KAT-330 AIS Class A / Inland transceiver

Operation manual

KODEN

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
DGPS	Differential GPS
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
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
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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List of figures and tables

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 such as the GLONASS or GPS.

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.

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.

CE

2 Operation

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

2.1 Display and controls

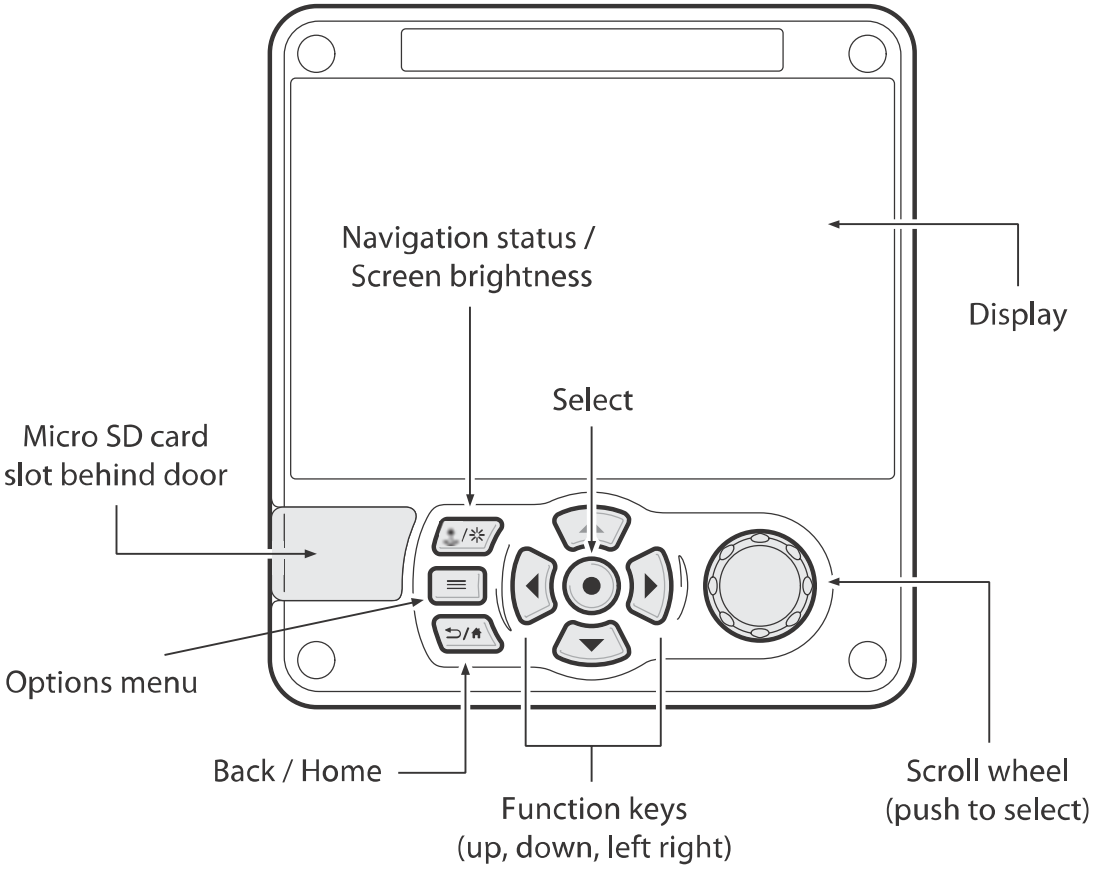

Figure 18 AIS Transceiver front panel

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

2.2 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 alarm 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.

2.3 Adjusting display brightness

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

2.4 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.

