ENGLISH

„easyTRX “
Operation manual

Class B AIS CS Transponder
Product Nr.: A023
Rev-1

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PLEASE READ THIS FIRST!

WEATHERDOCK **GENERAL WARNINGS**

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 vessels AIS derived position data and other vessels AIS derived position data with visual or radar based observations.

The easyTRX software is intended for use as an installation and configuration tool. The application is not a navigation tool and should not be used as such.

LICENSING

IMPORTANT: In most countries the operation of an AIS unit is included under the vessels marine VHF license provisions. The vessel on to which the AIS unit is to 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 easyTRX hardware and software may be upgraded from time to time and future versions of the easyTRX may therefore not correspond exactly with this manual. When necessary upgrades to the product will be accompanied by updates or

addenda 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. Weatherdock AG, disclaims any liability for consequences arising from omissions or inaccuracies in this manual and any other documentation provided with this product.

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WARNINGS AND PRECAUTIONS

IF YOU CHOOSE TO USE THE EASYTRX OR THE EASYSPLIT OR BOTH IN Y BOAT; IT IS THE SOLE RESPONSIBILITY OF THE OWNER/OPERATOR OF THE EASYTRX (AND OR THE EASYSPLIT)

TO SECURE THE BOAT SO THAT IT WILL NOT CAUSE ANY DEMAGE OR PERSONAL INJURY IN THE EVENT OF AN ACCIDENT.

SOME VESSELS DO NOT CARRY AIS.
IT IS IMPORTANT AT ALL TIME TO KEEP A PROPER LOOKOUT. NEITHER THE "easytrx" NOR (AND OR) easySPLIT ARE NOT A SUBSTITUTE FOR GOOD SEAMANSHHIP.

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Revision of the operation manual

Rev. 2.1:
Chance of sketch of connections to PC and Chartplotter
Chance of the explanation above the cable part list
Additon MMSI to troubleshooting list

Congratulations!

Thanks to purchase a unit from the Weatherdock AG. This testifies your high technical competence, because you purchased the best available product on the market

PREREQUISITES

The easyTRX application is designed to operate with Microsoft Windows® 2000 (SP 3), XP (SP 2) and above.
Recommended minimum system requirements are:

- Microsoft Windows® 2000 SP3 or Microsoft Windows® XP SP2
- Display resolution of at least 1024 x 768
- At least one RS232 serial port (or USB to serial converter already installed)
- When using a USB to serial converter please ensure it is fully installed before proceeding.
- A pointing device (mouse or equivalent)

This software uses the Microsoft .NET Framework V2.0. The framework will be installed automatically during setup if not already present on the system. To install the framework, the Microsoft Installer 3.1 is required and will also install automatically.
The .NET framework requires the Microsoft Internet Explorer, version 5.01 (or later) to be installed. This program is not part of the automatic installation and must be obtained separately.

Before installing a new version, make sure that an old version is removed from your PC. The program can be removed (uninstalled) at any time with the Windows® Control Panel's applet to "Add or Remove Programs".
Insert the installation CD.

When the installation does not start automatically, locate the file “setup.exe” on the CD-ROM drive and double click on this file it to start the installation process.
Follow the screen prompts to install the .NET Framework V2.0 and the Installer 3.1 if required
The installation process of the application starts with the Welcome screen:

Next you can choose the folder in which the program shall be installed. Also, select whether you want the program to be visible only for you or for everybody who uses the computer:

1. GENERAL INFORMATION TO AIS

1.1. What is AIS

AIS stands for **A**utomatic **I**dentification **S**ystem. 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 and the appropriate application software.

