



PRODUCT MANUAL

Nauticast B2

Class-B AIS Transponder

Product No. 1st3001001



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All marine Automatic Identification System (AIS) units utilize a satellite based system such as the Global Positioning Satellite (GPS) network or the Global Navigation Satellite System (GLONASS) network to determine position. The accuracy of these networks 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. It is desirable wherever possible therefore to verify both your vessel's AIS derived position data and other vessels' AIS derived position data with visual or radar based observations. The compass safe distance of this unit is 0.5m or greater for 0.3° deviation. **IMPORTANT:** In most countries the operation of an AIS unit is included under the vessel's marine VHF license provisions. The vessel onto which the AIS unit is to be installed must therefore possess a current VHF radiotelephone license which lists the AIS system and the vessel Call Sign and MMSI number. Please contact the relevant authority in your country for more information. In accordance with a policy of continual development and product improvement the NAUTICAST B2 hardware and software may be upgraded from time to time and future versions of the NAUTICAST B2 may therefore not correspond exactly with this manual. When necessary, upgrades to the product will be accompanied by updates or addendums to this manual. Please take time to read this manual carefully and to understand its contents fully so that you can install and operate your AIS system correctly. Information contained in this manual is liable to change without notice. Please visit our website for the latest manual revision at www.1st-relief.com. 1st-Relief GmbH disclaims any liability for consequences arising from omissions or inaccuracies in this manual and any other documentation provided with this product.

LIMITED WARRANTY

This product is warranted against factory defect in material and workmanship for a period of one year from date of purchase or receipt as a gift. During the warranty period 1st-Relief GmbH will repair or, at its option, replace at no cost to you for labour, materials or return transportation, provided you obtain a return authorization from 1st-Relief GmbH, Handelskai 388 / 632, 1020 Vienna, Austria. To obtain a return authorization, call our customer service department (see Section Contact & Support information). This warranty does not apply if the product has been damaged by accident or misuse, or as a result of service or modification by other than the factory. Except as otherwise expressly stated in the previous paragraph, the company makes no representation or warranty of any kind, express or implied, as to merchantability, fitness for a particular purpose, or any other matter with respect to this product. The company shall not be liable for, consequential or special damages.

CAUTION!:

Warranty and certification void if device is opened.

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History of Changes

Date	Version	Status	Comments	Responsible
2013-07-31	1.14	Release	First Official Release	Ch. Aschl

Software dependencies

This revision of the Manual is valid for the Software version (s) below stated and future versions unless otherwise noted (ref.: www.1st-relief.com).

Date	AIS software Version	Status	Comments	Responsible
2013-06-12	3001010-1-1-1-D411	Released		A. Lesch

Date	Link2AIS software Version	Status	Comments	Responsible
2013-06-28	3.0	Released		A. Lesch

1 WHAT IS AIS?

AIS stands for Automatic Identification System. AIS increases navigational safety and collision avoidance by transmitting vessel identification, helping to reduce the difficulty of identifying ships when not in sight (e.g. at night, in radar blind arcs or shadows or at distance) by broadcasting navigational intentions to other vessels by providing ID, position, course, speed and other ship data with all other nearby ships and land based stations.

According to IALA regulations, AIS is defined as follows:

AIS is a broadcast Transponder system, operating in the VHF maritime mobile band. It is capable of sending ship information such as identification, position course, speed and more, to other ships and to shore. It can handle multiple reports at rapid update rates and uses Carrier Sense Time Division Multiple Access (CSTDMA) technology to meet these high broadcast rates and ensure reliable and robust ship to ship operation.

The IMO defines the performance standards as follows:

Ship to ship working, ship to shore working, including long range application, automatic and continuous operation, provision of information messaging via PC and utilization of maritime VHF channels

The Modules:

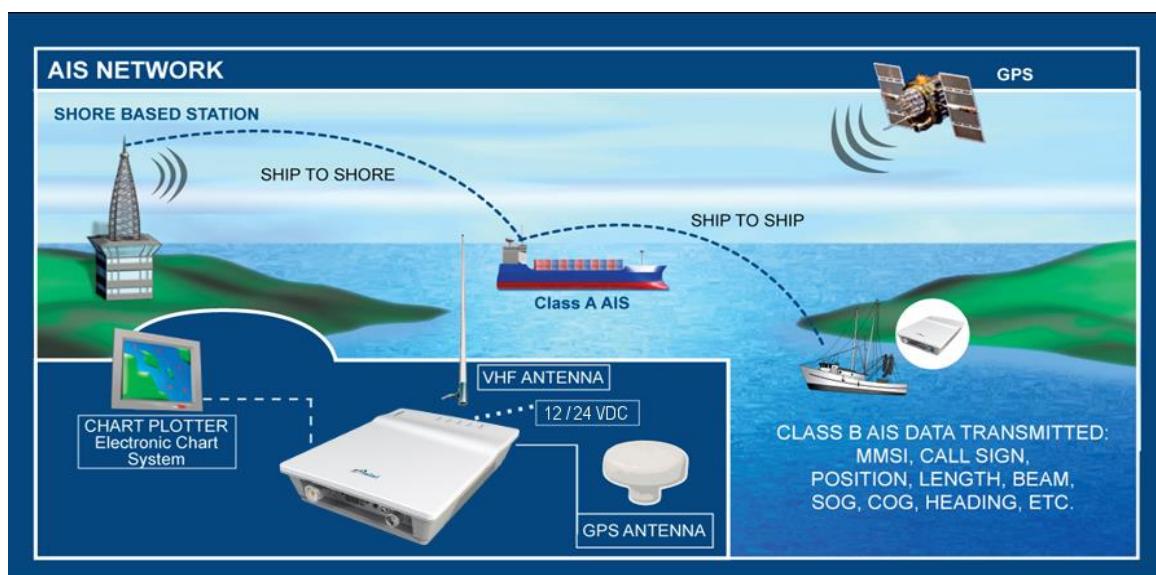
GPS system, AIS Transponder, VHF Antenna, and the Data Power Cable (appropriate application software connects the individual modules).

AIS are required to function flawlessly in a variety of modes. The relevant regulations requirements:

The system shall be capable of

- An "**autonomous and continuous**" mode for operation in all areas. This mode shall be capable of being switched to/from one of the following alternate modes by a competent authority;
- An "**assigned**" mode for operation in an area subject to a competent authority responsible for traffic monitoring such that the data transmission interval and/or time slots may be set remotely by that authority;
- A "**polling or controlled**" mode, where the data transfer occurs in response to interrogation from a ship or competent authority.

This illustration depicts a typical AIS System, where two or more AIS equipped vessels (and shore based systems) are automatically communicating with each other.

