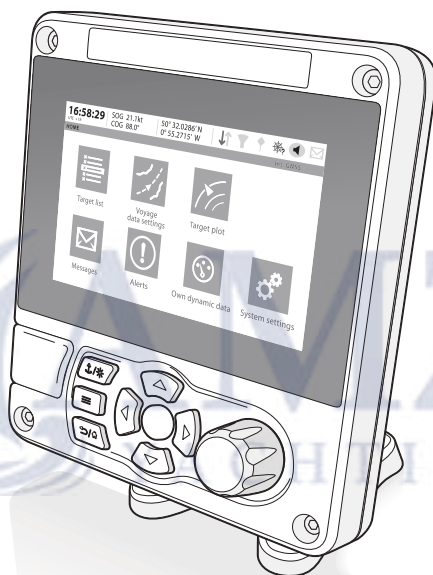


# A200 AIS Class A / Inland transceiver

## Installation and operation manual





**Thank you for purchasing this AIS Class A transceiver / Inland AIS.**

This product has been engineered to offer you the highest level of performance and durability and we hope that it will provide many years of reliable service. We constantly strive to achieve the highest possible quality standards, should you encounter any problems with this product, please contact your dealer who will be pleased to offer any assistance you require.

## List of abbreviations

|          |   |
|----------|---|
| AIS      | Automatic Identification System                 |
| AIS SART | AIS Search and Rescue Transmitter               |
| AP       | Access Point (Relating to WiFi behaviour)       |
| AtoN     | AIS Aid to Navigation                           |
| CD       | Compact Disc                                    |
| CE       | European Declaration of Conformity              |
| COG      | Course Over Ground                              |
| COM      | Common (electrical)                             |
| CPA      | Closest Point of Approach                       |
| CS       | Carrier Sense                                   |
| DC       | Direct Current                                  |
| Dec      | Decimal   |
| DGNSS    | Differential GNSS                               |
| DHCP     | Dynamic Host Configuration Protocol             |
| DOP      | Dilution of Precision                           |
| DSC      | Digital Selective Calling                       |
| DTM      | Datum   |
| ECDIS    | Electronic Chart Display and Information System |
| ENI      | Unique European Vessel Identification Number    |
| EPFS     | Electronic Position Fixing System               |
| EPIRB    | Emergency Position Indicating Radio Beacon      |
| ERI      | Electronic Reporting International              |
| ETA      | Estimated Time of Arrival                       |

## List of abbreviations

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|         |   |
|---------|---|
| EXT     | External  |
| FCC     | Federal Communications Committee                              |
| GBS     | GNSS satellite fault detection message                        |
| GFA     | GNSS fix accuracy and integrity message                       |
| GGA     | Global positioning system (GPS) fix data message              |
| GLL     | Geographic position - Latitude/longitude message              |
| GLONASS | Globalnaya Navigazionnaya Sputnikovaya Sistema (Russian GNSS) |
| GND     | Electrical Ground   |
| GNS     | GNSS fix data message   |
| GNSS    | Global Navigation Satellite System                            |
| GPS     | Global Positioning System                                     |
| GRS     | GNSS range residuals message                                  |
| GSA     | GNSS DOP and active satellites message                        |
| GSV     | GNSS satellites in view message                               |
| HDT     | Heading true message  |
| Hex     | Hexadecimal   |
| IEC     | International Electrotechnical Commission                     |
| IMO     | International Maritime Organisation                           |
| INT     | Internal  |
| IPx6    | Ingress Protection (to powerful water jets)                   |
| IPx7    | Ingress Protection (1m immersion for 30 minutes)              |
| ISO     | International Standards Organisation                          |
| Kt      | Knots   |
| LAT     | Latitude  |

|       |  |
|-------|--|
| LCD   | Liquid Crystal Display                         |
| LON   | Longitude                                      |
| LR    | Long-range                                     |
| MKD   | Minimum Keyboard and Display                   |
| MMSI  | Maritime Mobile Service Identity               |
| MOB   | Man Overboard                                  |
| NC    | Normally Closed (electrical)                   |
| NAV   | Navigation                                     |
| NM    | Nautical Miles                                 |
| NMEA  | National Marine Electronics Association        |
| PDF   | Portable Document Format                       |
| PGN   | Parameter Group Number                         |
| PI    | Presentation Interface                         |
| RAIM  | Receiver Autonomous Integrity Monitoring       |
| RED   | Radio Equipment Directive                      |
| RF    | Radio Frequency                                |
| RMC   | Recommended minimum specific GNSS data message |
| ROT   | Rate of Turn                                   |
| RX    | Receive  |
| SD    | Secure Digital                                 |
| SOG   | Speed Over Ground                              |
| SOLAS | Safety of Life at Sea                          |
| SRM   | Safety Related Message                         |
| TCP   | Transmission Control Protocol                  |
| TCPA  | Time to Closest Point of Approach              |

## List of abbreviations

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|       |  |
|-------|--|
| TDMA  | Time Division Multiple Access                  |
| THS   | True heading and status message                |
| TNC   | Threaded Neill–Concelman (a type of connector) |
| TPI   | Threads per Inch                               |
| TX    | Transmit                                       |
| UDP   | User Datagram Protocol                         |
| UHF   | Ultra High Frequency                           |
| UTC   | Co-ordinated Universal Time                    |
| VBW   | Dual ground/water speed message                |
| VDM   | All VDL AIS messages received                  |
| VDO   | AIS own-ship broadcast data                    |
| VHF   | Very High Frequency                            |
| VSWR  | Voltage Standing Wave Ratio                    |
| VTG   | Course over ground and ground speed message    |
| WGS84 | World Geodetic System 1984                     |
| WEEE  | Waste Electrical & Electronic Equipment        |
| WiFi  | Wireless networking technology                 |

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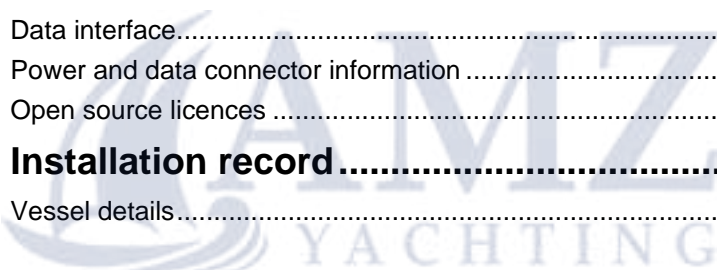
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# 1 Notices

---



**When reading this manual please pay particular attention to warnings marked with the warning triangle symbol shown on the left. These are important messages for safety, installation and usage of the AIS transceiver.**

## 1.1 Safety warnings



This equipment must be installed in accordance with the instructions provided in this manual. Failure to do so may seriously affect its performance and reliability. It is strongly recommended that a trained technician installs and configures this product.



This product must be connected to protective ground via the ground connection point. It is essential that the ground connection point is used in all installations, regardless of what other equipment is connected. The ground connection point must be bonded to protective ground using as short a connection as possible.



This equipment is intended as an aid to navigation and is not a replacement for proper navigational judgement. Information provided by the equipment must not be relied upon as accurate. User decisions based upon information provided by the equipment are done so entirely at the users own risk.



Do not install this equipment in a flammable atmosphere such as in an engine room or near to fuel tanks.



It is recommended that this product is not installed in direct sunlight or under a windshield where it may be subject to excessive solar heating.



Do not attempt to service this equipment as doing so may cause fire, electric shock or malfunction and will invalidate the warranty. If any malfunctions are detected contact your supplier or service agent.



**NOT ALL SHIPS CARRY AIS.** The Officer of the Watch should always be aware that other ships and, in particular, leisure craft, fishing vessels and warships may not be fitted with AIS. Any AIS equipment fitted on other ships as a mandatory requirement may also be switched off based on the Master's professional judgement.

## 1.2 General notices

### 1.2.1 Position source

All marine AIS transceivers utilise a satellite based location system.



The accuracy of a GNSS position fix is variable and affected by factors such as the antenna positioning, how many satellites are used to determine a position and for how long satellite information has been received.

### 1.2.2 Compass safe distance

The compass safe distance of this AIS transceiver is 0.5m or greater for a 0.3° deviation.

### 1.2.3 Safe operating distance

The safe operating distance of this AIS transceiver is 20cm from the antenna.

### 1.2.4 Product category

This product is categorized as 'protected' in accordance with the definitions provided in IEC 60945.

### 1.2.5 Disposal of AIS transceiver and packaging

Please dispose of this AIS transceiver in accordance with the European WEEE Directive or with the applicable local regulations for disposal of electrical equipment. Please dispose of the packaging in an environmentally friendly manner.

### **1.2.6 Accuracy of this manual**

This manual is intended as a guide to the installation, setup and use of this product. If you are in any doubt about any aspect of this product, please contact your dealer.

## **1.3 Regulatory statements**

### **1.3.1 Declaration of Conformity**

The manufacturer of this product declares that this product is in compliance with the Radio Equipment Directive (2014/53/EU) and as such, displays the CE mark. The RED declaration of conformity is provided as part of the documentation pack.

The manufacturer declares that this product complies with the United Kingdom Conformity Assessed requirements and as such, displays the UKCA mark. The UKCA declaration of conformity is provided as part of this documentation pack



### 1.3.2 FCC Notice

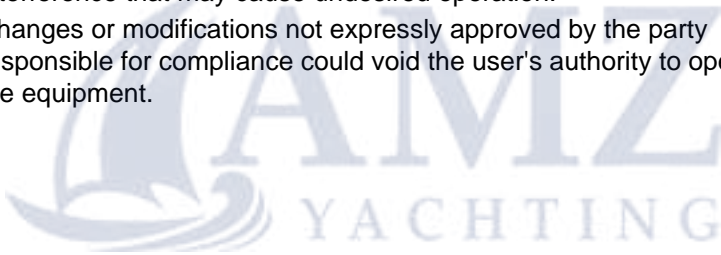


This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.





### 1.3.3 Industry Canada Notice



This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

This Class A digital apparatus complies with Canadian ICES-003.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage, et
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le Fonctionnement.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.





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## 2 Introduction

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### 2.1 About AIS

The marine Automatic Identification System (AIS) is a location and vessel information reporting system. It allows vessels equipped with AIS to automatically and dynamically share and regularly update their position, speed, course and other information such as vessel identity with similarly equipped vessels. Position is derived from GNSS and communication between vessels is by VHF digital transmissions.

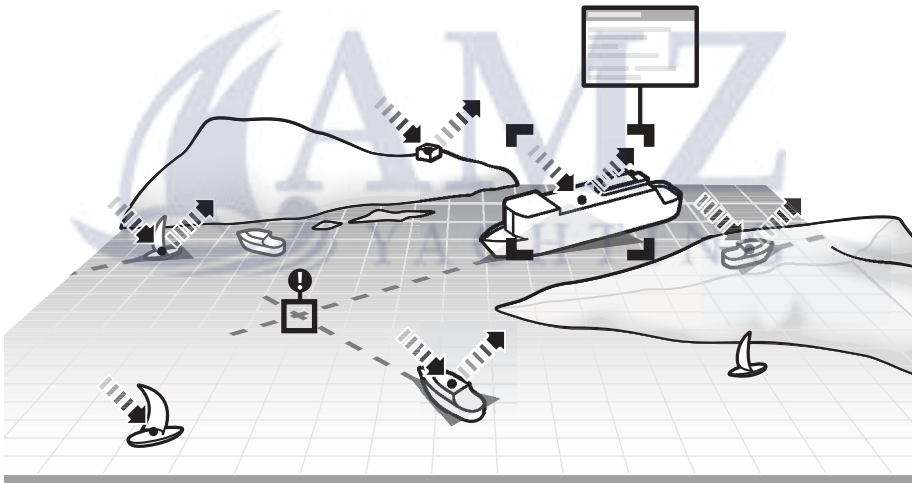


Figure 1 The AIS network



## 3 Installation and configuration

### 3.1 What's in the box?

Please ensure all items are present and if any of the items are missing please contact your dealer.

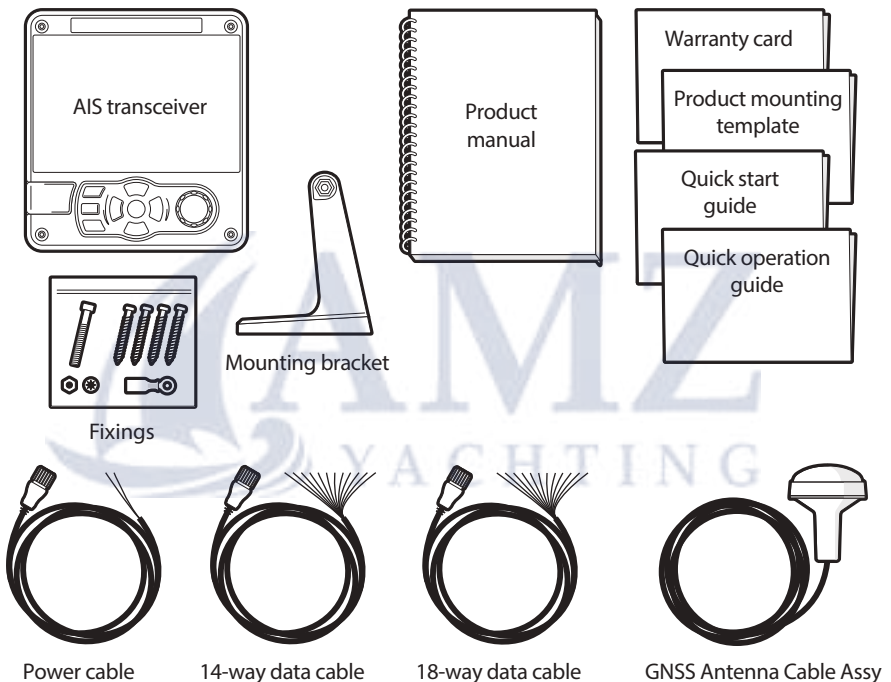


Figure 2 What's in the box?

### 3.2 Preparing for installation

In addition to the items provided with the AIS transceiver the following items will be required to complete the installation:

### **3.2.1 VHF Antenna**

Connection of a suitable VHF antenna will be required for the AIS transceiver to operate. The antenna cable should be terminated with a PL-259 (or UHF) connector. A surge arrestor should be fitted in line with VHF antenna connector. See section 3.3.3 for more information.

Please take note of the warnings listed at the start of this manual regarding the installation and use of antennas.

### **3.2.2 Antenna cables**

The supplied GNSS antenna is provided with 10 metres (32.8ft) of cable. If this is not sufficient to reach between the desired GNSS antenna location and the AIS transceiver you will require an extension cable. Please contact your dealer for details.

### **3.2.3 GNSS Antenna mount**

A mounting bracket is required for the supplied GNSS antenna.

### **3.2.4 Data interface cables**

Suitable screened, multi core cable will be required to connect the ships sensor (DGNSS, Gyro etc.) data ports to the AIS transceiver.

## **3.3 Installation procedures**

Before beginning installation of your AIS transceiver, please ensure that you read all of the instructions in this manual.

The following sections explain the installation process step by step for each of the main system elements. A typical system and connection diagram is provided in Figure 3.