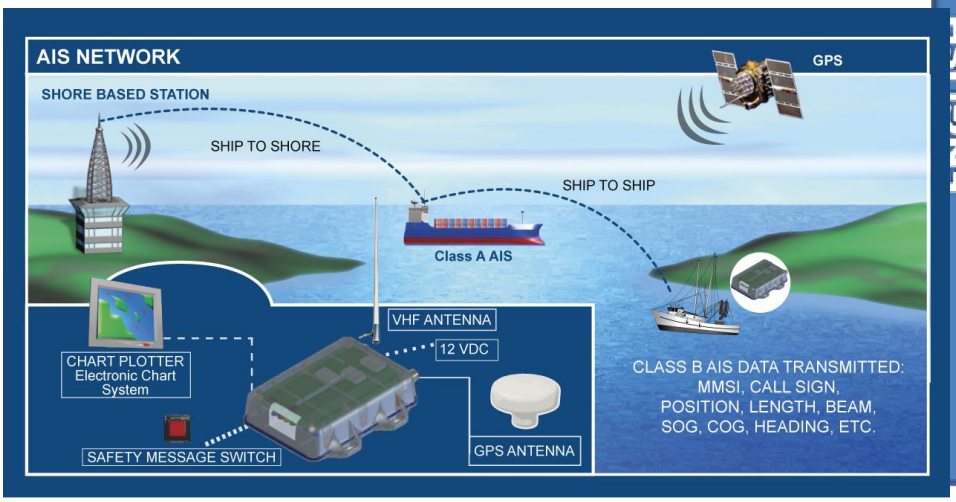
AIS are required to function flawlessly in a variety of modes.
The relevant regulations requirements:

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.

The following sketch shows a typical easyTRX installation in a common environment is shown. The easyTRX 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.

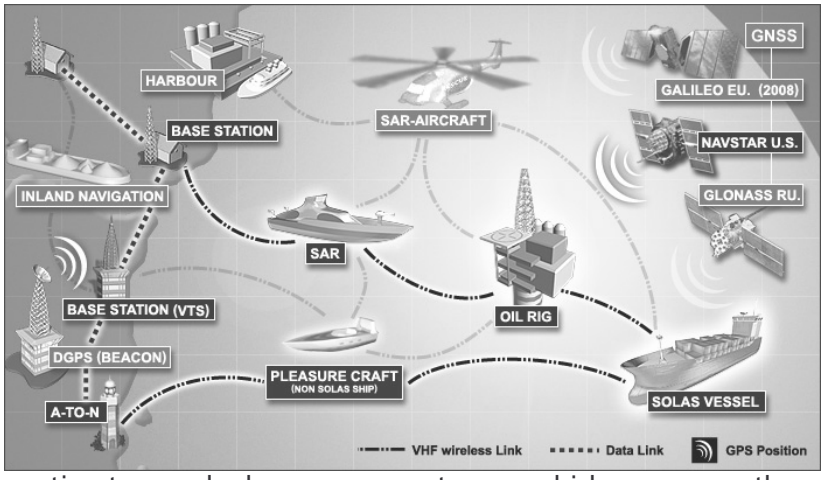
The scenario below shows a full AIS coverage area (including all applications and complete shore infrastructure).

1.2. What AIS classes do exist?

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.

1.2.1. Class A

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 Class A units.

The **Class A** operation consists of three different types of messages:

dynamic information:

- MMSI number
- position of the ship (derived from GPS)
- time, when the position was measured in UTC
- course over ground (COG)
- speed over ground (SOG)
- heading (HOG)
- ship status
- rotational speed/turn rate

static information:

- call sign and name of the vessel
- length and width of the vessel
- IMO-number of the vessel, if existent
- type of vehicle
- position of the GPS sensor onboard

journey-related information:

- draught of the vessel
- type of cargo
- port of destination and estimated time of arrival (ETA)
- route plan, optional

The block of dynamic information is the most important block looking for threatening collisions. Therefore this block of information is transmitted in a compulsory way, depending on the vessels movement. The following table shows the mandatory repetition rate of class A transmissions linked to the ship's movement:

- anchored vessels 3 minutes
- vessels at 0 – 14 kn 10 seconds
- vessels at 0 – 14 kn, fast maneuver 3.3 seconds
- vessels at 14 – 23 kn 6 seconds
- vessels at 14 – 23 kn, fast maneuver 2 seconds
- vessels at > 23kn 2 seconds
- vessels at > 23 kn, fast maneuver 2 seconds

Static information as well as information belonging to the journey is dispersed every 6 minutes.

