A052T Manual

5W SOTDMA Class B+ AIS Transponder

NMEA 2000/ 0183/ USB/ WiFi output

Multiplexing additional NMEA 0183 input

Built-in NMEA 0183 to NMEA 2000 Converter

Designed in UK

CE ⨀RoHS ⨂

Features

- Utilizes the latest generation AIS technology for collision avoidance and vessel tracking
- Receives and processes all AIS message types
- Automatically transmits position, speed, and heading to other vessels
- Monitors position, speed, and heading of AIS-equipped vessels
- Combines NMEA 0183 input and outputs it via NMEA0183/ WiFi/ USB & NMEA2000
- Silent mode available for power saving, privacy, or security
- Supports WiFi connections for up to four devices simultaneously
- Connects to NMEA 2000 networks for AIS and GNSS position data sharing
- Supplied with programming software for user programming
- Supports web-based configuration via WiFi

Contents

1. Introduction

This manual provides installation procedures, configuration and safety instructions for the A052T Class B+ Transponder.

1.1. How AIS Works

The Automatic Identification System (AIS) is a maritime communication technology designed to improve navigation safety and traffic management. AIS operates by using Very High Frequency (VHF) radio transmissions to share information between vessels and with shore-based stations. It enables vessels to transmit their position, speed, course, and identity while simultaneously receiving similar data from other AIS-equipped vessels within range. This two-way exchange of information allows vessels to be aware of each other's presence, reducing the risk of collisions, especially in crowded or low-visibility environments.

AIS relies on data from the Global Navigation Satellite System (GNSS), such as GPS, to determine the vessel's position, speed over ground (SOG), and course over ground (COG). This data is then combined with the vessel's identity and other key information (such as size and type) and transmitted at regular intervals over VHF radio frequencies. The transmission protocol ensures efficient use of the shared radio channels, even in areas with high vessel density.

AIS uses two communication protocols: Carrier-Sense Time Division Multiple Access (CSTDMA) for Class B devices and Self-Organising Time Division Multiple Access (SOTDMA) for Class A and Class B+ devices. These protocols ensure that multiple vessels can transmit and receive data without interference. SOTDMA offers priority access to the channel and faster updates, making it suitable for commercial and high-performance applications, while CSTDMA is optimised for lower-cost recreational use.

One of the key features of AIS is its ability to display the position and movement of other vessels on a chart plotter, PC, or mobile device. This allows users to track nearby traffic, monitor changes in course and speed, and predict potential collision risks. AIS data is especially valuable in areas with heavy maritime traffic, such as ports, narrow channels, and busy shipping lanes.

While AIS significantly enhances situational awareness, it is important to note that it complements, rather than replaces, other navigation tools such as radar, visual lookout, and sound signals. Not all vessels are equipped with AIS, so it is essential to maintain traditional watchkeeping practices. By integrating AIS with these practices, mariners can achieve a higher level of safety and confidence on the water.

1.2. AIS Classes

AIS transponders are categorised into three main types—Class A, Class B and Class B+—based on their functionality and intended use. Here's a breakdown of each class:

1. Class A AIS Transponders
- **Intended Use:** Primarily used on commercial vessels, such as cargo ships, passenger vessels, and larger fishing vessels, where compliance with international regulations (SOLAS) is mandatory.
- **Transmission Power:** High power (12.5W), enabling longer transmission ranges.
- **Reporting Rate:** Frequent position updates, with intervals as short as 2 seconds depending on the vessel's speed and manoeuvring status.
- **Features:** Class A devices have additional capabilities, such as text messaging and complex voyage data reporting (i.e. destination, estimated time of arrival).

Class A transponders are designed for commercial vessels and larger ships that are required to meet international regulations. These units transmit detailed information, including the vessel's IMO number (if applicable), MMSI, call sign and name, length and beam, ship type, time, course over ground (COG), speed over ground (SOG), heading, navigational status, rate of turn, draught, cargo type, destination, and safety-related messages. The frequency of transmission varies, with static and voyage-related information being sent less often.

2. Class B AIS Transponders

- **Intended Use:** Designed for non-commercial vessels, such as recreational boats, yachts, and smaller fishing vessels, where regulations may not require AIS but added safety is desired.
- **Transmission Power:** Lower power (2W), providing shorter transmission ranges compared to Class A devices.
- **Reporting Rate:** Less frequent position updates, typically every 30 seconds when the vessel is moving and every 3 minutes when stationary.
- **Features:** Class B transponders share essential information (i.e. position, speed, and heading) but lack some of the advanced features of Class A devices.

Class B transponders, like our A051T, are designed to operate alongside Class A units without interfering with their network. They are ideal for smaller commercial vessels, fishing boats, and leisure craft not required to carry Class A equipment. Class B transponders transmit essential data such as MMSI, call sign and name, length and beam, ship type, time, course over ground (COG), and speed over ground (SOG). While the information transmitted by Class B units is less comprehensive than that of Class A, it is sufficient for safe navigation and collision avoidance in most recreational and non-commercial applications.

3. Class B+ AIS Transponders (Class B+ SOTDMA)

- **Intended Use:** An enhancement of Class B for high-performance recreational and semi-commercial vessels that need improved visibility in congested areas.
- **Transmission Power:** Higher power (5W) than standard Class B, offering greater range and improved signal reliability.
- **Reporting Rate:** Faster position updates, similar to Class A (as often as every 5 seconds), making them more effective in high-traffic environments.
- **Features:** Utilises SOTDMA (Self-Organising Time Division Multiple Access) technology, the same transmission protocol as Class A devices, ensuring priority access to the VHF channel over standard Class B units.

Class B+ transponders like the A052T are designed to bridge the gap between Class B and Class A AIS systems. They offer higher performance than Class B transponders while maintaining a compact and cost-effective form factor, making them the ideal choice for high-speed leisure craft, offshore sailing vessels and light commercial boats that don't require full Class A capabilities. Class B+ transponders transmit the same key data as Class B units (including MMSI, vessel name, call sign, dimensions, type, position, COG and SOG) but with greater transmission power – 5W instead of 2W – and more frequent updates, thanks to their use of the SOTDMA protocol, the same time-sharing method used by Class A transponders.

The A052T is Class B+ transponder.

