

em-trak B100

AIS Class B Transceiver

HIGH PERFORMANCE
MARITIME
PRODUCTS



Product Manual

em-trak 
High Performance Maritime Products

www.em-trak.com

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1 Notices



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

1.1 Safety warnings



This equipment must be installed in accordance with the instructions provided in this manual.



The em-trak B100 is an aid to navigation and must not be relied upon to provide accurate navigation information. AIS is not a replacement for vigilant human lookouts and other navigation aids such as RADAR. The performance of the B100 may be seriously impaired if not installed as instructed in the user manual, or due to other factors such as weather and or nearby transmitting devices. Compatibility with other systems may vary and is reliant on the third party systems recognising the standard outputs from the B100. em-trak reserves the right to update and change these specifications at any time and without notice.



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

1.2 General notices



Using an AIS antenna splitter

The em-trak B100 can be used with an AIS antenna splitter in order to share a single VHF antenna with a VHF radio.

To ensure best performance and reliability em-trak strongly recommends that only the em-trak S100 antenna splitter is used with the B100. Third party antenna splitters can adversely affect the radio performance of the system and may result in permanent damage to connected equipment. Please ask your retailer or installer for further details on the em-trak S100 antenna splitter.

Position source

All marine Automatic Identification System (AIS) transceivers utilise a satellite based location system such as the Global Positioning Satellite (GPS) network.

The accuracy of a GPS position fix is variable and is affected by factors such as the antenna positioning, how many satellites are used to determine a position and how long satellite information has been received for. Please note that Class B transceivers can only obtain a position fix from their own GPS

Compass safe distance

The compass safe distance of this unit is 0.2m or greater for 0.3° deviation.

RF emissions notice

Caution: The AIS transceiver generates and radiates radio frequency electromagnetic energy. This equipment must be installed and operated according to the instructions contained in this manual. Failure to do so can result in personal injury and / or AIS transceiver malfunction.

Caution: Never operate the AIS transceiver unless it is connected to a VHF antenna.

To maximise performance and minimise human exposure to radio frequency electromagnetic energy you must make sure that the antenna is mounted at least 1.5 metres away from the AIS transceiver and is connected to the AIS transceiver before power is applied. The system has a Maximum Permissible Exposure (MPE) radius of 1.5m. This has been determined assuming the maximum power of the AIS transceiver and using antennas with a maximum gain of 3dBi. The antenna should be mounted 3.5m above the deck in order to meet RF exposure requirements. Higher gain antennas will require a greater MPE radius. Do not operate the unit when anyone is within the MPE radius of the antenna (unless they are shielded from the antenna field by a grounded metallic barrier). The antenna should not be co-located or operated in conjunction with any other transmitting antenna. The required antenna impedance is 50 Ohms.

Warranty

em-trak Marine Electronics Limited (“em-trak”) is pleased to support your em-trak product (“Product”) with a limited warranty (the “Warranty”) as specifically described in this document. This warranty does not affect your statutory consumer rights.

The period of your warranty is three calendar years commencing from the date of your purchase of the brand new product from an authorised em-trak vendor ("Warranty Period"). In order to make a valid claim on your warranty you will require proof of purchase.

What your Warranty covers

em-trak warrants that, subject to correct storage, installation and use as instructed in the Installation Manual, your Product will be substantially free from manufacturing and design defects for the Warranty Period. In the unlikely event of a problem with your Product then you will need to follow the warranty claim process during which em-trak will determine the validity of your claim and the action which needs to be taken. em-trak's decision on all warranty claims is final and is limited in all respects to the repair or replacement of the product at em-trak's sole discretion.

What this warranty does not cover

The Warranty does not cover the effects of normal wear and tear. The Warranty is immediately invalidated in the event that the Product has been opened and or tampered with in any way or not stored, installed or used as described in the Installation Manual, or subsequently issued directions from em-trak. This Warranty does not cover the data that is received and outputted by the Product as it is subject to external factors out of em-trak's control. This Warranty does not cover the product when, following testing by em-trak, it has been deemed to be damaged by any third party device.

How to make a warranty claim

In the unlikely event of a problem you should first consult your Installation Manual to ensure that you have followed all the instructions correctly. If you still wish to make a Warranty claim you will need to return the Product to the em-trak vendor from where it was purchased who will process a claim with em-trak on your behalf. If for whatever reason this is not possible then you should contact em-trak directly by email at support@em-trak.com, providing the date of purchase, vendor purchased from, exact product model number, the product serial number and a detailed description of the problem. In all cases em-trak's decision on the validity of any Warranty claim and the remedy is final.

Limitation of liability

em-trak's entire liability and responsibility is limited by the Warranty described herein. The Warranty is non-transferable and therefore is only valid for the original purchaser of the new product from an authorised em-trak vendor. Any additional Warranty offered by vendors is entirely at their own risk unless specifically sanctioned by em-trak in the form of a written commitment. em-trak is not liable for any direct, indirect, consequential and or vicarious liabilities

which may arise through your use of the Product, including but not limited to any consequences resulting from the inability to use the Product and or misinterpretation and or quality of the information generated by the Product. The entire extent of the liability from em-trak to you in respect of the Product in all situations and respects shall be limited to the net amount you paid for the Product from the original vendor.

Disposal of this product and packaging

Please dispose of the AIS transceiver in accordance with the European WEEE Directive or with the applicable local regulations for disposal of electrical equipment.

Every effort has been made to ensure the packaging for this product is recyclable. Please dispose of the packaging in an environmentally friendly manner.