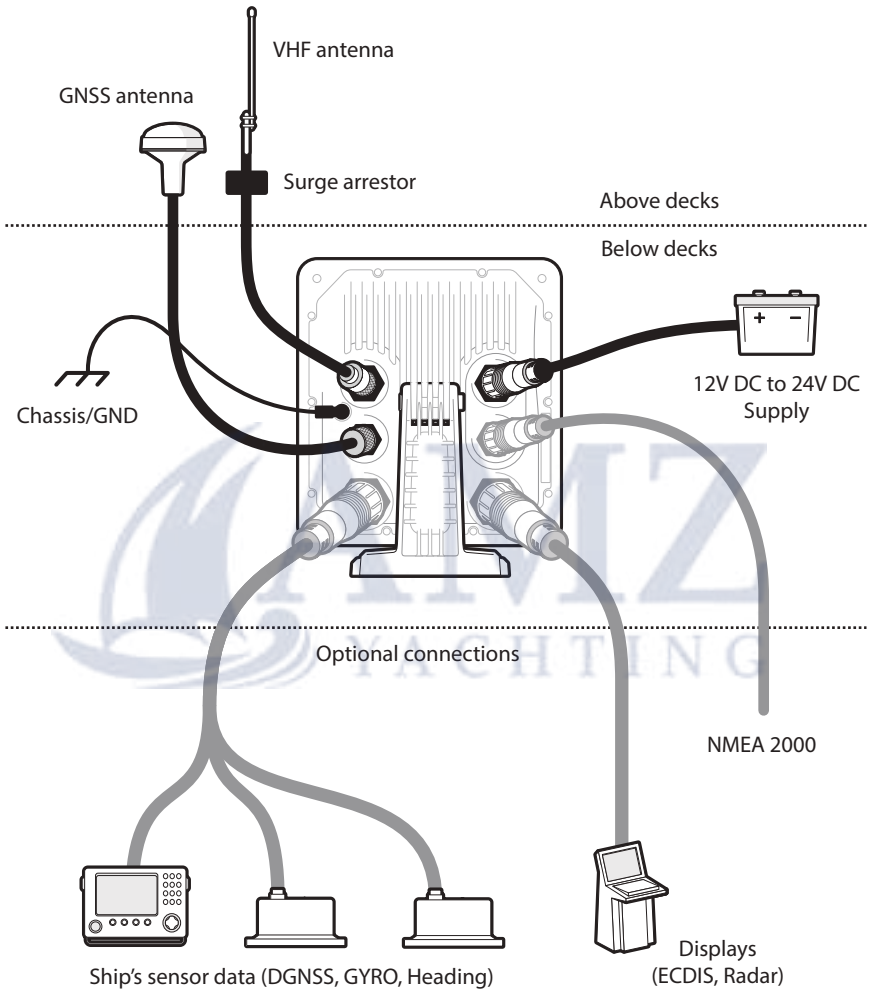


Figure 3 Typical AIS transceiver connection

### 3.3.1 Step 1 - Installing the AIS transceiver

Please note the following guidelines when selecting a location for your AIS transceiver:

- The AIS transceiver must be fitted in a location where it is at least 0.5m (1ft 8ins) from a compass or any magnetic device.
- There should be adequate space around the AIS transceiver for routing of cables. See Figure 31. for details of the AIS transceiver dimensions.
- The ambient temperature around the AIS transceiver should be maintained between -15°C and +55°C (5°F to 131°F). Ensure adequate ventilation is present when panel mounting the AIS transceiver.
- It is recommended that the AIS transceiver be installed in a 'below decks' environment protected from the weather.
- The AIS transceiver is supplied with four self-tapping screws for attachment of the AIS transceiver to a suitable surface using the supplied bracket. Please refer to Figure 5. for guidance.
- The AIS transceiver can be panel mounted using the four self-tapping screws provided. Please refer to Figure 6. for guidance. Access behind the panel is required when using this mounting option.
- The AIS transceiver should be mounted in a location where the display is visible to the user at the position from which the vessel is normally operated.

A pilot plug connection option is included in the 18-way connector located on the rear panel of the AIS transceiver. To provide the pilot plug an optional accessory can be purchased.



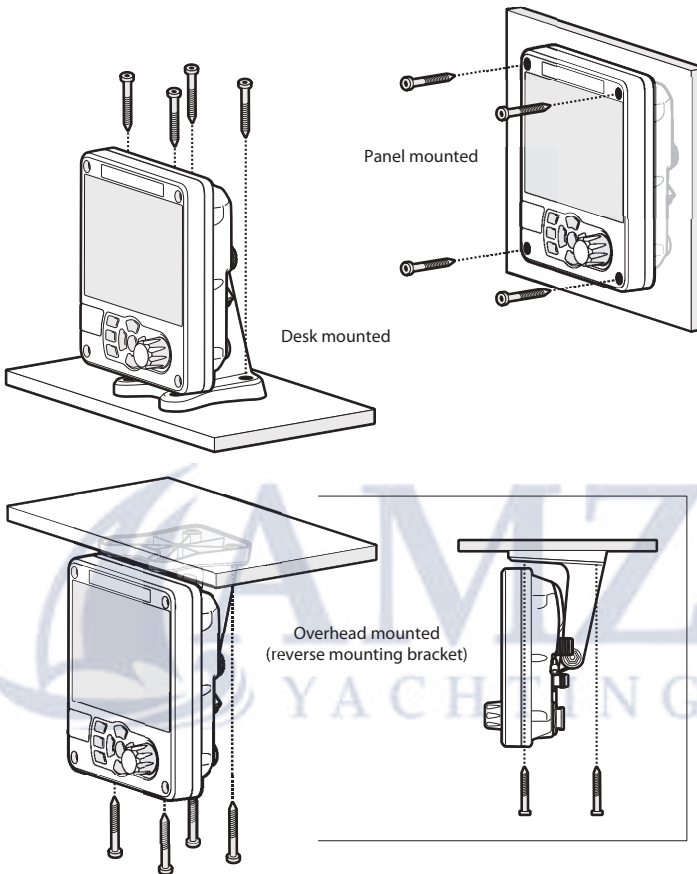


Figure 4 Mounting the AIS transceiver

Refer to Figure 31. for dimensions. A drilling and cutting template is provided with the AIS transceiver.

To panel mount the unit it is necessary to remove the 4 off socket cap screws recessed in front of the unit. See Figure 6.

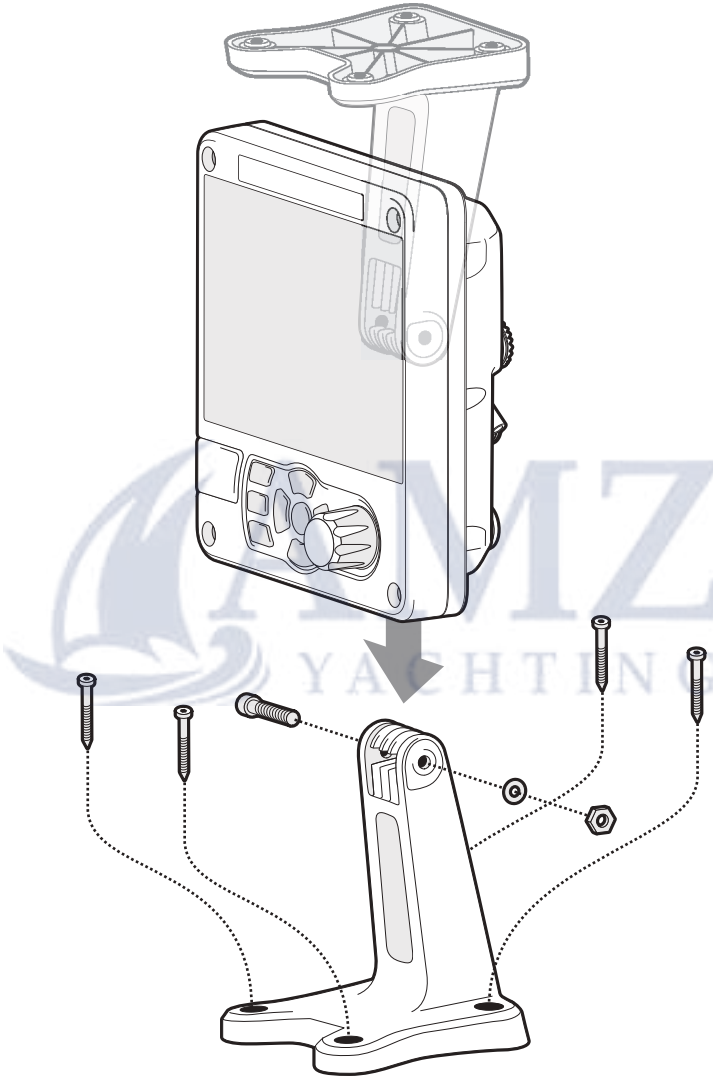


Figure 5 Desk mounting the AIS transceiver

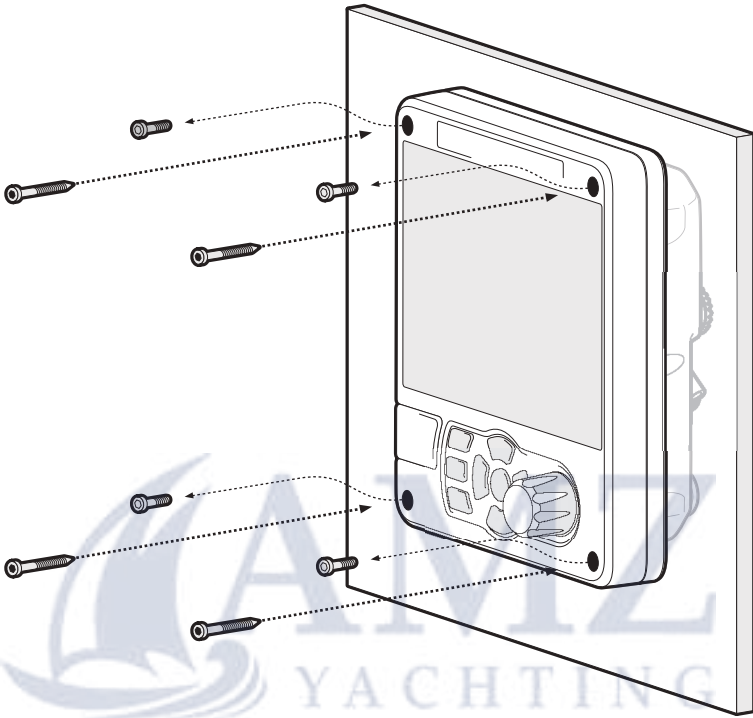


Figure 6 Panel mounting the AIS transceiver

### 3.3.2 Installing the GNSS antenna

For mounting the GNSS antenna supplied with your AIS transceiver you will require a one inch 14 TPI pole mount. Contact your dealer to source a mount suitable for the installation location.

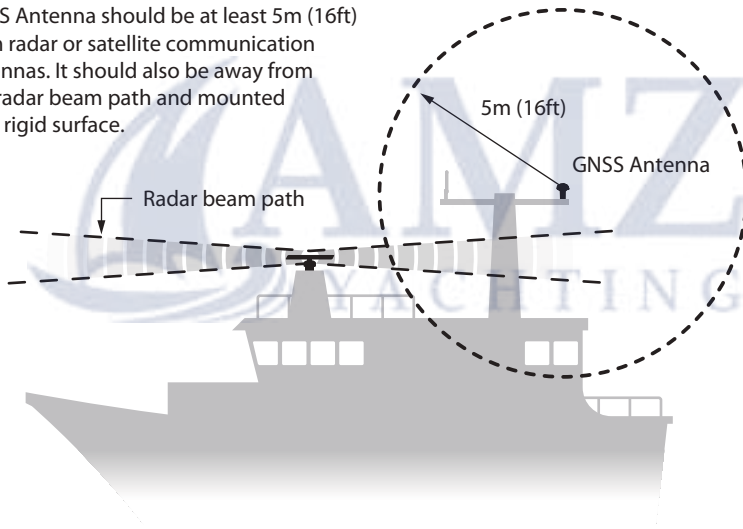
Please note the following guidelines when selecting a location for the GNSS antenna:

- The GNSS antenna mount should be secured to a rigid surface.

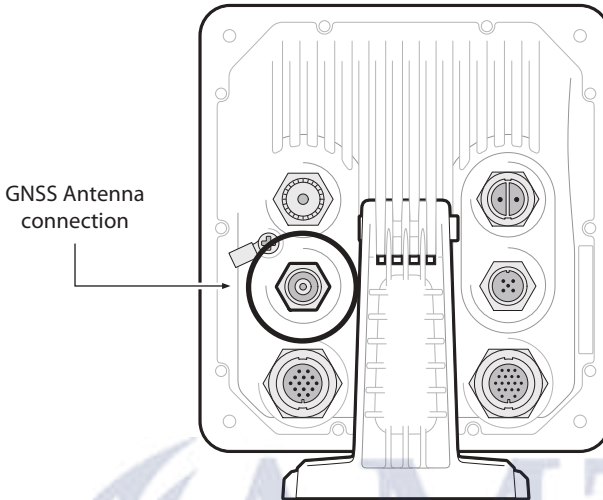
- The GNSS antenna should be located where it has a clear, unobstructed view of the sky overhead.
- The GNSS antenna should be mounted as high as possible, however it is not recommended to mount the antenna on the top of a high mast where the motion of the vessel will cause the antenna to move and potentially reduce the accuracy of the GNSS position.
- Route the GNSS antenna cable to the AIS transceiver. If extension cables are required all junctions should be made using appropriate co-axial connectors and made watertight.

Connect the GNSS antenna cable to the GNSS connector on the AIS transceiver.

GNSS Antenna should be at least 5m (16ft) from radar or satellite communication antennas. It should also be away from the radar beam path and mounted on a rigid surface.



*Figure 7 GNSS Antenna location*



*Figure 8 GNSS Antenna connection*

### **3.3.3 Installing the VHF antenna**

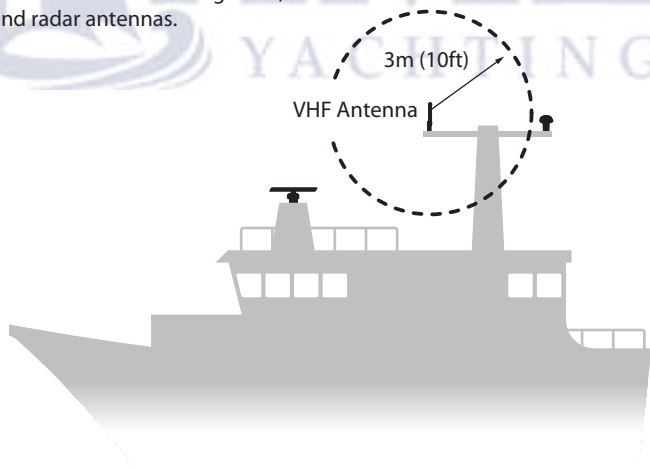
Please note the following guidelines when selecting and locating the AIS VHF antenna:

- The VHF antenna should be located as high as possible and positioned as far from other antennas as possible.
- The VHF antenna should have omnidirectional vertical polarization.
- Where possible the VHF antenna should be installed at least 3m (10ft) away from other transmitting radio, satellite and radar antennas.
- Ideally the AIS VHF antenna should be mounted directly above or below the ship's primary VHF radiotelephone antenna, with no horizontal separation and with a minimum of 2m vertical separation. Refer to Figure 9. for further guidance.

- The VHF antenna cable should be kept as short as possible to minimize signal loss. High quality, low loss co-axial cable appropriate to the installation location should be used.
- The VHF antenna cable should be terminated in a PL-259 co-axial connector for connection to the AIS transceiver.
- Any outdoor installed connectors in the antenna cables should be waterproof by design.
- Antenna cables should be installed in separate signal cable channels at least 10cm (4ins) away from power supply cables. Crossing of cables should be done at right angles and sharp bends in the antenna cables should be avoided.
- It is recommended that a suitable surge arrestor is fitted in-line with the VHF antenna connector.

Connect the VHF antenna cable to the VHF connector on the AIS transceiver as shown in Figure 10.

VHF Antenna should be at least 3m (10ft) from other transmitting radio, satellite and radar antennas.



*Figure 9 VHF Antenna location*

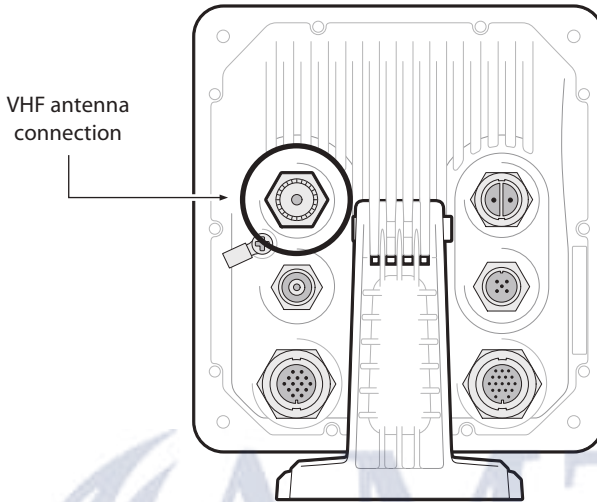


Figure 10 VHF Antenna connection

## 3.4 Connecting the equipment

### 3.4.1 Data connections

The AIS transceiver is supplied with a 2m (6.5 ft) 18-way data cable and a 2m (6.5 ft) 14-way data cable for connection of the AIS transceiver to external sensors and equipment.

### 3.4.2 Sensor configuration

The AIS transceiver has six NMEA 0183 (IEC 61162-1/2) data ports for connection of ship's sensors and display equipment as described in Table 1. and Table 2.

There are three input-only ports for ship's sensor data and three bi-directional high speed ports for connection of display equipment such as radar or electronic chart displays.

