (R?). If the statistical RAIM error exceeds a specified limit (100 meters-default) a RAIM Unsafe (R-) alert will be indicated. This means that the RAIM estimated position error is equal or greater than the preset limit. The operator is advised to take extra precautionary measures when using the navigation solution until the RAIM indicator switches to RAIM safe (R+) condition.

The RAIM feature and RAIM Alert can be turned ON or OFF using the procedure below:

1. Press the **MENU** key.
2. Scroll down to Tools & Settings menu, press **ENT**.
3. Select the GPS icon, press **ENT**.
4. Scroll to Enable RAIM (or RAIM Alert), press the **ENT** key to remove or leave a check mark.
5. Press the **CLR** key several times or any hot keys to exit.

Alert icons


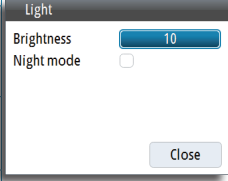
The system will continuously check for dangerous situations and system faults while the system is running. When an alert situation occurs, an Alert icon will appear on the status bar. If you have enabled the siren, an audible alert will be activated when an alert situation occurs.

| Icon | Description | Definition |
|-------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------|
|  | RAIM Safe | Position error is less than 100 meters (RAIM limit) |
|  | RAIM Unsafe | Position error is equal or more than the 100 meter RAIM limit |
|  | RAIM Caution | Not enough satellites are available. RAIM requires 5 (or more) satellites for proper operation. |
|  | Alert condition | Active alert. Red icon for alarms, yellow for warning, see also "Alert indications" on page 53. |

2

Basic operation

Light/Power key

| | | | |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  | <ul style="list-style-type: none">• Press and hold: | Turn unit off |  |
| | <ul style="list-style-type: none">• Single press: | To turn ON or display dialog for light/night mode adjustment | |
| | <ul style="list-style-type: none">• Repeated presses: | Toggle preset brightness levels (10 - 6 - 3- 1) | |
| | <ul style="list-style-type: none">• Check box | To switch to night mode operation | |

→ Notes:

1. The CDU goes through its boot-up routine as soon as external power is applied. It will be ready to turn on in about 30 seconds. The succeeding turn on time will be instantaneous thereafter as long as the external power is not disconnected.
2. If the **POWER** key is released before shut-down is completed, the power off is cancelled.

Night mode

The **Night** mode optimizes the color palette for low light conditions. To activate, rotate the knob until the **Night** mode check box is highlighted, then press the **ENT** key.

- **Note:** Details on the display may be less visible during Day time when the **Night** mode is selected!

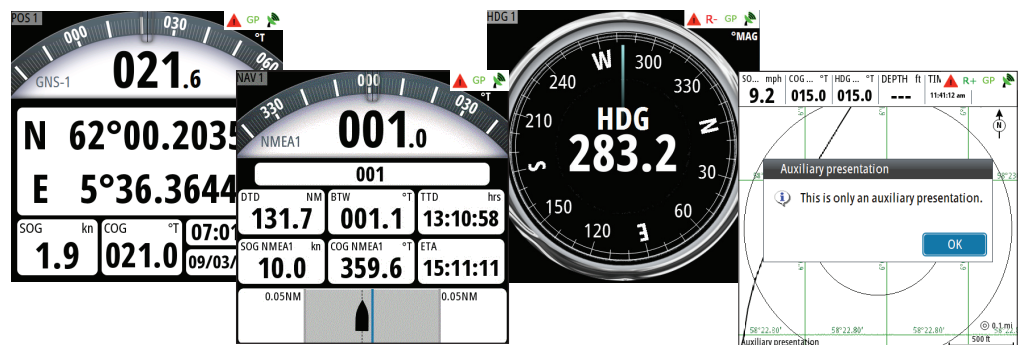
The display backlight can be adjusted in two ways by using the rotary knob (10 steps) or by pressing the **LIGHT/POWER** key repeatedly (4 steps).



PAGE key

Select pages

You can view the different main pages sequentially by pressing the **PAGE** key repeatedly.



You can also view the main pages directly by pressing the hot keys at the bottom of the display. The **PAGE** key is also used to change tabs or toggle between the Tools and Settings screens of the main menu.



MENU key

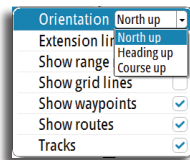
Menus are used to operate the system and to adjust configuration settings.

You display the menu by pressing the **MENU** key to bring up the “Quick Menu”.

Using the rotary knob, scroll down to Tools and Settings and press the **ENT** key.

| | | |
|--|------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | <ul style="list-style-type: none">Pressing the MENU key brings up the quick menu for the particular screen on the display | |
| | <ul style="list-style-type: none">Scroll down to the Tools and Settings then press the ENT key to display the main menu | |

- You can scroll through the menu icons by using the rotary knob and then pressing the **ENT** key or middle of the knob to select.
- Adjust slide bar values by turning the rotary knob clockwise (CW) or counterclockwise (CCW) direction.
- Drop-down listings are selected by pressing the **ENT** key when the highlight is at the selected item.



If you do not want to accept the entry or need to exit the setup screen, press the **CLR** key to return to previous menu level or to exit.

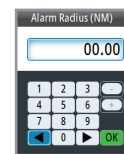
Dialog boxes

Select entry fields and keys in a dialog box by using the rotary knob then pressing the center of the knob or the **ENT** key. You can only enter information when the selected field is highlighted.

Virtual numeric or alphanumeric keyboards will automatically be displayed when required for entering user information in dialogs.

Pressing the **ENT** key after selecting the required value(s) will select the entry. Highlight the **OK** button and press **ENT** will save the entry.

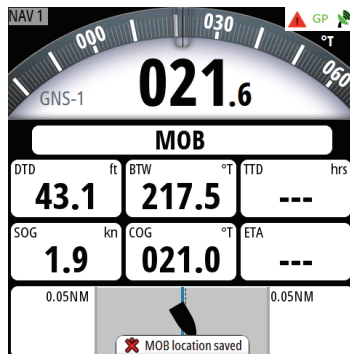
A dialog is closed without saving by pressing the **CLR** key.





MOB (Man-Over-Board)/Mark key

Marking or saving the present position into waypoint memory is accomplished by pressing the **MOB** key momentarily. The marked point can be renamed or edited thereafter and be made into a regular waypoint if needed.

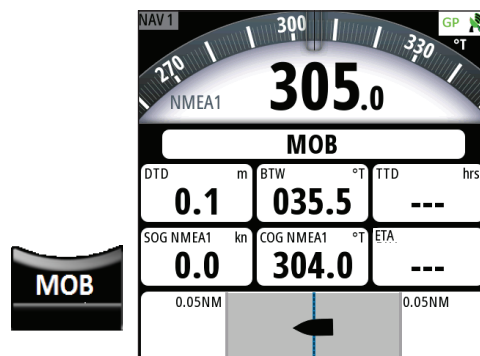


| Waypoints, Routes and Tracks | | | |
|------------------------------|------|------------------|----------------|
| Waypoints | | Routes | Tracks |
| Icon | Name | Distance Bearing | Position |
| ✕ | 001 | 257.7 °M | W 118°21.0148' |
| ✕ | 002 | 1.9 ft | N 33°48.5067' |
| ✕ | 002 | 257.7 °M | W 118°21.0148' |
| ✕ | 003 | 2.0 ft | N 33°48.5067' |
| ✕ | 003 | 258.4 °M | W 118°21.0148' |
| ✕ | 004 | 2.0 ft | N 33°48.5067' |
| ✕ | 004 | 258.4 °M | W 118°21.0148' |
| ✕ | 005 | 13.0 ft | N 33°48.5080' |
| ✕ | 005 | 296.6 °M | W 118°21.0164' |
| ✕ | MOB | 4862 mi | N 86°33.3711' |
| ✕ | MOB | 306.1 °M | E 95°50.5799' |
| New Waypoint... | | | |

If an emergency man over board situation should occur, you can position a Man Over Board mark at the vessel's current position by pressing the **MOB** key for 3 seconds. When you activate the MOB function the following actions are automatically performed:

- A MOB mark is positioned at the vessel's position.
- The display switches to NAV screen showing the range and bearing going back to the MOB point.
- The GN70/MX61x creates an active route to the MOB mark.

➔ **Note:** Press the **AIS/PLOT** key to show the relative location of the MOB point from your vessel.



Cancel MOB navigation

The GN70/MX61x will continue navigating towards the MOB point until you cancel this navigation. To cancel MOB, press the **MENU** key, highlight "Cancel navigation" then press the **ENT** key. Press any hot key to exit.

Delete a MOB mark

A MOB mark is deleted by selecting the MOB mark in the WPT list and then pressing the **MENU** key and selecting delete. It can also be deleted as described in "Waypoints, Routes & Tracks" on page 39.

Main pages

The four keys below the display are called hot keys because they can bring up the position, navigation, heading and AIS (plot) pages directly when pressed.



POS page

There are three POS pages available: POS 1, POS 2* and POS3*. The page indicator located on the top left corner pulses every second to indicate the display is updated every second. Pressing the **POS** key will bring up the POS 1 indicating the present position Lat/Long, SOG, COG, Date/Time and the compass heading. Pressing the POS key again will show the POS 2 page showing the L/L, Altitude and Depth. Pressing the POS key the third time will bring up the POS 3 page showing the odometer, trip meter, SOG and the trip time (hh:mm:ss).

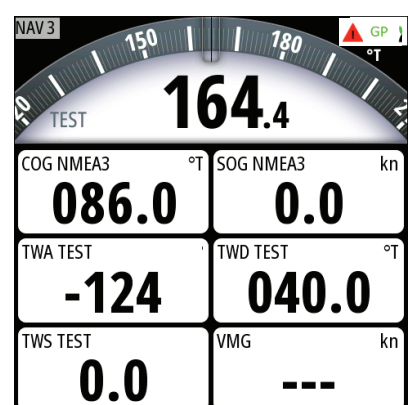
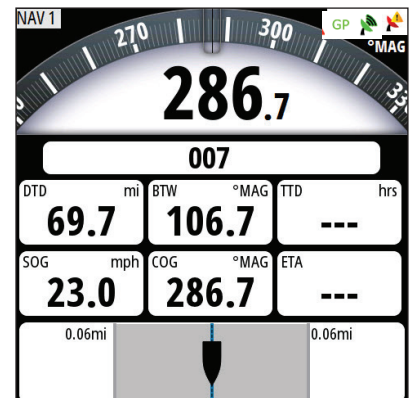
*) Not for GN70.



NAV page

There are three NAV pages available: NAV 1, NAV 2* and NAV 3*. The page indicator on the top left corner pulses every second to indicate the display is updated every second. Pressing the **NAV** key will bring up the NAV 1 page showing the WPT# you are headed to, the range, bearing, SOG, COG and ETA to destination. It also shows the graphical display of the cross-track error. Pressing the NAV key again will show the NAV 2 page and provide e.g. distance to waypoint. Pressing the NAV key the third time will show the NAV 3 page showing the COG, SOG, TWA, TWD, TWS and VMG information.

*) Not for GN70.





HDG page

There are two HDG pages available, namely: HDG 1 and HDG 2. Pressing the **HDG** key will bring up the HDG 1 page showing the full compass rose. Pressing the HDG key again will show the HDG 2 page showing the digital heading readout with ROT, pitch, roll and yaw. This information will be displayed when heading data is available in the NMEA 2000 network or when they are connected to the MX61xJB junction box.



AIS page

The AIS page is not certified for use on SOLAS ships. Pressing the **AIS** key will therefore bring up a warning page. After acknowledging, the plotter page will show your ship in the middle of the screen, together with waypoints, routes, and AIS targets if an AIS unit is available in the NMEA 2000 network.

1 Instrument bar

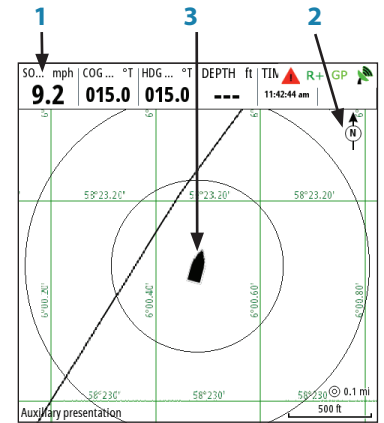
Navigation data is contained on the bar on top of the PLOT page. The PLOT is under the AIS key.

2 Plotter orientation

Possible orientation of the plotter is North Up or Course Up.

3 Ship's location

Always located in the middle of the plot screen.

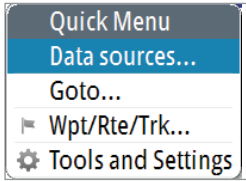


3

Menu overview

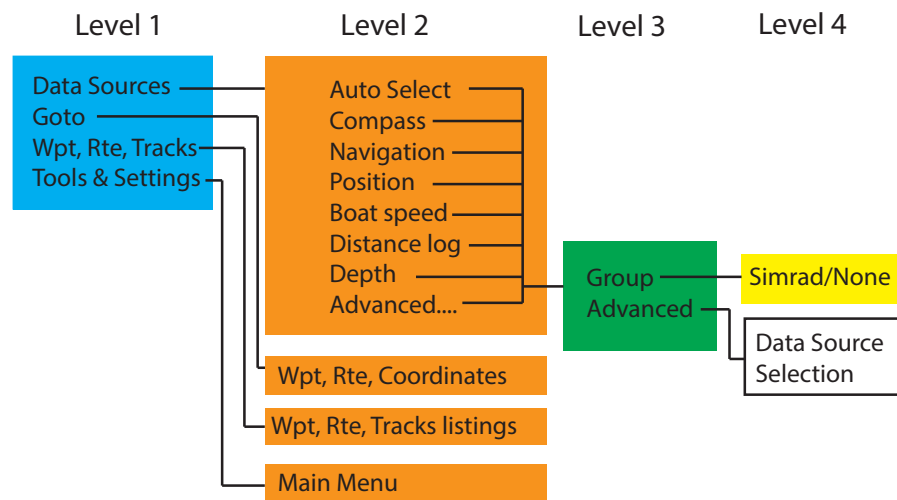
Quick menus

The Quick menus are mode dependent and contain the most common used settings for the active display screen. Pressing the **MENU** key one time brings up the quick menu. Each Quick menu has access to the main Tools and Settings menus.



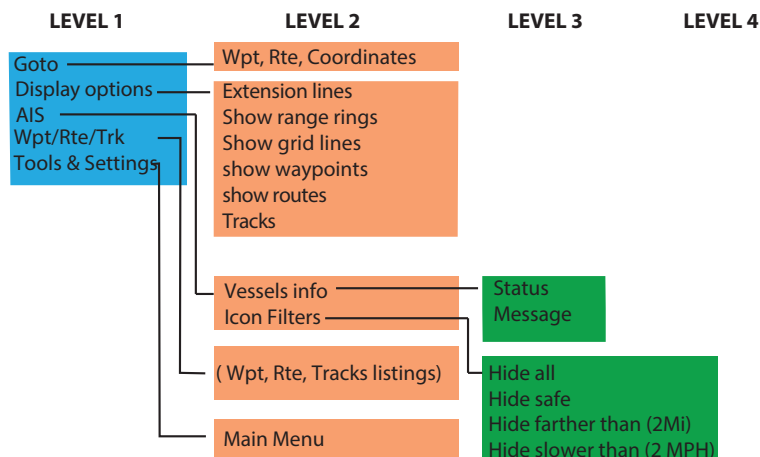
Quick menu under POS, NAV and HDG screens

From the Quick menu for **POS**, **NAV** and **HDG** screens, you can change the data sources used for positioning, navigation, etc. or you can Goto a waypoint or route. Using Auto Select will automatically search for the data source that is connected in the NMEA 2000 network. You can also create waypoints, routes or tracks or bring up the Tools and Settings menu.



Quick menu in AIS (PLOT)

Under the AIS (PLOT) screen the quick menu can be used to Goto a destination wpt, route or L/L coordinates. Below is the AIS screen quick menu map.

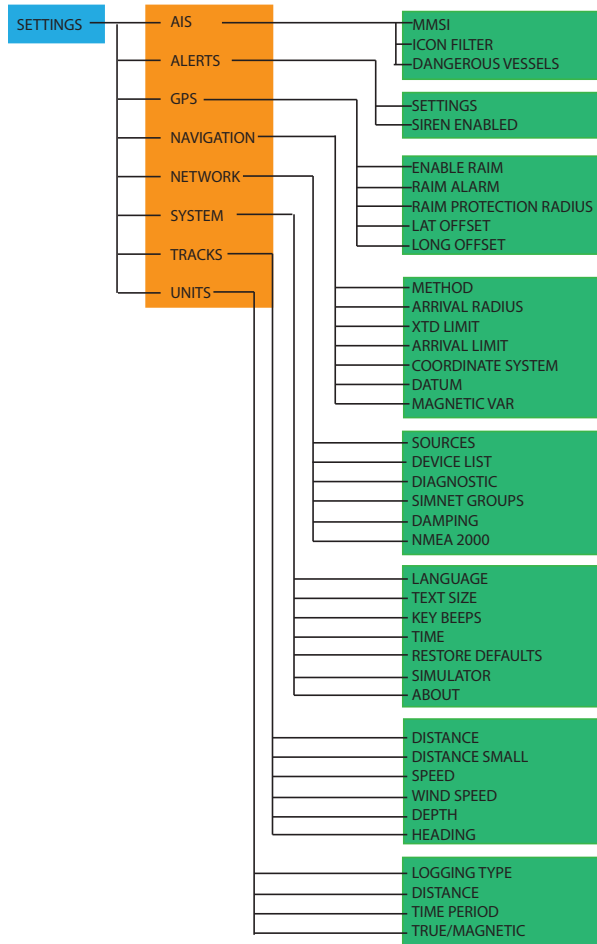




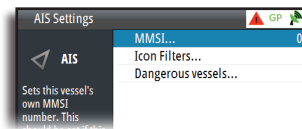
Settings dialog and submenus

The system is configured and most system settings defined during installation and commissioning of the system.

The settings parameters are logically grouped, and each group is presented with an icon in the Settings page. This page is accessed by pressing the **MENU** key, highlight the Tools & Settings then press the knob (or **ENT**). A settings menu map is shown below:

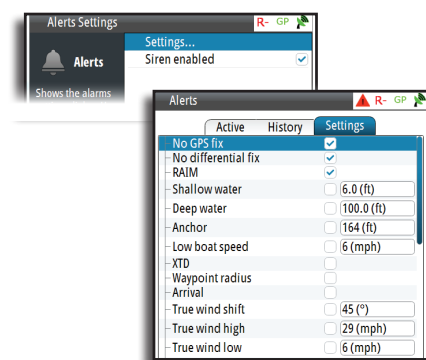
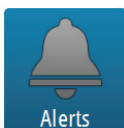


AIS settings



Used to enter the MMSI number of the vessel, set the icon filters to show or hide vessel targets and set limits for dangerous vessels based on distance or time of closest point of approach (CPA).

Alerts settings



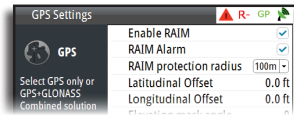
This screen is used to manage and control the alert feature. Press the **PAGE** key to change tabs

-Settings tab is used to turn on/off alerts and set limits.

-History tab lists all previous alerts.

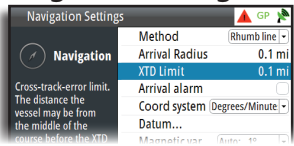
-Active tab shows alerts that are still active. The alert is removed from the list when the cause is corrected.

GPS settings



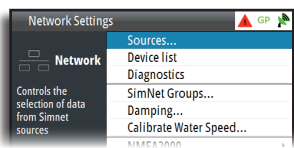
Settings for the GPS RAIM (Receiver Autonomous Integrity Monitoring) feature, alert and radius, L/L Offset, Elevation Mask Angle, COG/SOG filter time, GNSS mode, DGPS mode, Mixed mode, WAAS PRN and Antenna reset.

Navigation settings



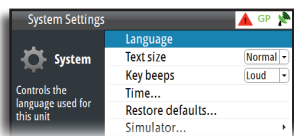
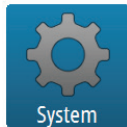
Controls the navigation calculation method to either the Great Circle or Rhumb line. You can also specify the limits for arrival radius, cross track error (XTE) limit, Arrival alert, Coordinate system, Datum and Mag. Variation.

Network settings



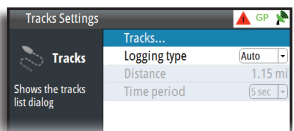
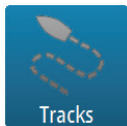
List of data sources, device list connected to the CAN bus network, diagnostics, SIMNET groups, damping, NMEA 2000, NMEA 0183 over MXJB and NMEA 0183 over Ethernet.

Systems settings



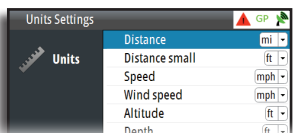
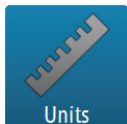
Controls the text language, size, key beeps, time, restore defaults, activate the simulator feature, special product options and information about the software and hardware of the unit.

Tracks settings



Shows the tracks list dialog and logging type.

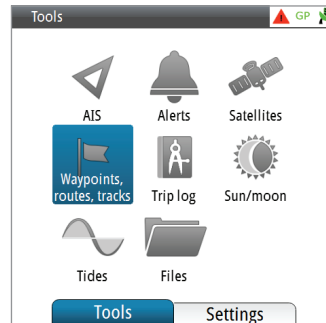
Units settings



Controls the units used for distance, depth, speed and heading.

Tools dialog and submenus

Several tools are available to help you operate the CDU unit. To bring up the TOOLS page, press the **PAGE** key to change tab from SETTINGS to TOOLS.



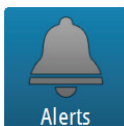
AIS tool



| Status - All | | Rx Messages | |
|--------------|---------------------|-------------|----------------|
| Name | Distance Bearing | CPA TCPA | Type Status |
| SIM VESSEL A | 5969 mi 154.8 °M | - | AIS safe |
| SIM VESSEL B | 5969 mi 154.8 °M | - | AIS safe |
| SIM VESSEL C | 5968 mi 154.8 °M | 0.0 ft | AIS safe |
| SIM VESSEL D | 5968 mi 154.8 °M | - | AIS safe |
| SIM VESSEL E | 5970 mi 154.8 °M | - | AIS safe |

Two tabs are available in this submenu, namely: Status-All and RX Messages. Press the **PAGE** key to change tabs. The Status-All provides a list of targets received from AIS or GMDSS as well as their distance and bearing with reference to your vessel. The RX message tab, provides a list of text messages received from other AIS enabled vessels who sent you a directed or broadcast message.

Alerts tool

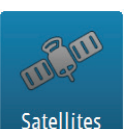


| Alarms | |
|----------------------------|-----------------------|
| Active | History |
| Wind data missing cleared | 8:47 am 05/17/2013 |
| Depth data missing cleared | 8:47 am 05/17/2013 |
| Heading missing cleared | 8:47 am 05/17/2013 |
| Depth data missing raised | 8:47 am 05/17/2013 |
| Heading missing raised | 8:47 am 05/17/2013 |
| Wind data missing raised | 8:47 am 05/17/2013 |

This screen is used to manage and control the alert feature. Press the **PAGE** key to change tabs

- Settings tab is used to turn on/off alerts and set limits.
- History tab lists all previous alerts. Press **MENU** to delete alert history
- Active tab shows alerts that are still active. The alert is removed from the list when the fault is corrected.

Satellite tool

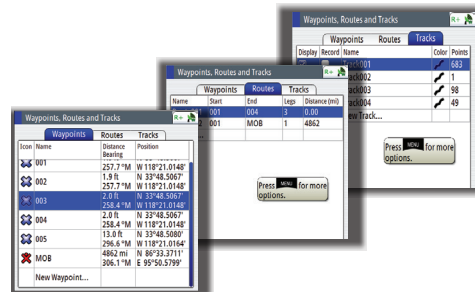


| Satellite | |
|------------------------------------------------------------------------------------------------------------------|------|
| GPS | DGPS |
| | |
| Status: Fix: 3D, WAAS EPE: 12.8 ft HDOP: 0.800 SNR: 44.8 RAIM: Safe | |
| Position: N 33°48.5063' W 118°21.0137' | |
| GPS Source: GS70 D/GNSS Ant... <input type="button" value="Change"/> <input type="button" value="Configure"/> | |

Provides the status display of the GPS satellites and differential correction status. Press the **PAGE** key to change tab to DGPS status screen. Press **MENU** to toggle Automatic, Database or Manual beacon

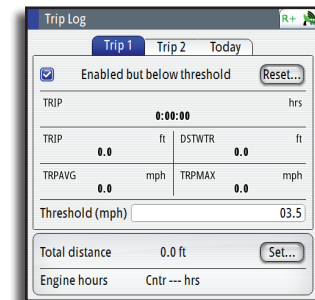
| Satellite | |
|-------------------|--------------|
| GPS | DGPS |
| Status: Beacon OK | Correction |
| Selection: --- | PRN Corr Age |
| SNR: --- | 7 -5.4m 5 |
| Strength: --- | 13 1.6m 5 |
| Ref. Station | 16 0.1m 5 |
| ID: 84 | 20 3.7m 5 |
| Status: Healthy | 23 4.0m 5 |
| Frequency: 000.0 | 31 -3.0m 5 |
| | 32 2.8m 5 |

Waypoints, Routes and Tracks tool



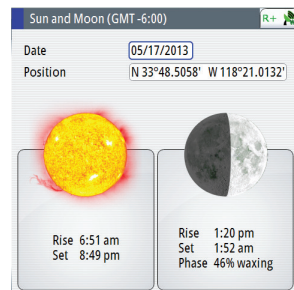
This tool submenu allows you to create waypoints, routes and start tracks. Pressing the **PAGE** Key will change tab to Waypoint, Route and Tracks page.

Trip Log tool



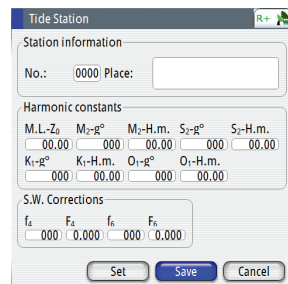
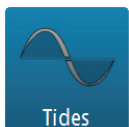
You can track the distance travelled using the two trip meters as well as the overall distance travelled in the today page. To reset, highlight the **Reset** button and press the **ENT** key. Change tab by pressing the **PAGE** key.

Sun/Moon tool



Calculates the sun and moon setting and rising.

Tide tool



Calculates the tides based on manually entered tide harmonics taken from the Admiralty Tide Table book.

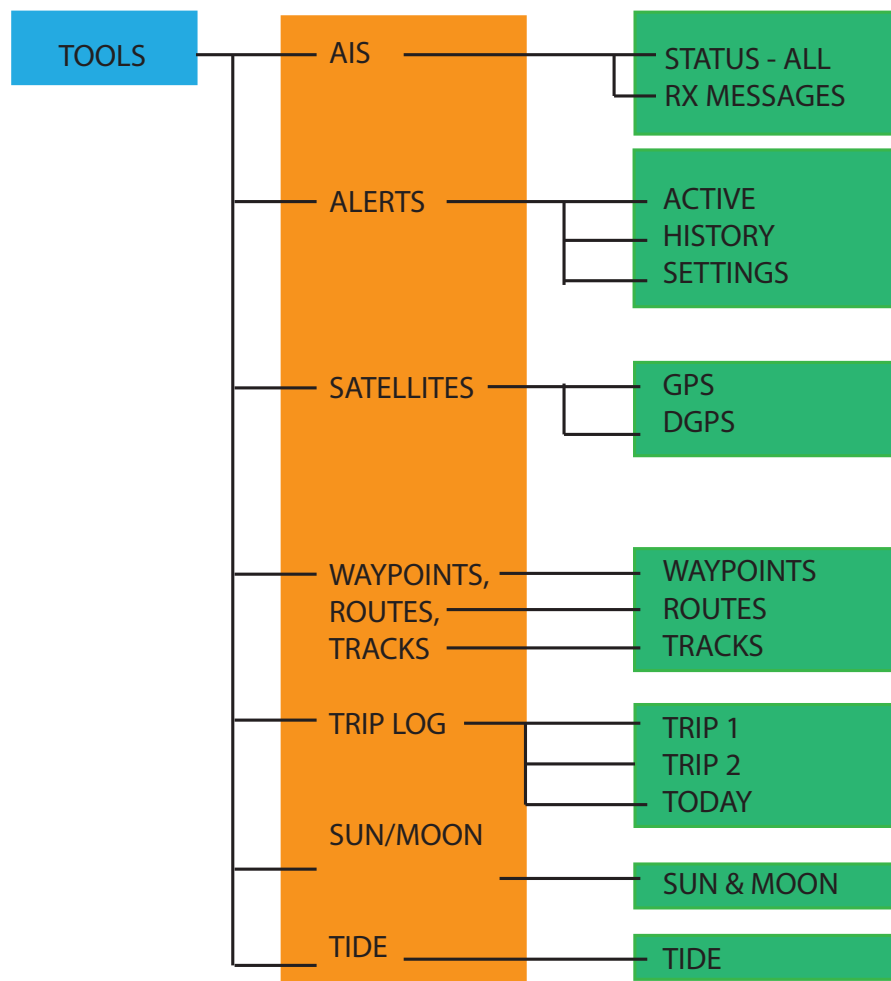
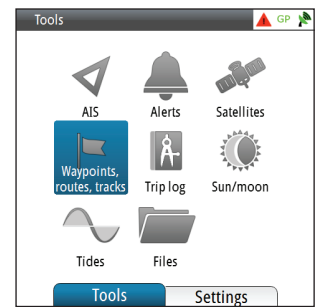
4

Tools page

Several tools are available to help you operate the GN70/MX61x unit. To bring up the TOOLS page, press the **MENU** key then scroll to Tool and Settings menu. Press the **PAGE** key to change tab from SETTINGS to TOOLS. Turn the knob to highlight the desired icon and press the **ENT** key to select it. The Tools dialog includes options and tools that are not specific to any display page. A tools dialog will open on top of your previous page. Press any hot key to exit or press the **CLR** key to return to last active page.