Accuracy of this manual

The AIS transceiver may be upgraded from time to time and future versions of the AIS transceiver may therefore not correspond exactly with this manual. Information contained in this manual is liable to change without notice. 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.

Declaration of conformity

The manufacturer of this product declares that this product is in compliance with the essential requirements and other provisions of the R&TTE directive 1995/5/EC.

The product carries the CE mark, notified body number and alert symbol as required by the R&TTE directive.

The product is intended for sale in the following member states: Great Britain, France, Spain, Sweden, Austria, Netherlands, Portugal, Denmark, Norway, Belgium, Italy, Finland, Ireland, Luxembourg, Germany, Czech Republic.

FCC notice

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference 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.



WARNING: It is a violation of the rules of the Federal Communications Commission to input an MMSI that has not been properly assigned to the end user, or to otherwise input any inaccurate data in this device.

Industry Canada notice

This AIS class B digital apparatus complies with Canadian ICES-003.

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

2 About your AIS class B transceiver

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 the Global Positioning System (GPS) and communication between vessels is by Very High Frequency (VHF) digital transmissions.

There are a number of types of AIS device as follows:

- **Class A transceivers.** These are similar to class B transceiver, but are designed to be fitted to large vessels such as cargo ships and large passenger vessels. Class A transceivers transmit at a higher VHF signal power than class B transceivers and therefore can be received by more distant vessels, and also transmits more frequently. Class A transceivers are mandatory on all vessels over 300 gross tonnes on international voyages and certain types of passenger vessels under the SOLAS mandate.
- **Class B transceivers.** Similar to class A transceivers in many ways, but are normally lower cost due to the less stringent performance requirements. Class B transceivers transmit at a lower power and at a lower reporting rate than class A transceivers.
- **AIS base stations.** AIS base stations are used by Vessel Traffic Systems to monitor and control the transmissions of AIS transceivers.
- **Aids to Navigation (AtoN) transceivers.** AtoNs are transceivers mounted on buoys or other hazards to shipping which transmit details of their location to the surrounding vessels.
- **AIS receivers.** AIS receivers will generally receive transmissions from class A transceivers, class B transceivers, AtoNs and AIS base stations but do not transmit any information about the vessel on which they are installed.

The em-trak B100 is an AIS class B transceiver.

2.2 Static and dynamic vessel data

There are two categories of information transmitted by an AIS transceiver: static and dynamic data.

The vessel's dynamic data, which includes location, speed over ground (SOG) and course over ground (COG), is calculated automatically using the internal GPS receiver.

Static data is information about the vessel which must be programmed into the AIS transceiver. This includes:

- Maritime Mobile Service Identity (MMSI)
- Vessel name
- Vessel call sign (if available)
- Vessel type
- Vessel dimensions

In most countries the operation of an AIS transceiver is included under the vessel's marine VHF licence provisions. The vessel on to which the AIS unit is to be installed must therefore possess a current VHF radiotelephone licence which lists the AIS system, vessel Call Sign and MMSI number.



An MMSI number is required in order for the AIS transceiver to operate. Please contact the relevant authority in your country for more information.

2.3 Important information for US customers

There are specific laws in the USA regarding the configuration of AIS class B transceivers.

If you are a US resident and intend to use your AIS class B transceiver in US waters, you should make sure that your retailer has configured your product prior to supplying it to you. If your AIS transceiver has not been pre-configured please contact your dealer for details of how to have it configured.

Alternatively, if you have received a configuration card for your AIS transceiver you may configure the AIS transceiver by following the instructions provided with the card.

2.4 What's in the box?

Figure 1 shows the items included with your AIS transceiver purchase. The following sections give a brief overview of each item. Please ensure all items are present and if any of the items are not present contact your dealer.

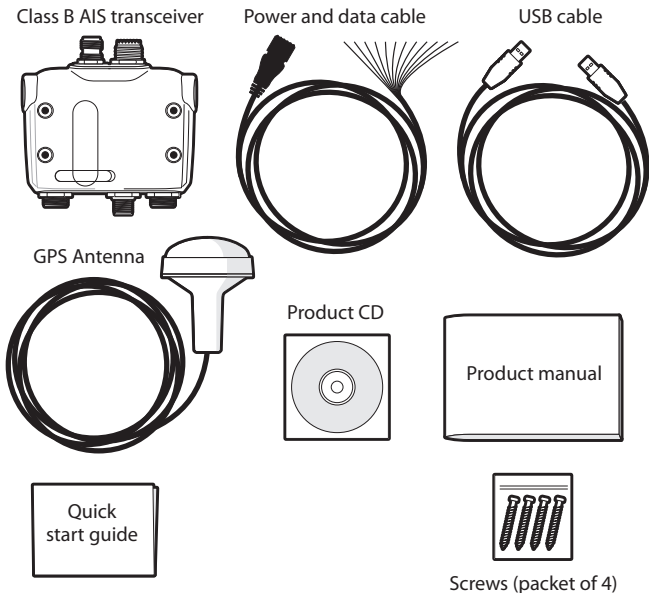


Figure 1 Items included in the product

Items included in the box:

- **Support tools CD**

The CD supplied with the package contains the following:

- proAIS2 software tool necessary to configure the AIS transceiver. Please refer to section 4 for details of the configuration process and how to use the proAIS2 tool.
- USB drivers required to connect to the AIS transceiver via USB.
- Alternative language versions of this manual.
- Other application software may be included on the CD depending on the version of product you have purchased. For details of AIS application software please contact em-trak via the details printed on the back of this manual.