### 3.4.3 Data input ports (14-way connector)

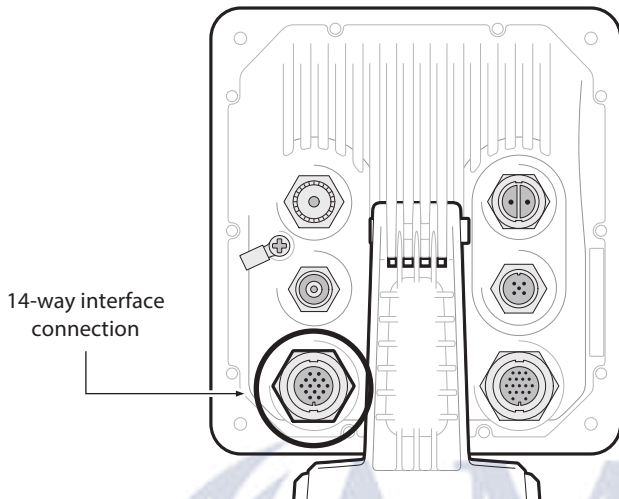


Figure 11 Serial input port connection





| SIGNAL        | WIRE COLOUR   | PIN     |
|---------------|---------------|---------|
| BLUE SIGN N   | BLACK         | 1       |
| BLUE SIGN P   | BROWN         | 3       |
| SILENT N      | BLUE          | 6       |
| SILENT P      | RED           | 7       |
| SENSOR 1 RX B | ORANGE        | 2       |
| SENSOR 1 RX A | PURPLE        | 5       |
| SENSOR 1 COM  | GREEN         | 8       |
| SENSOR 2 RX B | WHITE         | 9       |
| SENSOR 2 RX A | WHITE / BLACK | 12      |
| SENSOR 2 COM  | GREY          | 11      |
| SENSOR 3 RX B | YELLOW        | 14 </td |
| SENSOR 3 RX A | RED / BLACK   | 13      |
| SENSOR 3 COM  | PINK          | 10      |
| CHASSIS       | DRAIN WIRE    | 4       |

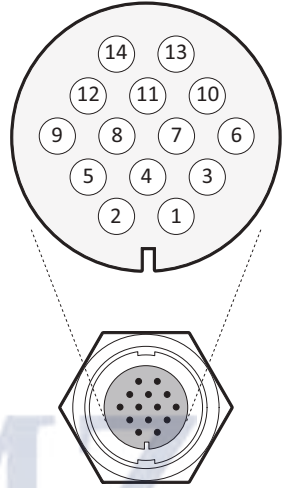


Figure 12 14-way connector cable wiring connections

| Data port | Function   | Type         | Default baud rate |
|-----------|--|--------------|-------------------|
| 4         | Sensor 1 input<br>(DGNSS - COG / SOG /<br>LAT / LON) | Receive only | 4800              |
| 5         | Sensor 2 input<br>(Rate of Turn)                     | Receive only | 4800              |
| 6         | Sensor 3 input<br>(Gyro heading)                     | Receive only | 4800              |

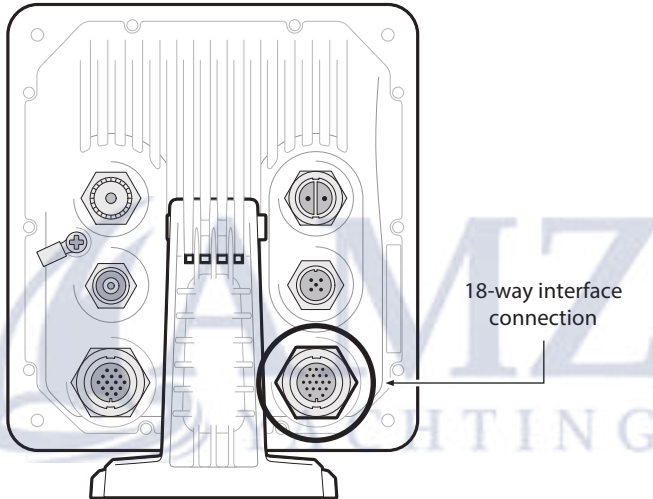
Table 1 14-way connector serial data ports

**Note:** Any unused ports should be terminated by a 120 Ohm resistor across RX A and RX B signals.

### 3.4.4 Silent mode switch

To activate the Silent mode switch, apply a voltage of between 2V and 30V to the SILENT P (Pin 7) and SILENT N (Pin 6) terminals of the 14-way connector.

### 3.4.5 Data bi-directional ports (18-way connector)



*Figure 13 Serial bi-directional port connection*

| SIGNAL           | WIRE COLOUR    | PIN |
|------------------|----------------|-----|
| LR DGNSS TX B    | ORANGE         | 3   |
| LR DGNSS TX A    | BROWN          | 4   |
| LR DGNSS RX B    | PURPLE         | 7   |
| LR DGNSS RX A    | BLUE           | 8   |
| LR DGNSS COM     | BLACK          | 1   |
| PILOT TX B       | RED            | 2   |
| PILOT TX A       | RED / WHITE    | 5   |
| PILOT RX B       | PINK           | 6   |
| PILOT RX A       | YELLOW         | 10  |
| PILOT COM        | GREEN          | 11  |
| ALM NC           | GREY           | 16  |
| ALM COM          | WHITE          | 12  |
| EXT DISPLAY TX B | ORANGE / WHITE | 13  |
| EXT DISPLAY TX A | BLACK / WHITE  | 17  |
| EXT DISPLAY RX B | BROWN / WHITE  | 14  |
| EXT DISPLAY RX A | YELLOW / WHITE | 18  |
| EXT DISPLAY COM  | GREEN / WHITE  | 15  |
| CHASSIS          | DRAIN WIRE     | 9   |

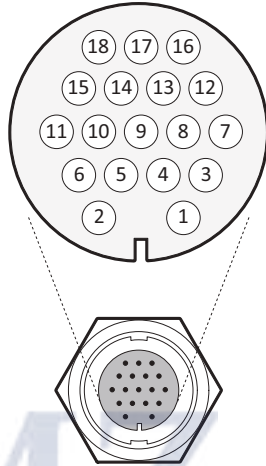


Figure 14 18-way connector cable wiring connections

| Data port | Function                         | Type           | Default Baud rate |
|-----------|----------------------------------|----------------|-------------------|
| 1         | External display / ECDIS         | Bi-directional | 38400             |
| 2         | Pilot port                       | Bi-directional | 38400             |
| 3         | Long-range / DGNSS / Ext Display | Bi-directional | 38400             |

Table 2 18-way connector serial data ports

**Note:** Any unused ports should be terminated by a 120 Ohm resistor across RX A and RX B signals. COMMON signals should be grounded.

All sensor ports can be configured via the Interface settings menu which can be found under the 'Home' > 'System settings' > 'Interfaces' menu option.

The Interface settings menu also includes the ability to disable the requirement for external GNSS sensors to provide a DTM (Datum) sentence.



**If an external GNSS device which does not provide a DTM sentence is connected to the AIS transceiver and the AIS transceiver is configured to require DTM sentences, the external GNSS data will not be accepted by the AIS transceiver. If no DTM sentence is required the WGS84 datum will be used as a coordinate origin and the external GNSS device must be configured to output position using this datum.**

### 3.4.6 Alarm relay connections

The AIS transceiver also provides connections to the alarm relay contacts. The alarm relay connections are described in Table 3.

| Alarm connection | Function                               | Contact rating              |
|------------------|--|-----------------------------|
| COM              | Alarm relay common connection          | 2A at 220VDC or 60W maximum |
| NC               | Alarm relay normally closed connection |                             |

*Table 3 Alarm relay connections*

### 3.4.7 Power connection

Power is connected to the AIS transceiver via the supplied 2-way power cable as shown in Figure 15.

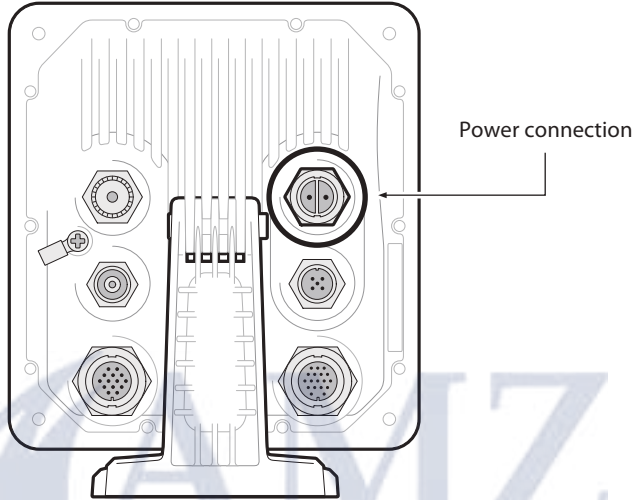


Figure 15 Power connection

| Wire colour | Function       | Connect to   |
|-------------|----------------|--|
| Red         | Power supply + | 12VDC to 24VDC power supply from ships emergency power source* |
| Black       | Power supply - | Power supply ground  |

Table 4 Power supply connections

\*Connection to an emergency power source is an IMO requirement for SOLAS vessels.

The power supply current ratings and recommended fusing or circuit breaker currents are as follows:

- A 12VDC supply should be able to provide a peak current of 6.0A and be fused at 10.0A.
- A 24VDC supply should be able to provide a peak current of 4.0A and should be fused at 6.3A.

### 3.5 Grounding the AIS transceiver

An M4 grounding screw and ring crimp are provided in the fixing kit to allow connection to the grounding point on the rear of the AIS transceiver chassis as indicated in Figure 16.

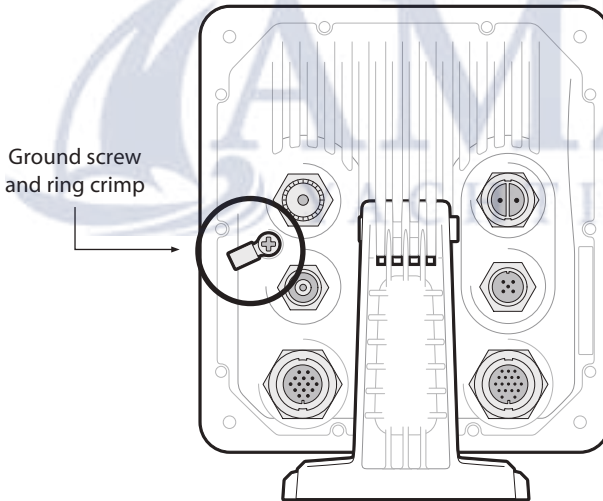


Figure 16 Grounding the AIS transceiver



This product **must** be connected to protective ground via the ground connection point. It is essential that the ground connection point is used in **all installations**, regardless of what other equipment is connected. The ground connection point must be bonded to protective ground using as short a connection as possible.

### 3.6 Connection to an NMEA 2000 network (optional)

The AIS transceiver can be connected to an NMEA 2000 network by a suitable NMEA 2000 network cable available from your local dealer. If your vessel has an NMEA 2000 network please refer to the relevant documentation for your NMEA 2000 equipment. Sensors providing position, ROT, or true heading will be displayed on the NMEA 2000 screen, where three separate source menus will allow for independent configuration based on the data type supported. There is also a fourth menu for displaying other devices. These are not selectable, but can be used to view the other devices on the network. Once connected, and with your chart plotter also connected you will be able to receive AIS targets on your chart plotter. A list of supported PGNs is provided at the rear of this document.

### 3.7 USB Connection

An optional USB cable is available for connection to a PC or Mac. Please note that the USB cable uses the 18-way connector, so the supplied 18-way cable cannot be utilised at the same time.



**If the USB connection is removed from the PC or Mac during use you must reset the connection before further use. To reset the connection, disconnect then reapply power to the AIS before closing and relaunching any PC or Mac applications using the USB connection. Finally, reconnect the USB cable between the PC or Mac and the AIS transceiver**

### 3.8 Turning the AIS transceiver on

The AIS transceiver does not have an On / Off switch and will operate immediately that power is applied to the unit.

### 3.9 Passwords and security

Certain important information stored within the AIS transceiver cannot be changed without knowledge of the password. When trying to edit any of this protected information you will be prompted to enter the password.

The password entry screen is shown in Figure 17. Highlight the required character, then press *'Select'* to enter that character. When all characters of the password have been entered, select *'OK'*.

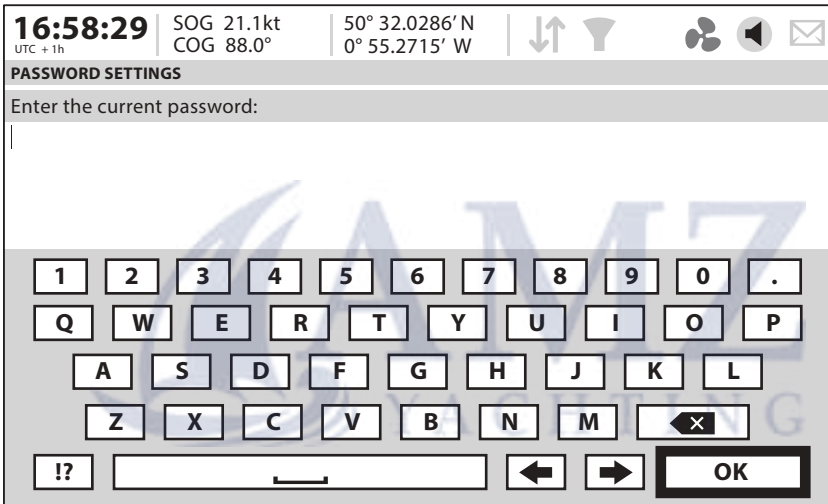


Figure 17 Enter password screen

Following configuration of the AIS transceiver the password should be changed from its default value of '0000' (four zeros) to another alpha numeric code. Password change is carried out by selecting *'Home'* > *'System settings'* > *'User Settings'* > *'Password'*.

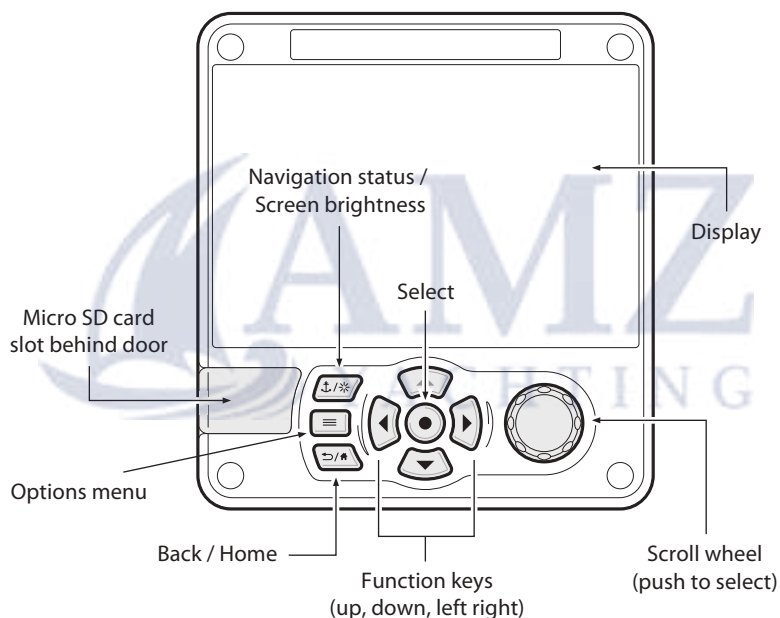
The password should be recorded on the installation record found in Section 9



## 4 Operation

Please read the warning notices at the front of this manual before operating the AIS transceiver.

### 4.1 Display and controls



*Figure 18 AIS Transceiver front panel*

The front panel of the AIS transceiver is shown in Figure 18. with each control marked.

## 4.2 Button functions

**Scroll wheel.** This is used to highlight information presented on the display. The scroll wheel can also be pressed to confirm data entry or select information.

**Navigation status / Screen brightness key.** When pressed with a short press will go to the Navigation status screen. When pressed and held it will go to the '*Display brightness*' screen.

**Options menu key.** Provides access to additional features and relevant shortcuts on certain screens.

**Back / Home key.** When pressed with a short press cancels the current operation and moves to the previous menu or if pressed and held will return to the home screen.

**Select key.** When pressed selects the current option highlighted on the screen.

**Up, down, left and right function keys.** Provide an alternative means of navigating around the screen.

**Speaker.** The speaker is located behind the '*Scroll*' wheel and can provide an audible sound when a key is pressed, a message is received, or an alert is activated. Sounds can be enabled or disabled via the Sound Settings menu.

**Micro SD card.** The Micro SD card socket (behind the door) is provided to allow uploading of new software to the AIS transceiver.

**Display.** The display shows essential AIS operating information and allows for configuration of the AIS transceiver via the menus.

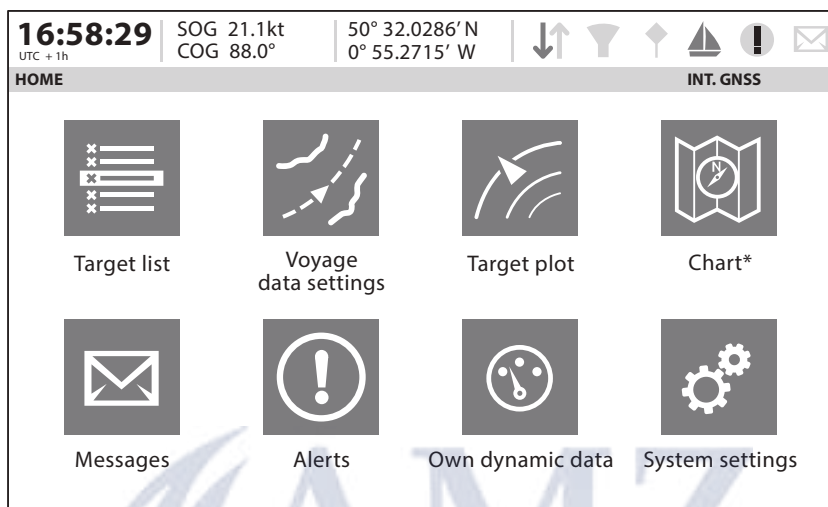
## 4.3 Adjusting display brightness

Press and hold the '*Navigation status / Screen brightness*' key. The screen will change to the '*Display Settings*' screen.

