SIMRAD

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 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.

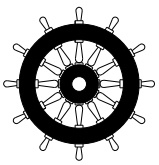
This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

Compliance

The MX610/MX612 system complies with the following regulations:

- IMO Res. A.694 (17), Reg. V/19 ,
- IMO Res. MSC.36(63)-(1994 HSC Code) 13
- IMO Res. MSC.97(73)-(2000 HSC Code) 13
- IMO Res. MSC.112(73)
- IMO Res. MSC.114(73),
- IMO Res. MSC.191(79)
- IEC 61108-1 (2003)
- IEC 61108-4 (2004)
- IEC 62288 Ed.1.0(2008).
- IEC 60945 (2002) including
- IEC 60945 Corrigendum 1 (2008)
- IEC 61162 series,

For more information please refer to our website:
www.navico.com/commercial



The Wheelmark

The MX610/MX612 system is produced and tested in accordance with the European Marine Equipment Directive 2010/68/EC and amemded by Directive 2011/75/EC. 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 eauipment, 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 covers 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

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 MX610/MX612 navigation system.

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:

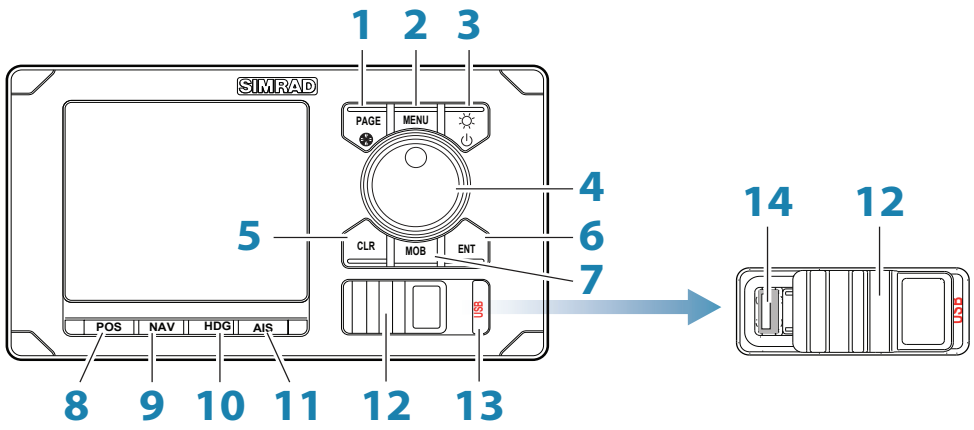
→ ***Note:*** Used to draw the reader's attention to a comment or some important information.

> ⚠ **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

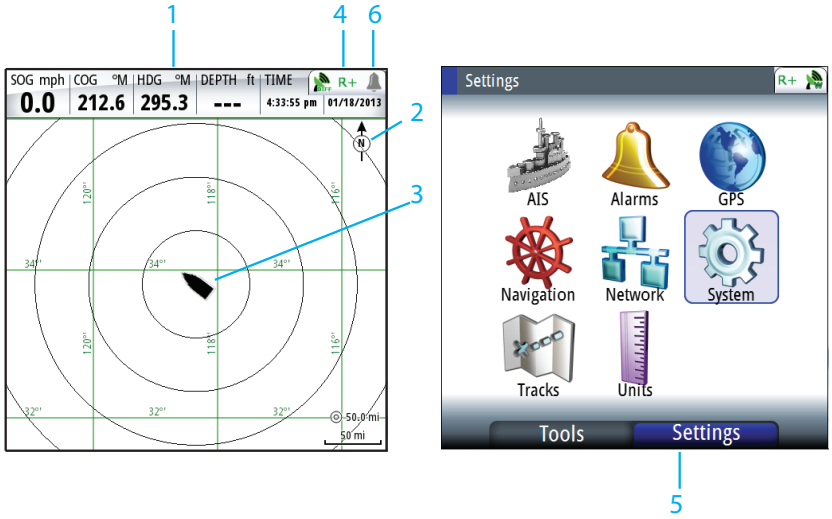
1 Introduction

MX610/MX612 Front Panel and Keys



No.	Key Description
1	**PAGE** key: Brings up different screen page every time this key is pressed or to change tab in the settings and tools menu.
2	**MENU** key: Brings up the quick menu dialog box.
3	**PWR/LIGHT** key Short press - to turn ON the unit. Momentary press brings up the backlight and night view controls. Series of short presses will cycle through 6 levels of display brilliance. Long Press - to turn power off.
4	**ROTARY KNOB:** Rotate to scroll through menu list, icons, alphabets or numbers in the virtual keypad and zoom-in or out in the PLOT mode. Press the center of the knob to select menu item or accept entry. The 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. The same action as pressing 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 activates the Man-Over-Board (MOB) function.
8	**POS** key: Hot key to display the present position Latitude, Longitude, COG, SOG, Date and Time. Press repeatedly to show POS1, POS2 or POS3 screens.
9	**NAV** key: Hot key to display the navigation information. Press repeatedly to show NAV1, NAV2 or NAV3 screens.
10	**HDG** key: Hot key to show the compass rose, Pitch, ROT and Yaw information coming from a gyro or a GPS compass. Press repeatedly to show HDG1 or HDG2 screens
11	**AIS** key: Hot key to display the PLOT screen showing your vessel, waypoints, route and other navigation information. Will 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. (MX610 and MX612 only)
13	**USB** key: Press to display the files contained in the USB memory stick.
14	**USB** Connector

MX610/MX612 Screens



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.

4 Status Bar

Appears on all navigation screens. It indicates the GPS and RAIM status or if an alarm is present (refer to Status bar indications below for more details). Normally, the status bar blinks off every 4 seconds to show what is behind it. This is not an alarm condition.

5 Main Menu

The main menu is used to operate the system and to adjust configuration settings. There are two tabs under the main menu, namely: Settings and Tools. To toggle between the Tools and Settings tab, press the **PAGE** button.

6 Alarm Icon

The system will continuously check for dangerous situations and system faults while the system is running. When an alarm situation occurs, an Alarm bell icon will appear on the status bar.

If you have enabled the siren, an audible alarm will be activated when an alarm situation occurs.

Status Bar Indications

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

➔ ***Notes:***

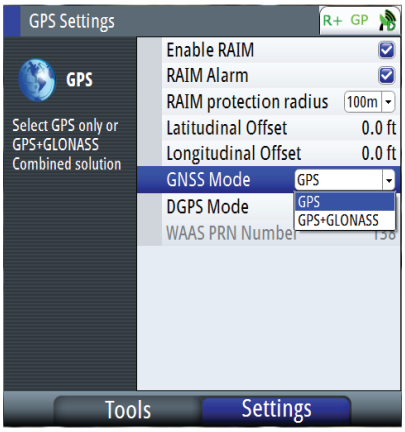
1. This feature is available in SIMRAD MX610/MX612 CDUs with software version 1.0.42.235 or higher.
2. When GPS+GLONASS (GNSS) mode is selected, the NMEA 0183 data headers are changed from $GPxxx to $GNxxx.

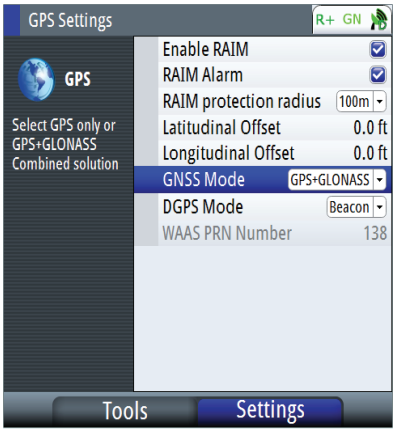
GPS/GLONASS selection

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 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 MX610/MX612 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-) alarm 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.

Icon	Description	Definition
R+	RAIM Safe	Position error is less than 100 meters (RAIM alarm limit)
R-	RAIM Unsafe	Position error is equal or more than the 100 meter RAIM alarm limit
R?	RAIM Caution	Not enough satellites are available. RAIM requires 5 (or more) satellites for proper operation.
	Alarm condition	A red bell icon indicates an alarm fault has been detected. The bell icon will be grayed-out when the alarm is corrected.

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

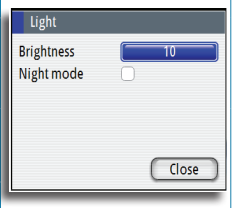
1. Press the **MENU** key.
2. Scroll down to Tools & Settings menu, press **ENT**.
3. Select the GPS icon, press **ENT**.
4. Scroll to Enable RAIM (or RAIM Alarm), press the **ENT** key to remove or leave a check mark.
5. Press the **CLR** key several times or any hot keys to exit.

→ ***Note:*** IMO regulations require that RAIM feature be on at all times.

2 Basic operation

Light/Power key

• Press and hold:	Turn unit off
• Single press:	To turn ON or display dialog for ***light/night*** mode adjustment
• Repeated presses:	Toggle preset brightness levels (10 - 6 - 3- 1)
• Check box	To switch to ***night*** mode operation



➔ ***Notes:***

1. The MX610/MX612 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.

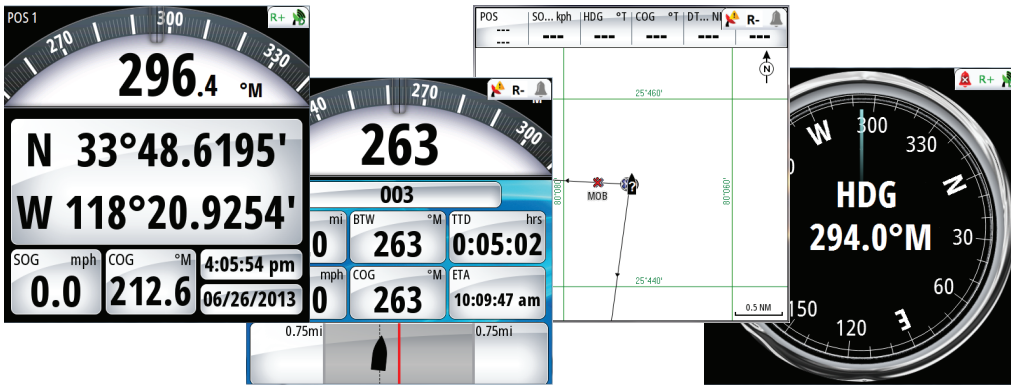
➔ ***Note:*** Details on the display may be less visible during Day time when the ***Night*** mode is selected!

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

PAGE key

Select Pages

You can view the different navigation display pages sequentially by pressing the **PAGE** button repeatedly.



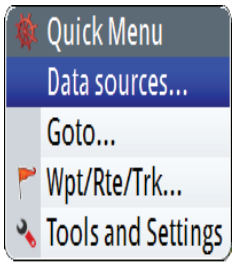
You can also view the navigation pages directly by pressing the hot keys at the bottom of the display. The **PAGE** key is also used to change tabs or toggle between the Tools and Settings screens of the main menu.

MENU key

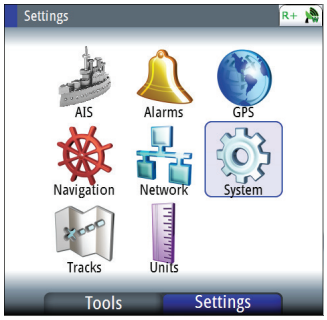
Menus are used to operate the system and to adjust configuration settings.

You display the menu by pressing the **MENU** button to bring up the "Quick Menu". Using the rotary knob, scroll down to Tools and Settings and press the **ENT** key . The main menu will have two tabs, namely: Tools and Settings. Pressing the **PAGE** key will toggle the display between the Tools or Settings tabs.

- Pressing the **MENU** key brings up the quick menu for the particular screen on the display
- Scroll down to the Tools and Settings then press the **ENT** key to display the main menu

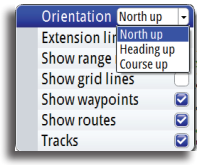


- You can scroll through the menu icons by using the rotary knob and then pressing the **ENT** key or middle of the knob to select.
- Adjust slide bar values by turning the rotary knob clockwise (CW) or counterclockwise (CCW) direction.
- Drop-down listings are selected by pressing the **ENT** key when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



Settings Menu

Tools Menu



Drop-down listing

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.

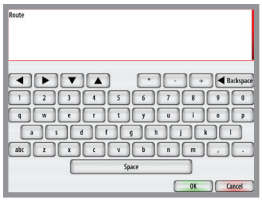
Dialog boxes

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.

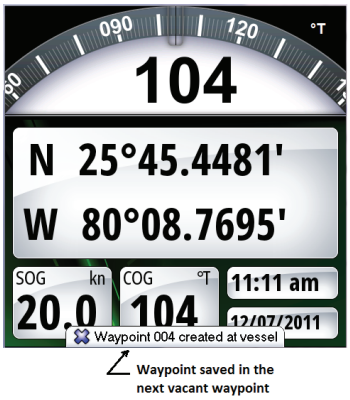
Pressing the **ENT** key after entering the required value(s) will select the entry. Highlight the **OK** button and press **ENT** will save the entry.

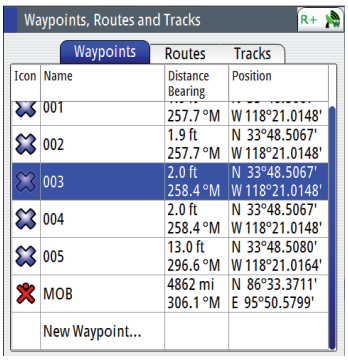
A dialog is closed without saving by pressing the **CLR** key.



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.

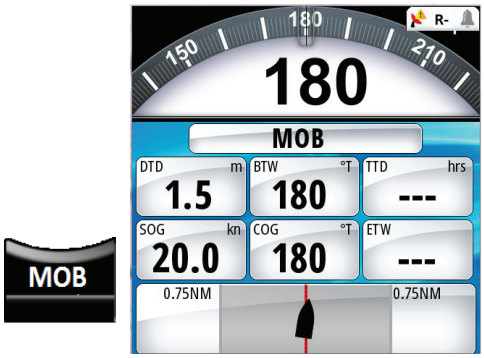




If an emergency man over board situation should occur, you can position a Man Over Board mark at the vessel's current position by pressing the **MOB** key for 3 seconds. When you activate the MOB function the following actions are automatically performed:

- 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 MX610/MX612 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 MX610/MX612 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

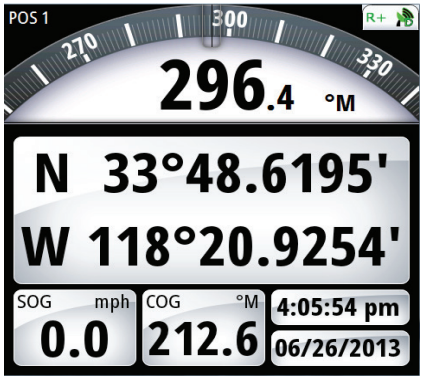
A MOB mark is deleted by selecting the MOB mark in the WPT list and then pressing the **MENU** key and selecting delete. It can also be deleted as described in "Waypoints, Routes & Tracks" on page 40.

MX610/MX612 hot keys

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

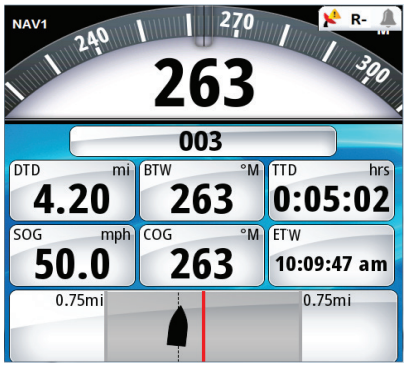
POS key

There are three POS screens available, namely: POS1, POS2 and POS3. The screen 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 POS1 indicating the present position Lat/Long, SOG, COG, Date/Time and the compass heading. Pressing the POS key again will show POS2 screen showing the L/L, Altitude and Depth. Pressing the POS key the third time will bring up the POS3 screen showing the Odometer, Trip meter, SOG and the trip time (hh:mm:ss).



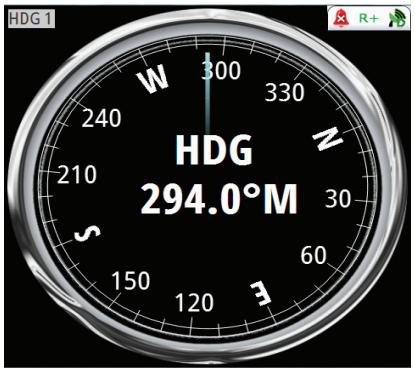
NAV key

There are three NAV screens available, namely: NAV1, NAV2 and NAV3. The screen 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 navigation screen 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 the third time will show the NAV3 screen showing the COG, SOG, TWA, TWD, TWS and VMG information.



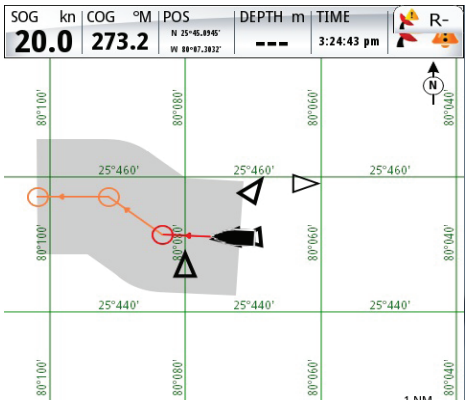
HDG key

There are two HDG screens available, namely: HDG1 and HDG2. Pressing the **HDG** key will bring up the HDG1 screen showing the full compass rose. Pressing the HDG key again will show the digital heading readout with ROT, pitch, roll and yaw. This information will be displayed when a gyro, HS80 or MX575C GPS compass is available in the NMEA 2000 network or when they are connected to the MX61xJB junction box.



AIS key

Pressing the **AIS** key will bring up the plotter screen that will show your boat in the middle of the screen, wpts, routes and AIS targets if an AIS unit is available in the NMEA 2000 network.

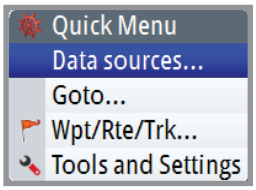


3

Menu overview

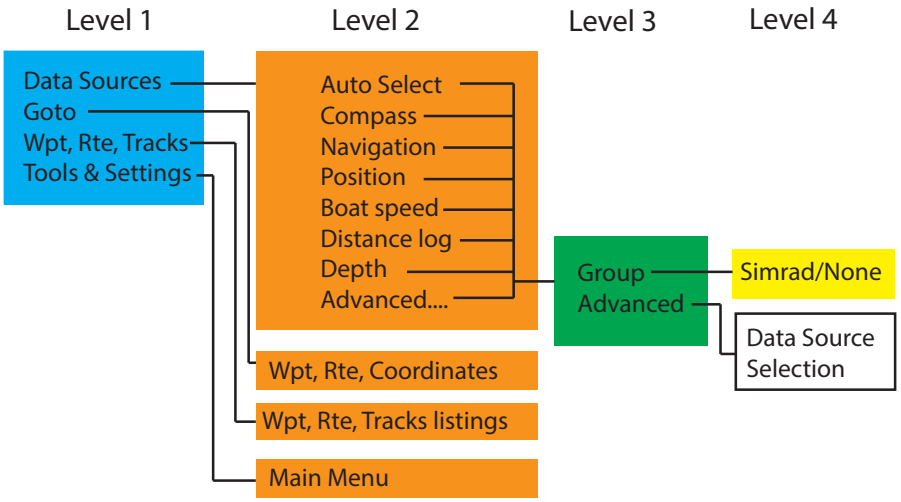
Quick Menus

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.



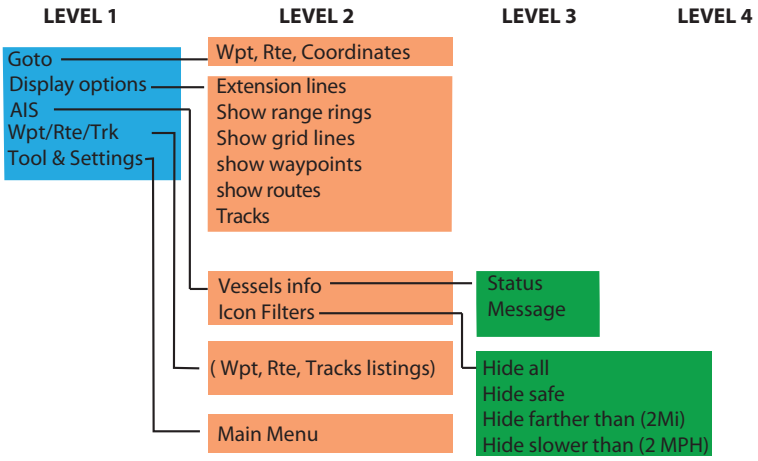
Quick Menu under POS, NAV and HDG Screens

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)

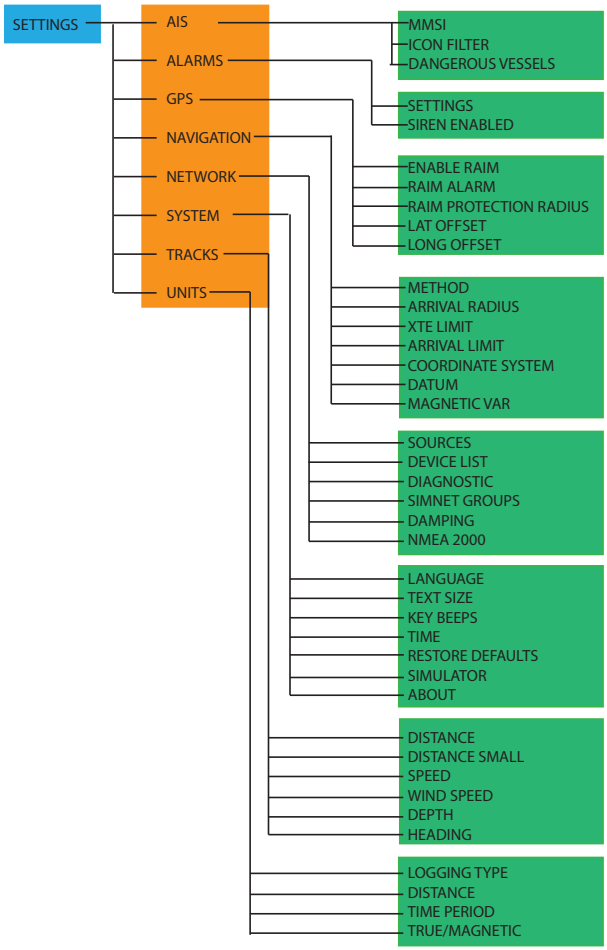
Under the AIS (PLOT) screen the quick menu can be used to Goto a destination wpt, route or L/L coordinates. Below is the AIS screen quick menu map.



