AMEC

CAMINO-108S
AIS Class B with Integrated Splitter

USER MANUAL

Automatic Identification System

Manual Revision: Version 1.7

FOREWORD

We thank you for the purchase of your new CAMINO-108S AIS class B transponder with built-in splitter. Wherever you sail now, you can have a better overview of your surroundings at sea and voyage with more safety.

CAMINO-108S is strictly tested to meet the rigorous demands of the marine environment. With proper installation and use, the equipment will serve loyally and reliably at its optimum.

For sales, services, and technical supports, please contact your local AMEC representatives or Alltek Marine Electronics Corp at sales@alltekmarine.com or service@alltekmarine.com. You are always welcome to visit our website at www.alltekmarine.com for new product status and company update.

Thank you again. Be safe.

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1   System Overview

1.1   Product Description

CAMINO-108S is a smart combination of AMEC AIS Class B with our latest antenna splitter. It allows you to share a single VHF antenna with VHF radio, which simplifies installation and reduces cable runs.

The unit is designed to provide high performance and great reliability, resulting from our year long field experience. It contains 1 VHF transmitter, 2 AIS receivers on 2 VHF channels and 1 MCU with cutting edge software defined radio technology. Chart plotter and PC can be integrated with ease over its NMEA2000, NMEA0183 or waterproof USB port.

CAMINO-108S supports "Dual GPS Backup" to enable GPS input from both NMEA 2000 and NMEA 0183. This feature actively backs up your external GPS antenna to ensure the positioning and transmission of your AIS transponder.

The built-in splitter featuring zero insertion loss on reception path and low insertion loss on transmission path ensures optimized range of your VHF radio and AIS transponder. The built-in test function gives a simple diagnosis in the event of antenna problem and system failure. Its transparent mode guarantees priority to VHF radio operation even if the splitter has power failure.

CAMINO-108S

Front   Back
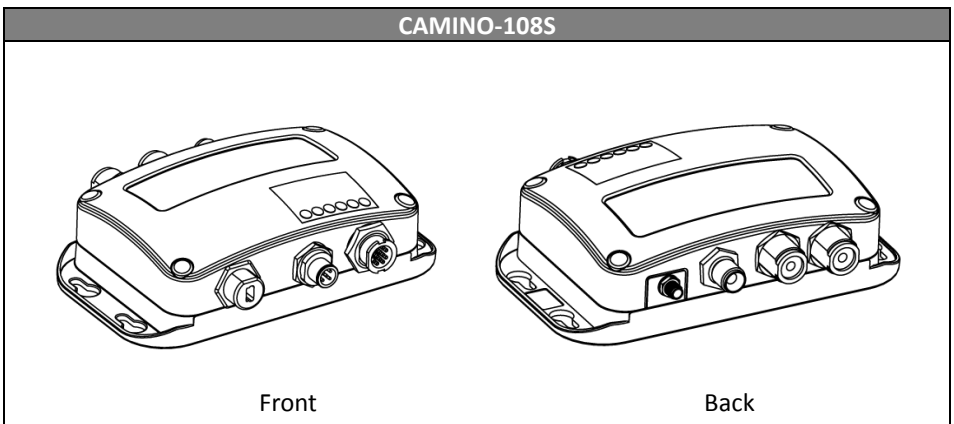
CAMINO-108S exchanges the following navigational data with other AIS equipped vessels within VHF range to increase the safety of your journey at sea:

- Static data:
- − Ship´s name
- − Call sign
- − MMSI
- − Ship type
- − Location of GPS antenna on the ship
- Dynamic data:
- − Position of the vessel
- − Course over ground (COG)
- − Speed over ground (SOG)
- − True heading

It receives also safety related messages (SRM) from other vessels or persons who are in distress.

AIS Class B transponder broadcasts ship´s static data every 6 minutes. Ship dynamic data will be transmitted per following reporting interval:

Ship Speed	Nominal Reporting Interval
>2 knots	Every 30 seconds
≤ 2 knots or at anchored or moored	Every 3 minutes

1.2 Equipments in the Box

Upon receiving the product please verify items in the box. If any is missing, please contact your local AMEC representative immediately.
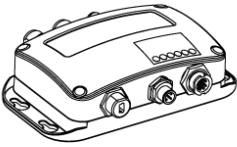
AIS Class B with
Integrated Splitter
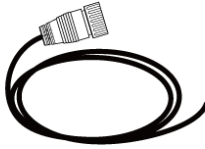
12pin power & data cable
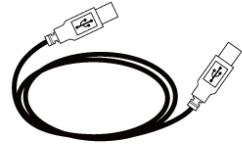
Mini USB to USB cable

VHF Radio Cable
(PL259-PL259)

FM Radio Cable
(SMA-Motorola Jack)

Software CD: configuration utility,
USB driver, AIS Viewer, user manual

User Manual

TP3x3/4 Screws

Optional Accessory

GPS antenna GA-22
with 10m cable

GPS antenna PA-02
with 3m cable
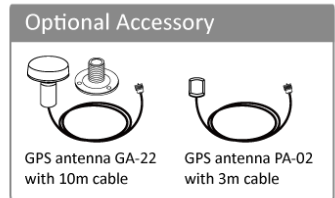
Figure 1   Box Content

2   Installation

2.1   Installation Procedures

Please familiarize the manual content before beginning the installation. Depending on your hardware configuration, use the following recommended steps for installation.