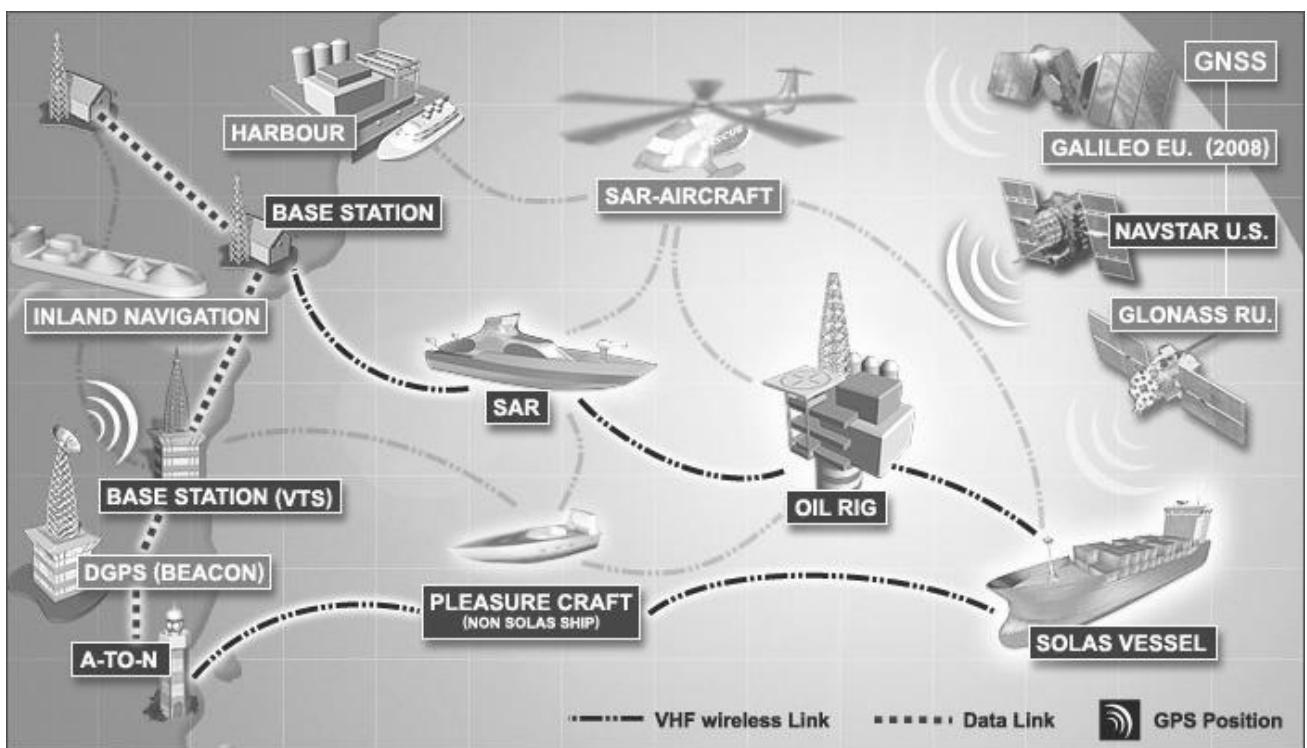


On the bottom, a typical NAUTICAST B2 installation in a common environment is shown. The NAUTICAST B2 is connected to the vessels power supply, and in connection with the VHF, and GPS-Antennas, the minimal requirements for Transponder operation are fulfilled.

Both vessels in the above illustration are equipped with an AIS transceiver. Due to “Time – Synchronization” they use the same organization of free and allocated windows (Slots) in the shared VHF Data Link (this method is called “Carrier Sense Time Division Multiple Access”) to send and receive messages. Without the necessity of any operating interaction, both vessels know exactly who or what is cruising nearby and where the individual object is heading.

The scenario below shows a full AIS coverage area (including all applications and complete shore infrastructure).

1.1 AIS Classes



There are two classes of AIS units fitted to vessels, Class-A and Class-B. In addition AIS base stations may be employed by the Coastguard, port authorities and other authorized bodies. AIS units acting as Aids to Navigation (A to N) can also be fitted to fixed and floating navigation markers such as channel markers and buoys.

Class-A units are a mandatory fit under the safety of life at sea (SOLAS) convention to vessels above 300 gross tons or which carry more than 11 passengers in International waters. Many other commercial vessels and some leisure craft also may be fitted with Class-A units.

Class-B units are designed for fitting in vessels which do not fall into the mandatory Class-A fit category.

The 1st-Relief GmbH NAUTICAST B2 is a full compliant Class-B AIS unit.

Information transmitted from vessels that have a Class-A AIS transponder on-board include:

• Name of Vessel	• Destination	• Size of Vessel	• Vessel Dimensions
• Speed (SOG)	• Call Sign	• ETA	• Draft
• Position	• Course (COG)	• Type of Vessel	• Status
• MMSI Number	• Navigational Status	• Heading	• Cargo
• Rate of Turn	• IMO Number		

Information transmitted from vessels that have a Class-B AIS transponder on-board include:

• Name of Vessel	• Vessel Dimensions
• Speed (SOG)	• Type of Vessel
• Position	• Heading
• MMSI Number	• Course (COG)
• Call Sign	

1.2 Position Information Source

The marine AIS system uses position information derived from networks such as the Global Positioning Satellite (GPS) or the Global Navigation Satellite System (GLONASS) in order to determine the location of the AIS unit and thus the vessel to which it is fitted. The NAUTICAST B2 utilizes the GPS satellite network.

2 Installation

2.1 The contents of this box

Before proceeding with the installation of the Nauticast B2, please check the contents of the box, which should include:

- The Nauticast B2 AIS transponder
- Power Cable
- USB Cable
- Mounting plate
- Mounting hardware (4 self tapping screws)
- VHF Antenna with connection cable
- GPS Antenna with connection cable
- Documentation and Software CD containing:
 - Nauticast B2 Product Manual
 - Nauticast B2 Protocol Specification
 - Nauticast B2 Product Sheet
 - Link2AIS User Guide
 - + other Documentation and Information Material
- Data Cable (optional)

Installation should be completed in 4 separate steps. Complete each step before proceeding to the next.

- Installing the Link2AIS software onto your PC.
- Enter your Ships data into the Link2AIS software (MMSI, Vessel Name, Call sign, Length, Beam etc.)
- Program your ship's data into the AIS hardware.
- Installing your AIS hardware to your vessel.

2.2 Software Prerequisites

The Link2AIS-software is designed to operate with Microsoft Windows® operating systems.

The recommended minimum system requirements are:

- Microsoft Windows® XP SP2 or above and Microsoft Windows® 7 SP1.
- Recommended screen resolution of 1280 x 1024 (although the Link2AIS-software can operate on screens with smaller resolution, with the use of scroll bars).
- One free USB port – minimum USB 2.0.
- A pointing device (mouse or equivalent).
- An Internet Browser used for the help system.

2.3 Software Installation

The Link2AIS-software is part of the NAUTICAST B2-bundle or may be downloaded from the webpage of 1st-Relief GmbH. Unzip the package when necessary, locate the file **Setup.exe** in the directory **Software** on the enclosed CD and double click on this file to start the installation process.

- Follow the screen prompts to install the Link2AIS software.

* Refer to Software User Guide for detailed installation instructions.

A Start Menu folder and shortcut on your desktop will be created with the name 'Link2AIS'. This short cut should be used to launch the application as required.

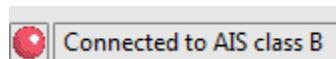
2.4 Programming

NOTE: To program your NAUTICAST B2 you will need to connect the AIS to a personal computer or Laptop with Link2AIS software installed. There is no external power source needed when using a USB connection. If you use RS232, 1st-Relief GmbH recommends you connect the AIS to your boat's power and connect it to a laptop in order to easily program your AIS before physically mounting the transceiver.