- **Quick start guide**

The quick start guide gives a handy one page reference for the installation process.

- **Product manual**

This document is the product manual and should be read thoroughly prior to any attempt to install or use the AIS transceiver.

- **GPS antenna**

The GPS antenna forms an integral part of the product's internal positioning system based on GPS. Please refer to section 3.2 for details of how to install the GPS antenna.

- **Fixing screws**

Four fixing screws are provided with the product for mounting of the AIS transceiver. Please refer to section 3.2 for details of how to mount the AIS transceiver.

- **Power and data cable**

The power and data cable connects to the AIS transceiver and enables connection to power, NMEA0183 and an external switch.

- **USB cable**

The USB cable enables connection to a PC for configuration purposes.

- **AIS transceiver unit**

Figure 2 shows an overview of the AIS transceiver unit. The AIS transceiver has a number of indicators which provide information to the user about the status of the AIS transceiver. Please refer to section 5.5 for more details of indicator functions.

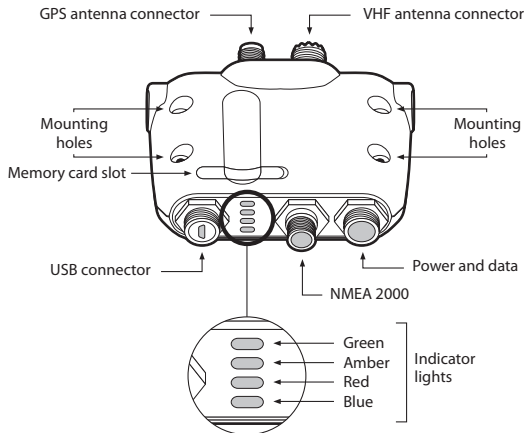


Figure 2 AIS transceiver overview

Electrical connections

The AIS transceiver has the following electrical connections:

- Power supply
- Two independent NMEA0183 data port for connection to chart plotters and other NMEA0183 compatible equipment
- USB for connection to a PC
- External switch input
- NMEA2000 port for connection to NMEA2000 compatible equipment
- Memory card slot

In addition there are two other connections for the GPS antenna and the VHF antenna. Figure 3 shows an overview of the electrical connections to the AIS transceiver.

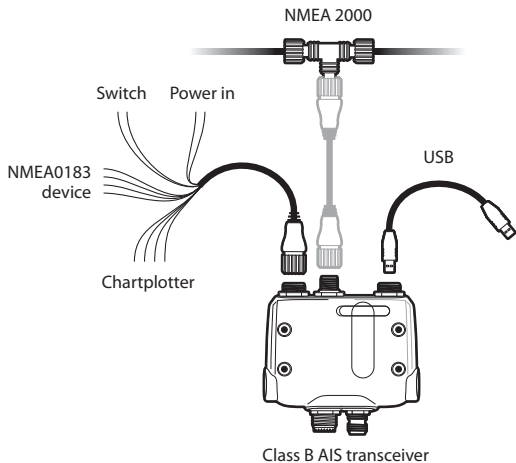


Figure 3 Electrical connections to the AIS transceiver

3 Installation

3.1 Preparing for installation

Figure 4 shows a typical installation configuration for the AIS transceiver. Please take the time to familiarise yourself with the system elements and their connections prior to attempting installation.

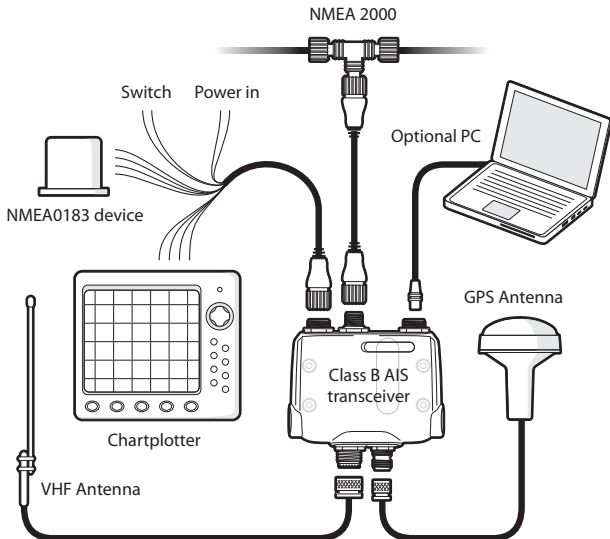


Figure 4 Typical installation configuration

In addition to the items provided with your AIS transceiver the following items will be required for installation.

VHF antenna

Connection to a suitable VHF antenna will be required for the AIS transceiver to operate. A 3 dB VHF Marine Band antenna such as that used with VHF voice radios will be sufficient. Please take note of the warnings in section 1 regarding the use of antennas.

Alternatively, if you wish to use an existing VHF antenna, antenna splitter products are available which allow the existing antenna to be used with two radio devices, such as a VHF voice radio and the AIS transceiver.

Antenna cables

The GPS antenna is provided with 10 metres of RG58 coax cable. If this is not sufficient to reach between the desired GPS antenna location and the AIS transceiver unit you will need an extension cable. Please contact your dealer for details. For reference the GPS antenna connector type on the AIS transceiver unit is TNC receptacle, and is intended to mate with a TNC jack connector.

Please check that the VHF antenna you intend to use has sufficient cable to reach between the VHF antenna and the AIS transceiver unit. If it is not sufficient you will need an extension cable. Please contact your dealer for details of suitable products. For reference the VHF antenna connector type on the AIS transceiver unit is SO239, and is intended to mate with a PL259 connector.