Any listing in the tools dialogs has a page menu, giving access to available options for the selected item.

Below is the Tools menu map:





AIS (Vessel info)

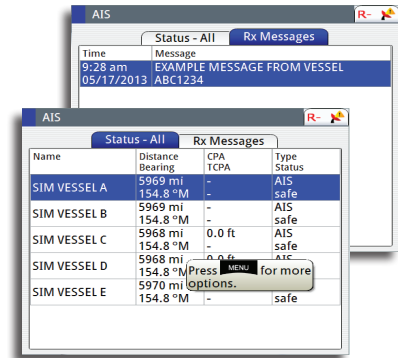
Status-All

Provides a list of all AIS target vessels with their information when the GN70/MX61x is connected to the AIS transponder via the NMEA 2000 network.

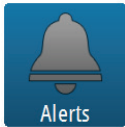
Pressing the MENU key will show a dialog box that allows you to sort the list based on names, distance, bearing, status, type, CPA and TCPA to other vessels.

Message listing

Shows the list of all text messages received from other vessels with time/date stamp.



Alerts



Active alerts

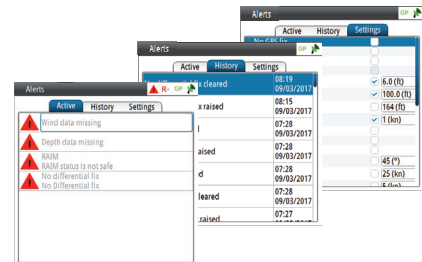
List of active alerts.

Alert history

List of all previous alerts with time stamp and description.

Alert settings

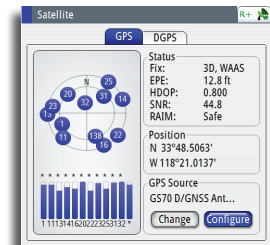
List of all available alert options in the system, with current settings.



Satellites



Status page for GPS satellites that are in view. The SBAS (like WAAS, EGNOS) differential position correction can be turned On or OFF using the configure button. The source of GPS position can be controlled from this screen if there are more than one active antenna connected in the N2K buss. Pressing the PAGE key will change the tab to the DGPS status screen.

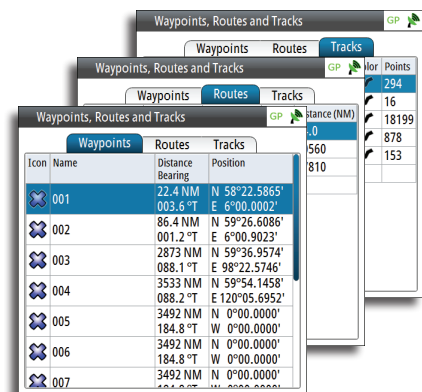


Waypoints/routes/tracks



The databank of waypoints, routes and tracks can be viewed from this display. Pressing the PAGE key repeatedly will change tabs from Waypoints, Routes or Tracks.

Creating new or editing existing waypoints, routes and tracks can be done in this screen. Pressing the MENU key while in this screen will allow you to easily GOTO the waypoint you selected or activate the Route to follow pre-programmed routes or tracks.





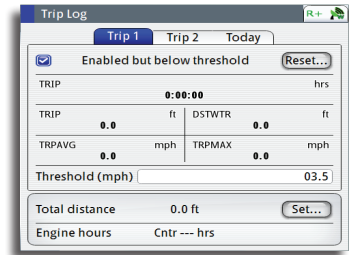
Trip log

Trip 1 / Trip 2

Displays voyage and engine information, with reset option for all data fields.

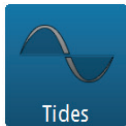
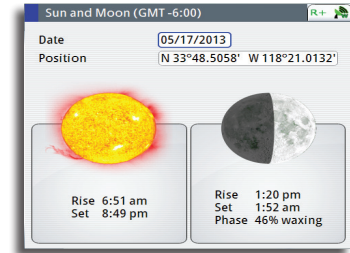
Today

Displays voyage and engine hour information for current date. All data fields will be automatically reset when the date changes.



Sun/moon

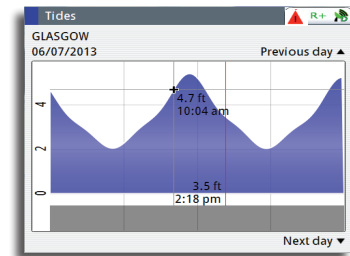
Displays sunrise, sunset, moonrise and moonset based on entered date and position.



Tides

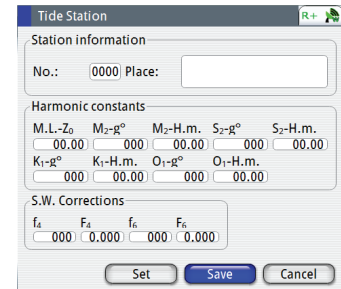
Displays tide information for the tide station nearest to your vessel.

Tide station harmonics needs to be entered manually using station information from the Admiralty Tide Reference table. Use the rotary knob to scroll through time.



Procedure to add a new tide station:

1. Press the **MENU** key to bring up the quick menu.
2. Select Tools and Settings menu then press the **ENT** key.
3. Press the **PAGE** key to change tab to Tools.
4. Scroll to TIDES using the rotary knob.
5. Press the **ENT** key.
6. Press the **MENU** key to bring up "Change Tide Station".
7. Press the **ENT** key.
8. Highlight the "New Tide Station" field.
9. Using the rotary knob, scroll to the top of dialog box and enter the station ID number, name of the place and all the Harmonic constants taken from the Admiralty Tide Station book.
10. Highlight the **SAVE** button.
11. Press the **ENT** key.
12. Press the **CLR** key to exit.



5

System Configuration

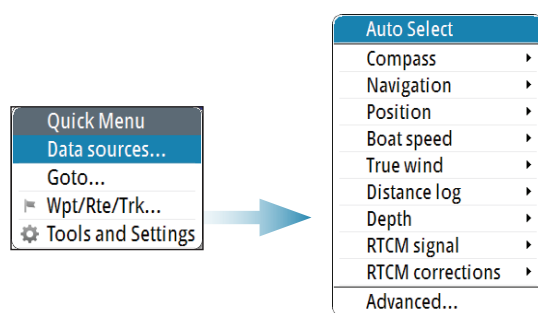
General

When the GN70/MX61x system installation is completed or when the unit is restored to the default settings, a simple network configuration to select the data source is needed. This can be done during the initial turn on. A series of dialog boxes will prompt you through the setup process. Answering yes by pressing the **ENT** key will initiate the auto selection of the antenna unit. Failure in setting up the GN70/MX61x correctly will prohibit the positioning and navigation system from functioning properly.

For installation with more than one display or more than one antenna unit, some setup is required to assign an antenna to a display unit. This section will help you perform the proper setup.

The Quick menu dialog and submenus

The network configuration settings can be accessed through the quick menu or through the Tools and Settings, then the Network submenu. This dialog is accessed by pressing the **MENU** key then selecting the Data sources menu or by highlighting the Tools and Settings and then selecting Network.



Network settings

Selecting data sources

A data source can be a GPS sensor, junction box with connected GPS antenna or a device connected to the network, providing data to other devices. Data can be of different type such as position data, compass data, depth data, etc.

Source of position selection is required on initial start up of the system, if any part of the CAN bus network has been changed or replaced, or if an alternative source is made available for a given data type and this source has not been selected automatically.

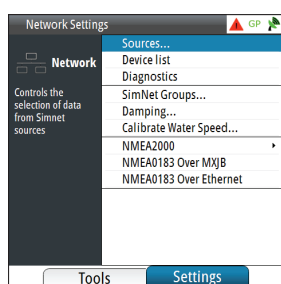
At the first time turn on of the GN70/MX61x the display will ask you to do an auto selection of data sources. You can have it perform an auto selection by pressing the ENT key. It will search for all available source of position, navigation, compass from an internal SimNet priority list. If a data source is connected to SimNet after the first time turn on, this will be identified and automatically selected if no other data source already is selected for the given data type.

→ **Note:** Only sources providing valid data are visible and can be selected.

Auto Select

The Auto Select option will look for all SimNet sources connected to the network. If more than one source is available for each data type, the system will automatically select from an internal priority list.

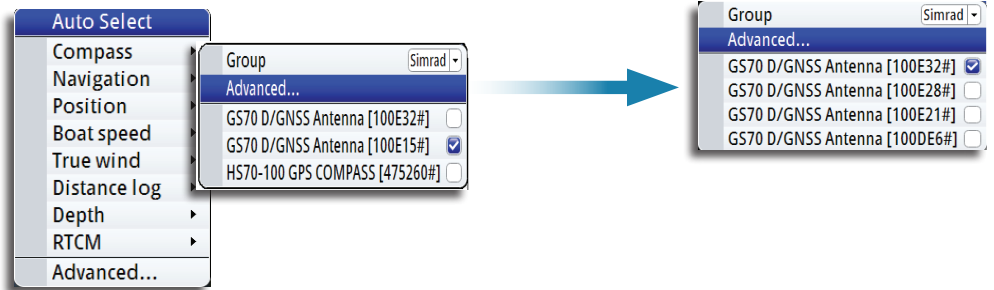
The Auto select function is mainly for situations where the automatic source selection needs to be updated because a selected data source is not supplying data or has been physically replaced with another one. The update secures that the existing source selections are valid and maintained. Missing sources are either automatically exchanged with an alternative source from the list of available sources for the given data type, or the replacing source is selected.



Manual Source Selection

You can manually select the preferred source. This is useful if you have more than one of the same type of device (i.e. multiple GPS antenna units) on the network.

Available sources are listed as shown in the example below. You select active source by ticking the preferred unit. Each GS70 antenna is noted with a serial number (i.e. 100E32#).

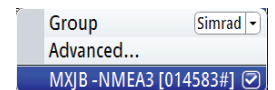
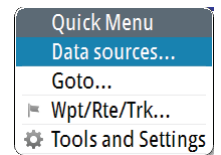


MX521B/MX575D Antenna setup

The MX521B and MX575D smart GPS antenna sensors are normally connected via the NMEA 0183 ports #3 and #4 of the MX61xJB junction box and will be selected and set up correctly when using Auto Select.

If manual selection is required, use procedure below:

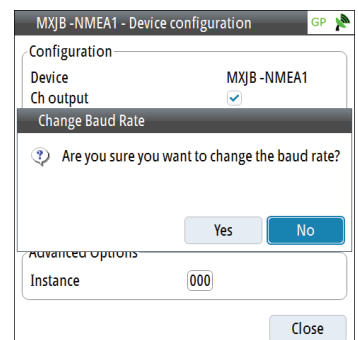
1. Press the **MENU** key.
2. Highlight the Data sources menu then press **ENT**.
3. Scroll to Position submenu then press **ENT**
4. Scroll to MXJB-NMEA3 [xxxxx#], where NMEA3 is Port 3 and xxxxx# is the serial number of the source as indicated on the junction box PCB then press the **ENT** key to place a check mark.
5. Press **CLR** key.
6. Scroll down to RTCM signal, press **ENT**.
7. Scroll to MXJB-NMEA4 [xxxxx#], press **ENT** to place a check mark.
8. Press the **CLR** key.
9. Scroll down to RTCM corrections, press **ENT**.
10. Scroll to MXJB-NMEA4 [xxxxx#], press **ENT** to place a check mark.
11. Press the **CLR** key to bring back the Quick Menu or any hot key to exit.
12. End of setup procedure



Setting the Antenna Port Baud Rate

If the CDU fails to detect the MX521A/MX521B/MX525A/MX575C/MX575D antenna connected to NMEA3 of the J-Box, do the following:

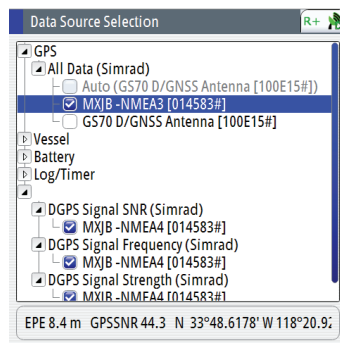
13. Press the **MENU** key to bring up the quick menu.
14. Scroll to Data sources, press **ENT**.
15. Select Position, press **ENT**.
16. Deselect MXJB-NMEA3 as source of position.
17. Press the **CLR** key until the Settings menu appears (or press the **MENU** then scroll to Tools & Setting, press **ENT**).
18. Select NETWORK, press **ENT**.
19. Scroll to Device List, press **ENT**.
20. Scroll to MXJB-NMEA3, press **ENT**.
21. The Configure button will be highlighted, press the **ENT** key.
22. Scroll to Baud rate, press **ENT**.
23. Scroll to 4800 (or 19,200) baud, press **ENT**.
24. Press the **CLR** key several times to exit to Settings menu.



25. Select Network, press **ENT**.
26. Select Sources, press **ENT**.
27. Scroll to Position, press **ENT**.
28. Select MXJB-NMEA3, press **ENT** to leave a check mark.
29. Press the **CLR** key to exit.
30. Verify if position L/L is displayed in POS1 screen.

→ **Notes:**

- If MXJB-NMEA3 (Port 3) is selected as position source the “Configure” button is not available. To configure Port 3, it has to be deselected first as source.
- At power up or when resetting the GPS antenna the J-Box sends a setup command to change the antenna baud rate to 19,200. Port 3 in turn switches itself to 19,200 baud automatically.
- Group selection
The GN70/MX61x can use GPS antennas or data sources that all other products on the N2K network use, or you may select individual sources for the GN70/MX61x system. If the group is set to “Simrad”, any changes to a source will also affect other similar display systems on the network.
If the group is “None”, the selected source will be used for that particular GN70/MX61x unit only.
- Advanced selection
This is similar to the manual selection mode. Using this mode will allow you to view all the available resources available in the N2K network. Selection can be done by placing a check mark on the item selected. You can only use one source of position at a time.



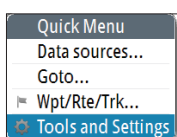
Device List

From the device list you can:

- List all of the active SimNet and NMEA 2000 devices on the network, showing model description and serial number. Devices can be sorted by model ID or by serial number
- Display information relating to a device such as, name, manufacturer, software version, instance, status
- Give the device a logical name relevant to the user (Ant#1 or FWD Ant., Etc.)
- See data coming from the device
- Get access to configuration page for the device.

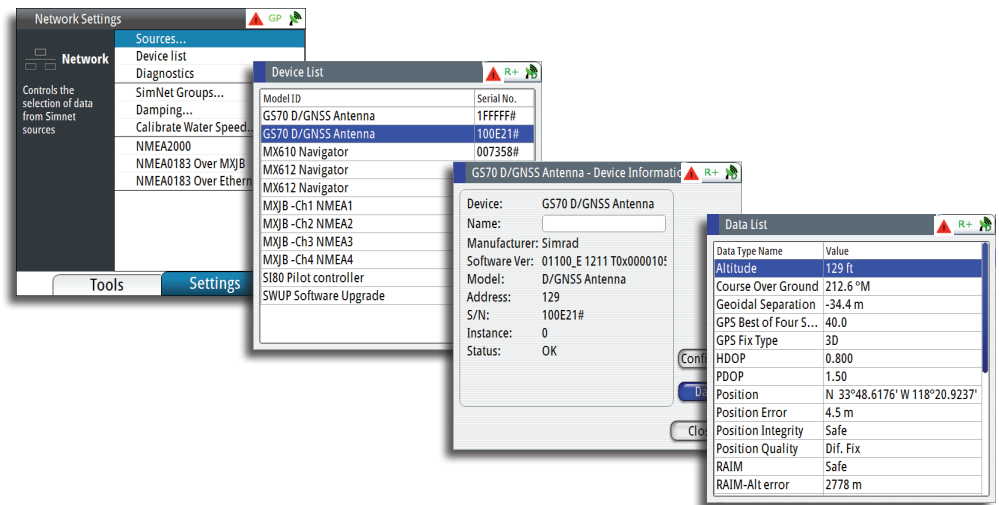
Displaying the Device List

1. Press the **MENU** key.
2. Highlight the “Tools and Settings”, then press the knob or the **ENT** key.
3. Scroll to NETWORK icon and press the **ENT** key.
4. Scroll to “Device List” then press the **ENT** key. This will bring up the list of all devices that are in the N2K network.
5. Scroll to the device desired (i.e. GS70, MXJB-Ch1, etc.) then press the **ENT** key to bring up the Device Information screen. This screen shows you the Device model, Name, Manufacturer, Software Version, Address, s/n, Status, etc.
6. Scroll to the Data button and press the **ENT** key. This will display the Data List for the selected



device.

7. Press the **CLR** key to exit the data list screen.
8. Highlight the Close button and press the **ENT** key or press the **CLR** key several times to exit. You may also press any hot key to directly go to that screen.



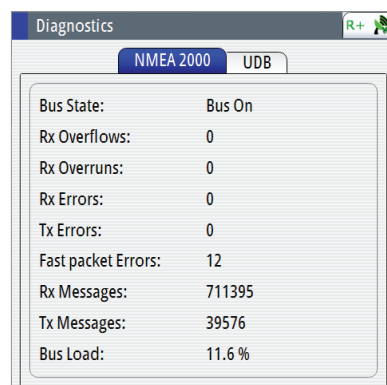
Changing baud rate

There are cases where you may need to change the baud rate speed of the NMEA 0183 port of the MX61xJB to match a NMEA “talker” or “listener”. This can be done using the procedure below:

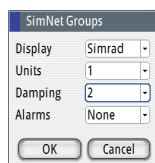
1. Press the **MENU** key.
2. Scroll to the “Tools and Settings”, then press the knob or the **ENT** key.
3. Scroll to Network then press the **ENT** key.
4. Scroll to NMEA 0183 over MX61xJB then press **ENT**.
5. Scroll to the Port# desired (i.e. Port 1) then press ENT. The MXJB-Ch1 NMEA1 - Device Information dialog box will show.
6. The Configure button will be highlighted at this point, press the **ENT** key to activate the configure button.
7. Scroll to Baud rate... 4800, press **ENT**. The baud rate selections are 4800, 9600, 19200 and 38400.
8. Scroll to the correct baud rate then press **ENT** to accept.
9. Press the **CLR** key several times or press any hot key to exit.

Diagnostics

The diagnostic page shows details for the NMEA 2000/CAN bus network. This can be accessed under the Tools & Settings/Network menu.



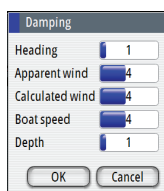
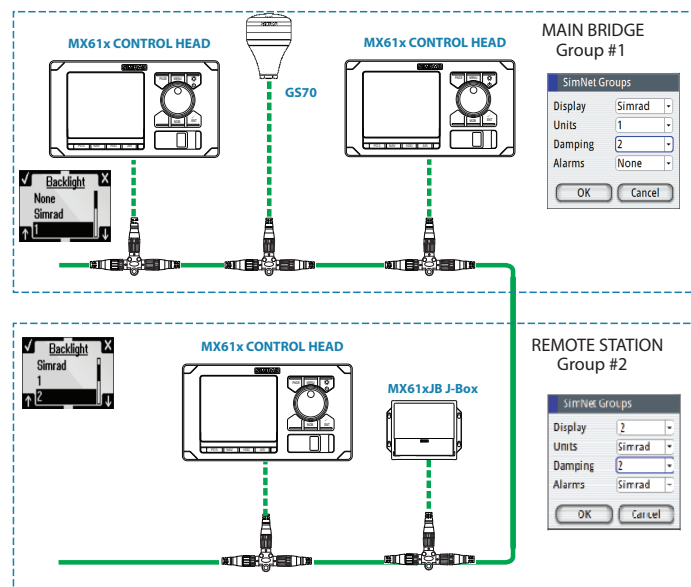
| Option | Description |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bus State | Indicates if network backbone is operating. If no data is detected, check power and check the terminations |
| Rx Overflows | Value greater than 0 could indicate the system is very busy and unable to keep up with incoming messages |
| Rx Overruns | |
| Rx Errors | CAN interface error counters. Count up when there are errors on the CAN bus, and down when things are okay. Should normally be 0. The bus power is off when 255 is reached. Check same things as for Bus state if greater than 0 observed |
| Tx Errors | |
| Fast packet Errors: | Detected errors since power up. Check the network if this is continually increasing |
| Rx Messages | A count since power up of messages received / transmitted |
| Tx Messages | |
| Bus Load | Real time bus load in percentage of max capacity |



SimNet Groups

The SimNet Group function is used to control parameter settings, either globally or in groups of units. The function is used on larger vessels where several SimNet units are connected via the network. By assigning several units to the same group, a parameter update on one unit will have the same effect on the rest of the group members.

The illustration below shows a network of three GN70/MX61x units (two on the bridge and one in the remote area). The two units on the bridge can be made to belong to one group (i.e. Group #1) so that when the backlight and damping settings is adjusted in one of the bridge units, the other GN70/MX61x display settings will also change. The third GN70/MX61x unit in the remote location which does not belong to group #1 will not be affected.



Damping

Controls how quickly the display updates values from sensors.

Increasing the damping applies more averaging or smoothing of the data update rate on the display.

Damping settings are applied to SimNet units belonging to particular damping SimNet Groups.

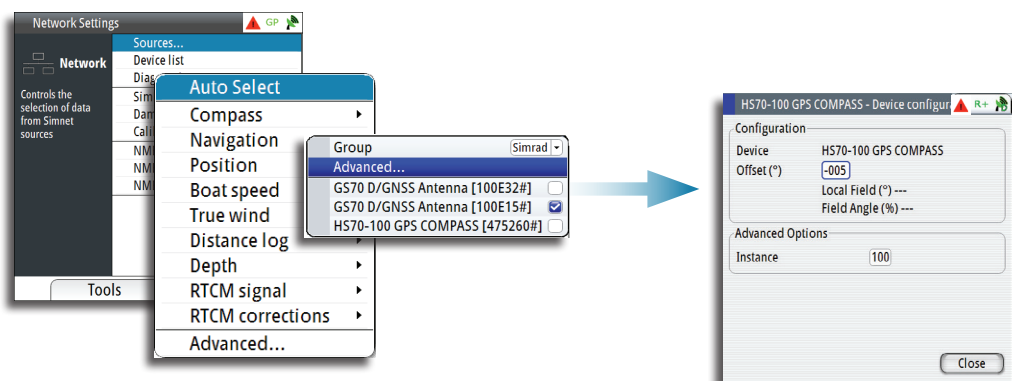


HS80A/MX575D D/GPS Compass Antenna Offset

The difference between the compass lubber line and the boat's center line should be compensated for. This can be done in two ways, namely: physically rotating the compass antenna so the heading is corrected or by entering an offset value using the procedure below. This offset value is saved in the antenna unit.

Entering heading offset procedure:

1. Find the bearing from the boat position to a visible object. Use a chart or a chart plotter
2. Steer the boat so that the center line of the boat is aligned with the bearing line pointing towards the object
3. Activate the device configuration dialog as shown below, by pressing the **MENU** key
4. Scroll to Tools and Settings, press the **ENT** key
5. Scroll to NETWORK icon, press the **ENT** key
6. Scroll to Device list, press the **ENT** key
7. Scroll to Compass, press the **ENT** key
8. Highlight the GPS compass unit being used, press the **ENT** key
9. The highlight will be in Configure button, press the **ENT** key
10. Highlight the Offset field, press the **ENT** key. The virtual keypad will show
11. Highlight (+) or (-), press the **ENT** key
12. Scroll to Enter the offset, press the **ENT** key
13. Enter the offset value using the virtual keypad
14. Highlight OK, press the **ENT** key
15. Highlight the Close button, then press the **ENT** key
16. Press the **HDG** hot key to exit.



- **Note:** Make sure that both the compass heading and the bearing to the object have the same unit (Magnetic or True).
- **Note:** Heading offset is only possible when the GPS compass is connected via N2K.

NMEA 0183 Output over TCP/IP (LAN)

The GN70/MX61x has the capability to output NMEA 0183 over the Ethernet (LAN) port. Since there is no bandwidth restrictions in LAN, all listed NMEA messages are transmitted (see message table below). The data of the sentences comes from the data source selected.

For more information on communication, refer to "Communications (via NMEA 0183)" on page 91.

List of NMEA messages supported in LAN

| NMEA Message | Description |
|--------------|------------------------------------------|
| GGA | GPS system fix data |
| GLL | Geographic position |
| GSA | GNSS DOP and Active Satellites |
| GSV | GNSS Satellites in view |
| GRS | GNSS Range Residuals |
| GBS | GNSS Satellite Fault Detection |
| GNS | GNSS Fix Data |
| APB | Autopilot Sentence "B" |
| VTG | Course over ground and speed over ground |
| ZDA | Time and Date |
| DTM | Datum |
| RMC | Recommended minimum specific GNSS data |
| AAM | Waypoint arrival alarm |
| BOD | Bearing - Origin to destination |
| MTW | Water temperature |
| XTE | Cross-Track error |
| DBT | Depth below transducer |
| VHW | Water speed and heading |
| HDG | Heading, deviation and variation |
| VLW | Distance Traveled through the Water |
| MWV | Wind Speed and Angle |

→ **Note:** NMEA 0183 over LAN is enabled by default, no user operation is required to turn it on/off.

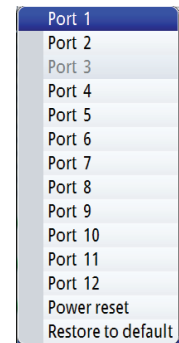
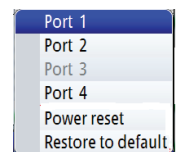
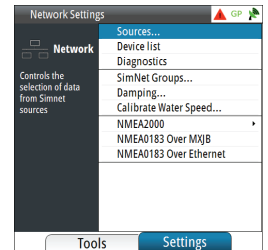
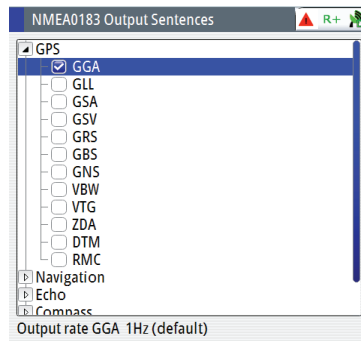
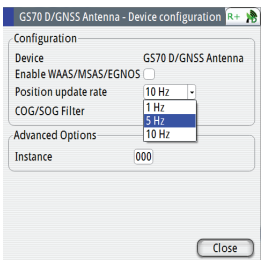
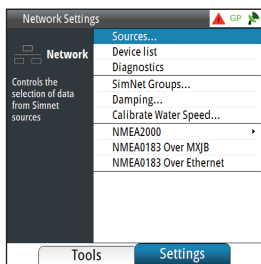
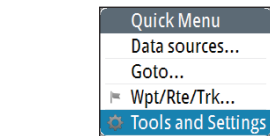
NMEA 0183 output over junction box

NMEA port selection is available only when a MX61xJB junction box is connected in the N2K network. The MX610JB has four RS-422 NMEA 0183 data ports, while the MX612JB has twelve RS-422 NMEA 0183 ports. When the GN70/MX61x CDU senses the presence of the MX61xJB junction box, it will provide a list of port numbers based on the CDU model. Limit the number of NMEA messages to eight per port.

The junction box supplies the power used by devices connected to the NMEA 2000 bus.