1) Mount the transponder unit to an appropriate location
2) Install VHF antenna
3) Connect to VHF radio
4) Connect to FM radio
5) Install GPS antenna
6) Connect to a chart plotter via NMEA 0183 and/or other instruments
7) Connect to a chart plotter via NMEA 2000 and/or other instruments
8) Connect to a Tx switch box (optional)
9) Connect to an appropriate power source (12V / 24V DC, 2A)
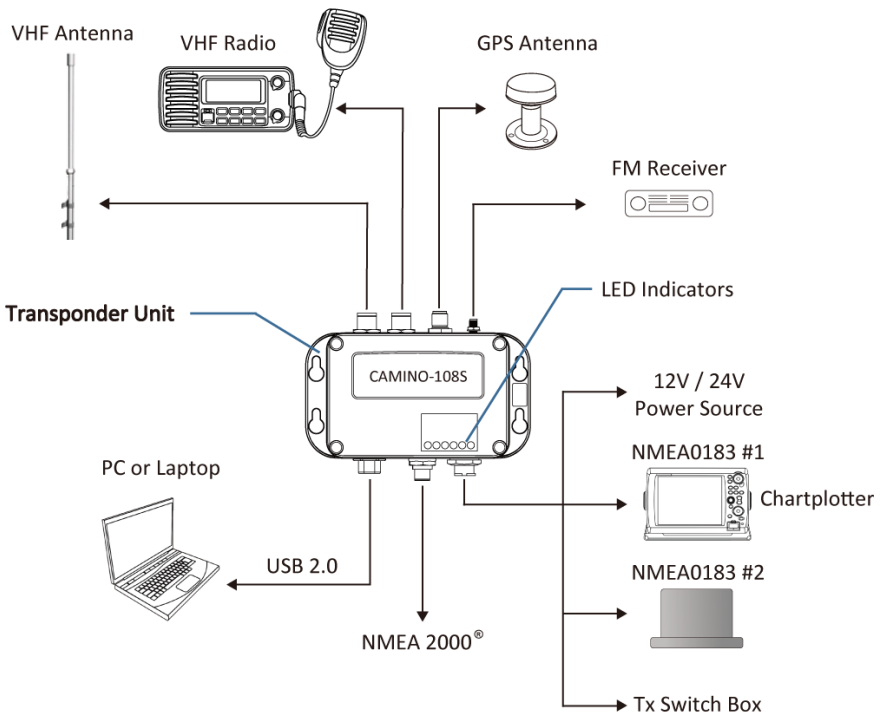
Figure 2   Connection Diagram

2.2 Mounting the Main Unit

The following guidelines should be noticed when selecting the environment to install your AMEC CAMINO-108S:

- Do not install the device in a flammable or hazardous atmosphere such as in an engine or generator room or close to fuel tanks.
- Installation of the device should be undertaken in a safe environment without being exposed to any splashing water or rain.
- There should be adequate space around the device for routing of cables. See figure below for details of the device dimensions.
- The safe distance of the transponder to any magnetic compass is at least 0.55m.
- The operating temperature is between -15°C and +55°C.
- The device can be installed and mounted on flat surface, or it can be mounted on wall with the four self tapping screws supplied.
- The device should be mounted in a location where the indicators can readily be observed as these indicators deliver relevant information on the status of the device.
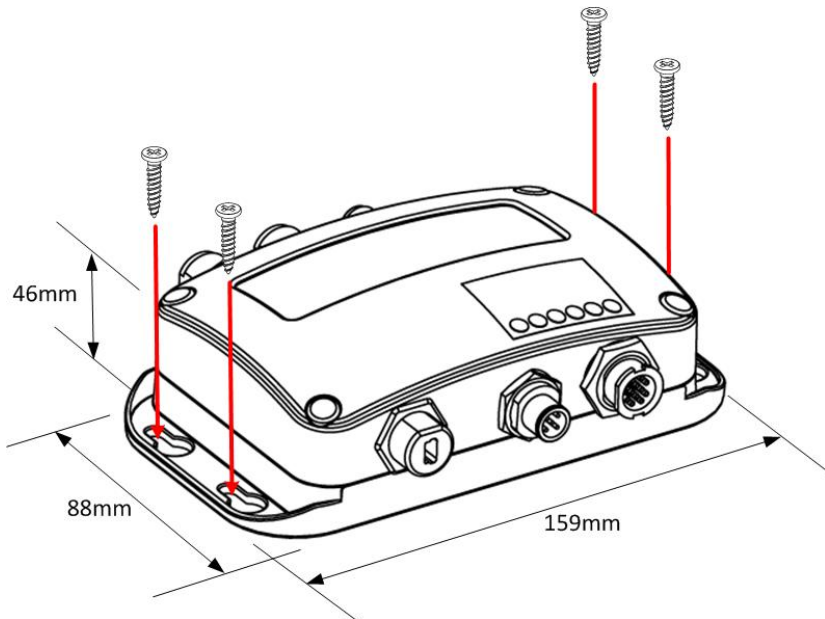
Figure 3   Mounting the Transponder

2.3 VHF Antenna Installation

The quality and positioning of the antenna are the most important factors dictating AIS performance. It is recommended that a VHF antenna with omnidirectional vertical polarization be specifically tuned for marine band. Since the range of VHF signals is largely decided by line of sight distance, the VHF antenna should be placed as high as possible and at least 5 meters away from any constructions made of conductive materials.
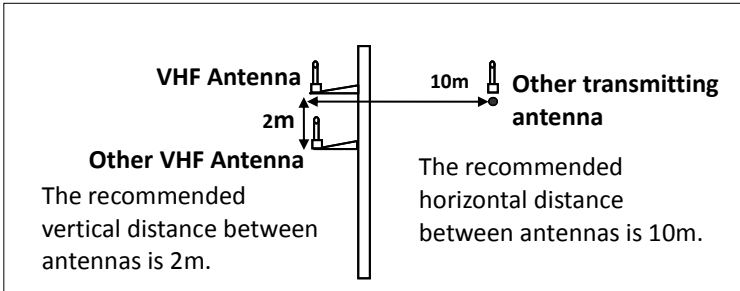
Figure 4   VHF Antenna Locations

The VHF antenna connector type on CAMINO-108S is SO239 which is designed to work with a PL259 connector.
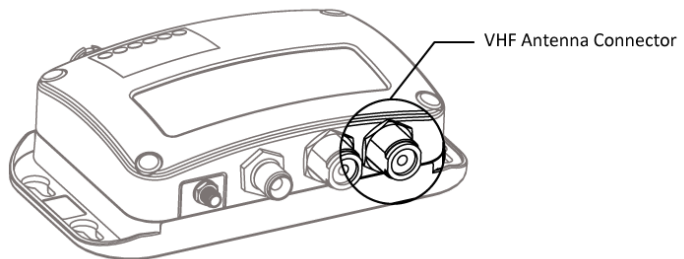
Figure 5   VHF Antenna Connector

2.4 Connecting to VHF Radio
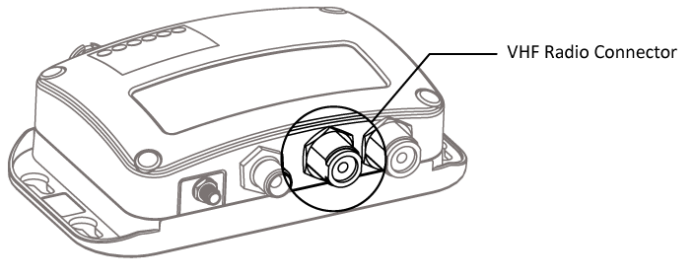
Figure 6 **VHF Radio Connector**

It is important for users to make sure that the VHF radio is always connected to the VHF radio input port (left SO-239 connector) – and never connected to antenna input port. When VHF radio is connected to antenna input port, the AIS receiver of CAMINO-108S might be severely damaged.