Power and data cables

The AIS transceiver unit is supplied with a two metre long power and data cable as an accessory. If you require longer cables to reach your power supply, please ensure the cables are capable of carrying currents of up to 2A peak and 200mA on average. Means of connecting the cables together will also be required. The use of ScotchlokTM connectors is recommended for this purpose.

Chart plotter

To display received AIS messages from other vessels on your chart plotter, you will need to connect your AIS transceiver to your chart plotter. Please refer to the user manual supplied with your chart plotter 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

38400 baud (sometimes referred to as 'NMEA HS' in the plotter configuration menu). You may also need to enable the display of AIS targets in the chart options.

Alternatively if you use an NMEA2000 network on your vessel it is possible to connect the AIS transceiver to the NMEA2000 network via a suitable cable. Please refer to your dealer for details of NMEA2000 cables.

Connection to a PC

If you choose to use a PC with suitable charting software to display received AIS messages as other vessels, this can be accomplished by connecting the USB connector on the unit to the PC via the supplied USB cable. Please refer to step 8 of section 3.2 for important advice on how to use the USB connection on this product.

GPS antenna mount

A one inch 14 TPI pole mount is required to mount the supplied GPS antenna. Please contact your dealer for details of suitable products.

3.2 Installation procedures

Before beginning installation of your AIS transceiver, please ensure you have the necessary additional items as detailed in section 3.1. It is strongly recommended that you read all of the instructions in this manual prior to installation.

If after reading this manual you are unsure about any element of the installation process please contact your dealer for advice.

The following sections explain the installation process step by step for each of the main elements of the system.

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 0.2m from a compass or any magnetic device.
- There should be adequate space around the AIS transceiver for routing of cables. See Figure 5 for details of the AIS transceiver dimensions.
- The ambient temperature around the AIS transceiver should be maintained between -10°C and +55°C.
- The AIS transceiver should not be located in a flammable or hazardous atmosphere such as in an engine room or near to fuel tanks.
- The AIS transceiver is not waterproof and must not be exposed to any spray or submersion.
- It is recommended that the AIS transceiver is installed in a 'below decks' environment.
- It is acceptable to mount the AIS transceiver either vertically or horizontally.
- The product is supplied with four self tapping screws for attachment of the AIS transceiver to a suitable surface. Please refer to Figure 5 for guidance.
- The AIS transceiver should be mounted in a location where the indicators are readily visible as these provide important information on the status of the AIS transceiver.

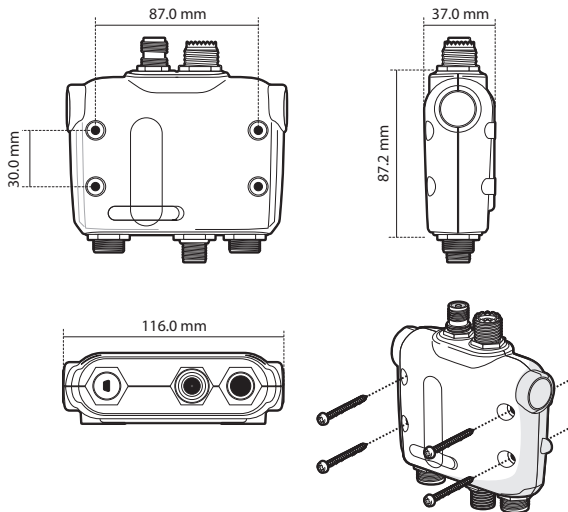


Figure 5 AIS transceiver dimensions and mounting

Step 2 - Installing the GPS antenna

For mounting of the GPS antenna provided with your AIS transceiver you will require a one inch 14 TPI thread pole. You should ensure the GPS antenna has a good clear view of the entire sky.

It is not recommended that the GPS antenna is mounted up a mast where the motion of the vessel will cause the antenna to swing and potentially reduce the accuracy of the GPS position.

Do not mount your antenna in the direct path of a RADAR transmitter.

Feed the ten metre long cable attached to the GPS antenna cable through the pole and screw the antenna onto the pole mount as shown in Figure 6.

Route the cable to your AIS transceiver unit, adding any necessary extension cables.

Connect the cable from the GPS antenna to the GPS connector on the AIS transceiver as shown in Figure 6.

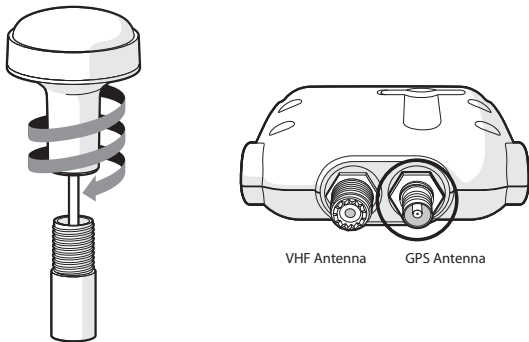


Figure 6 GPS antenna mounting and connection

Step 3 - Connecting the VHF antenna

Route the cable from the VHF antenna to the AIS transceiver and connect to the VHF connector on the AIS transceiver as shown in Figure 7.

A standard 3 dB marine band VHF antenna or AIS antenna should be used with the AIS transceiver. The connector type on the AIS transceiver is SO239. Your chosen VHF antenna requires a PL259 connector to mate with this. If your VHF antenna does not use this type of connector please contact your dealer for details of available adaptors.