To activate the NMEA 0183 port, use the procedure below:

1. Press the **MENU** key.
2. Turn the rotary knob to scroll down to Tools & Settings menu, then press **ENT**.
3. Scroll to Network, then press **ENT**.
4. Scroll down to NMEA 0183 over junction box, then press **ENT**.
A list of port numbers will be shown. The MX610JB has 4 ports while the MX612JB has 12 ports.
5. Scroll to the port you want to use (i.e. Port 1) then press **ENT** to bring up the "Port# -Device configuration" dialog screen.
6. Scroll to the Output sentences button then press **ENT** to bring up the NMEA 0183 Output Sentences dialog window.
7. Scroll to the GPS and press **ENT** to expand the list of NMEA messages related to GPS positioning.
8. Scroll to the desired NMEA message (i.e. GGA, VTG, etc.)
9. Turn on the NMEA sentence by pressing the **ENT** key to put a check mark on it.
10. Press the **CLR** key to go back to the dialog screen.
11. Highlight the CLOSE button then press **ENT**.
12. Press any hot key to exit.



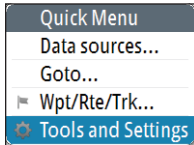
→ **Note:** Port 3 of the junction box is dedicated to antenna connection and cannot be used as a generic NMEA0183 input/output.

List of NMEA output sentences supported by the Junction Box

| Classification | NMEA sentence | Description |
|----------------|---------------|--------------------------------------------|
| GPS | GGA | GPS system fix data |
| | GLL | Geographic position |
| | GSA | GNSS DOP and active satellites |
| | GSV | GNSS satellites in view |
| | GRS | GNSS range residuals |
| | GBS | GNSS satellite fault detection |
| | GNS | GNSS fix data |
| | VTG | Course over ground and speed over ground |
| | ZDA | Time and date |
| | DTM | Datum |
| | RMC | Recommended minimum specific GNSS data |
| | RMB | Recommended minimum navigation information |
| NAV | AAM | Waypoint arrival alarm |
| | XTE | Cross-Track error |
| | APB | Heading/Track controller (autopilot) |
| | BOD | Bearing - Origin to destination |
| | WPL | Waypoint location |
| | RTE | Routes |
| | ALR | Set alarm state |
| ECHO | DPT | Depth |
| | VHW | Water speed and heading |
| Compass | HDG | Heading, deviation and variation |
| | HDT | Heading, True |
| | ROT | Rate of turn |
| | THS | True heading and status |
| AIS | VDx | AIS data |

Multi-Hz feature

For navigation applications that require more than 1 position per second data output, the GN70/MX61x can configure the GS70 antenna and the MX610JB junction box NMEA ports to output the NMEA sentences up to 10 Hz. Use the setup procedure below to turn on the multi-Hz output feature:

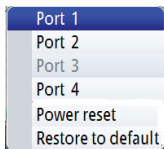


GS70 antenna setting:

1. Press the **MENU** key.
2. Select the Tools and Settings then press **ENT**.
3. Highlight the GPS icon then press **ENT**.
4. Select Advance configuration then press **ENT**.
5. Select Position update rate then press **ENT** to bring up the drop-down submenu.
6. Selection rates are 1, 5 or 10 Hz. Select desired speed then press **ENT**.
7. Press the **CLR** button to go back to main menu.

GN70/MX61x port setting:

1. Highlight the Network icon then press **ENT**.
2. Scroll down to NMEA 0183 over junction box menu then press **ENT**. A drop-down list showing the port numbers will be shown.
3. Scroll to the port# you want to use (i.e. Port 1) then press **ENT** to bring up the list of NMEA messages.
4. Scroll to GGA then press **MENU**.
5. Select 10 (for 10 Hz) then press **ENT**.
6. Repeat the steps 11-12 for other NMEA sentences that you want to use.
7. Press the **CLR** key or any hot keys to exit.

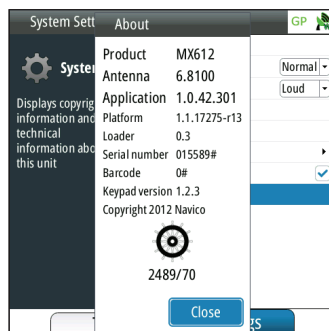


Determine the unit's software version

The About screen displays the copyright information, wheelmark icon and other technical information about the CDU model and MX antenna connected through the MX61xJB junction box. For devices connected through the NMEA 2000 network, the software version can be viewed using the device list.

CDU and antenna software version:

1. Press the **MENU** key.
2. Scroll to Tools & Settings, press **ENT**.
3. Scroll to Systems icon, press **ENT**.
4. Scroll to About, press **ENT**. The system Model#, s/w version, Antenna model# and s/w version will be indicated
5. To exit, press the **CLR** key repeatedly or press any hot key.



All devices in the N2K Network:

1. Press the **MENU** key.
2. Scroll to Tools & Settings, press **ENT**.
3. Scroll to Network icon, press **ENT**.
4. Scroll to Device List, press **ENT**.
5. Scroll to the device to be verified, press **ENT**.
6. Dialog box will show the software version and other technical data for that device.

GPS Settings

This settings screen allows the operator to control the RAIM feature, RAIM Alarm, RAIM protection radius, Lat/Long offsets, GNSS Mode and DGPS Mode. Use the procedure below to access these settings:

1. Press the **MENU** key to bring up the quick menu.
2. Select the Tools & Settings, press **ENT**.
3. Scroll to GPS icon, press **ENT**.
4. Scroll to RAIM or other features listed below.

RAIM Feature

RAIM (Receiver Autonomous Integrity Monitoring) is a fault detection feature that works in conjunction with the MX antenna unit. It gives the operator timely warnings when the GPS system error exceeds the pre-set limit of 100 meters. This feature requires at least five or more GPS satellite to operate properly. There are three RAIM states, namely:

- RAIM safe (R+) - system error is less than 100 meters
- RAIM unsafe (R-) - system error is equal or more than 100 meters
- RAIM caution (R?) - RAIM is not available as less than 5 satellites are available

The Enabled RAIM and RAIM alert can be disabled by removing the check mark next to them. The RAIM protection radius can be either 10 or 100 meters. Default setting is 100 meters.

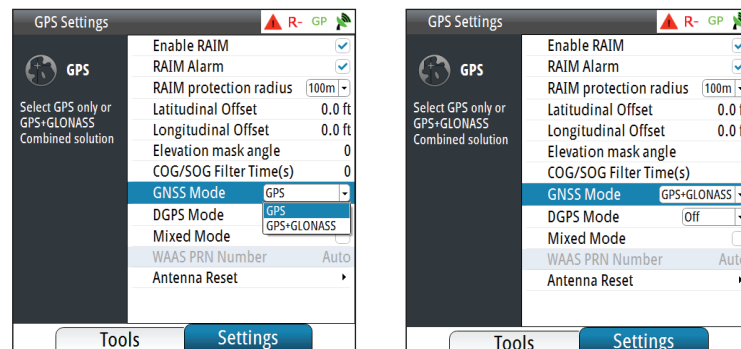
Lat/Long Offset

This feature allows the operator to enter the Latitude and Longitude offset values between the center of the ship to antenna position.

➔ **Note:** Heading data is required to enable this function.

GNSS Mode

Depending on the antenna type in use, the operator can select whether the position Lat/Lon will be determined using autonomous GPS satellites only or combination of GPS and GLONASS satellites. The GPS+GLONASS selection becomes available only when the GS70/MX521B or MX575D/HS80A antenna model is in use.



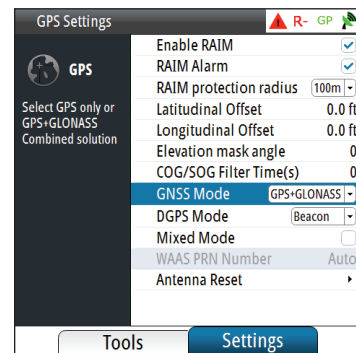
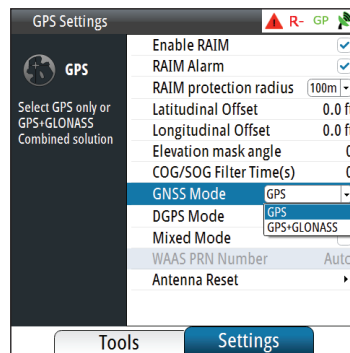
Autonomous GPS position fix is indicated by a "GP" icon in the status bar while GPS+GLONASS is indicated by "GN" icon.

GPS/GLONASS selection

By default, the SIMRAD CDU is set to navigate using the GPS satellite system. When using the GN70/MX521B smart antenna or the HS80A/MX575D smart D/GPS compass models, the system will use combined solutions from GPS and GLONASS satellites.

Setup procedure to use GPS and GLONASS (or GNSS) satellites:

1. Press the **MENU** key.
2. Scroll Tools & Settings menu, press **ENT**.
3. Scroll to GPS icon, press **ENT**.
4. Scroll to GNSS Mode, press **ENT**.
5. Scroll to GPS+GLONASS, press **ENT**.
6. Press the **CLR** key repeatedly (or press any hot key) to exit.
7. The GP (GPS) icon in the status bar will change to GN when position solution from combined GPS & GLONASS becomes available.

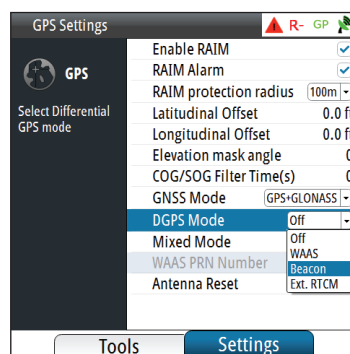


DGPS Mode

The DGPS mode controls the implementation of DGPS corrections to the GPS receiver. The three differential modes are Off, WAAS and Beacon. WAAS is also known in general term as SBAS (Satellite Based Augmentation System). This also includes EGNOS, MSAS and other satellite based GPS correction systems implemented by host countries. SBAS correction is not recognized by IMO and should not be used in lieu of the land-based differential station signals. It is recommended to turn the DGPS mode to OFF when navigating in areas where the land-based differential beacon signals are not available.

The source of DGPS corrections can be controlled using the procedure below:

1. Press the **MENU** key.
2. Scroll to Tools & Settings menu, press **ENT**.
3. Scroll to GPS icon, press **ENT**.
4. Scroll to DGPS mode, press **ENT**.
5. Scroll to OFF, Beacon or WAAS, press **ENT**.
6. Press any hot key to exit.



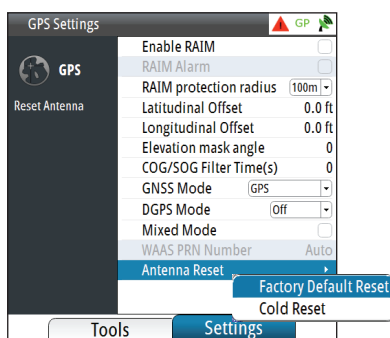
Reset Procedures

How to RESET the SIMRAD antenna: (MX521B, HS80A, MX575D)

1. Press the **MENU** key.
2. Scroll to Tools & Settings, press **ENT**.
3. Scroll to GPS icon, press **ENT**.
4. Scroll to Antenna Reset menu, press **ENT**.
5. Select Cold Reset or Factory Default, press **ENT**.

Where:

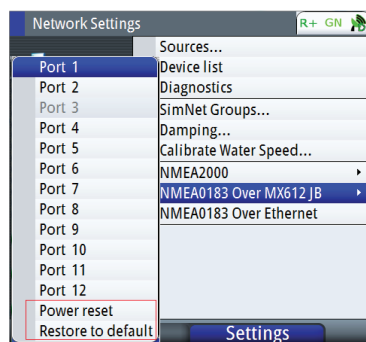
- Cold Reset - sets the baud rate to 4800, NMEA messages to default and clears the oscillator, ephemeris and almanac data
- Factory Default - sets the baud rate to 4800 and sets the NMEA messages to default



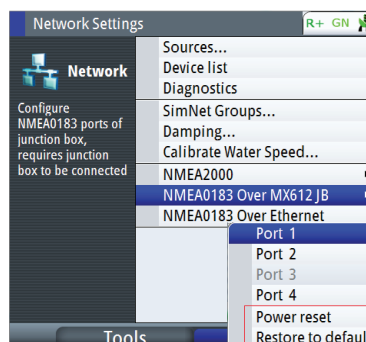
- **Note:** Resetting the antenna will automatically change the baud rate of the antenna and the MX61xJB port 3 to 4800 baud. After approx. 5 seconds a command will be sent to the antenna to change to 19,200 baud without user intervention. Normal operation of the system will typically be restored after 90 seconds.

How to RESET the Junction Box: (MX610JB & MX612JB)

1. Press the **MENU** key.
2. Scroll to Tools & Settings, press **ENT**.
3. Scroll to NETWORK, press **ENT**.
4. Scroll to "NMEA Over MX61xJB", press **ENT**.
5. Scroll to either "Restore to Default" or "Power Reset", press **ENT**.
6. Press the **CLR** key repeatedly or press any hot keys to exit.



MX612 with 12 Ports



MX610 with 4 Ports

Where:

- Power Reset - restarts the junction box.
- Restore to default - restores baud rate of ports as per the following table:

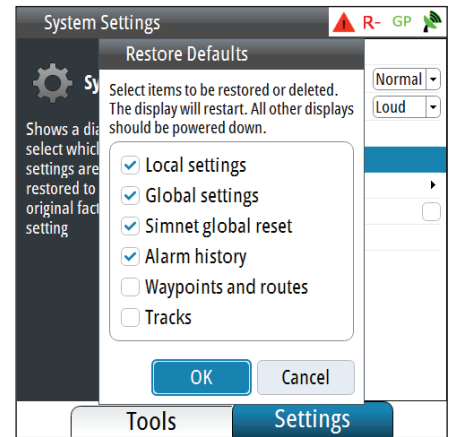
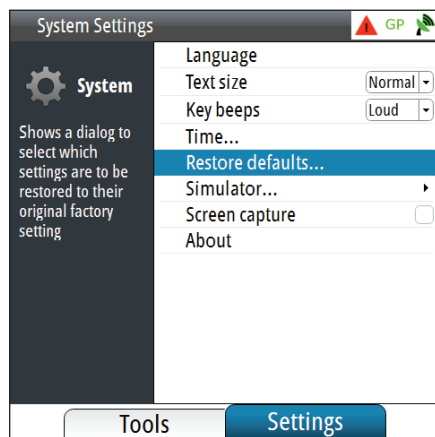
| Port# | MX610 | MX612 | Description |
|------------|-------|-------|-------------|
| MXJB-NMEA1 | 4800 | 4800 | NMEA 0183 |

| | | | |
|-------------|--------|--------|------------------------------|
| MXJB-NMEA2 | 4800 | 4800 | NMEA 0183 Out & RTCM In port |
| MXJB-NMEA3 | 19,200 | 19,200 | NMEA 0183 - Antenna Port |
| MXJB-NMEA4 | 4800 | 4800 | NMEA 0183 |
| MXJB-NMEA5 | - | 4800 | NMEA 0183 |
| MXJB-NMEA6 | - | 4800 | NMEA 0183 |
| MXJB-NMEA7 | - | 4800 | NMEA 0183 |
| MXJB-NMEA8 | - | 4800 | NMEA 0183 |
| MXJB-NMEA9 | - | 4800 | NMEA 0183 |
| MXJB-NMEA10 | - | 4800 | NMEA 0183 |
| MXJB-NMEA11 | - | 4800 | NMEA 0183 |
| MXJB-NMEA12 | - | 4800 | NMEA 0183 |

→ **Note:** Port 2 is reserved for RTCM if the DGPS Mode setting is set to “Ext. RTCM”.

How to restore the MX61x display to default settings:

1. Press the **MENU** key.
2. Scroll to Tools & Settings, press **ENT**.
3. Select SYSTEMS icon, press **ENT**.
4. Scroll to Restore defaults, press **ENT**.
5. Place check mark on each item you want to reset by scrolling to it and pressing the **ENT** key.
6. Scroll to the OK button and press **ENT**.
7. The MX61x CDU will restart.
8. Press the **PWR** key and hold it down until it beeps. Press the **PWR** key momentarily to stop the beeping.
9. Turn the power ON by pressing the **PWR** key momentarily.



Settings will be deleted or set to default when checked:

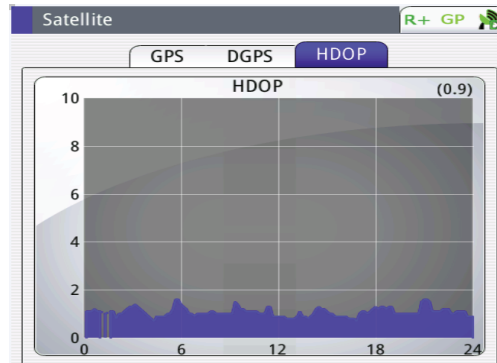
- Local settings - local display settings will be restored to default
- Global settings - global group settings will be restored to default
- SimNet global reset - Reset the SimNet network.
- Alarm history - all alarms logged will be deleted
- Waypoints and routes - all waypoints and routes will be deleted
- Tracks - all tracks will be deleted

→ **Note:** Unless you need to clear all stored values during the installation setup procedure, you should not perform a restore to factory settings.

24-Hour HDOP History

This screen presents a bar graph representing the HDOP for the past 23 hours. The GPS constellation shifts back 4 minutes per day. That means you can expect the GPS coverage to be virtually the same today as it was yesterday. The small 1 hour gap in the bar graph represents the 24th hour. The gap is provided to ease the readability of the graph for the present time. To bring up the HDOP history screen, do the following:

1. Press the **MENU** key.
2. Scroll to Tools & Settings, press **ENT**.
3. Press **PAGE** and scroll to Satellites, press **ENT**.
4. Press **PAGE** twice to change tab to HDOP.



6

Waypoints, Routes & Tracks

Waypoints, Routes and Tracks panels

The Waypoints, Routes and Tracks panels gives access to advanced edit functions and settings for all these items available on your system.

The edit and settings options are accessed from the tools menu or by using the dialog buttons when one of the items is selected.

| Icon | Name | Distance | Bearing | Position |
|------|------|----------|---------------|------------------------|
| 001 | | 22.4 NM | N 58°22.5865' | 003.6°T E 6°00.0002' |
| 002 | | 86.4 NM | N 59°26.6086' | 001.2°T E 6°00.9023' |
| 003 | | 2873 NM | N 59°36.9574' | 088.1°T E 98°22.5746' |
| 004 | | 3533 NM | N 59°54.1458' | 088.2°T E 120°05.6952' |
| 005 | | 3492 NM | N 0°00.0000' | 184.8°T W 0°00.0000' |
| 006 | | 3492 NM | N 0°00.0000' | 184.8°T W 0°00.0000' |
| 007 | | 3492 NM | N 0°00.0000' | 184.8°T W 0°00.0000' |

| Name | Start | End | Legs | Distance (NM) |
|-----------|-------|-----|------|---------------|
| Route001 | 002 | 001 | 1 | 64.0 |
| Route002 | 004 | 001 | 4 | 10560 |
| Route003 | 001 | 002 | 15 | 27810 |
| New Ro... | | | | |

| Display | Record | Name | Color | Points |
|-------------------------------------|--------------------------|--------------|-------|--------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Track001 | | 294 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Track002 | | 16 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Track003 | | 18199 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Track004 | | 878 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Track005 | | 153 |
| | | New Track... | | |

Waypoints

A waypoint is a location on the chart defined by unique latitude and longitude coordinates. They can be created in the GN70/MX61x using the following methods:

- Saving the vessel position
- Using Lat/Long coordinates taken from a chart
- Specified range and bearing.

Positioning waypoints

Saving the vessel's position as a waypoint

The easiest method to create a waypoint is by saving the vessel's position. This is done by a momentary press of the **MOB** key. This action will save the position Lat/Long into the next vacant waypoint number.

- ➔ **Note:** The **MOB** key is a two function key. A momentarily press saves the position L/L into the next vacant waypoint. Press and hold the **MOB** key for 3 seconds, will save the position as MOB and will calculate range and bearing back to that point.

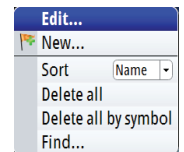
Creating or editing waypoints

A Waypoint can be created (or edited) by using the procedure below:

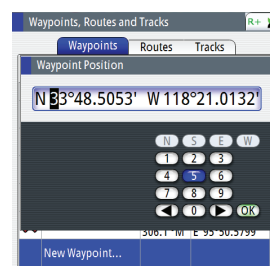
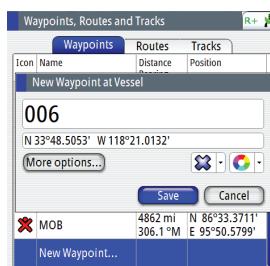
1. Press the **MENU** key to bring up the quick menu.
2. Scroll to Wpt/Rte/Trk... and press the **ENT** key.
3. Turn the rotary knob to highlight the "New Waypoint..."
4. Press the **ENT** key to bring up the waypoint dialog box.

- ➔ **Note:** You may also press the **MENU** key to bring up the sub-menu and then select "New..." for a new waypoint entry, then press the **ENT** key.

| Icon | Name | Distance | Bearing | Position |
|------|------|----------|---------------|------------------------|
| 001 | | 22.4 NM | N 58°22.5865' | 003.6°T E 6°00.0002' |
| 002 | | 86.4 NM | N 59°26.6086' | 001.2°T E 6°00.9023' |
| 003 | | 2873 NM | N 59°36.9574' | 088.1°T E 98°22.5746' |
| 004 | | 3533 NM | N 59°54.1458' | 088.2°T E 120°05.6952' |
| 005 | | 3492 NM | N 0°00.0000' | 184.8°T W 0°00.0000' |
| 006 | | 3492 NM | N 0°00.0000' | 184.8°T W 0°00.0000' |
| 007 | | 3492 NM | N 0°00.0000' | 184.8°T W 0°00.0000' |



The position L/L coordinates is copied on the waypoint position field for a new waypoint.



5. Rotate the knob to move the highlight to the Waypoint L/L field, then press the **ENT** key. The virtual numeric keypad will appear.
 6. Rotate the knob to highlight the left (or right) arrow key and press the center of the knob to shift the cursor to the digit you wish to change, then press the **ENT** key.
 7. Change the number by using the combination of the rotary knob and virtual numeric keypad, then press the **ENT** key. Do this for each digit you want to change.
 8. When all the digits are entered, highlight the **OK** button then press the **ENT** key to finish entry.
 9. Other items like the symbol color, waypoint name or other options can also be accessed in this screen. The alarm radius and depth can be entered in the options dialog box.
 10. Scroll to **SAVE** button and press the **ENT** key to save the information.
- **Note:** Pressing the center area of the rotary knob is the same action as pressing the **ENT** key.

Waypoint Alarm Settings

You can set an alarm radius for each individual waypoint you create.

1. In waypoint menu table, highlight waypoint title tab and press center of knob.
 2. From Edit Waypoint menu, scroll to Alarm Radius section, highlight field and press **ENT** key.
 3. With virtual keypad, use the cursor to change each digit. Range 00 to 99. Click the **SAVE** button.
- **Note:** The waypoint radius alarm must be toggled ON in the alarm panel to activate an alarm when your vessel comes within the defined radius.

Deleting waypoints

You can delete waypoints using the Delete All menu command or you can delete a specific group of waypoints with Delete all by symbol in the menu dialog box.

- **Note:** Waypoints that are used in an active route will not be deleted.

Routes

A route is a series of waypoints arranged in the order that you want to navigate them.

The route can be created from the Route's panel described below:

Creating a new Route

1. Press the **MENU** key to bring up the quick menu.
2. Scroll to "Wpt/Rte/Trk..." and press the **ENT** key.
3. Press the **PAGE** key to select the Routes tab.
4. Press the **MENU** key to bring up the dialog box. This step will allow you to edit, make new route, delete all or find a route.
5. Select New, and highlight create using route list option, press **ENT** key.
6. Turn the rotary knob to highlight new route field.
7. Use virtual keypad to type in the route name if necessary. Press rotary knob to enable/disable display option.
8. Display will go to the PLOT screen showing your present position and the route point.
9. Highlight the **Save** button and press the **ENT** key (or highlight the **Cancel** button if you want to cancel the entry).

| Name | Start | End | Legs | Distance (NM) |
|-----------|-------|-----|------|---------------|
| Route001 | 002 | 001 | 1 | 64.0 |
| Route002 | 004 | 001 | 4 | 10560 |
| Route003 | 001 | 002 | 15 | 27810 |
| New Ro... | | | | |

Adding Waypoint(s) to a Route

Waypoint(s) can be added to an existing route by using the procedure below: .

1. Press the **MENU** key to bring up the quick menu.
2. Highlight the Wpt,/Rte/Trk... menu.
3. Press the **ENT** key.
4. Press the **PAGE** key to tab to Routes.
5. Highlight the route you wish to modify.
6. Press the **ENT** key.

7. Using the rotary knob, move the highlight to the route table.
8. Press the **ENT** key.
9. Scroll down to the waypoint number where you want to add .
10. Press the **MENU** key.
11. Scroll to "Insert..." then press the **ENT** key.
12. Select the waypoint number you wish to add from the waypoint bank or make a new waypoint.
13. Press the **ENT** key.
14. Press the **CLR** key to go out of the table.
15. Highlight the **SAVE** button then press the **ENT** key.
16. Press any hot keys to exit.

| Waypoints, Routes and Tracks | | | | |
|------------------------------|-----------|--------|--------|---------------|
| | Waypoints | Routes | Tracks | |
| Name | Start | End | Legs | Distance (NM) |
| Route001 | 002 | 001 | 1 | 64.0 |
| Route002 | 004 | 001 | 4 | 10560 |
| Route003 | 001 | 002 | 15 | 27810 |
| New Ro... | | | | |

To find a Route

1. In the Wpts, Tracks and Routes table, press the **PAGE** key to highlight Routes tab.
2. Press the **MENU** key, on the menu list, scroll to Find, press the **ENT** key.
3. In Find from Vessel-Route window, highlight name field, press rotary knob. Use virtual keypad to enter name of route required.
4. Highlight the **Enter** button on keypad, press rotary knob. The result of the search will appear in table as illustrated.
5. Highlight the route desired, then press the **MENU** key to edit or start the route.

Starting a Route

1. Press the **MENU** key to bring up the quick menu.
2. Scroll to Wpt/Rte/Trk... and press the **ENT** key.
3. Press the **PAGE** key to tab to Tools.
4. Press the **MENU** key.
5. Select New, and highlight Create using route list option, press **ENT**.
6. The Route table will show route name's details. Use rotary knob to highlight the table, press rotary knob.
7. Scroll and select a route, press **ENT** key.
8. In Edit Route window, the route details will be displayed (legs, waypoint, distance and bearing).
9. Turn the rotary knob to highlight the **START** button, press **ENT**.
10. Select forward or reverse then press **ENT**.

Or, use the quick menu:

1. In main screen, press **MENU** key to bring up the quick menu.
2. Scroll to Goto... Press **ENT** key.
3. In submenu, choose Route.
4. On Select Route menu, scroll to required route, press **ENT** key.
5. The Start Route message will be prompted, forward, reverse or cancel route. Highlight action and press rotary knob.

Sending a route over NMEA0183

A route can be sent over NMEA0183 to a connected ECDIS, radar or similar. For this to work, there must be an MX Junction Box in the system, and it has to have the RTE and WPL sentences enabled. To start sending, do the following:

1. In the Wpts, Tracks and Routes table, press the **PAGE** key to highlight Routes tab.
2. Use the rotary knob to highlight the route you want to send.
3. Press the **ENT** key.
4. Use the rotary knob to highlight the **Send Route** button.
5. Press the **ENT** key.

The route will now be sent out over NMEA0183 from the connected MX Junction Box.

Tracks

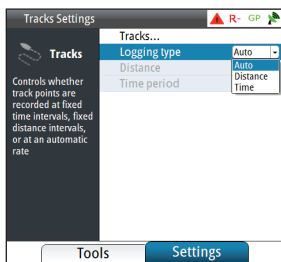
A track is a graphical presentation of the historical path of the vessel, allowing you to retrace where you have travelled.

With the Track Record activated, the system will continue to record the track until the track length reaches the maximum trail point setting, and will then automatically begin overwriting the oldest track points.

The automatic tracking function can be turned ON and OFF from the Tracks panel described later in this section. By default, tracking is turned OFF

Creating a new track

You define the track settings and start the new track from the Tracks Settings dialog described below.



Track settings

The track is made up of a series of track points connected by line segments whose length depends on the frequency of track recording.

You can select to position track points based on time settings, distance, or by letting the GN70/MX61x system position a waypoint automatically when a course change is registered.

→ **Note:** The Tracks option display must also be turned ON to be visible in the AIS/plotter display.

Track setup

Use the procedure below to configure the track feature: .