2.5 Menu navigation

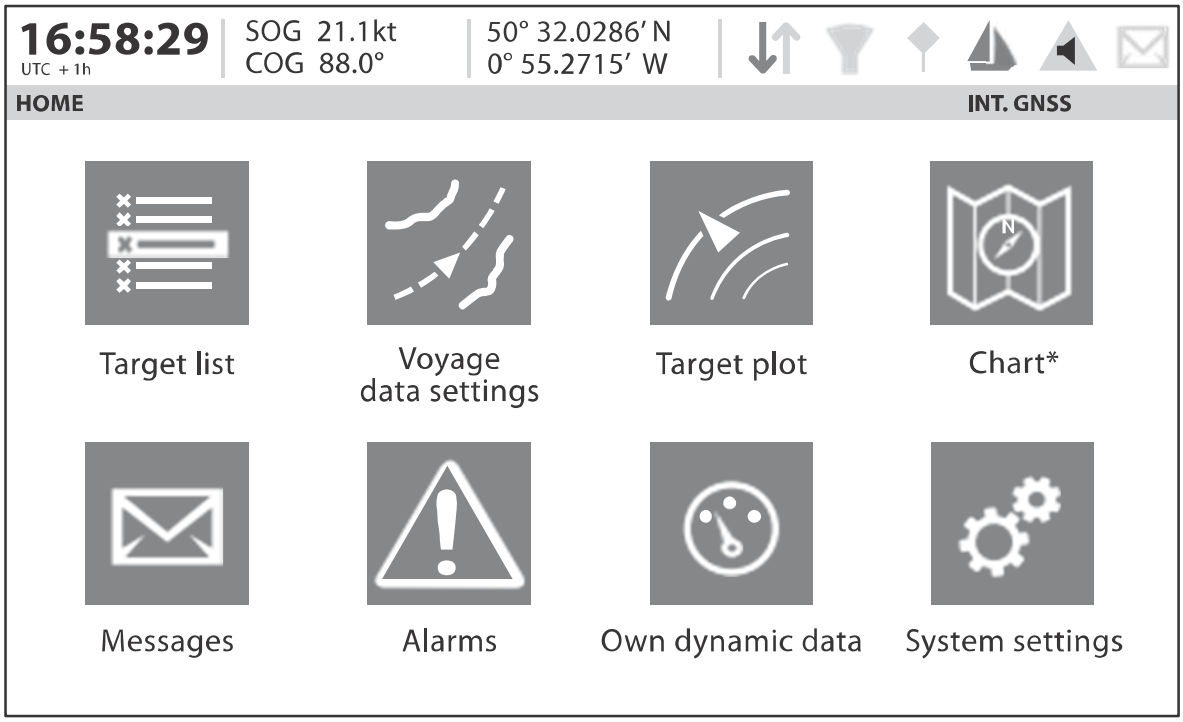

Figure 19 Home page menu screen

2.5.1 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.