The internal path for VHF radio stays transparent also when CAMINO-108S is switched off or has power failure. CAMINO-108S is designed to give priority to VHF radio in the event of simultaneous transmission of VHF radio and AIS.

In case VHF radio is not connected to CAMINO-108S, the VHF radio connector should stay floating or be connected with a 50ohm dummy load.

2.4.1 FM radio connection

Use the Motorola jack of the attached FM radio cable to connect to radio´s female receptacle. For best FM radio reception, make sure the VHF antenna is extended to the highest achievable position.
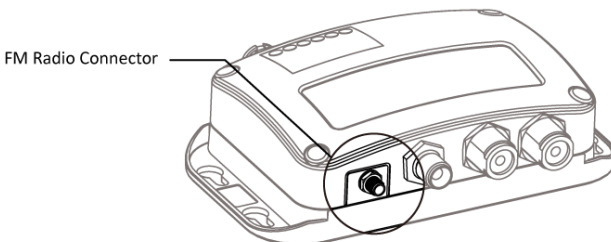
Figure 7 **FM Radio Connector**

2.5 GPS Antenna Installation

Install the GPS antenna where it has a clear view to the sky, so that it may access the horizon freely with 360° degrees.

Ensure a free 360˚ horizon with a vertical observation of 5˚.

5˚

3m

The recommended horizontal distance between GPS antennas and other antennas is 3m.
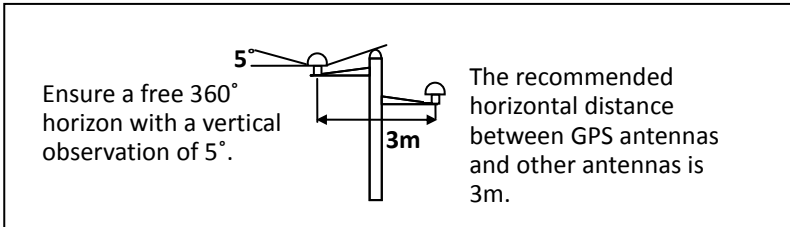
Figure 8   GPS Antenna Locations

It is recommended to keep the GPS antenna out of the transmitting beam of high-power transmitters such as Inmarsat devices and radar.

When connecting the cables, take note of the following precautions.

- Bending cables may cause damages to the inner wires and impair overall the performances.
- Each coaxial cable should be set up separately and can only be set up in a single cable tube.
- Insulation on connector port of the coaxial cable should be considered.

CAMINO-108S is tested with the GPS antenna GA-22. It's recommended to use GA-22 to ensure optimal reliability of your AIS system.

Pole Mounting:

For pole mounting the GA-22, a 1 inch 14 TPI thread pole will be required.

1. Align the GPS cable with the opening slot found on the side of the GPS Antenna.

Note: Lightly pull the GPS cable outward to ensure that the cable is not lodged between the GPS Antenna and the pole while is being secured.

2. Align the GPS Antenna to the pole and turn clockwise until is securely tightened.
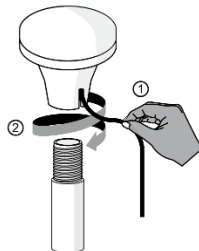
Figure 9   GPS Antenna Pole Mounting

Base Mounting:

1. Mount the base with the provided screws.

2. Align the GPS cable with the opening slot found on the side of the GPS Antenna.

Note: Lightly pull the GPS cable outward to ensure that the cable is not lodged between the GPS Antenna and the pole while is being secured.

3. Align the GPS Antenna to the pole and turn clockwise until is securely tightened.
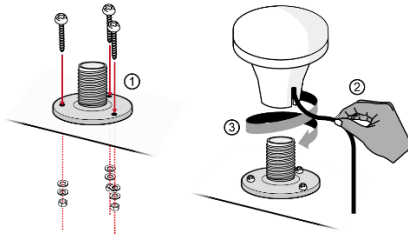
Figure 10   GPS Antenna Base Mounting

 WARNING: Applicable to Pole and Base mount installations. The GPS Cable should not be routed through the middle opening of the pole or the base mount.
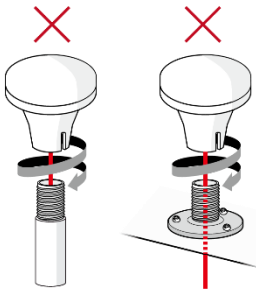
Figure 11   Improper Installation

2.6   Connecting with NMEA 0183 Devices

CAMINO-108S supports two NMEA 0183 ports and external silent mode switch with its 12-pin data cable. The default NMEA 0183 baud rates are 38400-bps (high speed) and 4800-bps (low speed). User can change the baud rates using the provided configuration utility. Typically the high speed setting is primarily for chart plotter connection, while the low speed setting can be used for NMEA 0183 compatible instruments. CAMINO-108S NMEA 0183 supports multiplexer function. Received NMEA 0183 data from both ports will be multiplexed and forwarded to both NMEA 0183 output ports and USB.
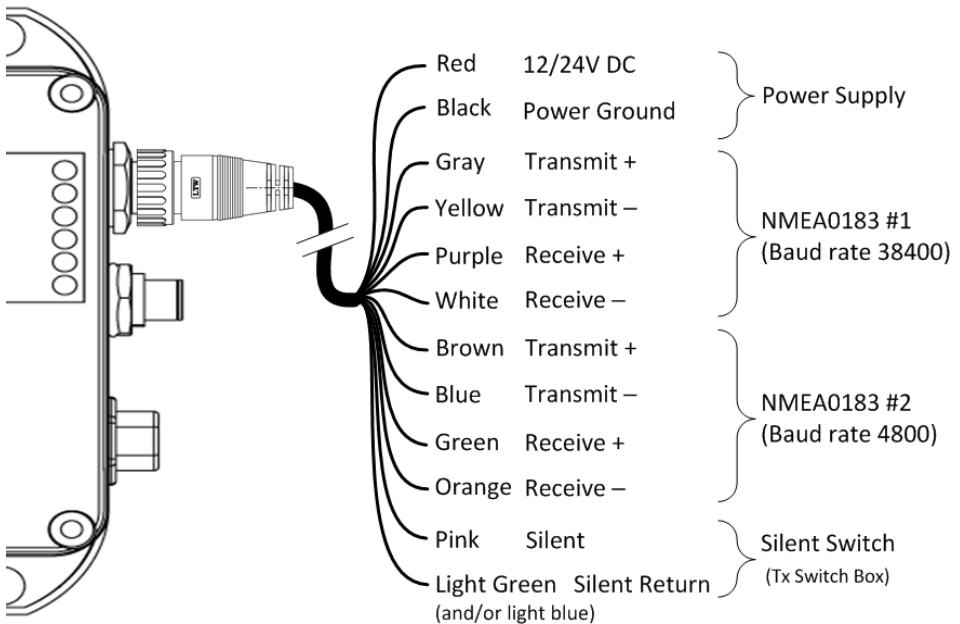
Figure 12   Wiring Instructions

Warning: During installation, you may have to peel off some wires to make the appropriate connections. After completing the installation, please cover all exposed wires with a rubber-vulcanized tape to prevent the devices from malfunctioning or short-circuited.