1. Press the **MENU** key.
2. Scroll to Tracks, press the **ENT** key.
3. Turn the knob to highlight the Logging type then press the knob.
4. Select Auto, Distance or Time, press the **ENT** key.
5. If selection is the Distance, to change follow instruction below:
 - Highlight Distance, press **ENT** key
 - On virtual keypad, enter numeric value for distance period. Use the arrows to navigate the keypad. Range 000 to 115.07
6. If selection is the Time, to change follow instruction below:
 - Highlight Time, press **ENT** key
 - Choose time interval (secs/mins) from menu list, turn rotary knob clockwise, highlight and press rotary knob
7. Press **CLR** key to escape.

To edit Track

Use to change track log

1. Press the **MENU** key.
2. Scroll to Wpt/Rte/Trk.
3. Press the **ENT** key.
4. Press the **PAGE** key to change the tab to Tracks.
5. Scroll to the desired track.
6. Press **MENU** key.
7. In submenu, choose Edit option then press the **ENT** key.
8. In Edit Track window, rotate knob and highlight fields to change.
9. To change track name, highlight the name field, press rotary knob, use virtual keypad to enter name.
10. Highlight the **Enter** button in keypad when completed, then press the **ENT** key.
11. To (remove) display or record track, (un)check the selection.

12. Customize track display, rotate knob to graphic and press rotary knob, from grid select color of track.
13. Enter description of track, press **ENT** key, use virtual keypad to enter alphanumeric details. Use **Enter** button to exit.
14. Highlight Create Route from track.
15. Highlight the **START** button then press the **ENT** key to start the route.
16. Select going forward or reverse, then press the **ENT** key.
17. At bottom of window, select to delete, show, save or cancel modification.

→ **Note: Show** button will display the plot screen
To toggle, press **ENT** key in the Edit Track window.

To add new Track

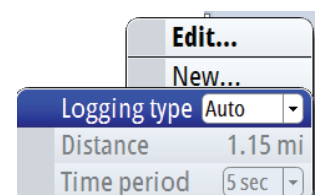
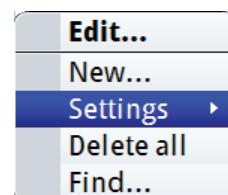
1. Press the **MENU** key.
2. Highlight the Wpt/Rte/trk, then press the **ENT** key.
3. Press **PAGE** key, to Tracks tab, see list of tracks.
4. Rotate knob to highlight track line identified as New Track, press **ENT** key (or for same function, press **MENU** key, scroll to New).
5. In New Track window, highlight field, press rotary knob, use virtual keypad to enter name.
6. Press **Enter** button in keypad when completed.
7. To (remove) display or record track, (un)check the selection.
8. Customize track display, rotate knob to graphic and press rotary knob, from grid select color of track.
9. Enter description of track, press **ENT** key, use virtual keypad to enter alphanumeric details. Use **Enter** button to exit.
10. At bottom of window, select to save or cancel entry.
11. Press **CLR** key to exit.

To find a Track

1. Press the **MENU** key.
2. Highlight the Wpt/Rte/Trk and press the **ENT** key.
3. Press **PAGE** key, to Tracks tab, see list of tracks.
4. Press the **MENU** key.
5. In submenu, choose Find option, press **ENT** key.
6. Find from Vessel- Track window, select a track from list below.
7. Press **MENU** key, scroll to Show option, press **ENT** key.

The selected track will be displayed in the plot screen.

| Waypoints, Routes and Tracks | | | | |
|-------------------------------------|-------------------------------------|--------------|-------|--------|
| Waypoints Routes Tracks | | | | |
| Display | Record | Name | Color | Points |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Track001 | | 294 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Track002 | | 16 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Track003 | | 18199 |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | Track004 | | 878 |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Track005 | | 153 |
| | | New Track... | | |

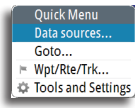


7

Navigating with the GN70/MX61x

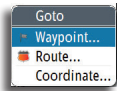
The navigation function allows you to navigate towards a waypoint, along a predefined route or a new Lat/Long coordinate.

Goto menu



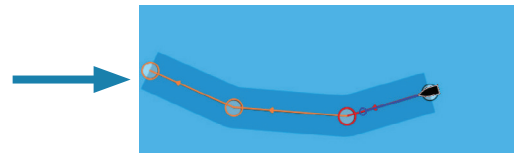
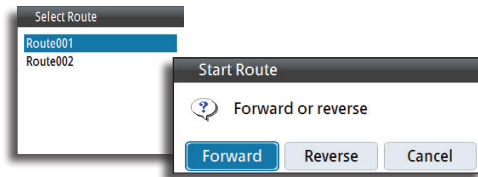
You can start navigation to any waypoint or route from the NAV screen by using the Goto menu, displayed by pressing **MENU** key.

→ **Note:** When the GN70/MX61x starts navigating, the cross track limits will be indicated on the NAV screen.



Navigate a route

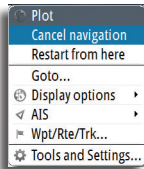
Start navigating a route by pressing the **NAV** key, then pressing the **MENU** key and then activating the Goto menu and scroll to Route.



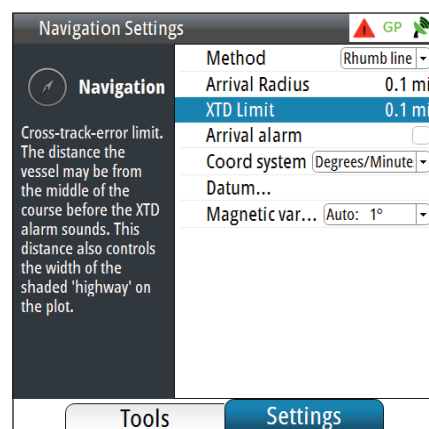
When route navigation is started, the Goto menu will expand showing options for skipping a waypoint, or for restarting the route from current vessel position.

Cancel navigation

You can cancel navigation from the Goto menu. Press the **MENU** key one time to bring up the quick menu. Select the Cancel navigation and press the **ENT** key.



Navigation settings panel



Navigation method

Different methods are available for calculating the distance and bearing between any two points on a chart.

The Great Circle (GC) route is the shortest path between two points. However, if you are to travel along such a route, it would be difficult to steer manually as the heading would constantly be changing (except in the case of due north, south, or along the equator).

Rhumb lines (RL) are tracks of constant bearing. It is possible to travel between two locations using Rhumb line computation, but the distance would usually be greater than if Great Circle is used.

Steering alarm limits

Arrival radius

Sets an invisible circle around the destination waypoint.

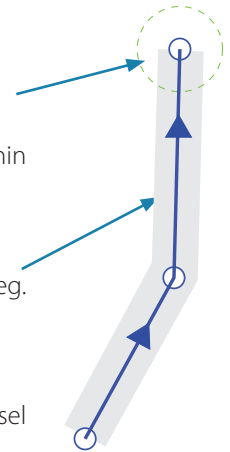
The vessel is considered to have arrived at the waypoint when it is within this radius.

Off course (XTE) limit

This parameter defines the vessel's accepted offset distance from the leg. If the vessel goes beyond this limit an alarm will be activated.

Arrival alarm

When the arrival alarm is enabled, an alarm will be activated as the vessel reaches the waypoint or when it is within the specified arrival radius.



Magnetic variation

Magnetic variation is the difference between true bearings and magnetic bearings, caused by different location of the Geographic and the Magnetic north poles. Any local anomalies such as iron deposits might also affect the magnetic bearings.

Magnetic variation is applied in order to navigate with heading in "True" mode when a magnetic compass is used as source.

When set to Auto, the system automatically converts magnetic north to true north. Select manual mode if you need to enter your own local magnetic variation.

Datum

Most paper charts are made in the WGS84 format, which also is used by the GN70/MX61x system.

If your paper charts are in a different format, you can change the datum setting accordingly to match your paper chart.

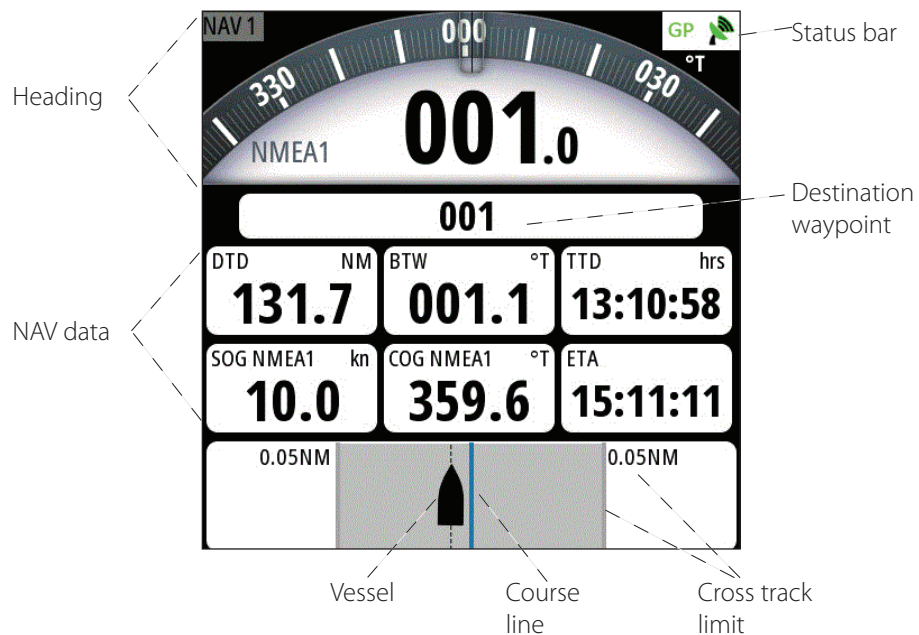
Coordinate system

Several coordinate systems can be used to control the format for Lat/Long coordinates displayed on the POS and PLOT panels.

Navigation panels

The Steer and Position panels are used to display information when you are navigating.

NAV panel



Data fields

The NAV/Steer panel offers the following information:

| | |
|------------|----------------------------------------|
| Heading | True or magnetic compass heading |
| Status Bar | Shows condition of GPS, RAIM and alarm |
| WPT#/Name | Destination waypoint identification |
| DTD | Distance to destination |
| BTW | Bearing to waypoint |
| SOG | Speed over ground |
| COG | Course over ground |
| TTD | Time to destination |
| ETA | Estimated time of arrival |
| STEER | Course to steer towards next waypoint |

Course line

When travelling on a route the course line shows the intended course from one waypoint towards the next.

When navigating towards a waypoint (MOB or an entered Lat/Long position), the course line will show the intended course from the point at which navigation was started towards the next waypoint.

Vessel symbol

The vessel symbol indicates distance and bearing relative to the intended course.

Off course limit

If the XTD exceeds the defined off course limit, this will be indicated with a red arrow including the distance from the track line.

If the off course alarm is enabled, and the XTD exceeds the defined off course limit, the alarm will activate.

Position panel

The POS screens (POS 1, POS 2 and POS 3) provides the largest presentation of the present position Lat/Long coordinates. It also displays the course-over-ground (COG) and speed-over-ground (SOG), odometer, trip meter and the UTC Date & time. The time can be configured for local 24-hour or AM-PM setting as well as local time offset.



GPS position info



SOG/COG with source name indicated

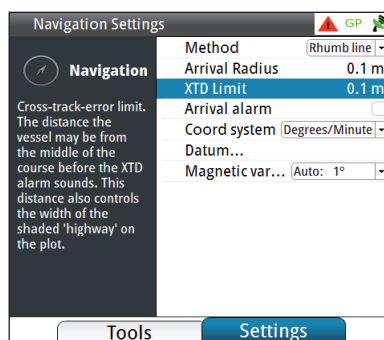
Data fields

| | |
|------------|-------------------------------------------------------------------|
| Heading | True or Magnetic compass heading |
| Status Bar | Indicates status of GPS, RAIM and alarm |
| GPS | Position in Lat. and Long. (other coordinate format is available) |
| Time | UTC or Local |
| Date | DD/MM/YYYY or MM/DD/YYYY |
| SOG | Speed over ground (Knots) |
| COG | Course over ground (True or Magnetic) |

→ **Note:** The COG/SOG field will indicate the source of data if you assign a 5-character alphanumeric name to the device used for positioning and heading (i.e. SOG xxxxx Kn and COG xxxxx M) (see above picture).

The GN70/MX61x can display the Lat/Long data in several coordinate formats. To change the L/L format:

1. Press the **MENU** key to bring up the quick menu.
2. Scroll down to Tools and Settings and press the **ENT** key.
3. Scroll to NAVIGATION and press the **ENT** key.
4. Scroll to Coord System (the default setting is Degrees-Minutes).
5. Press the **ENT** key to bring up the different selections.
6. Scroll to the desired L/L format.
7. Press the **ENT** key to confirm selection.
8. Press the **POS** hot key to verify.



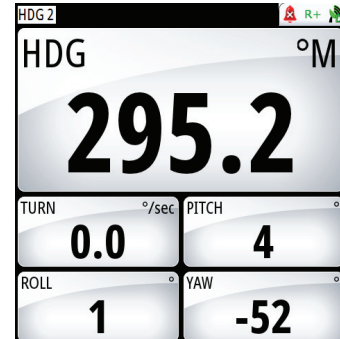
8

HDG screens

There are two heading (HDG 1 and HDG 2) screens. The HDG 1 screen displays the analog compass rose with the digital heading readout in the center, while the HDG 2 screen displays the digital HDG, ROT, Pitch, ROLL and YAW information. The HDG data is only valid if a GPS compass antenna or an alternative source of heading is available via the N2K network. You can toggle between the HDG 1 and HDG 2 screens by pressing the HDG hot key once or twice.



HDG1 screen



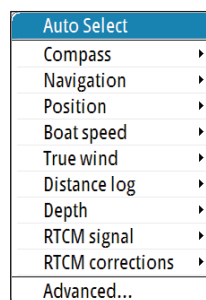
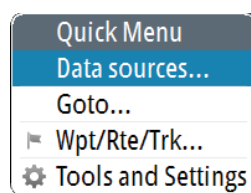
HDG2 screen

Quick menu

| Quick menu | Description |
|--------------------|-----------------------------------------------------------------------------------------------------|
| Data source | Allows you to select the source of position and heading data to be used for navigation and display. |
| Goto | Lets you navigate to a waypoint, route or coordinate. |
| Wpt/Rte/Trk | Shortcut to the Tools=>Wpt/Rte/Trk menu. |
| Tools and Settings | Will bring up the main menu page. |

Data source selection

There are two methods for data source selection; auto or manual. In **Auto Select** mode, the source of compass data is selected based on the availability of the heading data in the N2K network. The **Auto Select** mode assures you that the GN70/MX61x will pick the best possible source of data for all features listed in the sub-menu below. Should there be a need to override this auto feature, the operator can manually change the individual selection using the procedure below.

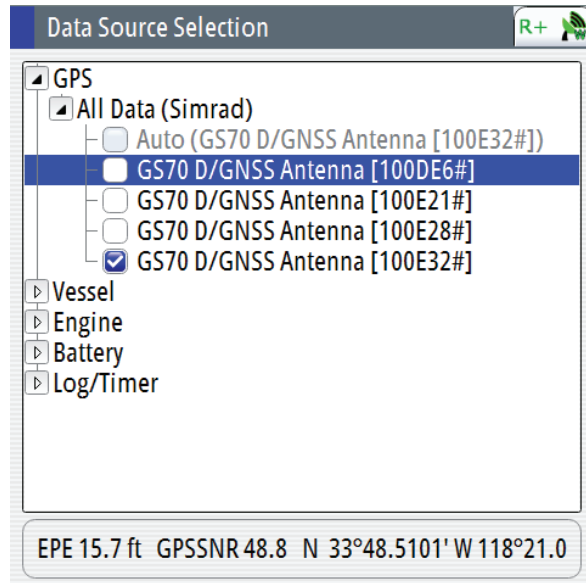


Manual Selection procedure:

1. Press the **MENU** key.
2. Highlight the Data sources... menu.
3. Press the **ENT** key.
4. Highlight Compass, then press the **ENT** key.
5. Press the **ENT** key to change the group (if none is selected) to SIMRAD -for all SIMRAD products.
6. Highlight the Compass source then press the **ENT** key.
7. Repeat the process for Navigation, Position, Boat speed, and others when necessary.
8. When selection is completed, press the **CLR** key or any hot key (NAV, POS, etc.) to exit.

Advanced data source selection

Selecting the “Advanced...” setting will bring up the list of data sources that are detected in the N2K network. Manual selection can be done by scrolling to the desired source and pressing the **ENT** key to leave a check mark. You can exit at anytime when the selection is completed by pressing any one of the hot keys.



Heading reference control

The heading reference can be changed to TRUE or MAGNETIC using the procedure below:

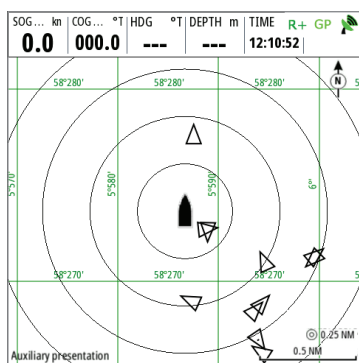
1. Press the **MENU** key.
2. Scroll to Tool and Settings and then press the **ENT** key.
3. Scroll to UNITS icon and then press the **ENT** key.
4. Scroll down to Heading and then press the **ENT** key.
5. Toggle to T (True) or M (Magnetic) and then press **ENT** key to accept.
6. Press any hot keys to exit.

9

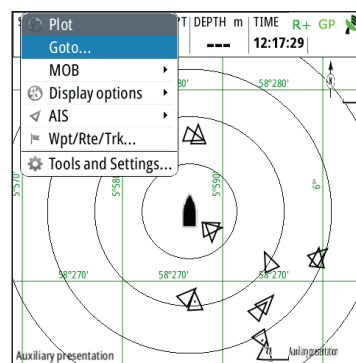
Using AIS (PLOT)

If a SIMRAD AIS transponder or DSC transceiver device is connected to the NMEA 2000 network, the GN70/MX61x can display the AIS target information in the AIS page. You can also see messages and position for DSC transmitting devices within range. The plotter screen can also show the waypoints, routes and tracks. You can zoom out by turning the rotary knob counter-clockwise and zoom in by turning it in clockwise direction. AIS targets can be displayed as overlay on the plotter screen. This feature is an important tool for safe travelling and collision avoidance.

You can define alarms to notify you if an AIS target gets too close or if the target is lost.



AIS vessels on AIS/PLOT screen

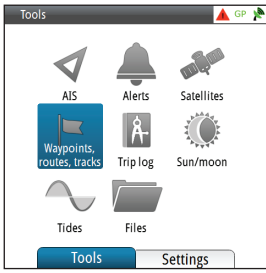


AIS Plot with Quick Menu

Target symbols

The GN70/MX61x system use the AIS target symbols shown below:

| Symbol | Description | |
|--------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Sleeping AIS target (not moving or at anchor) | |
| | Moving and safe AIS target with course extension line. | |
| | Dangerous AIS target, illustrated with bold line. | A target is defined as dangerous based on the CPA and TCPA settings. Refer to "Defining dangerous vessels" on page 52. |
| | Lost AIS target. | When no signals have been received within a time limit a target will be defined as lost. The target symbol represents the last valid position of the target before the reception of data was lost. |



Viewing information about AIS targets

AIS target list

The list of AIS targets can be displayed by using the procedure below:

1. Press the **AIS** hot key.
2. Press the **MENU** key to bring up the quick menu.
3. Using the rotary knob, scroll to Settings.
4. Press **ENT**.
5. Press the **PAGE** key.
6. Scroll to AIS.
7. Press **ENT** again to show the list.
8. To exit, press the **CLR** a few times or any hot key.

| Name | Distance | Bearing | CPA | TCPA | Type | Status |
|--------------|----------|----------|--------|------|------|--------|
| SIM VESSEL A | 5969 mi | 154.8 °M | - | - | AIS | safe |
| SIM VESSEL B | 5969 mi | 154.8 °M | - | - | AIS | safe |
| SIM VESSEL C | 5968 mi | 154.8 °M | 0.0 ft | - | AIS | safe |
| SIM VESSEL D | 5968 mi | 154.8 °M | - | - | AIS | safe |
| SIM VESSEL E | 5970 mi | 154.8 °M | - | - | AIS | safe |

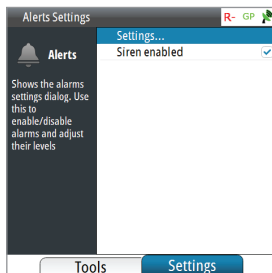
Selecting AIS target

Viewing information about all AIS targets

Detailed information about an AIS target can be accessed by using the previous procedure (steps 1-7) and:

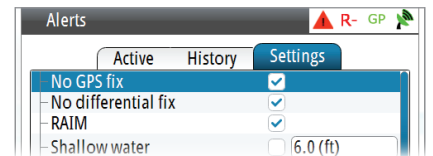
1. Using the rotary knob, scroll to the desired AIS target.
2. Press the **ENT** key to show the details of the target vessel.
3. Press any hot key to exit.

| AIS Vessel Details | |
|--------------------------------|--------------------------|
| SIM VESSEL A (MMSI: 366771124) | |
| Callsign: ABC1234 | Status: Safe |
| IMO: 123 | NavStatus: Under engine |
| AIS Class: A | Draught (ft): 3.3 |
| Type: Unknown | Latitude: N 25°45.0928' |
| Length (ft): 40.0 | Longitude: W 80°07.0921' |
| Beam (ft): 20.0 | Accuracy: High (10m) |
| Bearing (°M): 154.8 | ROT (°/s): 0.0 |
| Distance (mi): 5969 | SOG (mph): 17.3 |
| CPA (mi): | COG (°M): 194.5 |
| TCPA (hrs): | Heading (°M): 194.5 |
| Relative speed (mph): 29.9 | Destination: MIAMI |
| Relative course (°M): 144.5 | ETA: 10/04/2008 12:00 |



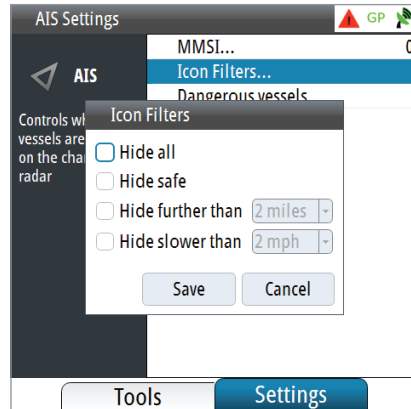
Vessel alarms

You can define several alarms to alert you if a target comes within predefined range limits, or if a target is lost.



| Alarm ID | Description |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Dangerous vessel | Controls whether an alarm shall be activated when a vessel comes within the predefined CPA or TCPA. See "Defining dangerous vessels" on page 52. → Note: The check box controls whether the alarm pop-up box is displayed and if the siren will sound. The CPA and TCPA defines when a vessel is dangerous regardless of the enabled/disabled state. |
| AIS vessel lost | Sets the range for lost vessels. If a vessel is lost within this range this will trigger an alarm |
| Vessel message | Controls whether an alarm shall be activated when a message is received from an AIS target |

Vessel settings panel



Your vessel's MMSI number

You need to have your own MMSI (Maritime Mobile Service Identity) number entered in the GN70/MX61x system to be able to receive addressed messages from AIS and DSC vessels.

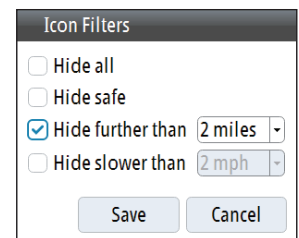
It is also important to have the MMSI number entered to avoid seeing your own vessel as an AIS target on the plotter.

→ **Note:** The Vessel message option in the alarm settings must be toggled on if any MMSI message shall be displayed.

Filtering the targets

All targets are by default shown on the display if an AIS device is connected to the N2K network.

You can select not to show any targets, or to filter the icons based on security settings, distance and vessel speed.



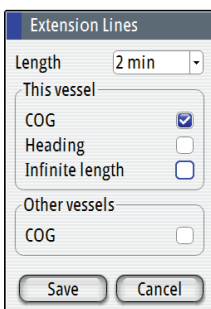
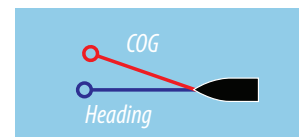
Vessels extension lines

The length of the extension lines for your vessel and for other vessels can be set by the operator.

The length of the extension lines is either set as a fixed distance, or to indicate the distance the vessel will move to in the selected time period.

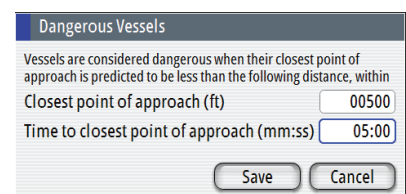
For your vessel, heading information is read from active heading sensor, and COG information is received from the active GPS.

For other vessels COG data is included in the message received from the AIS system.



Defining dangerous vessels

You can define an invisible guard zone around your vessel. When a target comes within this distance from your vessel, the symbol will change to the "dangerous" target symbol. An alarm will be triggered if activated in the Alarm settings panel.



10

Alert system

The GN70/MX61x system continuously checks for dangerous situations and system faults while the system is running. When an alert situation occurs, an alert message will pop up on the screen and the status indicator on the top-right corner of the display will show the alert icon.









Type of messages

There are two type of messages:

- Alarms
 - Generated when conditions are detected that critically effect the capability or performance of the system.
You must critically examine all alert messages to determine their cause and effect.
- Warnings
 - Informing you of conditions that could result in unwanted system response or eventual failure.

Alert indications

When an alert situation occurs, siren will sound, the alert icon will be active. The alert dialog will show the alert cause.

| Alert type | Icon | State | Indication |
|------------|-------------------------------------------------------------------------------------|-----------------------------------------|------------------------------------------------------------------------------------------------------|
| Alarm |  | Active - not acknowledged, not silenced | Flashing symbol and descriptive text accompanied by 3 short audible signals repeated every 8 seconds |
| |  | Active - not acknowledged, silenced | Flashing symbol and descriptive text No audible signal |
| |  | Active - acknowledged | Steady symbol and descriptive text No audible signal |
| |  | Rectified - not acknowledged | Flashing symbol and descriptive text No audible signal |
| Warning |  | Active - not acknowledged, not silenced | Flashing symbol and descriptive text accompanied by 2 short audible signals repeated every 1 min. |
| |  | Active - not acknowledged, silenced | Flashing symbol and descriptive text No audible signal |
| |  | Active - acknowledged | Steady symbol and descriptive text No audible signal |
| |  | Rectified - not acknowledged | Flashing symbol and descriptive text No audible signal |

The alert and alert details are recorded in the alert listing, see next page.

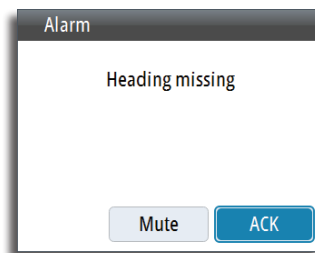
The icon

An alert icon will remain on the display until the alert is acknowledged and rectified.

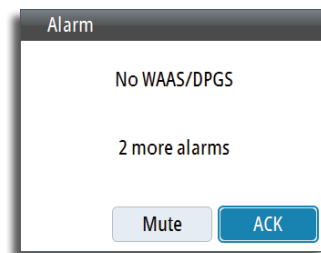
Alert dialog

All new alerts will activate an alert dialog. The dialog will be closed when the message is acknowledged.

If more than one message is activated, it will be indicated in the alert dialog. Only the cause for the most recent message will be displayed, and when acknowledged, the next alert will be displayed. The remaining messages are available in the Alerts listing.



Single alert



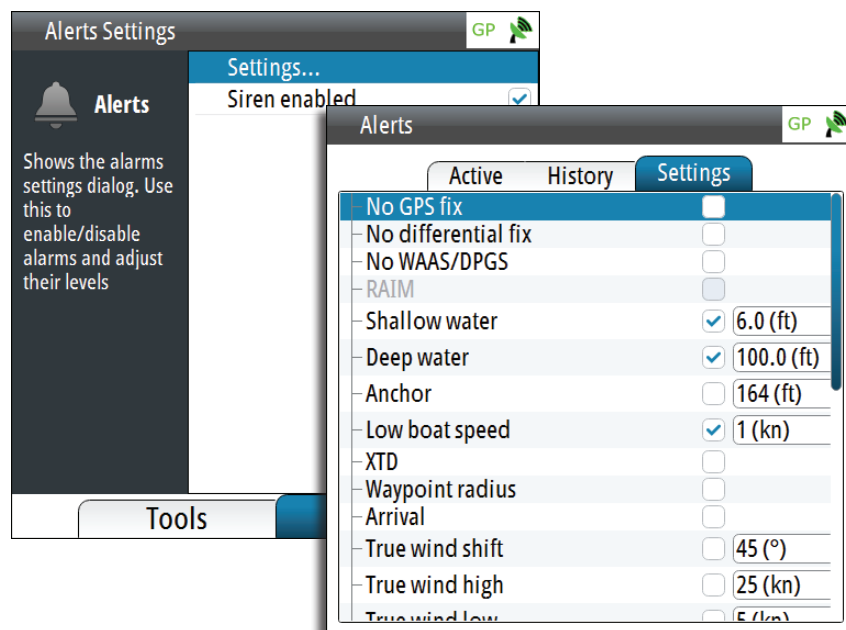
Multiple alerts

Alert settings

The system includes three different alert displays:

- Active alerts
 - List of all active messages
- Alert history
 - Alert events, including alert type and time/date
- Alert settings
 - List of all alerts that can be enabled and configured by the user

To setup the alert limits, press the **PAGE** key to change the tab to Settings. Use the rotary knob to scroll up or down through the different alert settings and press the **ENT** key to affix the check mark and specify limit values.