The reporting intervals correspond to both radio channels (161.975 MHz, 162.025 MHz) together.

1.2.2. Class B

Class B: EN62287, 2005:
class B operation is described in the standard EN62287, published in 2005. This document is obligatory for class B. Pages 15 and 38 describe the operation:

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

The EASTRX is a Class B AIS unit
Reporting intervals are:
dynamic ship data:
boats at < 2 kn: 3 minutes
boats at > 2 kn: 30 seconds
static ship data (similar to class A): 6 minutes
These intervals are the standard operation modes.
Competent authorities, like base stations, can have influence on the reporting intervals (as they do with class A as well). Interval timing can be reduced down to 5 seconds in exceptional cases. There is no automatism to change the 30sec/3min dynamic intervals by the ship itself.

Think about

The comparison is done only for dynamic data transmission, because these datasets contain the relevant information to calculate a future collision point in time and distance, as well as allow the threatened ships to communicate (MMSI number is stringent part of dynamic data information) by VHF. Additionally, 2 more facts concerning class B operation need to be mentioned:
Unlike the class A service, which is using the SOTDMA method (self organized time division multiple access) with predefined timeslots (the ship listens to the traffic and the information containing in all other telegrams and defines it's own raster of transmission timing, which is then

distributed to all other participants within the radio range) the class B service is using a "listen-before-talk-method". This means, that before transmitting, a ship has to observe the radio channel, whether to be allowed to transmit, if the channel is not occupied, or whether to wait for a free time slot.
To avoid disturbance of the professional class A service in crowded areas, higher-ranking authorities can switch off all class B transponder activities, which will probably never happen, but it should be mentioned.
Above given information is not complete and should give only an overview about the AIS topic. For more details please have a look to the following links :
US coast guard -
http://www.navcen.uscg.gov/enav/ais/default.htm
www.imo.com
http://www.aislive.com

2. SCOPE OF DELIVIERY

In the carton there is contained:

- The easyTRX
- The cable for the easyTRX
- The manual for the operation of the easyTRX and the software
- The installation CD for the software

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3. MOUNTING AND INSTALLATION

3.1. Instruction

- Installation of the software onto the PC (See detailed instruction in the separate software manual!)
- Connection of the easyTRX by means of the supplied cable to the serial port of the PC
    - NOTE:
      If you do connect the easyTRX to the PC by means of an serial⇔USB adapter there is the following procedure obligationary:
        - First install the adapter to the PC
        - Then connect the adapter with the easyTRX, not vice versa.
- Connect the easyTRX to the VHF antenna or the easySPLIT OCB
- Connect the easyTRX to the GPS Antenna of the easyTRX Ant
- THEN, connect the easyTRX to the power, not before!
- Start the easyTRX Link 2 AIS software (Detailed information please find in the separate software instruction)
- Configure the connection and the ship data (Detailed information please find in the separate software instruction)
- Mount the easyTRX, if everything works well.

3.2. Mechanic and electric installation

3.2.1. Mounting

The schematics of the mounting please take out of the following sketches:

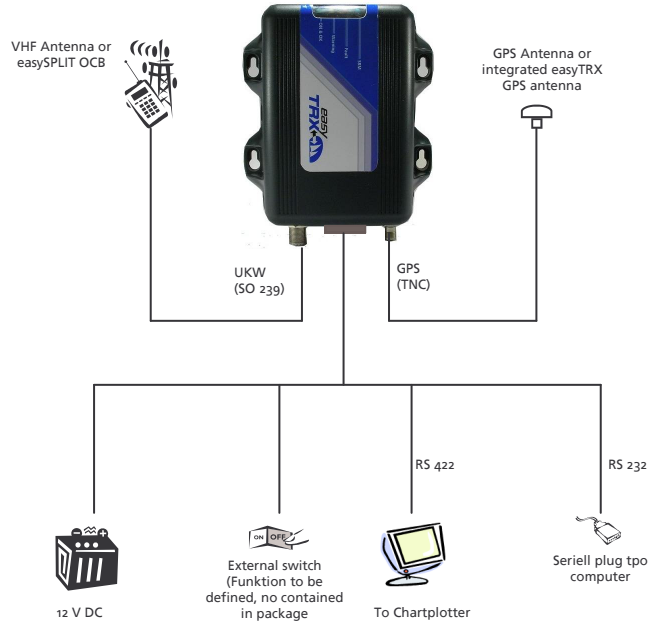

Abbildung 1: Schematics for the easyTRX connection

Cable colours

At the delivered cable you will find a cable set at which a SUB-D9 plug is already attached. This cable/plug is used to connect the easyTRX with a computer via the serial port.
If you want to connect the easyTRX to a chartplotter please use the 4-pole cable, marked with RS422. You need two cables. The orange one has to be connected to the NMEA data input of the chartplotter, the black one to the NMEA ground of the input.The cable connection schematics please find in following table:

Power and data cable connection

	Pin #	Pin #		
Description	**DB15**	**DB9**	**Color**	**CABLE #**
12V +	1		RED	CABLE1
12V -	9		BLACK	CABLE1
RS422 TX A	2		ORANGE	CABLE 2
RS422 RX A	3		YELLOW	CABLE 2
RS422 TX B	10		BLACK	CABLE 2
RS422 RX B	11		WHITE	CABLE 2
SW1GND	15		BLACK	CABLE 3
SW1 Switch	8		PURPLE	CABLE 3
RS232 TX =NMEA TX	12	2	RED	CABLE 4
RS232 RX =NMEA RX	13	3	BLUE	CABLE 4
GND	14	5	BLACK	CABLE 4

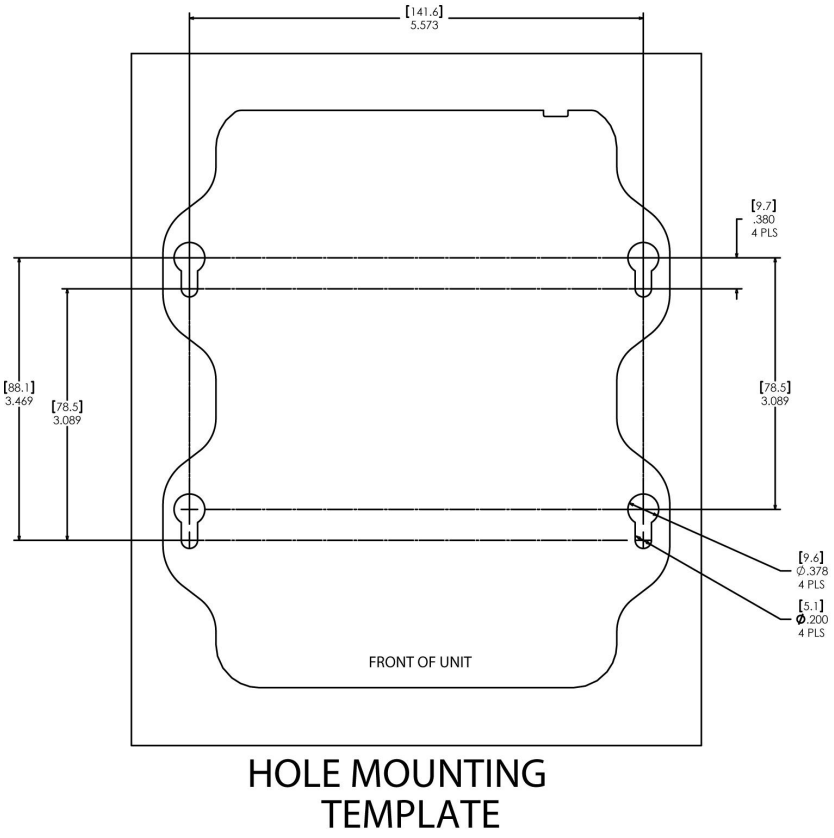

Abbildung 2: Hole mounting template

3.2.2. VHF Antenna

For the VHF antenna there is a VHF female bulkhead connector used, 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.