Feature	Class A	Class B	Class B+
Power Output	12.5W	2W	5W
Update Rate	Up to every 2 sec	Up to every 30 sec	Up to every 5 sec
Protocol	SOTDMA	CSTDMA	SOTDMA
Typical Users	Commercial vessels	Recreational boats	High-performance recreational or semi-commercial vessels

1.3. Maritime Mobile Service Identity (MMSI)

IMPORTANT: In most countries the operation of an AIS unit is included under the vessel's marine VHF license provisions. An MMSI number is a unique identifier assigned to a vessel. The International Telecommunications Union (ITU) sets the international conventions for the use of MMSI numbers. An MMSI number is a 9-digit code issued by the host country agency for use in VHF marine radio equipment. The vessel onto which the AIS unit is installed must therefore possess a current VHF radio telephone license which lists the AIS system and the vessel Call Sign and MMSI number.

Please Note: The A052T Transponder will allow you to input an MMSI number only once.
Please ensure the MMSI number is correct before clicking 'Config'. Once confirmed, the MMSI cannot be changed.

2. Installation

The A052T package includes everything needed for installation and setup. Inside the box, you will find the AIS Class B+ Transponder unit, a power/NMEA cable is provided to connect the device to your vessel's power supply and NMEA network for data integration. A USB cable is also included, enabling you to connect the transponder to a computer for configuration or software updates.

The A052T is rated IP67 for water and dust ingress protection. It is housed in a durable plastic enclosure specifically designed to shield the device from moisture and water exposure. The enclosure includes four mounting holes, allowing for secure installation on a suitable flat surface.

Before beginning the installation of your transponder, please follow these guidelines to select an appropriate installation location:
• The A052T is water resistant with an IP67 rating, however, we recommend it to be mounted in a dry location on a flat surface.
• Ensure that the LED indicators always remain visible to the operator, as they provide critical information about its working status.
• The ambient temperature around the A052T should be maintained between -15°C and +55°C.
• Avoid installing it in flammable or hazardous areas, such as an engine room or near fuel tanks.
• Must be installed at least 0.25m away from a compass or any magnetic device (e.g., Quark-elec AS08).
• Must be installed at least 0.25 m away from other high-power transmitting equipment (e.g., VHF radios), unless sharing the VHF antenna with the A052T via a suitable splitter.
• Ensure there is adequate space around the A052T for cable routing and proper airflow.

Figure 1 Inside the box

By following these guidelines, you will ensure that the A052T operates efficiently and reliably, delivering a robust and dependable AIS solution.
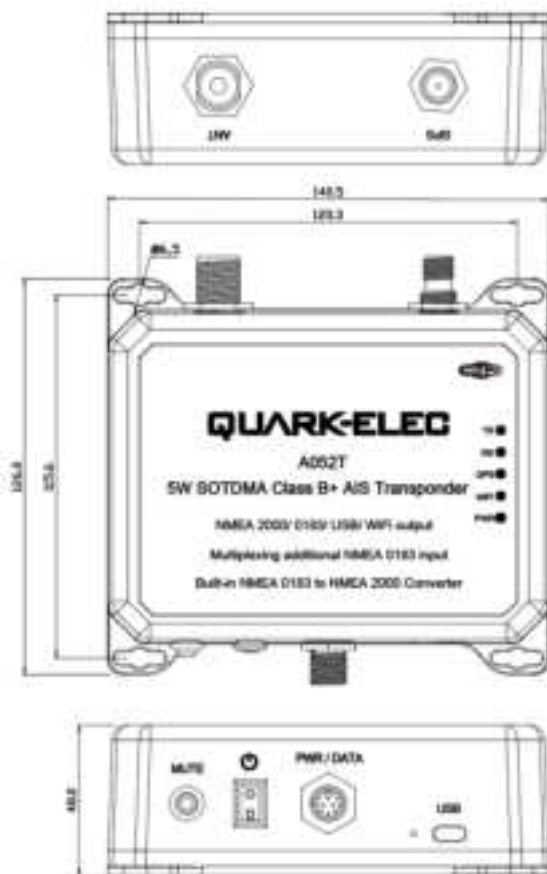

Figure 2 A052T Top view
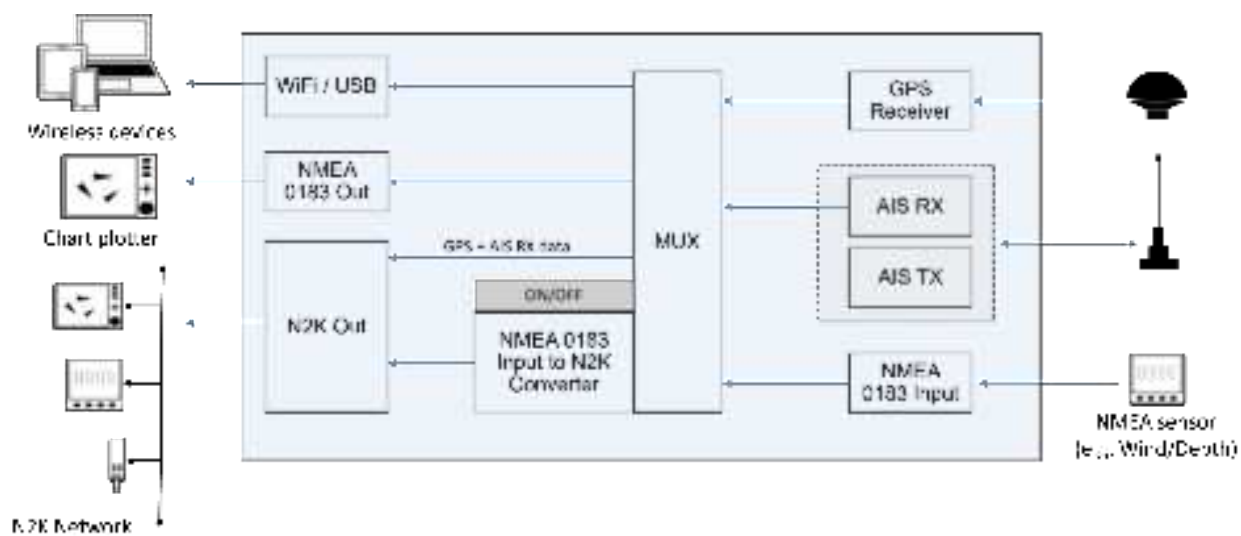

Figure 3 Dimensions (mm)