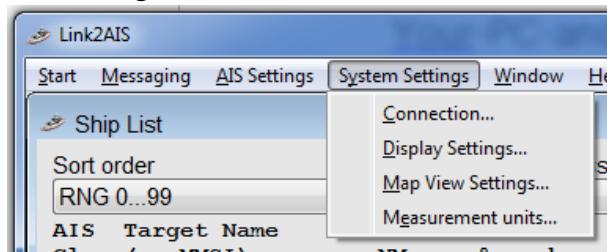
- Connect the NAUTICAST B2 to your laptop using USB.



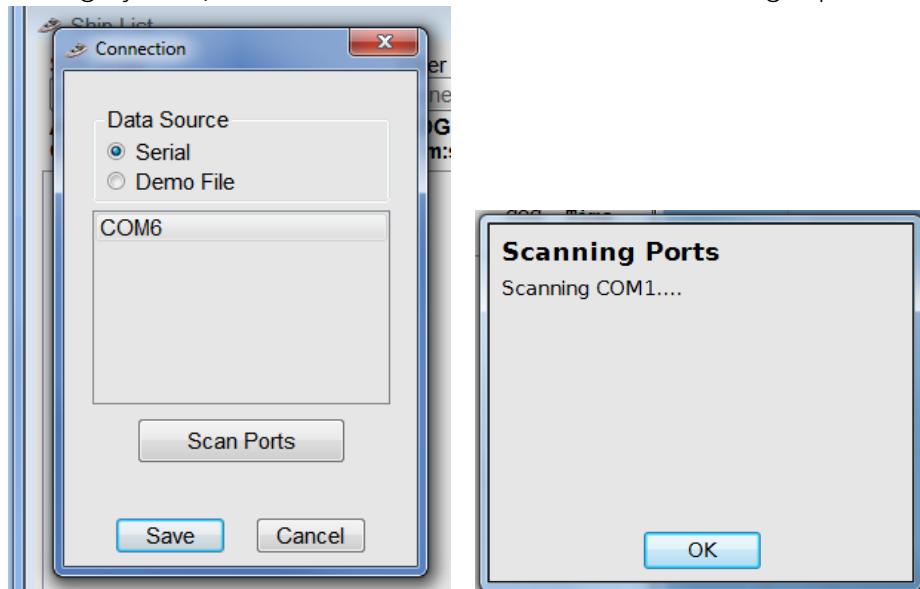
- Start the Link2AIS software program on PC.
- The application requires a USB connection to a NAUTICAST B2 transponder. The connection status is indicated in the lower left corner of the Link2AIS window:



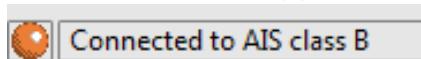
- Open the connection settings:



- By pressing 'Scan Ports' the software checks the available ports for the device and gives you a suggestion when ready. Select the serial port (port number can be found in the device manager of the system settings of your Microsoft Windows operating system) from the menu. Click 'Save' when the right port is selected.



- Once a connection is established the application is ready to use. Connection status is indicated at the bottom left of the application window:



- The status light should now turn amber, but still not green, because the MMSI is not programmed yet.

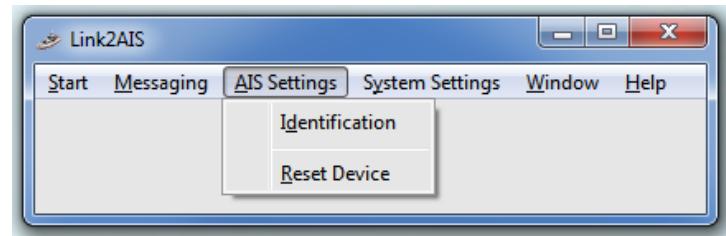
2.5 Help

There is a context based Help file, which explains what each data entry field means and what sort of data is expected. The help system is started by pressing the F1 key on your PC.

2.6 Software Configuration

The functions of Link2AIS are arranged in a series of tabs. Each tab contains information relating to a particular aspect of the connected AIS transponder. Depending on the version of Link2AIS installed not all tabs shown below may be visible.

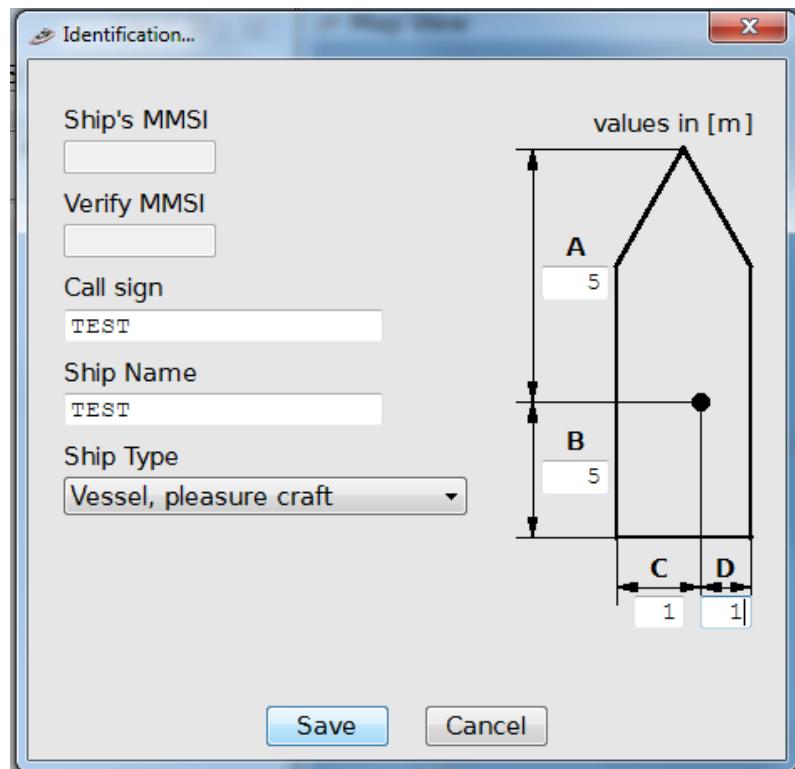
Open the 'Identification' tab. This will display the 'Static Data' for the connected AIS transponder. This includes the vessel's name, call sign, MMSI number and other fixed information.



To configure the transponder all of the data fields must be completed and saved to the AIS.

① CAUTION:

For security reasons the MMSI of the vessel cannot be changed once programmed. Do not program the MMSI unless you are certain you have the correct information. Please check the number entered carefully. If the MMSI programmed is incorrect the AIS transponder will need to be returned to the supplier for factory reset.



Enter the vessels information in the appropriate box:

- MMSI number – enter the vessel's Maritime Mobile Service Identity number
- Call Sign – enter the vessel's radio call sign (7 characters maximum)
- Ship's name – enter the name of the vessel (20 characters maximum)
- Select the most appropriate vessel type from the drop down menu.
- Enter the vessels dimensions as follows rounded to the nearest meter
 - Dimension A – distance from bow to GPS antenna location to the nearest meter
 - Dimension B – distance from the GPS antenna location to the stern to the nearest meter
 - Dimension C – distance from the port side to the GPS antenna location to the nearest meter
 - Dimension D – distance from the GPS antenna to the starboard side to the nearest meter

① CAUTION:

If no MMSI is entered (MMSI is set to 000000000) then the AIS transponder will operate in receive only mode and the red LED will remain on. The vessels own position will not be transmitted. An MMSI must be entered to allow the AIS transponder to transmit its own position to other vessels.