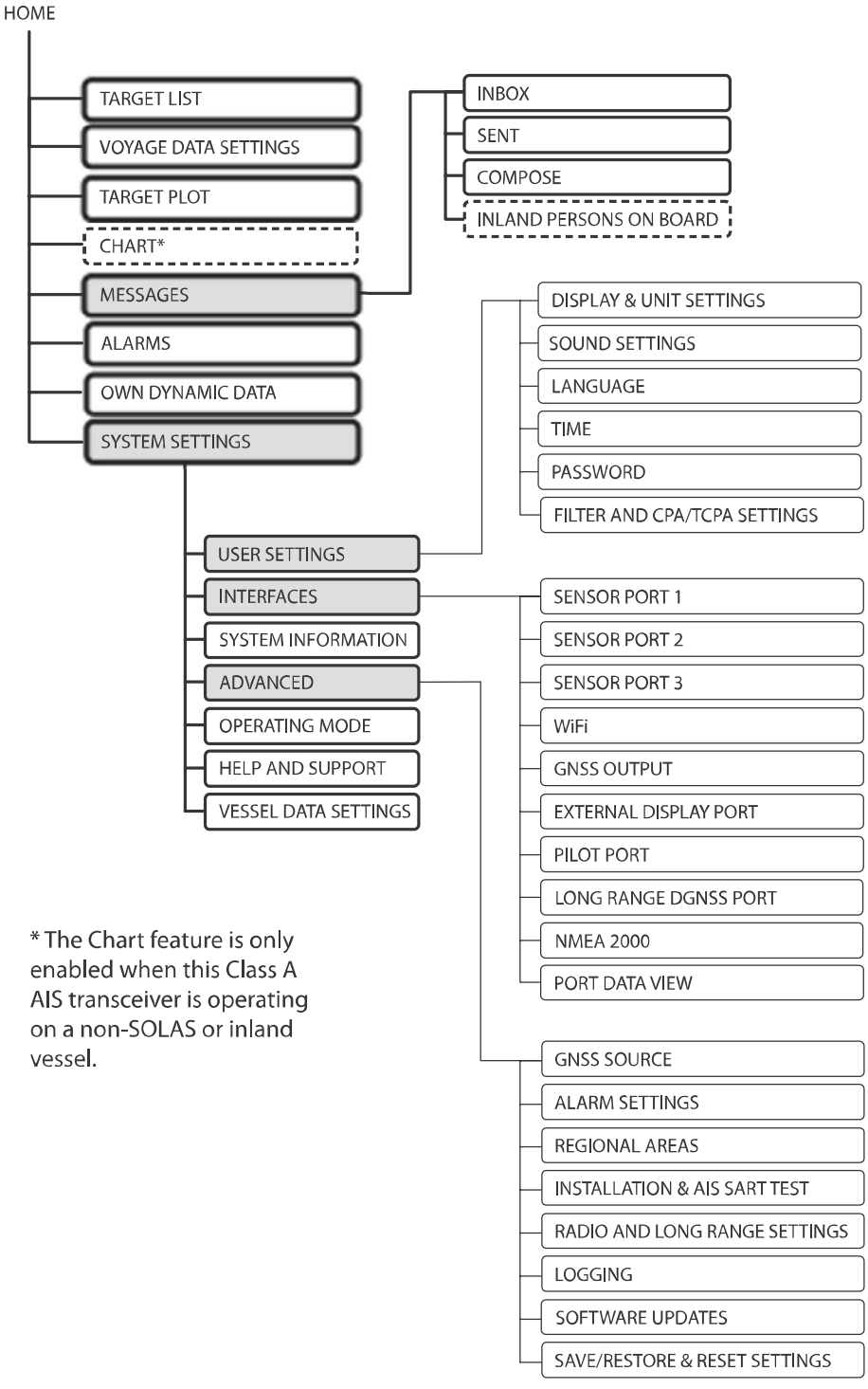

Figure 20 Main menu structure

2.5.2 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.

2.5.3 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.