2.7   AIS Silent Mode Connection

When Silent Mode is required, it is possible to connect an external toggle switch to CAMINO-108S. Connect the toggle switch between the pink and light green (and/or light blue) wires to enable Silent Mode function, as depicted in Figure 13. An optional external Tx Switch Box (part number SB-181) is available from AMEC for silent mode activation.
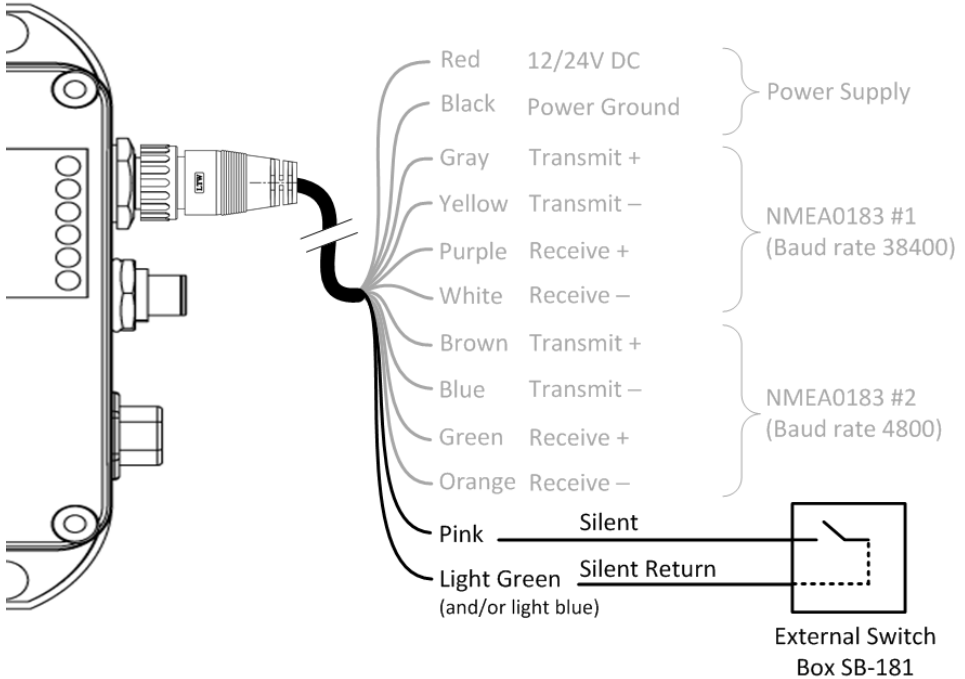
Figure 13   Silent Switch Connection

2.8 Connection to NMEA 2000 Network

The CAMINO-108S is equipped with NMEA 2000 interface with LEN=1. CAMINO-108S is able to send AIS data and forward received GPS data (from internal GPS antenna) via NMEA 2000 network to other NMEA 2000 devices. An updated PGN list is available at AMEC website under FAQ for CAMINO-108.

A compatible T-connector and drop cable available by your local service partner are needed to connect the device to your chart plotter with NMEA 2000 interface.

CAMINO-108 series works with GPS input from both NMEA 2000 and NMEA 0183 to back up your external GPS antenna. The GPS input priority is external GPS antenna → NMEA 0183 → NMEA 2000.

When there are multiple GPS sources available on the NMEA 2000 bus, the CAMINO-108 series will pick the source following the criteria below:

● The source has the lowest device source address
● The source has a valid GPS position fix

Please refer to 5.3 and 5.4 for more info about the related NMEA 2000 and NMEA 0183 sentences for GNSS reception support.
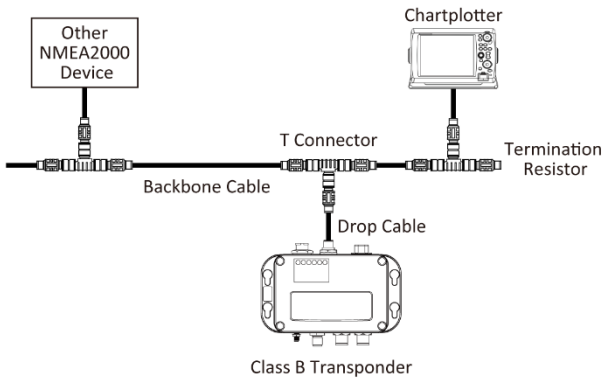
Figure 14   NMEA 2000 Network

2.9 Connecting to Power Supply

The CAMINO-108S requires a 12V or 24V DC power supply (9.6 to 31.2V) capable of supplying 2A peak current @12V DC. The red wire and the black wire on the 12 pin cable are used to connect the power supply's positive and negative terminals. Practically, it is suggested to use a minimum 2A fuse before connecting directly to the battery/power supply.

3   Configuring Your CAMINO-108S

Your CAMINO-108S is delivered with a powerful "AIS Configuration Tool" allowing user to set up the transponder and make a real-time diagnosis. A more detailed user guide of configuration tool can be found in the "Help" of the software.

3.1   Connecting to your AIS Transponder

3.1.1   Required Items

Before preceding the configuration procedure, make sure the following items are available:
- USB Driver (included in the software CD)
- USB cable (included in the box)
- Mac OS X 10.6 and later or Microsoft® Windows® XP, Windows® Vista®, Windows 7, Windows 8, Windows 10 (including both 32 and 64-bit versions)
- One available USB port on PC
- Available CD-ROM drive on PC

⚠️ **Note***:* **For configuration and firmware upgrade purpose, B600 series can be powered only by USB. When USB power is in use, the device will not transmit any data.**

3.1.2   Installing "AIS Configuration Tool"

The "AIS Configuration Tool" must be installed before connecting your transponder to your PC or Mac.