Figure 4 A052T Function diagram

3. Connections

The following figure shows connections for the AIS transponder. The user should take the time to familiarize themselves with the system elements and their connections prior to attempting installation.
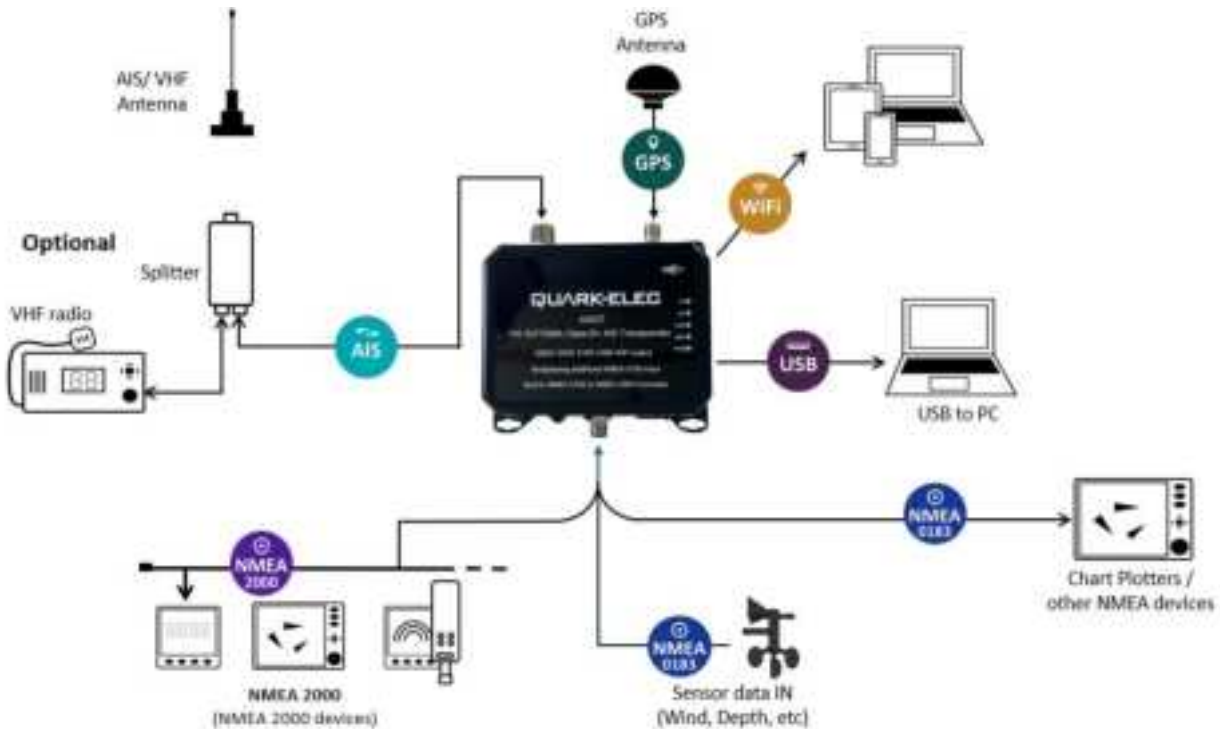

Figure 5 A052T Connection diagram

- **AIS connection**: a SO239 VHF connector for an external AIS antenna.

- **GPS connection**: a TNC female bulkhead connector is for an external GPS antenna.

- **12 pins Power/NMEA connection and cable**: the A052T Class B+ transponder features a 12-pin female connector mounted directly on the enclosure. This connector provides power input, as well as NMEA 0183 input and output capabilities. The NMEA 0183 data cable can be connected to plotters or other NMEA 0183-compatible devices. Additionally, the A052T includes a standard NMEA 2000 female connector, which allows for direct connection to an NMEA 2000 bus.

- **USB**: USB-C connector for software configuration and information display on PC. Connect to Windows system for software configuration and information display. The A052T configuration tool can be downloaded from our website: https://www.quark-elec.com/downloads/configuration-tools/

- **WiFi connection**: The A052T features a built-in WiFi antenna and supports two output modes: Ad-hoc and Station. By default, it operates in Ad-hoc mode, with an option to switch to Station mode using the Configuration Tool. If the WiFi data output is not required, the module can be set to Standby mode via the same tool. Additionally, the WiFi supports web-based configuration for added convenience.

- **NMEA 2000:** The A052T can be connected to an existing NMEA 2000 network to provide AIS and position data to other connected devices such as chart plotters, instruments, sensors, etc. Connection is made by a 1-meter drop cable to the existing NMEA 2000 network T-piece.

3.1. Status LEDs

The A052T has 5 LED lights to confirm power and data transfer, and for troubleshooting.

- **TX:** LED will flash for every class B+ signal transmitted from the A052T.
- **RX:** LED will flash independently depending on the channel signal received. The A052T receives AIS data on channel A (161.975 MHz) and B (162.025 MHz) simultaneously.
- **GPS:** LED will stay lit when GPS connection is established. The GPS LED will flash once per second while waiting for a GPS fix or if GPS signal is lost.
- **PWR:** LED indicates Power. This LED is lit constantly when the device is powered.
- **WiFi:** LED will flash when AIS/GPS sentences are sent out via WiFi. If the LED is unlit, this indicates there is no traffic being transmitted over the WiFi network.

See the troubleshooting chapter below if the LEDs are not functioning in the expected manner.

Figure 6 A052T front panel (LEDs) and side panel

3.2. Silent Button (Mute)

Disabling the transmitter while keeping the receiver active has proven useful for privacy or security reasons. In some situations, boat owners may not wish to transmit their position or identification information to other vessels or receiving stations. The A052T supports Silent Mode, which can be activated using the mute button on the side panel. When Silent Mode is active, the LED on the mute button will remain illuminated to indicate that the transmitter is off, while the receiver continues to function.

3.3. NMEA/POWER Connection

The A052T features a 12-pin coaxial female connector mounted directly on the enclosure. This connector provides both power input and supports NMEA 0183 and NMEA 2000 data connections.

The included 1-meter cable connects to the 12-pin connector on the A052T and terminates a female NMEA 2000 connector. In addition to the NMEA 2000 connection, the cable includes seven separate wires for NMEA 0183 input and output, and the power connections. This setup allows for easy

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integration with NMEA 2000 networks and compatibility with NMEA 0183 devices such as plotters and sensors.