2.5.4 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. ☰

2.6 Information displayed

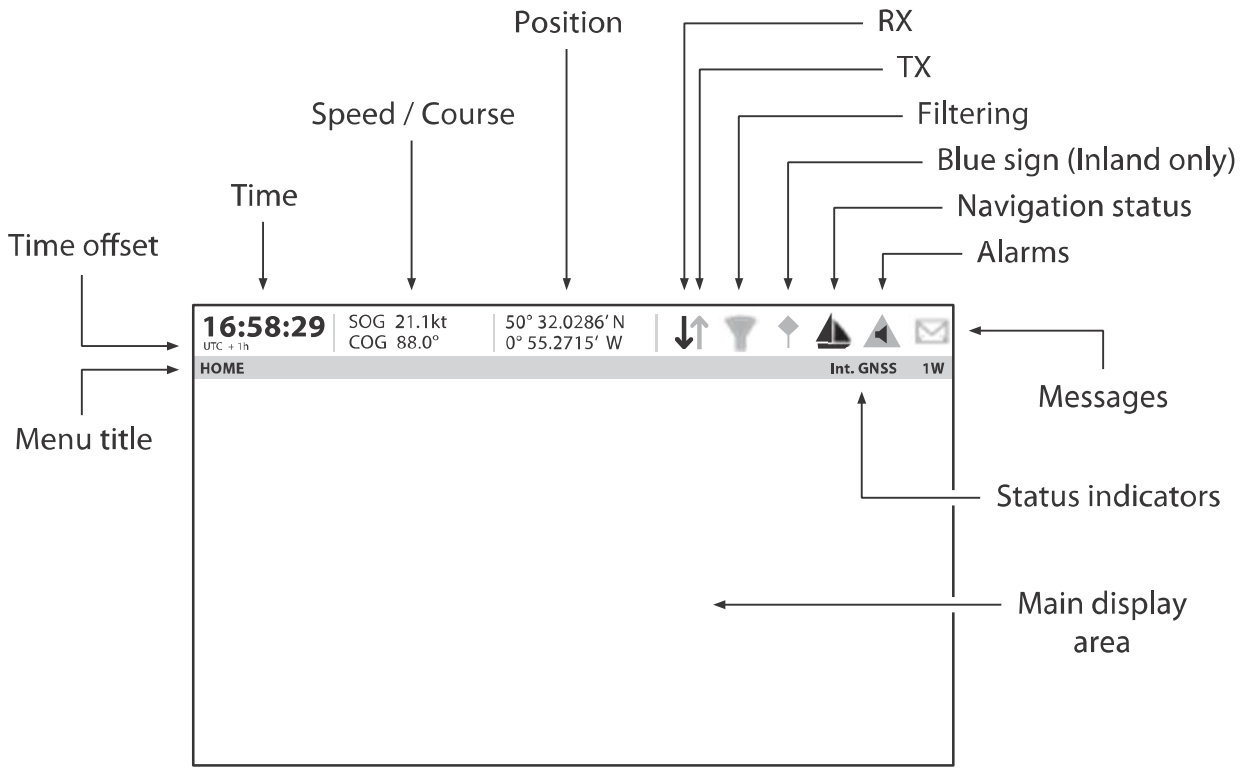

Figure 21 Display layout

2.6.1 Menu title

Refers to the current menu displayed from Figure 20.

2.6.2 Time

Time derived from GNSS satellites or AIS Base Stations.

2.6.3 Time offset

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

2.6.4 Speed / Course

Vessel speed and course as taken from GNSS satellite data.

2.6.5 Position

Vessel position taken from GNSS source.

2.6.6 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.

Alarms - Displays an alarm icon to show the presence of acknowledged or unacknowledged AIS alarms.

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

2.6.7 Alarms

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. This will be accompanied by a sound. The alarm can be acknowledged via an on-screen message. The list of currently active AIS Alarms can be displayed by accessing the ‘*Alarms’* menu. If any alarm condition persists, contact your dealer or installer.

Possible alarm conditions are listed Table 6.

Alarm	Description
TX Malfunction	**This alarm will occur if the MMSI has not been configured.** This alarm 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. The alarm will be cleared if the transmitter recovers normal operation.
RX Channel *x* malfunction	This alarm occurs should the receiver hardware malfunction. The receiver is identified by the value of x (as shown below). The following alarms will be generated over the PI in this condition: ALR 003 - Rx Channel 1 ALR 004 - Rx Channel 2 ALR 005 - DSC (Channel 70) If the receiver returns to normal operation this alarm will be cleared.
Antenna VSWR exceeds limit	This alarm occurs if there is a problem with your antenna or antenna connection.
External EPFS lost	This alarm occurs if the position from the external Electronic Position Fixing System (i.e. GNSS) is invalid or lost.
No valid COG information	This alarm occurs if the AIS transceiver has no valid Course Over Ground information from any connected sensor.

Alarm	Description
No valid SOG information	This alarm occurs if the AIS transceiver has no valid Speed Over Ground information from any connected sensor.
Heading lost or invalid	This alarm 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 alarm occurs if the AIS transceiver has no Rate Of Turn information from connected sensors or via internal calculation.
No sensor position in use	This alarm occurs if the AIS transceiver has no valid position information from any connected sensor.
UTC Sync Invalid	This alarm 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	Nav Status incorrect This alarm will occur if the navigation status is in conflict with the current speed of the vessel. For example the alarm 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 alarm.

Alarm	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 alarm 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 alarm 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 6 Alarms list

2.6.8 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

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. Messages are limited to 80 characters in length.

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.

2.6.9 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.

2.6.10 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.

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

2.6.11 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.

2.6.12 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.

2.7 Configuring vessel information

2.7.1 Pre-configuration checks

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

2.7.2 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.

2.7.3 Configuring the internal GNSS receiver

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

- GLONASS and GPS – in this mode the position fix is derived from both the GLONASS and GPS network in parallel. This mode is the default setting and gives the best performance.
- GPS – in this mode only GPS satellites are used for the position fix.
- GLONASS – in this mode only GLONASS satellites are used for the position fix.

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 22.