## 4.4 Changing navigation status

Press the '*Navigation status / Screen brightness*' key. The screen will change to the Navigation menu screen. Move to the desired navigation status icon to select it.

## 4.5 Menu navigation



\* The Chart feature is only enabled when this Class A AIS transceiver is operating on a non-SOLAS or Inland vessel.

Figure 19 Home page menu screen

### 4.5.1 Main / Sub menus

Menus are displayed as a set of icons which can be navigated by using the controls. Selection of an icon will then display the information beneath in accordance with Figure 20. Pressing the 'Back / Home' key will exit the menu.

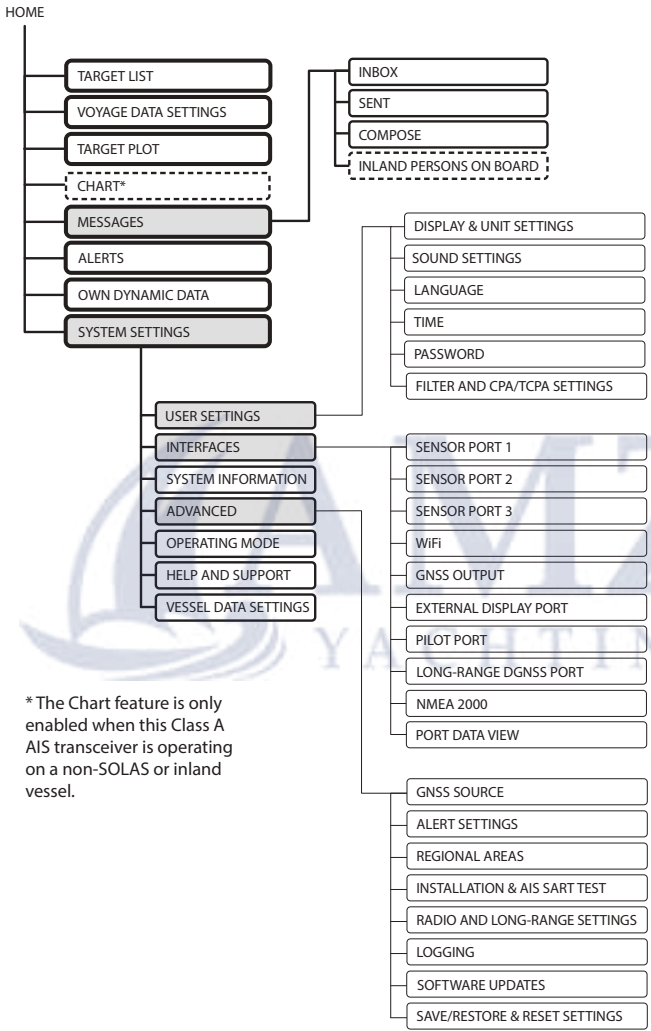


Figure 20 Main menu structure

### 4.5.2 Data entry screens

Some screens allow you to enter data, such as vessel parameters. On these screens you navigate to the desired field and select the appropriate menu item. Some data entry items require a password, this is shown by means of a 'Padlock' icon. Pressing the 'Back / Home' key will exit these menus.

### 4.5.3 Keyboard / Keypad screens

Some screens require text or numeric entry. When these are selected, a virtual keyboard is displayed which can be used to enter text or numbers.

### 4.5.4 Options menu

On certain screens, the Options Menu will bring up a further list of functions specific to that screen. This is indicated by this icon. ☰

## 4.6 Information displayed

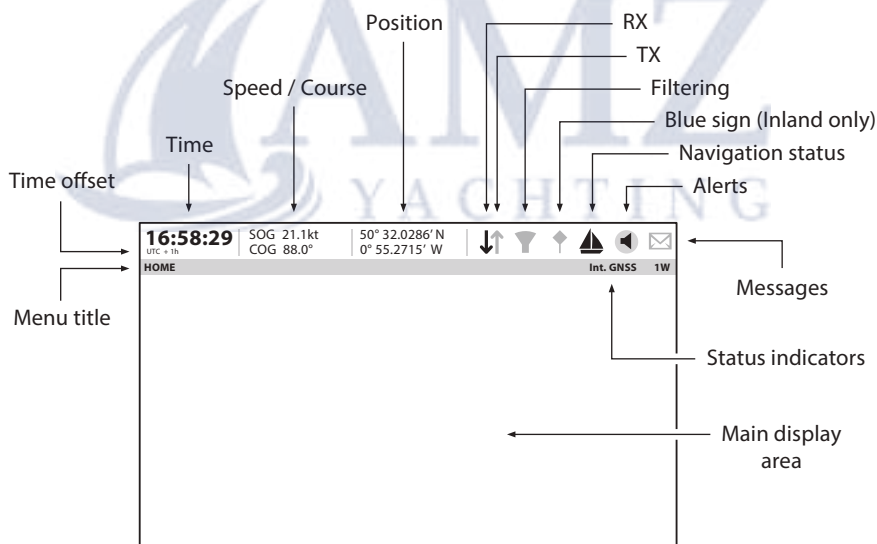


Figure 21 Display layout

#### 4.6.1 Menu title

Refers to the current menu displayed from Figure 20.

#### 4.6.2 Time

Time derived from GNSS satellites or AIS Base Stations.

#### 4.6.3 Time offset

Offset from UTC, set on the *'Time'* menu.

#### 4.6.4 Speed / Course

Vessel speed and course as taken from GNSS satellite data.

#### 4.6.5 Position

Vessel position taken from GNSS source.

#### 4.6.6 Icons

**RX** - Illuminates to show receiving an AIS message.

**TX** - Illuminates to show transmission of an AIS message.

**Filtering** - Illuminated to show that target filter settings apply.

**Blue sign** - Inland only. Display of Blue Sign status.

**Navigation status** - Vessel navigation status.

**Alerts** - Displays an alert icon to show the presence of AIS alerts.

**Messages** - Displays an envelope icon with a number to show the presence of AIS messages received See menu *'Messages'*.

**Status indicators** - Displays the AIS transceiver status as shown in Table 5.

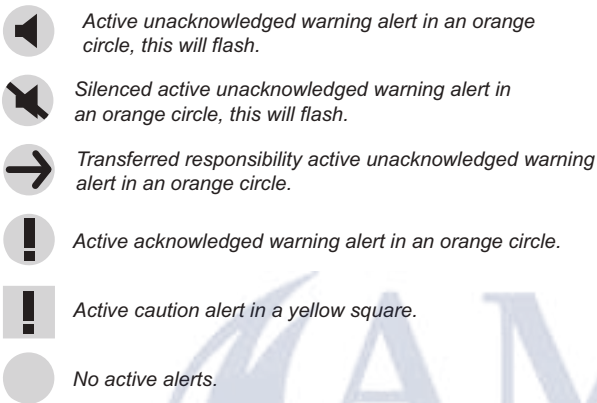
| Icon      | Description  |
|-----------|--|
| INLAND    | Shown when the AIS transceiver is operating in 'Inland Waterways' Mode                 |
| 1W        | Shown when the transmitter is set to 1W mode.  |
| INT GNSS  | Shown when the internal GNSS receiver has a valid position fix.                        |
| EXT GNSS  | Shown when the connected external GNSS receiver has a valid position fix.              |
| NO GNSS   | Shown when there is no valid internal or external position fix.                        |
| INT DGNSS | Shown when the internal GNSS receiver has a valid differential position fix.           |
| EXT DGNSS | Shown when the connected external GNSS receiver has a valid differential position fix. |

*Table 5 Status indicators*

#### 4.6.7 Alerts

The AIS transceiver performs self-checking functions continuously. If a self-check fails a display will appear on the screen notifying the operator of this. If the feature is enabled via the '*Sound Settings*' menu, the occurrence of an Alert will be accompanied by a notification sound. The alert can be acknowledged via the on-screen message. The list of currently active AIS alerts can be displayed by accessing the '*Alerts*' menu. If an alert occurs please try restarting the transceiver or checking the relevant connections in the first instance. If any alert condition persists, contact your dealer or installer. The Alerts icon indicates the alert status. When there are no active alerts the blank icon is displayed, see Figure 22. If a warning alert occurs, the display

changes to show the unacknowledged warning alert icon. Once the warning alert has been acknowledged, the acknowledged warning alert icon is displayed. If the only active alerts are caution alerts, the caution alert icon is displayed. Specific alerts can be disabled in the Alert settings menu if the relevant sensors are not installed.



**Figure 22** Alert icons

When the transceiver is used with a Central Alert Management (CAM) system, other equipment in the system is able to take responsibility for the transceiver's warning alerts (caution alerts are unaffected). The transferred responsibility active unacknowledged warning alert icon is used to indicate when this has occurred. A CAM system also allows other equipment to silence alerts produced by the transceiver. This is indicated by the silenced active unacknowledged warning alert icon.

All supported alerts are Category B (as per IEC 62923-1 - Bridge Alert Management) and are listed in Table 6 and Table 7. This product supports Escalation of a Warning as a Warning only. This product supports the silencing and responsibility transfer of warning alerts by external CAM equipment via the IEC 61162 (NMEA 0183) serial ports only.



| Alert            | Alert Additional Information | Alert Identifier (Instance ID) | Description  |
|------------------|------------------------------|--------------------------------|--|
| Locating device  | Check AIS targets            | 3108 (1)                       | An active locating (AIS SART, MOB or PLB) message has been received. The device will be displayed as the top item in the target list. Select this item to see the location of the device.  |
| Transceiver fail | Not transmitting, check AIS  | 3008 (1)                       | <b>This alert will occur if the MMSI has not been configured.</b><br>This alert can occur if the radio hardware has failed. Please restart the transceiver.<br>The alert will be cleared if the transmitter recovers normal operation. |
| Transceiver fail | Not receiving, check AIS     | 3008 (2)                       | This alert occurs should the receiver hardware malfunction. Please restart the transceiver.<br>If the receiver returns to normal operation this alert will be cleared.   |

| Alert         | Alert Additional Information      | Alert Identifier (Instance ID) | Description   |
|---------------|-----------------------------------|--------------------------------|---|
| Lost position | Own ship position not transmitted | 3015<br>(1)                    | This alert occurs if the AIS transceiver has no valid position information from any connected sensor. Please check the connections to the sensor. |

*Table 6 Warnings in priority order*

| Alert          | Alert Additional Information  | Alert Identifier (Instance ID)                    | Description   |
|----------------|---|---|---|
| Impaired radio | Reduced coverage (antenna VSWR)   | 3116<br>(1)                                       | This alert occurs if there is a problem with your antenna or antenna connection. Please check the antenna and cable to ensure it is fully connected                 |
| Impaired radio | Ch1 inoperative, check AIS<br>Ch2 inoperative, check AIS<br>DSC inoperative | 3116<br>(2)<br><br>3116<br>(3)<br><br>3116<br>(4) | This alert occurs should the receiver hardware malfunction. Please restart the transceiver. If the receiver returns to normal operation this alert will be cleared. |

| Alert            | Alert Additional Information           | Alert Identifier (Instance ID) | Description   |
|------------------|--|--------------------------------|---|
| Sync in fallback | Check AIS for UTC time synchronisation | 3113<br>(1)                    | This alert indicates that the transmitter is no longer directly synchronized with the GNSS receiver. This may be because the GNSS receiver cannot receive sufficient satellites. Please check the supplied GNSS antenna is installed correctly. |
| Lost ext EPFS    | Check external position sensor         | 3003<br>(1)                    | This alert occurs if the position from the external Electronic Position Fixing System (i.e. GNSS) is invalid or lost. Please check the connections to the sensor.   |
| Missing COG      | Not transmitting COG                   | 3119<br>(1)                    | This alert occurs if the AIS transceiver has no valid Course Over Ground information from any connected sensor. Please check the connections to the sensor.   |

| Alert           | Alert Additional Information   | Alert Identifier (Instance ID) | Description  |
|-----------------|--------------------------------|--------------------------------|--|
| Missing SOG     | Not transmitting SOG           | 3119 (2)                       | This alert occurs if the AIS transceiver has no valid Speed Over Ground information from any connected sensor. Please check the connections to the sensor.   |
| Missing Heading | Not transmitting Heading       | 3119 (3)                       | This alert occurs if the AIS transceiver has no valid heading information from any connected sensor, or if the heading is undefined. Please check the connections to the sensor.                       |
| Missing ROT     | Not transmitting Rate of Turn  | 3119 (4)                       | This alert occurs if the AIS transceiver has no Rate Of Turn information from connected sensors or via internal calculation. Please check the connections to the sensor.                               |
| Doubtful GNSS   | Int/Ext GNSS position mismatch | 3013 (1)                       | This alert occurs if the difference in position reported by the internal and external GNSS receivers is too large. Check the vessel dimensions and GNSS antenna locations have been entered correctly. |

| Alert            | Alert Additional Information           | Alert Identifier (Instance ID) | Description   |
|------------------|--|--------------------------------|---|
| Doubtful heading | Difference with COG exceeds limit      | 3013<br>(2)                    | This alert occurs if the difference between the course over ground and heading data is greater than 45° for more than 5 minutes. This alert only occurs if the vessel speed over ground is greater than 5 knots. Please check the connections to the sensor.                        |
| Wrong NavStatus  | Check NavStatus setting                | 3019<br>(1)                    | This alert will occur if the navigation status is in conflict with the current speed of the vessel. For example the alert will activate if the Navigation status is set to moored, but the vessel speed is greater than 3 knots. Correct the navigation status to clear this alert. |
| Lost MKD         | Cannot display safety related messages | 3009<br>(1)                    | This alert occurs should the MKD hardware malfunction. Please restart the transceiver. If the MKD returns to normal operation this alert will be cleared.   |

Table 7 Cautions

#### 4.6.8 Messages

AIS text messages and Safety Related Messages (SRMs) can be received from other AIS equipped vessels and also sent to specific vessels (addressed messages) or sent to all vessels in range (broadcast messages).

Reception of an AIS text message is indicated by the presence of the message icon at the top of the screen. This icon is shown whenever there are unread AIS text messages. Messages can be reviewed and replied to via the Inbox. The AIS transceiver can store up to a maximum of 20 messages in the Inbox and 20 messages in the Sent folder. If the number of messages exceeds 20 then the oldest message will be overwritten.

When a Safety Related Message is received the user will be notified immediately with a pop-up showing the message. Standard text messages are not displayed on receipt, however the message icon will be displayed at the top of the screen.

AIS messages can be viewed, created and transmitted from the 'Messages' menu.

The available options are:

Compose - takes you to the message composition screen.

Inbox - takes you to the received message list view, where 20 messages can be saved.

Sent - shows a list of recently sent messages.

To compose a new message, select the type of message from the drop down menu and the destination. This can be by directly entering the MMSI, or by selecting from a list of visible targets.

The message text is entered using the on-screen keyboard.



**Class B AIS transceivers are permitted to receive broadcast SRMs and broadcast text messages, however this function is not mandatory. Some Class B AIS transceivers are not able to receive addressed SRM or text messages. There is therefore no guarantee that text messages or SRMs sent by this device to a Class B AIS transceiver will be received.**

#### 4.6.9 Long-range messages

If the AIS transceiver is connected to a long-range communication system via the long-range communications port then long-range interrogations may be received. These are requests for information from a distant base station beyond normal AIS operation range.

The AIS transceiver can be configured to automatically respond to Long-range (LR) interrogations, or you can opt to respond to any interrogation manually. Automatic response is the default setting, but this can be changed on the 'Home' > 'System settings' > 'Advanced' > 'Radio and Long-range settings' menu.

When a Long-range interrogation is received you will be alerted by an on-screen pop-up message.

In automatic response mode simply review and acknowledge the notification screen using 'Acknowledge'. In manual response mode you should review the request and select either the 'Respond' or 'Decline' option as appropriate.

#### 4.6.10 Silent Mode

Silent mode can be enabled or disabled in the Home' > 'System settings' > 'Advanced' > 'Radio and Long-range settings' menu.

#### 4.6.11 Chart

The Chart feature is only enabled when this Class A AIS transceiver is operating on a non-SOLAS or Inland vessel.

The AIS transceiver contains an application which will display AIS targets received, along with its own vessel position on a chart style plot.