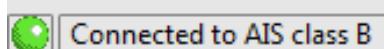
When you have entered all of the vessel's data click the 'Save to AIS' button to program this configuration into the AIS transponder:

A warning will be displayed asking you to verify the MMSI number. The MMSI can only be changed by your dealer once programmed into the transponder. You can change all data (except the MMSI) at any time, should the need arise. Please check that the number displayed is correct before proceeding. If the number is incorrect click the 'No' button to cancel programming of the MMSI.

Click the 'Yes' button if the MMSI is correct.

The 'Identification' tab will be updated to show the newly programmed vessel information. The MMSI number will be displayed with a grey background to indicate that it has been programmed and cannot be changed.

Connection status is indicated at the bottom left of the application window in green:



For additional Software applications unrelated to the installation, please refer to the Link2AIS manual for technical support.

2.7 Hardware Installation

2.7.1 Electrical connections

Please see the Appendix B of this manual for details of the power, data and RF cables supplied.

Using the two co-axial leads supplied connect the down-lead from a VHF antenna to the VHF antenna port and connect the down-lead of a GPS antenna to the GPS antenna port. Please see Appendix A for a block diagram of the antenna installation.

Connect a 12 VDC or 24 VDC, capable of supplying 2A peak to the DC power lead (red = positive, black = negative).



2.7.2 Physical Mounting, Standard Operation Position

The unit shall be mounted with the mounting plate on a vertical bulkhead with the cables in the down position. The mounting location should be protected from the weather (e.g. rain, snow, ..) and direct water spray. Normally this would be under the helm station or in the cabin.

It is recommended that the unit is attached to a solid surface with Phillips self tapping head screws (10-32 x 1,2). Please see Appendix C for the mounting plates exact dimensions.

WARNING:

Only the cables provided with the NAUTICAST B2 unit should be used to connect antennas, power and display devices so as to maintain the integrity of the enclosure.

WARNING:

Do not connect the NAUTICAST B2 unit to a main (line) AC electrical supply, as it could cause electric shock or fire. Length of Data/Power Cable connection must not exceed 3 meters.

CAUTION:

Do not connect the NAUTICAST B2 unit to a DC supply exceeding 24 VDC or reverse the supply polarity, because it may cause damage to the unit. Ensure that the power supply is limited in accordance with EN 60950-1:2006 and protected with fuse or breakers not exceeding the specifications listed in this manual. **CAUTION:** Do not apply excessive force to connectors during installation!

CAUTION:

The NAUTICAST B2 unit is designed for operation in the temperature range -25 °C to +55 °C. Do not install (or use) the NAUTICAST B2 unit in environments which exceed this range.

CAUTION:

Do not install the NAUTICAST B2 unit in an environment where there is excessive water exposure.

2.8 Antenna Installation

2.8.1 GPS Antenna

This is a TNC female bulkhead connector that mounts to the back of the case. This port provides the 5V DC feed for the active GPS antenna required by the NAUTICAST B2 unit (i.e. it should incorporate an LNA) and must be suitable for marine shipboard applications (index of protection, ruggedness, means of mounting, etc.). An antenna should be selected with a gain (in dB) depending on the length of cable between the antenna and the AIS unit; after subtraction of cable and connector losses a minimum total gain of 20 dB should be available at the NAUTICAST B2 unit GPS antenna connector. The GPS antenna to be used for AIS use, must be a dedicated antenna, i.e. not shared with any other GPS receiver. Installation of the GPS antenna is critical for the performance of the built in GPS receiver which is used for timing of the transmitted time slots and for the supply of navigational information should the main navigational GPS fail.

We strongly recommend that:

- The GPS antenna is mounted in an elevated position and free of shadow effect from the ship's superstructure.
- The GPS antenna has a free view through 360 degrees with a vertical angle of 5 to 90 degrees above the horizon.
- As the received GPS signal is very sensitive to noise and interference generated by other onboard transmitters, ensure that the GNSS antenna is placed as far away as possible from radar, Inmarsat and Iridium transmitters and that the GPS antenna is free from direct view of the radar and the Inmarsat beam.
- It is also important that the MF/HF and other VHF transmitter antennas are kept as far away as possible from the GNSS antenna. It is good practice never to install a GNSS antenna within a radius of 2 meters from these antennas.

2.8.2 VHF Antenna

This is a UHF female bulkhead connector that mounts to the back of the case.

The VHF antenna employed for AIS use:

- Must be a dedicated antenna, i.e. not shared with any other VHF transmitter/receiver.
- Must be suitable for marine shipboard applications (index of protection, ruggedness, means of mounting, etc.).
- Should be omni-directional and vertically polarized with unity gain (0 dB) with a bandwidth sufficient to maintain VSWR <1.5 over the frequency range 156 – 163 MHz. As a minimum the 3dB bandwidth must cover the two AIS channels and the DSC Channel.
- Should be mounted with at least a two meter vertical separation distance from any other VHF antenna used for speech or DCS communication but see also the section “Radio Frequency Exposure Warning” below.

2.9 Warnings

Connecting a badly mismatched VHF antenna, leaving the VHF antenna port disconnected, or shorting the VHF antenna port will activate the VSWR alarm, cause the unit to stop sending position reports or cause damage to the transponder and activating the red LED.

To meet the requirements for Radio Frequency Exposure it is necessary to install the VHF antenna correctly and operate the AIS equipment according to the instructions.

The GPS, VHF, power and data cables need to be secured to the bulkhead within 6" to 12" from the connectors.

3 Using the transponder

3.1 Status LEDs

3.1.1 Power OK

A green LED illuminates to show that the unit is connected to an external power source and is operating.

3.1.2 TX Timeout

An amber LED illuminates if the unit has failed to transmit a position report during the last two reporting intervals.

Examples:

- Message 23 “quiet period”
- A high VDL load
- Positional information unavailable
- Transmissions disable
- Unit has not been configured

3.1.3 Error

An amber LED illuminates if the unit has failed its inbuilt integrity test.

The unit is equipped with built in integrity tests (BIIT) that simultaneously operate with the standard AIS functions.

The BIIT provide the following test functions:

- Receiver monitoring of background noise level – indicates if background noise level exceeds -77dBm
- GPS antenna connection – indicates if open or short circuit
- GPS module – indicates if module has failed

3.1.4 Channel 1 and Channel 2

Two tri-colour LEDs indicate the status of channel 1 and channel 2 as follows:

- Green indicates that the channel has received an AIS message
- Amber (red and green) indicates the channel is transmitting
- Red indicates the channel is in DSC mode



3.2 Data Port Messages

The data port will output the following:

- Details of relevant AIS transmissions received
- Details of AIS transmissions sent
- Details of channel management messages received
- Alarm messages generated by the BIIT function

The data port will accept the following inputs:

- Programming information
- Alarm acknowledgements

An AIS unit in operation:

- uses one of two VHF channels within the international marine band allocation (channel 87B: 161.975MHz, or channel 88B: 162.025MHz) to regularly transmit information such as the vessel position, Maritime Mobile Service Identity (MMSI), name, speed, course, etc.
- receives similar information from other AIS equipped vessels within VHF range and outputs that information for use by an external display medium (AIS enabled chart plotter, PC using AIS enabled chart plotter software etc.)

3.3 Information Transmitted And Received

A Class-A unit will transmit its IMO number (if known), 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 via a short message service (SMS) facility. Message lengths are variable with static and voyage related information being transmitted less often.

A Class-B unit will transmit its MMSI, Call Sign and Name, length and beam, ship type, time, course over ground (COG), speed over ground (SOG) and heading.