3.2.3. GPS Antenna

For the GPS antenna there is a TNC female bulkhead connector used, that mounts to the back of the case. This port provides the 5V DC feed for the active GPS antenna required by the easyTRX unit.

The GPS antenna used must be of the active type (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 EASYTRX 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 ensure 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.

4. USE OF THE EASYTRX

After the easyTRX is connected according point "3 Mounting and installation" and the 12V supply is switched on, all four LEDs visible on the front panel of the unit will illuminate twice for a period of one second on each illumination.

- The blue LED will then go out, when the internal GPS starts outputting valid position information
- The red LED will go out and the easyTRX unit transmits its first position report (message 18)
- The yellow LED will go out; note that this process may take up to 30 minutes depending on the switch-on state of the GPS receiver.

- When the yellow LED goes out the green LED will illuminate indicating that the unit is now operating correctly

More details for the LED indications you´ll find in the software manual.

5. TROUBLESHOOTING

Problem	Cause	Solution
Unable to connect to the EasyTRX	Incorrect connection data	• Verify data COM-Port, etc. • Com port must be configured correct in the PC (Please see under configuration in the software manual) • Check connection • Did you use a adapter serial ⇔ USB, please assure that the adapter was installed first, before you connected the adapter to the easyTRX
	Not connected to network or cable	Check if your computer and the EasyTRX have connection to the network (IP-connection) or the same serial cable (serial connection)
Config form settings not loaded	Enquiry not successful	Close form and re-open it

	Load settings not provided for this sentence	See standard for more information
Changes made to config form not accepted	Entries not valid	Correct the entries and transmit again
No output in Console Log or Message View	Not connected	Connect to the EasyTRX
	No output types selected	Select output types
MMSI not programmeable	Old Link2AIS software	2 possibilities: 1.Please disconnect the VHF antenna from the easyTRX while you are programming the MMSI 2.Load an extra small MMSI programming tool from our homepage www.easyais.de (MMSI_programme.exe) 3. Load the lastest version of the Link2AIS programme from our homepage www.easyais.de

6. MAINTANANCE

Unauthorized opening of the easyTRX system will invalidate the warranty.

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

The easyTRX contains no user serviceable parts.

Contact your Service Agent for repair or for replacing.

7. DATA SERIELL PORT

The default baud rate of the data link is 38.4kBaud with 8 data bits, one stop bit and no parity.

The data interface conforms to IEC 61162-1.

The sent messages are VDM, VDO, ACA, ACS, ALR, TXT and ACK are conform to NMEA 0183. Please refer to NMEA 0183 for full details of these AIS messages.

8. NORMS

This product complies to 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 followed in pursuance of this:

- IEC62287-1: 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
- IEC60945: 2002-08 Maritime navigation and radio communication equipment and systems – General requirements – Methods of testing and required test results

- IEC61162-1: Maritime navigation and radio communication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners
- IEC61108-1: 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)
- EN60950-1:2006 Information technology equipment – Safety – Part 1: General requirements

9. SPEC

Parameter	Value
Dimensions	7.8 x 6.22 x 1.84 in. (198 x 158 x 46.7 mm)
Weight	13.2 oz (375g)
Power	DC (9.6-15.6V)
	Average power consumption 4W
	Peak current rating 2A
GPS Receiver (AIS Internal)	IEC 61108-1 compliant
Electrical Interfaces	RS232 38.4kBaud bi-directional
	RS422 NMEA 38.4kBaud bi-directional
Connectors	VHF Antenna connector (UHF female bulkhead connector)
	GPS Antenna connector (TNC female bulkhead connector)