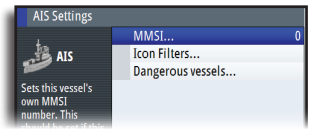
Settings dialog and submenus

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:

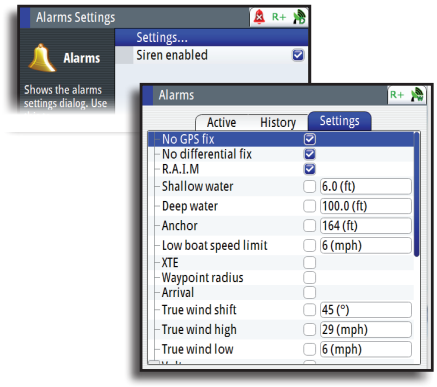


AIS settings



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).

Alarms settings



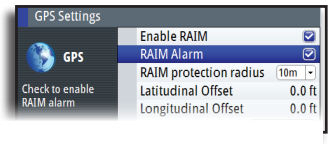
This screen is used to manage and control the alarm feature. Press the **PAGE** key to change tabs

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

-History tab lists all previous alarms.

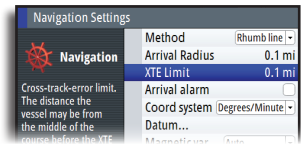
-Active tab shows alarms that are still active. The alarm is removed from the list when the cause is corrected.

GPS settings.



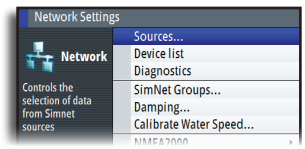
Settings for the GPS RAIM (Receiver Autonomous Integrity Monitoring) feature, alarm and radius, L/L Offset, Elevation Mask Angle, COG/SOG filter time, GNSS mode, DGPS mode, Mixed mode, WAAS PRN and Antenna reset. .

Navigation settings



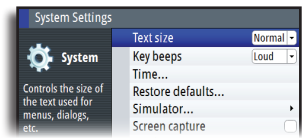
Controls the navigation calculation method to either the Great Circle or Rhumb line. You can also specify the limits for arrival radius, cross track error (XTE) limit, Arrival alarm, Coordinate system, Datum and Mag. Variation.

Network settings



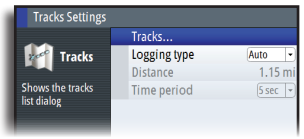
List of data sources, device list connected to the CAN bus network, diagnostics, SIMNET groups, damping, NMEA 2000, NMEA 0183 over MXJB and NMEA 0183 over Ethernet.

Systems settings



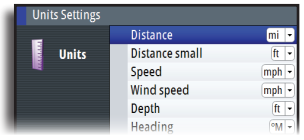
Controls the text language, size, key beeps, time, restore defaults, activate the simulator feature, special product options and information about the software and hardware of the unit.

Tracks settings



Shows the tracks list dialog and logging type.

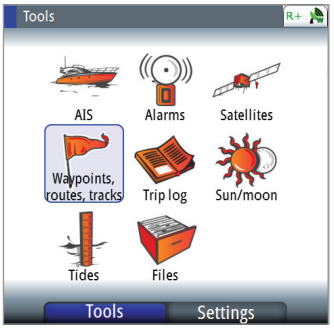
Units settings



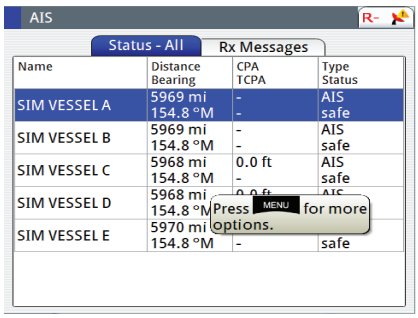
Controls the units used for distance, depth, speed and heading.

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.

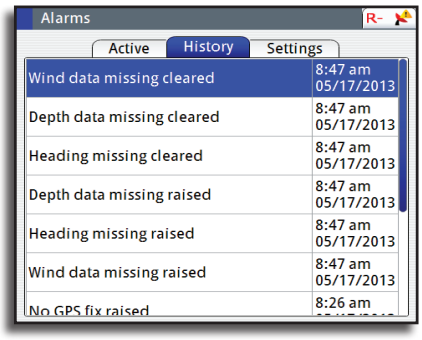


AIS tool



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.

Alarms tool



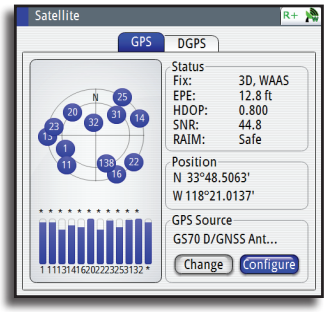
This screen is used to manage and control the alarm feature. Press the **PAGE** key to change tabs

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

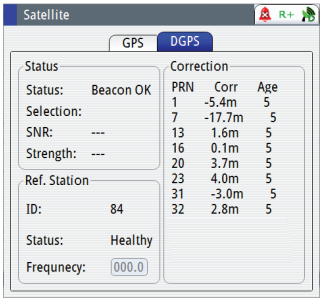
-History tab lists all previous alarms. Press **MENU** to delete alarm history

-Active tab shows alarms that are still active. The alarm is removed from the list when the fault is corrected.

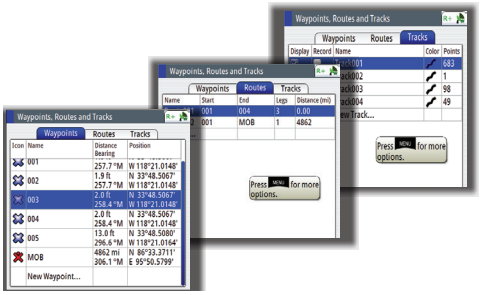
Satellite tool



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

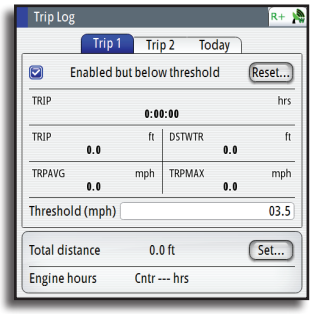


Waypoints, Routes and Tracks tool



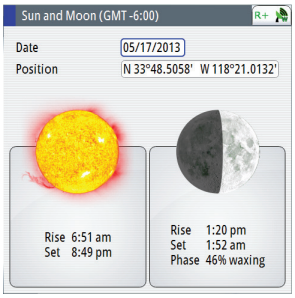
This tool submenu allows you to create waypoints, routes and start tracks. Pressing the **PAGE** Key will change tab to Waypoint, Route and Tracks page.

Trip Log tool



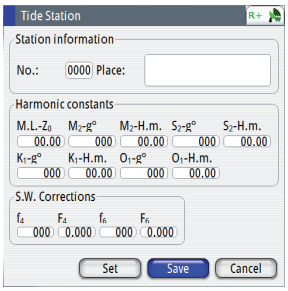
You can track the distance travelled using the two trip meters as well as the overall distance travelled in the today page. To reset, highlight the **Reset** button and press the **ENT** key. Change tab by pressing the **PAGE** key.

Sun/Moon tool



Calculates the sun and moon setting and rising.

Tide tool



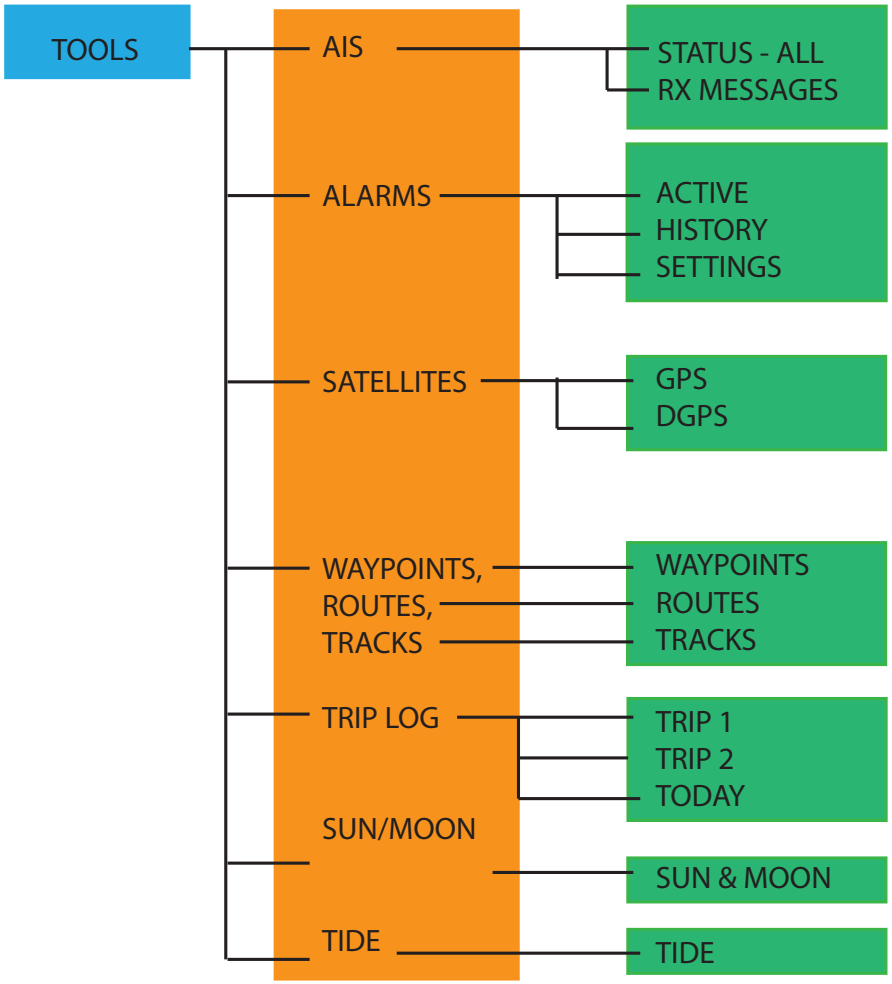
Calculates the tides based on manually entered tide harmonics taken from the Admiralty Tide Table book.

4

Tools page

Several tools are available to help you operate the MX610/MX612 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:

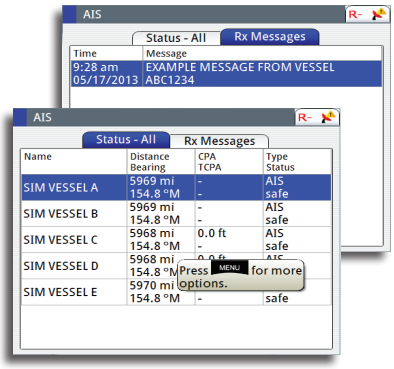


AIS (Vessel info)

Status-All

Provides a list of all AIS target vessels with their information when the MX610/MX612 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.



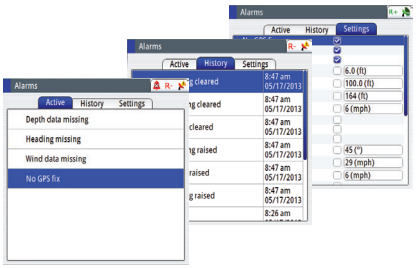
Message listing

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

Alarms

Active alarms

List of active alarms.



Alarm history

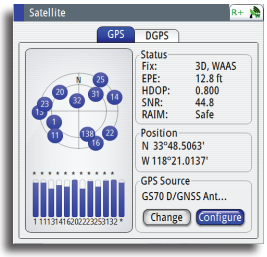
List of all previous alarms with time stamp and description.

Alarm settings

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

Satellites

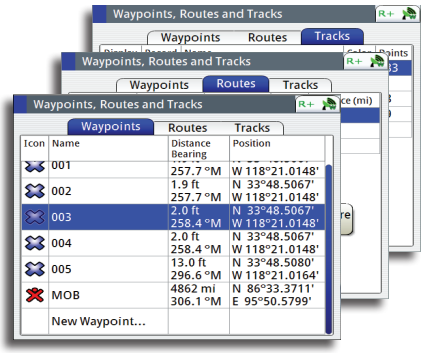
Status page for GPS satellites that are in view. The SBAS (like WAAS, EGNOS) differential position correction can be turned On or OFF using the configure button. The source of GPS position can be controlled from this screen if there are more than one active antenna connected in the N2K buss. Pressing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



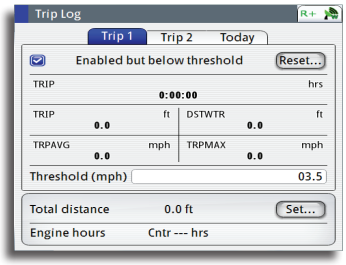
Trip Log

Trip 1 / Trip 2

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

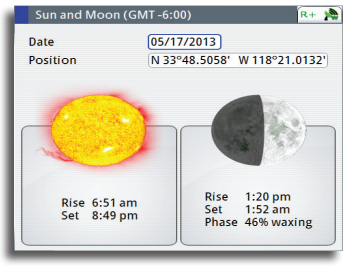
Today

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



Sun/moon

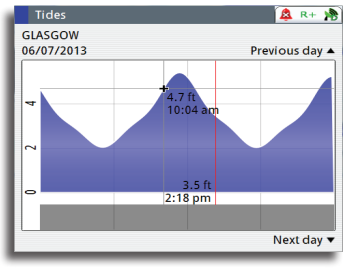
Displays sunrise, sunset, moonrise and moonset based on entered date and position.



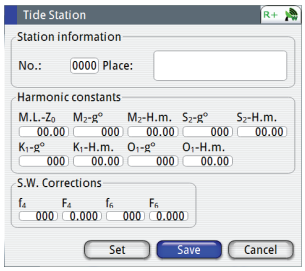
Tides

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

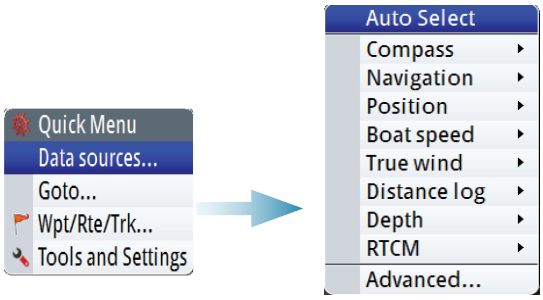
General

When the MX610/MX612 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 MX610/MX612 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.

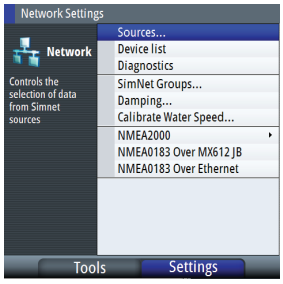
Quick Menu Dialog and Submenus

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



Network Settings

Selecting Data Sources



A data source can be a GPS sensor, smart junction box 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 MX610/MX612 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

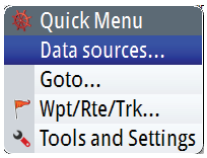
The Auto Select option will look for all SimNet sources connected to the network. If more than one source is available for each data type, the system will automatically select from an internal priority list.

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.

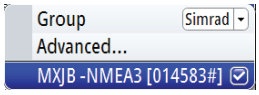
MX521A/MX521B/MX525A/MX575C/MX575D Antenna setup

In the initial commissioning of the MX61x navigation system or when a new MX antenna is installed, you need to manually select the position data source of the MX610/MX612 when using the MX521A, MX525A, MX575C and MX575D smart GPS antenna sensors. They are normally connected via the NMEA 0183 ports #3 and #4 of the MX61xJB junction box.

Use the manual selection procedure below:



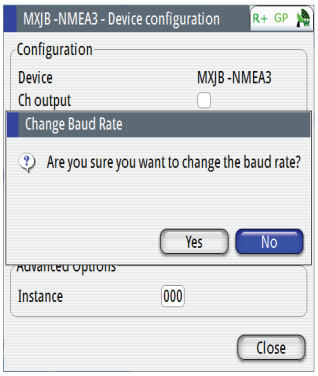
1. Press the **MENU** key.
2. Highlight the **Data sources** menu then press **ENT**.
3. Scroll to Position submenu then press **ENT.**
4. Scroll to MXJB-NMEA3 [xxxxx#], where NMEA3 is Port 3 and xxxxx# is the serial number of the source as indicated on the junction box PCB then press the **ENT** key 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/MX525A/MX575C/MX575D antenna connected to NMEA3 of the J-Box, do the following:

1. Press the **MENU** key to bring up the quick menu.
2. Scroll to Data sources, press **ENT**.
3. Select Position, press **ENT**.
4. Deselect MXJB-NMEA3 as source of position.
5. Press the **CLR** key until the Settings menu appears (or press the **MENU** then scroll to Tools & Setting, press **ENT**).
6. Select NETWORK, press **ENT**.
7. Scroll to Device List, press **ENT**.
8. Scroll to MXJB-NMEA3, press **ENT**.
9. The **Configure** button will be highlighted, press the **ENT** key.
10. Scroll to Baud rate, press **ENT**.
11. Scroll to 4800 (or 19,200) baud, press **ENT**.
12. Press the **CLR** key several times to exit to Settings menu.
13. Select Network, press **ENT**.
14. Select Sources, press **ENT**.
15. Scroll to Position, press **ENT**.
16. Select MXJB-NMEA3, press **ENT** to leave a check mark.
17. Press the **CLR** key to exit.
18. Verify if position L/L is displayed in POS1 screen.



→ ***Notes:***

1. If MXJB-NMEA3 (Port 3) is selected as position source the "Configure" button will not be available. To configure Port 3, it has to be deselected first as source.
2. Possible baud rates are 4800 or 19,200. When both antenna and J-Box port 3 are at the same baud rate (i.e. 4800), 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. If this fails to happen, you may have to manually reset the baud rate of the Port 3 of the junction box to 19,200 (see setting the antenna port baud rate for procedure).

Group selection

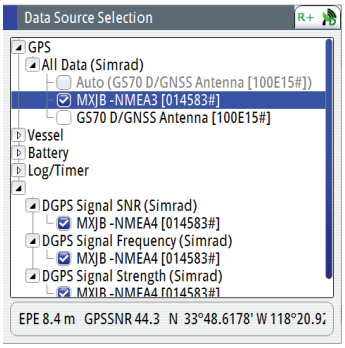
The MX610/MX612 can use GPS antennas or data sources that all other products on the N2K network use, or you may select individual sources for the MX610/MX612 system.

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 MX610/MX612 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.

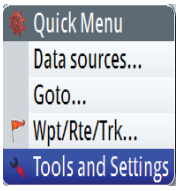


Device List

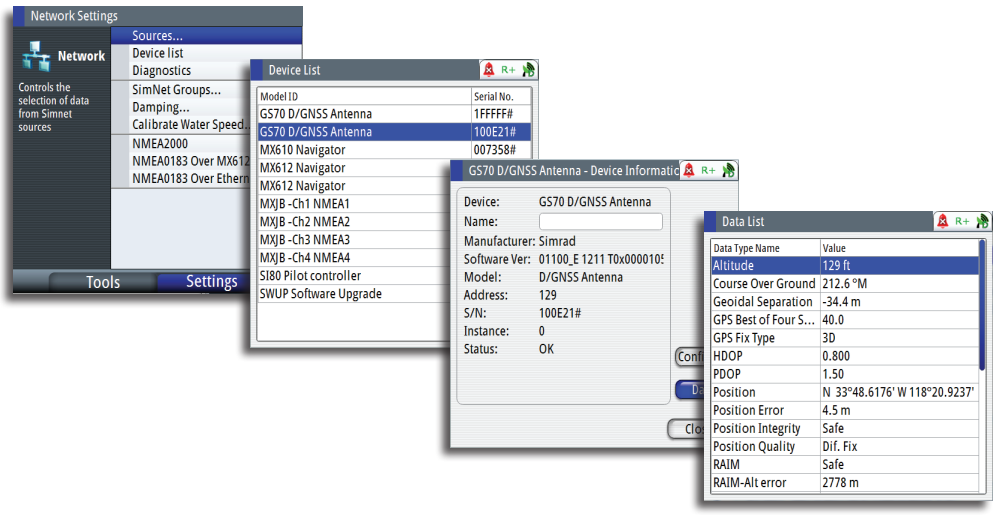
From the device list you can:

- 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.



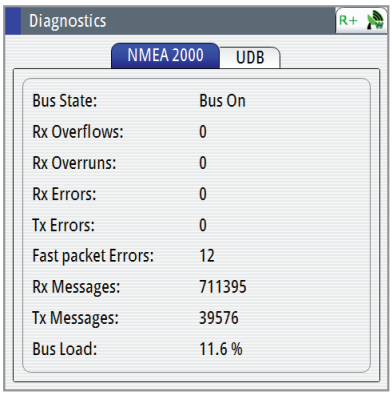
Changing BAUD rate

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:

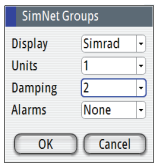
1. Press the **MENU** key.
2. Scroll to the "Tools and Settings", then press the knob or the **ENT** key.
3. Scroll to Network then press the **ENT** key.
4. Scroll to NMEA 0183 over MX61xJB then press **ENT**.
5. Scroll to the Port# desired (i.e. Port 1) then press ENT. The MXJB-Ch1 NMEA1 - Device Information 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.