4 Maintenance

WARNING: Unauthorized opening of the NAUTICAST B2 system will invalidate the warranty.

CAUTION: Avoid using chemical solvents to clean the NAUTICAST B2 as some solvents can damage the case material. To clean, wipe down with a damp cloth.

NOTE: The NAUTICAST B2 contains no user serviceable parts. Contact your Service Agent for repair for replacing the fuse fails to make the equipment serviceable.

5 Electrical Connections

5.1 Power

There is a standard DC female connector mounted on the unit, where power can be provided using the power cable. Please make sure the voltage of your power source is 12 VDC or 24VDC before connecting to the unit.

5.2 Data / USB-Power

There is a standard USB-B Socket on the unit, fitting to the cable shipped with the AIS to connect the unit to a PC. This enables you to program your device by using the Link2AIS software, you are also able to see the device status including the information the device sends or transmits.

NOTE: The NAUTICAST B2 is a “RECEIVE ONLY device” once it is powered with the USB from a connected PC only!

5.3 Additional I/O (optional cable necessary)

We offer you an optional data cable, which allows you to use a RS232 and RS422 data port as well as various Status Outputs. If you want to use a ‘Silent Mode Switch’ this cable is necessary. The cable needs to be connected to the 15 pin D-SUB socket on the device, enabling you to connect data plotters or similar navigational equipment. The data is sent using NMEA 0183 sentences. See APPENDIX B for further information.

5.4 VHF data link messages (NMEA 0183)

This sentence is used to transfer the receipt of a VHF Data Link (VDL) message on either AIS radio channel, as defined in ITU-R M.1371, using the “Six-bit” field type. The structure provides the transfer of long binary messages by using multiple sentences. Data messages should be transmitted in as few sentences as possible. When a data message can be accommodated in a single sentence, then it shall not be split.

For more information about the used interface protocol refer to the latest “PROTOCOL SPECIFICATION” of the Nauticast B2 or contact our Technical Support Team (see Section: Contact & Support information).

6 Standards

This product complies with all the necessary standards under the European R&TTE directive for Article 3.1(a), 3.1(b), 3.2 and 3.3(e). The following standards have been implemented in pursuance of this:

- IEC 62287-1: 2006-03 Maritime navigation and radio communication equipment and systems – Class-B ship borne equipment of the automatic identification system (AIS)
– Part 1: Carrier-sense time division multiple access (CSTDMA) techniques
- IEC 60945: 2002-08 Maritime navigation and radio communication equipment and systems – General requirements – Methods of testing and required test results
- IEC 61162-1: Maritime navigation and radio communication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners
- IEC 61108-1: GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) – Part 1: Global positioning system (GPS) – Receiver equipment – Performance standards, methods of testing and required test results
- EN 301 843-1 v2.1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for marine radio equipment and services; Part 1: Common technical requirements
- EN 50383: 2002 Basic standard for calculation and measurement of electromagnetic field strength and SAR related to human exposure from radio base stations and fixed terminal stations for wireless telecommunications system (110MHz – 40GHz)
- EN 60950-1:2006 Information technology equipment – Safety – Part 1: General requirements

6.1 Product Specification

Product Number:	1st3001001
Model Number:	NAUTICAST B2
Size:	195x145x35mm
Power:	12 VDC or 24VDC 0,3A Average power consumption, 2A Peak
Electrical Interfaces:	USB, RS232, RS422
VHF receivers:	2 AIS receivers (shared between AIS and DSC) 1 DSC receiver (shared between AIS and DSC) Frequency 156–162MHz Sensitivity –107dBm for 20% BER
VHF transmitter:	1 Transmitter Output PWR 2W nominal Frequency 161–162MHz
Internal GPS Receiver:	48 channel 1 Hz Update rate 5V DC Antenna feed IEC61108-1 compliant
5 LED Lamps	
PWR	Green In Operation
TX	Amber Transmit Timeout
ERR	Amber Rx noise level >77dBm GPS Ant. connection failure GPS module failure
CH1 Tricolour	Green – Receive AIS data Amber – Transmit AIS data Red – DSC data mode
CH2 Tricolour	Green – Receive AIS data Amber – Transmit AIS data Red – DSC data mode
Environmental Class	“Protected” according to IEC 60945-Ed.4
Compass Safe Distance	0,55m

6.2 Information Reporting Intervals

The Nauticast Class-B AIS will transmit position reports (Message 18) in reporting intervals of

- Every 30 seconds if SOG is > 2 kn;
- Every 3 Minutes if SOG is \leq 2 kn

Provided that the transmission time periods are available. A command received by Message 23 shall override the reporting interval.

Static Data sub messages 24A and 24B will be transmitted every 6 minutes in addition to and independent of the position report.

7 Contact & Support information

Although 1st-Relief GmbH strives for accuracy in all its publications; this material may contain errors or omissions, and is subject to change without prior notice. 1st-Relief GmbH shall not be made liable for any specific, indirect, incidental or consequential damages as a result of its use. 1st-Relief GmbH components may only be used in safety of life devices or systems, with the express written approval of 1st-Relief GmbH, as the failure of such components could cause the failure of the 1st-Relief GmbH device or system. If these fail, it is reasonable to assume that the safety of the user or other persons may be endangered. Contact your local dealer for NAUTICAST B2 support. Please see our 1st-Relief GmbH Website for Dealer / Service Listing.