Power/ NMEA Cable Colour Codes:

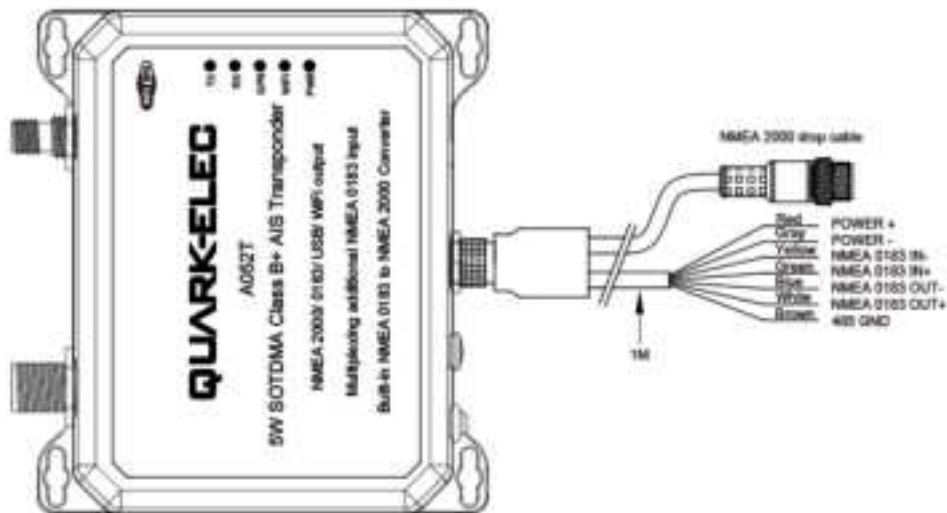| Pin name	Colour
Power+	Red
GND / Power-	Grey
NMEA 0183 IN-	Yellow
NMEA 0183 IN+	Green
NMEA 0183 OUT-	Blue
NMEA 0183 OUT+	White
GND *	Brown, (* reserved for NMEA 0183 RS422 port. Don't use it for power supply.)

Figure 7 12 Pin cable

⚠ **WARNING:** Double-c**heck all wiring connections before applying power to the A052T.** Failure to wire the product correctly could result in permanent damage.

Figure 8 12 Pin power/data connector location

3.3.1.   Connecting to an NMEA 2000 network

The A052T integrates seamlessly with existing NMEA 2000 networks, providing AIS and position data to connected devices such as chart plotters, instruments, and sensors.
To connect the A052T, simply attach the included NMEA 2000 drop cable to your NMEA 2000 network. No additional configuration is required.
Please note that the A052T is powered via its dedicated 12V and GND wires. It does not draw power from the NMEA 2000 bus.

3.3.2.   Power supply

The A052T operates on 12V DC, and it is crucial to ensure that all connections are made correctly during installation. Although the device is equipped with reverse polarity protection to safeguard against incorrect power connections, mistakes can still lead to serious issues. If the NMEA input or output signal wires are accidentally connected to a power wire, it will cause permanent damage to the device. Therefore, it is essential to double-check all connections thoroughly before powering up the unit.
Another critical point to note is that the GND wire reserved for the NMEA 0183 connection, identifiable by its brown colour, should not be used for power supply purposes. Ensuring these guidelines are followed will help protect the A052T and maintain its reliable operation.

3.4. NMEA input/output

NMEA 0183 input/output ports allow for connection to NMEA 0183 instruments and chart plotters.
The built-in multiplexer combines the input NMEA 0183 data (i.e. wind/depth/radar) with the AIS and GPS data and sends the combined data stream to all outputs, including the NMEA 0183 output port.

3.4.1.   Default baud rates

'Baud rates' refer to the data transfer speed. When connecting two NMEA 0183 devices, both devices' baud rates, must be set to the same speed.

•   The A052T input port's default baud rate is 4.8k bps as it is usually connected to low speed NMEA format data instruments, like heading sensor, sounder, or wind/depth sensors.

•   The A052T output port's default baud rate is 38.4k bps. To display received AIS position reports from other vessels on your chart plotter, you will need to connect your A052T to your chart plotter via NMEA output. Please refer to the user manual for details of how to connect and configure your chart plotter for use with AIS devices. For general guidance your chart plotter should be configured to accept NMEA data at 38.4k baud (sometimes referred to as 'NMEA HS' or 'NMEA High speed' in the plotter configuration menu). You may also need to enable the display of AIS targets in the chart options.

These are the default baud rate settings and are most likely to be the baud rates required, however, both baud rates are configurable if needed. Baud rates can be adjusted using the Configuration software. (See Configuration section)

3.4.2.   NMEA 0183 RS422 / RS232

The A052T works with the NMEA 0183-RS422 protocol (differential signal). However, some chart plotters or devices may still rely on the older NMEA 0183-RS232 protocol (single-ended signal).

It is important to check which protocol your NMEA devices, such as chart plotters or wind sensors, use before making any connections. If you are unsure whether your devices operate on the RS422 or RS232 protocol, the input/output connections on the device can provide some clues.

Be aware that manufacturers using the older RS232 protocol are not always consistent with their product labelling, which can lead to confusion. The table below may help you identify which protocol your device uses, but it is always recommended to consult the product manual to confirm.

RS422 (Differential)	RS232 (single-ended)		
TX+ and TX- / RX+ and RX-	TX+ and TX- (GND)	/	RX+ and RX- (GND)
	TXa+ and TXa- (GND)	/	RXa+ and RXa- (GND)
	Output +Ve and –Ve	/	Input +Ve and –Ve
	Occasionally older NMEA 0183 RS232 devices are labelled like RS422 (TX+ and TX- / RX+ and RX-) so check the products' manuals.		

Connecting to NMEA 0183 (RS422) devices
Connecting RS422 devices is a simple process. Just ensure 'TX to RX' and '+ to +', '- to – '.

	A052T	Connection needed on RS422 device
NMEA 0183 input	NMEA INPUT-	NMEA OUTPUT- (sometimes called NMEA/B or -Ve)
	NMEA INPUT+	NMEA OUTPUT+ (sometimes called NMEA/A or +Ve)
NMEA 0183 output	NMEA OUTPUT-	NMEA INPUT- (sometimes called NMEA/B or -Ve)
	NMEA OUTPUT-	NMEA INPUT+ (sometimes called NMEA/A or +Ve)

Connecting to NMEA 0183 (RS232) devices
Connecting to NMEA 0183 (RS232) devices can be a bit tricky because RS232 typically only provide a single terminal, such as TX or RX. In most cases, one of the suggested connections will work for your setup. However, if these connections still do not function, please consider our protocol bridge AS03 (not included). The AS03 connects and converts RS422 to the older RS232 and visa-versa, through a simple connection with no configuration needed.

	A052T	Connection needed on RS232 device
NMEA 0183 input	NMEA IN-	TX (NMEA Output)
	NMEA IN+	GND
NMEA 0183 output	NMEA OUTPUT-	RX (NMEA Input)
	NMEA OUTPUT+	GND

3.5. USB Connection
A052T is supplied with a USB cable. This connector provides AIS, GPS data output as standard. The USB cable can be linked directly to a USB port on the PC.