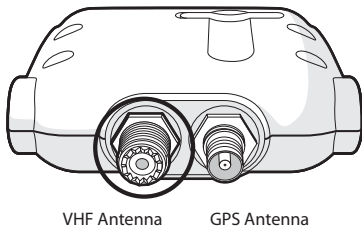


Figure 7 Position of the VHF antenna connector

Step 4 - Connecting the accessory cable

An accessory cable is supplied with the product to provide connections to power, the external switch and NMEA0183 data ports. The cable has a pre-moulded connector at one end which should be connected to the connector on the unit marked 'PWR/DATA'. The other end of the cable has twelve colour coded bare wires ready for connection. The table below in Figure 8 lists the function of each colour coded wire for reference.

Wire colour	Description	Function
Red	Power in +	Power supply connections
Black	Power in -	
Light green	Switch input-	External switch connection for silent mode
Orange	Switch input+	
Brown	NMEA0183 port 1 TX+	High speed NMEA0183 port (38,400baud) intended for connection to chart plotters
Blue	NMEA0183 port 1 TX-	
White	NMEA0183 port 1 RX+	
Green	NMEA0183 port 1 RX-	
Purple	NMEA0183 port 2 TX+	Low speed NMEA port (4,800baud) intended for connection to other NMEA0183 compatible sensors for multiplexing of data to the chart plotter
Pink	NMEA0183 port 2 TX-	
Grey	NMEA0183 port 2 RX+	
Yellow	NMEA0183 port 2 RX-	

Figure 8 Colour coding of wires in the accessory cable



Please check your wiring very carefully before applying power to the product. Failure to wire the product correctly could result in permanent damage.

Step 5 - Connecting an external switch

If you require a remote external switch to activate the silent mode feature, it is possible to connect a toggle switch to the AIS transceiver.

Connect the toggle switch between the light green and orange wires as shown in Figure 9. Connection of an external switch to toggle silent mode is optional and not essential for normal operation of the product.



Do not connect a voltage source across the switch inputs as this may damage the transceiver.

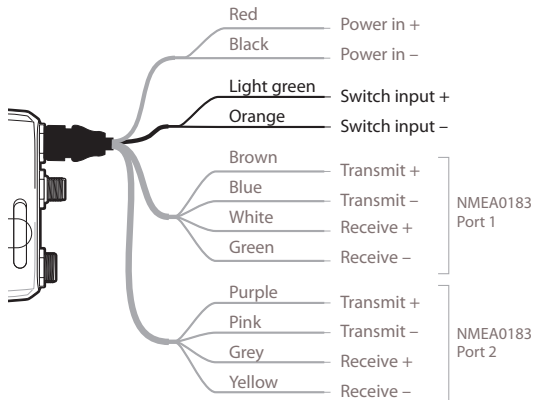


Figure 9 Connecting an external switch

Step 6 - Connecting to NMEA0183 compatible equipment

The two independent NMEA0183 data ports provide connection to your chart plotter and other NMEA0183 compatible equipment. Each port consists of four wires colour coded as shown in the table in Figure 8 and in the diagram in Figure 10. Connect the wires to the appropriate connections on your NMEA0183 compatible equipment. Please refer to your equipment manual for more information.

The AIS transceiver has a high speed port which operates at 38400baud and a low speed port which operates at 4800baud. The high speed port is intended primarily to connect to a chart plotter, while the low speed port is intended to connect to other NMEA0183 devices. The ports have bidirectional multiplexing, which means any messages which are received via the high speed are automatically transmitted via the low speed port and vice-versa. This is particularly useful when using a chart plotter having only a single NMEA0183 port as any other sensor such as a gyro-compass can be connected to the AIS transceiver via the low speed port and the AIS transceiver can be connected via the high speed port to the chart plotter resulting in the chart plotter receiving both AIS information and heading information simultaneously. Please ensure your equipment is configured to use the correct baud rate for the port it is connected to. Please note that in the standard factory default setting, the low speed NMEA 0183 port is not configured to output AIS or GPS data. Please contact your local dealer to learn more about NMEA configurations.

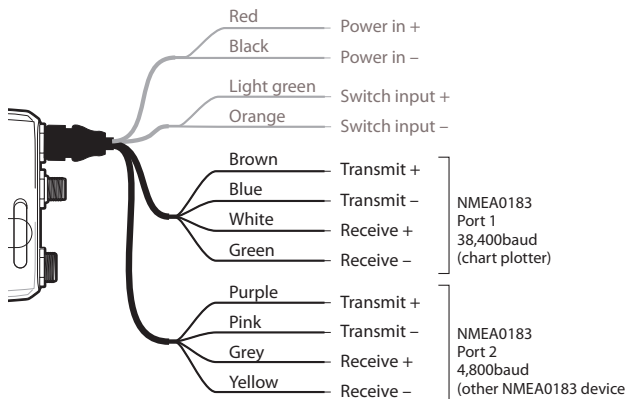


Figure 10 Connecting to the NMEA0183 data port

Step 7- Connection to an NMEA2000 network (optional)

The AIS transceiver can be connected to an NMEA2000 network by a suitable NMEA2000 network cable available from your local dealer. If your vessel has an NMEA2000 network please refer to the relevant documentation for your NMEA2000 equipment. Once connected, and with your chart plotter also connected to your NMEA2000 network you will be able to receive AIS targets on your chart plotter.

Step 8 - USB Connection (optional)

The AIS transceiver is supplied with a USB port for connection to a PC. The USB connector can be connected directly to the USB port on the PC via the supplied USB cable. To enable connection of the AIS transceiver to a PC the USB drivers, supplied on the product CD, must be

installed on the PC. If your PC is connected to the Internet, then USB drivers will be automatically updated via Windows Update.