The chart can be scrolled up, down, left, and right using the 'Function' keys. Zooming in and out is via the 'Scroll' wheel.

Targets can be selected by moving the cross hairs over a target and pressing the 'Select' key.

The 'Options' menu is also available for more advanced features.

Within the 'Options' menu, the chart can be oriented to either North, Heading, or Course Up. The chart can be set so that the own vessel position is always in the centre of the screen.

The chart can be de-cluttered by hiding filtered targets, or vessel names from the display.

SOG vectors can also be displayed on the screen if this item is selected from the 'Options' menu.

Some of the layers displayed on the chart can be removed to provide more clarity on the display. The 'Chart Settings' screen provides a way of modifying these.

It is possible to record and display your own vessel track on the Chart feature, showing up to 30 days of voyage history. It can also be downloaded to an SD card from the Logging menu.

The chart feature is an aid for the display of information only and should not be used for vessel navigation.

#### **4.6.12 Help and support screen**

This screen is available from the 'Home' > 'System Settings' menu and provides contact information for the product manufacturer.

It also provides relevant information from the User Manual.

#### **4.6.13 User settings screen**

From this screen, it is possible to set the display brightness, set the display to a day or night colour scheme, set the operating units to metric or nautical, and configure the sounds emitted by the device. It is also possible from this screen to set the UTC time offset, change the password, change the filter settings and display the menus in a number of non-English languages.

### **4.7 Configuring vessel information**

#### **4.7.1 Pre-configuration checks**

To proceed with configuration the steps in Section 3 should already have been completed.

#### **4.7.2 Configuring vessel identification information**

The AIS transceiver must be configured with information about the vessel on which it is installed prior to operation. The following information is required to be entered in the 'Home' > 'system settings' > 'Vessel data settings' menu:



- MMSI - Vessel MMSI number, this can usually be found on the ships VHF radio license and should be the same MMSI as used for the VHF / DSC radio.
- Ship name (limited to 20 characters)
- Callsign - Vessel radio call sign (limited to 7 characters)
- IMO - Vessel's IMO identification number (if applicable)
- Ship type - Selected from the menu provided.
- Internal dimensions of the location of the GNSS antenna connected directly to the AIS transceiver (Internal GNSS).
- External dimensions of the location of an optional GNSS antenna connected to the AIS transceiver via an NMEA interface.
- 

#### **4.7.3 Configuring the internal GNSS receiver**

The internal GNSS receiver can be configured to operate in one of six modes:

- GLONASS and GPS – in this mode the position fix is derived from both the GLONASS and GPS systems in parallel. This mode is the default setting.
- GPS and BeiDou - in this mode the position fix is derived from both the GPS and BeiDou systems in parallel.
- BeiDou and GLONASS - in this mode the position fix is derived from both the BeiDou and GLONASS systems in parallel
- GPS – in this mode the position fix is derived from the GPS system only.
- GLONASS – in this mode the position fix is derived from the GLONASS system only.
- BeiDou - in this mode the position fix is derived from the BeiDou system only.

The operating mode can be selected from the '*GNSS source*' option in the '*Home*' > '*System settings*' > '*Advanced*' settings menu.

The antenna dimensions should be entered in metres according to the diagram provided in Figure 23.

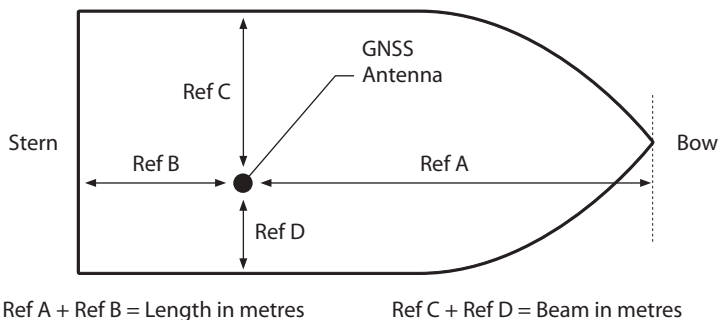


Figure 23 Vessel dimension measurement



## 4.8 Configuring voyage information

### 4.8.1 Configure voyage related data

The AIS transceiver must be configured with information about its voyage prior to operation. To enter the vessel identification information select the *'Home'* > *'Voyage Data settings'* option.

The following information is required:

- Destination - Ships next destination port (limited to 20 characters).
- ETA - Estimated time / date of arrival at destination (using UTC time).
- Static draught - Maximum present static draught to the nearest 1/10th of a metre.
- Navigation status - Navigational status selected from the icons on the screen.

The following information is optional:

- Extension dimensions - enter the dimensions of the craft being towed
- Persons on board - Number of crew on board.

If the vessel is being operated in Inland mode then further additional data is required to be input. Refer to Section 5 for details.

## 4.9 Confirming correct operation

Following entry of the vessel and voyage information the AIS transceiver will commence normal operation. Correct operation should be verified as follows:

1. Select the *'Own dynamic data'* option from the *'Home'* menu.
2. Check that the displayed position, course, speed and heading are correct by comparing to the display associated to the connected position source and other data sources.
3. Check that the *'TX'* icon flashes periodically.
4. If the vessel is in an area where other AIS equipped vessels are present press the *'Back / Home'* key and select *'Target list'* to check that data from other AIS equipped vessels is displayed.

5. Go to the *'Home' > 'System settings' > 'System Information'* screen and select *'Hardware status'*, check that the supply voltage, forward power, and antenna VSWR are acceptable. A good VSWR is 3:1. A good Forward Power is 41dBm.

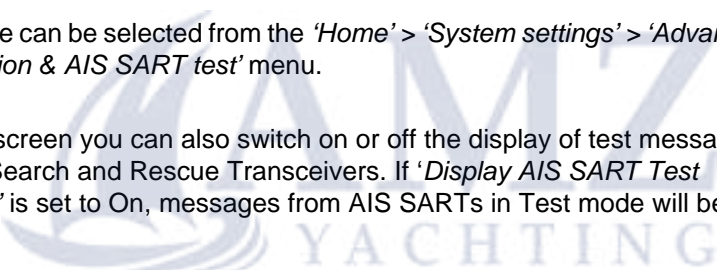
The AIS transceiver is now operational and should remain powered unless authorised by the local maritime authority. The installation record at the rear of this manual should be completed and left on board the vessel.

#### **4.10 Communication test**

It is possible to conduct an AIS communication test with another AIS equipped vessel. This test sends an AIS message to another vessel and checks for a response. The AIS transceiver will display a list of vessels from which one can be selected for a communication test.

This feature can be selected from the *'Home' > 'System settings' > 'Advanced' > 'Installation & AIS SART test'* menu.

From this screen you can also switch on or off the display of test messages from AIS Search and Rescue Transceivers. If *'Display AIS SART Test Messages'* is set to On, messages from AIS SARTs in Test mode will be displayed.



## 4.11 Displaying AIS targets

### 4.11.1 Target list

The *'Target list'* screen is the primary screen for displaying AIS targets received. This is the first screen displayed when the unit is switched on, but can also be accessed from the *'Target list'* option on the *'Home'* menu.

| <b>16:58:29</b><br>UTC +1h  | SOG 21.1kt<br>COG 88.0° | 50° 32.0286' N<br>0° 55.2715' W |        |        |           |        |
|-----------------------------|-------------------------|---------------------------------|--------|--------|-----------|--------|
| TARGET LIST                 |                         |                                 |        |        | INT. GNSS |        |
| NAME/MMSI                   | Range                   | Bearing                         | CPA    | TCPA   | Type      | Age    |
| DUBLIN FISHER               | 3.15NM                  | 120.8°                          | 3.15NM | -      |           | 1m 50s |
| PROXIMITY CRAFT             | 15.5NM                  | 22.6°                           | 15.5NM | -      |           | 1m 47s |
| ATLANTIC PRIDE              | 6.9NM                   | 37.20                           | 6.9NM  | -      |           | 0m 1s  |
| 212222222                   | 6.7NM                   | 313.4°                          | 6.7NM  | -      |           | 0m 36s |
| EMSLAKE                     | -                       | -                               | -      | -      |           | 0m 45s |
| PIER 4                      | 5.2NM                   | 86.6°                           | 5.2NM  | 5h 38m |           | 0m 6s  |
| 444110175                   | 35.8NM                  | 167.3°                          | 35.8NM | -      |           | 0m 5s  |
| Visible: 12 Filtered out: 0 |                         |                                 |        |        |           |        |

Figure 24 Target list screen

By default the *'Target list'* is sorted by range but can be sorted on any column by using the left and right *'Function'* keys to select a column and pressing the *'Select'* key to sort either in ascending or descending order. Navigation up and down the list is via the up and down arrow keys or scroll wheel. Selecting a highlighted target using the Select key will bring up more details of that target. The *Options* menu on this screen provides additional actions which can be performed on the *'Target list'*.

Different symbols are shown for an AIS target depending on the type of target and its status, these are shown in Figure 25. These symbols are common to the *'Target list'* and *'Target plot'* displays.

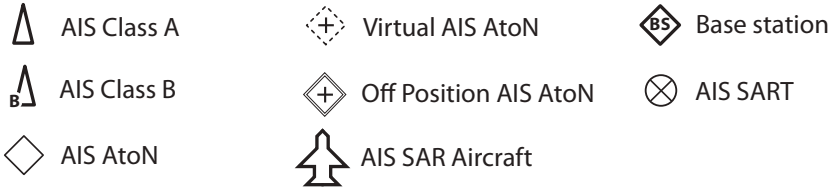


Figure 25 AIS target symbols displayed

### 4.11.2 Target filtering

From the *'Target list'* options menu, if *'Show Filter Settings'* is selected, a screen is displayed indicating which filter parameters can be set to reduce the amount of data displayed on-screen. This screen can also be accessed through *'Home' > 'System settings' > 'User settings'*.



Filters can be toggled on and off on the *'Target list'* by pressing the *'Options menu'* key and selecting *'Toggle Filters On / Off'*. The bottom line of the *'Target list'* shows how many targets are visible or filtered out. If a filter is set, the filter icon is displayed at the top of the screen.

The Filters icon does not represent CPA/TCPA settings.

### 4.11.3 CPA/TCPA Settings

The AIS transceiver can be configured to identify approaching vessels which fall within certain limits. The Closest Point of Approach (CPA) defines a boundary around the own vessel upon which, if breached, will trigger an alert. Time to Closest Point of Approach (TCPA) can only be set if CPA is set, and will trigger the alert if the time to the CPA limit is breached.

These parameters are set on the *'Home' > 'System settings' > 'User settings' > 'Filtering and CPA/TCPA Settings'* menu.

The target list shows targets which trigger the CPA/TCPA alert in red.

These CPA/TCPA figures are calculated solely on AIS data and should not be used for anti-collision purposes.

**Note:** Setting the CPA/TCPA filter will not activate the Filters Icon.

#### 4.11.4 Target plot

The '*Target plot*' screen shows the location of other AIS equipped vessels and shore stations relative to your own vessel. The '*Target plot*' screen provides a basic overview of AIS targets and should not be regarded as a substitute for display of AIS information on a dedicated electronic chart display system (ECDIS).

The plot range can be adjusted by rotating the scroll wheel which cycles through the ranges 0.1NM up to 100NM. The range relates to the radius of the outer range ring shown on the screen.

Individual targets can be selected by using the arrow keys. When selected a square outline will appear around the target and the vessel details will be shown on the left-hand side of the screen.

By pressing the options menu key, additional display features can be selected. If the Own Vessel Details option is selected the left-hand side of the screen will change to show own vessel dynamic data.

If the MOB Details Display option is selected, the target plot will change to show only AIS-MOB, AIS-SART, and AIS-EPIRB devices. The left-hand side of the screen will show the range and relative bearing to whichever target is currently highlighted using the arrow keys.

## 4.12 Micro SD card data input

On the front of the AIS transceiver under the cover on the lower left-hand side is a socket for a Micro SD memory card. See Figure 26. This can be used to upgrade the unit firmware, display detailed charts or to log port data. Note the orientation of the Micro SD card, which is critical to ensure the product is not damaged.

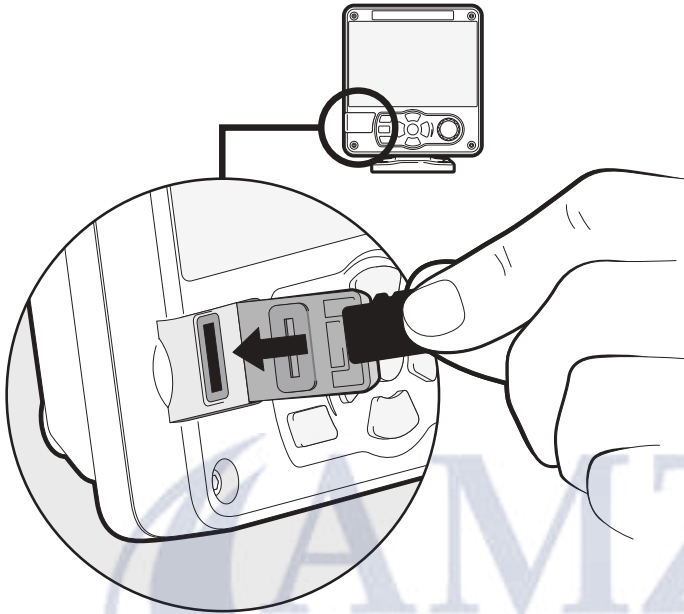


Figure 26 Micro SD card Socket

#### 4.12.1 Loading new charts

The AIS transceiver always contains a basic low resolution world chart. More detailed resolution charts can be purchased and overlaid onto the AIS transceiver's chart display.

The AIS transceiver will read only C-MAP MAX format Micro SD cards. See your dealer for available charts for your region.

Insert a C-MAP Micro SD card into the Micro SD card socket. The AIS transceiver will then automatically overlay that higher resolution chart region onto the relevant region on the AIS transceiver's world chart.

Remove the Micro SD card and the region will revert back to the basic world chart.



### 4.12.2 Upgrading the unit firmware

If a Micro SD card that contains valid upgrade firmware is inserted into the card socket, the unit will recognize the new firmware and will display a message asking you if you want to install it. The system will guide you to the appropriate menu screen, where the firmware update can be applied.

### 4.12.3 Logging ports to the Micro SD card

If a Micro SD card is inserted into the card socket, the AIS transceiver can be configured to output specific data to the card. This is accessed from the individual port menu (from the *'Home' > 'System settings' > 'Interfaces' menu.*) If the *'Log port to SD'* option is set to *'On'*, data will be output from that port to the Micro SD card, if one is inserted into the card socket. Only one port can be logged to the Micro SD card at a time. It is also possible to save a copy of the current screen to the Micro SD Card for diagnostics purposes by pressing and holding the rotary controller for at least 3 seconds.

### 4.12.4 Saving / Loading settings

From the *'Home' > 'System Settings' > 'Advanced' > 'Save / Restore & Reset settings'* menu, all system settings and AIS transceiver configuration data can be saved to the Micro SD card, if one is inserted into the card socket. Settings previously saved can be restored, thus restoring the AIS transceiver to a previous configuration. *'Reset all settings'* will restore the unit to its factory defaults and is protected by the unit password.

## 4.13 WiFi Feature

The AIS transceiver provides features to operate with vessel WiFi networks, or to create its own network. Access the WiFi menu through *'Home' > 'System settings' > 'Interfaces' > 'WiFi'*.

### 4.13.1 Client mode

If client mode is selected, the AIS transceiver will search for available WiFi networks to connect to. If one is selected a password may be required, and upon connection the details of the connection will be shown in the bottom right corner of the screen. Once a WiFi connection is made, the AIS transceiver will

output a range of NMEA 0183 sentences over the selected WiFi port to any connected devices.

#### **4.13.2 Access point mode**

If the AIS transceiver is configured as a WiFi access point (AP) it will create its own WiFi network, allowing other WiFi enabled devices to connect to it. Up to 5 simultaneous connections are supported. Once connections are made, a range of NMEA 0183 sentences will be transmitted from the AIS transceiver to any connected devices. The following parameters are set by default:

- Protocol: TCP
- DHCP: Enable
- IP address: 192.168.50.1
- Port: 49200
- SSID: Class A AIS <unique number>
- Encryption: WPA-2
- Channel: 6

#### **4.13.3 Advanced WiFi features**

Within the 'WiFi' screen, certain parameters can be changed such as Channel Number, Protocol, Port, Encryption, etc. These are recommended for advanced users only.

WiFi is switched off by selecting 'Disable' in the 'Select operating mode' box.

## 5 Inland mode

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### 5.1 Mode SOLAS / Inland AIS

The AIS transceiver supports both standard ‘high seas’ operation and ‘Inland AIS’ operation. Inland AIS is an extension of AIS intended for use on board vessels navigating Inland waterways.