The application can be found on the CD supplied with your AIS Class B transponder. Insert the CD into your PC or Mac and navigate to the 'Windows' or 'Finder' folder.

> **Windows:** Double-click the 'setup.exe' item to start the installer and follow the on-screen instructions.

> **Mac:** Double-click the 'AISConfigurationTool.dmg' file. A new Finder window will open and drag the "AIS Configuration Tool" to the Applications folder to complete the installation process.

You can now launch the application from the Windows® Start menu or the Mac Applications folder.

3.1.3 Three steps to connect AIS transponder

Step 1:

Connect your Class B AIS transponder to your PC or Mac using a USB cable. In most cases the USB driver will be installed automatically by Windows system. When USB driver installation is not done automatically, it can be found on the attached CD and installed manually. Follow the on-screen instructions and assign the correct file path of the USB driver to complete the installation. You can also install the USB driver via the Device Manager in the Control Panel.

Step 2:

Select the "Com Port" corresponding to your AIS transponder from the drop down menu at the top left of the application window, the Com Port will normally be listed as "AIS Virtual Com".

Step 3:

Click the 'Connect' button. In a short moment, the button will be displayed as "Disconnect" when the connection is established.

3.1.4 Home page of the application

The application is now communicating with your AIS transponder and will display any pre-configured vessel data on the 'Home' page depicted as follows.
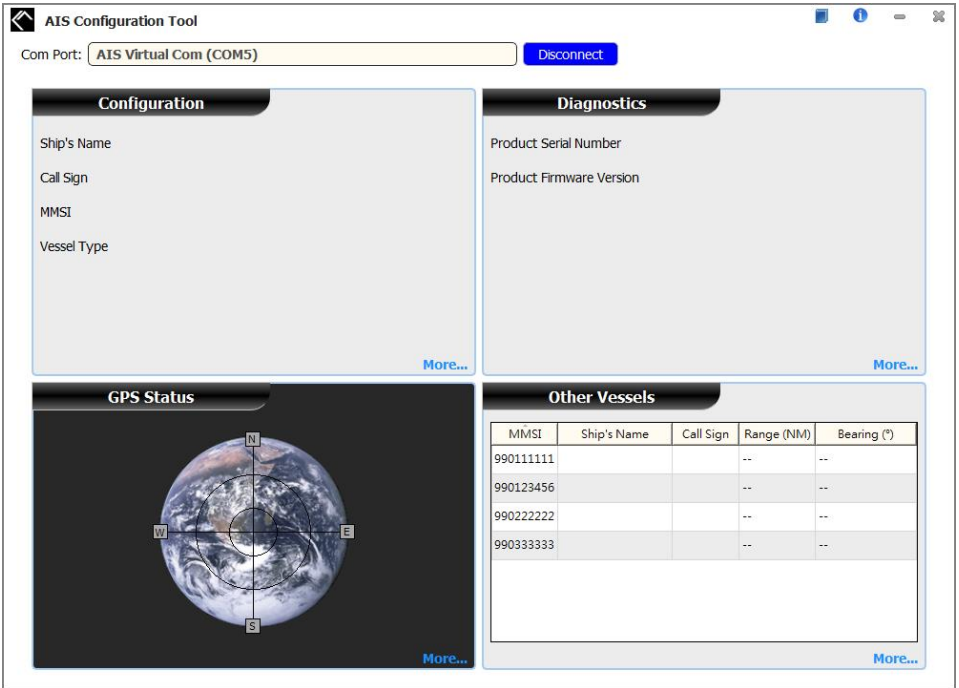
Figure 15   Home Page of the Application

3.2 Programming your vessel data

After the device is successfully connected with the Configuration Tool, click on the "Configuration" tab. You will require the following information in order to configure the device:

- Vessel´s name: limited to 20 characters

- Call sign: limited to 7 characters

- MMSI: Enter your MMSI (Maritime Mobile Service Identity) number

- Vessel type: choose your ship type from the drop down list

- Ship dimensions: Enter the vessel dimensions by appointing the position of your GPS antenna

- Configure NMEA 0183 Baud Rate: Baud rate of NMEA 0183 # 1 and NMEA 0183 # 2 can be configured here to 38400, 9600 or 4800.

⚠️ **WARNING:** The MMSI number can only be entered once. Be sure to enter the correct MMSI number, as it cannot be corrected if entered incorrectly.

Figure 16   Static Data Setting

4   GET STARTED

4.1   Start up CAMINO-108S

The device starts up whenever the connected power source is ON. It will operate automatically when the device has been properly configured using the Configuration Software and GPS/VHF antenna are properly installed. The device transmits its own ship positions depending on vessel´s moving speed and should receive information of other vessels in the vicinity.

The operation status of the device can be observed with the LED lights on the unit. Description of the LED indications is provided in the following section.

4.2   LED Indicators

Indicator	Light	Description
Power	Green, steady	The device has been powered up correctly. By USB power, the Power LED does not light showing that the device is in low power mode.
Error	Red, steady	MMSI is not properly programmed
	Red, flashing	A BIIT system error is detected referring to chapter 4.5, or by USB power
Rx	Green, flashing	The device is receiving AIS data.
Tx/Silent	Orange, flashing	The device is acquiring a GPS fix, no AIS transmission during this time period. This can be the following situation: • The device is just newly powered on and is acquiring a GPS position fix prior to transmitting its first vessel information report. This process may take several minutes. • The GPS position fix has been lost. The device is attempting to re-acquire position fix for 30 minutes before entering a BIIT system error state.
	Orange, steady	The device is in silent mode, no AIS transmission at all.
	Green, flashing	The device is transmitting AIS data. The flash interval is 3 minutes when vessel speed under 2 knots. The flash interval is 30 seconds when vessel speed above 2 knots.
VHF Tx	Green, flashing	The VHF radio is transmitting
Warning	Orange, steady	The red LED illuminates when antenna VSWR is over 3:1 by VHF transmission at 25W.

4.3   Built-in Integrity Test (BIIT)

With BIIT (Built in Integrity Test) function, the CAMINO-108S is constantly monitoring and testing the integrity of the AIS device. Should an abnormal condition be detected within the device, the Error LED will alert with flashing red light. Abnormal conditions may include situations like the followings:
● MMSI not set (Error LED steady on)
● Antenna VSWR exceeding the maximum allowed level (Error LED flashing)Background noise level exceeds allowable threshold (-77dBm) (Error LED flashing)
● GPS is unable to gain lock (3D fixed) after 30 minutes of losing GPS signal (Error LED flashing)
● Low input power (< 8.6 V DC) or by USB power (Error LED flashing)

4.4   AIS Viewer Description

The AIS Viewer is a complementary charting software supplied with your CAMINO-108S purchase. The software installation file and its user manual can be found in the provided CD-ROM.