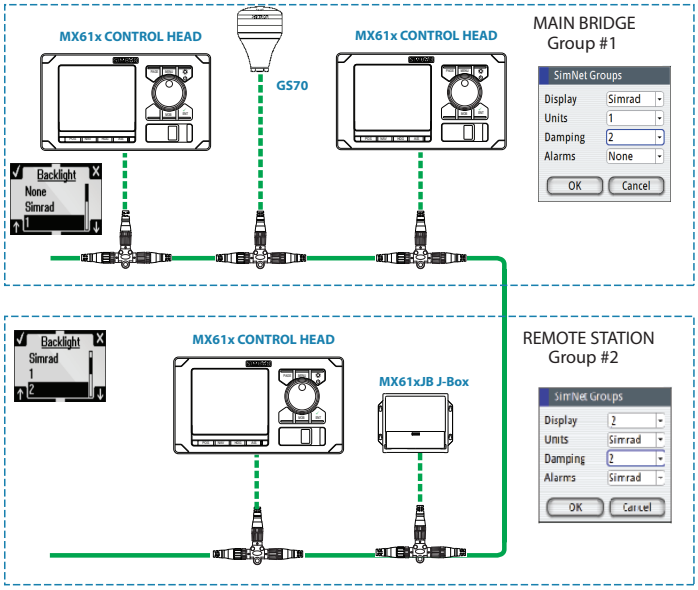
Option	Description
Bus State	Indicates if network backbone is operating. If no data is detected, check power and terminations
Rx Overflows	Value greater than 0 could indicate the software is very busy and unable to keep up with incoming messages
Rx Overruns	
Rx Errors	CAN interface error counters. Count 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

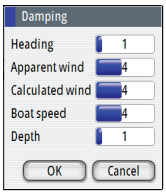


SimNet Groups

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 MX610/MX612 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 MX610/MX612 display settings will also change. The third MX610/MX612 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.

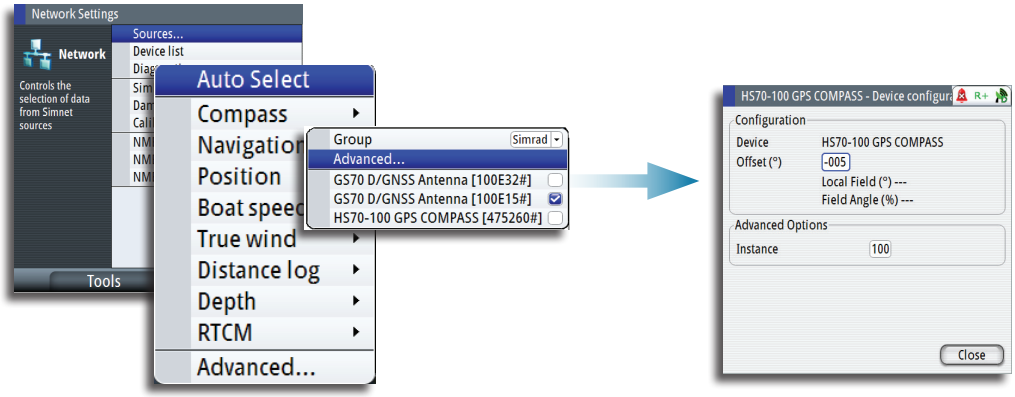
➔ ***Note:*** If the damping factor for heading is high, the captured heading might differ from the heading read on the display when using the heading capture function. This feature controls equipment that are connected in the NMEA 2000 bus only.

HS70/HS80/MX575C D/GPS Compass Antenna Offset (N2K connection)

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).

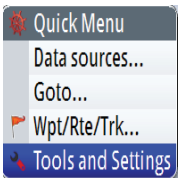
NMEA 0183 Output over TCP/IP (LAN)

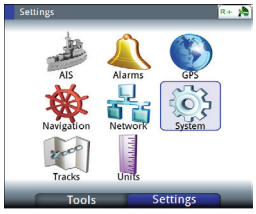
The MX610/MX612 has the capability to output NMEA 0183 over the Ethernet (LAN) port. Since there is no bandwidth restrictions in LAN, all listed NMEA messages are transmitted (see message table below). The data of the sentences comes from the data source selected.

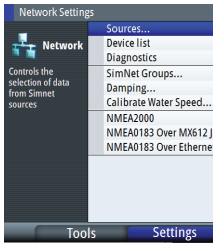
List of NMEA messages supported in LAN

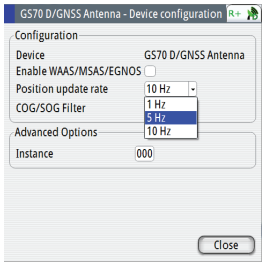
NMEA Message	Description
GGA	GPS system fix data
GLL	Geographic position
GSA	GNSS DOP and Active Satellites
GSV	GNSS Satellites in view
GRS	GNSS Range Residuals
GBS	GNSS Satellite Fault Detection
GNS	GNSS Fix Data
APB	Autopilot Sentence "B"
VTG	Course over ground and speed over ground
ZDA	Time and Date
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.







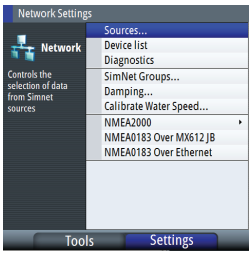


NMEA 0183 output over junction box

NMEA port selection is available only when a MX61xJB junction box is detected 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 MX610/MX612 CDU senses the presence of the MX61xJB junction box, it will provide a list of port numbers based on the CDU model.

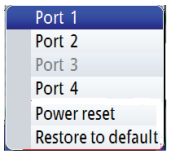
The junction box supplies the power used by devices connected to the NMEA 2000 bus. It also provides the N2K termination when the DIP switch is set to ON.

When an MX smart antenna is connected in Ports 3 & 4 of the junction box and selected as source of position, port 3 will be grayed out in the list. The operator will be able to control ports 1 and 2 for the MX610JB data output and ports 1,2,5,6,7,8,9,10,11 & 12 for the MX612JB junction box.

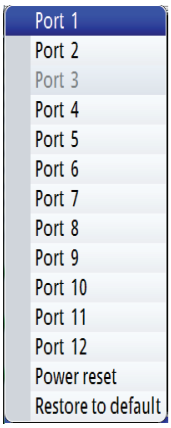


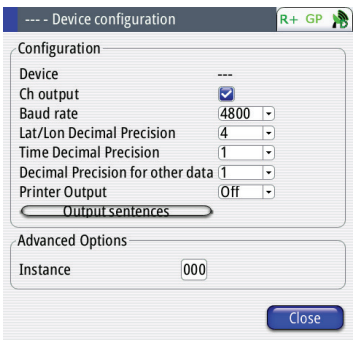
To activate the NMEA -0183 port, use the procedure below:

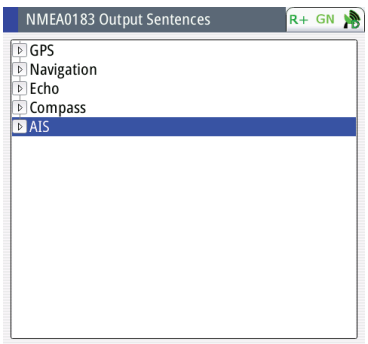
1. Press the **MENU** key.
2. Turn the rotary knob to scroll down to Tool & Settings menu then press **ENT**.
3. Scroll to Network then press **ENT**.
4. Scroll down to NMEA 0183 over junction box then press **ENT**. A list of port numbers will be shown. The MX610JB has 4 ports while the MX612JB has 12 ports.



5. Scroll to the port you want to use (i.e. Port 1) then press **ENT** to bring up the "- -Device configuration" screen.
6. You may change the Baud rate, Lat/Lon Decimal Precision, Time Decimal Precision and Decimal precision for other data by scrolling to it and pressing **ENT**.
7. Scroll to the Output sentences button then press **ENT** to bring up the NMEA 0183 Output Sentences dialog window.
8. Scroll to GPS and press **ENT** to expand the list of NMEA messages related to GPS positioning.
9. Scroll to the desired NMEA message (i.e. GGA, VTG, etc.).
10. Turn on the NMEA sentence by pressing the **ENT** key to put a check mark on it.
11. Press the **CLR** key to go back to the dialog screen.
12. Highlight the **CLOSE** button then press **ENT**.
13. Press any hot key to exit.





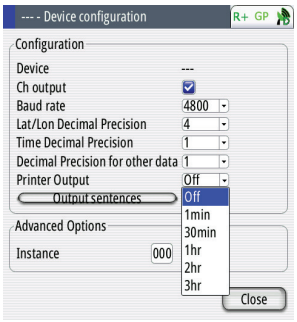


List of NMEA messages supported by the Junction Box

Classification	NMEA Message	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
	ALR*	Set alarm state*
NAV	APB	Autopilot Sentence "B"
	XTE	Cross-Track error
	WPL	Waypoint Location
	RTE	Routes
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 messages (VDO & VDM)*

* Consideration for future implementation

Printer Output



This menu item controls the printer output. NMEA ports 1 or 2 can be configured to output to a printer. Printer time settings are Off, 1 min, 30 min, 1 hr, 2 hr or 3 hr interval (typical setting is 1 hr). Use 1 min to test the printer function, then set it to the desired print time thereafter.

The printer output is simple ASCII text designed to operate on any serial printers (i.e. EPSON thermal printer Model M267A @ 38,400 baud). An RS-422 to RS-232 converter is needed to match the electrical standard of the printer.

A sample of the printer format is shown below:

Simrad MX 610/612 Navigation System

==========

18:06:59 UTC 09 2 2015

Differential GPS Fix

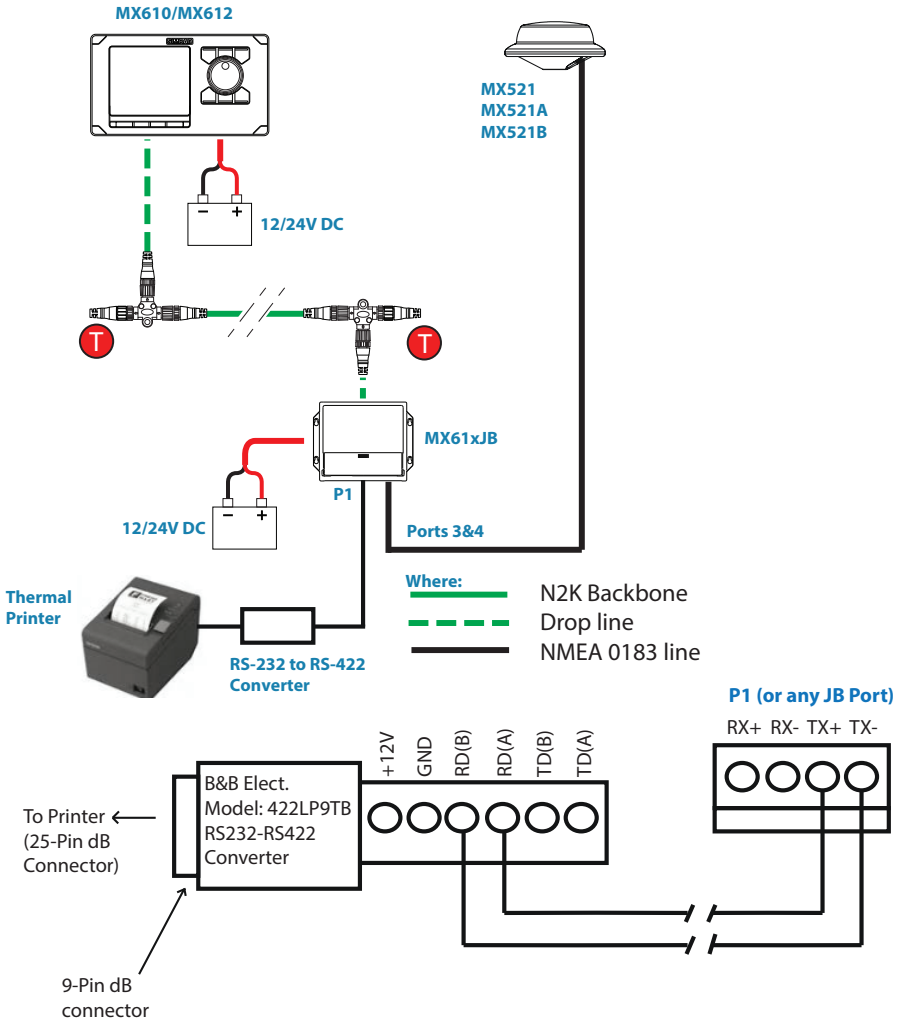
Latitude: 33 48.5084' N

Longitude: 118 21.0106'W

COG: 320.76 SOG: 5.00 kn

To activate the Printer Output, use the procedure below:

1. Press the **MENU** key.
2. Turn the rotary knob to scroll down to Tool & Settings menu then press **ENT**.
3. Scroll to Network then press **ENT**.
4. Scroll down to NMEA 0183 over junction box then press **ENT**.
5. A list of port numbers will be shown. The MX610JB has 4 ports while the MX612JB has 12 ports.
6. Scroll to the port you want to use (i.e. Port 1) then press **ENT** to bring up the "- -Device configuration" screen.
7. Uncheck the "CH Output" function. This will turn off any NMEA 0183 messages that may be on.
8. Scroll to Printer Output, press **ENT**.
9. Click on the printing time desired (Off, 1 Min, 30 min, 1 Hr, 2 Hr or 3 Hr).
10. Select Close and press **ENT**.



Multi-Hz feature

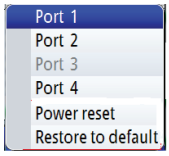
For navigation applications that require more than 1 position per second data output, the MX610/MX612 can configure the GS70 antenna and the MX610JB junction box NMEA ports to output the NMEA sentences up to 10 Hz position update. Use the setup procedure below to turn on the multi-Hz output feature:

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.

MX610/MX612 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.

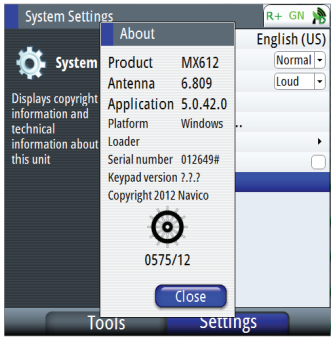


Determine the unit's software version

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 this 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?) - less than 5 satellites are available

The Enabled RAIM and RAIM alarm 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.

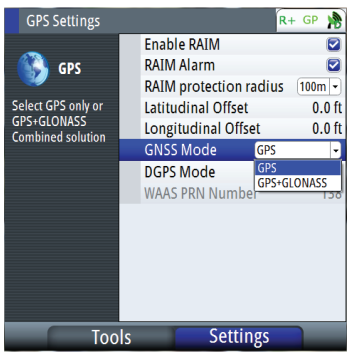
Lat/Long Offset

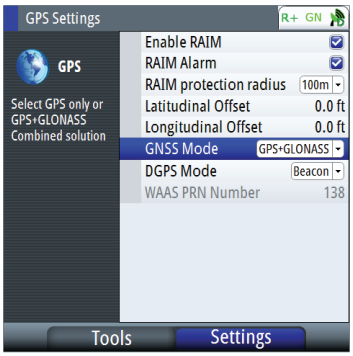
This feature allows the operator to enter the Latitude and Longitude offset values between the center of the ship to antenna position.

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 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.



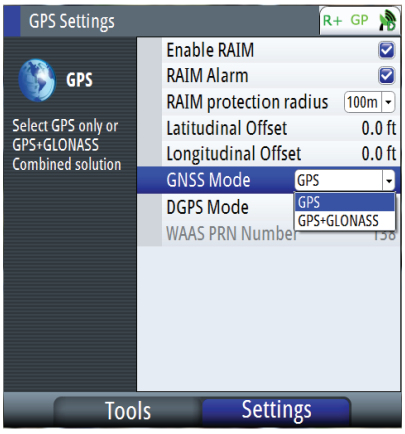


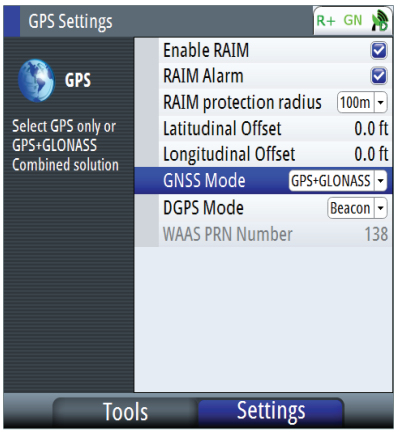
GPS/GPS+GLONASS selection

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 D/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 (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**.





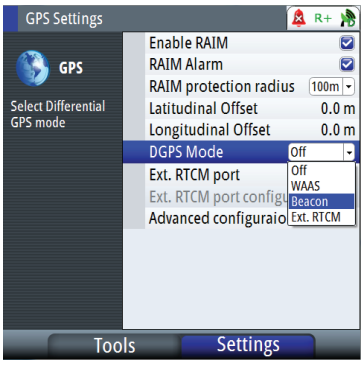
5. Scroll to GPS+GLONASS, press **ENT**.
6. Press the **CLR** key repeatedly (or press any hot key) to exit.
7. The GP (GPS) icon in the status bar will change to GN when position solution from combined GPS & GLONASS becomes available. Also, the NMEA 0183 message header is changed from $GPxxx to $GNxxx.

DGPS Mode

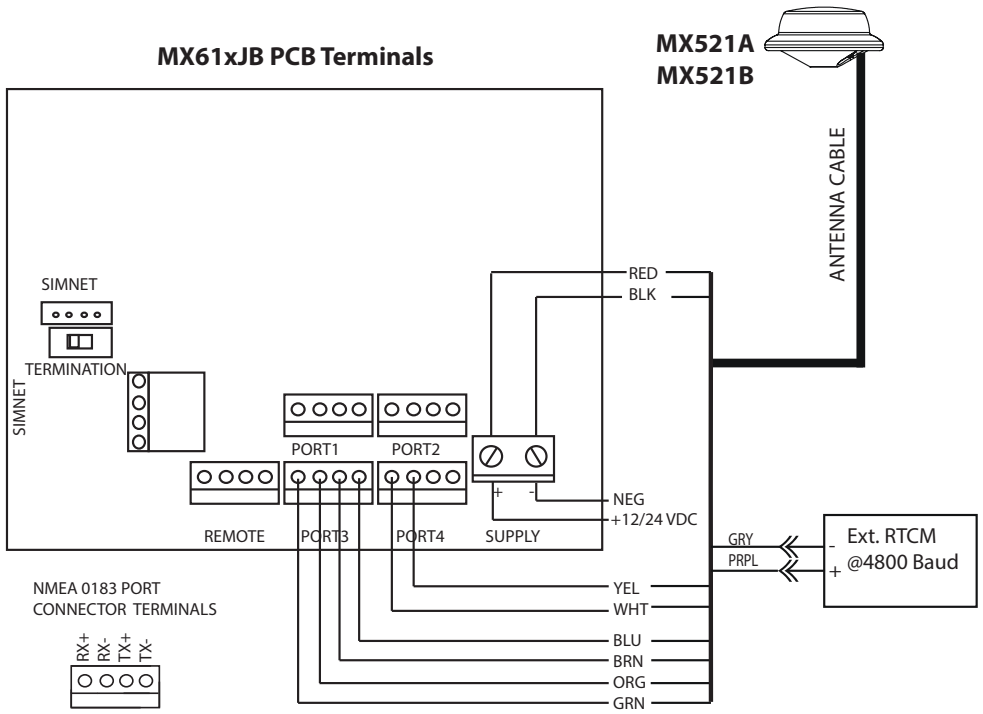
The DGPS mode controls the implementation of DGPS corrections to the GPS receiver. The three differential modes are Off, WAAS and Beacon. WAAS is also known in general term as SBAS (Satellite Based Augmentation System). This includes WAAS, EGNOS, MSAS and other satellite based GPS correction systems 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. In addition to the DGPS control, a Mixed mode setting can be used to allow position solution to be derived from differentially corrected satellites as well as un-corrected satellites. This is a good feature in areas where partial correction is the only available option.

The source of DGPS correction for the MX521A/B antenna model can be controlled using the procedure below:

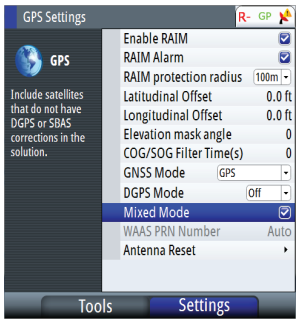
1. Press the **MENU** key.
2. Scroll to Tools & Settings menu, press **ENT**.
3. Scroll to GPS icon, press **ENT**.
4. Scroll to DGPS mode, press **ENT**.
5. Scroll to OFF, Beacon, WAAS or Ext. RTCM, press **ENT**.
6. Press any hot key to exit.



→ ***Note:*** External RTCM data and connection for the MX521A/B antenna model is shown in the diagram below. Connection of the RTCM +/- is directly done to the gray and purple wires of the MX521 antenna cable.



Mixed Mode



This feature allows position calculation using all available satellites in view whether they have differential correction data or not. In areas where beacon differential signal from land-based station or SBAS is marginal and only partial satellite correction is available, it may be useful to use the MIXED mode selection.

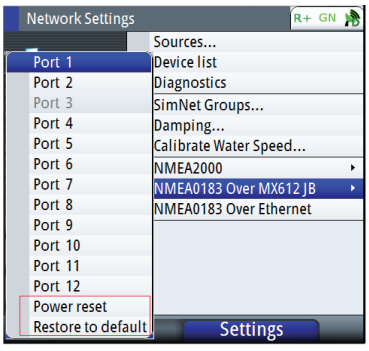
Reset Procedures

In order to access the RESET functionality, the following software versions have to be in place:

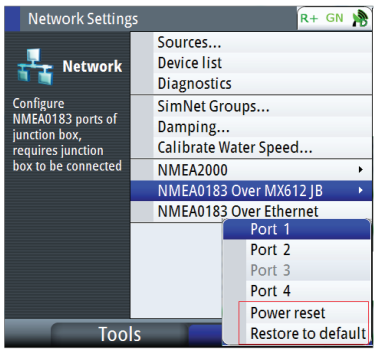
- MX61x CDU - s/w version 1.0.42.235 (or newer),
- MX61xJB junction box - s/w version 1100 100121 (or newer)

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 - cycles the power to the junction box.
- Restore to default - restores baud rate of ports as per the table below.

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 - Beacon status input
MXJB-NMEA5	-	4800	NMEA 0183
MXJB-NMEA6	-	4800	NMEA 0183 Out & RTCM In port
MXJB-NMEA7*	-	19,200	NMEA 0183 -High-speed port
MXJB-NMEA8	-	4800	NMEA 0183 - Beacon status input
MXJB-NMEA9	-	4800	NMEA 0183
MXJB-NMEA10	-	4800	NMEA 0183 Out & RTCM In port
MXJB-NMEA11*	-	19,200	NMEA 0183 - High-speed port
MXJB-NMEA12	-	4800	NMEA 0183 - Beacon status input

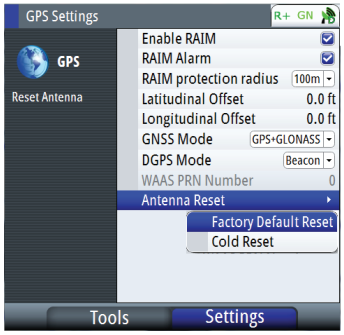
➔ ***Note:*** Restoring to default causes the baud rate of Port 3 to match the antenna baud rate at 4800 baud. When the antenna is detected, it will automatically configure the antenna to 19,200 and then adjust itself to 19,200 after 5 seconds. This action is duplicated in high-speed ports 7 and 11. Only equipment set to 19,200 should use this port.