**The information entered and transmitted in Inland mode is not the same as that transmitted in SOLAS mode. After switching modes, please check your voyage and vessel data settings to ensure the configuration is correct.**

#### 5.1.1 Switching between ‘Class A’ and ‘Inland AIS’ modes

To switch between operating modes select the ‘Home’ > ‘System settings’ > ‘Operating mode’ option. Set the ‘Operating mode’ setting to ‘Inland AIS’ or ‘Class A /SOLAS’ before saving the setting. When the AIS transceiver is configured to operate in Inland AIS mode the word ‘INLAND’ is shown permanently in the Menu title bar.

#### 5.1.2 Entering Inland vessel identification settings

Additional vessel identification information is required for Inland operation along with some changes to the standard AIS configuration. The following additional information must be entered into the AIS transceiver:

- A quality setting for the speed, course and heading data sources connected to the AIS is required. The quality setting can be ‘high’ or ‘low’ for each data source. The low setting should be used unless a type approved sensor (e.g. a gyro providing heading information) is connected to the AIS transceiver.

The additional identification information can be entered via the ‘Vessel data settings’ menu.

The following standard AIS vessel identification information must be updated for Inland AIS:

- The vessels ENI - this is an 8-digit number allocated to the vessel.
- The ship and convoy type as an ERI code selected from the menu provided.
- The length and beam of the ship to the nearest 10cm (greater accuracy than standard AIS configuration).

These updates are all made using the process described in section 4.7.2

### 5.1.3 Entering Inland vessel voyage settings

Additional voyage related information is required for Inland operation along with some changes to the standard AIS configuration. The following additional information must be entered into the AIS transceiver:

- The vessel's load status (Loaded, Unloaded, or Unknown).
- The number of blue cones or blue flag status for the cargo.
- The static draught of the vessel to the nearest centimetre.
- The number of crew, passengers and other shipboard personnel.
- Convoy dimensions - enter the extension beyond the normal vessel size of any convoy attached. See Figure 27.

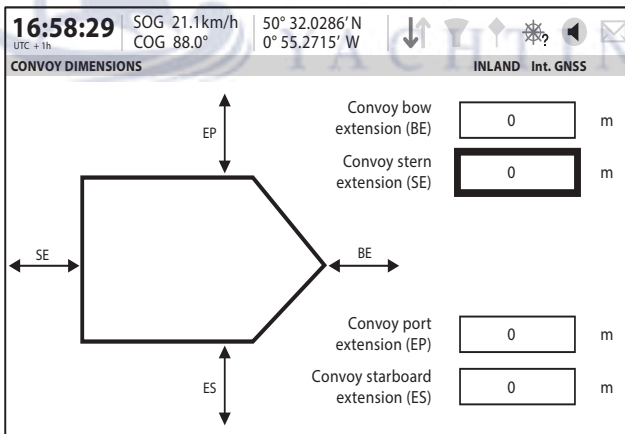


Figure 27 Convoy dimensions screen

The additional identification information can be entered via the '*Voyage data settings*' menu.

The voyage destination should be entered using UN terminal location codes and ERI terminal codes where possible when in Inland Mode

#### 5.1.4 Inland alert masking

Inland AIS installations do not typically include connection of external GNSS, Heading or Rate of Turn sensors to the AIS transceiver. The system alerts associated with these sensors can be disabled in Inland mode through the '*Alerts*' screen.

#### 5.1.5 Blue Sign switch

When operating in Inland mode it is possible to connect a 'Blue Sign' switch to the AIS transceiver.

The AIS transceiver provides an isolated input for Blue Sign switch connection. It comprises two connections BLUE\_SIGN\_P and BLUE\_SIGN\_N. When enabled for Inland Waterways operation and the BLUE\_SIGN\_P terminal has a positive voltage with respect to BLUE\_SIGN\_N the Blue Sign status will be present on the display and transmitted accordingly in AIS position reports. See Figure 28.



**Neither Blue Sign terminal should be connected to any other point on the AIS transceiver side of any isolation barrier present in the vessel wiring.**

Suitable options for connection to the Blue Sign interface are shown in Figure 28.

Settings for the Blue Sign switch are available by selecting the '*Home*' > '*System settings*' > '*Operating mode*' menu.

Select the '*Blue Sign switch*' option to set up the Blue Sign switch.

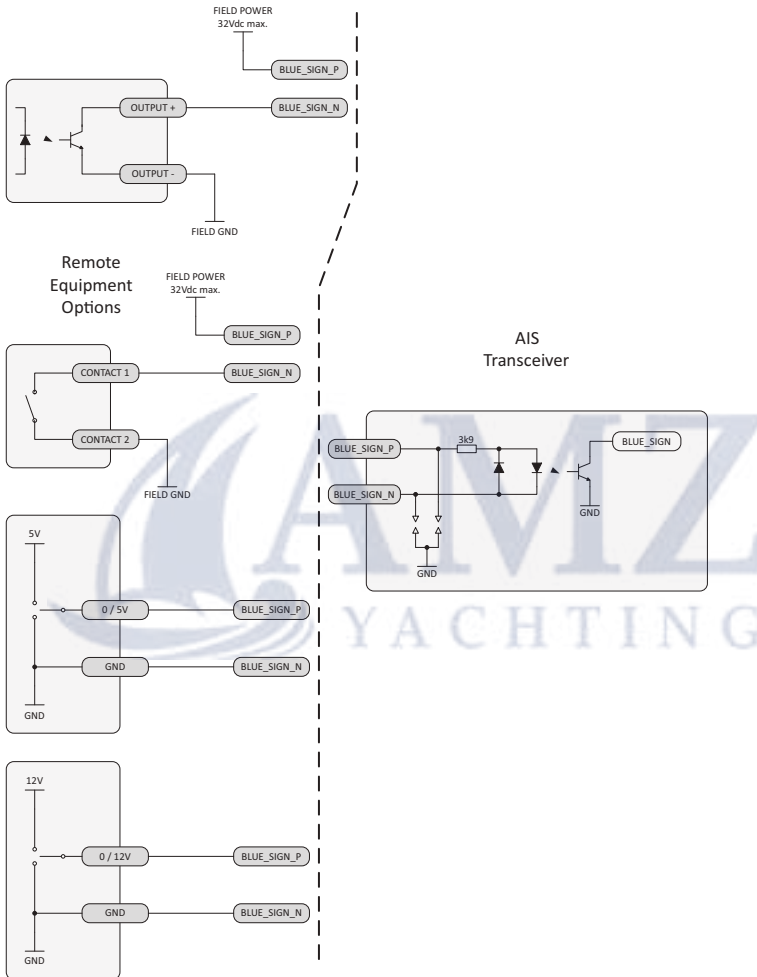


Figure 28 Blue Sign interface connection options

## 6 Technical information

### 6.1 Interface circuits

#### 6.1.1 Sensor data input port

The sensor data input port schematic is shown in Figure 29.

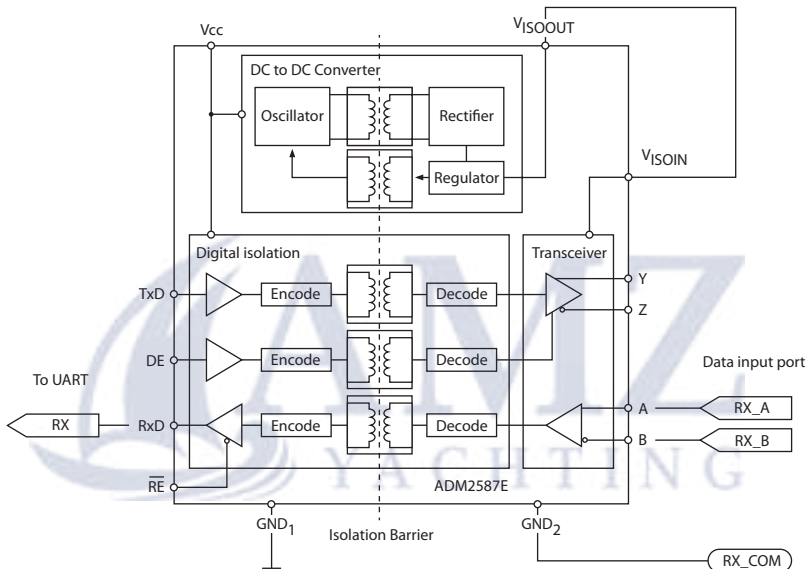


Figure 29 Input port schematic

A logical low input is defined as:  $A-B < -0.2V$ .

A logical high input is defined as:  $A-B > +0.2V$ .

#### 6.1.2 Bi-directional data ports

The input circuitry of the bi-directional data ports is identical to the input circuitry for the sensor data input ports described in the preceding section. The output circuitry consists of a differential line driver IC (Analog Devices ADM2587E) and is shown in Figure 30.

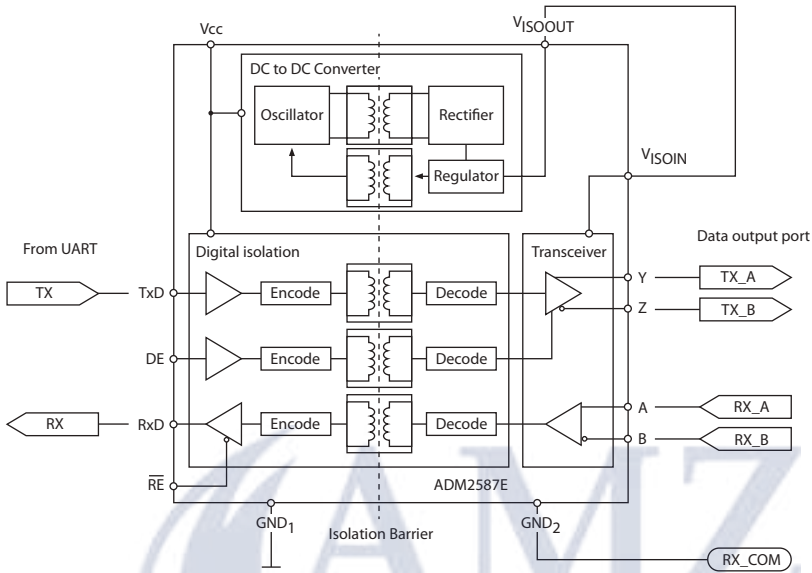


Figure 30 Data output port schematic



Each bi-directional data port is isolated from the other bi-directional data ports and from the AIS transceiver's internal power supply.

## 6.2 Output drive capability of bi-directional ports

Bi-directional ports can supply an output current of up to 30mA. The output voltages are 0 (low) and 3.3V (high). Effective load resistance should be in excess of 100 Ohms.



### **6.3 DGNSS Port**

The DGNSS correction port is intended for connection to a beacon receiver. The port has the same physical characteristics as the bi-directional data ports as described in the preceding sections. If connection of a beacon receiver is not required this port can be re-configured as an additional bi-directional port to IEC 61162-2.

### **6.4 Input data sentence formats**

All data input is via IEC 61162 / NMEA 0183 sentences. For details of the sentences and their checksums please refer to IEC 61162-1.



## 6.5 AIS Transceiver overall dimensions

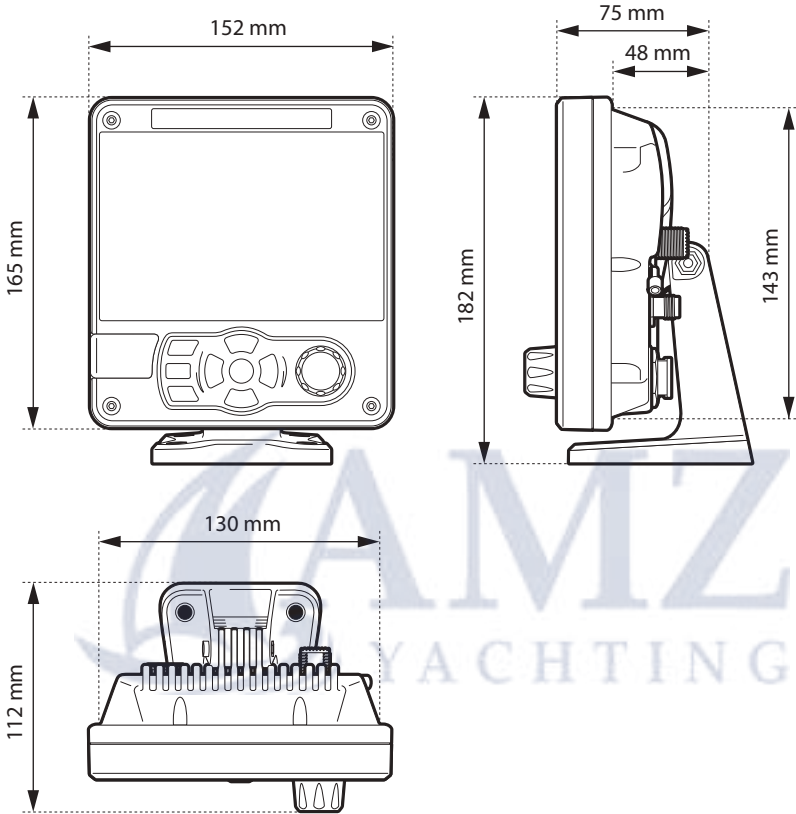


Figure 31 AIS Transceiver dimensions

## 6.6 GNSS Antenna drawing

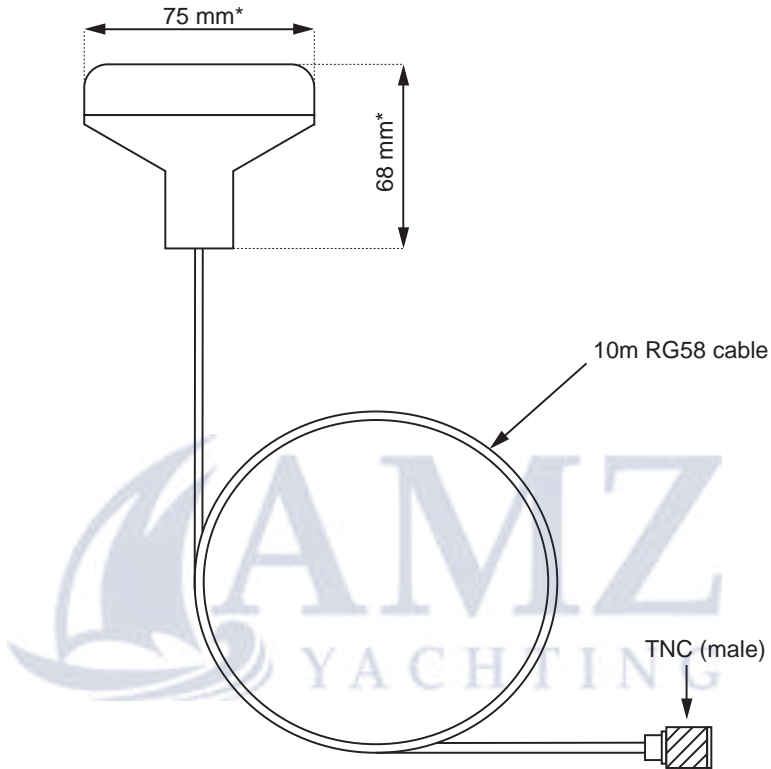


Figure 32 GNSS Antenna

\* The dimensions of the supplied antenna may vary from those shown here.

## 6.7 Transmission intervals

The IEC 61162 sentences are in general output in response to a specific event, such as initiation of a binary message via the user interface. Certain messages are output over the ports at regular transmission intervals. Table 8. lists each sentence type and the transmission interval.

| Output sentence type                             | Transmission interval   | Comments   |
|--|---|--|
| VDO  | Once a second   | Own vessel VDL reports. A 'dummy' VDO is generated every second. A transmission VDO is generated whenever the transceiver transmits a message.   |
| ALC  | Once every thirty seconds   | The cycle alert list (ALC) sentence provides a list of all alerts that are not in alert state normal. When all alerts are in alert state normal, the number of alert entries will be zero. |
| ALR (inactive)                                   | Once a minute   | If no alerts are active, a single empty ALR sentence is output   |
| ALR (active)                                     | Once every thirty seconds   | If any alerts are active, an ALR sentence is output for each active alert.   |
| ABK, ACA, ALF, LR1, LR2, LR3, LRF, LRI, TXT, VDM | Only transmitted when specifically initiated by an external event |  |

*Table 8 IEC 61162 Transmission interval for periodic sentences*

## 6.8 Interface sentences

The IEC 61162 sentences accepted by and output by the AIS transceiver serial data ports are listed in Table 9.

| Data port  | Input sentences   | Output sentences   |
|--|---|--|
| Sensor 1<br>Sensor 2<br>Sensor 3                       | DTM, GBS, GGA, GLL,<br>GNS, HDT, RMC, ROT,<br>THS, VBW, VTG   | N/A  |
| External<br>Display<br>External<br>Display 2*<br>Pilot | ABM, ACA, ACK, ACN,<br>AIR, BBM, DTM, EPV,<br>GBS, GGA, GLL, GNS,<br>HDT, RMC, ROT, SPW,<br>SSA, SSD, THS, VBW,<br>VSD, VTG | ABK, ACA, ACS,ALC,<br>ALF, ALR, ARC, EPV,<br>NAK, SSD, TRL, TXT,<br>VDM, VDO, VER, VSD |
| Long-<br>range*  | LRF, LRI  | LR1, LR2, LR3, LRF, LRI  |
| DGNSS*   | RTCM SC-104 binary<br>format  |  |

\* External Display 2 / Long-range / DGNSS interfaces use the same port. Please select the required interface in the Interface menu.