This powerful tool allows users to display AIS targets either on a basic line map or in an alphanumeric view. It transforms your PC to a user-friendly AIS data logger and can trace other vessels with voyage track. Besides, the software offers various safety features to help users be alerted during their voyage.

Please notice that before trying to connect to PC, you should quit the Configuration Software or vice-versa. The device can only establish connection to one software at a time. The AIS CPA/TCPA setting can be configured via AIS Viewer.

Figure 17   AMEC AIS Viewer

5   SPECIFICATIONS

5.1   Product Specifications

APPLICABLE STANDARDS	
EN 301 489-1 V2.1.0 / EN 301 489-3 V2.1.0	IEC 60945 Ed. 4:2002
EN 301 489-1 V2.1.0 / EN 301 489-17 V3.1.0	IEC 62287-1 Ed. 3:2017
EN 301 843-1 V2.1.1 / EN 301 843-2 V2.1.1	IEC 61108-1 Ed. 2:2003
EN 300 440 V2.1.0	EN 300 328 V2.1.0
EN 60950-1:2006 + A11:2009 + A1:2010 +	EN 62311:2008
A12:2011 + A2:2013	ITU-R .1371-5, 2014
VHF TRANSPONDER	
Frequency Range	156.025 MHz ~ 162.025 MHz
Channel Bandwidth	25 KHz
Modulation	GMSK / FM
Data Rate	9,600 bps
Number of AIS Transmitter	1
Number of AIS Receiver	2 (one time-shared between AIS and DSC)
Number of DSC Receiver	1 (time-shared between AIS and DSC)
AIS Channel 1	CH 87B (161.975 MHz)
AIS Channel 2	CH 88B (162.025 MHz)
Rx Message Format	AIS Class A & B messages
DSC RECEIVER	
Modulation	1,300 Hz / 2,100 Hz FSK
Data Rate	1,200 bps ± 30 ppm
Spurious Response Rejection	$\geqq$ 70 dB for signal @ -104 dBm; BER $\leqq$ 1 %
Blocking	$\geqq$ 84 dB for signal @ -104 dBm; BER $\leqq$ 1 %
GPS RECEIVER (INTEGRATED)	
Receiving Channels	50 channels
Accuracy	IEC 61108-1 compliant
Output Rate	1 Hz
POWER SUPPLY	
Supply Voltage	12V / 24V DC, 2A
Power Consumption	Typically less than 3W average @ 12V DC
CONNECTION INTERFACE	
GPS Antenna Connector	TNC (Female)
VHF Antenna Connector	SO-239 (Female)
VHF Radio Connector	SO-239 (Female)
NMEA 2000	Standard connector LEN=1
Silent Mode Setting	Set by the dedicated pins in the 12-pin cable
USB	Mini-B type, waterproof

FM Radio	SMA (Female) & dedicated cable with Motorola jack
NMEA 0183 (RS-422)	Support two NMEA 0183 interfaces Default baud rate 38,400 & 4,800bps Configurable and separate Tx/Rx baud rate Standard IEC 61162-1 / IEC 61162-2 sentences
RF PERFORMANCE (SPLITTER)	
Insertion loss, VHF Radio Receive path	Typical 0dB
Insertion loss, VHF Radio Transmit path	Typical 1dB
ENVIRONMENTAL	
Operating Conditions	IEC 60945 "protected" category
Operating Temperature	-15°C ~ 55°C
Waterproof	IP54
PHYSICAL	
Width	157 mm (6.18 inches)
Height	47 mm (1.85 inches)
Depth	88 mm (3.46 inches) (exclude connector)
Weight	306 g
SOFTWARE TOOL	
AMEC AIS Configuration	PC configuration utility
AMEC AIS Viewer	AIS Viewer for PC
GA-22 GPS Antenna (optional)	
Cable	Integral 10m RG-174 cable plus mounting bracket
Supply Voltage	3.3V