The USB port built into this product is not isolated from the vessel power supply, VHF antenna ground or GPS ground. Please observe the following procedures when connecting the USB port to avoid grounding problems.

If the computer is permanently installed on the vessel and / or electrically connected to any other vessel equipment, including power supplies, it is recommended that connection is made using the NMEA0183 or NMEA 2000 interfaces. These benefit from being specifically designed for use in the marine environment and provide isolated and robust communication between your devices.

If a battery powered laptop is being used then it is recommended that you always switch off the computer before connecting the USB cable. If you need to connect to your PC for a prolonged period of time, we would recommend you use a dedicated NMEA0183 to USB / WiFi adaptor.

Prior to connecting the AIS to a PC the USB drivers must first be installed. To install the drivers please follow the steps below:

1. Insert the product CD into the PC and navigate to the USB drivers folder.
2. Double click on the setup.exe file to launch the installer.
3. Follow the on screen installation instructions to complete installation.
4. Once installed the AIS unit can be connected to the PC. The USB drivers will be installed automatically and the AIS will appear as a new COM port device.
5. Select the AIS COM port and a baud rate of 38,400 in PC based navigation software to make use of the AIS data.

Step 9 - Connecting to a power supply

The AIS transceiver requires a 12V or 24V power supply typically provided by the vessel's battery.

It is recommended that crimped and soldered lugs are used to connect the AIS transceiver to the power source. It is recommended that the power supply is connected via a suitable circuit breaker and/or 3A fuse block.

1. Connect the **red** wire to a 12V or 24V power supply positive terminal.
2. Connect the **black** wire to the supply negative terminal.

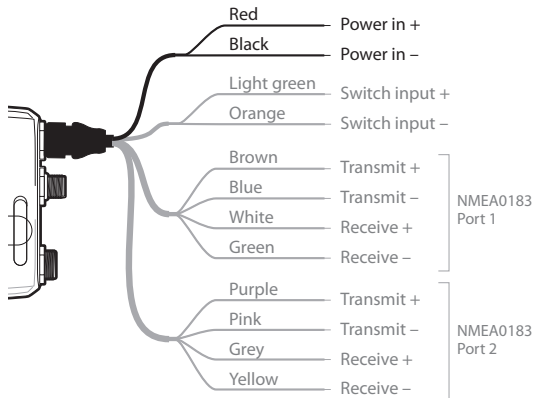


Figure 11 Connecting the power supply

4 Configuring your AIS transceiver



Until correctly configured your AIS class B transceiver will only receive AIS messages and will not transmit AIS messages.

4.1 Switching on your AIS transceiver for the first time

A few seconds after power is applied to the AIS transceiver, the indicators on unit will illuminate in a pattern dependent on the configuration state of the unit. Figure 12 shows the functions of the four indicators.

Indicator	Function
Green	Unit is powered up and operating normally
Amber	Unit is in a 'transmit timeout' mode
Red	Unit has detected a system error
Amber and blue	Silent mode is activated

Figure 12 Indicator functions

If the AIS transceiver has been pre-configured the amber indicator will illuminate until a transmission has been sent by the unit. This may take several minutes as the transceiver must acquire a GPS position fix prior to transmitting its first message.

If the transceiver has not been pre-configured the amber and red indicators will be illuminated until the configuration process has been completed.

4.2 Configuring your AIS transceiver

There are three potential ways in which your AIS transceiver can be configured:

1. Configuration in advance by your dealer or installer.

If your AIS transceiver has been configured for you by your dealer or installer you can proceed to section 5.

2. Configuration using a configuration card

If you have received a configuration card with which to configure your AIS transceiver, please refer to section 5.2 for more information.

3. Configuration using proAIS2

Providing it is acceptable to do so under your local legislation it is possible to configure your AIS transceiver yourself using the proAIS2 software provided with the product.



US Customers only: It is a violation of the rules of the Federal Communications Commission for the end user to programme the vessel data. The vessel data must only be programmed by a competent installer. If your AIS transceiver has not been pre-configured for you please refer to your dealer for advice on how to have the AIS transceiver configured by a competent installer, or refer to the information provided with the product explaining how to apply for a configuration card.

4.3 Introduction to proAIS2

Included in the CD supplied with your product is a software tool called 'proAIS2'. proAIS2 provides the facility to configure, monitor and diagnose issues with your AIS transceiver. proAIS2 can provide assistance with ensuring a satisfactory GPS is being received, and if any internal alarms are being generated by the transceiver such as poor VHF antenna quality or if the power supply is outside of the acceptable range. proAIS2 can also be used to activate 'silent mode' which disables AIS transmissions.

Section 4.4 provides instructions on how to install proAIS2. Section 4.5 provides instructions on how to configure the AIS transceiver using proAIS2. Further help on how to use the features of proAIS2 can be found in the 'Help menu within the proAIS2 tool.

proAIS2 is designed to be installed and used with a PC connected to the AIS transceiver via USB using the supplied USB cable.

4.4 Installing proAIS2

1. Insert the CD into your PC then locate and run the setup.exe file on the CD and then follow the on-screen prompts.
2. If a security warning appears, click 'Install' to continue with the installation.
3. Once installation is complete, proAIS2 will launch automatically and a start menu folder and shortcut will be created for future use.

4.5 Configuration using proAIS2

For configuration purposes only, it is possible to power the AIS transceiver via its USB connection. This is useful if you wish to configure your AIS transceiver away from the vessel power supply. The AIS transceiver will not transmit any data whilst powered by USB.