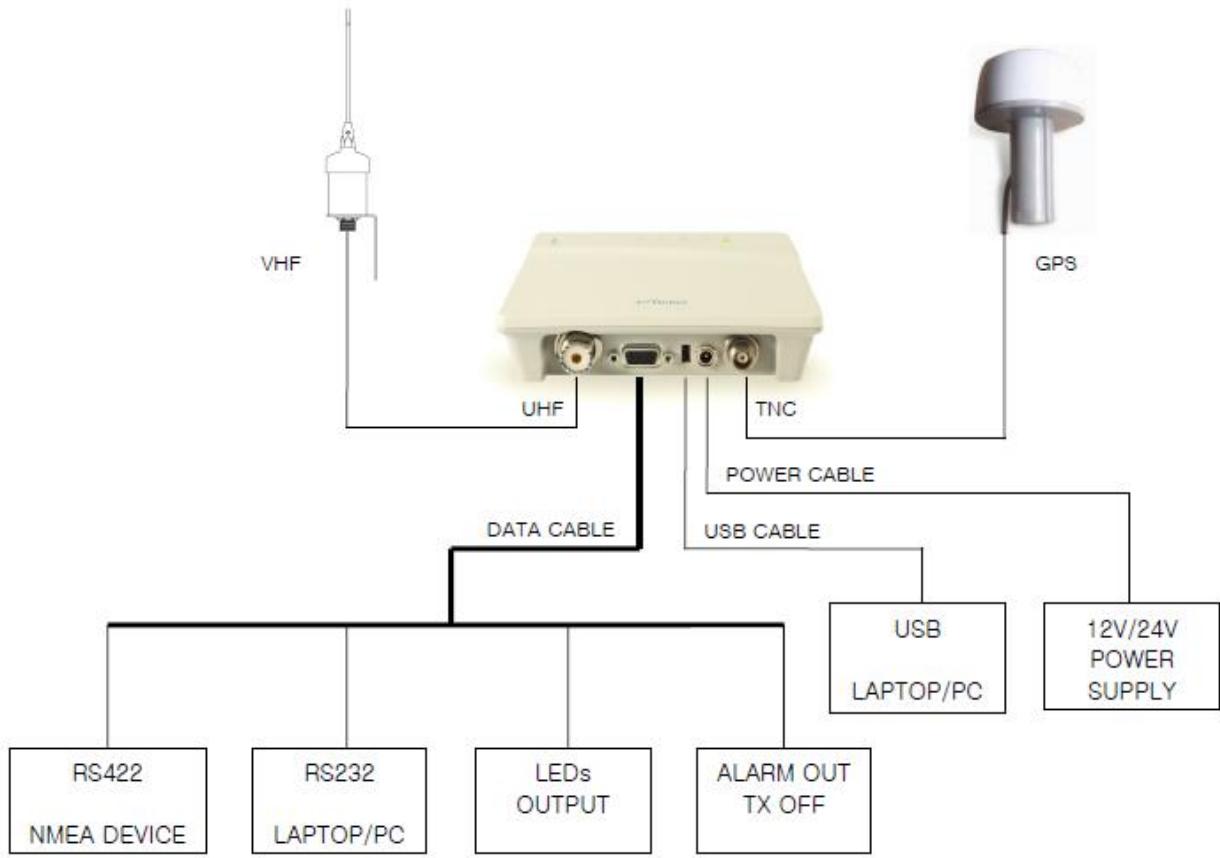
1st-Relief GmbH

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1020 Vienna
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Mail: Technical.Support@1st-Relief.com
Web: www.1st-Relief.com

8 Appendix

APPENDIX A



System Block Diagram

Power supply, PC, NMEA compatible devices not included

Data Cable optional

(Mount unit with cable side down)

APPENDIX B

Class-B POWER CABLE

Description		Wire Type		Color	AWG
10VDC-32VDC +		Copper		RED	24
GND	-	Copper		BLACK	24

Class-B DATA CABLE

Description		DB15	Wire Type	Color	AWG	CABLE #
RS422 TX A		15	Copper	YELLOW	24	CABLE 1
RS422 TX B		5	Copper	GREEN	24	CABLE 1
RS422 RX A		4	Copper	WHITE	24	CABLE 1
RS422 RX B		10	Copper	GREY	24	CABLE 1
RS232 TX		9	Copper	GREEN	24	CABLE 2
RS232 RX		13	Copper	WHITE	24	CABLE 2
GND		2	Copper	BROWN	24	CABLE 2
GND		7	Copper	BROWN	24	CABLE 3
TX OFF (silent mode)		6	Copper	GREEN	24	CABLE 3
ALARM OUT		11	Copper	YELLOW	24	CABLE 3
+		14	Copper	GREY	24	CABLE 3
CH2 LED RED		3	Copper	BROWN	24	CABLE 4
TX TIMEOUT LED		8	Copper	WHITE	24	CABLE 4
ERROR LED		12	Copper	YELLOW	24	CABLE 4
CH1 LED RED		1	Copper	GREEN	24	CABLE 4
+		14	Copper	GREY	24	CABLE 4

Use of the Data Cable

CABLE 1:

Connect the according cable ends to the designated NMEA 0183 device.

Wire end Nauticast B2	Possible end of attached NMEA device	
RS422 TX A, yellow	connect to	RX A (+)
RS422 TX B, green	connect to	RX B (-)
RS422 RX A, white	connect to	TX A (+)
RS422 RX B, grey	connect to	TX B (-)

CABLE 2:

Connect the D-SUB 9-pin connector to a matching RS232 serial interface (direct to PC or using a serial to USB adapter).

CABLE 3:

TX OFF:

You have to connect a switch between TX OFF (green) and GND (brown). To turn transmission off, the switch has to be activated:



Transmission ON

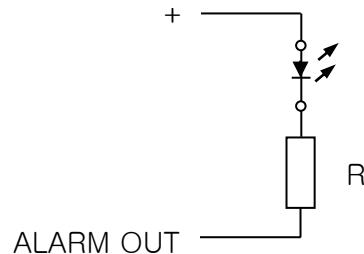


Transmission OFF

ALARM OUT:

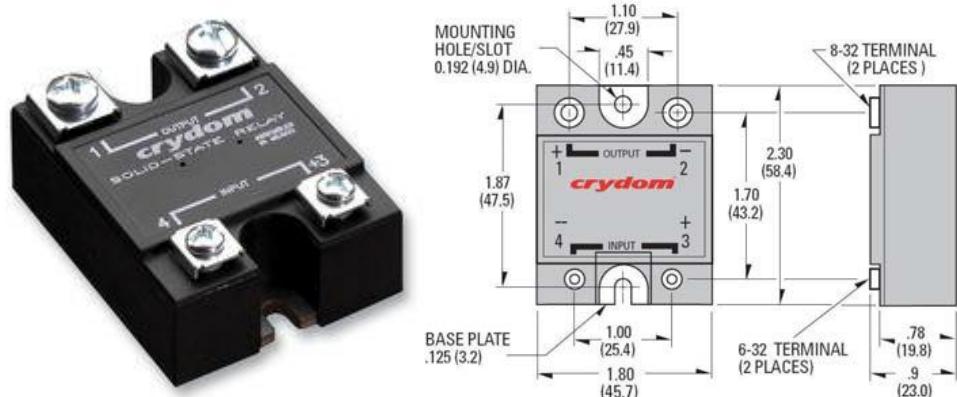
If you want to signal an alarm with a LED only, you can connect the LED with a series resistor R between + (grey) and ALARM OUT (yellow). Depending on the Voltage used for the Nauticast B2 you either have to use a 470Ω (calculated 500Ω) resistor (LED: $U_F=2V$, $I_F=20mA$) when using 12VDC or a $1k\Omega$ (calculated 1100Ω) when using 24VDC.

See calculation in the Section for CABLE 4.

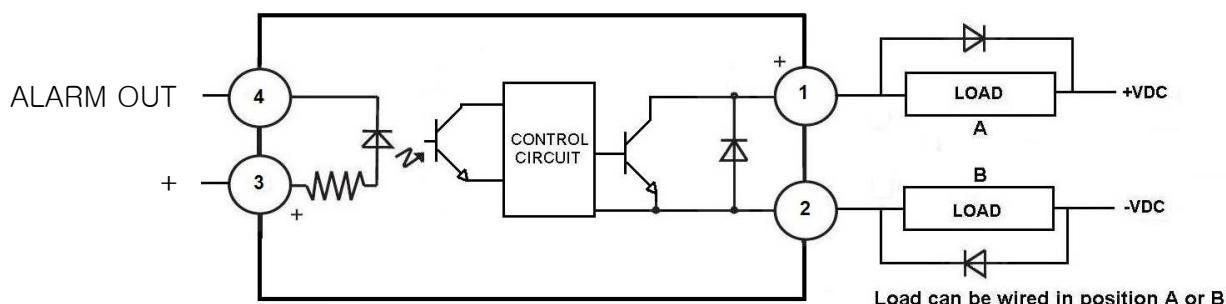


How to connect a LED to Alarm OUT

The next figures show the alarm relay (1st3001009) and its dimensions, explain how to connect the alarm relay to the data cable and how to connect the load (alarm circuit) to the alarm relay. The input voltage of the alarm relay is matched with the operating voltage of the Nauticast B2. The operating voltage of the alarm relay is 3 to 60 VDC with a load current of 0.1 to 2 A (3A when using a heat sink).