5.2 Dimensions
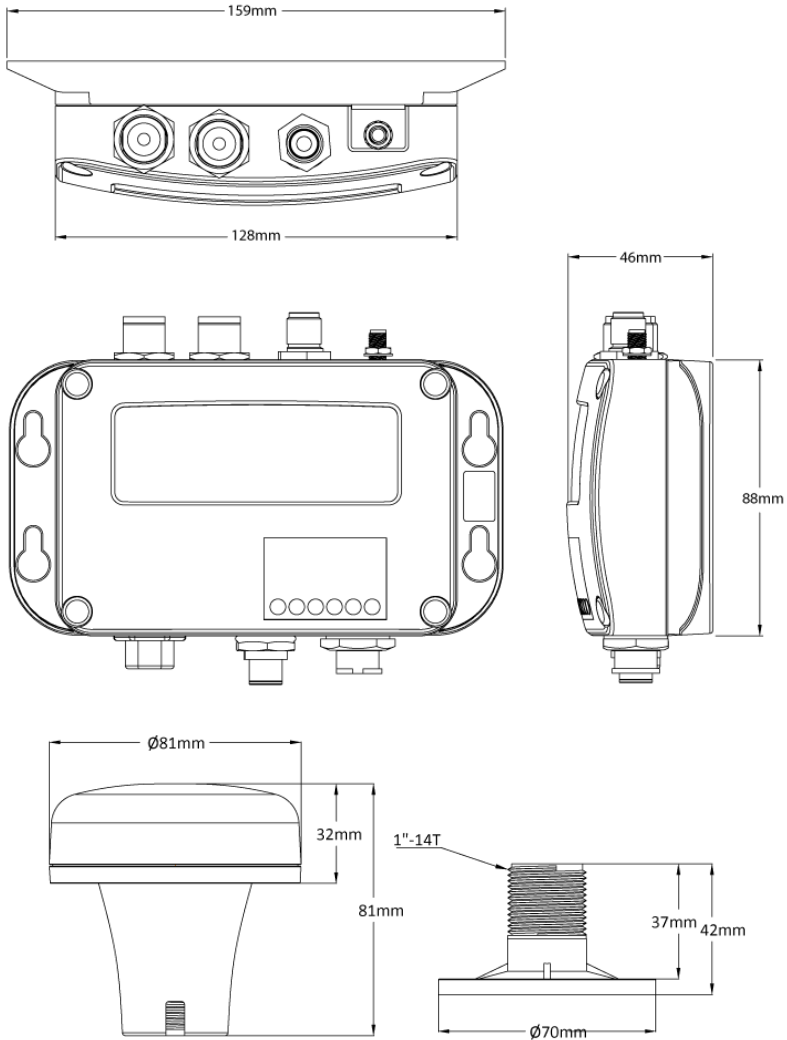
(GPS antenna is an optional item)

5.3 NMEA 2000 PGN Information

Transmit	
PGN	**Description**
59392	ISO Acknowledgment
59904	ISO Request
60928	ISO Address Claim
126464	PGN List - Transmit PGN's group function
126996	Product Information
129025	Position Rapid Update
129026	COG SOG Rapid Update
129029	GNSS Position Data
129038	AIS Class A Position Report
129039	AIS Class B Position Report
129040	AIS Class B Extended Position Report
129041	AIS Aids to Navigation (AtoN) Report
129539	GNSS DOPs
129540	GNSS Sats in View
129792	AIS DGNSS Broadcast Binary Message
129793	AIS UTC and Date Report
129794	AIS Class A Static and Voyage Related Data
129795	AIS Addressed Binary Message
129796	AIS Acknowledge
129797	AIS Binary Broadcast Message
129798	AIS SAR Aircraft Position Report
129800	AIS UTC/Date Inquiry
129801	AIS Addressed Safety Related Message
129802	AIS Safety Related Broadcast Message
129803	AIS Interrogation
129804	AIS Assignment Mode Command
129805	AIS Data Link Management Message
129806	AIS Channel Management
129807	AIS Group Assignment
129809	AIS Class B "CS" Static Data Report, Part A
129810	AIS Class B "CS" Static Data Report, Part B
Receive	
PGN	**Description**
59392	ISO Acknowledgment
59904	ISO Request
60928	ISO Address Claim
127250	Vessel Heading
127258	Magnetic Variation
129026	COG & SOG, Rapid Update
129029	GNSS Position Data
129539	GNSS DOPs

5.4 Supported NMEA 0183 Sentences

Transmit	
Sentence	**Description**
GGA	Global Positioning System Fix Data
GSA	GNSS DOP and Active Satellites
GSV	GNSS Satellites In View
GLL	Geographic Position – Latitude/Longitude
RMC	Recommended Minimum Specific GNSS Data
VDO	AIS VHF Data-Link Own-Vessel Report
VDM	AIS VHF Data-link Message
Receive	
Sentence	**Description**
DTM	Datum Reference
GBS	GNSS Satellite Fault Detection
GSA	GNSS DOP and Active Satellites
HDT	Heading, True
RMC	Recommended Minimum Specific GNSS Data
ROT	Rate Of Turn

6 TROUBLESHOOTING

The transmitting LED (Green color) is not illuminated, why?

- The transmitting interval of a Class B transponder is 3 minutes if the speed of the vessel is less than 2 knots. If the speed exceeds 2 knots, the transmitting interval will be 30 seconds. For each transmission, the channel indicator will flash once quickly. The green light from the Tx indicator could be missed if not observed carefully.
- For AIS transmitting, GPS information from GPS antenna is required. Without GPS information, AIS will not transmit AIS signal. Please check if your GPS antenna is connected and setup correctly.

CAMINO-108S receives AIS signals normally, but no one in the surrounding can see me, why?

- AIS Class B transmission range limitation: an AIS Class B transponder transmitting range of 5-7 miles in perfect conditions. The AIS receiver in the transponder will typically see Class A vessels that are 20-30 miles away or even more in excellent conditions. The major reason is that all AIS Class B transponders transmit at 2 watts vs. the 12.5 watts that Class A transponders typically use. This difference in power impacts on the transmission range of each transponder type. For this reason, it is quite possible that Class A vessel can be seen, but Class B vessel might not be seen.
- VHF antennas interference: if you are using a dedicated AIS/VHF antenna for your transponder, be sure that it is placed at least 6 ft (1.83 m) away from other VHF antennas or vertical metal objects and ideally install the antenna on a different vertical plane from other VHF antennas. In several tests, mounting two VHF antennas next to another typically reduces the transmitting range to both antennas by 50-70%.
- GPS is not fixed: If your GPS antenna is not connected or setup correctly, your transponder will see other vessels fine, but you will not be sending out your vessel position. All AIS transponders need a good GPS fix before it can send out any type of transmission. The color and state of the LEDs on the transponder indicate if the unit is in transmission mode or not.
- The location of VHF antenna is directly related to AIS transmitting range. The VHF antenna should be installed at mast as high as possible.

Even though my CAMINO-108S is transmitting, why do some vessels with AIS take a long time to see my vessel name or not see it at all?

- AIS Class B users should keep in mind that Class B transponders do not broadcast position updates as often as Class A commercial transponders. As with Class B transponders, the full static information, such as vessel's names, the transmission is broadcasted every 6 minutes; however, MMSI and dynamic information, such as position, update will only be sent out every 3 minutes if the vessel is moving

slower than 2 knots. To add to this, if the receiving party is using non-standard dual channel receiver (a single channel receiver), then in perfect conditions, the receiver will get your full static information every 12 minutes and your MMSI and dynamic information every 6 minutes if you are moored.

No data is being received by chart plotter, why?

- Please check that the power supply is connected correctly at CAMINO-108S.
- Please check that the power supply is 12V or 24V with sufficient current capacity (no less than 2A).
- Please make sure that the connections between CAMINO-108S to the chart plotter are correct (baud rate, polarity, NMEA format etc.).

My MMSI is being received by other vessels but my vessel name is not shown on their chart plotter or PC, why?

- Older software and AIS displays may not be fully compatible with Class B transponders. In some of these cases, older equipment might only have Class B vessel show up on their displays with just MMSI number without the vessel name. This is usually due to the receiving device not knowing how to process the Message 24 static data from Class B transponders. Please contact the chart plotter maker and ask for software upgrades (for these older chart plotters) to resolve this issue.

It´s to notice that the VHF and AIS transmission range is reduced, why?

- CAMINO-108S has up to 1dB insertion loss on transmission path both for AIS and VHF. Therefore it´s normal to have a slight reduction in transmission range.

If you still encounter difficulties to set up or operate CAMINO-108S correctly, please email to service@alltekmarine.com for further instructions.