You will require the following information in order to configure your AIS transceiver:

- MMSI
- Vessel name
- Vessel type
- Call sign
- Vessel dimensions and position of your GPS antenna installation

For further assistance in configuring your AIS transceiver please refer to the Help menu within proAIS2.



Please ensure that you enter all vessel data accurately. Failure to do so could result in other vessels failing to identify your vessel correctly. The vessel MMSI can only be programmed once using proAIS2, please take care to programme your MMSI correctly. If you need to change the MMSI for any reason, please contact your dealer who will arrange to have the MMSI reset.

5 Operation

5.1 Using the AIS transceiver

Once the unit has been configured it is ready for use. Provided other vessels with AIS transceivers installed are within radio range of your vessel you should see their details appear on your chart plotter or PC. These vessels will also be able to see your vessel on their chart plotter or PC. It may take up to six minutes for your full vessel details to be visible to others.

Specific details of how to configure your chart plotter to make use of the AIS transceiver features will be given in your chart plotter manual. If you are using charting software running on a PC, please refer to the instructions provided with your chart plotting software for details of how to configure it to display AIS information.

5.2 Using a memory card

A memory card of the 'SD' or 'MMC' type can be used with your AIS transceiver to perform a number of functions:

- Automatically configure the AIS transceiver with the vessel data for the vessel.
- Provide a mechanism for updating the software within the AIS transceiver.
- Provide the facility to record voyage data. Recorded data can be played back using a suitable PC application to replay your voyages.

Please refer to Figure 13 for details of how to insert the memory card.

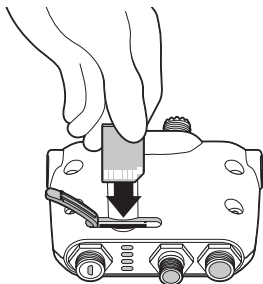


Figure 13 Inserting a memory card

Configuration of the AIS transceiver via the memory card

You may have been asked to complete a registration form giving your vessel details and subsequently received a configuration card with which to configure your AIS transceiver. If so you should follow the instructions provided with the configuration card.

Software update via the memory card

You may have received a memory card with which to update the software in your AIS transceiver. If so you should follow the instructions provided with the software update card.

Data logging via the memory card

You can record the AIS data from your voyage onto a memory card for play back using a suitable PC chart plotting application. The card used must be of the following type:

- Standard 'SD' or 'MMC' memory card
- Maximum 2GB
- FAT32 formatted (most off the shelf SD cards used in digital cameras are pre-formatted to this standard)

To begin data logging, insert the card into the slot as shown in Figure 13. The AIS transceiver will begin logging data immediately and the blue status indicator will flash three times to indicate

logging has started. Once the memory card is full the blue status indicator will flash for one second every ten seconds until the card is removed. No further data logging will take place until the logging file has been removed from the card. Logging file will not be deleted by re-inserting the card.

If the card is removed from the card slot whilst the unit is powered on, or if the power is switched off whilst the card is inserted, data logging will cease immediately. When the card is re-inserted and the power is switched on, the logging file will be appended with logging data.

Reviewing voyage data from the memory card

Reviewing the voyage data logged on the memory card requires the use of a PC with a suitable memory card reader. PC chartplotting application software capable of reading the AIS voyage data will also be required and this may be included with your AIS transceiver product.

5.3 Switch function

When connected to the AIS transceiver following the instructions in section 3.2 an external switch provides the ability to set the AIS transceiver into 'silent mode'. In silent mode the transmission of your own vessel data ceases, whilst the reception of other vessel's AIS data continues. You should use silent mode if you do not wish your vessel data to be received by other AIS devices. When silent mode is active the blue indicator will be illuminated.



When silent mode is active other vessels will not be able to receive your vessel information on their AIS devices. Your navigational safety may be compromised as a result.

5.4 Using proAIS2 with your AIS transceiver

The proAIS2 tool has a range of features to help monitor the performance of your AIS transceiver. To use the full range of features your AIS transceiver must be installed as described in section 3 and connected to a PC running the proAIS2 application. Follow the instructions provided in the help menu within proAIS2.

5.5 Indicator functions

The AIS transceiver includes four coloured indicators as shown in Figure 14. The state of the indicators provides information regarding the status of the AIS transceiver.

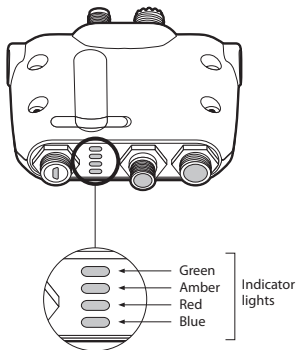










Figure 14 Indicator location on the AIS transceiver unit

The meaning of typical indicator configurations is shown in the table below and Figure 14 shows the orientation of the AIS transceiver.