Alarm Relay with dimensions



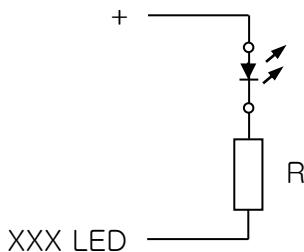
Load can be wired in position A or B

DC Inductive loads must be diode suppressed to prevent damage to SSR

Connection of the Alarm Relay

CABLE 4:

Depending on the Voltage used for the Nauticast B2 you have to calculate the series resistor which is connected with the LED between the + wire (grey) and the OUTPUT wire (CH1 LED RED, green; CH2 LED RED, brown; TX TIMEOUT LED, white; ERROR LED, yellow). A series resistor of 330Ω (calculated 350Ω) for 12VDC and 910Ω or $1k\Omega$ (calculated 950Ω) for 24VDC are needed – see calculation below.



How to connect a LED to XXX LED OUT

Calculation of the series resistor:

Used variables:

U ... operating voltage of the Nauticast B2

U_F ... Forward Voltage of LED [V]

I_F ... Forward Current of LED[V]

R ... Series Resistor[Ω]

P ... Power consumption of the resistor[W]

$$R = \frac{U - U_F}{I_F}$$

Examples:

$U=12V$, $U_F=2V$, $I_F=20mA$:

$$R = \frac{12V - 2V}{0.02A} = \frac{10V}{0.02A} = 500\Omega$$

As there is already a 150Ω resistor included for the LED OUT ports, you have to subtract this from the 500Ω . Therefore 350Ω is the result.

(!) The ALARM OUT has no resistor included therefore 500Ω is the result. (see CABLE 3)

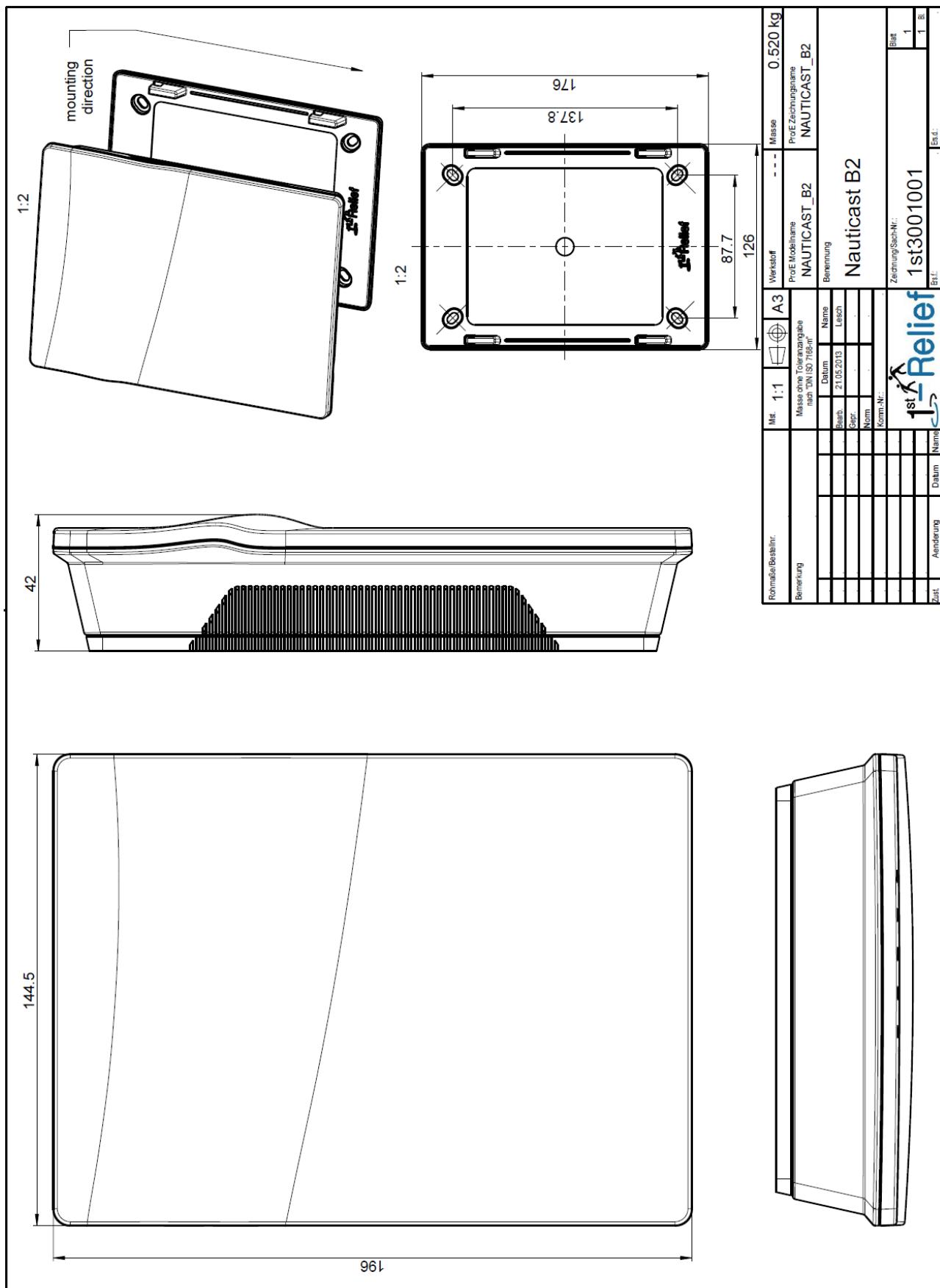
$U=24V$, $U_F=2V$, $I_F=20mA$:

$$R = \frac{24V - 2V}{0.02A} = \frac{22V}{0.02A} = 1100\Omega$$

As there is already a 150Ω resistor included for the LED OUT ports, you have to subtract this from the 1100Ω . Therefore 950Ω is the result.