List of alert and warning messages

| Alarm/Warning | Type | Trigger Condition |
|---------------------------------------------------------------|------|---------------------------------------------------------------------------------------------------------------------------------------------|
| No GPS Fix* | A | No position fix available from the smart antenna |
| No differential fix | A | No differential correction is available. GPS position fix only |
| RAIM (R- or R?) (Receiver Autonomous Integrity Monitoring) | A | The position solution exceeded 100 meter error (R-) or when not enough satellites available (R?). RAIM safe condition is indicated with R+. |
| Shallow water | A | Depth less than limit |
| Deep water | W | Depth greater than limit |
| Anchor | A | Vessel drifts away from the anchor radius |
| Low boat speed limit | W | Boat speed below the limit |
| XTD (Cross Track Error) | A | Vessel drifts out of the crosstrack zone |
| Waypoint radius | A | Vessel enters the radius of the waypoint |
| Arrival | W | Vessel arrives at waypoint |
| High voltage | A | Input voltage above the limit |
| Low voltage | A | Input voltage below the limit |
| Depth data missing | A | No depth data from data source |
| Heading missing | A | No heading data from data source |
| Dangerous vessel | A | AIS target within the limit |
| AIS vessel lost* | A | AIS target is no longer received |
| Vessel message | A | Received an AIS message |
| Wind data missing | A | No wind data from data source |
| True wind shift | A | Wind shift above limit |
| True wind high | W | Wind speed above limit |
| True wind low | W | Wind speed below limit |
| CAN bus failure* | A | Not possible to send or receive network data |
| Low CAN bus voltage* | W | <9 V |

Type A = Alert

Type W = Warning

*) See also "Troubleshooting" on page 57

11

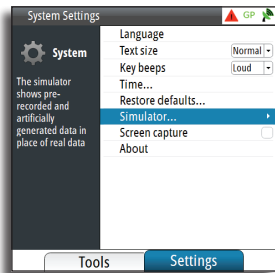
Using the simulator

Simulator mode

The simulation feature will let you see how the unit works in a stationary position and without being connected to the GPS antenna.

You can use the simulator to help you become familiar with your unit before using it out on the water.

When the simulator is toggled on, this is indicated in the lower part of the display.



Advanced simulator settings

The advanced simulator settings allow you to define how to run the simulator. When the settings are saved, these will be used as default when starting the simulator mode.

GPS source

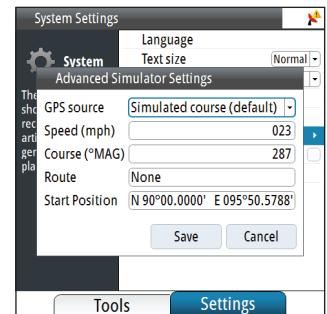
Selects where the GPS data is generated from. The selections are: Simulated course or Simulated route (default).

Speed, course and route

Used to manually enter values when GPS source is set to Simulated course or Simulated route.

Set start position

Moves the vessel to current Lat/Long position.



 **Warning:** Do not use the MX61x for navigation when in Simulator mode.

Simulation setup

To activate the simulator, do the following:

1. Press the **MENU** key.
2. Scroll to Tools and Settings then press the **ENT** key.
3. Scroll to System icon then press the **ENT** key.
4. Scroll down to Simulator, then press the **ENT** key.
5. Scroll to Simulator Settings then press the **ENT** key. This will bring up the advanced simulator settings dialog box.
6. Select Simulated course (default) setting.
7. Scroll down to Speed (Kn) and press the **ENT** key. Enter the desired speed in knots using the numeric keypad.
8. Scroll to **OK** button, then press the **ENT** key to confirm your entry.
9. Scroll to Heading then press the **ENT** key.
10. Enter the heading in degrees using the numeric keypad. Press the **ENT** key.
11. Highlight the **OK** button and then press the **ENT** key.
12. Scroll down to Start Position field then press the **ENT** key.
13. Using the numeric keypad, enter the Lat/Lon coordinates where you want to start the navigation.
14. Press the **ENT** key after the last digit is entered.
15. Highlight **SAVE** button then press the **ENT** key.
16. Press the **NAV** key to exit and verify the displayed Lat/Long.

Using the simulator mode, you can create waypoints, routes and calculate range and bearing to destination waypoint.

12

Maintenance

Preventive maintenance

The GN70/MX61x display and antenna unit does not contain any field serviceable components, therefore the operator is required to perform only a very limited amount of preventative maintenance.

It is recommended that you use an optional protective sun cover when the display unit is not in use.

Simple maintenance procedures

Cleaning the display unit

The supplied cleaning cloth should be used to clean the screen, where possible. Use plenty of water to resolve and take away salt remains. Crystallized salt may scratch the coating if using a damp cloth. Apply minimal pressure to the screen.

Where marks on the screen can't be removed by the cloth alone, use a 50/50 mixture of warm water and isopropyl alcohol to clean the screen. Avoid any contact with solvents (acetone, mineral turpentine etc.) or ammonia based cleaning products, as they may damage the anti-glare layer, plastics bezel, or rubber keys.

To prevent UV damage to the plastic bezel and rubber keys, it is recommended that sun cover be fitted when the unit is not in use for an extended period.

Checking the keys

Make sure that no keys are stuck in the down position. If one is stuck, wiggle the key to free it back to normal.

Checking the connectors

The connectors should be checked by visual inspection only.

Push the connector plugs into the connector, if the connector plugs are equipped with a lock; ensure that this is in the correct position.

Troubleshooting

| Failure | Corrective action |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unit fails to turn ON | Make sure the power cable is plugged in to the back of the GN70/MX61x and the 12-24 VDC power is turned ON. The unit normally takes about 30 seconds to re-boot when power connection is removed and re-connected. |
| | Check the in-line fuse (or circuit-breaker) of the power cable. Replace the fuse when blown. |
| | Using a voltmeter, verify that the 12-24 VDC supply is present on the power cable connector pins. |
| | If problem persists, replace the GN70/MX61x unit. |

| | |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Unit fails to detect the antenna | For N2K antenna models (GS70 or HS80/HS70A): Make sure the antenna is connected properly and the cable connector is good. Check for any damage to the cable. |
| | Verify if the dedicated 12 VDC supply to the N2K network is available. Re-cycle the power to the N2K bus. |
| | Verify if the antenna is selected as the source of data under the main Menu/Network/Sources page. |
| | Make sure N2K terminators are used on both ends of the NMEA 2000 bus. |
| | For MX521B or MX575D antennas connected to Port 3 of the MX61xJB, check the following: <ul style="list-style-type: none"> 1. Port 3 of the MX61xJB is configured to match the baud rate setting of the MX antenna 19,200. 2. The MXJB Port 3 is selected as the source of position under the MENU/Data sources/Position. 3. Check the wiring for proper connections (see installation wiring section) |
| If problem persist, replace the antenna unit. | |
| Frequent No GPS fix alert | Check antenna position and sources for interference. See "Antenna mounting guidelines" on page 67. |
| | Cold reset antenna. See "How to RESET the SIMRAD Antenna: (MX521B, HS80A, MX575D)" on page 36 |
| True Heading is not displayed | Verify if the source of data is the HS70/HS80A/MX575D or Gyro is selected under the MENU/Data sources/Compass. Perform an auto select procedure or manually select the proper GPS compass unit. If problem persist, replace the GPS compass antenna unit. |
| AIS targets are not detected | Verify if an AIS transponder is connected in the N2K bus. |
| | Make sure the AIS transponder is ON. |
| | Check the VHF antenna, coaxial cable and connector(s) for any damage. |
| If problem persist, replace the AIS transponder. | |
| Dim display | Press the power button momentarily to increase the backlight brightness. |
| Red flashing power button, black display | Local supply voltage missing or <5 V. Check local supply, connections and fuses. Press and hold down the power button for 5-6 seconds to turn off the unit completely. Repower by pressing the power key thereafter. |
| CAN bus failure | Poor CAN bus backbone, defective cable/connector or defective CAN bus receiver in autopilot control unit. <ul style="list-style-type: none"> 1. Check backbone terminations 2. Check cable(s) and connectors 3. Replace N2K power supply or MX61xJB junction box unit. |
| Low CAN bus voltage | Check cable length, bus load and bus supply feeding point. If possible, check if fault disappears by disconnecting some units. |

Software upgrades

Software upgrade of the GN70/MX61x display unit and MX61xJB junction box can be accomplished using USB memory stick or a PC. The GN70 software upgrade can only be done using a PC.

The latest software files and upgrade instructions for the GN70/MX61x and junction box can be downloaded from the SIMRAD professional website: www.navico.com/commercial

It is recommended always to refer to the latest upgrade instructions available from the website and to first upgrade the junction box and then the display unit(s).

→ **Note:** If the junction box software is older than 1.1.02.00, an external 12 V power supply to the network is required during the upgrade.

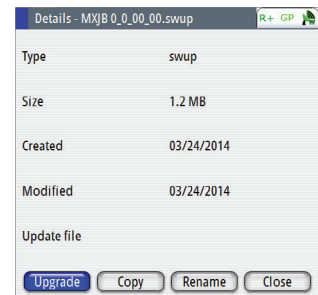
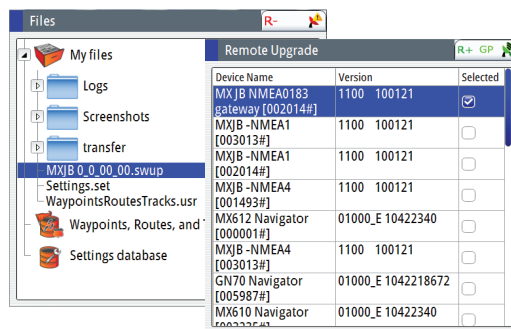
MX61x CDU software update procedure (USB method)

1. Copy the *.upd file to a USB memory stick.
2. Insert the USB stick into the MX61X USB connector.
3. Turn off the MX61x unit by pressing the power key for a few seconds until the beeper sounds.
4. Turn the power on by pressing the power key momentarily . The s/w update will start automatically.
5. At the end of the programming procedure, remove the USB memory stick.
6. Turn ON the unit.
7. Verify the software version number by pressing the **MENU** key.
8. Scroll down to **Tools & Settings** menu, press **ENT**.
9. Select the **Systems** icon, press **ENT**.
10. Scroll to **About**, press **ENT**.
11. End of procedure.

MX61xJB junction box software update procedure using the MX61x display (USB method)

This programming feature is available in GN70/MX61x CDU with software version 1.0.42.226 or newer. Updating the software of the junction box can be done through the display's USB port.

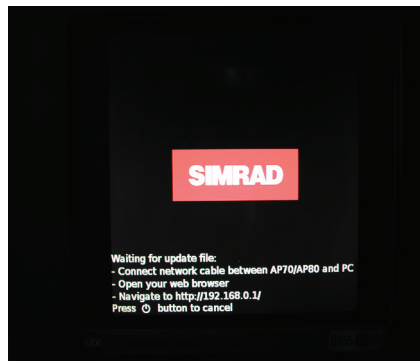
1. Copy the junction box software file (*.swup) to a USB memory stick.
2. Restore the junction box to default using the below procedure:
 - a. Press the **MENU** key.
 - b. Scroll to Tools and Settings, press **ENT**.
 - c. Select Network, press **ENT**.
 - d. Scroll to NMEA 0183 over MXJB, press **ENT**.
 - e. Select Restore to Default, press **ENT**.
3. Insert a USB memory stick loaded with the MXJB *.swup file.
4. Press the **USB** key.
5. Scroll to "Memory Card - USB", press **ENT**.
6. Scroll to the Junction Box SWUP file, press **ENT**.
7. Select the **Upgrade** button, press **ENT**.
8. Put a check mark on the "MXJB NMEA0183 gateway [00xxxx#]" device in the list. The MX612JB has three of these, so put a check mark on all three of them.
9. Press the **MENU** key, then choose Start Upgrade, press **ENT**.



10. Answer YES on the dialog box.
11. After a few seconds the progress meter will indicate the status of download.
12. Remove the USB.
13. Verify the software version under the Menu/Tools and Settings/Network/Device List.
14. Reset the junction box to Default. Press MENU, select Tools and Settings, Network and NMEA183 Over MXJB. Activate Restore to default.
15. Power cycle the system.

GN70/MX61x software update procedure using a PC

1. Copy the *.upd file to your PC (not a network location).
2. Connect the GN70/MX61x directly to your computer with a LAN network cable.
3. Completely cut the 12-24 VDC power to the MX61x unit by using the power supply switch or circuit breaker.
4. Press and hold down the **PAGE** button (top left button above the rotary) and apply external power to the unit.
5. Launch the Internet Explorer (or other web browser) and type the address as shown on the MX61x (i.e. <http://192.168.0.1>).
6. Browse to the file on your PC.
7. Click on upload.
8. The display unit will start the update process automatically after the upload.
9. End of procedure.



13

List of components

The tables below list parts that are included in GN70/MX61x GPS and DGPS navigation kits, as well as optional items such as, cables and accessories that are available from your dealers.

MX610 DGPS navigation system (P/N 000-10919-002)

| Part Name | Qty | Part number |
|----------------------------------|-------|---------------|
| MX610 Display Unit | 1 | 000-10914-001 |
| Operator and Installation Manual | 1 | 988-10370-004 |
| Quick Guide | 1 | 988-10369-002 |
| Power Cable Assembly | 1 | 032-0055-88 |
| Mounting Template | 1 | 988-10200-002 |
| Mounting kit | 1 bag | 003-8520-00 |
| Mounting gasket | 1 | 074-1114-000 |
| Cable Assy, 6M N2KExt-BLK | 1 | 003-8634-00 |
| Micro-C, T-Connector | 1 | 037-0491-01 |
| MX610JB Junction Box | 1 | 000-11139-001 |
| MX521B DGPS antenna | 1 | 000-11640-001 |

MX610 GPS navigation system (P/N 000-10917-002)

| Part Name | Qty | Part number |
|----------------------------------|-------|---------------|
| MX610 Display Unit | 1 | 000-10914-001 |
| Operator and Installation Manual | 1 | 988-10370-004 |
| Quick Guide | 1 | 988-10369-002 |
| Power Cable Assembly | 1 | 032-0055-88 |
| Mounting Template | 1 | 988-10200-002 |
| Mounting kit | 1 bag | 003-8520-00 |
| Mounting gasket | 1 | 074-1114-000 |
| Cable Assy, 6M N2KExt-BLK | 1 | 003-8634-00 |
| Micro-C, T-Connector | 1 | 037-0491-01 |
| MX610JB Junction Box | 1 | 000-11139-001 |
| MX521B GPS antenna | 1 | 000-11641-001 |

MX612 DGPS navigation system (P/N 000-10923-002)

| Part Name | Qty | Part number |
|----------------------------------|-------|---------------|
| MX612 Display Unit | 1 | 000-10915-001 |
| Operator and Installation Manual | 1 | 988-10370-004 |
| Quick Guide | 1 | 988-10369-002 |
| Power Cable Assembly | 1 | 032-0055-88 |
| Mounting Template | 1 | 988-10200-002 |
| Mounting kit | 1 bag | 003-8520-00 |
| Mounting gasket | 1 | 074-1114-000 |
| Cable Assy, 6M N2KExt-BLK | 1 | 003-8634-00 |
| Micro-C, T-Connector | 1 | 037-0491-01 |
| MX612JB Junction Box | 1 | 000-10916-001 |
| MX521B DGPS antenna | 1 | 000-11640-001 |

MX612 GPS navigation system (P/N000-10921-002)

| Part Name | Qty | Part number |
|----------------------------------|-------|---------------|
| MX612 Display Unit | 1 | 000-10915-001 |
| Operator and Installation Manual | 1 | 988-10370-004 |
| Quick Guide | 1 | 988-10369-002 |
| Power Cable Assembly | 1 | 032-0055-88 |
| Mounting Template | 1 | 988-10200-002 |
| Mounting kit | 1 bag | 003-8520-00 |
| Mounting gasket | 1 | 074-1114-000 |
| Cable Assy, 6M N2KExt-BLK | 1 | 003-8634-00 |
| Micro-C, T-Connector | 1 | 037-0491-01 |
| MX612JB Junction Box | 1 | 000-10916-001 |
| MX521B GPS antenna | 1 | 000-11641-001 |

GN70 standard parts list

| Part Name | Qty | Part number |
|----------------------------------|-------|---------------|
| GN70 Display Unit | 1 | 000-10913-001 |
| Operator and Installation Manual | 1 | 988-10370-004 |
| Quick Guide | 1 | 988-10369-002 |
| Power Cable Assembly | 1 | 032-0055-88 |
| Mounting Template | 1 | 988-10201-001 |
| Mounting kit | 1 bag | 003-8721-00 |
| Mounting gasket | 1 | 074-1114-000 |
| Cable Assy, 6 m N2K Ext-BLK | 1 | 003-8634-00 |
| Micro-C, T-Connector | 1 | 000-10404-001 |

NMEA 2000 (N2K) smart antenna models (choose one)

| Part Name | Part number | Remarks |
|-----------------------------------|---------------|----------------------|
| GS70 Smart Antenna | 000-11137-001 | Standard GPS antenna |
| HS80 GPS compass with N2K adapter | 000-10938-001 | Option (HDG & POS) |

NMEA 0183 smart antenna models (optional)

| Part Name | Part number | Remarks |
|----------------------------------|---------------|-------------------------|
| MX512B GPS/GLONASS Antenna | 000-11641-001 | GPS, Beacon & WAAS |
| MX512B DGPS/GLONASS Antenna | 000-11640-001 | GPS & WAAS |
| MX575D DGPS Compass w/15 m cable | 000-11644-001 | GPS, HDG, Beacon & WAAS |

→ **Note:** The MX610JB junction box is required when using antenna models that use NMEA 0183 interface. The MX610JB is not weatherproof and must be mounted in a sheltered location.

NMEA 2000 (N2K) cables and accessories (order separately)

| Part Name | Part number |
|----------------------------------|---------------|
| CZONE, NMEA 2000 EXTENSION 0.5 m | 000-10816-001 |
| CZONE, NMEA 2000 EXTENSION 2.0 m | 000-10817-001 |
| CZONE, NMEA 2000 EXTENSION 5.0 m | 000-10814-001 |
| CZONE, NMEA 2000 EXTENSION 10 m | 000-10815-001 |

Optional accessory items for N2K network

| Part Name | Part number |
|-------------------------------------|---------------|
| Protective cover (White) | 000-10596-001 |
| Optional bracket mounting kit | 000-10590-001 |
| MX610JB Smart junction box | 000-10425-001 |
| MX612JB smart junction box | 000-10916-001 |
| AT10 N2K to NMEA Converter | 24005936 |
| Cable, Micro-C, 0.6 m | 000-0119-88 |
| Cable, Micro-C, 1.8 m | 000-0127-53 |
| Micro-C, 4.5 m | 000-0119-86 |
| Cable, Micro-C, 7.5 m | 000-0119-83 |
| Micro-C T-connector | 000-0119-79 |
| Micro-C, Field Connector | 000-10404-001 |
| N2K-PWR-RD - NMEA 2000® power cable | 000-0119-75 |
| NMEA2000 Terminator kit | 000-0127-52 |
| CZONE, NMEA 2000 FEMALE RESISTOR | 000-10820-001 |
| CZONE, NMEA 2000 MALE RESISTOR | 000-10821-001 |
| N2K-EXP-KIT,MICRO-C,STARTER KIT | 000-0124-69 |

14

Mounting

General

The standard mounting of the GN70/MX61x display is in-dash or panel mount. If there is a need to bracket mount the unit, an optional U-bracket assembly can be ordered separately.

Mounting location

The GN70/MX61x unit should be mounted with special regard to the unit's easy access for operation and maintenance, environmental protection, temperature range, cable connection and cable length.

Survey the front and back of the instrument panel where the unit will be mounted before cutting the mounting hole to make sure there is ample room around the unit and no hidden electrical wires or other parts will be damaged behind the panel. The panel mounting surface must be flat and even to within 0.5 mm.

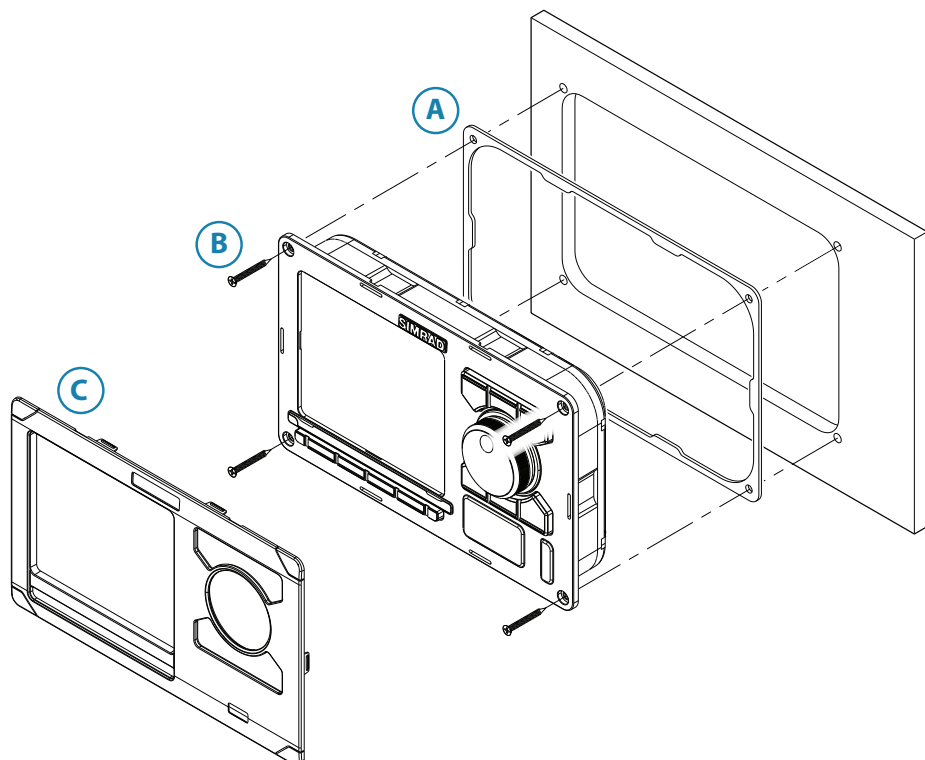
The GN70/MX61x conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but proper installation is required to get best use and performance from this product. Ensure adequate separation from other on-board electronics and electrical equipment.

GN70/MX61x control unit

Avoid mounting the GN70/MX61x control unit where it is easily exposed to sunlight, as this will shorten the lifetime of the display. If this is not possible, make sure the unit is always covered with the optional protective cover when not in use.

Panel (flush) mount

1. Attach the mounting template to the selected mounting position.
2. Drill pilot holes for the 4 hole saw cuts and for the 4 self tapping screws used to secure the unit. If using M4 machine screws use a 5 mm (0.20 ") drill bit.
3. Use a 25 mm (1 ") hole saw to cut the four corner radius.
4. Cut along the dotted line and remove waste material.
5. Peel backing off the gasket and apply it to the unit (A).
6. Connect the cables to the rear of the unit before placing the unit into the console.
7. Secure the display to the surface with 4 screws (B).
8. Firmly clip the bezel in place (C).

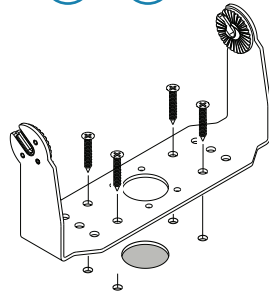


Bracket mount (option)

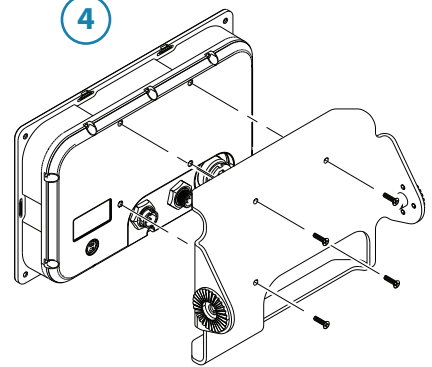
→ **Note:** When the control unit is bracket-mounted, it is not completely weatherproof from the back due to a breathing hole in the back cabinet. When bracket-mounted, the exposed parts of the plugs should be protected against salt corrosion.

1. Use the bracket base as a template to mark the screw hole locations.
2. Drill pilot holes and hole for cables if required.
3. Secure the bracket base to the surface.
4. Secure the bracket's adapter to the rear of the control unit using the 4 screws supplied with the bracket.
5. Align the bracket base with the cradle and partially screw in the bracket knobs one at a time.
6. Adjust the unit for best viewing angle, and tighten the bracket knobs.

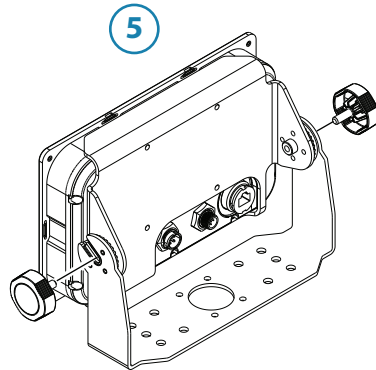
1 - 3



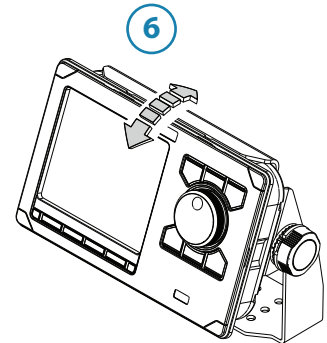
4



5



6



Antenna systems

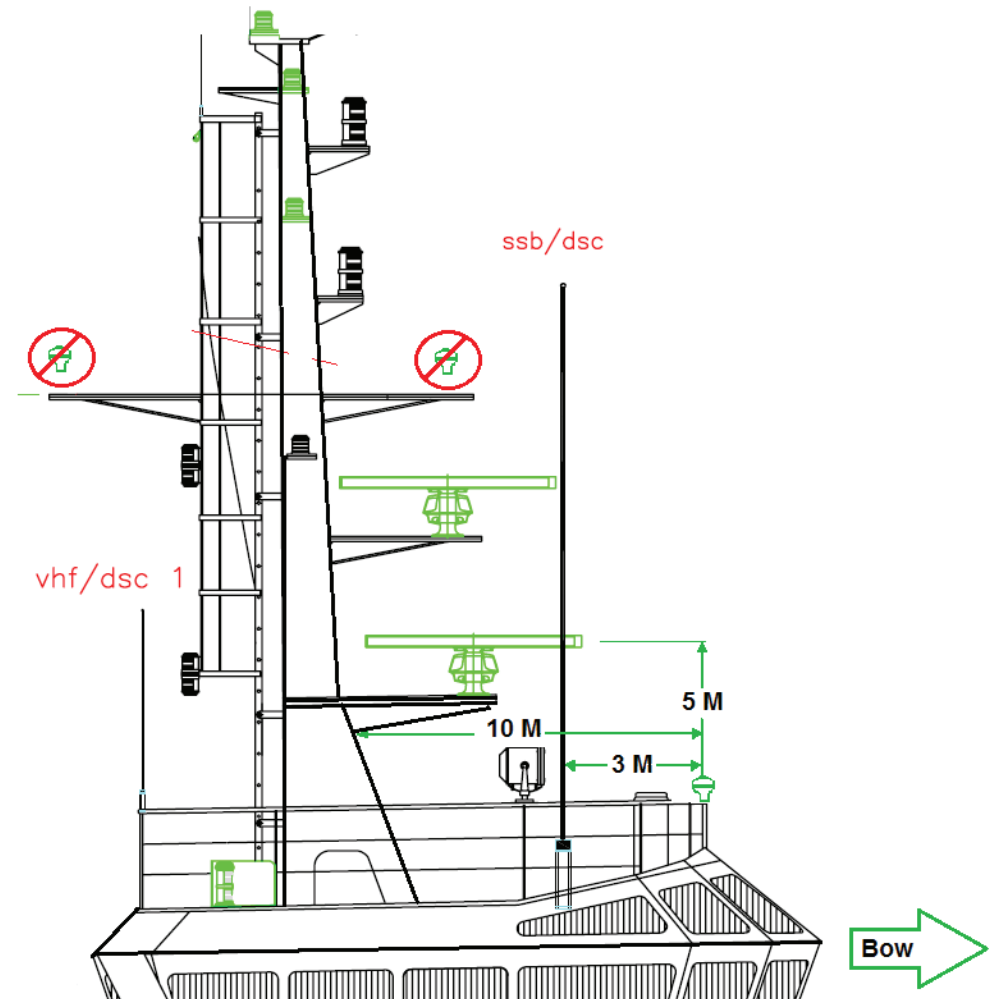
Several I type-approved antenna models can be used with the GN70/MX61x, namely:

- MX521B - GPS/DGPS smart antenna (NMEA 0183 interface). - Standard
- HS80A or MX575D D/GPS compass unit (N2K or NMEA 0183 interface) - Option
- GS70 - GPS/WAAS smart antenna (N2K interface) - Option

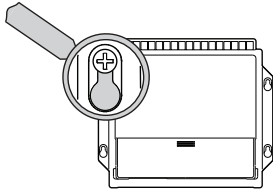
As a general rule, the antenna unit must be located in the open where it will have a good view of the sky around it. It must also be located away from large metal objects that can block the GPS signal as well as influence the operation of the antenna unit.