<ul style="list-style-type: none"> ● ① ○ ② ○ ③ ○ ④ ○ ⑤ 	<p>Green indicator only</p> <p>The AIS transceiver is powered up, has a position fix and has transmitted at least one vessel information report.</p>
<ul style="list-style-type: none"> ○ ① ○ ② ● ③ ○ ④ ○ ⑤ 	<p>Red indicator only</p> <p>The AIS transceiver has detected a system error. The likely causes of this are detailed in the troubleshooting guide in section 6.</p>

   	<p>Amber and blue indicators</p> <p>The AIS transceiver is in 'silent' mode. Please note that the blue LED indicator can be shown in conjunction with any other LED to show that the unit has been placed in silent mode.</p>
   	<p>Amber indicator only</p> <p>The AIS transceiver is in 'transmit timeout' mode. This can be for a number of reasons:</p> <ul style="list-style-type: none">• The unit has only recently been powered on and is obtaining a position fix prior to transmitting its first vessel information report. (This process can take several minutes).• Position fix has been lost. The AIS transceiver will attempt to regain position fix for 30 minutes before entering an error state.• The AIS radio channels are exceptionally busy so there is currently no available timeslot for transmission.• The unit has been in silent mode and after deactivating silent mode this amber indicator will illuminate until the first AIS message has been sent• The AIS transceiver has been commanded by the local authority (via an AIS base station) to cease transmissions.

6 Troubleshooting

Issue	Possible cause and remedy
No data is being received by the chart plotter	<ul style="list-style-type: none"> • Check that the power supply is connected correctly. • Check that the power supply is a 12V or 24V supply. • Check that the connections to the chart plotter are correct.
No indicators are illuminated	<ul style="list-style-type: none"> • Check that the power supply is connected correctly. • Check that the power supply is a 12V or 24V supply.
The Red 'error' indicator is illuminated	<ul style="list-style-type: none"> • 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 red indicator may illuminate briefly if the power supply is interrupted or the VHF antenna characteristics are briefly affected. • The GPS antenna may be faulty. Please check the connection to the GPS antenna and that the GPS antenna is not damaged. • The power supply is outside the allowable range. Check that the power supply is within the range 9.6V to 31.2V. • If none of the above correct the error condition please contact your dealer for advice.
My MMSI is being received by other vessels but my vessel name is not shown on their chart plotter or PC	<ul style="list-style-type: none"> • Some older AIS devices and chart plotters do not process the specific class B AIS 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.

<p>No GPS data is being output on NMEA0183 Port 2</p>	<ul style="list-style-type: none"> The default configuration for the NMEA0183 low speed port is to act as a multiplex point to and from NMEA0183 Port 1. It is not configured to output GPS or AIS data. It is possible to change the configuration however. Please contact your local dealer for advice on how to change the NMEA port settings.
<p>The Amber LED is flashing</p>	<ul style="list-style-type: none"> This indicates that there unit is waiting for a GPS fix. Ensure that all connections between the GPS antenna and Class B are secure and that the GPS antenna has a clear view of the sky.
<p>I see "TX attempt failed and CP Busy" in proAIS2</p>	<ul style="list-style-type: none"> It is quite normal to see CP (Candidate Position) busy messages in areas where other AIS equipped vessels are operating. If the green LED is indicated, then the unit will be working correctly.
<p>I can't change my MMSI number</p>	<ul style="list-style-type: none"> The Class B specification dictates that once programmed, it will not be possible for the user to change their vessel MMSI number. If you need to change your MMSI number, please contact your local dealer who will be able to arrange to do this for you.

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

7 Specifications

Parameter	Value
Dimensions	116 x 115 x 37 mm (L x W x H)
Weight	150g (AIS transceiver unit only)
Power	DC (9.6V - 31.2V)
	Average power consumption 170mA at 12VDC
	Peak current rating 2A
GPS Receiver (AIS Internal)	50 channel IEC 61108-1 compliant
Electrical Interfaces	USB
	NMEA0183 38.4kBaud bi-directional NMEA0183 4.8kBaud bi-directional
	NMEA2000 LEN=1
	External switch
Connectors	VHF antenna connector (SO-239)
	GPS antenna connector (TNC)
	USB mini-B
	NMEA2000 standard connector
	12 way power input / NMEA0183 / external switch
VHF Transceiver	Transmitter x 1
	Receiver x 2 (One receiver time shared between AIS and DSC)
	Frequency: 156.025 to 162.025 MHz in 25 kHz steps

Output Power	33dBm \pm 1.5 dB
Channel Bandwidth	25kHz
Channel Step	25kHz
Modulation Modes	25kHz GMSK (AIS, TX and RX) 25kHz AFSK (DSC, RX only)
Bit rate	9600 b/s \pm 50 ppm (GMSK) 1200 b/s \pm 30 ppm (FSK)
RX Sensitivity	Better than -107dBm at 20% PER Co-channel 10dB Adjacent channel 70dB IMD 65dB Blocking 84dB
Environmental	Water resistant to IPx2 Operating temperature: -25°C to +55°C Tested to IEC 60945 'Protected' category
Indicators	Power, TX timeout, error, status
Operator Controls	Single switch configurable to enable silent mode

The em-trak B100 is an aid to navigation and must not be relied upon to provide accurate navigation information. AIS is not a replacement for vigilant human lookouts and other navigation aids such as RADAR. The performance of the B100 may be seriously impaired if not installed as instructed in the user manual, or due to other factors such as weather and or nearby transmitting devices. Compatibility with other systems may vary and is reliant on the third party systems recognising the standard outputs from the B100. em-trak reserves the right to update and change these specifications at any time and without notice.

Head Office:

em-trak Marine Electronics Ltd
Wireless House,
Westfield Industrial Estate,
Midsomer Norton,
Bath, BA3 4BS
United Kingdom
T +44 (0)1761 409559 | F +44 (0)1761 410093
enquiries@em-trak.com

Regional Office:

em-trak Marine Electronics Limited
470 Atlantic Avenue,
4th floor,
Boston MA 02210
USA
T +1 617 273 8395 | F +1 617 273 8001
enquiries@em-trak.com

For support enquiries email: support@em-trak.com