How to RESET the SIMRAD Antenna: (smart antenna connected to Ports 3 & 4 of the MXJB)

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 Reset, press **ENT**.

Where:

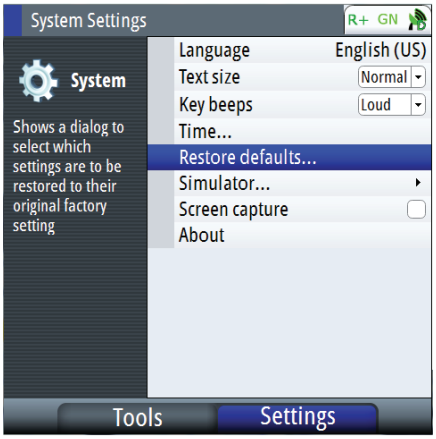
- Cold Reset - sets the baud rate to 4800, NMEA messages to default and clears the oscillator, ephemeris and almanac data
- Factory Default - sets the baud rate to 4800 and sets the NMEA messages to default

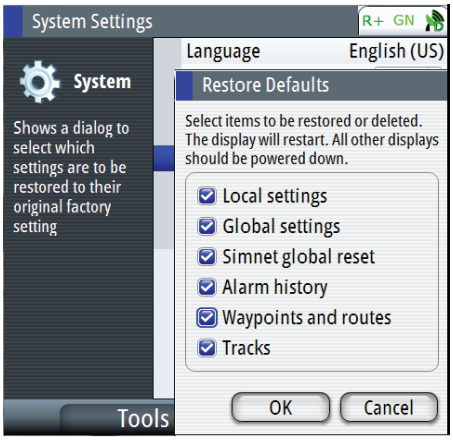


➔ ***Note:*** Resetting the antenna will automatically change the baud rate of the antenna and the MX61xJB port 3 to 4800 baud. When normal communication between the MX antenna and the Junction box is established, the J-box will send a setup command to the antenna to switch to 19200 baud without user intervention. .

How to restore the MX61x display to default settings:

1. Press the **MENU** key.
2. Scroll to Tools & Settings, press **ENT**.
3. Select SYSTEM 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 **POWER** key momentarily to stop the beeping.
9. Turn the power ON by pressing the **POWER** key momentarily.



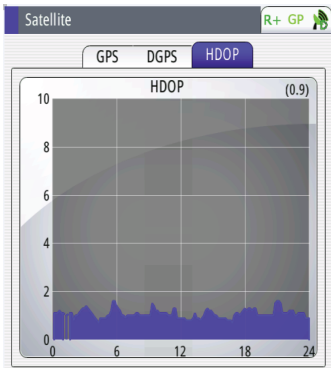


Settings will be deleted or set to default when checked:

- 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.

HDOP tab



This screen presents a bar graph representing the HDOP (Horizontal Dilution of Precision) history for the past 24 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:

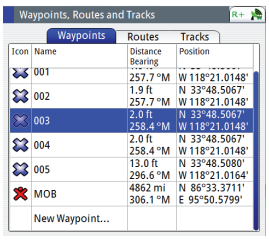
1. Press the **MENU** key.
2. Scroll to Tools & Settings, press **ENT**.
3. Scroll to GPS icon, press **ENT**.
4. Press the **PAGE** key to change tab to HDOP.

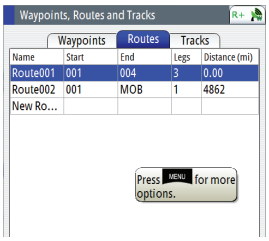
6 Waypoints, Routes & Tracks

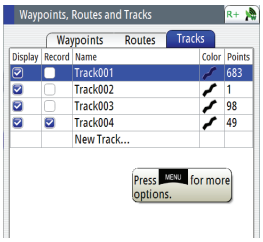
Waypoints, Routes and Tracks panels

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.







Waypoints

A waypoint is a location on the chart defined by unique latitude and longitude coordinates. They can be created in the MX610/MX612 using the following methods:

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

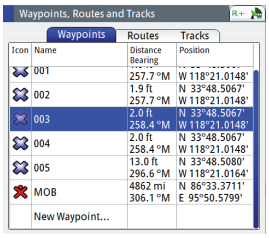
Positioning waypoints

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.

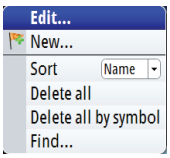
→ ***Note:*** The **MOB** key is a two function key. A momentarily press saves the position L/L into the next vacant waypoint. Press and hold the **MOB** key for 3 seconds, will save the position as MOB and will calculate range and bearing back to that point.

Creating or editing waypoints



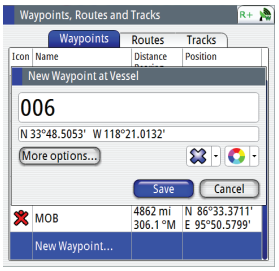
A Waypoint can be created (or edited) by using the procedure below:

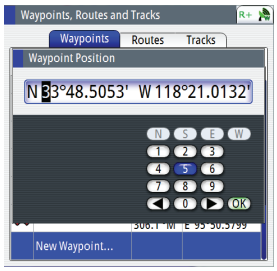
1. Press the **MENU** key to bring up the quick menu.
2. Scroll to Wpt/Rte/Trk... and press the **ENT** key.
3. Turn the rotary knob to highlight the "New Waypoint..."
4. Press the **ENT** key to bring up the waypoint dialog box.



→ ***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.

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.

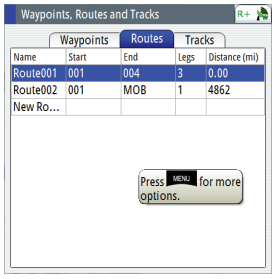
→ ***Note:*** Waypoints that are used in an active route will not be deleted.

Routes

A route is a series 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).

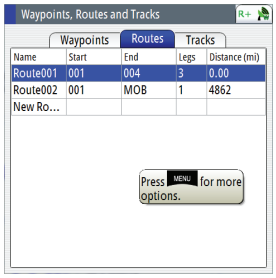
Adding Waypoint(s) to a Route

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.

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. Scroll to Waypoints, routes and tracks icon, then press the **ENT** key.
5. Press the **PAGE** key to select the Routes tab.
6. Press the **MENU** key.
7. Select New, and highlight create using route list option, press **ENT.**
8. The Route table will show route name's details. Use rotary knob to highlight the table, press rotary knob.
9. Scroll and select a route, press **ENT** key.
10. In Edit Route window, the route details will be displayed (legs, waypoint,distance and bearing).
11. Turn the rotary knob to highlight the **START** button, press **ENT.**
12. 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.

Tracks

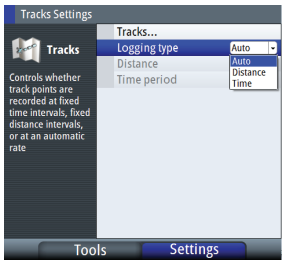
A track is a graphical presentation of the historical path of the vessel, allowing you to retrace where you have travelled.

From the factory, the system is set to automatically draw a track. 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 off from the Tracks panel described later in this section.

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 MX610/MX612 system position a waypoint automatically when a course change is registered.

➔ ***Note:*** The Tracks option must also be turned ON in the chart settings to be visible.

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.

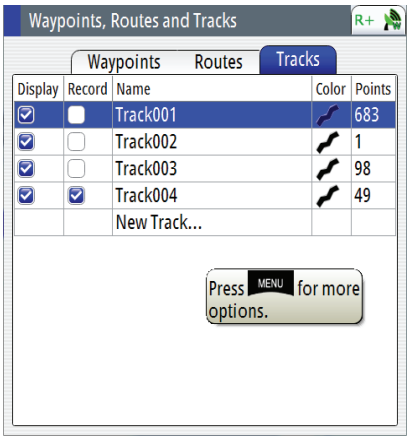
To add new Track

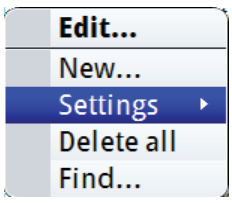
1. Press the **MENU** key.
2. Highlight the Wpt/Rte/trk, then press the **ENT** key.
3. Press **PAGE** key, to Tracks tab, see list of tracks.
4. Rotate knob to highlight track line identified as New Track, press **ENT** key (or for same function, press **MENU** key, scroll to New).
5. In New Track window, 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.

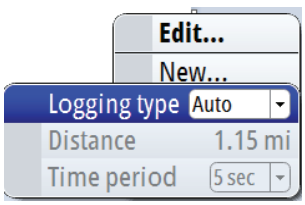
To find a Track

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.



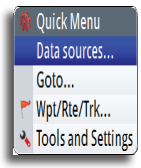




7 Navigating with the MX610/MX612

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

Goto Menu

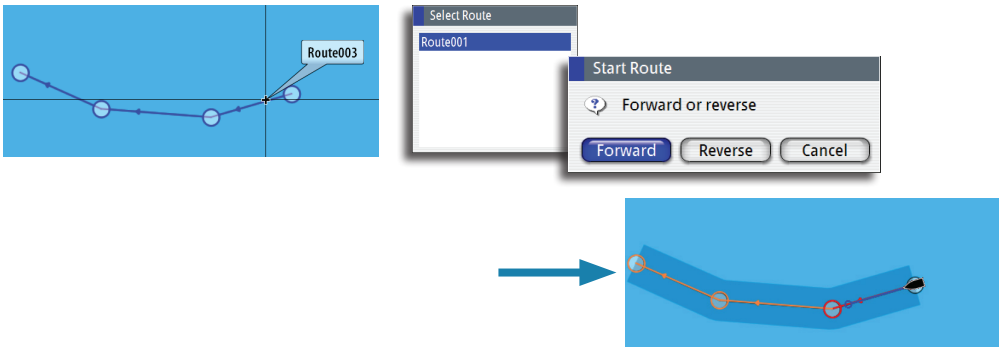


You can start navigation to any waypoint or route from the NAV screen by using the Goto menu, displayed by pressing **MENU** key.

➔ ***Note:*** When the MX610/MX612 starts navigating, the cross track limits will be indicated on the NAV screen.

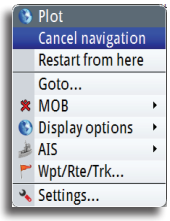
Navigate a Route

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



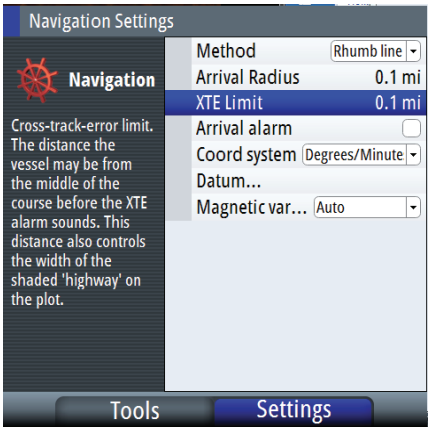
When route navigation is started, the Goto menu will expand showing options for skipping a waypoint, or for restarting the route from current vessel position.

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



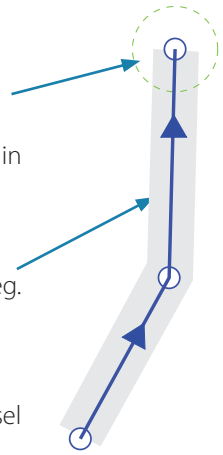
Navigation Method

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 MX610/MX612 system.

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

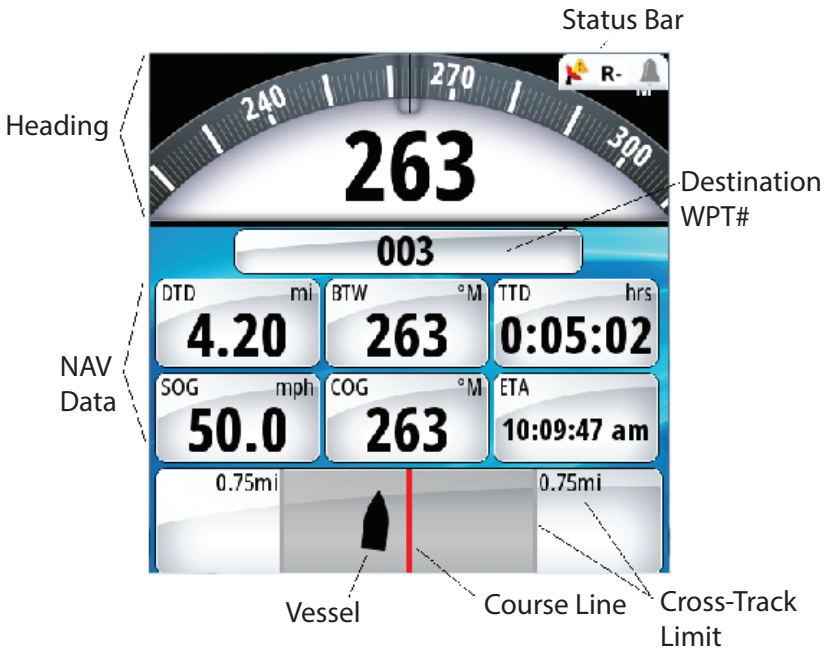
Coordinate System

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
ETW	Estimated time of arrival at next waypoint
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 XTE 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 XTE exceeds the defined off course limit., the alarm will activate.

POSition Panel

The POS screens (POS1, POS2 and POS3) 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

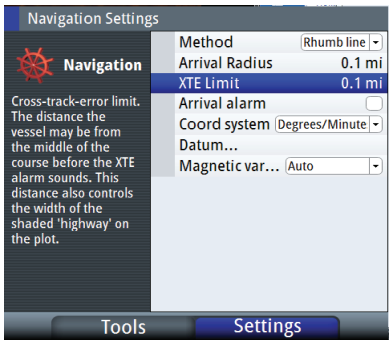
Data Fields

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	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 alpha-numeric name to the device used for positioning and heading (i.e. SOG xxxxx Kn and COG xxxxx M) (see above picture).

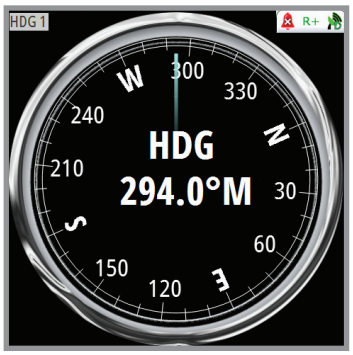
The MX610/MX612 can display the Lat/Long data in several coordinate formats. To change the L/L format:

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.

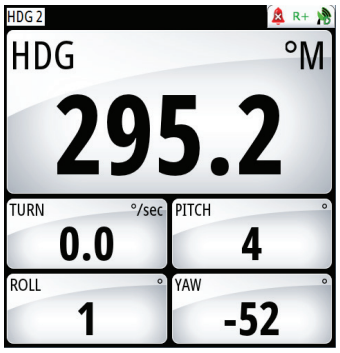


8 HDG screens

There are two heading (HDG1 and HDG2) screens. The HDG1 screen displays the analog compass rose with the digital heading readout in the center, while the HDG2 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 HDG1 and HDG2 screens by pressing the HDG hot key once or twice.



HDG1 screen



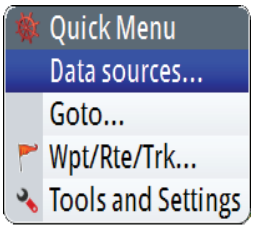
HDG2 screen

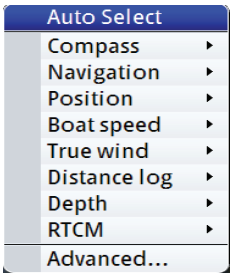
Quick Menu

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 MX610/MX612 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.



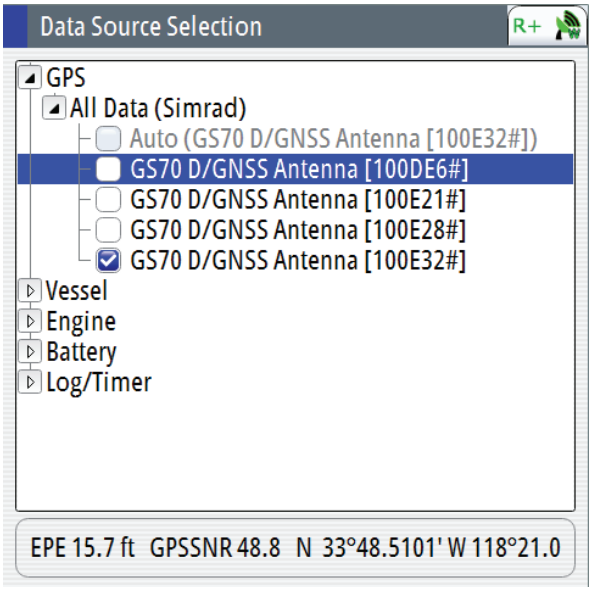


Manual Selection procedure:

1. Press the **MENU** key.
2. The 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.

Advance Data Source Selection

Selecting the "Advance..." setting will bring up the list of data sources that is 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

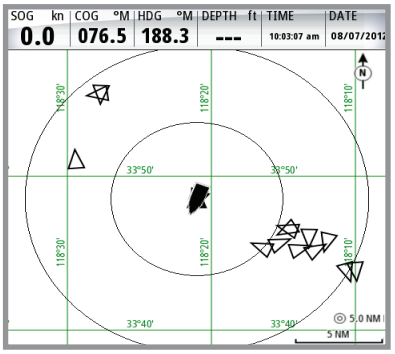
The heading reference can be changed to TRUE or MAGNETIC using the procedure below:

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.

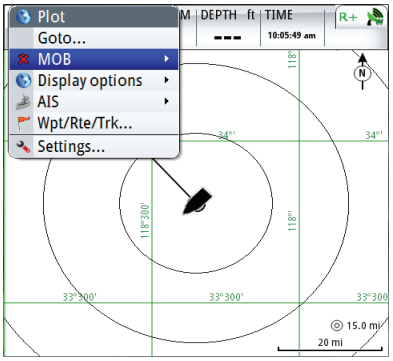
9 Using AIS (PLOT)

If a SIMRAD AIS transponder or DSC transceiver device is connected to the NMEA 2000 network, the MX610/MX612 can display the AIS target information in the AIS page. You can also see messages and position for DSC transmitting devices within range. If none is available, the plotter screen can 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



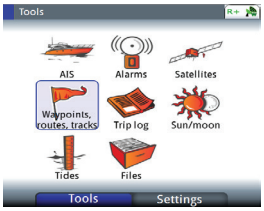
AIS Plot with Quick Menu

Target symbols

The MX610/MX612 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 53.
	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.

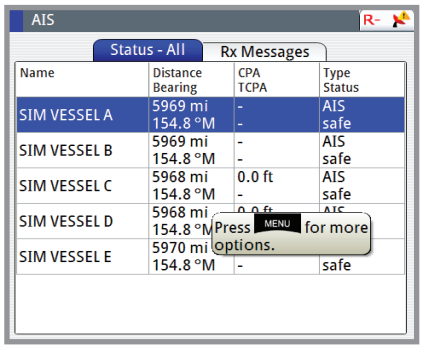
Viewing information about AIS targets



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.

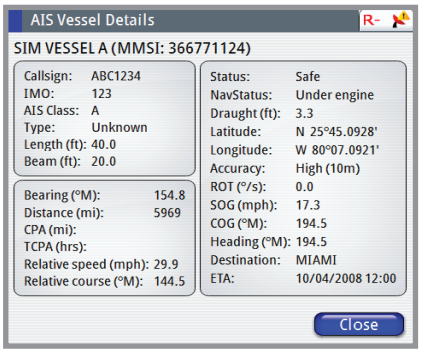


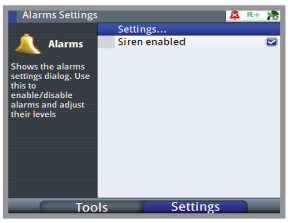
Selecting AIS target

Viewing information about all AIS targets

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

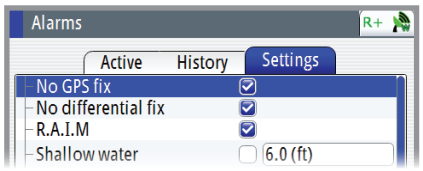
1. Using the rotary knob, scroll to the desired AIS target.
2. Press the **ENT** key to show the details of the target vessel.
3. Press any hot key to exit.





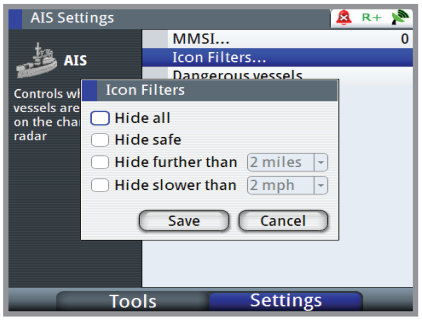
Vessel alarms

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 53. → ***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



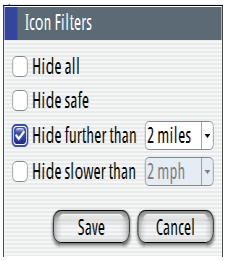
Your vessel's MMSI number

You need to have your own MMSI (Maritime Mobile Service Identity) number entered in the MX610/MX612 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.

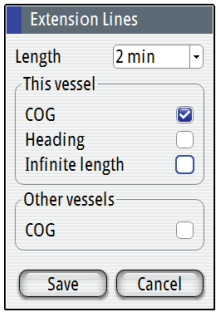
Filtering the targets



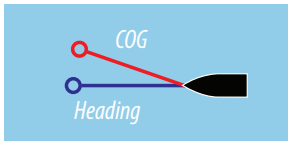
All targets are by default shown on the display if an AIS device is connected to the N2K network.

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.

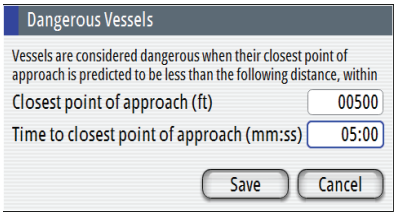


The length of the extension lines is either set as a fixed distance, or to indicate the distance the vessel will move to in the selected time period.