Windows: To enable the USB data connection of A052T to other devices, related hardware drivers may be needed dependent on your system requirements.

Windows 7,8,10: the driver can be downloaded from https://www.quark-elec.com

The A052T registers itself to the computer as a virtual serial com port.
The drivers usually install automatically to your device if it is running an original Windows 10 version. A new COM port will automatically show up in the device manager after plug in.

Mac: For Mac OS X, the A052T will be recognized and shown as a USB modem. The ID can be checked with the following steps:
1. Plug the A052T into a USB port and launch Terminal.app.
2. Type: less /dev/*sub*
3. The Mac system will return a list of USB devices. A052T will display as - "/dev/tty.usbmodemXYZ" where XYZ is a number. Nothing further needs to be done if it is listed.

Linux: No driver is required for Linux. When plugged into the computer, A052T will show up as a USB CDC device on /dev/ttyACM0.

Once the driver is installed (if needed), run the Device Manager and check the **COM port number**. Your chart software will require your COM port number in order to access the data. (Your COM port number is the number associated with the USB port you are using. The port number is the number that Windows assigned as an input device. These are generated randomly by your computer and can be changed manually if required).

The port number for the A052T can be found in Windows 'Control Panel->System->Device Manager' under 'Ports (COM & LPT)'. Look for 'STMicroelectronics…' and the associated COM port.

To change this number (if desired), double click the A052T and select the 'Port Settings' tab. Click the 'Advanced' button and change the port number to the one required.
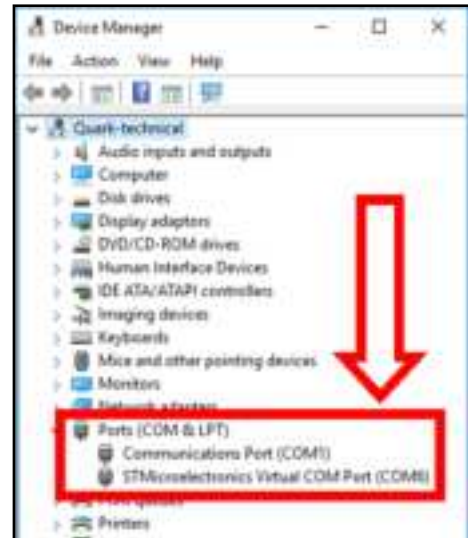

Figure 9 USB connection

Operators can also use a Windows system to setup and configure the A052T through the USB port. More details on this process can be found in the 'Configuration' Chapter.

3.5.1.   USB data check - OceanCom

If desired, the USB data output can be checked with OceanCom (Quark-elec's free Com port monitoring application). The latest version of OceanCom can be downloaded from our website https://www.quark-elec.com/doc/OceanCom_1.0.zip

To view your raw USB data, enter the following parameters into OceanCom (or the Com port monitoring software of your choice) Com port settings: B**aud rate: 38400bps**, **Data bit: 8**, **Check: None**, and **Stop bit: 1**.
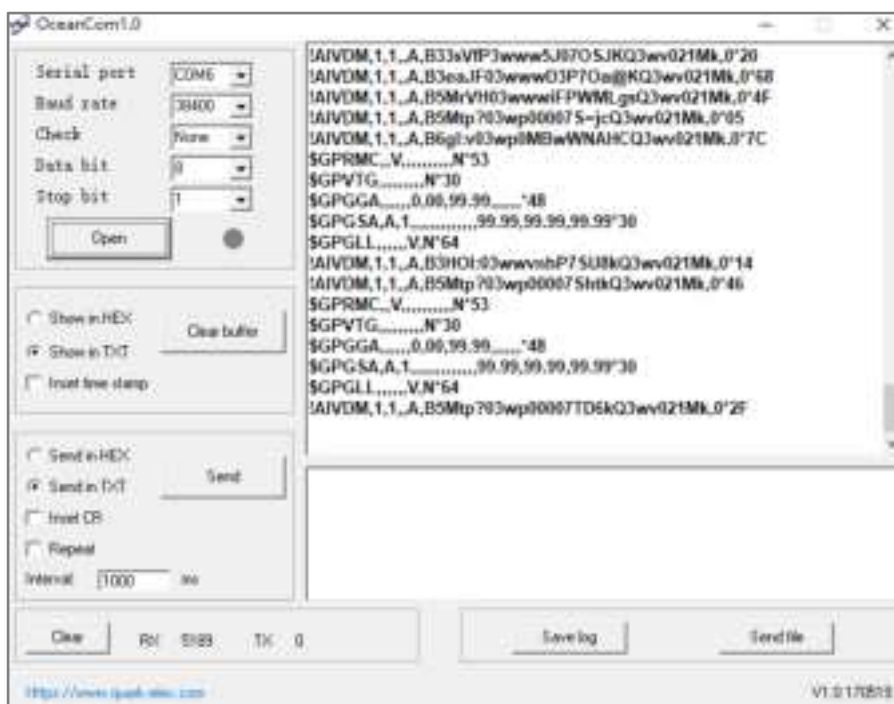

Figure 10 OceanCom interface

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Operators can also use a Windows system to setup and configure the A052T through the USB port. More details on this process can be found in the 'Configuration' Chapter.

3.6. Wireless Connections

The A052T enables users to view marine data wirelessly on a PC, tablet, smartphone, or any WiFi enabled device. Data such as vessel position, course, and speed can be accessed directly within compatible chart plotting or navigation software.

The A052T is equipped with a high-performance WiFi module that supports both Ad-hoc (peer-to-peer) and Station (infrastructure) modes. Through a wireless connection, users can receive NMEA 0183 AIS and GPS data in real time.

Figure 11 WiFi working modes

- **Ad-hoc mode:** WiFi enabled devices (PC's, Laptops, Phones Tablets, etc) connect directly to the device, without the need for a router or access point. For example, your PC, tablet or smart phone can connect directly to the A052T to receive marine data.
- **Station mode:** Wireless devices communicate through an access point (AP) such as a router that serves as a bridge to other networks (such as the internet or a LAN). This allows your router to handle the data and traffic from your device. This data can then be picked up through your router anywhere on your local area network. This is similar to plugging the device directly into the router by wire, but instead using wireless technology. In this way, the mobile devices receive both your marine data and other AP connections (for example Internet).

3.6.1. Ad-hoc mode (Default Setting)

The A052T is set to Ad-hoc mode by default, allowing direct wireless connection from a WiFi enabled device without requiring a router. This mode can be changed to Station mode using the Configuration Tool.