Antenna mounting guidelines

- Install the antenna where it has a clear view of the sky around it
- Ensure a minimum distance of 1 m to other GPS antennas
- Keep it away from large metal structures like the main mast or overhead railings
- Stay away from high-powered transmitter antennas like SSB, VHF and other radio transmitter antennas
- Mount the GPS antenna low to avoid excessive position and speed errors while underway
- Locate the antenna at least 10 meters away and below the transmitting beam of the radar and INMARSAT antennas.



- **Note:** Powerful Xenon search lights emit strong RF radiation that could interfere with GPS reception. We recommend providing extended horizontal distance separation from the MX61x antenna unit. Minimum vertical separation should be 3 meters above the light. Please refer to manufacturer's instruction for more details.



MX61xJB junction box

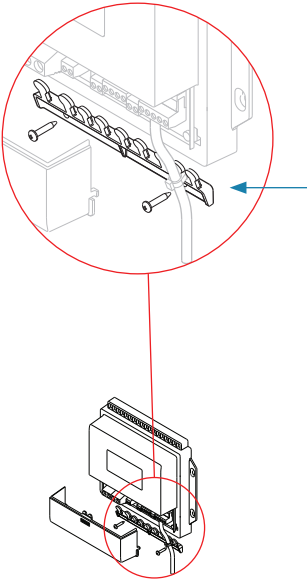
The MX61xJB mounting location must allow for easy access when connecting the cables. Also ensure that the location for the computer units allows viewing the board's LED indicators.

The mounting surface needs to be structurally strong, with as little vibration as possible. If possible, mount the unit close to the edges of a panel to minimize vibration.

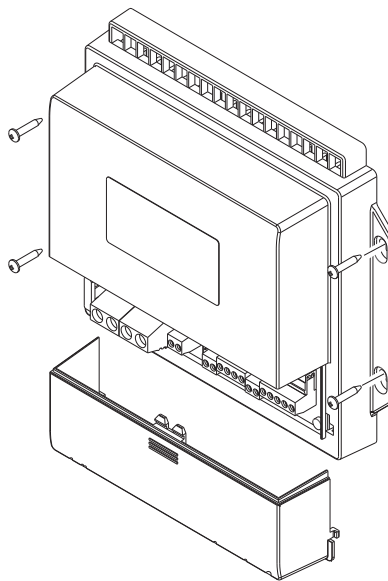
Ensure that any holes cut are in a safe position and will not weaken the boat's structure. If in doubt, consult a qualified boat builder. Ensure that there are no hidden electrical wires or other parts behind the panel.

Preferably mount the junction box with the cable entries exiting downwards.

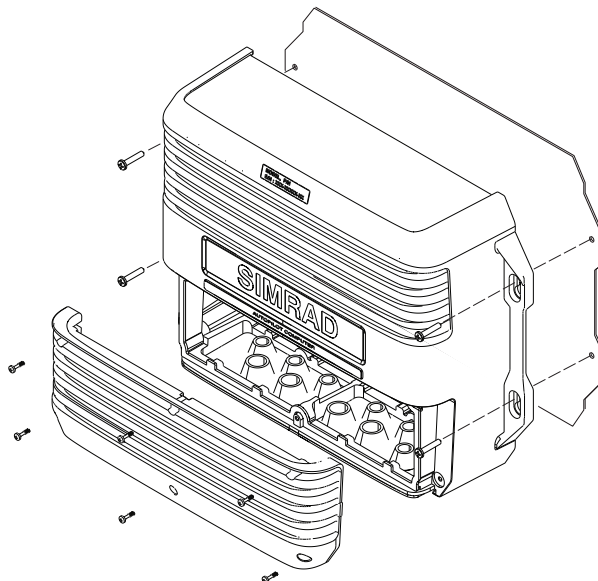
Mount the cable retainer included with the MX610 J-Box on the wall beneath the unit.



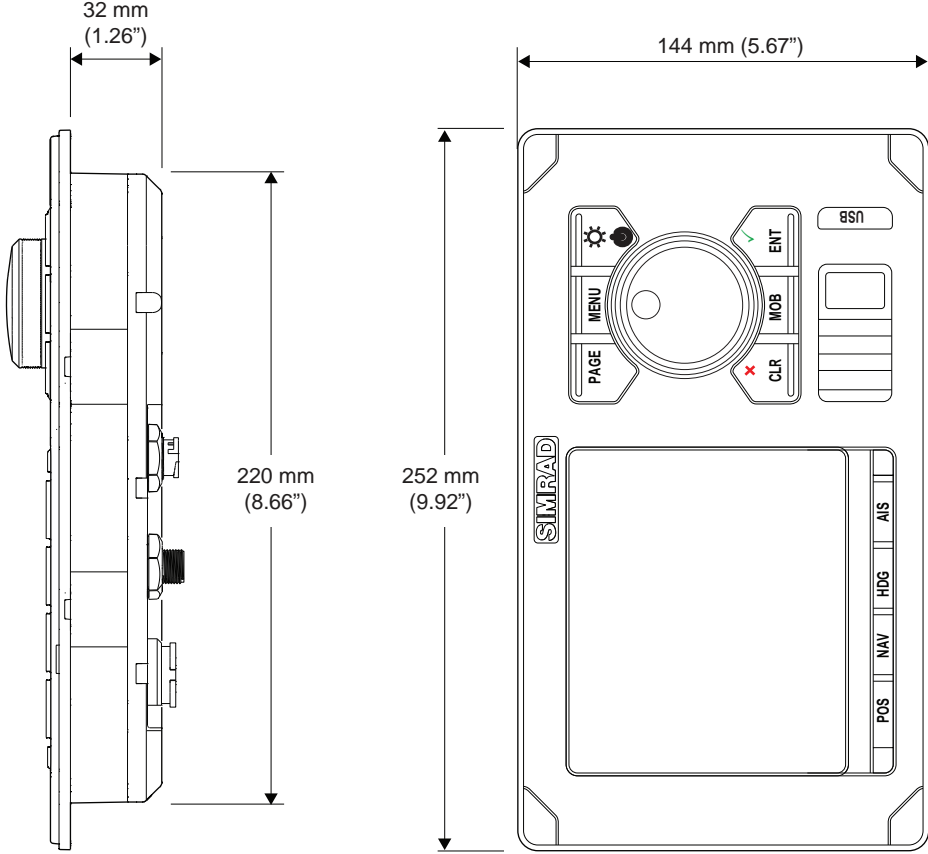
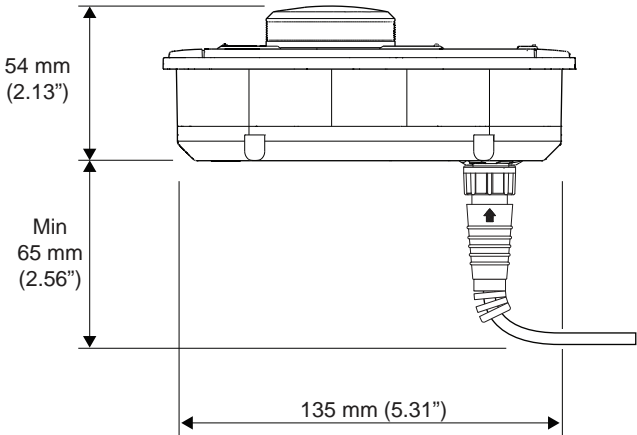
MX610JB mounting



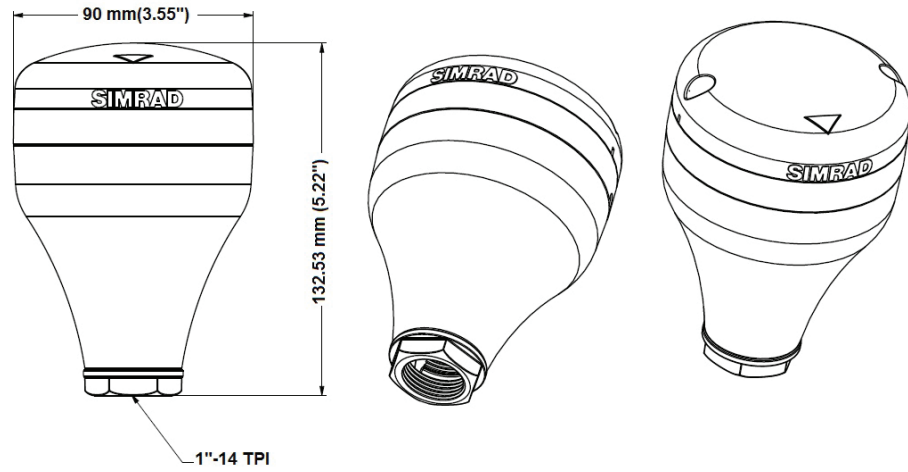
MX612JB Mounting



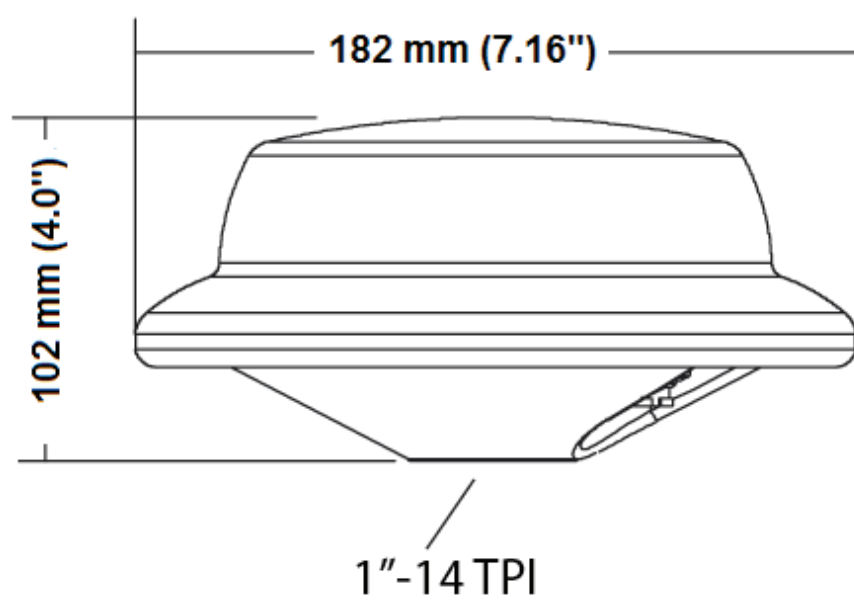
GN70/MX610/MX612 display unit (mechanical dimensions)



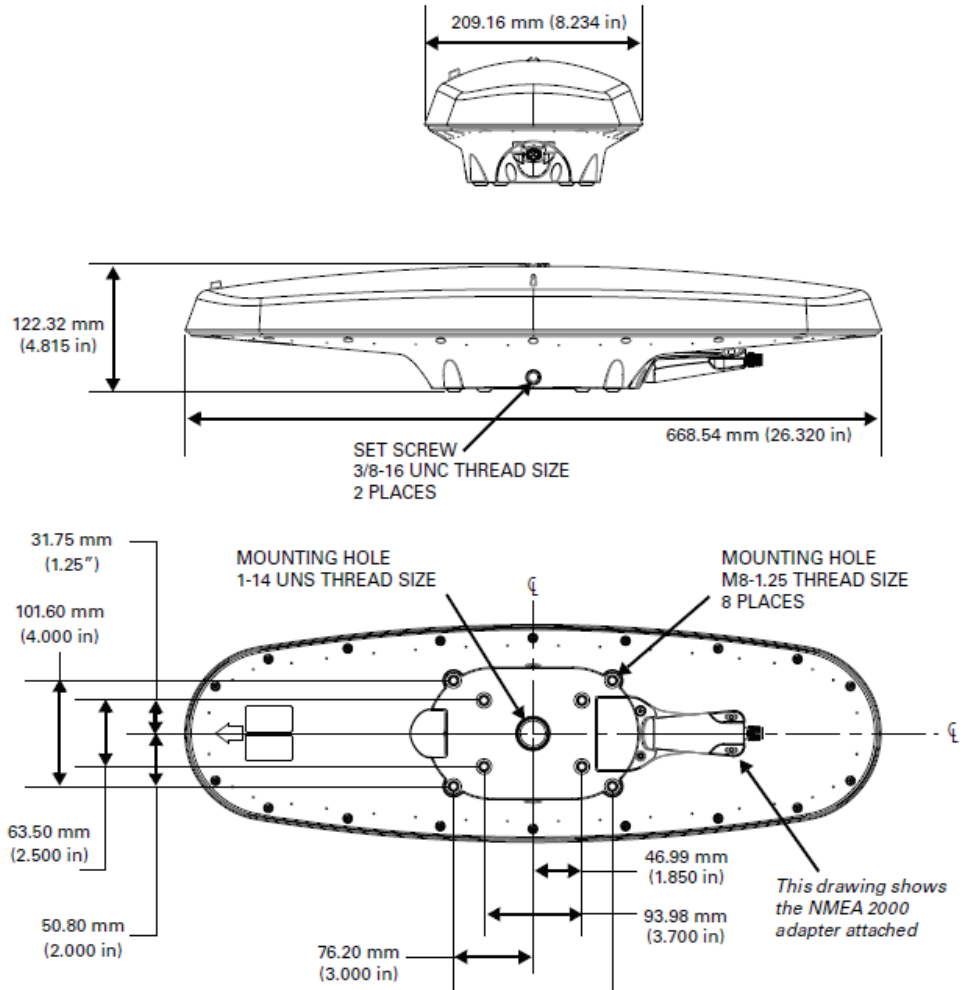
GS70 antenna unit



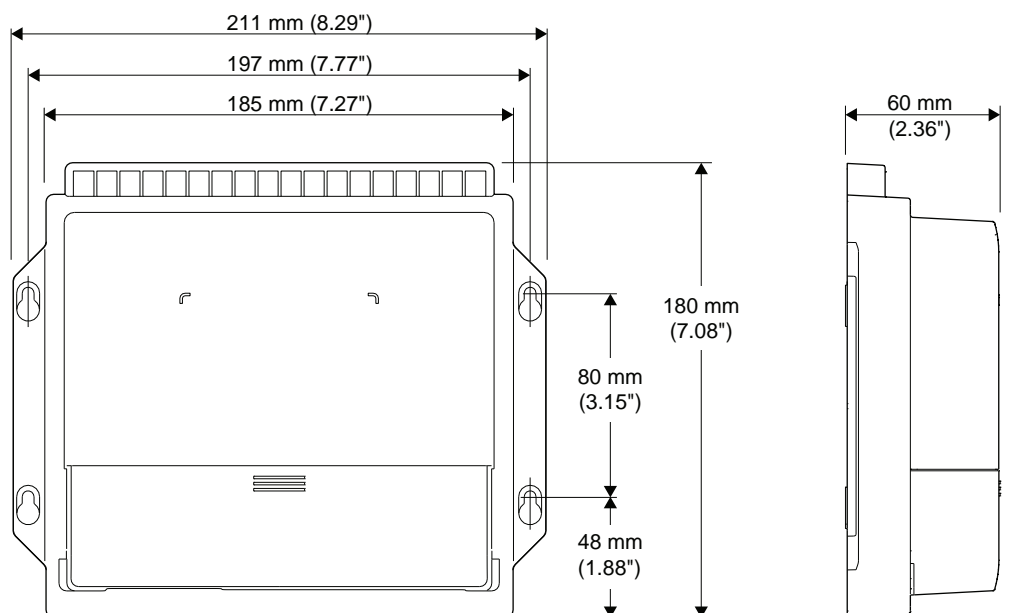
MX521B smart D/GPS antenna unit



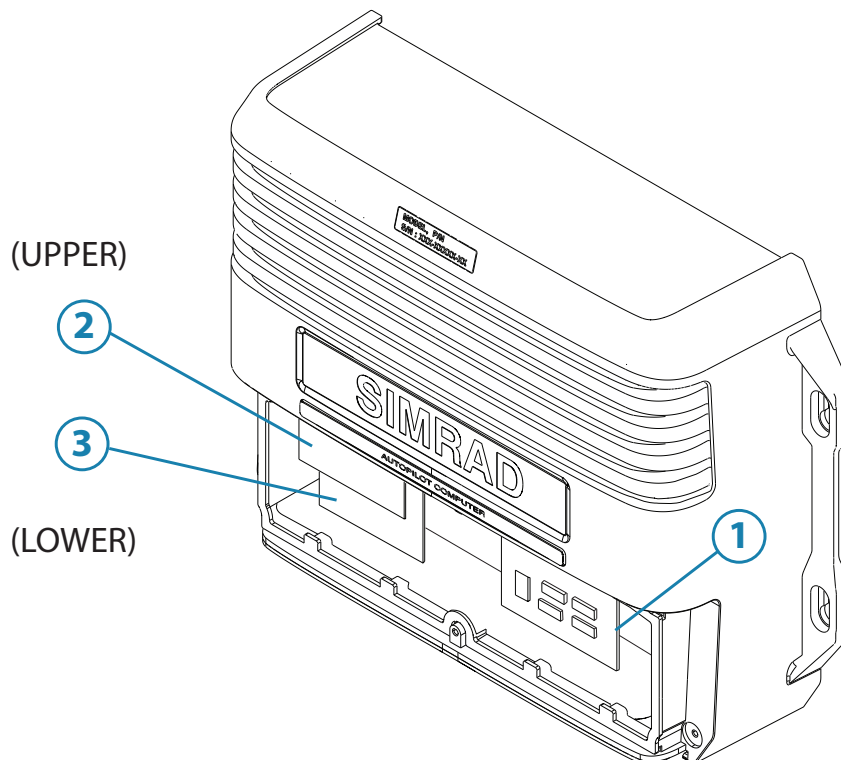
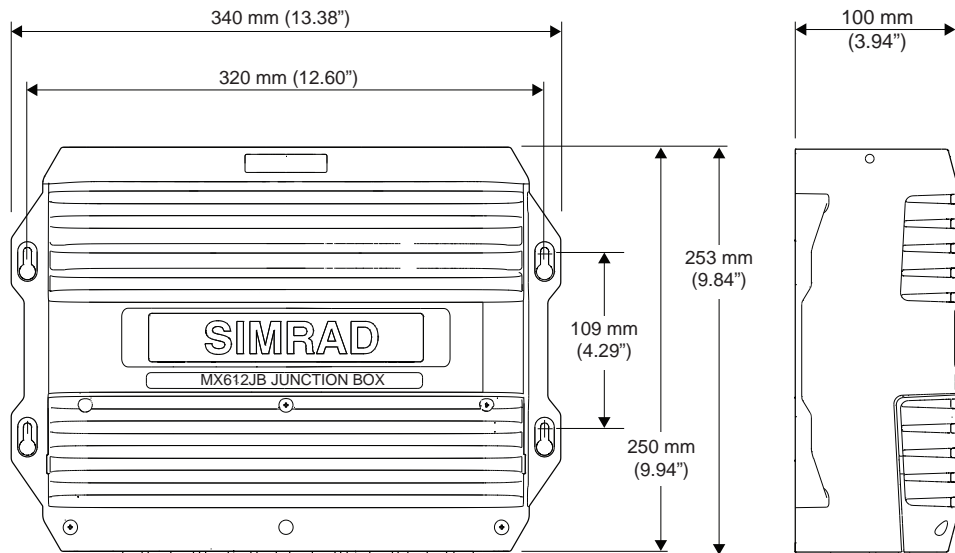
HS80A/MX575D D/GPS compass unit



MX610JB smart junction box unit



MX612JB smart junction box unit



15

Wiring

Wiring guidelines

The CAN network cables and other signal cables (i.e. antenna, compass, NMEA) should not be run in parallel with other cables carrying radio frequency or high current, such as VHF and SSB transmitters, battery chargers/generators, and winches.

Don't make sharp bends in the cables, and avoid running cables in a way that allows water to flow down into the connectors. If required, make drip and service loops.

If cables are shortened, lengthened or re-terminated, do insulate and protect all wiring connections.

Most of the units are communicating on the CAN bus with drop cables. Try mounting the units within the standard cable length supplied with each unit. Additional cables and cable extensions are available from our distributors.

⚠ Warning: Before starting the installation, be sure to turn electrical power off. If power is left on or turned on during the installation, fire, electrical shock, or other serious injury may occur. Be sure that the voltage of the power supply is compatible with the spec for the units!

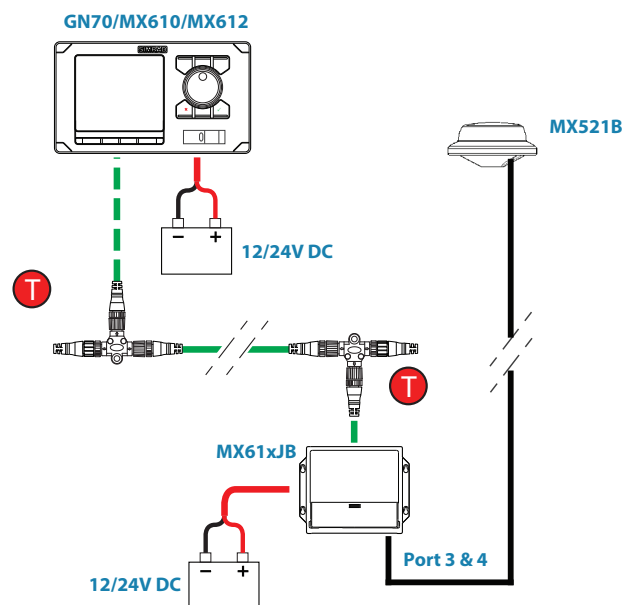
GN70 or MX61x navigation system; basic wiring principles

The GN70/MX61x display uses CAN bus backbone, which makes it simple to interface to SimNet and other NMEA 2000 (N2K) devices. The 12-Volt DC power to the CAN bus can be supplied through a T-Connector or by the junction box.

NMEA 0183 devices such as the MX521B DGPS smart antenna, autopilots, radar and PC-based ECDIS can be interfaced using the MX61xJB junction box.

In systems with the MX61xJB junction box the CAN bus is powered by the junction box. The GN70/MX61x models have separate power supply cables and can be wired directly to 12-24 VDC. Other SimNet/NMEA devices are powered by the CAN bus.

The following sections describe installation of the components listed in the illustration below. Refer to separate manuals for detailed information about each interfacing unit.



MX61x with MX521 antenna and junction box wiring diagram

→ **Note:** The MX521B antenna is connected to ports 3 and 4 of the junction box .

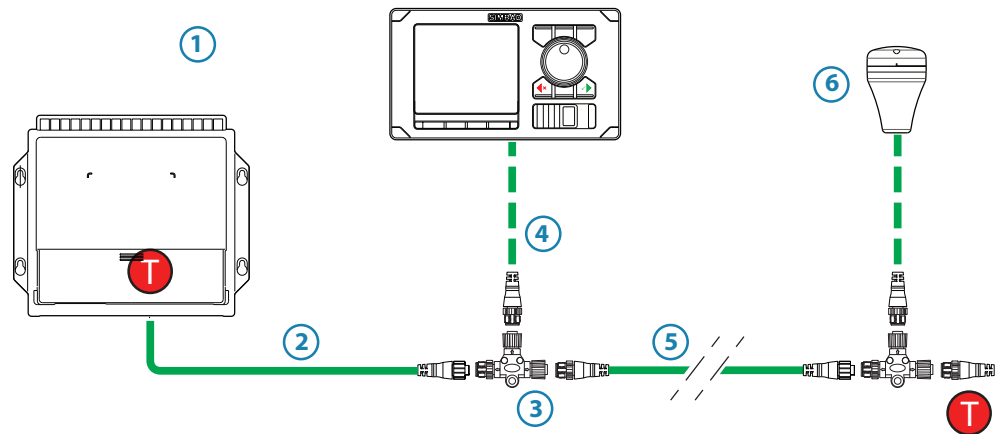
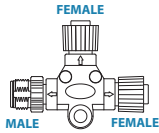
CAN bus

The CAN bus is based on the well known SimNet plug & play concept and on the NMEA 2000 (N2K) SAE J1939 protocol. Hard wiring is based on standard NMEA 2000 cables with Micro-C type connectors and joiners.

The bus consists of a linear backbone using drop cables and Micro-C T-joiners for connecting NMEA 2000 and SimNet devices.

The bus has a maximum cable length of 150 m (500 ft), and a drop cable has a maximum length of 6 m (20 ft).

In a default GN70/MX61x system the CAN bus backbone expands from the MX610JB, which supplies power to the backbone. There will always be a female connector in the expanding end of the backbone cables.



GN70/MX61x with MX610 junction box wiring diagram

| No. | Description |
|-----|---------------------------------------------------------------------------------------------|
| 1 | MX610JB (or MX612JB) junction box with built-in CAN bus terminator and network power supply |
| 2 | 0,6 m (2 ft) pigtail cable, female connector |
| 3 | Micro-C T-joiner |
| 4 | CAN bus drop cable, with connectors in each end (female - male) - (6 meter max) |
| 5 | CAN bus Backbone, various lengths available. Connectors in each end |
| 6 | Optional GS70 smart antenna |
| T | Terminator, 120 Ohm, male |

→ **Note:** If cables are not supplied by Simrad, ensure that they meet NMEA 2000/IEC61162-1/2 requirements.

Planning and installing a network backbone

- Plan the network carefully
 - It is recommended to create a diagram of the network prior to starting the installation
- Run the backbone between the locations of all CAN devices you want to install
 - It must be less than 6 m (20 ft) cable run from a device to the backbone
- Consider the load/current draw from the devices

For details on network cables and components, refer to our websites: www.navico.com/commercial and www.simrad-yachting.com

Terminating the CAN bus

The CAN bus must have a 120 Ohm terminator at each end of the backbone.

In a default GN70/MX61x system the CAN bus can be powered and terminated from the junction box PCB, enabled by the micro switch.

- Set the switch to ON when the MX610JB board is at the end of the CAN bus
- Set the switch to OFF when the MX610JB board is used as additional power supply to the CAN bus which already has correct termination.

Factory default setting of MX610JB terminator is ON.

For location of the dip switch, refer to the illustrations inside the junction box unit.

A terminator in the other end of the CAN bus can be one of the following:

- A power cable with built in terminator (plug marked 120 Ohm)
- A single terminator plug (marked 120 Ohm)

Shield connection

It is required to use shielded cables to meet radio frequency interference requirements as defined in the NMEA 2000 specification:

- The shield shall not be electrically connected within the interface to the electronic device chassis or ground
- The shield shall be electrically continuous through the network connection
- The shield shall be connected to ground at a single point, normally the ship's ground at the source of network power

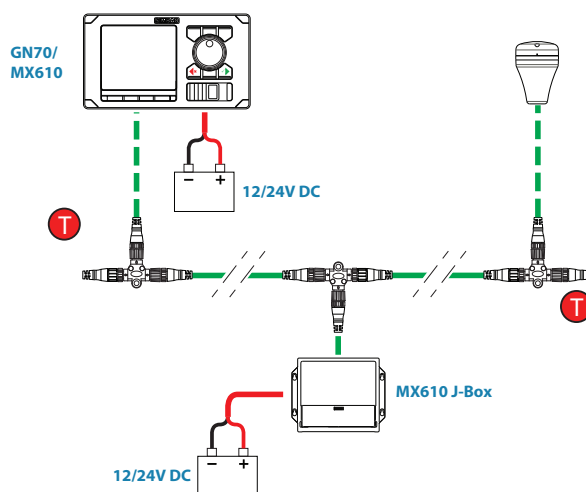
Power supply

→ Notes:

- Wheelmark/US Coast Guard approved systems require a Power Failure alarm. In such installations the GN70/MX61x and the MX610JB must be connected to different independent power supplies.
- It is recommended to install an external on/off switch or circuit breaker for the Junction Box power supply.
- Do not connect the power cable to the same terminals as the start batteries, drive units, thruster or other high current products.
- If joining to an existing NMEA 2000 network or similar CAN bus network that has its own power supply, use an NMEA 2000 Gateway to isolate the two power supplies.