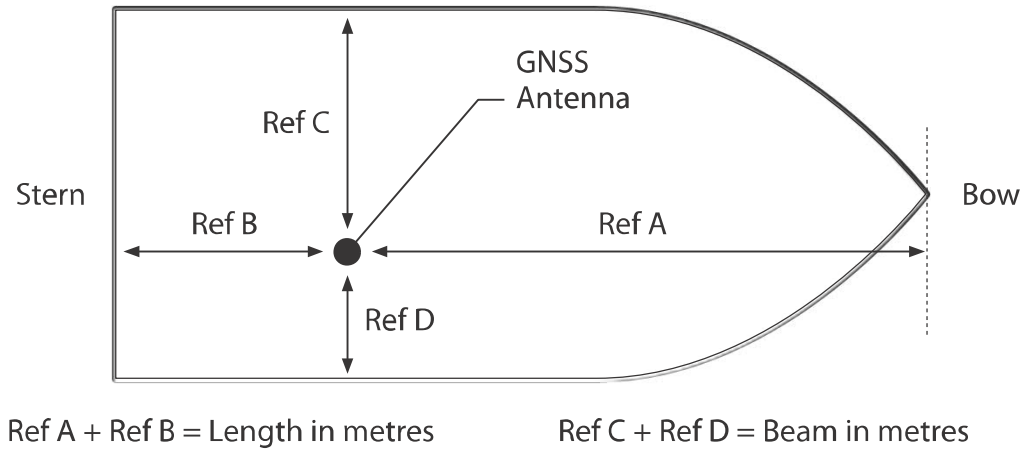

Figure 22 Vessel dimension measurement

2.8 Configuring voyage information

2.8.1 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 nearest1/10th of a metre.
- Navigation status - Navigational status selected from the icons on the screen.

Persons on board - Number of crew on board (optional).

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

2.9 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.

2.10 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.

2.11 Displaying AIS targets

2.11.1 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.

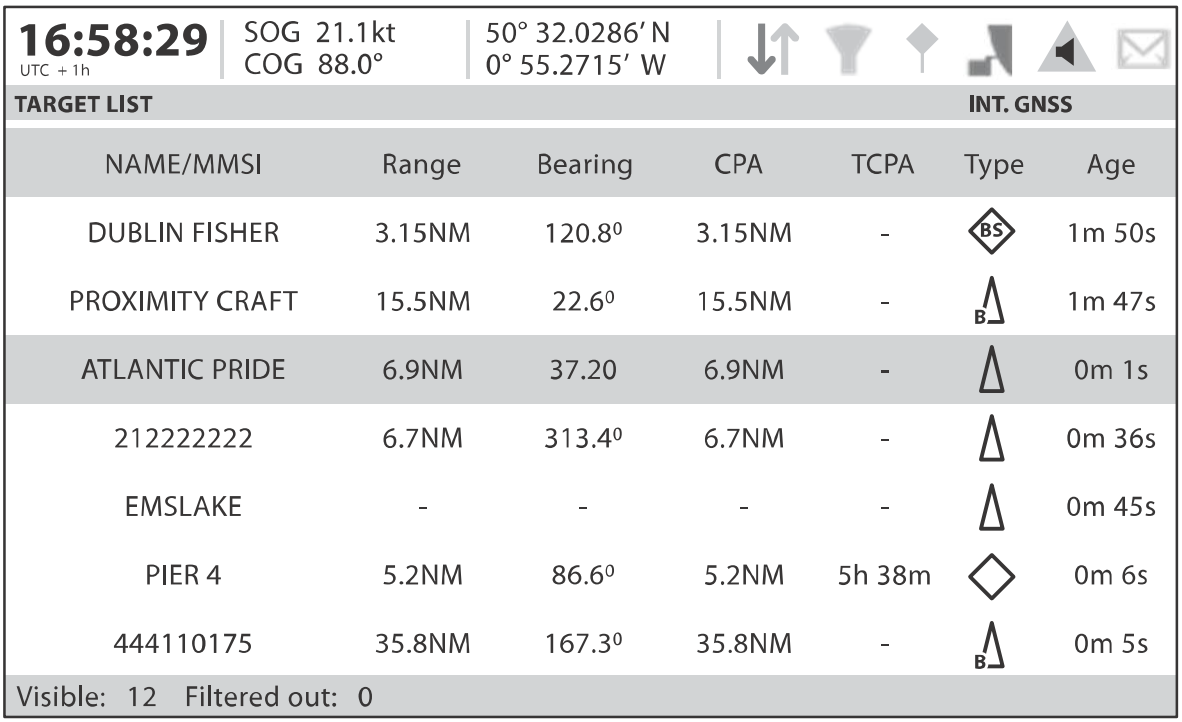

Figure 23 Target list screen

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 24. These symbols are common to the *'Target list'* and *'Target plot'* displays.