Parameter	Value
Cable – Data/Power	RS232 / RS422 / Data / Power (15-pin Connector) Typically, 1.5 meter DSUB
VHF Transceiver	Transmitter x 1
	Receiver x 2 (One receiver time shared between AIS and DSC)
AIS1: 161.975 MHz AIS2: 162.025 MHz	Frequency: 156.025 to 162.025 MHz in 25 kHz steps
Output Power	33dBm ± 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 ± 50 ppm (GMSK)
	1200 b/s ± 30 ppm (FSK)
RX Sensitivity	Sensitivity – 107dBm 25kHz (Message Error Rate 20%)
	Co-Channel 10dB
	Adjacent Channel 70dB
	IMD 65dB
	Blocking 84dB
Environmental	IEC 60945
	Operating Temperature: -25°C to +55°C
	IEC 62287, IP67 (with cables installed)
Indicators	Power, TX timeout, status, pre-set SRM sent or Silent Mode
Operator Controls	Optional pre-set safety related message (SRM) transmit button or Silent Mode -No Transmit (user Configured).

Parameter	Value
Reporting intervals	Every 30 seconds if SOG is > 2 kn; Every 3 Minutes if SOG is ≤ 2 kn Provided that the transmission time periods are available. A command received by Message 23 shall override the reporting interval. Static Data sub message 24B will be transmitted every 6 minutes in addition to and independent of the position report. (MMSI, ship type, cargo type, call sign, ship dimensions)

10. CONTACT AND SUPPORT INFORMATION

Although WEATHERDOCK strives for accuracy in all its publications; this material may contain errors or omissions, and is subject to change without prior notice. WEATHERDOCK shall not be made liable for any specific, indirect, incidental or consequential damages as a result of its use. WEATHERDOCK components may only be used in safety of life devices or systems, with the express written approval of WEATHERDOCK, as the failure of such components could cause the failure of the WEATHERDOCK 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 WEATHERDOCK AIS support.

Please see also our WEATHERDOCK Website: www.easyAIS.com

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91058 Erlangen
Tel: +49 [0] 9131-691-46-0
info@weatherdock.de

11. WARRANTY

This Weatherdock product is warranted to be free from defects in materials or workmanship for 24month from the date of purchase. Within this period, Weatherdock will at its sole option repair or replace any components that fail in normal use Such repairs or replacement will be made at no charge to the customer for parts or labor, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident or unauthorized alteration or repairs.

THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED OR STATUTORY, INCLUDING ANY LIABILITY ARISING UNDER ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY OR OTHERWISE.

IN NO EVENT SHALL WEATHERDOCK BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE, OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT.

Weatherdock retains the exclusive right to repair or replace the unit or software or offer a full refund of the purchase price at its sole discretion. Such remedy shall be your sole and exclusive remedy for any breach of warranty.

If you choose to use the EasyTRX and/or/or easySPLIT or both in a boat, it is the sole responsibility of the owner/operator of the EasyTRX to secure the easyTRX so that it will not cause damage or personal injury in the

event of an accident. It is the sole responsibility of the operator of the boat to operate the boat in a safe manner, maintain full surveillance of all boating conditions at all times, and never become distracted by the EasyTRX to the exclusion of safe operating practices.

SOME VESSELS DO NOT CARRY AIS.
IT IS IMPORTANT AT ALL TIME TO KEEP A PROPER LOOKOUT.
THE "easyTRX" ARE NOT A SUBSTITUTE FOR GOOD SEAMANSHHIP

12. WHAT IS A CUSTOMER FOR THE WEATHERDOCK AG?

1. Our customers are the most important people for us, in our offices or on the phone
2. Our customers are not depended on us. We are dependent on them!
3. Our customers cannot interrupt our work, they are our work. We do not doing them a favor by serving them, they are doing us a favor be allowing us to do so.
4. Our customers are not outsiders to our business, they are part of it
5. Our customers are not cold statistic names or file cards or ledger sheets. They are flesh and blood human beings with needs and emotions like our own
6. Our customers are not people to argue with, nobody ever won an argument against a customer
7. Our customers are people who bring us theirs wants. It is our job to fill these efficiently and courteously

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