*Table 9 IEC 61162 Sentences input and output*

The default SSA key is ABCDZX. Please contact your dealer if you wish to change it.

### 6.8.1 Legacy sentences

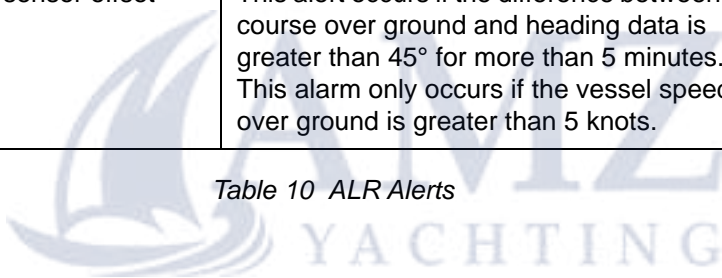
AIS alerts are now provided using the Bridge Alert Management requirements. However, in order to main compatibility with legacy systems, the ALR sentence continues to be supported. The details of the supported alerts are shown in Table 10.

| Alert                          | Description   |
|--------------------------------|---|
| TX Malfunction                 | <p><b>This alert will occur if the MMSI has not been configured.</b></p> <p>This alert can also occur if the radio hardware has failed to select the correct frequency, that the output power is too low or a transmitter shutdown has occurred. In this situation, ALR 001 is output over the PI.</p> <p>The alert will be cleared if the transmitter recovers normal operation.</p>   |
| RX Channel x malfunction       | <p>This alert occurs should the receiver hardware malfunction. The receiver is identified by the value of x (as shown below). The following alerts will be generated over the PI in this condition:</p> <ul style="list-style-type: none"> <li>ALR 003 - Rx Channel 1</li> <li>ALR 004 - Rx Channel 2</li> <li>ALR 005 - DSC (Channel 70)</li> </ul> <p>If the receiver returns to normal operation this alert will be cleared.</p> |
| VHF Antenna VSWR exceeds limit | <p>This alert occurs if there is a problem with your antenna or antenna connection.</p>   |
| External EPFS lost             | <p>This alert occurs if the position from the external Electronic Position Fixing System (i.e. GNSS) is invalid or lost.</p>  |
| No valid COG information       | <p>This alert occurs if the AIS transceiver has no valid Course Over Ground information from any connected sensor.</p>  |

| Alert                     | Description  |
|---------------------------|--|
| No valid SOG information  | This alert occurs if the AIS transceiver has no valid Speed Over Ground information from any connected sensor.   |
| Heading lost or invalid   | This alert occurs if the AIS transceiver has no valid heading information from any connected sensor, or if the heading is undefined.   |
| No valid ROT information  | This alert occurs if the AIS transceiver has no Rate Of Turn information from connected sensors or via internal calculation.   |
| No sensor position in use | This alert occurs if the AIS transceiver has no valid position information from any connected sensor.  |
| UTC Sync Invalid          | This alert indicates that the transmitter is no longer directly synchronized with the GNSS receiver. This may be because the GNSS receiver cannot receive sufficient satellites.   |
| Nav Status Incorrect      | <p>Nav Status incorrect</p> <p>This alert will occur if the navigation status is in conflict with the current speed of the vessel. For example the alert will activate if the Navigation status is set to moored, but the vessel speed is greater than 3 knots. Correct the navigation status to clear this alert.</p> |

| Alert                             | Description  |
|-----------------------------------|--|
| Active AIS SART                   | An active AIS SART (AIS Search and Rescue Transmitter) message has been received. The SART will be displayed as the top item in the target list. Select this item to see the location of the SART.               |
| Internal / External GNSS mismatch | This alert occurs if the difference in position reported by the internal and external GNSS receivers is too large. Check the vessel dimensions and GNSS antenna locations have been entered correctly.           |
| Heading sensor offset             | This alert occurs if the difference between the course over ground and heading data is greater than 45° for more than 5 minutes. This alarm only occurs if the vessel speed over ground is greater than 5 knots. |

*Table 10 ALR Alerts*





## 6.9 Unused fields

Unused fields in the sentences from section 6.8 are listed in Table 11. All fields of other input and output sentences that are not in this table are used.

| Sentence | Unused fields                           | Description  |
|----------|---|--|
| AIR      | 9<br>10<br>11<br>12                     | Channel of Interrogation<br>Message ID 1.1 Station 1 reply slot<br>Message ID 1.2 Station 1 reply slot<br>Message ID 2.1 Station 2 reply slot  |
| DTM      | 2<br>3<br>5<br>7                        | Local datum subdivision code<br>Lat offset, min, N/S<br>Longitude offset, min, E/W<br>Altitude offset, (meter)   |
| GBS      | 4<br>5<br>6<br>7<br>8                   | Expected error in altitude<br>ID of most likely failed satellite<br>Probability of missed detection for most likely failed satellite<br>Estimate of bias on most likely failed satellite<br>Standard deviation of bias estimate  |
| GGA      | 5<br>6<br>7<br>8<br>9<br>10<br>11<br>12 | No. of satellites in use, 00-12<br>Horizontal dilution of precision<br>Antenna altitude above / below mean sea level (geoid)<br>Units of antenna altitude, m<br>Geoidal separation<br>Units of geoidal separation, m<br>Age of diff. GPS data<br>Differential reference station ID 0000-1023 |

| Sentence | Unused fields                    | Description  |
|----------|----------------------------------|--|
| GNS      | 5<br>6<br>7<br>8<br>9<br>10      | Number of satellites in use, 00-99<br>Horizontal dilution of precision<br>Antenna altitude, m, above mean sea-level<br>Geoidal separation, m<br>Age of differential data<br>Differential reference station ID              |
| RMC      | 7<br>8                           | Date: dd/mm/yy<br>Magnetic variation, degrees, E/W   |
| VBW      | 1<br>2<br>3<br>7<br>8<br>9<br>10 | Longitudinal water speed, knots<br>Transverse water speed, knots<br>Status: water speed<br>Stern transverse water speed, knots<br>Status: stern water speed<br>Stern transverse ground speed<br>Status: stern ground speed |
| VTG      | 2                                | Course over ground, degrees magnetic   |

*Table 11 Unused fields*

## 6.10 Proprietary sentences

The AIS transceiver outputs no proprietary sentences in normal operation.

## 6.11 Priority of sensor ports

The AIS transceiver automatically assigns a priority scheme to connected sensors. Data from the highest priority sensor will always be used. Sensor input priority is for:

- Position
- COG+SOG

- Heading
- Rate of Turn

The sensor input ports have a priority order as shown in Table 12.

| Port             | Priority (1 = highest) |
|------------------|------------------------|
| Sensor 1         | 1                      |
| Sensor 2         | 2                      |
| Sensor 3         | 3                      |
| External Display | 4                      |
| Pilot            | 5                      |
| Long-range       | 6                      |

*Table 12 Port priority order*

### 6.11.1 Position priority scheme

Position information is taken from the highest priority source reporting DTM with WGS84 or datum override and RMC. If no RMC sentences are available, position shall be taken from the highest priority source reporting DTM with WGS84 or datum override and any one of:

- GGA
- GNS
- GLL

The following sentences are only processed if they are from the currently selected position source:

- RMC
- GGA
- GNS
- GLL

- GBS
- GRS
- GSA
- GSV
- GFA

When no position has been received on the selected port for 30 seconds, the port is deselected as a position source, and a new source selected as described above.

### **6.11.2 Course and Speed priority scheme**

COG and SOG are taken from the highest priority source reporting any one of:

- RMC (with DTM=WGS84 or datum override)
- VTG
- VBW

VTG and VBW are only processed if they are from the currently selected COG & SOG source. When no COG+SOG has been received on the selected port for 30 seconds, the port shall be deselected as a COG+SOG source, and a new source selected as described above.

### **6.11.3 Heading priority scheme**

Heading shall be taken from the highest priority sensor reporting any one of:

- HDT
- THS

HDT and THS are only processed if they are from the currently selected Heading source. When no heading has been received on the selected port for 30 seconds, the port shall be deselected as a heading source, and a new source selected as described above

#### 6.11.4 Rate of Turn priority scheme

Rate of Turn shall be taken from the highest priority sensor reporting ROT. ROT shall only be processed if they are from the currently selected Rate of Turn source. When no Rate of Turn has been received on the selected port for 30 seconds, the port shall be deselected as a Rate of Turn source, and a new source selected as described above.

#### 6.12 Compatibility mode

Some devices require the use of Compatibility mode for correct operation. When operating in the standard mode the fix quality flag indicates the type of GNSS position that is being reported. In compatibility mode, the fix quality reported will either be No GNSS or GNSS.

On the 'Home' > 'System settings' > 'Interfaces' screen, under the configuration menu for each sensor port there is an On / Off toggle which can be set if Compatibility mode is required for that port.

#### 6.13 Message 24 content

The Unit Serial Number transmitted in AIS Message 24B, in response to a Message 15 request, is encoded as follows (note that these characters represent individual bits in the data):

wwwwww wwyy yxxx xxxx xxxx

w = week (0 - 52)

y = years since 2014 (0 - 7)

x = incrementing number (0 - 2047)

#### 6.14 NMEA 2000 PGN List

The PGN's listed in Table 13. are supported by the AIS transceiver. There are no unused fields.

| PGN (Dec.) | PGN (Hex) | Title in NMEA database | Usage   | NMEA 0183 |
|------------|-----------|------------------------|---------|-----------|
| 059392     | 0E800     | ISO Acknowledgment     | in, out |           |
| 059904     | 0EA00     | ISO Request            | in, out |           |

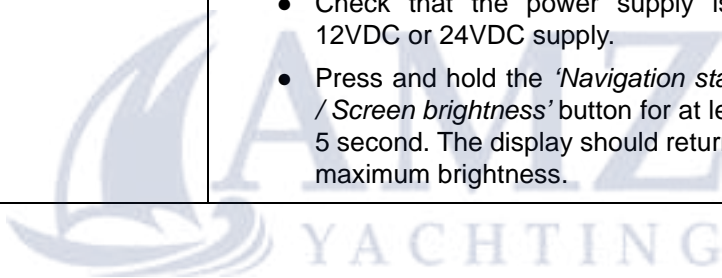
| <b>PGN<br/>(Dec.)</b> | <b>PGN<br/>(Hex)</b> | <b>Title in NMEA database</b>       | <b>Usage</b> | <b>NMEA 0183</b> |
|-----------------------|----------------------|-------------------------------------|--------------|------------------|
| 060416                | 0EC00                | ISO Transport Protocol - Data       | in, out      |                  |
| 060160                | 0EB00                | ISO Transport Protocol - Connection | in, out      |                  |
| 060928                | 0EE00                | ISO Address Claim                   | in, out      |                  |
| 065240                | 0FED8                | ISO Commanded Address               | in           |                  |
| 126208                | 1ED00                | Group Function                      | in, out      |                  |
| 126464                | 1EE00                | PGN list - Group Function           | in, out      |                  |
| 126992                | 1F010                | System time                         | out          |                  |
| 126993                | 1F011                | Heartbeat                           | out          |                  |
| 126996                | 1F014                | Product Information                 | in, out      |                  |
| 126998                | 1F016                | Configuration Information           | out          |                  |
| 127250                | 1F112                | Vessel Heading                      | in           | HDT/THS          |
| 127251                | 1F113                | Rate of Turn                        | in           | ROT              |
| 129025                | 1F801                | GNSS Position (Rapid Update)        | out          | RMC              |
| 129026                | 1F802                | GNSS Direction data                 | in, out      | RMC              |
| 129029                | 1F805                | GNSS Position data                  | in, out      | RMC              |
| 129038                | 1F80E                | AIS Class A Position Report         | out          | VDM/VDO          |
| 129039                | 1F80F                | AIS Class B Position Report         | out          | VDM/VDO          |

| <b>PGN<br/>(Dec.)</b> | <b>PGN<br/>(Hex)</b> | <b>Title in NMEA database</b>                 | <b>Usage</b> | <b>NMEA 0183</b> |
|-----------------------|----------------------|---|--------------|------------------|
| 129040                | 1F810                | AIS Class B Extended<br>Position Report       | out          | VDM/VDO          |
| 129041                | 1F811                | AIS AtoN Report                               | out          | VDM/VDO          |
| 129545                | 1FA09                | GNSS RAIM                                     | in           | GBS              |
| 129793                | 1FB01                | AIS UTC and Date Report                       | out          | VDM/VDO          |
| 129794                | 1FB02                | AIS Class A Static and<br>Voyage Related Data | out          | VDM/VDO          |
| 129795                | 1FB03                | AIS Addressed Binary<br>Message               | out          | VDM/VDO          |
| 129796                | 1FB04                | AIS Acknowledge                               | out          | VDM/VDO          |
| 129797                | 1FB05                | AIS Binary Broadcast<br>Message               | out          | VDM/VDO          |
| 129798                | 1FB06                | AIS SAR Aircraft Position<br>Report           | out          | VDM/VDO          |
| 129801                | 1FB09                | AIS Addressed SRM                             | out          | VDM/VDO          |
| 129802                | 1FB0A                | AIS Safety Broadcast<br>Binary Message        | out          | VDM/VDO          |
| 129809                | 1FB11                | AIS Class B CS Static<br>Data Report Part A   | out          | VDM/VDO          |
| 129810                | 1FB12                | AIS Class B CS Static<br>Data Report Part B   | out          | VDM/VDO          |

*Table 13 PGN Lists*

## 6.15 Troubleshooting

| Issues   | Possible cause and remedy  |
|--|--|
| No data is being received by a connected chart plotter | <ul style="list-style-type: none"><li>● Check that the power supply is connected correctly.</li><li>● Check that the power supply is a 12VDC or 24VDC supply.</li><li>● Check that the connections to the chart plotter are correct.</li></ul>   |
| The screen is not illuminated                          | <ul style="list-style-type: none"><li>● Check that the power supply is connected correctly.</li><li>● Check that the power supply is a 12VDC or 24VDC supply.</li><li>● Press and hold the '<i>Navigation status / Screen brightness</i>' button for at least 5 second. The display should return to maximum brightness.</li></ul> |





|  |  |
|--|--|
| <p>The 'Alert' icon is illuminated or flashing</p> | <ul style="list-style-type: none"> <li>● The unit may not have a valid MMSI. Check that the AIS transceiver is correctly configured with a valid MMSI.</li> <li>● The VHF antenna may be faulty. Please check the connection to the VHF antenna and that the VHF antenna is not damaged. The alert icon may illuminate briefly if the VHF antenna characteristics are briefly affected.</li> <li>● No GNSS position fix can be obtained. Please check the AIS transceiver is located where the internal GNSS antenna has a clear sky view or that an external GNSS antenna is properly connected and installed. Review the GNSS signal strength graph in 'Home' &gt; 'System settings' &gt; 'Advanced' &gt; 'GNSS Source'.</li> <li>● The power supply is outside the allowable range. Check that the power supply is within the range 10.8VDC to 31.2VDC</li> <li>● Check the alert messages in the 'Alerts' menu and check the help available.</li> <li>● If none of the above correct the alert condition please contact your dealer for advice.</li> </ul> |
|--|--|

|  |   |
|--|---|
| External Sensors not being recognised. | <ul style="list-style-type: none"><li>● Check Compatibility Mode option in the Interface Settings Menu.</li><li>● Check the Baud Rate set.</li><li>● Check the wiring is correct.</li></ul>   |
| VSWR Alert Activated or High VSWR.     | <ul style="list-style-type: none"><li>● Ensure VHF Antenna is as far away as possible from metallic structures and any other antennae.</li><li>● Ensure VHF Antenna is as high as possible.</li><li>● Ensure VHF Antenna is suitable for AIS i.e. 3dBi Gain, 156-162MHz, and uses high quality RG213 or RG214 cable.</li><li>● The VHF Antenna cable should be as short as possible and no more than 30 metres (100ft) in length.</li></ul> |

*Table 14 Troubleshooting*

If the guidance given in the table above does not rectify the problem you are experiencing, please contact your dealer for further assistance.

## 7 Junction box accessory

### 7.1 What's in the box

Please ensure all items are present and if any of the items are missing please contact your dealer.