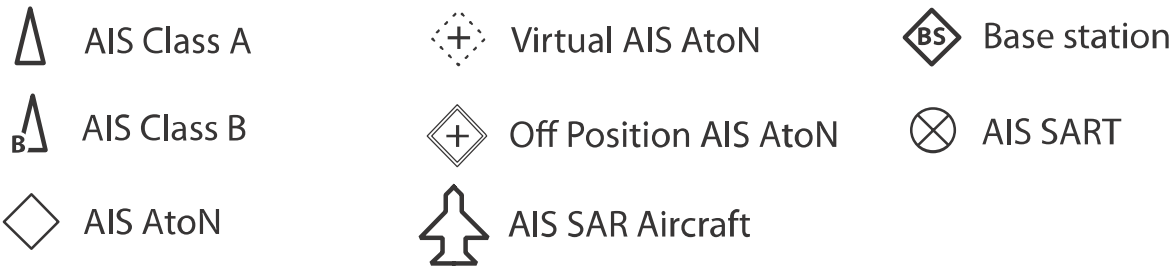

Figure 24 AIS target symbols displayed

2.11.2 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.

2.11.3 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.

2.11.4 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.

2.12 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 25. 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.

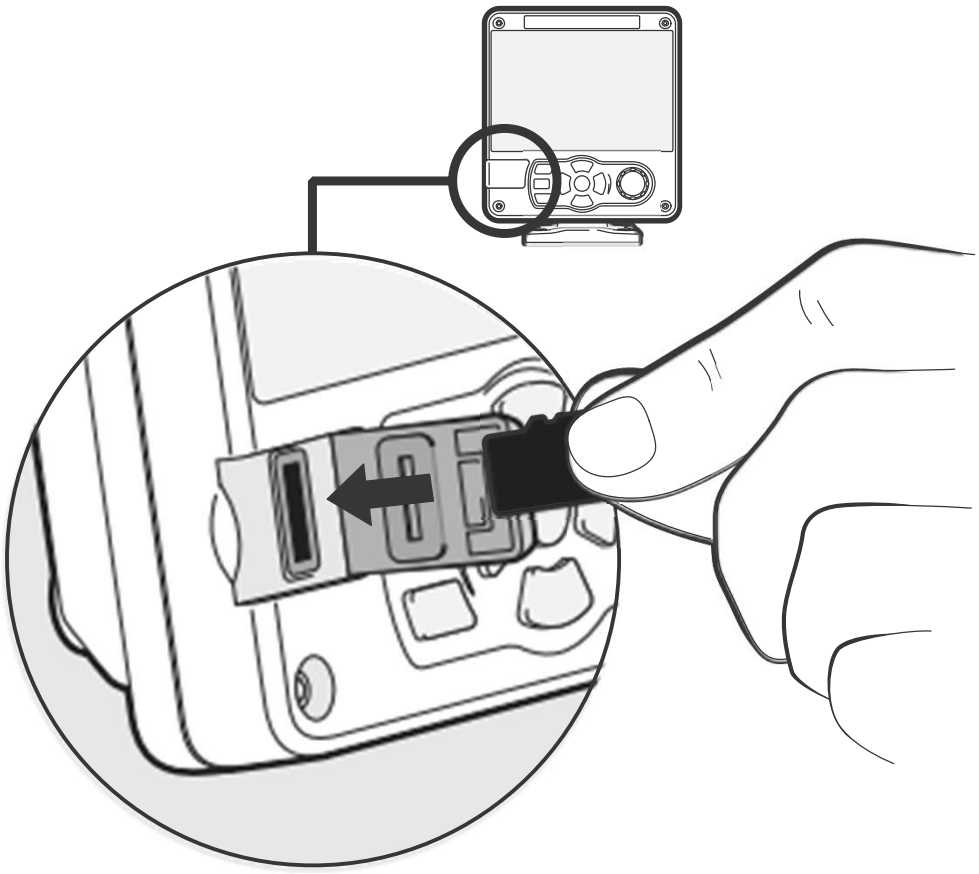

Figure 25 Micro SD card Socket

2.12.1 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 Jeppesen 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.

2.12.2 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.

2.12.3 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.

2.12.4 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.

2.13 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'.*

2.13.1 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 NMEA0183 sentences over the selected WiFi port to any connected devices.