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

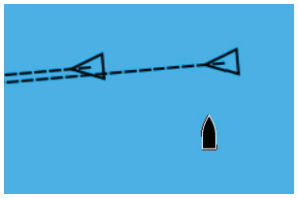


You can define an invisible guard zone around your vessel. When a target comes within this distance from your vessel, the symbol will change to the "dangerous" target symbol. An alarm will be triggered if activated in the Alarm settings panel.

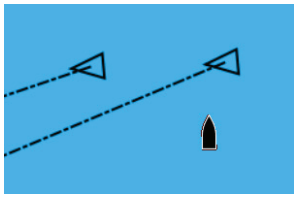
Speed and Course indication

The extension line can be used to indicate speed and course for targets; either as absolute (true) motion in the chart or relative to your vessel.

Different line style is used on the extension lines to indicate motion as shown below.



Absolute motion



Relative motion

10

Alarm system

The MX610/MX612 system continuously checks for dangerous situations and system faults while the system is running. When an alarm situation occurs, an alarm message will pop up on the screen and the status indicator on the top-right corner of the display will show the alarm bell icon.

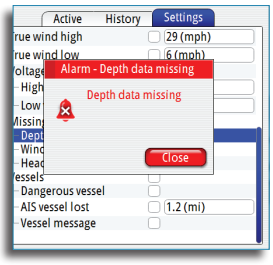
If you have enabled the siren, the alarm message will be followed by an audible alarm, and the external alarm output will be active.

The alarm is recorded in the alarm listing so that you can see the details and take the appropriate corrective action.

Type of messages

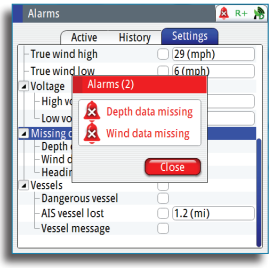
There are two type of messages:

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



Single alarms

A single alarm is displayed with the name of the alarm as the title, and with details for the alarm.



Multiple alarms

If more than one alarm is activated simultaneously, the alarm message will display a list of up to 3 alarms. The alarms are listed in the order they occur with the alarm activated first at the top. The remaining alarms are available in the Alarms dialog.

Acknowledging a message

The following options are available in the alarm dialog for acknowledging a message:

Option	Result
Close (or OK)	Sets the alarm state to acknowledged, meaning that you are aware of the alarm condition. The siren / buzzer will stop and the alarm dialog will be removed. The alarm will however remain active in the alarm listing until the reason for the alarm has been removed.
Disable	Disables the current alarm setting. The alarm will not show again unless you turn it back on in the Alarms dialog.

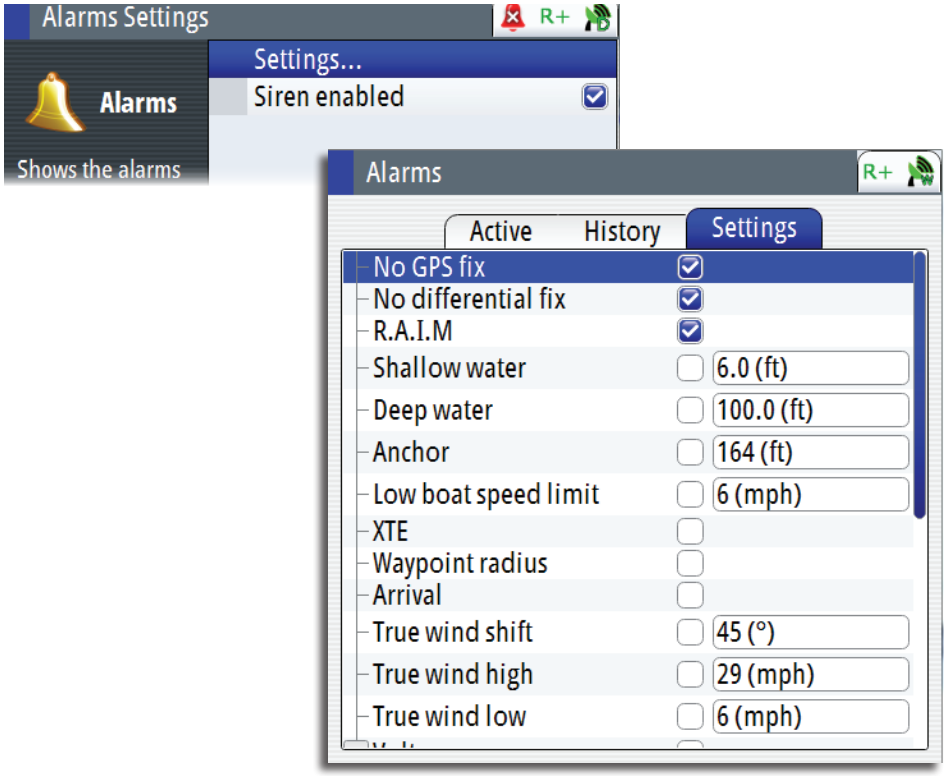
There is no time-out on the alarm message or siren. These remain until you acknowledge it by pressing the **ENT** key or the center of the rotary knob or until the reason for the alarm is removed.

Alarms dialog

The alarms can be setup in the Alarms dialog. This dialog also includes information about active alarms and alarm history.

Alarm Settings

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



List of alarm messages

Alarm name	Trigger Condition
No GPS Fix	No position fix available from the smart antenna
No differential fix	No differential correction is available. GPS position fix only
RAIM (R- or R?) (Receiver Autonomous Integrity Monitoring)	The position solution exceeded 100 meter error (R-) or when not enough satellites available (R?). RAIM safe condition is indicated with R+.
Shallow water	Depth less than limit
Deep water	Depth greater than limit
Anchor	Vessel drifts away from the anchor radius
Low boat speed limit	Boat speed below the limit
XTE (Cross Track Error)	Vessel drifts out of the crosstrack zone
Waypoint radius	Vessel enters the radius of the waypoint
Arrival	Vessel arrives at waypoint
High voltage	Input voltage above the limit
Low voltage	Input voltage below the limit
Depth data missing	No depth data from data source
Heading missing	No heading data from data source
Dangerous vessel	AIS target within the limit
AIS vessel lost	AIS target is no longer received
Vessel message	Received an AIS message

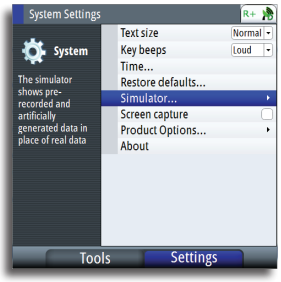
11 Using the simulator

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

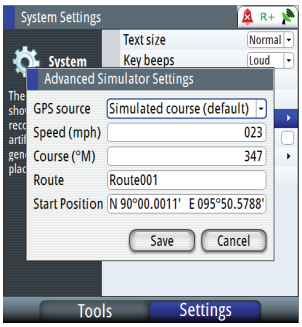
Selects where the GPS data is generated from. The selections are: Simulated course or Simulated route (default).

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 MX610/MX612 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, plastic 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.

Trouble shooting

Failure	Corrective action
Unit fails to turn ON	Make sure the power cable is plugged in to the back of the MX610/MX612 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 persist, replace the MX610/MX612 unit.

Failure	Corrective action
Unit fails to detect the antenna	For N2K antenna models (GS70 or HS80): 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 MX521A or MX575C/D antennas connected to Port 3 of the MX61xJB, check the following: 1. Port 3 of the MX61xJB is configured to match the baud rate setting of the MX antenna (4800 (or 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.
True Heading is not displayed	Verify if the source of data is the HS70/HS80/MX575C 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. **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 MX610/MX612 display unit and MX61xJB junction box can be accomplished using USB memory stick or a PC.

The latest software files for the MX610/MX612 and junction box can be downloaded from the SIMRAD professional website: www.navico.com/commercial

MX610/MX612 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 removing the power cable or turning off the circuit breaker to the unit.
4. Reconnect the power cable (or turn on the circuit breaker), 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 Tool & Settings menu, press **ENT**.
9. Select the Systems icon, press **ENT**.
10. Scroll to About, press **ENT**.
11. End of procedure.

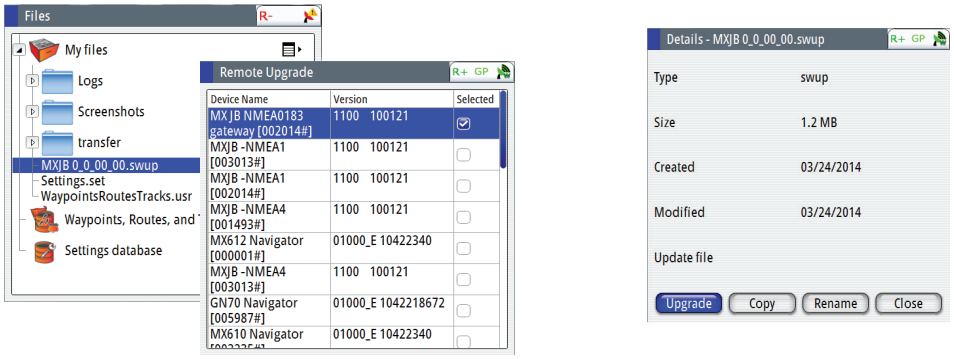
MX610/MX612 CDU Software Update Procedure using a PC

1. Copy the *.upd file to your PC (not a network location).
2. Connect the 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. An IP address will be indicated on the CDU.
5. Launch the Internet Explorer (or other web browser) and type the IP 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.

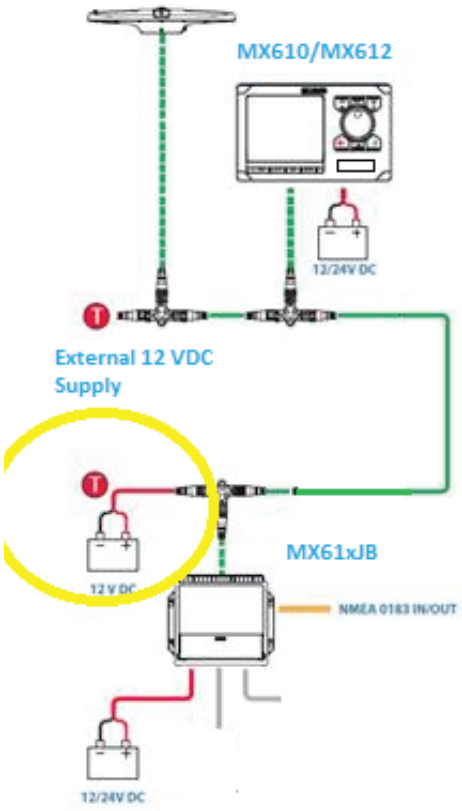
MX61xJB junction box software update procedure using the MX61x display (USB method)

This programming feature is available in MX610/MX612 CDU with s/w version V1.0-42.226 or newer. Program update of the junction box can be done through the display USB. For junction boxes with software version 1.28 or lower, make sure there is external 12 VDC supply to the NMEA 2000 network (see diagram below).

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 MXJB 1_0_01_20.swup file (or newer version), press **ENT**.
7. Select the Upgrade button, press **ENT**.
8. Put a check mark on the "SI80 Pilot controller [00xxxx#]" or "MXJB NMEA0183 gateway [00xxxx#]" device in the list. The MX612JB has three of these, please put a check mark and upgrade one at a time starting at the gateway or controller with S/N [003xxx].



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. Repeat the process for gateway number [002xxx#], then finish with the programming with the board s/n [001xxx#].
13. Remove the USB.
14. Verify the software version under the Menu/Tools & Settings/Network/Device List.



➔ ***Notes:***

1. It is important that the three MXJB gateways (or SI80 Pilot Controller) of the MX612JB be programmed one at a time to prevent conflicts.
2. Upgrading the MX610JB/MX612JB junction box software through the USB port of the MX61x CDU may require an external 12 VDC supply to the NMEA 2000 bus (see the diagram above). Software update of the junction box may fail if no external 12 VDC is applied.

13 List of components

The tables below list parts that are included in MX610/MX612 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 000-10919-001)

Part Name	Qty	Part number
MX610 Display Unit	1	000-10914-001
Operator and Installation Manual	1	988-10370-001
Quick Guide	1	988-10369-001
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
MX521A (or MX521B) DGPS antenna	1	727051 (000-11640-001)

MX610 GPS navigation system (P/N 000-10917-001)

Part Name	Qty	Part number
MX610 Display Unit	1	000-10914-001
Operator and Installation Manual	1	988-10370-001
Quick Guide	1	988-10369-001
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
MX521A (or MX521B) GPS antenna	1	727050 (000-11641-001)

MX612 DGPS navigation sytem (P/N 000-10923-001)

Part Name	Qty	Part number
MX612 Display Unit	1	000-10915-001
Operator and Installation Manual	1	988-10370-001
Quick Guide	1	988-10369-001
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
MX521A (or MX521B) DGPS antenna	1	727051 (000-11640-001)

MX612 GPS navigation sytem (P/N000-10921-001)

Part Name	Qty	Part number
MX612 Display Unit	1	000-10915-001
Operator and Installation Manual	1	988-10370-001
Quick Guide	1	988-10369-001
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
MX521A (or MX521B) GPS antenna	1	727050 (000-11641-001)

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
MX521A DGPS Antenna	727051	GPS, Beacon & WAAS
MX521A GPS Antenna	727050	GPS & WAAS
MX575C DGPS Compass w/ 15M cable	000-10747-001	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 MTR	000-10816-001
CZONE, NMEA 2000 EXTENSION 2.0 MTRS	000-10817-001
CZONE, NMEA 2000 EXTENSION 5.0 MTR	000-10814-001
CZONE, NMEA 2000 EXTENSION 10 MTRS	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, Metal, 0.4m	000-10396-001
Cable, Micro-C, Metal, 2m	000-10397-001
Micro-C, Metal, 5m	000-10398-001 Cable
Cable, Micro-C, Metal, 9m	000-10399-001
Micro-C T-connector, Metal	000-10403-001
Micro-C, Field Connector	000-10404-001
N2K-PWR-RD - NMEA 2000® power cable	000-0119-75
NMEA2000 MicroTerminator, Metal, Female	000-10462-001
NMEA2000 MicroTerminator, Metal, Male	000-10463-001
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 MX610/MX612 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 MX610/MX612 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.

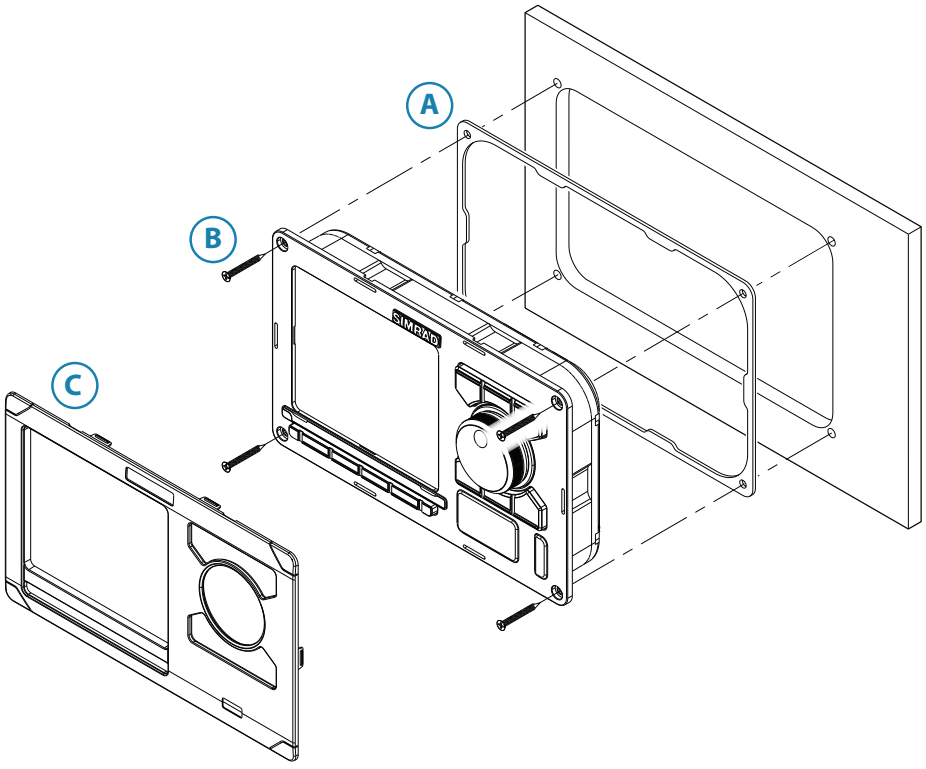
The MX610/MX612 conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but proper installation is required to get best use and performance from this product. Ensure adequate separation from other on-board electronics and electrical equipment.

MX610/MX612 control unit

Avoid mounting the MX610/MX612 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

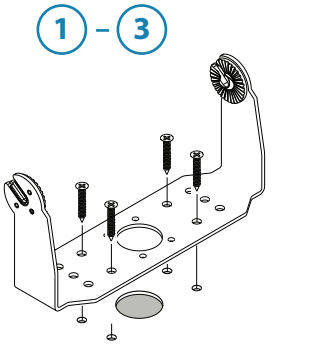
1. Attach the mounting template to the selected mounting position.
2. Drill pilot holes for the 4 hole saw cuts and for the 4 self tapping screws used to secure the unit. If using M4 machine screws use a 5 mm (0.20 ") drill bit.
3. Use a 25 mm (1 ") hole saw to cut the four corner radius.
4. Cut along 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).

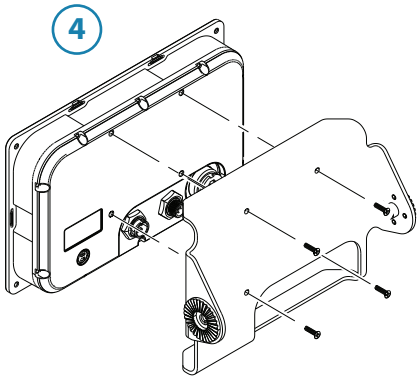


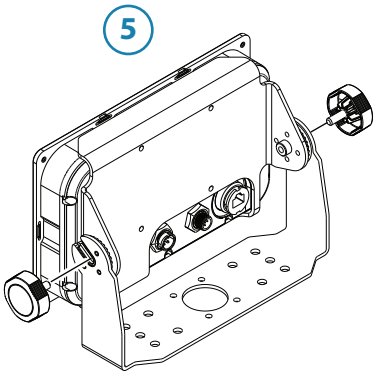
Bracket mount (option)

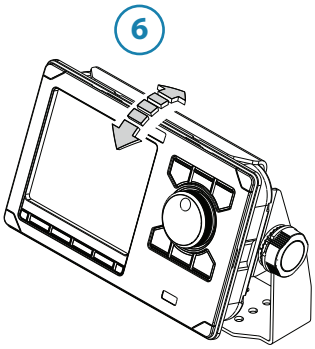
➔ ***Note:*** When the control unit is bracket-mounted, it is not completely weatherproof from the back due to a breathing hole in the back cabinet. When bracket-mounted, the exposed parts of the plugs should be protected against salt corrosion.

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.









Antenna systems

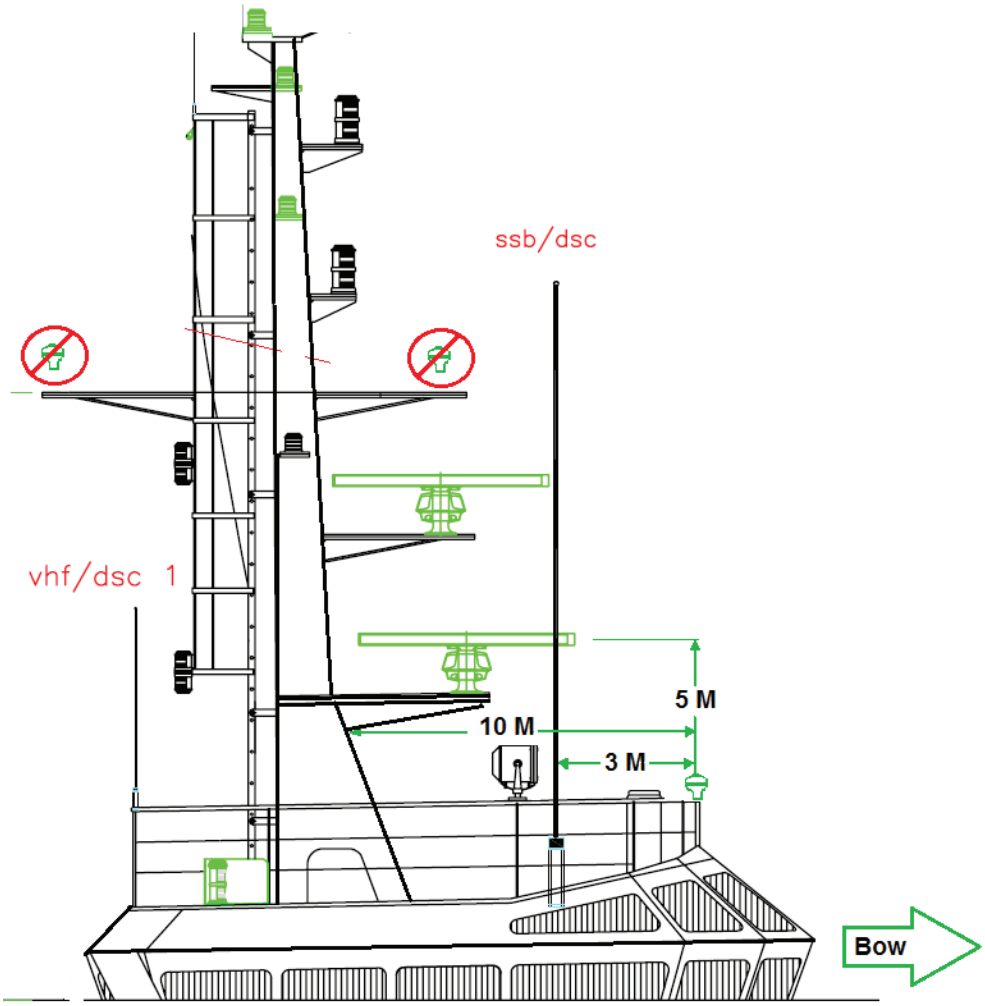
Several Itype-approved antenna models can be used with the MX610/MX612, namely:

- MX521A/B - GPS/DGPS smart antenna (NMEA 0183 interface). - Standard
- HS80/HS80A or MX575C/D D/GPS compass unit (N2K or NMEA 0183 interface) - Option
- GS70 - GPS/WAAS smart antenna (N2K interface) - Option

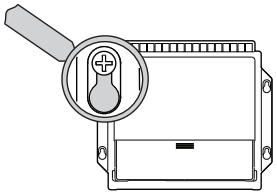
As a general rule, the antenna unit must be located in the open where it will have a good view of the sky aournd it. It must also be located away from large metal objects that can block the GPS signal as well as influence the operation of the antenna unit.