Powering the CAN (N2K) bus

The CAN bus can be powered at one end using the MX61x junction box. For larger systems the power should be connected at a central point in the backbone to balance the voltage drop of the network.



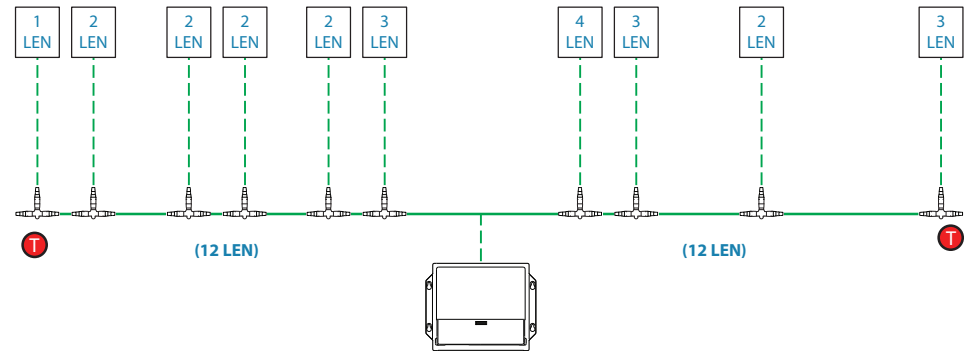
N2K power diagram

Network LEN

When you have a larger system with network power in center of the backbone, you should make the installation such that the load/current draw from the devices in each side/branch is equal.

→ **Note:** 1 LEN (Load Equivalency Number) equals 50 mA current draw.

→ **Note:** Internal terminator must be OFF.

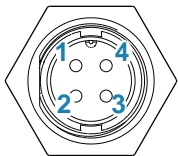


N2K system with balanced load

Powering the GN70/MX61x display units

The GN70/MX61x control units are powered directly from a 12 V DC or 24 V DC source.

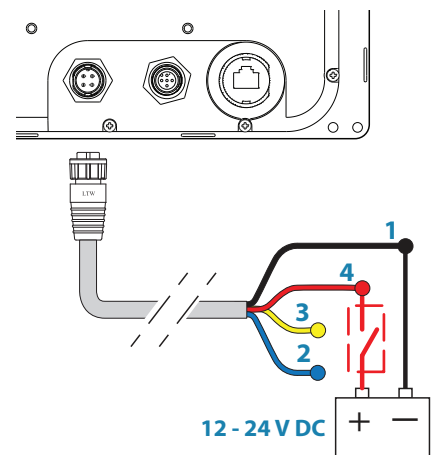
The units are protected against reverse polarity, under voltage and over voltage.



| Pin | Color | Description |
|-----|--------|---------------------------|
| 1 | Black | Battery (-) |
| 2 | Blue | External Alarm |
| 3 | Yellow | External MOB |
| 4 | Red | Battery (+), 12 - 24 V DC |

→ **Notes:**

- It is recommended to install an external circuit breaker switch for power.
- Do not connect the power cable to the same terminals as the start batteries, drive units, thruster or other high current products.



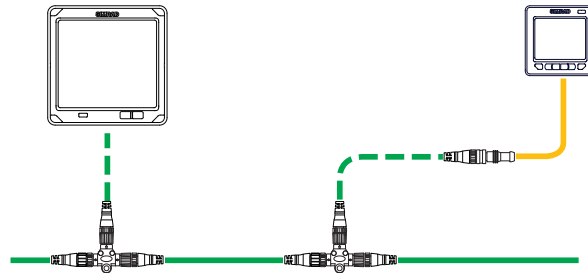
NMEA 2000 and SimNet devices

NMEA 2000 devices can be connected to the CAN bus providing they are NMEA 2000 certified, meet the CE, FCC regulations and do not exceed the load specification.

NMEA 2000 devices and SimNet devices with Micro-C connectors connect directly to the CAN bus backbone using drop cables and Micro-C T-joiners.

→ **Note:** It is recommended to use a gateway when connecting non-Simrad units to the CAN bus backbone.

Devices with SimNet connectors only must be connected using a SimNet to Micro-C adapter cable.

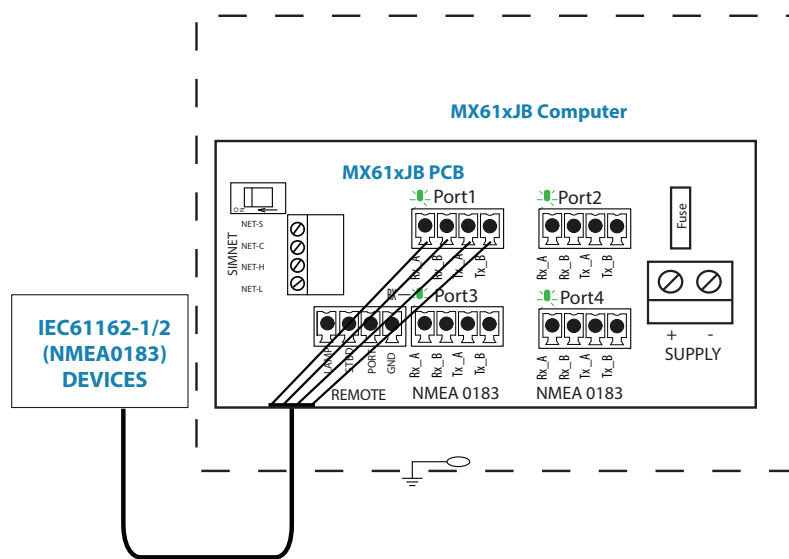


SimNet System

IEC61162-1/2 (NMEA 0183) Devices

Connects to: MX61xJB board.

The MX610JB board includes 4 NMEA port terminals, while the MX612JB unit has 12 NMEA port terminals.



NMEA 0183 wiring hookup to MX61xJB



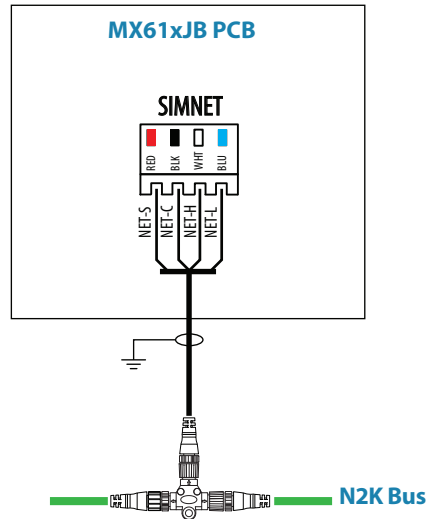
The green LED at each NMEA port terminal will flash when serial data is received.

The MX61xJB board uses the serial RS422 (IEC 61162-1/2) standard and can be configured in the GN70/MX61x display for different baud rates, up to 38,400 baud (default baud rate is 4800). Sentence output by the GN70/MX61x can be individually turned on or off.

Connecting the MX61xJB computer to the N2K bus

The MX61xJB smart junction box features a built-in 15 V power supply for the N2K bus and GPS antenna. The junction box can form one end of the network with the built-in terminator set ON (default). With the terminator set to OFF, the junction box can connect anywhere on the N2K bus back bone by using a drop cable connected to the SIMNET connector and a male connector on the Micro-C T-joiner.

Drop cables of varying lengths can be purchased from local SIMRAD dealers.



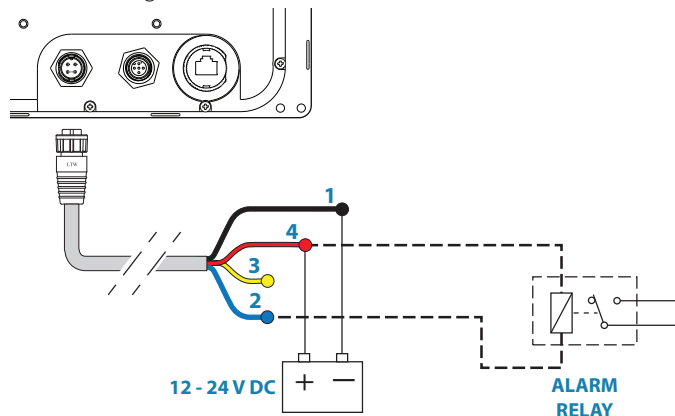
MX61xJB connection to NMEA 2000 Bus

Alarm interface

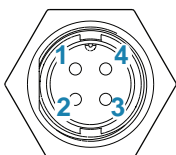
External alarm

An external alarm can be connected to the GN70/MX61x display unit. The alarm signal has an open contact for an alarm buzzer or an external alarm relay as illustrated below. The alarm voltage is the same as the main supply voltage. The maximum load on the external alarm output is 0.75 Amp.

Alarms are configured globally in the system, i.e. they can be configured on one unit and seen, heard and acknowledged from all other SIMRAD control units.



External alarm connection



| Pin | Color | Description |
|-----|--------|---------------------------|
| 1 | Black | Battery (-) |
| 2 | Blue | External Alarm |
| 3 | Yellow | External MOB |
| 4 | Red | Battery (+), 12 - 24 V DC |

External Alarm Setup

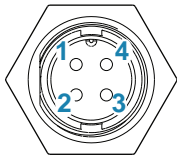
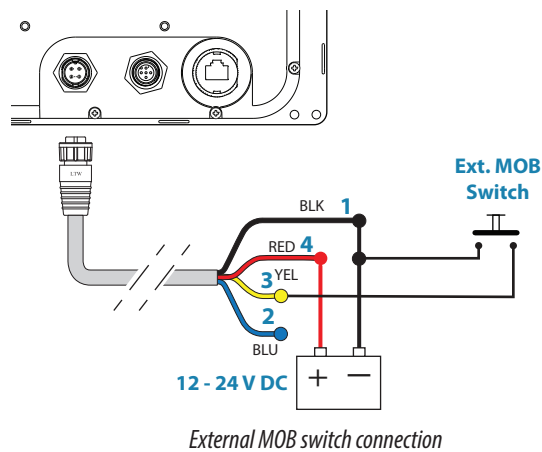
The siren must be enabled in order for the unit to drive the external alarm when an alarm condition arises.

External MOB command

An external N.O. (Normally Open) push button switch can be used to mark your present position and activate the MOB feature (see diagram below for connection).

A momentary press on the Ext. MOB switch will save the MOB point and calculate the range and bearing back to the MOB point.

To stop the MOB, press the **MENU** key. The Cancel navigation menu will be highlighted, press the **ENT** key. Press **CLR** or any of the hot keys to exit.



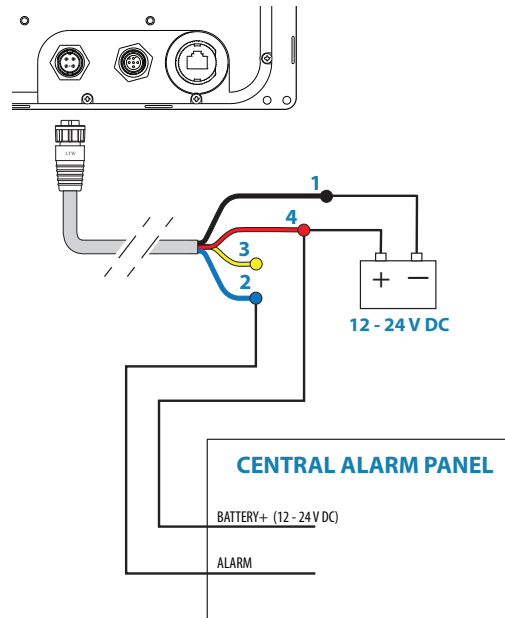
| Pin | Color | Description |
|-----|--------|---------------------------|
| 1 | Black | Battery (-) |
| 2 | Blue | External Alarm |
| 3 | Yellow | External MOB |
| 4 | Red | Battery (+), 12 - 24 V DC |

Central alarm panel with direct I/O interface

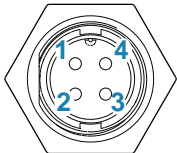
The interfacing described below applies for central alarm panels that use direct lines for alarm, mute and acknowledge. For alarm panel using serial interface, refer to "IEC61162-1/2 (NMEA 0183) Devices" on page 77.

From the GN70/MX61x unit we are using the same two wires (red and blue) as for external alarm relay connection.

Under normal operation you will see 12/24 V between these two wires. In an alarm situation, or when power is lost, you will see no voltage.



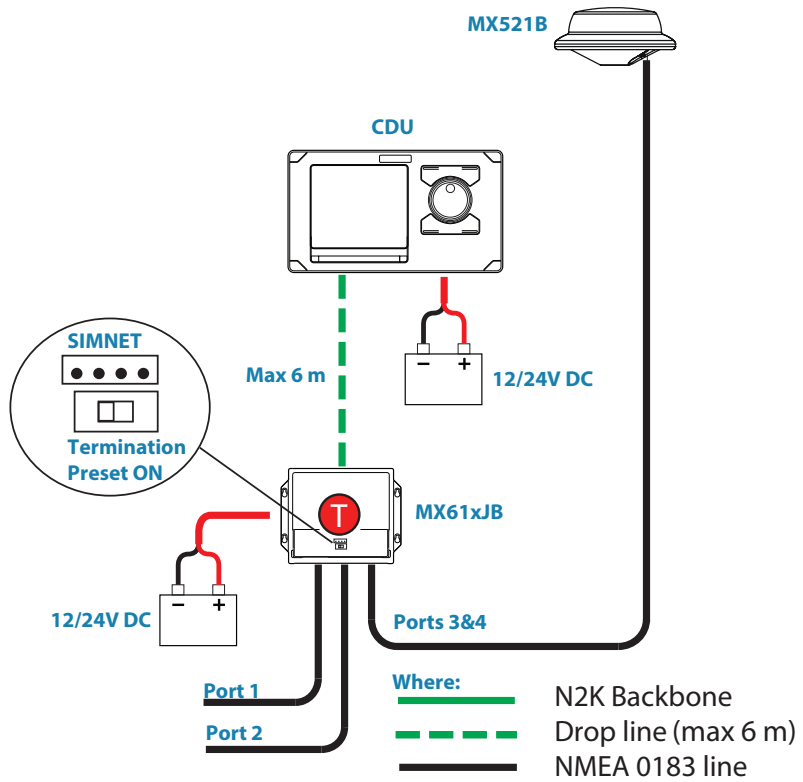
External alarm wiring Connection



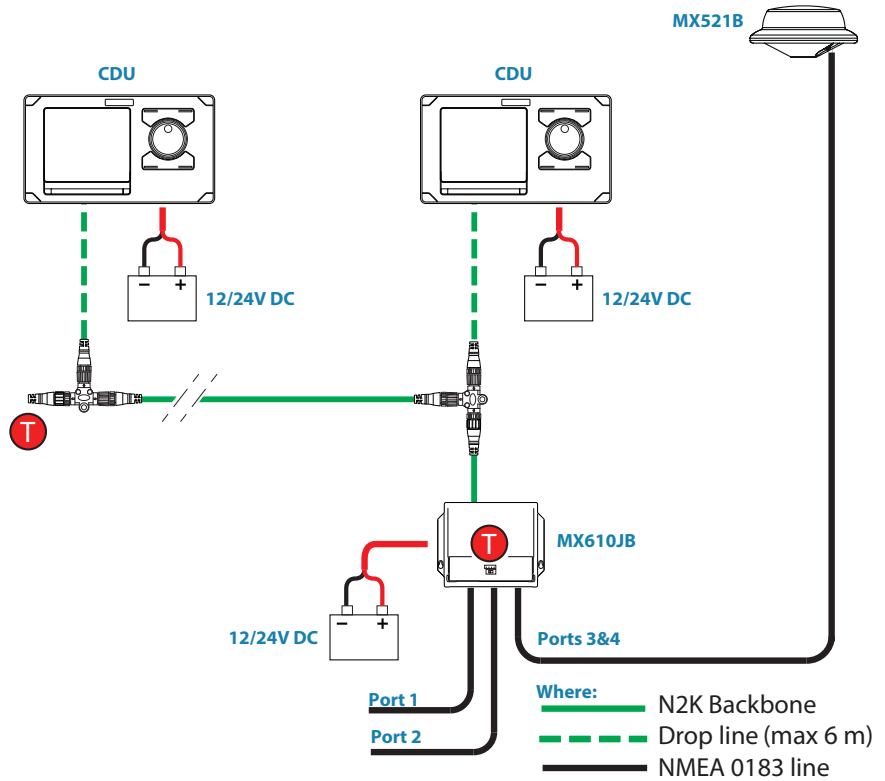
| Pin | Color | Description |
|-----|--------|---------------------------|
| 1 | Black | Battery (-) |
| 2 | Blue | External Alarm |
| 3 | Yellow | External MOB |
| 4 | Red | Battery (+), 12 - 24 V DC |

System connection

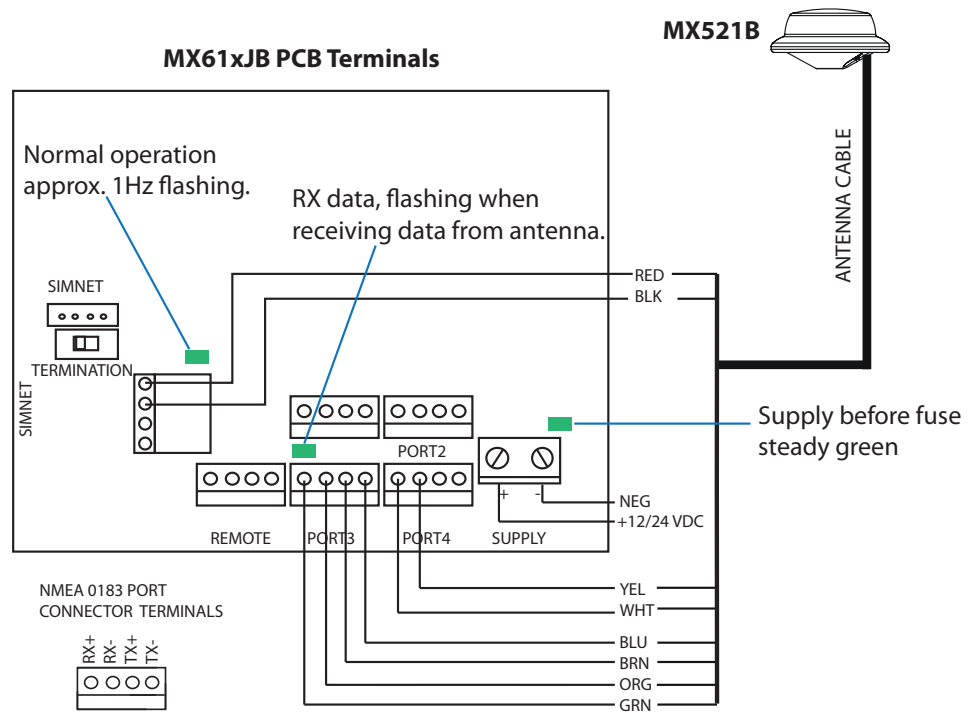
Single station networking



Dual station networking

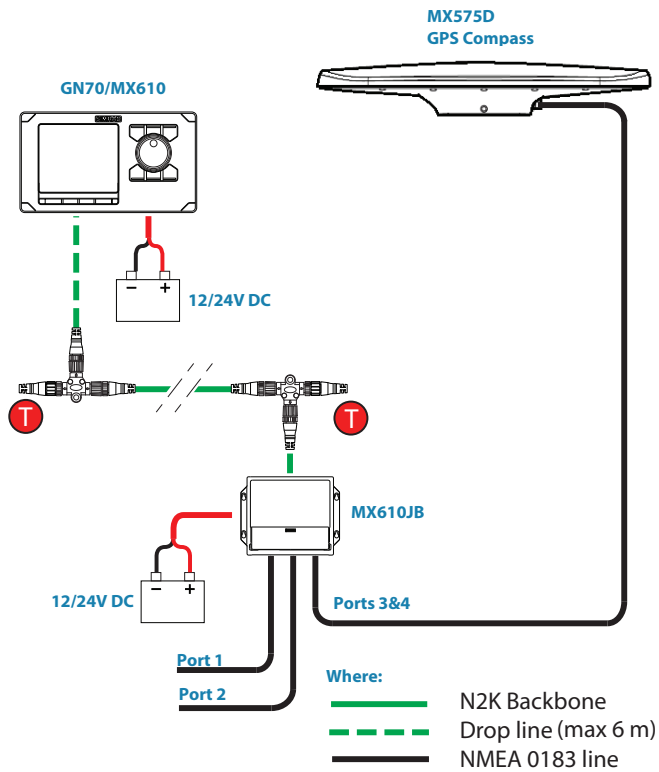


GN70/MX610, MX610JB junction box and MX521/MX525 diagram



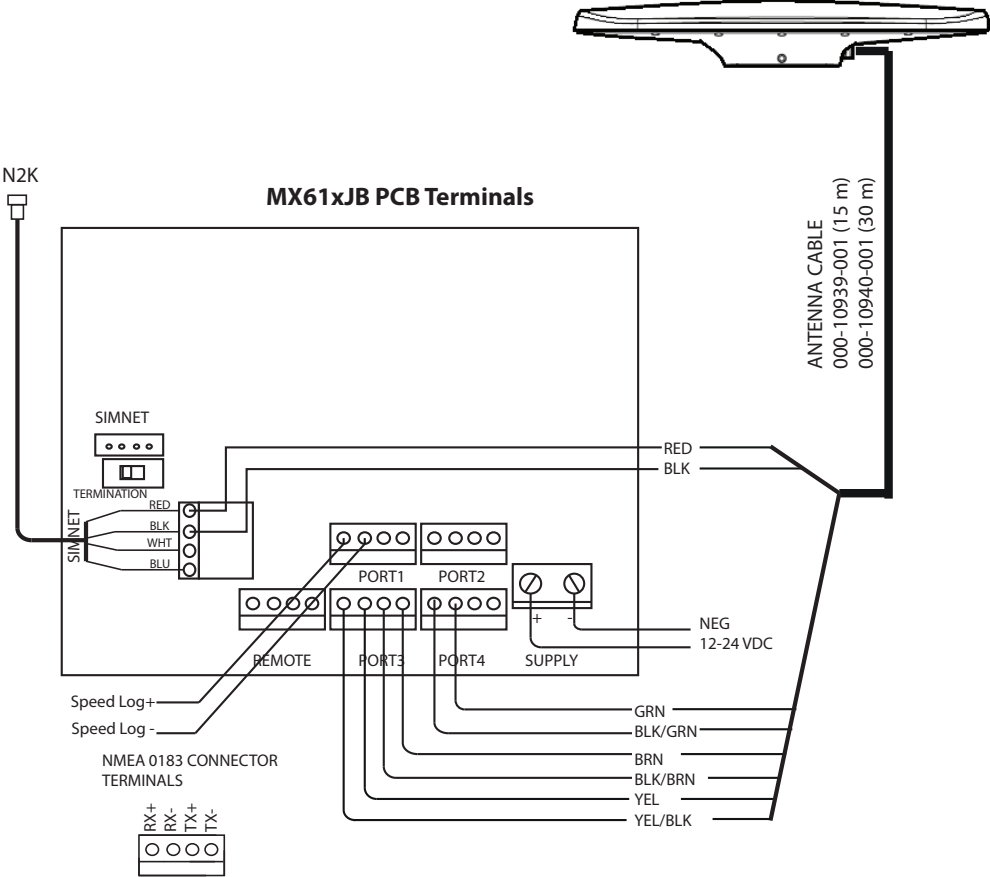
MX521 to MX61xJB wiring Diagram

→ **Note:** Antenna power leads are to be connected to the SIMNET terminals:
 Red wire to NET-S
 Black wire to NET-C

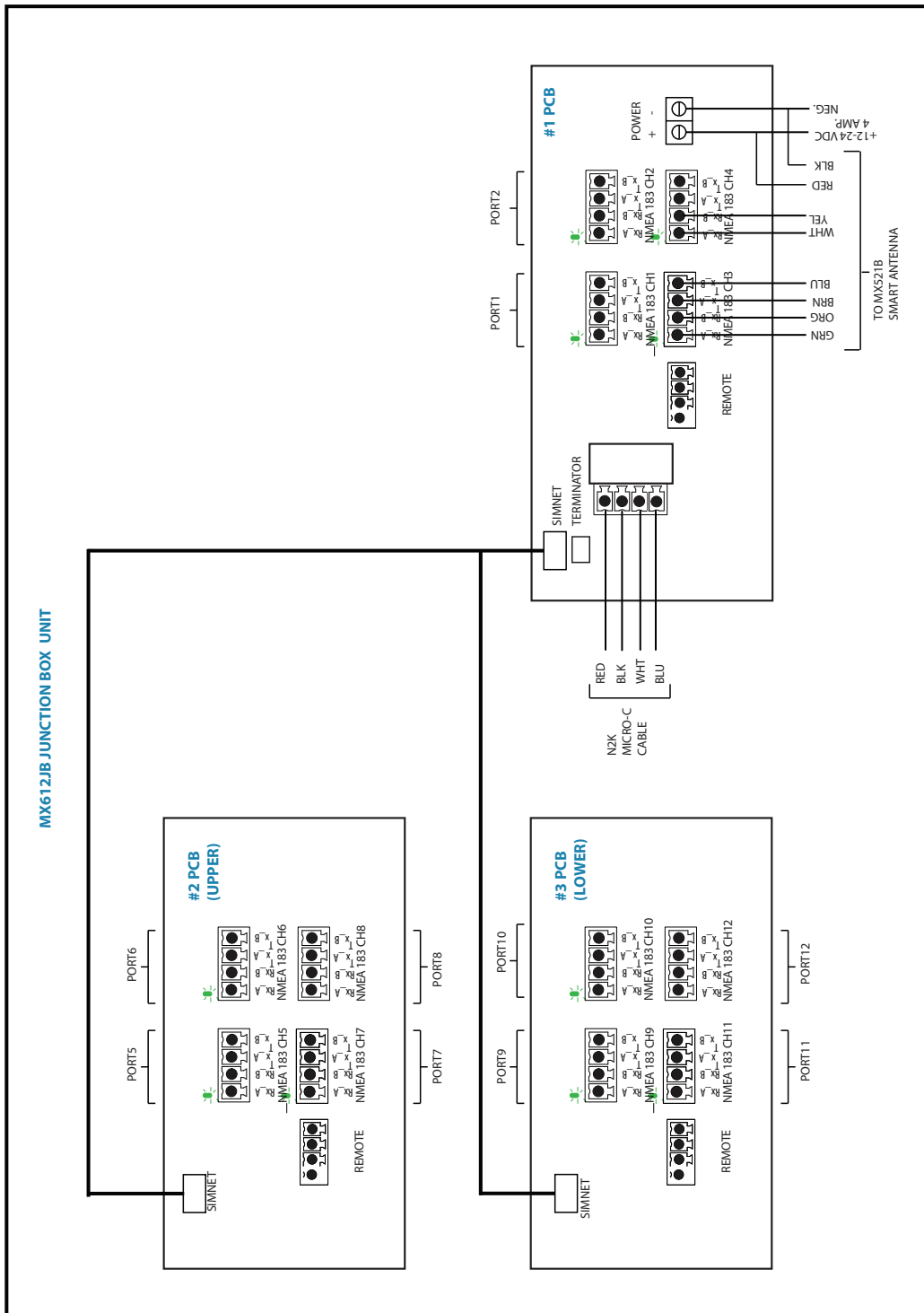


GN70/MX61x system with MX575D GPS compass diagram

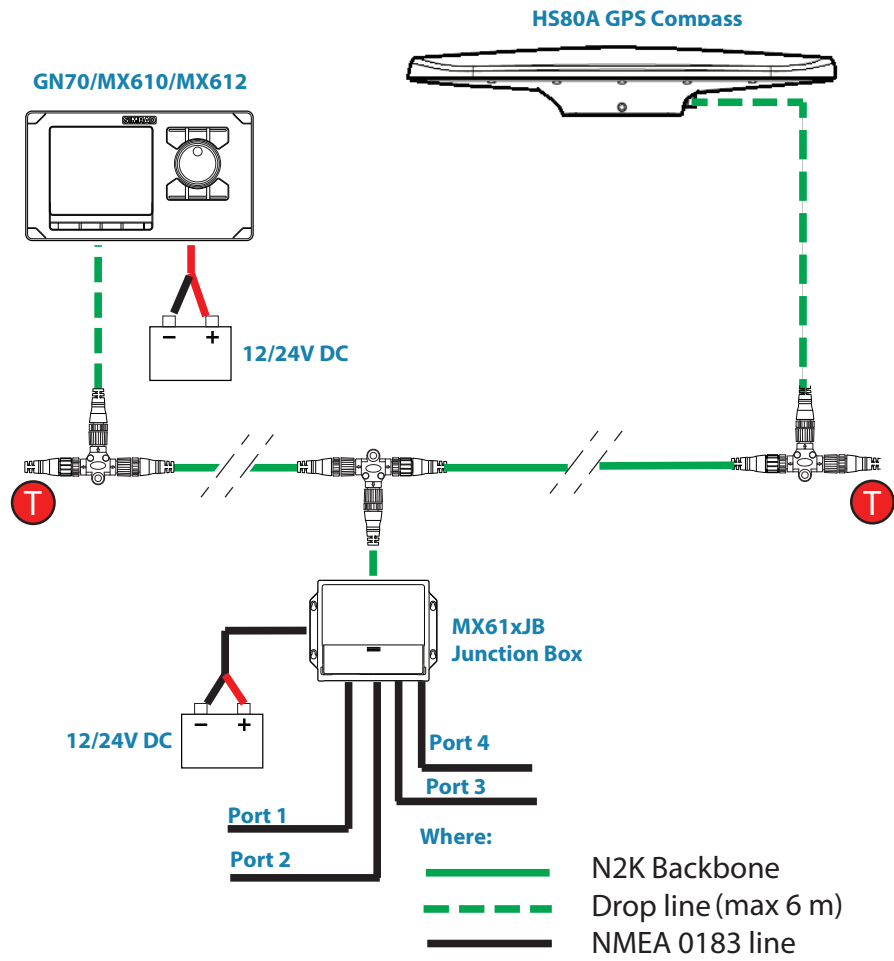
**MX575D
GPS Compass**



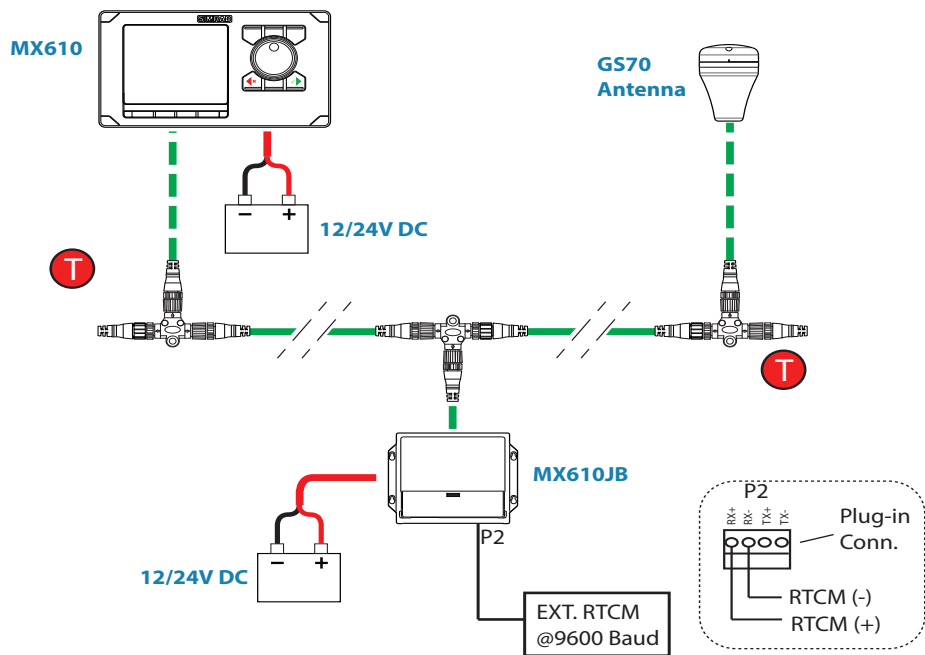
NMEA 0183 connection of the MX575D to MX610JB wiring diagram