2.13.2 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 NMEA0183 sentences will be transmitted from the AIS transceiver to any connected devices.

2.13.3 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.

3 Inland mode

3.1 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.

3.1.1 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.

3.1.2 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

3.1.3 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 26.

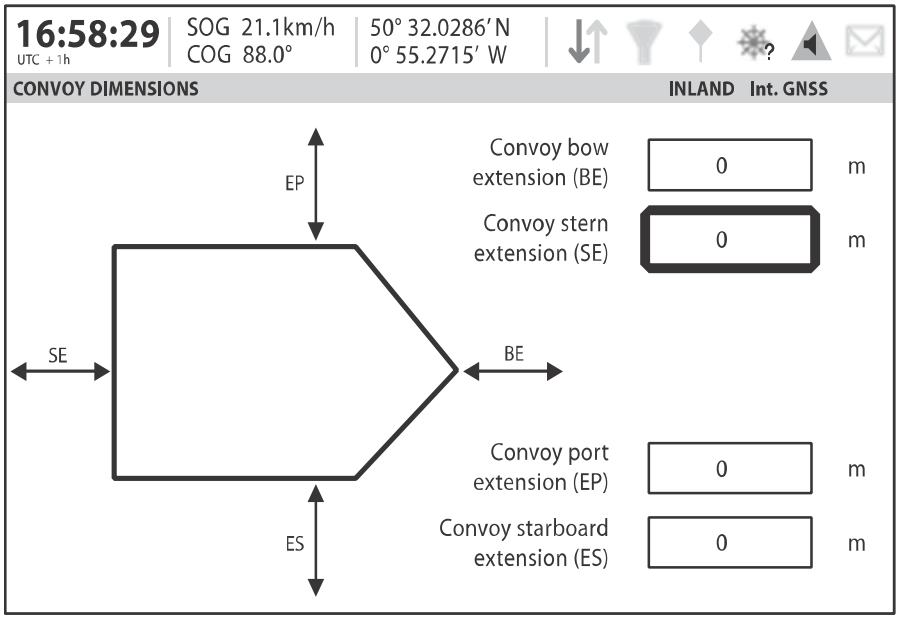

Figure 26 Convoy dimensions screen

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

3.1.4 Inland alarm masking

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

3.1.5 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 27.

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 27.

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.