Antenna mounting guidelines

- Install the antenna where it has a clear view of the sky around it
- 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.

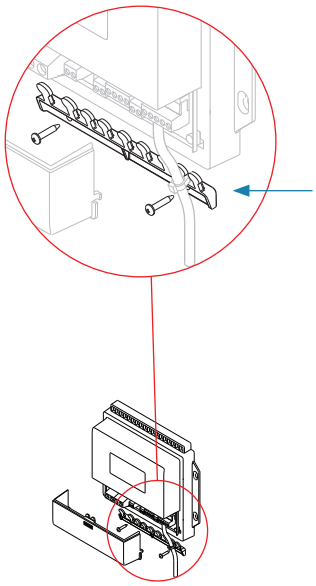


MX61xJB junction box

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.

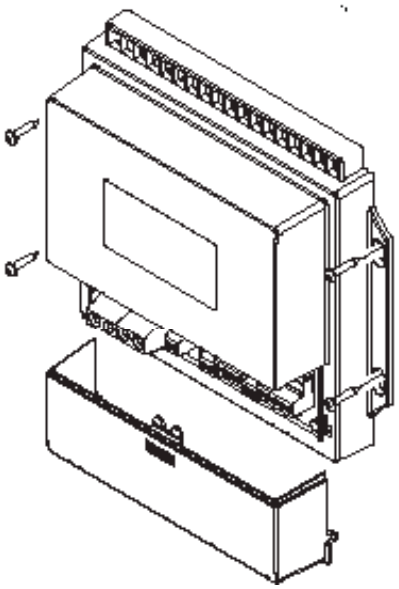
Ensure that any holes cut are in a safe position and will not weaken the boat's structure. If in doubt, consult a qualified boat builder. Ensure that there are no hidden electrical wires or other parts behind the panel.



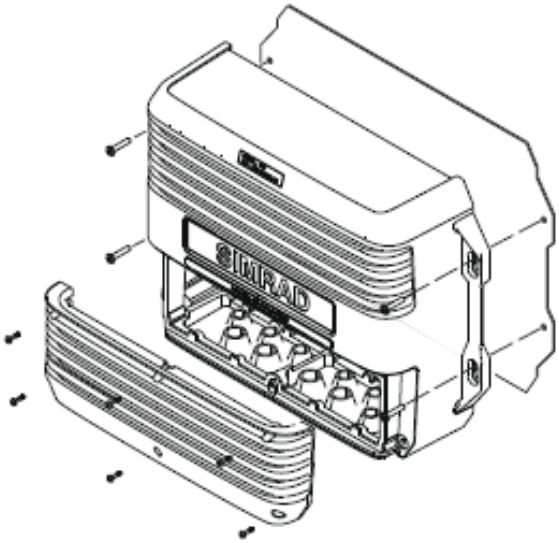
Preferably mount the junction box with the cable entries exiting downwards.

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

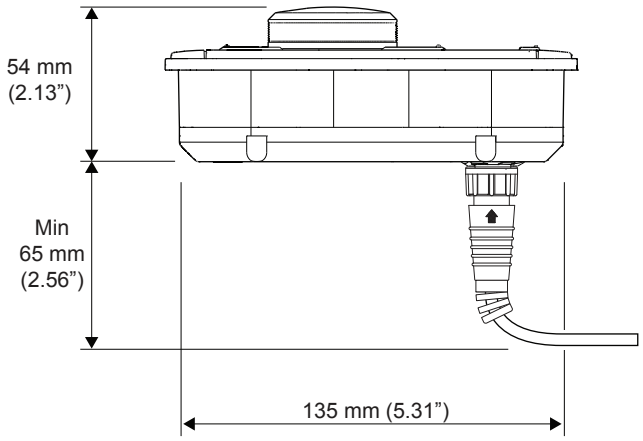
MX610JB mounting

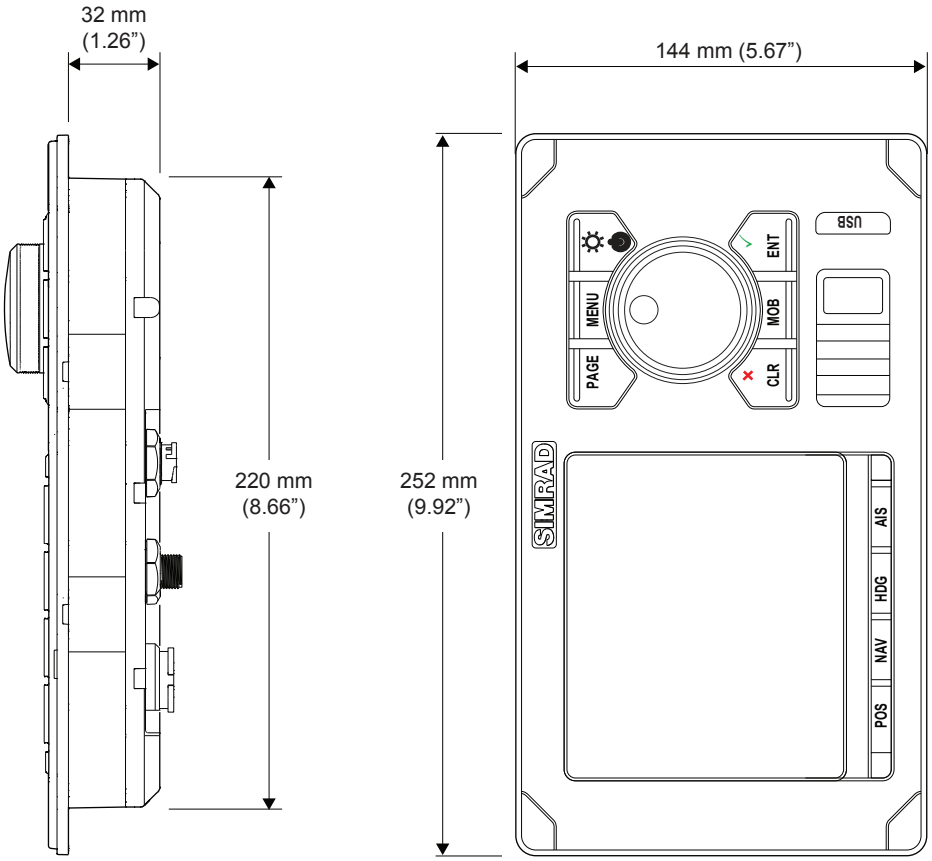


MX612JB Mounting

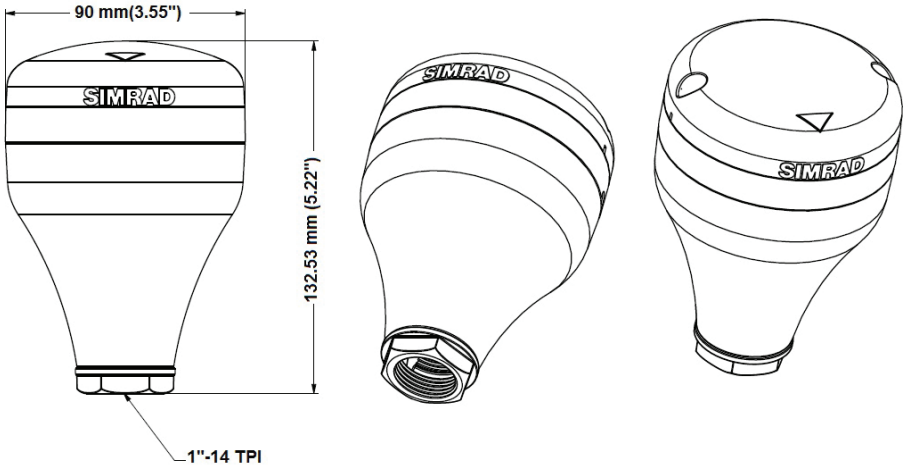


MX610/MX612 display unit (mechanical dimensions)

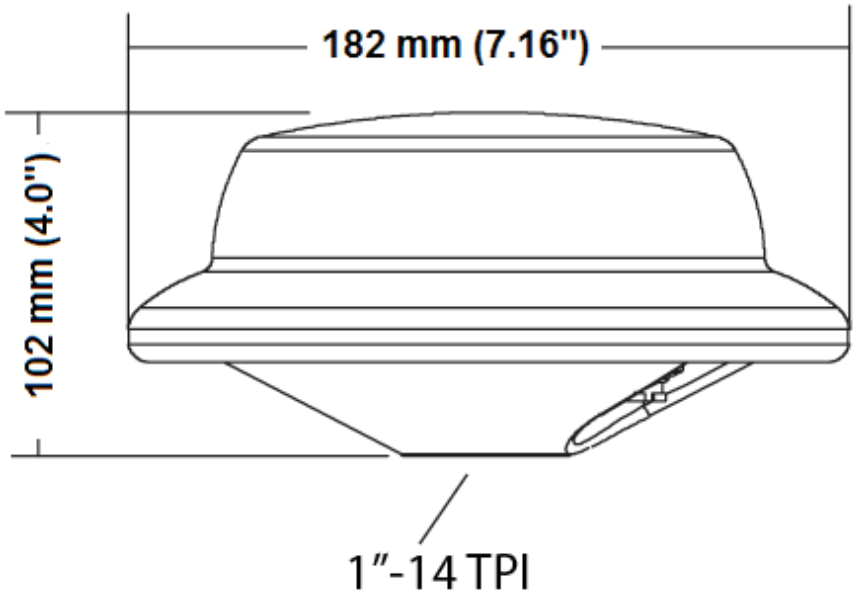




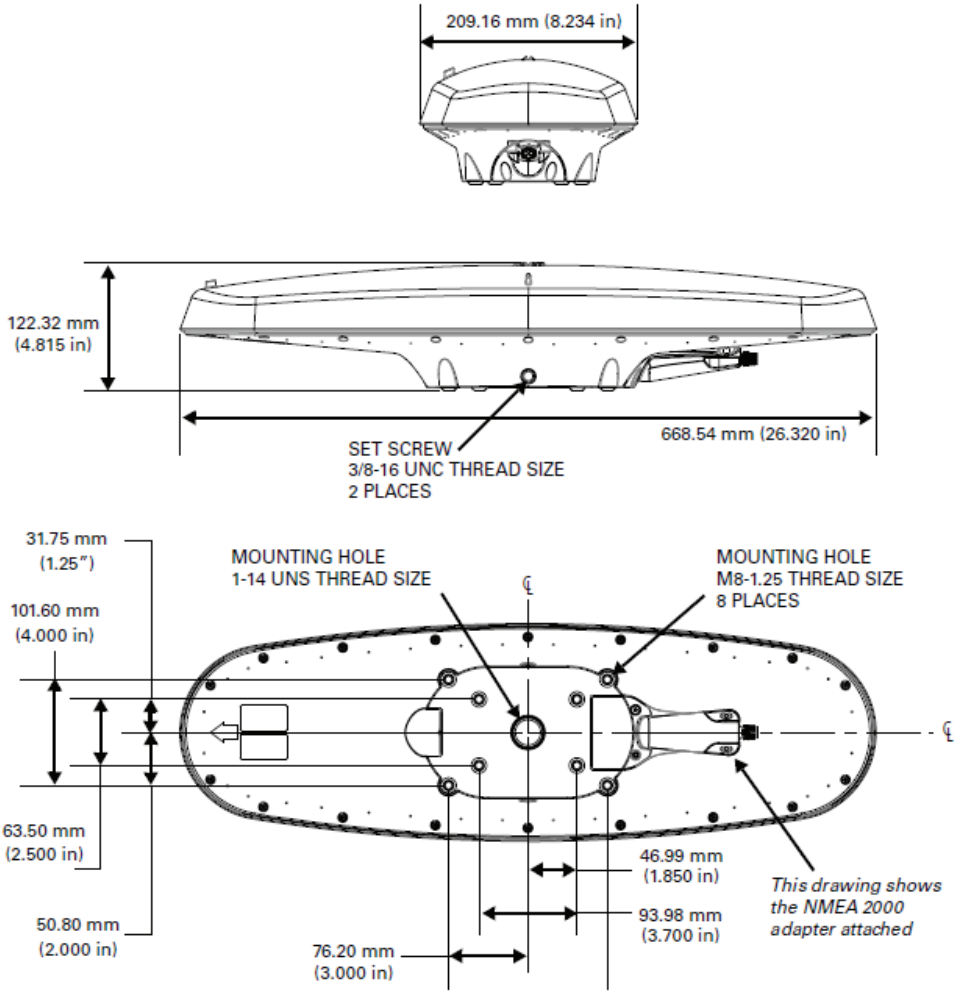
GS70 antenna unit



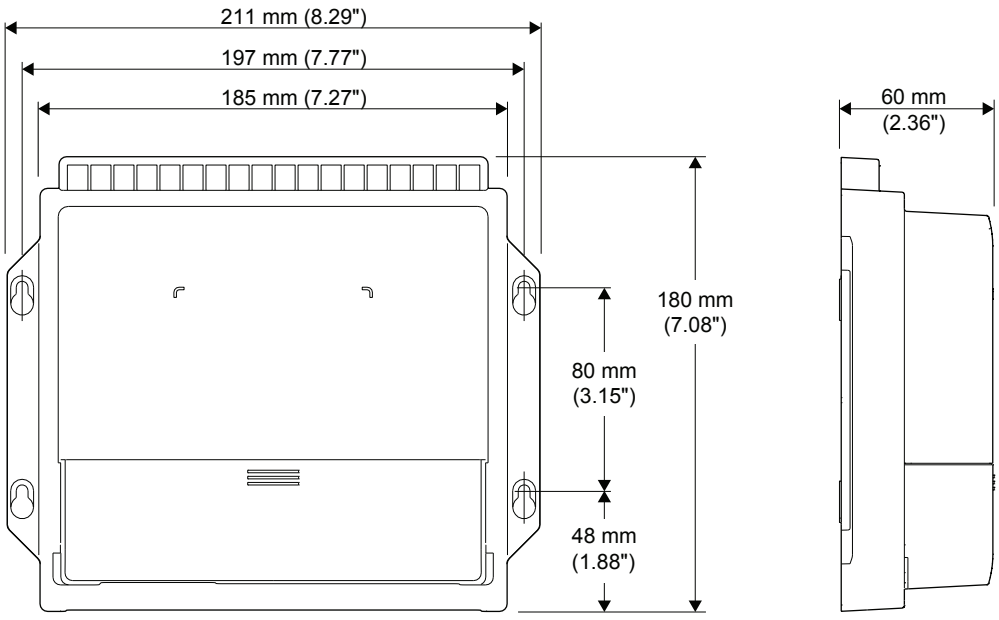
MX521A/MX521B smart D/GPS antenna unit



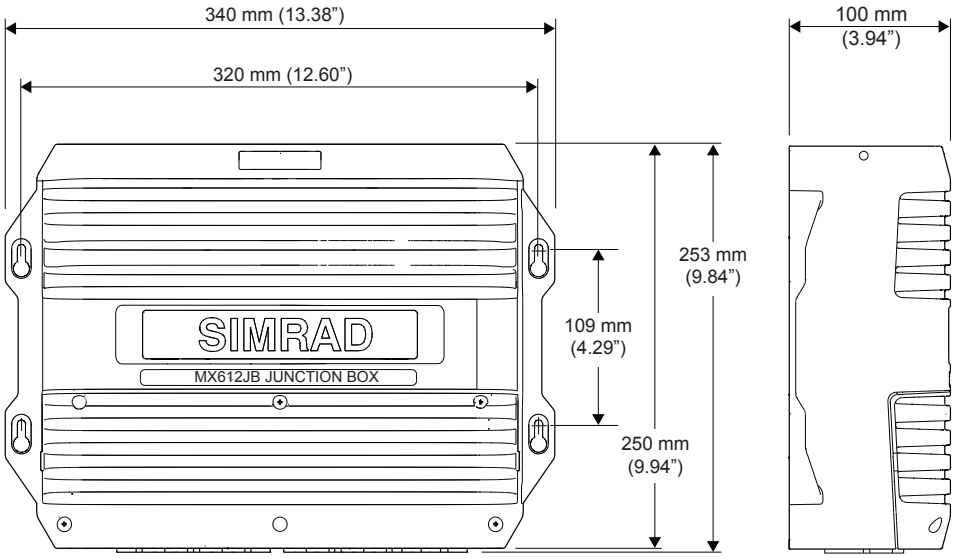
HS80/HS80A/MX575C/MX575D D/GPS compass unit

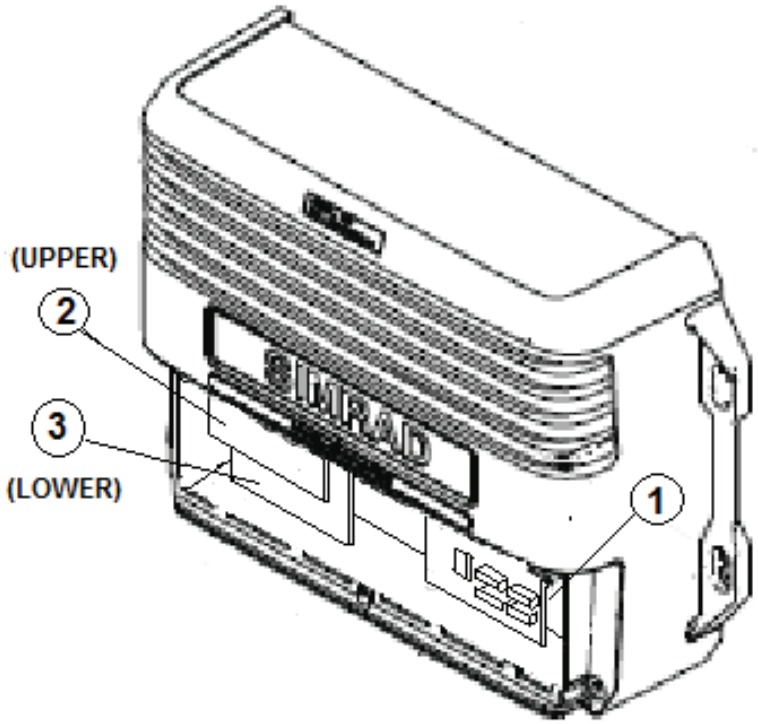


MX610JB smart junction box unit



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!

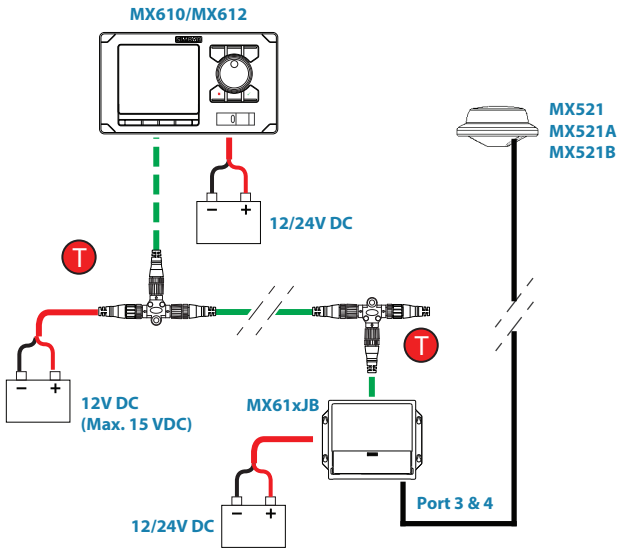
MX61x navigation system; basic wiring principles

The MX610 or MX612 navigation system is comprised of the MX61x display unit, MX61xJB junction box and MX521A/B smart D/GPS antenna unit. The MX61x display use 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 MX521A DGPS smart antenna, autopilots, radar and PC-based ECDIS can be interfaced using the MX61xJB smart junction box.

In systems with the MX61xJB junction box the CAN bus is powered by the junction box. The MX610/MX612 model have separate power supply cable 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/x antenna and junction box wiring diagram

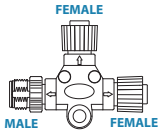
→ ***Note:*** The MX521A antenna is connected to ports 3 and 4 of the junction box .

CAN bus

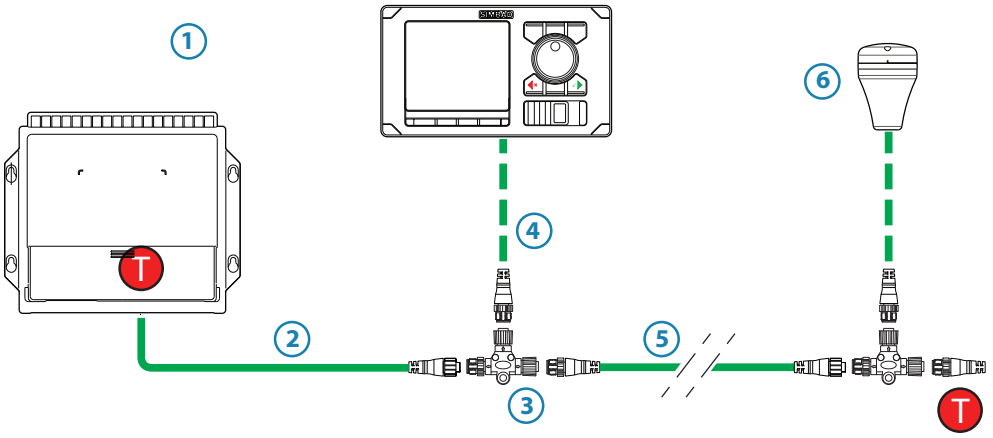
The CAN bus is based on the well known SimNet plug & play concept and on the NMEA 2000 (N2K) SAE J1939 protocol. Hard wiring is based on standard NMEA 2000 cables with Micro-C type connectors and joiners.

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 MX610/MX612 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.



MX610/MX612 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 MX610/MX612 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 OFF.