MX612JB junction box antenna connection



HS80A N2K connection



External Differential Correction connection to GS70 through the MX610JB junction (Port 2 is dedicated to external RTCM data)

16

Specifications

Technical specifications

→ **Note:** For updated technical specifications, compliance and certifications, refer to our website at www.navico.com/commercial

GN70/MX61x control unit


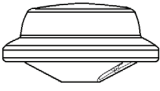
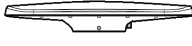
| | GN70 | MX610/MX612 |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| DISPLAY | | |
| Size | 5 in. (127 mm) | |
| Resolution (HxW) | 480x480 | |
| Type | 16-bit color TFT | |
| Antifog | Bonded LCD | |
| Best viewing direction | Any direction | |
| Backlight | Cold Cathode Fluorescent Lamp (CCFL) | |
| Waypoints | 2000 | |
| Routes | 100 Routes with a dynamic number of waypoints; up to 2000 in all routes | |
| Tracks | 2000 | |
| NETWORKING | | |
| CAN bus | NMEA 2000 (N2K) | |
| Ethernet (LAN) | Yes- used for software update and NMEA 0183/IP | |
| USB Socket | No | Yes |
| POWER | | |
| Local supply | 12/24 VDC +30-10% | |
| Consumption local supply | 0.7/0.4 A at 12 VDC 0.4/0.3 A at 24 VDC "backlight full/off" | |
| NMEA 2000 LEN* (50 mA) | 1 | |
| INTERFACE | External alarm/Active unit output max 100 mA, 4.5 A short circuit limit External MOB input, contact current max 8 mA | |
| ENVIRONMENT | | |
| Temperature, operation | -25°C to +55°C (-13°F to 131°F) | |
| Temperature, storage | -30°C to +70°C (-22°F to 158°F) | |
| Protection | IPx4 | |
| MECHANICAL | | |
| Weight | 1,2 Kg (2.7 lbs) | 1.4 Kg (3.0 lbs.) |
| Size | 230 (W) x 144 (H) x 54 (D) mm | 252 (W) x 144 (H) x 54 (D) mm |
| Mounting | Panel (flush) or optional bracket | |
| Material | Epoxy coated seawater resistant aluminium back cover, plastic front bezel | |
| Color | Black and grey | |
| Cable inlet | 1 Power/alarm, 1 Micro-C, LAN connectors | |


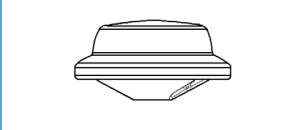
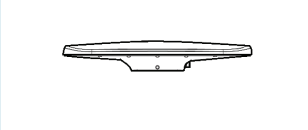
* LEN - NMEA 2000 Load Equivalent Number. Where 1 LEN draws up to 50 mA current from the N2K network.

MX61xJB junction box

| | MX610JB | MX612JB |
|-------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------|
| POWER | | |
| Local supply | 12/24 VDC, +30 - 10%. | |
| Consumption local supply | 0,3 - 5 A CAN bus load dependent | |
| NMEA 2000 LEN* (50 mA) | 1 | 3 |
| Output for CAN bus supply | 15 VDC, +/- 5%, 4 A max | |
| ENVIRONMENT | | |
| Temperature, operation | -15°C to +55°C (5°F to 131°F) | |
| Temperature, storage | -30°C to +70°C (-22°F to 158°F) | |
| Protection | IPx2 | |
| MECHANICAL | | |
| Weight | 0,9 kg (2 lbs) | 4.4 kg (9.5 lbs.) |
| Size (width x height x depth) | 211 x 180 x 60 (mm) | 340 x 250 x 100 (mm) |
| Mounting | Bulkhead | |
| Material | Plastic + Anodized aluminium | Aluminum |
| Color | Black | |
| Cable inlet | Slots: 9 x 95 mm and 18 x 45 mm (0.4" x 3.7" and 0.7" x 1.8") | Rubber cable glands |
| Data I/O | | |
| NMEA 2000 | 1x CAN bus | |
| NMEA 0183 Ver. 4.0 | 4x - Bidirectional RS-422 Serial ports (+/-5 V) | 12x - Bidirectional RS-422 Serial ports (+/-5 V) |
| Baud rate | 4800 (default) configurable by GN70/MX61x. Port 2 RX is for RTCM data only. | |

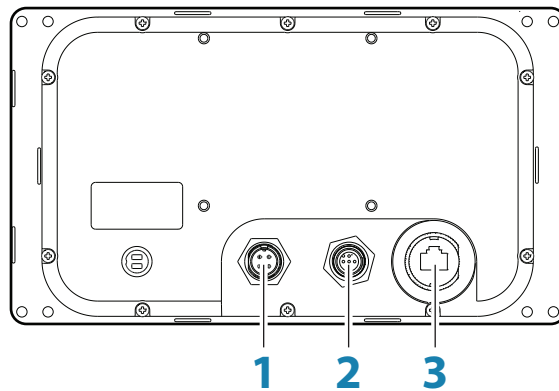
Smart antenna units

| |  |  |  |
|--------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| | GS70 | MX521B | HS80A/MX575D |
| Receiver Type | L1 C/A code, 1.575 GHz | L1 GPS + GLONASS | L1 GPS + GLONASS |
| Number of Channels | 32 | 270 | 540 |
| Position Update rate | Up to 10 Hz (1, 5, 10) | Up to 10 Hz (1, 2, 5,10) | |
| GPS Accuracy (2 DRMS) | ≤5 m | ≤3 m | |
| DGPS Accuracy | ≤2 m | ≤1 m | |
| Cold start | 50 sec. | 60 sec. | |
| Warm start | 3 sec. | 10 sec. | |
| WAAS (SBAS) | Yes (SBAS is not yet approved by IMO) | | |
| Beacon receiver | No | Yes | HS80A * - No MX575D - Yes |
| Operating Mode | No | Manual, Automatic and Database * | |
| Channels | No | 2 channel - parallel tracking * | |
| Beacon Freq. | No | 283.5 to 325.0 KHz * | |
| Compliance | No | IEC 61108-4 beacon standard * | |
| Input voltage | 9-18 VDC | 10-32 VDC | |
| Reverse polarity protection | Yes | | |
| Power consumption | <2 Watts | <2 Watts | <3 Watts |
| Data I/O Protocol | NMEA 2000 | NMEA 1083 | NMEA 2000/NMEA 0183 |
| POWER | | | |
| Local supply | 9-18 VDC | 12/24 V DC +30-10% | |
| Consumption local supply | < 100 mA @ 12 VDC | <150 mA @ 12 VDC | <200 mA @ 12 VDC |
| NMEA 2000 LEN* (50 mA) | 3 | N/A | 4 (N2K connection) |
| ENVIRONMENT | | | |
| Temperature, operation | -25°C to +60°C | -15°C to +55°C | |
| Temperature, storage | -40°C to +85°C | -30°C to +70°C | |
| Protection | IPX6,7 (Exposed category) | | |
| MECHANICAL | | | |
| Weight | 0.14 Kg (0.3 lbs.) | 0.6 Kg (1.3 lbs.) | 2.4 Kg (5.4 lb.) |
| Size (length x width x height) | 90 mm (Dia.) x 38 mm (H) | 182 mm (Dia.) 102 mm (H) | 209.16 mm (W), 668.54 mm (L), 122.32 mm (H) |

| |  |  |  |
|-----------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| | GS70 | MX521B | HS80A/MX575D |
| Connector | N2K Micro C | 10-Pin Round | 18-Pin Round (N2K adapter option) |
| Mounting | Surface mount or Pole | | |
| Material | Plastic | | Plastic/Metal |
| Color | White | White w/ red band | White -top, dark gray - bottom |

→ *LEN - Load Equivalent Number @ 50 mA.

GN70/MX61x connector pinouts



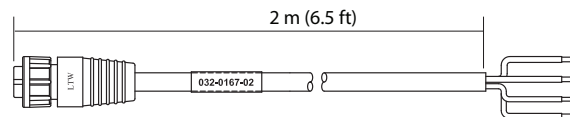
- 1 Power**
- 2 N2K bus**
- 3 Ethernet**

Power

Cable connector (female - front view)

| Layout | Pin | Wire color | Function |
|--------|-----|------------|---------------------------|
| | 1 | Black | Battery (-) |
| | 2 | Blue | Alarm/Active |
| | 3 | Yellow | External command |
| | 4 | Red | Battery (+), 12 - 24 V DC |

Power cable



CAN/NMEA 2000/SimNet

Micro-C cable connector (female - front view)

| Layout | Pin | Wire Color | Function |
|--------|-----|------------|---------------|
| | 1 | (Bare) | Shield |
| | 2 | Red | NET S (+12 V) |
| | 3 | Black | NET C (-) |
| | 4 | White | NET H |
| | 5 | Blue | NET L |

Ethernet

→ **Note:** Both straight and crossed Ethernet cables may be used for software upload!

Supported data

IEC61162-1/2 (NMEA 0183) interface channels

| MX610JB Channels | MX612JB Channels | Default name | Default sentences | Default Baud rate |
|------------------|------------------|--------------------------------------|-------------------|-------------------|
| 1 | 1 | MXJB-NMEA1 | GGA, DTM, ZDA,VTG | 4800 |
| 2 | 2 | MXJB-NMEA2*** | | |
| 3 | 3 | MXJB-NMEA 3 - (ANTENNA - GPS I/O)* | Off | 19.2K** |
| 4 | 4 | MXJB-NMEA4 - (ANTENNA - BEACON Out)* | Off | 4800 |
| N/A | 5 | MXJB-NMEA5 | GGA, DTM, ZDA,VTG | 4800 |
| N/A | 6 | MXJB-NMEA6 | | |
| N/A | 7 | MXJB-NMEA7 | Off | 4800 |
| N/A | 8 | MXJB-NMEA8 | Off | 4800 |
| N/A | 9 | MXJB-NMEA9 | GGA, DTM, ZDA,VTG | 4800 |
| N/A | 10 | MXJB-NMEA10 | | |
| N/A | 11 | MXJB-NMEA11 | Off | 4800 |
| N/A | 12 | MXJB-NMEA12 | Off | 4800 |

* Option for MX521A, MX521B, MX525A and MX575C, MX575D, HS80 and HS80A antenna connection.

** High speed port, restores to 19,200 after restore or power cycle.

*** Dedicated RTCM data input port when DGPS mode is set to 'Ext. RTCM'. Output is selectable.

Communications (via NMEA 0183)

| Sentence | NMEA 0183 | | Message Data Type |
|----------|-----------|-----|--------------------------------------------|
| | In | Out | |
| ACK | √ | √ | Acknowledge Alarm |
| ALR | | √ | Set Alarm State |
| APB | √ | √ | Autopilot Sentence "B" |
| DPT | √ | √ | Depth |
| DTM | √ | √ | Datum |
| GBS | √ | √ | GNS Satellite Fault Detection |
| GGA | √ | √ | Global Position System Fix data |
| GLL | √ | √ | Geographic Position - Lat/Lon |
| GNS | √ | √ | GNSS Fix Data |
| GRS | √ | √ | GNSS Range Residuals |
| GSA | √ | √ | GNS DOP's And Active Satellites |
| GSV | √ | √ | GNSS Satellites in View |
| HDG | √ | √ | Heading Deviation & Variation |
| HDT | √ | √ | Heading True |
| MWV | √ | | Wind Data |
| RMC | √ | √ | Recommended Minimum Specific GNSS Data |
| RMB | √ | √ | Recommended Minimum Navigation Information |
| ROT | √ | √ | Rate Of Turn |
| RTE | | √ | Routes |
| THS | √ | √ | True Heading |
| VHW | √ | √ | Water Speed and Heading |
| VTG | √ | √ | Course and Speed Over Ground |
| WPL | | √ | Waypoints |
| XTE | √ | √ | Cross Track Error, Measured |
| ZDA | √ | √ | Time & Date |

| | | | |
|-----------------------------|---|---|-----------------------------------------|
| VDX | | √ | AIS |
| Proprietary messages | | | |
| \$PMVXG,GBS | √ | | Fills in RAIM integrity in 129029 field |
| \$PCSI,CS0 | √ | | Beacon/WAAS Reference station data |
| \$PMVXG035 | √ | | MX 035 Proprietary message |
| \$PMVXG,312 | √ | | DGPS Corrections |
| \$PMVXG,313 | √ | | GPS Satellite Health |
| \$PMVXG,314 | √ | | |
| \$PMVXG,315 | √ | | |
| \$PMVXG,316 | √ | | |
| \$PMVXG,317 | √ | | |

GN70/MX61x display unit communication via NMEA 2000

| PGN number | In | Out | PGN Title |
|------------|----|-----|----------------------------------------|
| 59392 | √ | √ | ISO Acknowledgement |
| 59904 | √ | √ | ISO Request |
| 60160 | √ | √ | ISO Transport Protocol, Data Transfer |
| 60416 | √ | √ | ISO Transport Protocol, Connection |
| 60928 | √ | √ | ISO Address Claim |
| 61184 | √ | √ | Parameter Request/Command |
| 65240 | | √ | ISO Command Access |
| 127245 | | √ | Rudder |
| 127250 | | √ | Compass heading (Vessel Heading) |
| 127251 | | √ | Rate Of Turn |
| 127257 | | √ | Attitude |
| 127258 | √ | √ | Magnetic Variation |
| 127508 | | √ | Battery Status |
| 128259 | | √ | Speed, Water Referenced |
| 128267 | | √ | Water Depth |
| 128275 | | √ | Distance Log |
| 129025 | | √ | Position, RU |
| 129026 | | √ | COG & SOG RU |
| 129029 | | √ | Position data |
| 129033 | √ | √ | Local Time offset |
| 129038 | | √ | AIS Class A Position Report |
| 129039 | | √ | AIS Class B Position Report |
| 129040 | | √ | AIS Class B Extended Position Report |
| 129041 | | √ | AIS Aids to Navigation (AtoN) Report |
| 129044 | √ | | Datum |
| 129283 | √ | √ | Cross Track Error |
| 129284 | √ | √ | Navigation Data |
| 129285 | √ | | Navigation - Route/WP Information |
| 129539 | | √ | GNS DOP |
| 129540 | | √ | GNS Satellites In View |
| 129545 | | √ | GNSS RAIM |
| 129551 | | √ | GNSS Differential Correction RX Signal |
| 129794 | | √ | AIS Class A Static and Voyage Data |

| | | | |
|--------|---|---|-----------------------------------------|
| 129801 | | √ | AIS Addressed Safety Related Message |
| 129802 | | √ | AIS Safety Related Broadcast Message |
| 129808 | | √ | DSC Call Information |
| 129809 | | √ | AIS Class B "CS" Static Data Report - A |
| 129810 | | √ | AIS Class B "CS" Static Data Report - B |
| 130067 | √ | | Route and WP Service - WP List |
| 130306 | | √ | Parameter Handle |
| 130310 | | √ | Environmental Parameters |
| 130311 | | √ | Environmental Parameters |
| 130312 | | √ | Temperature |
| 130313 | | √ | Humidity |
| 130314 | | √ | Actual Pressure |
| 130576 | | √ | Small Craft Status |
| 130577 | | √ | Direction Data |
| 130817 | | √ | Product Info |
| 130840 | √ | √ | Data User Group Configuration |
| 130842 | | √ | SimNet DSC Message |
| 130845 | √ | √ | Paramet Handle |
| 130850 | √ | √ | RTCM feedback |
| 130851 | √ | √ | Event reply |

MX61x junction box communication via NMEA 2000

| PGN number | In | Out | PGN Title |
|------------|----|-----|---------------------------------------|
| 59392 | √ | √ | ISO Acknowledgement |
| 59904 | √ | √ | ISO Request |
| 60160 | √ | √ | ISO Transport Protocol, Data Transfer |
| 60416 | √ | √ | ISO Transport Protocol, Connection |
| 60928 | √ | √ | ISO Address Claim |
| 61184 | √ | √ | Parameter Request/Command |
| 65240 | | √ | ISO Command Access |
| 127245 | √ | √ | Rudder |
| 127250 | | √ | Compass heading (Vessel Heading) |
| 127251 | | √ | Rate Of Turn |
| 127258 | | √ | Magnetic Variation |
| 128259 | | √ | Speed, Water Referenced |
| 128267 | | √ | Water Depth |
| 129025 | | √ | Position, RU |
| 129026 | | √ | COG & SOG RU |
| 129029 | | √ | Position data |
| 129033 | | √ | Local Time offset |
| 129038 | | √ | AIS Class A Position Report |
| 129044 | | √ | Datum |
| 129283 | | √ | Cross Track Error |
| 129284 | | √ | Navigation Data |
| 129285 | | √ | Navigation - Route/WP Information |
| 129539 | | √ | GNS DOP |
| 129540 | | √ | GNS Satellites In View |
| 129545 | | √ | GNSS RAIM |

| | | | |
|--------|---|---|--------------------------------------|
| 129792 | | √ | AIS DGNSS Broadcast Binary Message |
| 129793 | | √ | AIS UTC and Date Report |
| 129794 | | √ | AIS Class A Static and Voyage Data |
| 129795 | | √ | AIS Addressed Binary Message |
| 129796 | | √ | AIS Acknowledge |
| 129797 | | √ | AIS Binary Broadcast Message |
| 129800 | | √ | AIS UTC/Date Inquiry |
| 129801 | | √ | AIS Addressed Safety Related Message |
| 129802 | | √ | AIS Safety Related Broadcast Message |
| 129803 | | √ | AIS Interrogation |
| 129804 | | √ | AIS Assignment Mode Command |
| 129805 | | √ | AIS Data Link Management Message |
| 130074 | | √ | Route and WP Service - WP List |
| 130306 | | √ | Parameter Handle |
| 130840 | √ | √ | Data User Group Configuration |
| 130845 | √ | √ | Paramet Handle |
| 130850 | √ | √ | RTCM feedback |
| 130851 | √ | √ | Event reply |

GS70/HS80 smart antenna communications NMEA 2000

| NMEA 2000 messages | |
|------------------------|-----------------------------------|
| PGN number | PGN Title |
| 59392 | ISO Acknowledgement |
| 59904 | ISO Request |
| 60928 | ISO Address Claim |
| 126996 | Product Information |
| GPS related | |
| 65293 | Configuration Message |
| 126992 | System Time |
| 129025 | Position on, RU |
| 129026 | COG & SOG RU |
| 129029 | Position Data |
| 129539 | GNS DOP |
| 129540 | GNS Satellites in view |
| 127258 | Magnetic variation |
| Compass related | |
| 127250 | Compass Heading (Vessel Heading) |
| 130845 | Parameter Handle |
| 127251 | Rate of Turn |
| 127257 | Attitude |
| RAIM feature | |
| 129545 | GNSS RAIM output |
| 129546 | GNSS RAIM settings |
| 129542 | GNSS Pseudorange noise statistics |
| 129547 | GNSS Pseudorange error statistics |
| RTCM correction | |
| 129549 | Ext. RTCM correction data |
| 130852 | RTCM feedback to GN70/MX61x |

Additional NMEA 2000 messages for AIS

| NMEA 2000 messages | |
|--------------------|---------------------------------------------|
| PGN number | PGN Title |
| 129038 | AIS Class A position report |
| 129039 | AIS Class B position report |
| 129040 | AIS Class B extended position report |
| 129041 | AIS Aids to Navigation (A to N) report |
| 129792 | AIS DGNSS broadcast binary message |
| 129793 | AIS UTC and date report |
| 129794 | AIS Class A Static and Voyage Related Data |
| 129795 | AIS Addressed Binary Message |
| 129796 | AIS Acknowledge |
| 129797 | AIS Binary Broadcast Message |
| 129800 | AIS UTC/Date Inquiry |
| 129801 | AIS Addressed Safety Related Message |
| 129802 | AIS Safety Related Broadcast Message |
| 129803 | AIS Interrogation |
| 129804 | AIS Assignment Mode Command |
| 129805 | AIS Data Link Management Message |
| 129806 | AIS Channel Management |
| 129807 | AIS Group Assignment |
| 129809 | AIS Class B "CS" Static Data Report, Part A |
| 129810 | AIS Class B "CS" Static Data Report, Part B |

GPS and GNSS (GPS+GLONASS) modes NMEA 0183 messages

| GPS Mode | GNSS mode | Remarks |
|----------|----------------|-------------------------------------------------------------------------------------------------------|
| GPGGA | Not applicable | GGA message is used in GPS mode only |
| GPGNS | GNGNS | GNSS Fix Data |
| GPZDA | GPZDA | Normally the time reference is synchronized to GPS time, so ZDA stays with GP talker in combined mode |
| GPDTM | GNDTM | DATUM |
| GPGBS | GNGBS | RAIM sentence |
| GPRMC | GNRMC | Recommended Minimum Specific GNSS Data |
| GPVTG | GNVTG | COG/SOG data |

Where:

\$GPxxx - NMEA message header when autonomous GPS system is used

\$GNxxx - NMEA message header when combined GPS and GLONASS system is used

17

List of abbreviations

The following table holds a list of abbreviations used in display examples etc. in this manual.

| | |
|---------|-------------------------------------------------------------------------------------------------------|
| AIS | Automatic Identification System |
| BTW | Bearing To Waypoint |
| BWW | Bearing Waypoint to Waypoint |
| CDU | Control Display Unit |
| COG | Course Over Ground |
| CRS | Course |
| CTS | Course To Steer |
| DGPS | Differential Global Positioning System |
| DSC | Digital Selective Calling |
| DTD | Distance To Destination |
| DTW | Distance To Waypoint |
| EGNOS | European Geostationary Navigation Overlay System |
| ETA | Estimated Time of Arrival |
| ETW | Estimated Time of arrival at next Waypoint |
| GLONASS | Global Orbiting Navigational Satellite System |
| GMDSS | Global Maritime Distress and Safety System |
| GNSS | Global Navigation Satellite System |
| GPS | Global Positioning System |
| HDOP | Horizontal Dilution Of Precision |
| HDG | Heading |
| MAG | Magnetic |
| MAN | Manual (speed input) |
| MOB | Man OverBoard |
| MSAS | Multi-functional Satellite Augmentation System |
| N2K | NMEA2000 network specified by National Marine Electronics Association and standardized as IEC 61162-3 |
| RAIM | Receiver Autonomous Integrity Monitoring |
| ROT | Rate Of Turn |
| RTCM | Radio Technical Commission For Maritime |
| SBAS | Satellite Based Augmentation System |
| SOG | Speed Over Ground |
| STEER | Course to steer towards next waypoint |
| STW | Speed Through Water |
| TTD | Time To Destination |
| WAAS | Wide Area Augmentation System |
| WPT | Waypoint (followed by waypoint name) |
| XTD | Cross Track Distance |

Index

A

- Abbreviations 96
- AIS 50
 - Defining dangerous vessels 52
 - Filtering the targets 52
 - Selecting targets 51
 - Target symbols 48, 50
 - Vessel alarms 51
 - Vessel settings 52
- Alarms
 - Interface 80
 - Waypoint 40
- Alerts 22, 54
 - Listing 22
 - Messages 54
 - Multiple alerts 55
 - Settings 56
 - Single alerts 55
 - Vessel 51

B

- Basic Operation 11

C

- Cancel navigation 44
- Components 64
- Cursor
 - Navigate to cursor position 44
 - Placing 13

D

- Data fields 46
- Datum 45
- Dialog boxes 12

F

- Front panel and keys 7

G

- Goto menu 44
- GPS position info 47
- GPS source 58
- Great-circle 45

H

- HDG Screen 48

K

- Keys 7
 - Power key 11

L

- Listings 21
 - Alerts 22
 - Satellites 22
 - Sun/moon 23

- Trip Log 23
- Vessels 21
- Waypoints/routes/tracks 22

M

- Magnetic variation 45
- Maintenance 59
- Man Over Board 13
 - Cancel navigation 13
 - Delete a MOB mark 13
 - External MOB command 81
- Menus 12
 - Menu overview 16
 - Quick Menu 16
 - Rotary knob 12
 - Submenus 17
- MMSI number 52
- Mounting 67
 - Antenna systems 69
 - MX610/MX612 control unit 67

N

- Navigating on the chart 44
- Navigation settings panel 44
- Network Settings 24
 - Manual Source Selection 25
 - SimNet Groups 28

P

- Pages and panels
 - Plotter orientation 15
 - Position panels 47
 - Steer panel 46, 47
- Position panels 47
- Power key 11

Q

- Quick menu 48

R

- Rhumb line 45
- Routes
 - Course line 46
 - Creating new 40
 - Edit 40
 - Leg 45
 - Navigate a route 44
 - Off course limit 46
 - Panel 40
 - Selecting start point 44

S

- Satellite status 22
- Ship's location 15
- SimNet basics and terminology 76
- Simulator 58
 - Advanced settings 58

- Mode 58
- Selecting source files 58
- Set start position 58
- Software upgrades 61
- Steer panel 46, 47
- Sun/moon 23
- System Configuration 24

T

- Target symbols 50
- Tides 23
- Tracks 42
 - Creating new 42
 - Panel 39
 - Settings 42
- Trouble shooting 59

V

- Vessel settings panel 52
- Vessel status listing 22

W

- Waypoints 39
 - Alarm settings 40
 - Edit 39
 - Panel 39
 - Positioning 39
- Waypoints, Routes & Tracks 39
- Wiring guidelines 75



SIMRAD