Connecting to the A052T via Ad-hoc Mode:
- Power on the A052T. Wait approximately 15 seconds after powering up the A052T.
- Connect to the WiFi Network. On your device, scan for a WiFi network with an SSID similar to:

Device SSID	Similar to 'QK-A052Txxxx'

Default WiFi password	88888888

Connect to this network using the default password.

- Configure your chart software. In your marine navigation or chart software, use the following connection settings:

Device SSID	Similar to 'QK-A052Txxxx'
Protocol	TCP
IP address	192.168.4.1
Data Port	81

With these settings, a wireless connection should be established, and your marine data (e.g. AIS, GPS) will be visible within the chart software.

We recommend that customers do not change this IP address in Ad-hoc mode to ensure proper communication. The default password (88888888) can be changed using the Configuration Tool. The new password must be between 8 and 12 characters.
Once changed, all users will need the new password to connect to the A052T in Ad-hoc mode.

3.6.2.   Station mode

Station mode allows the A052T to connect to your Access Point (AP) or router, enabling the router to manage data and traffic from the device. This setup allows AIS and GPS data to be accessed wirelessly from any device on the same local network.

In this mode, your mobile device can receive marine data while still maintaining access to other router-based services, such as the Internet (if available).

Station mode is configured using the Configuration Tool. For setup instructions, refer to the Configuration section of this manual.

3.6.3.   WiFi data check

If required, the user can always check the wireless connection with a TCP/IP port monitoring software as shown below:
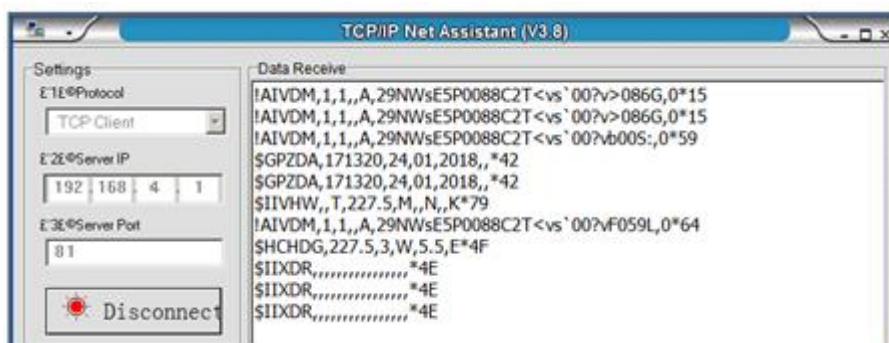

Figure 12 Using Net Assistant to view data

4. Configuration software

The A052T transponder must be correctly configured with your vessel's details before use. It is important that all information is entered accurately, as it will be broadcast to other AIS-equipped vessels and shore stations.

Configuration is done by connecting the A052T to a Windows PC using the supplied USB cable and running the A052T Configuration Tool. After completing the setup, unplug the USB and re-power the A052T to activate the new settings.

The Configuration Tool allows you to enter essential vessel details such as: MMSI number, vessel name, vessel type, dimensions, and other required AIS data. This information is necessary for the A052T to operate properly as a Class B+ AIS transponder.

To download the Configuration Tool, please use the link provided below.

https://www.quark-elec.com/downloads/configuration-tools/

The Configuration Tool is compatible with Windows only. For users on Android, iPhone, or iPad, please use the web-based configuration via WiFi.

To Configure the A052T,

- Connect the A052T to a Windows system via USB (for Mac users, boot camp).
- Close other programs that would connect to the A052T via USB.
- Run the Configuration tool.
- Click 'Connect' to connect the Configuration Tool to the A052T.
- Check connection status, Configuration Tool should display the 'A052T Connected' message at the bottom of the screen together with the A052T's MCU and WiFi firmware versions.
- Change the transponder's settings as required.
- Click 'Config' to save the new settings to the device. The 'Config' button on the left will only save the NMEA 0183 ports' baud rates, WiFi settings and the NMEA 0183 IN to N2K Converter's working mode to the transponder. The 'Config' button on the right will save the Ship Information only to the device. The 'Config' button at the top right will save the AIS power settings only to the transponder.
- After clicking on 'Config', wait for 10-15 seconds for the transponder to save the new settings and repower your device. The A052T will boot up with the new configuration.

Figure 13 The A052T Configuration tool

4.1. NMEA 0183 input/output band rate

The NMEA 0183 ports' default baud rates are the following:
- NMEA 0183 input port: 4.8k bps
- NMEA 0183 output port: 38.4k bps

The baud rate for the NMEA 0183 input port can be configured to 4.8k bps, 9.6k bps, 19.2k bps, or 38.4k bps, as needed. The NMEA 0183 output port supports baud rates of 4.8k bps, 9.6k bps, 19.2k bps, 38.4k bps, and 115.2k bps, or it can be disabled if not required.

Before making any changes, ensure that the Configuration Tool is connected to the transponder. The status message 'A052T Connected' should appear at the bottom of the window. Set the NMEA 0183 input and/or output port to the desired baud rate, then click 'Config' to save the new settings to the transponder.
Allow 10-15 seconds for the configuration to complete, then power cycle the device. The transponder will restart with the updated configuration.

4.2. WiFi Config

The A052T supports three WiFi modes: Ad-hoc, Station, and Standby(Refer to the WiFi Configuration section for detailed information.).   By default, the A052T is configured to operate in Ad-hoc mode.

4.2.1. Station mode setup

A052T can join an existing WiFi network in Station mode, by entering the parameters of your Wireless Access Point into the Configuration software as outlined below:

Connect the A052T to a Windows system via USB (for Mac users, boot camp). Run the Configuration tool, checking connection to A052T in the bottom of the tool. Remember to open the Serial port (see above)

1. Change working mode to '**Station'**
2. Enter your router's **SSID.**
3. Enter your network **password**.
4. Enter the **IP address** you want to assign to the A052T. Start with 192.168. The third group of digits depends on your router's configuration (Commonly 1 or 0). The fourth group must be a unique number between 0 and 255. This number must not be used by any other equipment connected to your router.
5. Enter your **router's IP address** in the **Gateway** section. This can usually be found on the router.
6. Leave the Net settings as they are.
7. We recommend using 81 as the port number; however, you may change it to any other number except 80, which is reserved for communication with the configuration tool.
8. Click '**Config'** in the bottom right-hand corner.
9. After 10-15 seconds Click '**Disconnect'**.
10. Power Cycle the A052T. The A052T will now attempt to connect to your router.

Figure 14 Station mode WiFi settings

In your chart software set the protocol as '**TCP**'
Insert the **IP address** you assigned the A052T
Enter the Port number as '81' in the chart software.