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

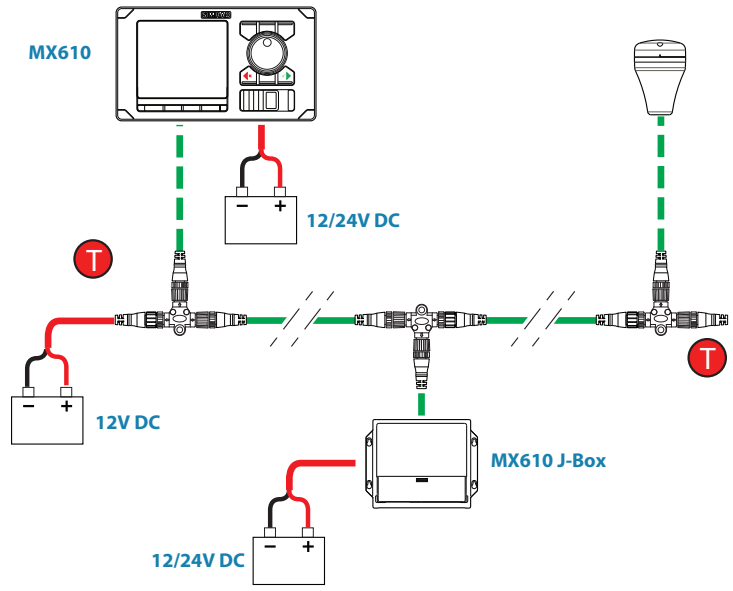
Power supply

→ ***Notes:***

1. Wheelmark/US Coast Guard approved systems require a Power Failure alarm. In such installations the MX610/MX612 and the MX610JB must be connected to different independent power supplies.
2. It is recommended to install an external on/off switch or circuit breaker for the Junction Box power supply.
3. Do not connect the power cable to the same terminals as the start batteries, drive units, thruster or other high current products.
4. 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

For larger systems additional power should be added at a central point in the backbone to balance the voltage drop of the network. Additional power may be supplied by using an MX610JB junction box or through a Micro T-Joiner.

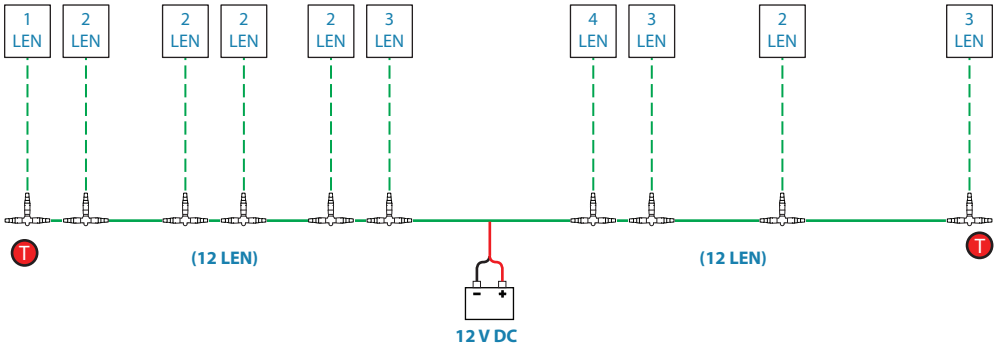


N2K power diagram

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.

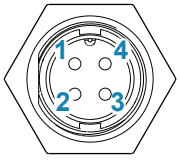


N2K system with balance load

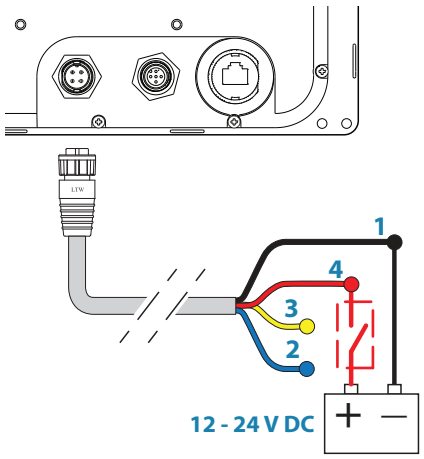
Powering the MX610/MX612 display units

The MX610/MX612 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:***

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

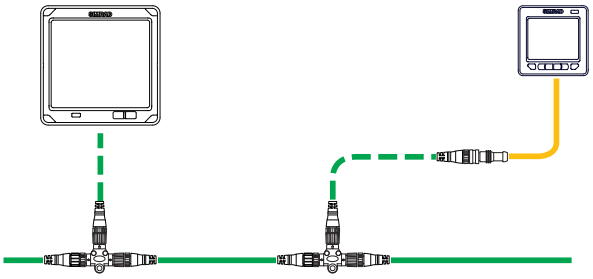
NMEA 2000 and SimNet devices

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 connects 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.

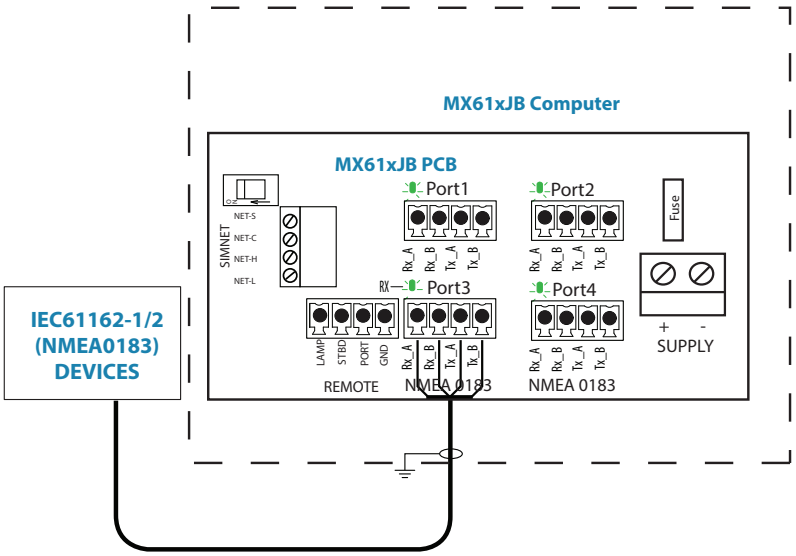


SimNet System

IEC61162-1/2 (NMEA 0183) Devices

Connects to: MX61xJB board (in MX61xJB computer).

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.

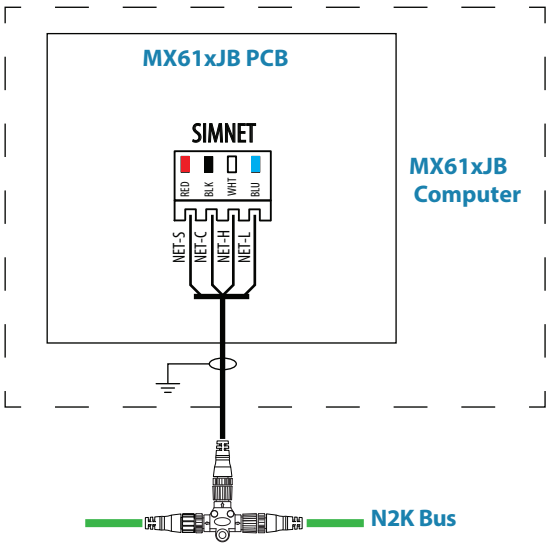
The MX61xJB board uses the serial RS422 (IEC 61162-1/2) standard and can be configured in the MX610/MX612 display for different baud rates, up to 38,400 baud (default baud rate is 4800). Sentence output by the MX610/MX612 can be individually turned on or off. The default NMEA sentence setting is off.

➔ ***Note:*** Limit the number of NMEA messages turned on to eight (8) per port. Although the junction box allows you to turn on more than eight and will output all messages you turn on, the MX61x JB memory can only retain up to 8 messages per port when power is turned off.

Connecting the MX61xJB computer to the N2K bus

The MX61xJB smart junction box can connect anywhere on the N2K bus back bone by using drop cables connected to the SIMNET connector and a female connector on the Micro-C T-joiner.

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



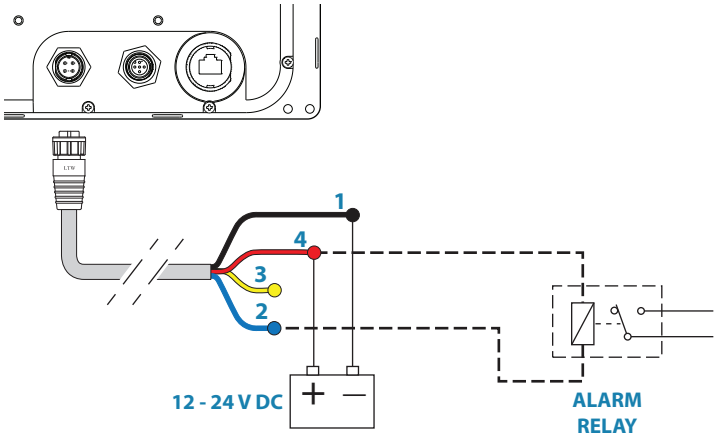
MX61xJB connection to NMEA 2000 Bus

Alarm interface

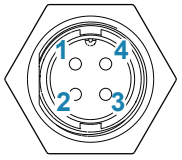
External alarm

An external alarm can be connected to the MX610/MX612 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

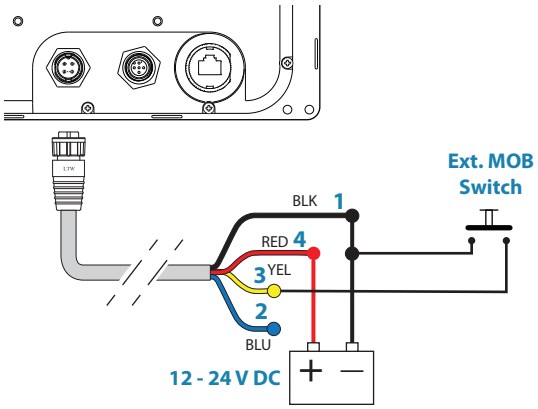
The siren must be enabled in order for the unit to drive the external alarm when an alarm condition arises.

External MOB command

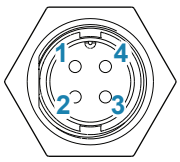
An external N.O. (Normally Open) push button switch can be used to mark your present position and activate the MOB feature (see diagram below for connection).

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.



External MOB switch connection



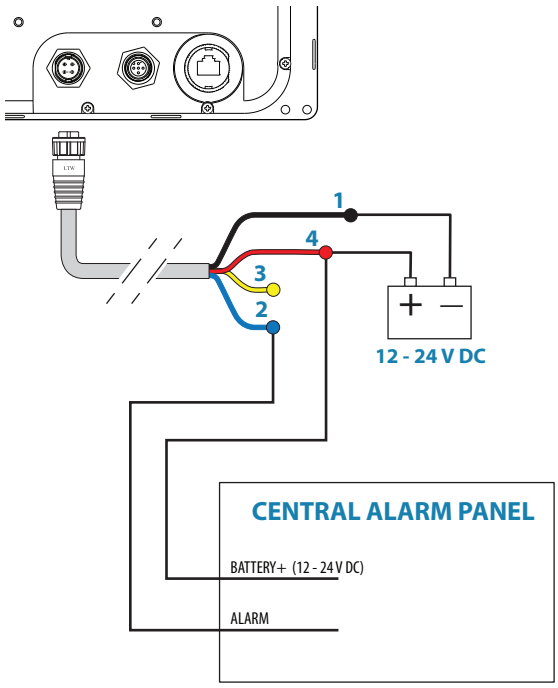
Pin	Color	Description
1	Black	Battery (-)
2	Blue	External Alarm
3	Yellow	External MOB
4	Red	Battery (+), 12 - 24 V DC

Central alarm panel with direct I/O interface

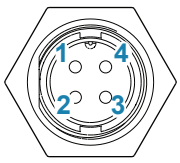
The interfacing described below applies for central alarm panels that use direct lines for alarm, mute and acknowledge. For alarm panel using serial interface, refer to "IEC61162-1/2 (NMEA 0183) Devices" on page 79.

From the MX610/MX612 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

Printer interface

Printer Ouput Control

The printer output is simple ASCII text designed to operate on any thermal printer. Printer output is available on any NMEA ports of the MX61xJB junction box except ports 3 & 4. These are ports used for antenna connection. The baud rate of the output is selectable from 4800 or higher. Because the MXJB ports are RS-422, it needs to be converted to RS-232 using a converter (B&B 422LP9TB model). Please refer to the diagram for connections.

A sample of the printer output is given below:

Simras MX610/612 Navigation System

==========

17:29:42 UTC 14 1 2015

Diffrential GPS Fix

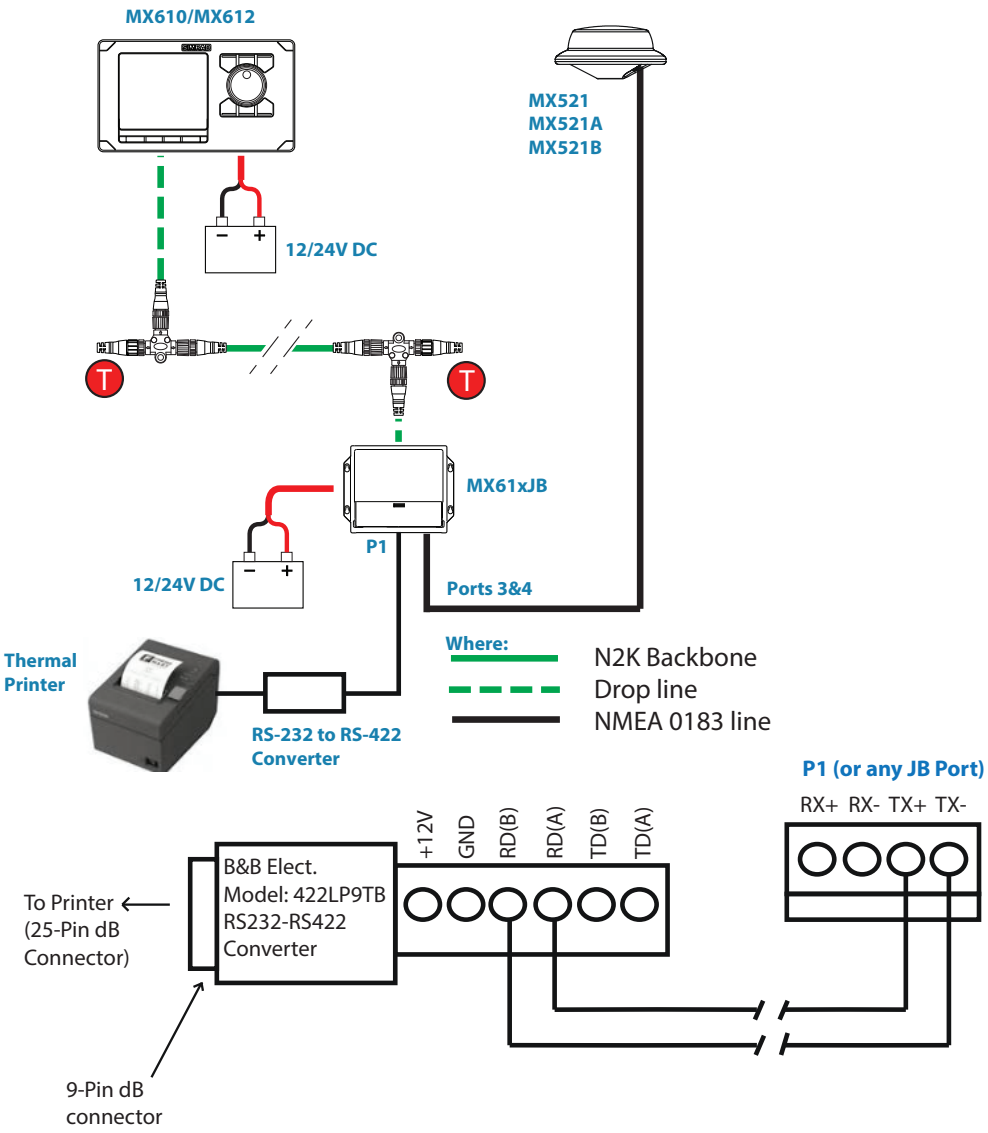
Latitude: 33 48.5085' N

Longitude: 118 21.0115'W

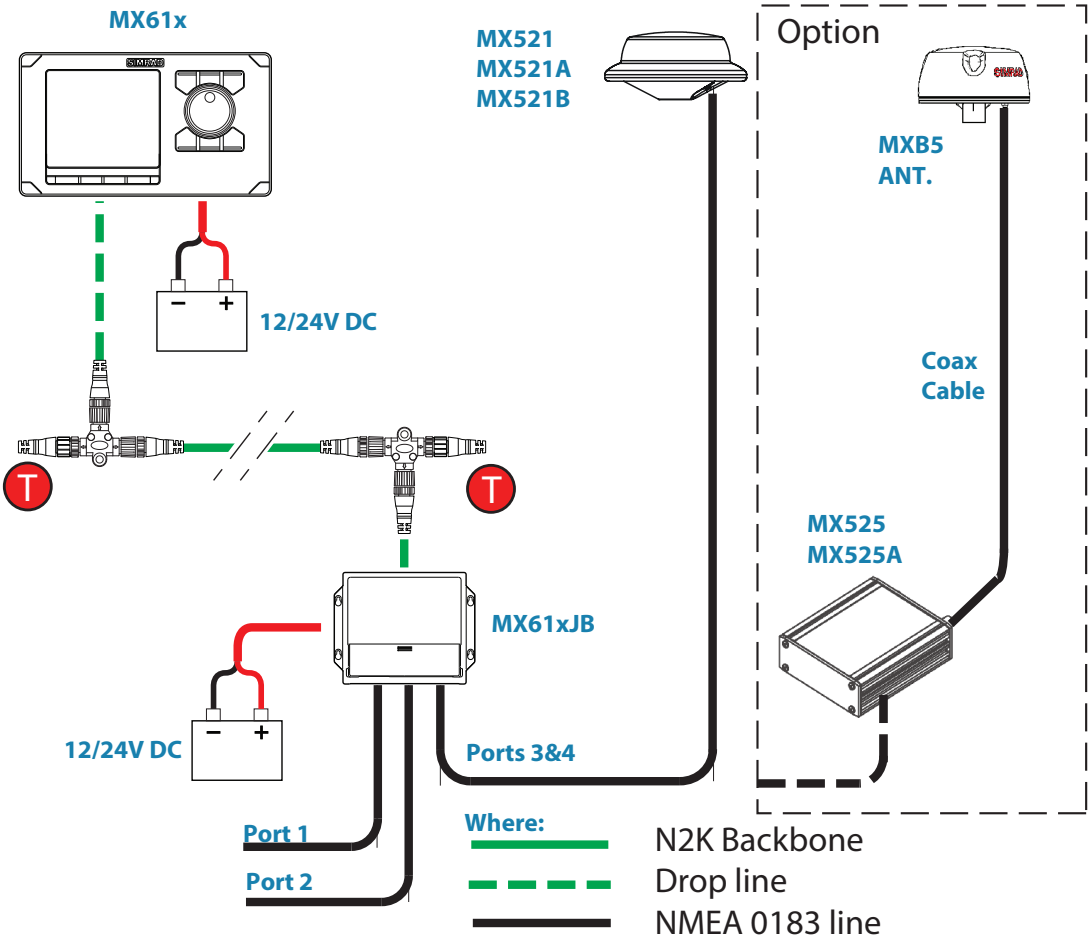
COG: 300 SOG: 10.01 kn

Procedure for printer output setting:

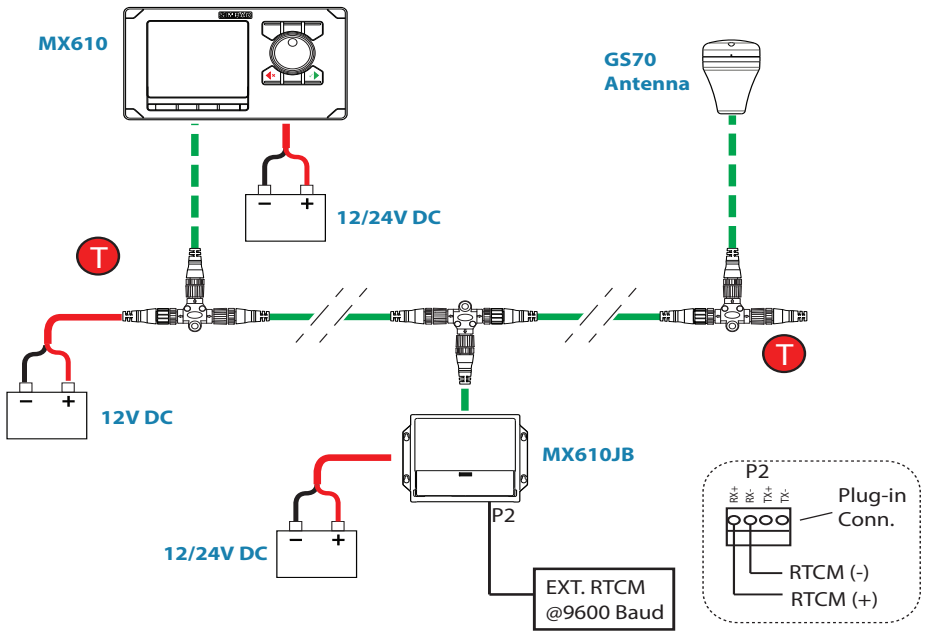
1. Press the **MENU** key.
2. Scroll to Tools and Settings, press **ENT**.
3. Scroll to Device List, press **ENT**.
4. Select MXJB NMEA1 (or Port 1 or any port used to connect to a printer), press **ENT**.
5. Scroll to Baud Rate, press **ENT**.
6. Select the baud rate to match what the printer needs.
7. Scroll to Printer output, press **ENT**.
8. Select the printing time (typically 1/hr), press **ENT**.
9. Select Yes, press **ENT**.
10. Highlight the **Close** button, press **ENT**.
11. Press **CLR** or any hot key to exit.