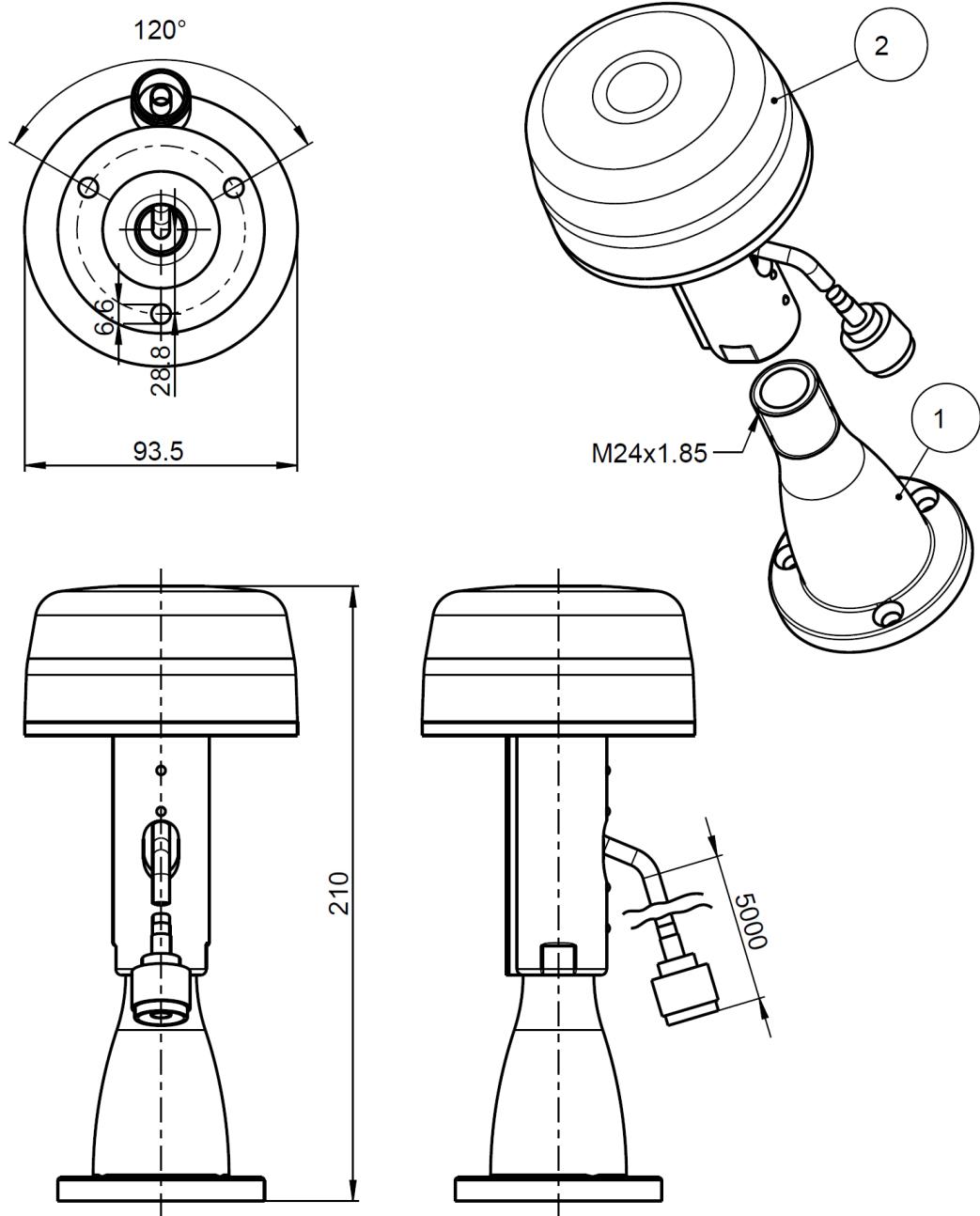
(!) The ALARM OUT has no resistor included therefore 1100Ω is the result. (see CABLE 3)

APPENDIX C



Appendix D

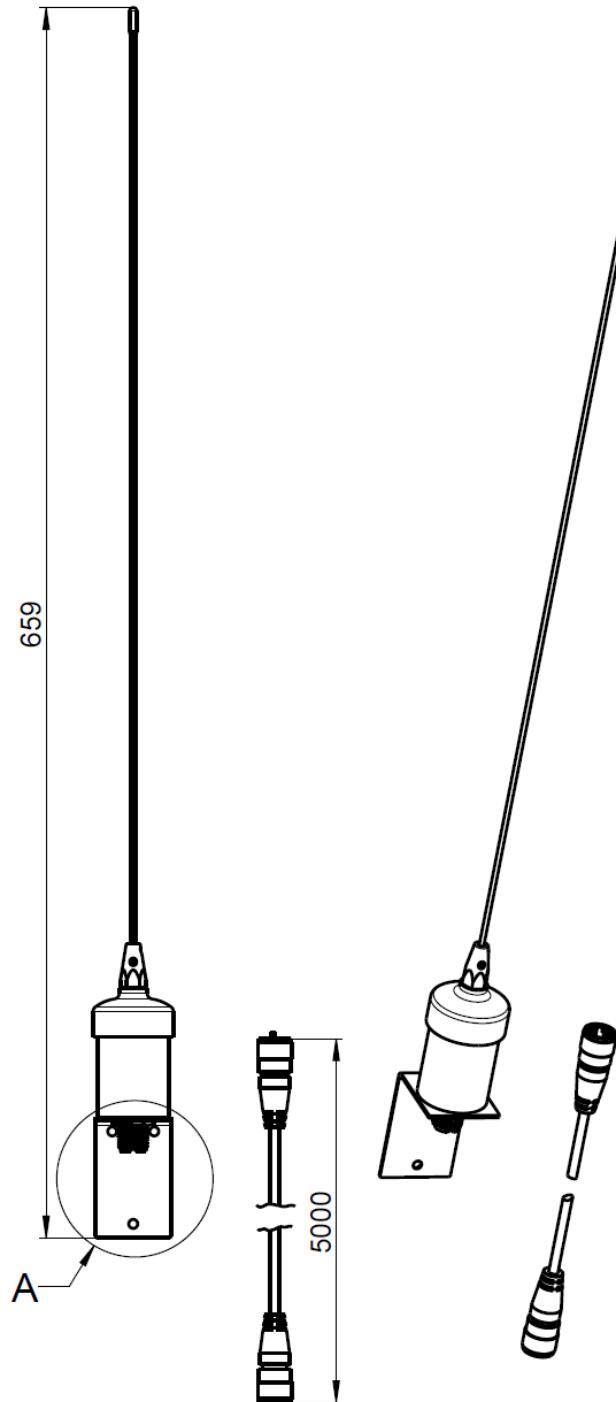
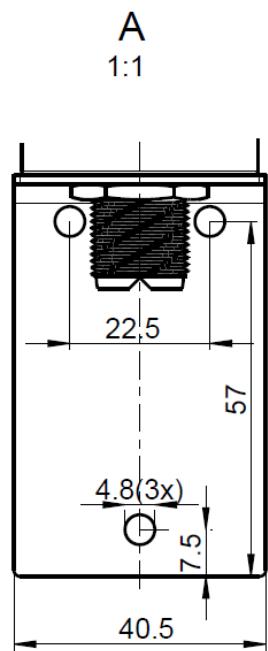
Pos.	Benennung	Sachnr./Normbez.	Werkstoff	Masse	Anz.
1	GPS Antenna mount	1st3001002-2		0.030	1
2	AIS GPS Antenna with 5m cable	1st3001002-1		0.335	1



Rohmaße/Bestellnr.	Mst. 1:2		A4	Werkstoff	Masse 0.365 kg
Bemerkung	Masse ohne Toleranzangabe nach "DIN ISO 2768-m"		Pro/E Modellname	Pro/E Zeichnungsname	
			AIS_GPS_ANTENNA	BBTGPS	
			Benennung	AIS GPS Antenna	
				Zeichnung/Sach-Nr.	Blatt
				1st3001002	1
Zust.	Aenderung	Datum	Name	Ers.f.:	1 Bl.

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Appendix E



Rohmaße/Bestellnr.		Mst. 3:10		A4	Werkstoff	Masse 0.224 kg
Bemerkung		Masse ohne Toleranzangabe nach "DIN ISO 2768-m"		Pro/E Modellname	Pro/E Zeichnungsname	
				VH-3200_EXTERIOR	VH-3200_EXTERIOR	
		Bearb.	Datum	Name	Benennung	
		Gepr.				
		Norm				
		Komm.-Nr.:				
Zust.	Aenderung	Datum	Name		Zeichnung/Sach-Nr.:	Blatt
					1st3001003	1
					Ers.f.:	1 Bl.
					Ers.d.:	