Protocol	TCP
IP address	The IP address you assigned in configuration (or check your router IP address list)
Data Port	81

You should now be connected and see AIS or GPS targets on your chart software.
If not, check your router's **IP address list** and check the **IP address** that your router has given your A052T.
Occasionally, a router assigns a different **IP address** to a device than the one you chose to assign it during Configuration. If this is the case, copy the **IP address** from the router into your chart software. If the **IP address** in your router's **IP address list** is the same as the one you input into your chart software, then everything will work in station mode. If you are unable to see any data repeat the steps and check all the data has been inputted correctly.

If you are unable to view your data in Station mode, the likely cause is either the data has been input incorrectly, or the IP address is different in your chart software to that of your router.

4.2.2.   Standby mode- Disabling WiFi

The user can disable the WiFi output by selecting **'Standby' mode**, if desired.

4.3. NMEA 0183 to N2K converter

The A052T includes a built-in NMEA 0183 to NMEA 2000 data converter, which allows the conversion of sentences received via the NMEA 0183 input into NMEA 2000 PGNs. This feature is enabled by default but can be configured as required using the configuration tool.

When the converter is enabled (ON), the received NMEA 0183 sentences are converted into NMEA 2000 PGNs and transmitted to the NMEA 2000 network. When the converter is disabled (OFF), the NMEA 0183 sentences are not converted and will not be output to the NMEA 2000 network.

To modify the converter's working mode:

1.   Select 'ON' or 'OFF' from the dropdown menu (see the configuration interface below).
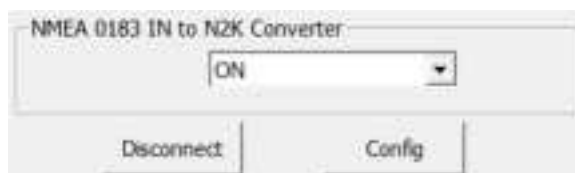

Figure 15 NMEA converter switch

2.   Click **'Config'** to save the new setting to the device.

3.   Wait for 60 seconds, then click **'Disconnect'** and power cycle your A052T transponder. Upon reboot, the device will apply the updated settings.

Please note, only supported NMEA 0183 sentences can be converted by the built-in data converter. Unsupported sentences will not be processed or output to the NMEA 2000 network. Please check the table below for the complete list of supported data conversions:

NMEA 0183 sentence	Function	Converted to NMEA 2000 PGN/s
AAM	Waypoint Arrival Alarm	129284
ABM	AIS Addressed binary and safety related messages	129795,129801
APB	Heading/Track Controller (Autopilot) Sentence "B"	129283,129284
DBT	Depth Below Transducer	128267
DPT	Depth	128267
DSC	Digital Selective Calling Information	129808
DSE	Expanded Digital Selective Calling	129808
GGA	Global Positioning System Fix Data	126992, 129025, 129029
GLL	Geographic Position Latitude/Longitude	126992, 129025
GSA	GNSS DOP and Active Satellites	129539
GSV	GNSS Satellites in View	129540
HDG	Heading, Deviation & Variation	127250
HDM	Heading, Magnetic	127250
HDT	Heading, True	127250
HSC	Heading Steering Command	127237
MTW	Water Temperature	130311
MWD	Wind Direction & Speed	130306
MWV	Wind Speed and Angle (True or relative)	130306
RMB	Recommended Minimum Navigation Information	129283,129284
RMC*	Recommended Minimum Specific GNSS Data	126992, 127258, 129025, 12902
ROT	Rate Of Turn	127251
RPM	Revolutions	127488
RSA	Rudder Sensor Angle	127245
THS	True Heading and Status	127250
VDR	Set and Drift	129291,130577
VHW	Water Speed and Heading	127250, 128259
VLW	Dual Ground/Water Distance	128275
VTG*	Course Over Ground and Ground Speed	129026
VWR	Relative (Apparent) Wind Speed and Angle	130306
XDR	Battery information (Voltage, current and status)	127506,127508
XTE	Cross Track Error, Measured	129283
ZDA	Time & Date, Local Time Offset	126992, 129033
VDM/VDO	AIS Message 1,2,3	129038
VDM/VDO	AIS Message 4	129793
VDM/VDO	AIS Message 5	129794
VDM/VDO	AIS Message 9	129798
VDM/VDO	AIS Message 14	129802
VDM/VDO	AIS Message 18	129039
VDM/VDO	AIS Message 19	129040
VDM/VDO	AIS Message 21	129041
VDM/VDO	AIS Message 24	129809. 129810

*please note: some of the NMEA 0183 sentences that are received require additional data before being sent.

4.4. AIS Power setting

The A052T allows users to adjust the transmission power to suit their needs. There are three available output levels: 1W, 2W, and 5W. By default, the power is set to 5W, in accordance with Class B+ AIS standards.

Users may choose a lower transmission power, such as 1W or 2W, if they require a reduced range to conserve power or avoid interference in specific situations. For example, in a marina or congested area, a lower power setting may be preferred to limit the range and reduce the likelihood of unwanted AIS signals being broadcast over long distances.

Figure 16 AIS power settings

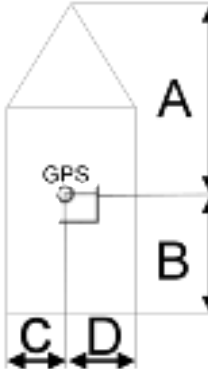To check the current transmission power setting:
1.   Navigate to the **AIS Power Setting** section.
2.   Click '**Read'** to display the currently selected output level.

To change the transmission power:
1.   Click the arrow next to the dropdown list and select your desired power level (1W, 2W, or 5W).
2.   Click '**Config'** to save the new setting to the transponder.
3.   Wait 10–15 seconds, then click '**Disconnect'**.
4.   Finally, power-cycle the transponder (turn it off and back on) for the changes to take effect.

4.5. Ship Information Configuration

Name	Description
Ship type	This field should contain a number referring to the type of vessel you are using this transponder on. For example enter the number 36 for vessels using sail propulsion. For example enter the number 37 for pleasure craft (Yacht powered by engine)
Name	Enter the name of your vessel
MMSI	**Maritime Mobile Service Identity** is a unique 9 digit number that is assigned to a (Digital Selective Calling) DSC radio or an AIS unit. Your MMSI number is your unique calling number for DSC radios or an AIS unit. See chapter mobile maritime service identity
CALL SIGN	Call sign for your vessel

A **B** **C** **D**	These relates to your size and GPS antenna location. Your ships size is determined by the Data input into the transponder under the section **A, B, C, and D** (see image above). The transponder must know where your antenna is located to make accurate readings for other ships and your own. Please be as accurate as possible when filling this information in. A: Distance from bow to GPS antenna in metres B: Distance from stern to GPS antenna in metres C: Distance from port to GPS antenna in metres D: Distance from Starboard to GPS antenna in metres

Note: Some of this information is legally required if using the A052T on water. Please check with your relevant authority or coastguard. Please input this information carefully.