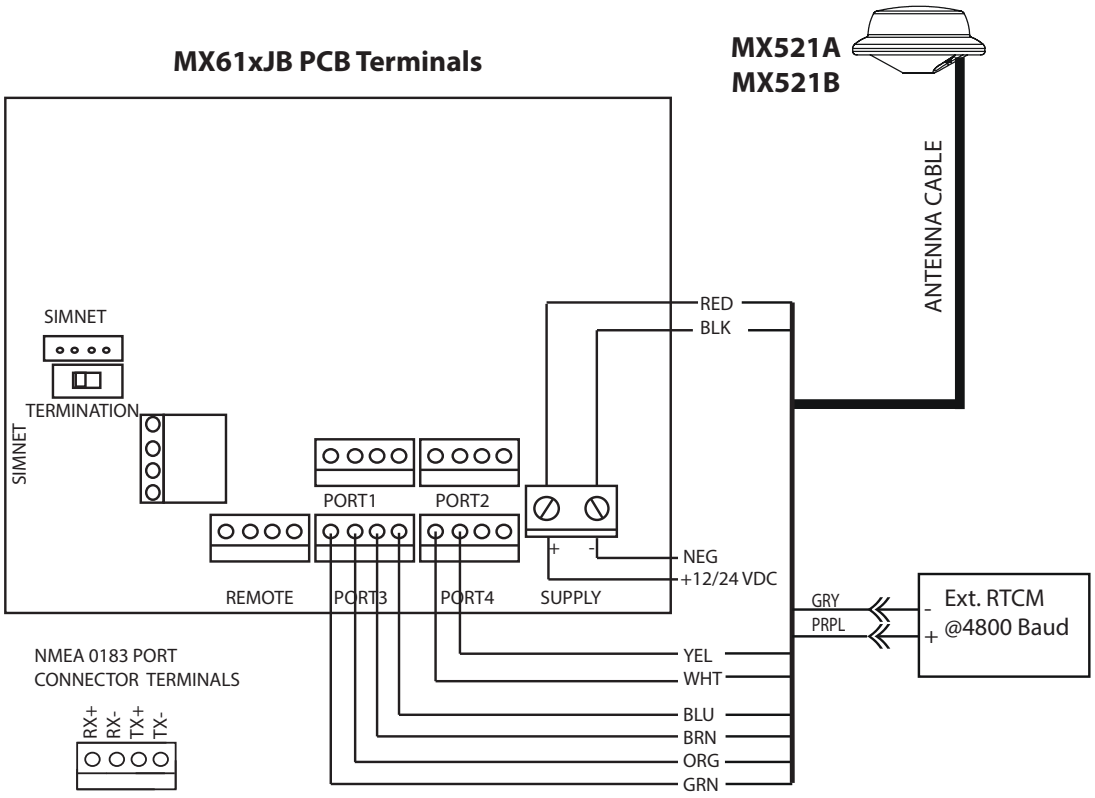
MX610/MX612 with MX521A smart antenna and MX525A sensor connections



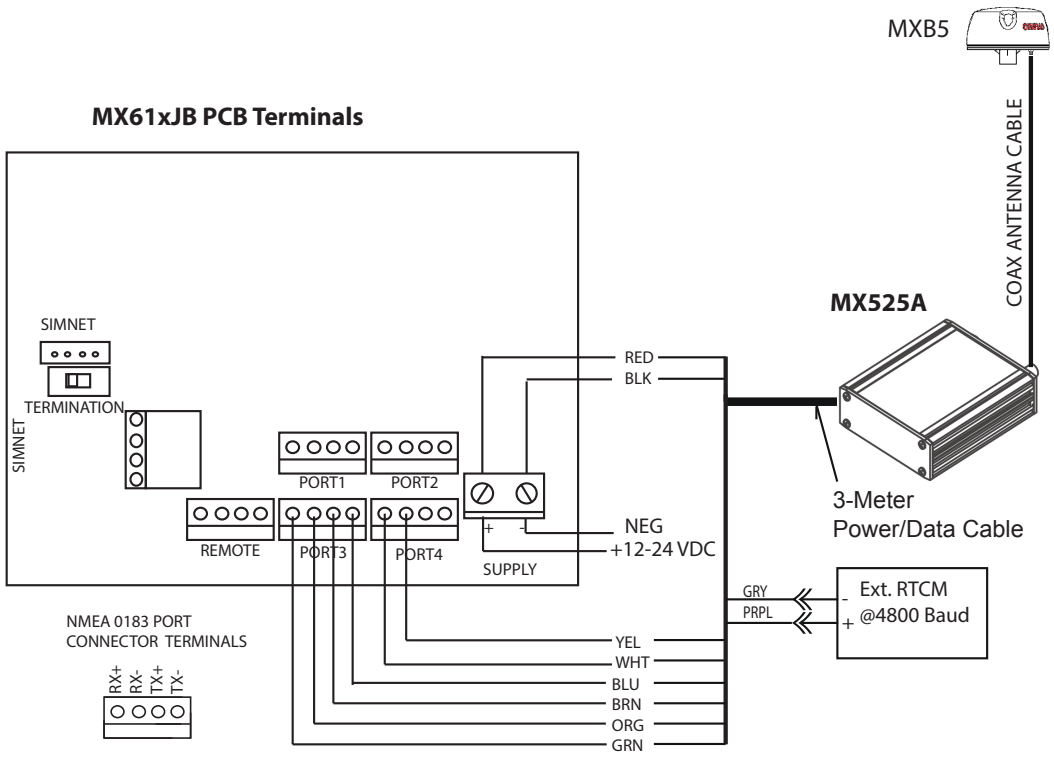
MX610, MX610JB junction box and MX521/MX525 diagram



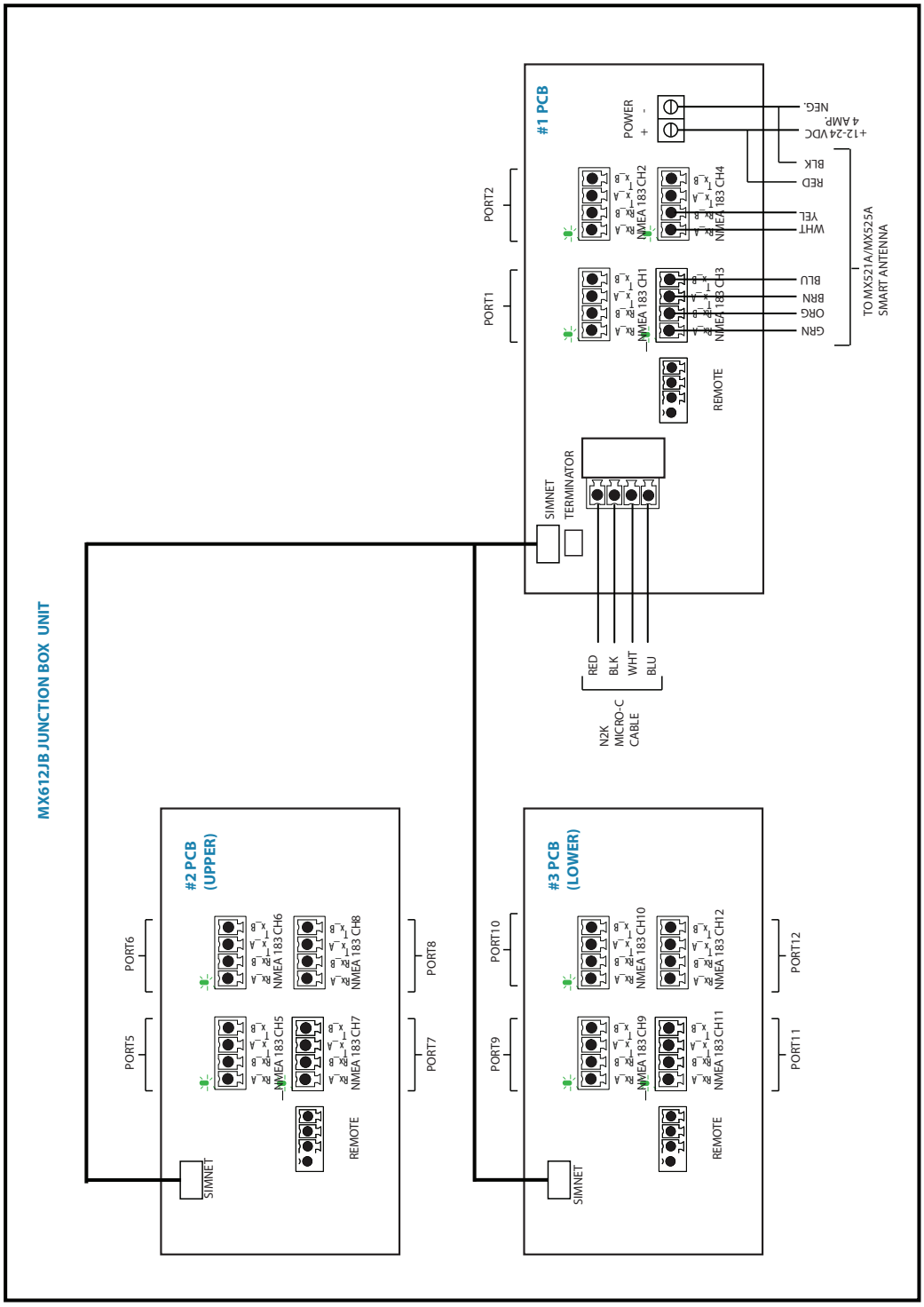
External Differential Correction connection to GS70 though the MX610JB junction



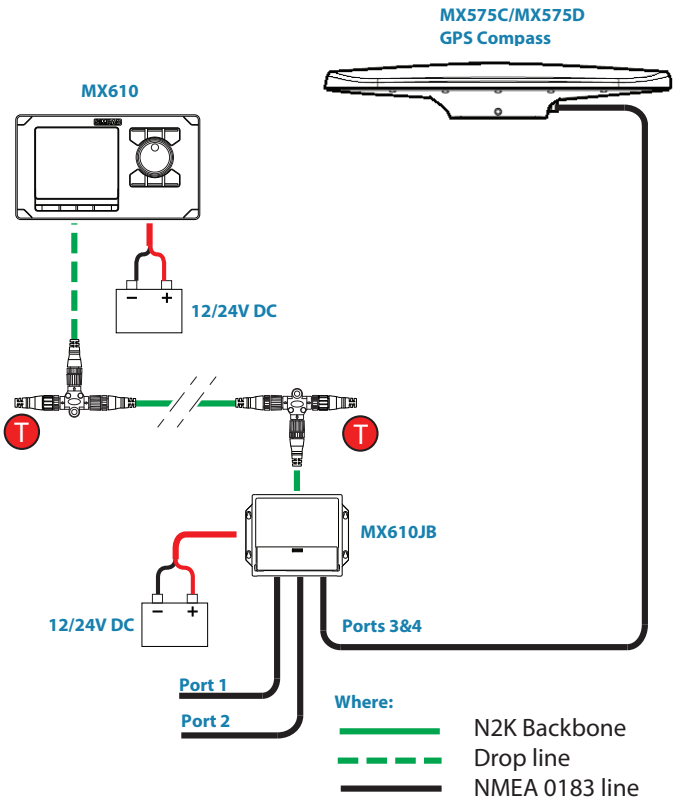
MX521 to MX61xJB wiring Diagram



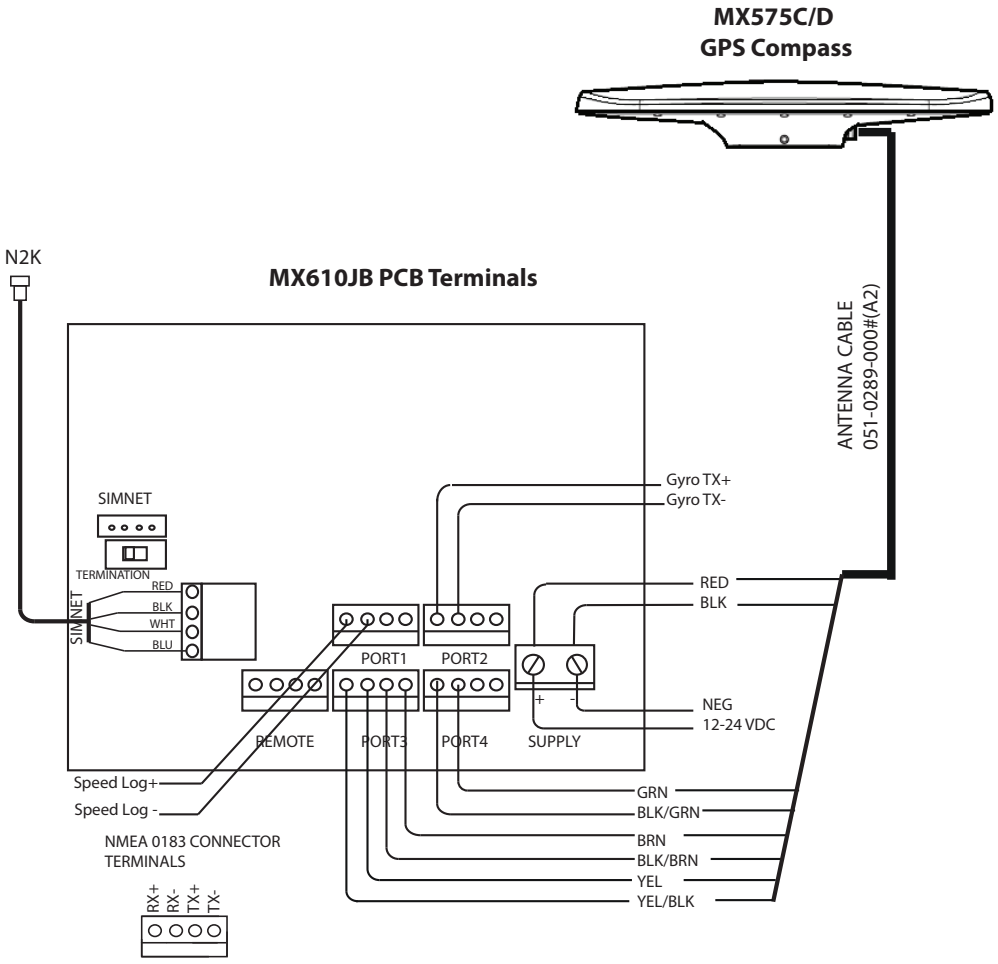
MX525A to MX61x JB wiring diagram



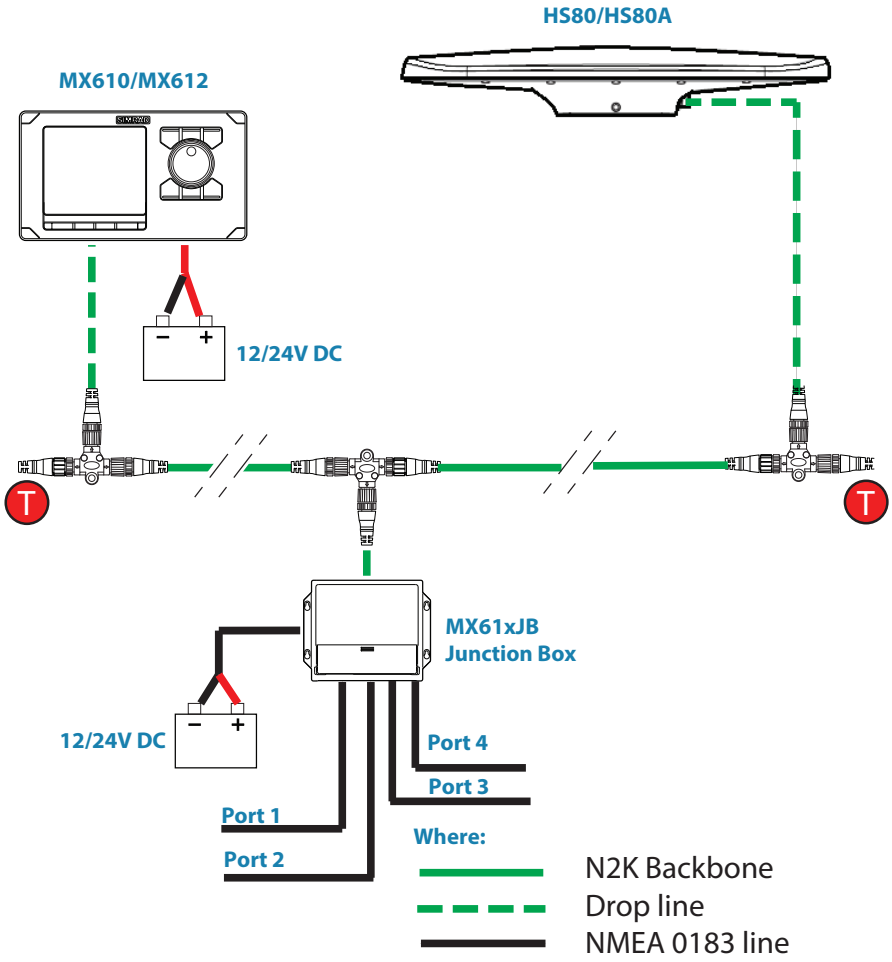
MX612JB junction box antenna connection



MX610/MX612 system with MX575x GPS compass diagram



NMEA 0183 connection of the MX575x to MX610JB wiring diagram



HS80/HS80A NMEA 2000 Connection

16 Specifications

Technical specifications

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

MX610/MX612 Control and Display Unit

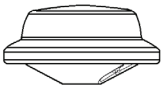
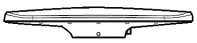
DISPLAY		
Size	5 in. (127 mm)	
Resolution (HxW)	480x480	
Type	16-bit color TFT	
Antifog	Bonded LCD	
Best viewing direction	Any direction	
Backlight	Cold Cathode Fluorescent Lamp (CCFL)	
Waypoints	2000	
Routes	100 Routes with a dynamic number of waypoints; up to 2000 in all routes	
Tracks	2000	
NETWORKING		
CAN bus	NMEA 2000 (N2K)	
Ethernet (LAN)	Yes- used for software update and NMEA 0183/IP	
USB Socket	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	-30°C to +55°C (-22°F to 131°F)	
Temperature, storage	-25°C to +70°C (-13°F to 158°F)	
Protection	IPx4	
MECHANICAL		
Weight	1.4 Kg (3.0 lbs.)	
Size	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	

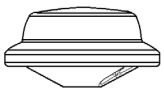
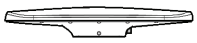
* LEN - NMEA 2000 Load Equivalent Number. Where 1 LEN draws about 50 mA current from the N2K network.

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 MX610/MX612	
Log Pulses I/O	1x Bidirectional RS-422 port (PPM configurable by MX610/MX612)	

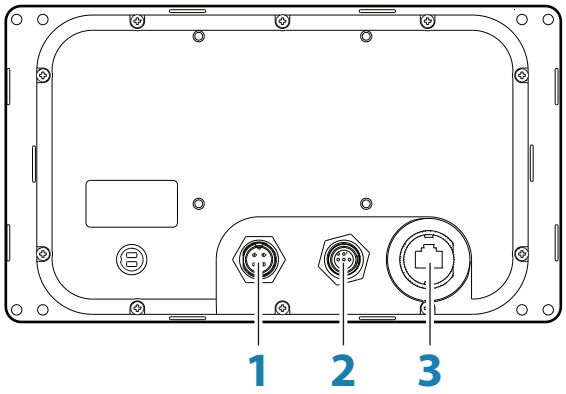
Smart antenna unit

					
	GS70	MX521A	MX521B	HS80/ MX575C	HS80A/ MX575D
Receiver Type	L1 C/A code, 1.575 GHz	L1 C/A Code @ 1.575 GHz	L1 GPS + GLONASS	L1 C/A Code @ 1.575 GHz	L1 GPS + GLONASS
Number of Channels	32	12	270	12	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		HS80 - No MX575C - 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 0183		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	
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	MX521A MX521B	HS80/ MX575C HS80A/ MX575D
Connector	N2K Micro C	10-Pin Round	18-Pin Round (N2K adapter option)
Mounting	Surface mount or Pole		
Material	Plastic		
Color	White	White w/red band	White -top, dark gray - bottom

* LEN - Load Equivalent Number @ 50 mA.

MX610/MX612 Connector Pinouts



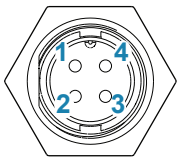
1 **Power**

2 **N2K bus**

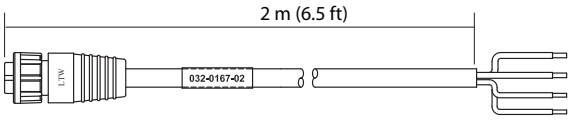
3 **Ethernet**

Power

Connector (male)

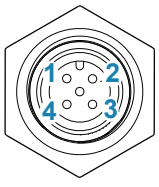
Layout	Pin	Wire Color	Function
	1	Black	Battery (-)
	2	Blue	Alarm/Active
	3	Yellow	External MOB
	4	Red	Battery (+), 12 - 24 V DC

Power cable



CAN/NMEA 2000

Micro-C Connector (male)

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

Ethernet

➔ ***Note:*** Use crossed (red) Ethernet cable for software upload!

Supported data

IEC61162-1/2 (NMEA 0183) interfaces channels

MX610JB Channels	MX612JB Channels	Default name	Default sentences	Default Baud rate
1	1	MXJB-NMEA1	GGA, DTM, ZDA,VTG, HDT	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, HDT	4800
N/A	6	MXJB-NMEA6		
N/A	7	MXJB-NMEA7	Off	19.2K**
N/A	8	MXJB-NMEA8	Off	4800
N/A	9	MXJB-NMEA9	GGA, DTM, ZDA,VTG, HDT	4800
N/A	10	MXJB-NMEA10		
N/A	11	MXJB-NMEA11	Off	19.2K**
N/A	12	MXJB-NMEA12	Off	4800

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

** High-speed NMEA port, defaults at 19,200 baud on power cycle. Listener unit connected to this port must be set to operate at 19,200 baud rate.

MX610/MX612 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	TBD	√	Routes
THS	√	√	True Heading
VHW	√	√	Water Speed and Heading

VTG	√	√	Course and Speed Over Ground
WPL	TBD	√	Waypoints
XTE	√	√	Cross Track Error, Measured
ZDA	√	√	Time & Date
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

*Consideration for future implementation.

GS70/HS80 smart antenna communications (N2K)

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 MX610/MX612

++Additional NMEA 2000 messages for AIS (Input only)

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
129794	AIS Class A Static and Voyage Related Data
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message
129809	AIS Class B "CS" Static Data Report, Part A
129810	AIS Class B "CS" Static Data Report, Part B
129808	DSC Call Info
130842	Proprietary for "Class B" AIS and VHF message

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

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