7 ABBREVIATIONS

AIS	Automatic Identification System
COG	Course Over Ground
CPA	Distance to Closest Point of Approach
CSTDMA	Carrier-Sense Time Division Multiple Access
DSC	Digital Selective Calling
ECS	Electronic Chart System
ETA	Estimated Time of Arrival
GPS	Global Positioning System
IMO	International Maritime Organization
MMSI	Maritime Mobile Service Identity
SOG	Speed Over Ground
TCPA	Time to Closest Point of Approach
TDMA	Time Division Multiple Access
TPI	Thread per Inch
UTC	Coordinated Universal Time
VHF	Very High Frequency
VTS	Vessel Traffic Services

8 FCC INTERFERENCE STATEMENT

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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.

Any changes or modifications not expressly approved by AMEC for compliance could void of the user's authority to operate the equipment.

9 RF Exposure Warning

WARNING: This device generates and radiates RF electromagnetic energy and must be installed and operated according to the instructions contained in this manual. Failure to do so may result in product malfunction and/or exposure to potentially harmful levels of radio frequency radiation.

WARNING: Never operate this device unless it is properly connected to a VHF antenna. To maximize performance and minimize human exposure to RF energy, always mount the antenna at least 3m from the device.

The system has a Maximum Permissible Exposure (MPE) radius of 50cm from the antenna. This has been determined assuming the maximum power of the transmitter and using a standard half-wave monopole VHF antenna with a maximum gain of 3dBi and termination impedance of 50 ohms.

When installing the antenna and operating the equipment consider the following:

- The antenna should be mounted at a minimum vertical distance of 5m above the deck in order to meet international safety directives on Maximum Permissible Exposure (MPE). Failure to adhere to these limits could expose persons within the radius to RF radiation in excess of the recommended MPE limits.
- Higher gain VHF antennas will require a larger MPE radius.
- Do not operate the unit when anyone is within the MPE radius of the antenna.
- The antenna should not be co-located or operated in conjunction with any other transmitting antenna.

DECLARATION OF CONFORMITY

Hereby, Alltek Marine Electronics Corp. (AMEC) declares that this CAMINO-108S is in compliance with the essential requirements and other relevant provisions of Radio Equipment Directive (RED) 2014/53/EU.

AMEC WORLDWIDE WARRANTY

Limited warranty

Subject to the terms, conditions and limitations set forth in this Worldwide Limited Warranty (hereinafter the "Warranty"), AMEC warrants that its products, when properly installed and used, will be free from defects in material and workmanship for a period of twelve (12) months, from the date of first purchase (the 'Warranty Period')

For the purposes of this warranty, 'date of first purchase' means the date that the product was purchased by the first retail customer, or by the institutional customer, or in the case of a product installed on a new vessel or any other marine related platform by a certified AMEC original equipment manufacturer (a 'AMEC OEM'), the date that such vessel was purchased by the first retail customer.

AMEC will, at its sole option, repair or replace any defective products or components returned during the Warranty Period in accordance with the terms, conditions and limitations set forth below. Such repairs or replacement will be the sole remedy of the customer under this Warranty.

Standard Warranty Service

To qualify for standard warranty service the product must be returned to a AMEC-certified service agent (i) within the Warranty Period, and (ii) within thirty (30) days of the alleged product failure. Any products returned must be securely packaged and sent pre-paid and insured to AMEC or to a AMEC-certified service agent. All products returned must be accompanied by a copy of the original sales receipt to be eligible for standard warranty service.

Other conditions

This Warranty is fully transferable provided that you furnish the original proof of purchase to the AMEC -certified service agent. This Warranty is void if the seal label is removed or defaced.

THE LIABILITY OF AMEC TO A CUSTOMER UNDER THIS WARRANTY, WHETHER FOR BREACH OF CONTRACT, TORT, BREACH OF STATUTORY DUTY OR OTHERWISE SHALL IN NO EVENT EXCEED AN AMOUNT EQUAL TO THE TOTAL PURCHAE PRICE OF THE PRODUCT GIVING RISE TO SUCH LIABILITY AND IN NO EVENT SHALL AMEC BE LIABLE FOR SPECIAL, INCIDENTAL, CONSEQUENTIAL OR INDIRECT DAMAGES OR LOST OF GOODWILL, REPUTATION, LOSS OF OPPORTUNITY OR INFORMATION, DATA, SOFTWARE OR APPLICATIONS.

In the event that any term or provision contained in this Warranty is found to be invalid, illegal or unenforceable by a court of competent jurisdiction, then such provision shall be deemed modified to the extent necessary to make such provision enforceable by such court, taking into account the intent of the parties.

All AMEC products sold or provided hereunder are merely aids to navigation. It is the responsibility of the user to exercise discretion and proper navigational skill independent of any AMEC product.

Appendix: How to Determine Serial Port

If you PC/laptop does not have available serial port, you may use a RS232-to-USB adapter. To find out the proper serial port for connection use the following instructions.

Windows 7 or VISTA version:
Click on "Start" → Select "Control Panel" → Select "Device Manager" → Click Port (COM&LPT)
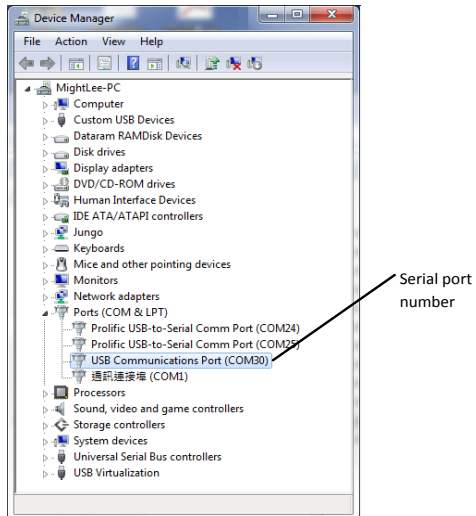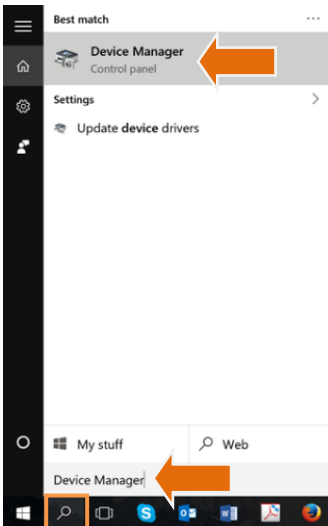
Windows 8 and 8.1:
Click (W)* + I and then click on Control Panel → Select "Device Manager" → Click Port (COM&LPT)

Windows 10
(W)* + S → type Device Manager in the search box, and select Device Manager from the list of results. Expand the Ports (COM & LPT) and port number are presented with numerical number within a parenthesis in the following format (COMXX).
* means Windows button

NOTE:

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