The A052T transponder will allow you to input an MMSI number only once. Please make sure you input the correct MMSI number before clicking 'config', as changes are not permitted after confirming. Unrequired fields can be left bank.

5. Web-based configuration

The A052T features a built-in web interface that enables quick and easy setup of AIS transmission power and vessel details via WiFi—without the need for a USB connection or configuration tool.
This web interface can be accessed through any standard web browser on a Windows PC, Apple Mac/MacBook, or Android device, making it particularly convenient for users who do not use Windows.

If the A052T's WiFi is set to Ad-Hoc Mode:

• Connect your computer or mobile device to the A052T's WiFi network (SSID similar to QK-A052Txxxx).
• Open a web browser and enter the following address in the address bar: 192.168.4.1:80
• Press Enter, and the A052T web interface should load.

2. If the A052T is in Station Mode:

• Connect your computer or mobile device to the same WiFi network (router/access point) that the A052T is connected to.
• Open a web browser and enter the A052T's IP address followed a semi colon by the port number (default: 80) in the address bar. (i.e. 192.168.4.1:80)
(Note: You may need to find the A052T's IP address from your router's connected devices list.)
• Press **Enter** to access the web interface.

Once connected, the web interface will be displayed in your browser, allowing you to configure transmission power, vessel details, and other settings.

Figure 17 A052T Web user interface

The A052T web interface includes two main sections for configuration:

1. Power Settings (Top Section):
- Click Refresh to view the current AIS transmission power level.
- Select the desired power level (1W, 2W, or 5W) from the dropdown menu.
- Click Save to apply the new setting.
- Wait 10–15 seconds, then power-cycle the transponder (turn it off and then back on) for the changes to take effect.

2. AIS Settings (Bottom Section):
- Select your vessel type from the dropdown list.
- Enter the vessel's name, MMSI number, call sign, and dimensions in the corresponding fields.
- Click Save to write the information to the transponder.
- Wait 10–15 seconds, then power-cycle the transponder.
- You can click Refresh to view the AIS data currently stored on the device.

6. Specification

Item	Specification
Standard	IEC 62287,ITU-RM.1371,IEC 60945, IEC 61162
NMEA 0183	4.8kbps, 38.4kbps

Sensitivity	-110 dBm
Power	5W
Channel A	CH87B(161.975MHz)
Channel B	CH88B(162.025MHz)
Input Level	9.6V-28.0V
Transmit Mode	SOTDMA
Bandwidth	25 KHz
Bit ratio	9600 bps
Consumption	< 4 W
Working Temperature	-15℃~55℃
Store Temperature	-25℃~70℃
Humidity	0~95% RH at 40℃
Water resistance	IP67

7. Troubleshooting

Phenomenon	Possible Reason	Solution
RX LED not flashing	Disconnected antenna	Reconnect cable
	Damaged cable / connector	Inspect cable and connector for damage, replace the damaged part
TX LED not flashing / A052T not transmitting AIS information	AIS transmission muted	Press 'Mute' button to activate AIS transmission.
GPS LED flashing	Disconnected antenna	Check the connection
	GPS receiver waiting for a GPS fix.	Wait up to 10-15 minutes for the GPS receiver to get a GPS fix
PWR LED unlit	Disconnected power cable / power wires	Check power wires for loose connection, ensure that the A052T is connected to a stable 12V power supply.
WiFi LED not flashing	WiFi disconnected	Check that your mobile device is still connected to the A052T's WiFi network directly or through your router

8. Limited Warranty and Notices

Quark-elec warrants this product to be free from defects in materials and manufacture for one year from the date of purchase. Quark-elec will, at its sole discretion, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labour. The customer is, however, responsible for any transportation costs incurred in returning the unit to Quark-Elec. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs. A returns number must be given before any unit is sent back for repair.
The above does not affect the statutory rights of the consumer.

QUARK-ELEC

This product is designed to aid navigation and should be used to augment normal navigational procedures and practices. It is the user's responsibility to use this product prudently. Neither Quark-elec, nor their distributors or dealers accept responsibility or liability either to the product user or their estate for any accident, loss, injury or damage whatsoever arising out of the use or failure to use this product.

Quark- products may be upgraded from time to time and future versions may therefore not correspond exactly with this manual. The manufacturer of this product disclaims any liability for consequences arising from omissions or inaccuracies in this manual and any other documentation provided with this product.

WARNING: The transponder must be installed and configured in conformity with the provided instructions in the manual in order to maximize the device performance.
WARNING: DO NOT DISASSEMBLE OR MODIFY THE EQUIPMENT. Improper disassembly or modification could cause personal injury and will invalidate the guarantee.
WARNING: It is important to know that AIS is designed for the purpose of anti-collision and serves to complement navigation. It is not the absolute navigational equipment and does not replace any navigational system installed on board. Please bear in mind that not all vessels are equipped with AIS transponders and therefore may not be visible to this transponder. Likewise, certain conditions including the environment, improper use, and overcrowded port traffic, may exist whereby the vessel equipped with an AIS transponder is not visible to other AIS users.
WARNING: Never Switch on the AIS transponder without a VHF antenna connected.
WARNING: Ensure the WiFi antenna has at least 20 cm free space around it and is not covered.

Document history

Issue	Date	Changes / Comments
1.0	14-06-2025	Initial release

9. Glossary

- **Ad-hoc WiFi:** devices communicate directly with each other without a router.

- **Station mode WiFi:** devices communicate by going through an Access Point(AP) or router.

- **IP:** internet protocol (ipv4, ipv6)

- **IP Address:** is a numerical label assigned to each device connected to a computer network.

- **Router:** A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet.

- **NMEA 0183:** is a combined electrical and data specification for communication between marine electronics

- **MMSI (Maritime mobile service identity):** is a unique 9 digit number that is assigned to an AIS transponder. Similar to a cell phone number, your MMSI number is your unique calling number for that AIS transponder.

- **IMO (International Maritime Organization):** is a unique identifier for ships and for registered ship management companies. For ships, it consists of the three letters "IMO" followed by the seven-digit number assigned to all ships

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