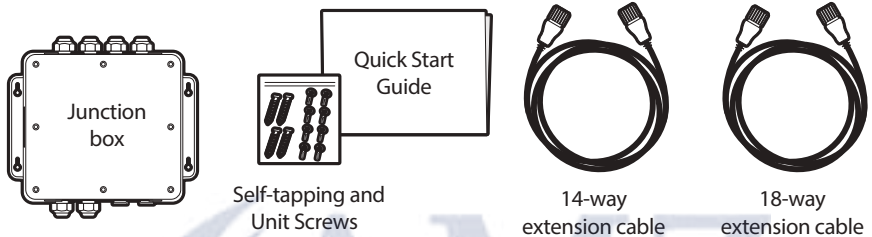


Figure 33 Junction box - What's in the box

### 7.2 Installation

The junction box should be mounted within 2m of the AIS transceiver, to ensure that the cable can be run without compromising its performance.

- Connect the two extension cables between the AIS transceiver and the junction box.
- Route your accessory cables through the waterproof cable glands and find the appropriate terminal blocks to fix them to.
- Use the connector wiring diagrams shown in Figure 11. and Figure 13. as your guide.
- Secure the ground / screen / shield of the accessory cables to the metallic strips of the junction box or to the appropriate connection on the terminal block.
- The termination jumpers are there to ensure correct 120 Ohm termination to the serial ports. These will all be fitted by default but if

a port requires no termination then that port's jumper can be removed.

- Secure the accessory cables within the junction box with cable ties (not supplied).
- Fit the lid securely using the 8 screws provided to ensure the waterproof integrity of the unit.

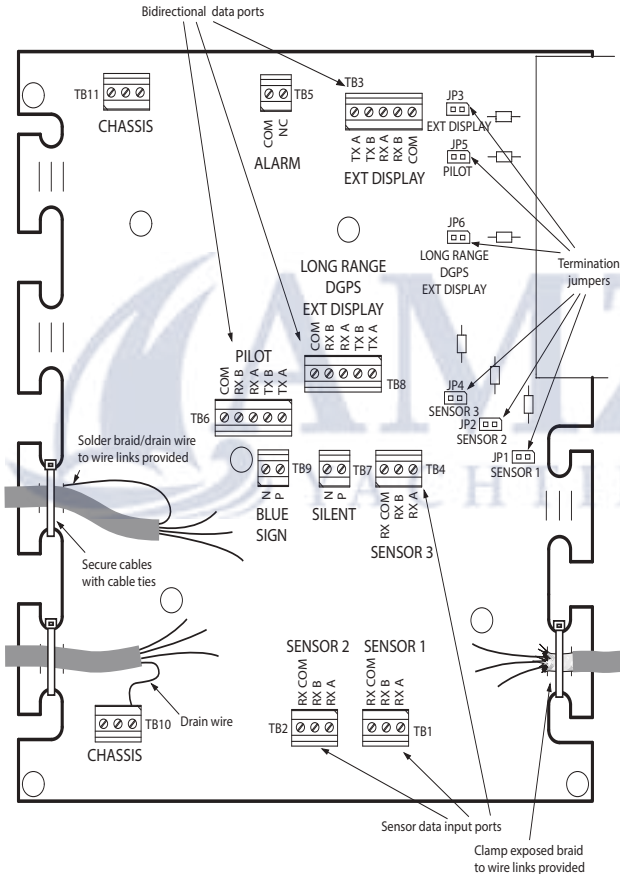


Figure 34 Junction box connections

### 7.3 Connecting external equipment

- Figure 35. shows an example of how external equipment could be connected through the junction box accessory.

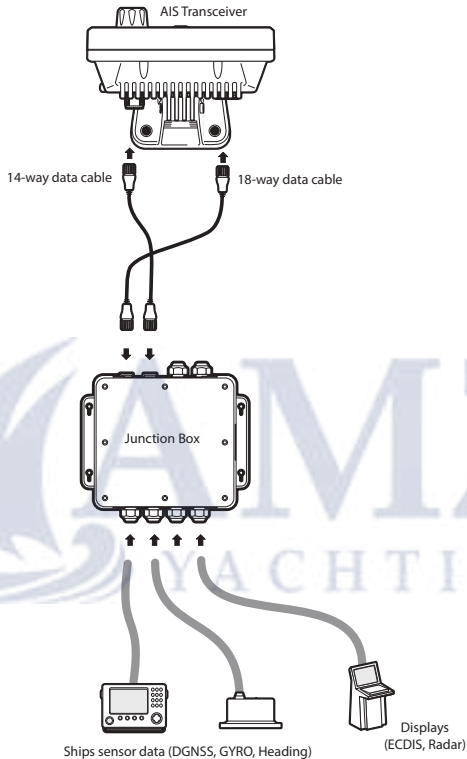


Figure 35 Connecting external equipment

When connecting external equipment the following procedures should be observed.

- The common line should be connected to the sensor port if one is available.

- The shield in the cable used to connect the external equipment should be connected at one end only. Refer to the manufacturer's documentation regarding cable construction.
- The chassis connection can be made with **EITHER** a drain wire **OR** directly to the cable shield using exposed wire links on the junction box printed circuit board, depending on the cable construction.

## 7.4 Technical information

### 7.4.1 Physical

|                         |                              |
|-------------------------|------------------------------|
| Junction box dimensions | 235mm x 69mm x 233mm (WxHxD) |
| Junction box weight     | 0.65kg                       |

### 7.4.2 Environmental

|                             |                              |
|-----------------------------|------------------------------|
| Operating temperature range | -15°C to +55°C               |
| Maximum operating humidity  | 90% at +40°C, non-condensing |
| Water ingress rating        | IPx6                         |

### 7.4.3 Data Connector Information

|                       |                           |             |                        |
|-----------------------|---------------------------|-------------|------------------------|
| 18-way data connector | Chogori<br>23018525-04-RC | Mating half | Chogori<br>23018221-01 |
| 14-way data connector | Chogori<br>23014525-05-RC | Mating half | Chogori<br>23014221-01 |

## 8 Technical specification

### 8.1 Applicable equipment standards

|   |   |
|---|---|
| ITU-R M.1371-5<br>02/2014                   | Technical characteristics for an automatic identification system using time division multiple access in the VHF maritime mobile band  |
| IEC 60945:2002<br>+ Corr.1:2008             | Maritime navigation and radio communication equipment and systems –<br>General requirements – Methods of testing and required test results  |
| IEC 61108-2<br>1st Ed.<br>1998-06           | Global navigation satellite systems (GNSS) - Part 2:<br>Global navigation satellite system (GLONASS) -<br>Receiver equipment - Performance standards,<br>methods of testing and required test results |
| IEC 61108-1<br>2nd Ed.<br>2003-07           | Global navigation satellite systems (GNSS) – Part 1:<br>Global positioning system (GPS) - Receiver<br>equipment - Performance standards, methods of<br>testing and required test results              |
| IEC 61162-1<br>2016                         | Maritime navigation and radio communication<br>equipment and systems –<br>Digital interfaces - Single talker and multiple listeners   |
| IEC 61162-2<br>Ed. 1.0<br>1998-09           | Maritime navigation and radio communication<br>equipment and systems –<br>Digital interfaces - Single talker and multiple<br>listeners, high speed transmission                                       |
| IEC 61162-<br>3:2008 + A1:2010<br>+ A2:2014 | Maritime navigation and radio communication<br>equipment and systems -<br>Digital interfaces - Part 3: Serial data instrument<br>network  |

|  |   |
|--|---|
| IEC 61993-2:<br>2018                                 | Class A shipborne equipment of the universal automatic identification system (AIS) – Operational and performance requirements, methods of test and required test results  |
| IEC 62288<br>Ed. 2.0<br>2014-07                      | Maritime navigation and radiocommunication equipment and systems - Presentation of navigation related information on shipborne navigational displays - General requirements, methods of testing and required test results |
| IEC 62923-1<br>2018                                  | Maritime navigation and radiocommunication equipment and systems - Bridge alert management - Part 1: Operational and performance requirements, methods of testing and required test results                               |
| IEC 62923-2<br>2018                                  | Maritime navigation and radiocommunication equipment and systems - Bridge alert management - Part 2: Alert and cluster identifiers and other additional features  |
| CESNI Test<br>Standard Inland<br>AIS<br>Ed. 2021/3.0 | Inland AIS Shipborne Equipment according to the Vessel Tracking and Tracing Standard for Inland Navigation<br>Operational and performance requirements, methods of test and required test results                         |

## 8.2 Product category

|                  |   |
|------------------|---|
| Product category | This product is categorised as 'protected' in accordance with the definitions provided in IEC 60945 |
|------------------|---|



### 8.3 Physical

|                            |  |
|----------------------------|--|
| AIS Transceiver dimensions | 152mm x 165mm x 111mm (WxHxD), see Figure 31. for drawing) |
| AIS Transceiver weight     | 1.5kg  |
| Compass safe distance      | 0.5m (AIS Transceiver)                                     |
| Safe operating distance    | 20cm from the antenna                                      |



## 8.4 Environmental

|                             |                              |
|-----------------------------|------------------------------|
| Operating temperature range | -15°C to +55°C               |
| Maximum operating humidity  | 90% at +40°C, non-condensing |
| Water ingress rating        | IPx6, IPx7                   |

## 8.5 Electrical

|                                    |  |
|------------------------------------|--|
| Supply voltage                     | 12VDC to 24VDC (absolute min 10.8V, absolute max 31.2 V) |
| Power consumption                  | 6.2W (average)   |
| Current consumption @12 VDC supply | 0.9A typical, 6.0A peak                                  |
| Current consumption @24 VDC supply | 0.5A typical, 4.0A peak                                  |

## 8.6 Display and user interface

|                              |  |
|------------------------------|--|
| Display                      | 800 x 480 pixel colour LCD with adjustable backlight             |
| Luminance                    | 500cd/m <sup>2</sup> max, 75cd/m <sup>2</sup> default            |
| Recommended viewing distance | 45cm   |
| Keypad                       | Five function keys and three menu keys with adjustable backlight |
| Rotary control               | Encoder with push function                                       |
| Speaker                      | 600mW@750Hz 11mm x 15mm  |

## 8.7 Internal GNSS

|                     |   |
|---------------------|---|
| Receiver channels   | 72 channels GPS, GLONASS and BeiDou operating modes   |
| Time to first fix   | Typically 26 seconds  |
| Frequency           | L1 GPS band 1575.42MHz<br>L1 GLONASS band 1597.1 - 1609.5MHz<br>B1 BeiDou band 1561.098MHz                    |
| Accuracy            | 2.5m CEP / 5.0m SEP without differential correction<br>2.0m CEP / 3.0m SEP with SBAS or RTCM DGNSS correction |
| Antenna requirement | Active antenna (5V bias) with gain >15dB  |

## 8.8 TDMA Transmitter

|                        |                                   |
|------------------------|-----------------------------------|
| Frequency range        | 156.025MHz to 162.025MHz          |
| Channel bandwidth      | 25kHz                             |
| Output power           | 1W or 12.5W (automatic selection) |
| Data transmission rate | 9600 bits/s                       |
| Modulation mode        | 25kHz GMSK                        |

## 8.9 TDMA Receiver

|                     |                          |
|---------------------|--------------------------|
| Number of receivers | 2                        |
| Frequency range     | 156.025MHz to 162.025MHz |
| Channel bandwidth   | 25kHz                    |
| Sensitivity         | <-107dBm for 20% PER     |

|                              |            |
|------------------------------|------------|
| Modulation mode              | 25kHz GMSK |
| Adjacent channel selectivity | 70dB       |
| Spurious response rejection  | 70dB       |

### 8.10 DSC Receiver

|                              |                                    |
|------------------------------|------------------------------------|
| Number of receivers          | 1                                  |
| Frequency                    | 156.525MHz (Channel 70)            |
| Channel bandwidth            | 25kHz                              |
| Sensitivity                  | -107dBm @ BER <math>10^{-2}</math> |
| Modulation mode              | 25kHz AFSK                         |
| Adjacent channel selectivity | 70dB                               |
| Spurious response rejection  | 70dB                               |

### 8.11 RF Connections

|                          |              |
|--------------------------|--------------|
| VHF Antenna connection   | SO-239 / UHF |
| VHF Port impedance       | 50 Ohms      |
| GNSS Antenna connections | TNC female   |
| GNSS Port impedance      | 50 Ohms      |

## 8.12 WiFi

|                                     |        |
|-------------------------------------|--------|
| Maximum output power IEEE 802.11g/n | +15dBm |
| Maximum output power IEEE 802.11b   | +17dBm |

## 8.13 Data interface

|  |                         |
|--|-------------------------|
| Sensor data input ports                          |                         |
| Number of ports                                  | 3                       |
| Standard   | IEC 61162-1 / -2        |
| Baud rate  | 4800 baud or 38400 baud |
| Port impedance                                   | 54K Ohms                |
| Bi-directional data ports (including pilot port) |                         |
| Number of ports                                  | 3                       |
| Standard   | IEC 61162-1 / -2        |
| Baud rate  | 4800 or 38400 baud      |
| Port impedance                                   | 54K Ohms                |
| Differential correction port                     |                         |
| Standard   | ITU 823-2 / RTCM SC-104 |
| Baud rate  | 4800 baud or 38400 baud |
| Port impedance                                   | 54K Ohms                |
| Blue Sign port                                   |                         |
| Port impedance                                   | 10K Ohms                |

|                               |          |
|-------------------------------|----------|
| Silent Mode port              |          |
| Port impedance                | 10K Ohms |
| NMEA 2000 Port:               |          |
| Load equivalency number (LEN) | 1        |

### 8.14 Power and data connector information

|                       |                           |             |                        |
|-----------------------|---------------------------|-------------|------------------------|
| Power connector       | Chogori<br>22002525-04-RC | Mating Half | Chogori<br>22002221-01 |
| 18-way data connector | Chogori<br>23018525-04-RC | Mating Half | Chogori<br>23018221-01 |
| 14-way data connector | Chogori<br>23014525-05-RC | Mating Half | Chogori<br>23014221-01 |

### 8.15 Open source licences

This product contains open source software. For details please see the 'System information' screen.

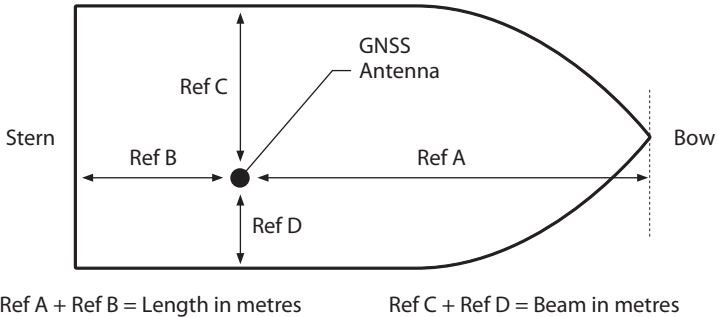
## 9 Installation record

The following installation record should be completed and retained on board the vessel once the AIS transceiver has been installed and commissioned.

### 9.1 Vessel details

|                               |  |                          |  |
|-------------------------------|--|--------------------------|--|
| Vessel name                   |  |                          |  |
| Flag state                    |  |                          |  |
| IMO Number                    |  | MMSI Number              |  |
| Owner                         |  | Radio call sign          |  |
| Type of vessel                |  | Gross registered tonnage |  |
| Length (m)                    |  | Beam (m)                 |  |
| AIS Transceiver serial number |  |                          |  |
| Installation password         |  |                          |  |
| Radio software version number |  |                          |  |
| MKD software version number   |  |                          |  |

|   |    |    |    |
|---|----|----|----|
| External GNSS antenna location (all dimensions in meters, refer to diagram below) |    |    |    |
| A=  | B= | C= | D= |



*Figure 36 GNSS Antenna position*

Connected equipment type (where applicable note equipment and AIS data port in each case).

|                 |  |
|-----------------|--|
| (D)GPS Receiver |  |
| Gyro compass    |  |
| ROT Indication  |  |
| Speed log       |  |
| ECDIS           |  |
| Radar           |  |
| Other equipment |  |
| Power supply    |  |

The following drawings should be provided and attached to this installation record.

- Antenna layout for VHF and GNSS antennas
- AIS arrangement drawing
- Block diagram showing interconnection of equipment



## Maintenance Record

| Modification record number | Details (enter details of modifications to the AIS transceiver including software updates) |
|----------------------------|--|
| 1                          |  |
| 2                          |  |
| 3                          |  |
| 4                          |  |
| 5                          |  |
| 6                          |  |
| 7                          |  |
| 8                          |  |
| 9                          |  |
| 10                         |  |

## Installer Detail

|                                 |  |
|---------------------------------|--|
| Installed by (name)             |  |
| Installation company name       |  |
| Date of installation            |  |
| Vessel location at installation |  |
| Signature                       |  |







Manufacturer's code: 427  
NMEA 2000 Product code: 12354



201-0687:7