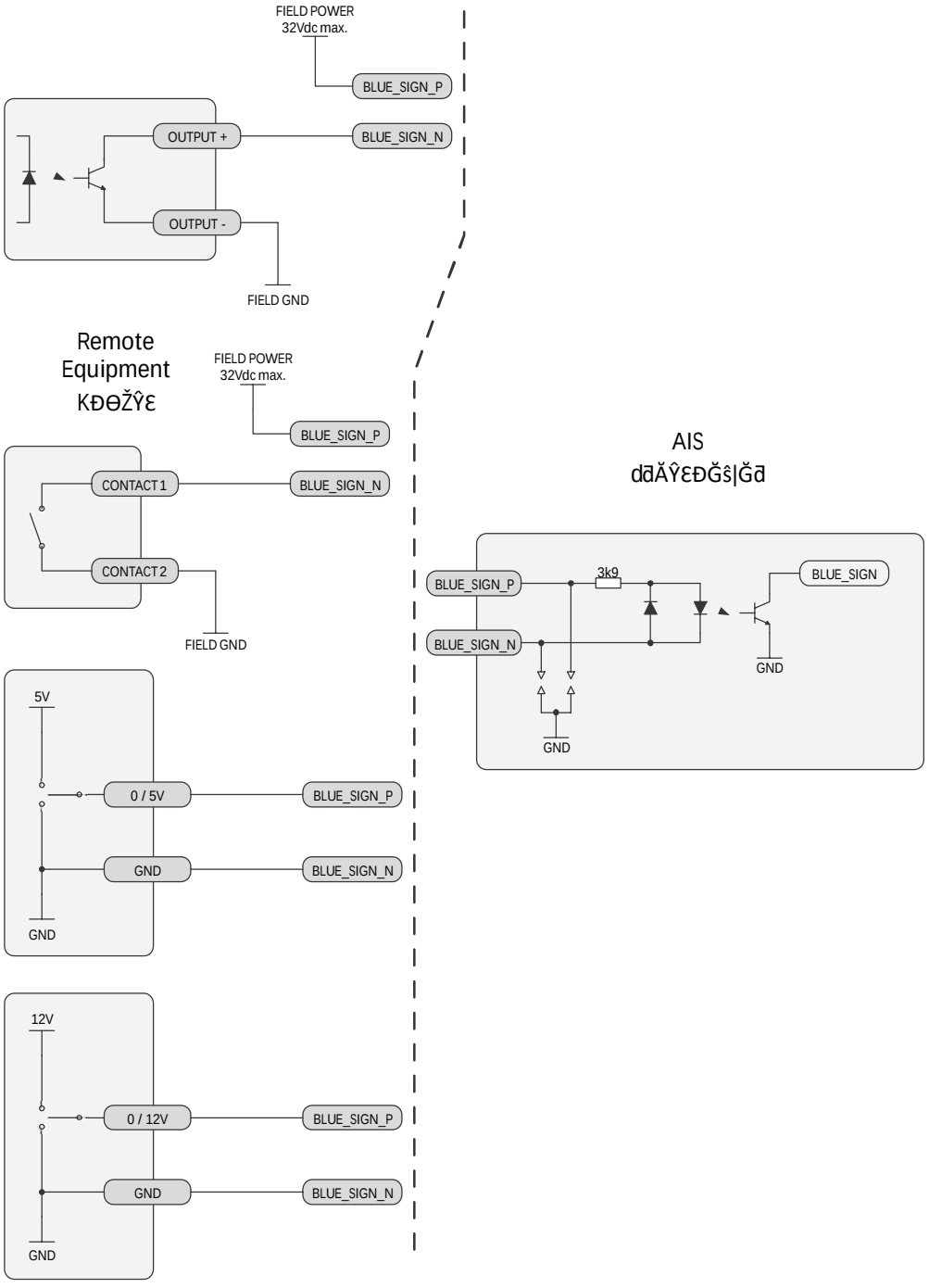

Figure 27 Blue Sign interface connection options

4.1 Troubleshooting

Issues	Possible cause and remedy
No data is being received by a connected chart plotter	● Check that the power supply is connected correctly. ● Check that the power supply is a 12VDC or 24VDC supply. ● Check that the connections to the chart plotter are correct.
The screen is not illuminated	● Check that the power supply is connected correctly. ● Check that the power supply is a 12VDC or 24VDC supply. ● Press and hold the *'Navigation status / Screen brightness'* button for at least 5 second. The display should return to maximum brightness.

The RED ‘Alarm’ icon is illuminated or flashing	● The unit may not have a valid MMSI. Check that the AIS transceiver is correctly configured with a valid MMSI. ● The VHF antenna may be faulty. Please check the connection to the VHF antenna and that the VHF antenna is not damaged. The alarm icon may illuminate briefly if the VHF antenna characteristics are briefly affected. ● No GPS position fix can be obtained. Please check the AIS transceiver is located where the internal GPS antenna has a clear sky view or that an external GPS antenna is properly connected and installed. Review the GPS signal strength graph in *‘Home’* > *‘System settings’* > *‘Advanced’* > *‘GNSS Source’*. ● The power supply is outside the allowable range. Check that the power supply is within the range 10.8VDC to 31.2VDC ● If none of the above correct the error condition please contact your dealer for advice. ● Check for error and alarm messages in the *‘Alarms’* menu.

My MMSI is being received by other vessels but my vessel name is not shown on their chart plotter or PC.	● Some older AIS devices and chart plotters do not process the specific class B message which provides the vessel name (message 24). This is not a fault of your AIS transceiver. Software upgrades are available for many older chart plotters which will correct this issue. The other vessel should update its AIS unit and / or chart plotting software to receive AIS message 24.
External Sensors not being recognised.	● Check Compatibility Mode option in the Interface Settings Menu. ● Check the Baud Rate set. ● Check the wiring is correct.
VSWR Alarm Activated or High VSWR.	● Ensure VHF Antenna is as far away as possible from metallic structures and any other antennae. ● Ensure VHF Antenna is as high as possible. ● Ensure VHF Antenna is suitable for AIS i.e. 3dBi Gain, 156-162MHz, and uses high quality RG213 or RG214 cable. ● The VHF Antenna cable should be as short as possible and no more than 30 metres (100ft) in length.

Table 12 Troubleshooting

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