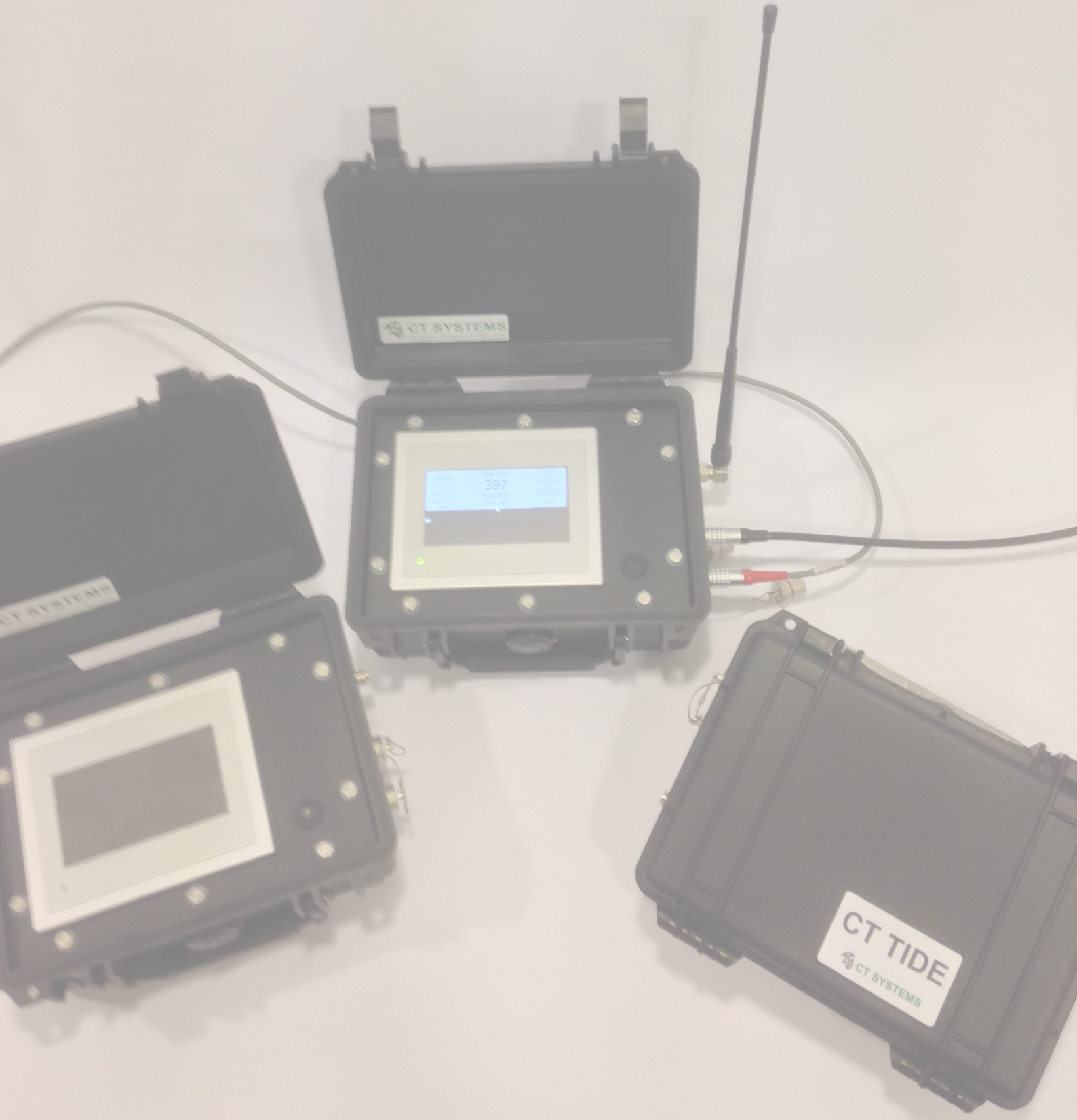
CT-TIDE

Manual Version 1.7



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The purpose of this manual is to give the users of the CT-tide unit information on the use of this hardware and its software.

This manual may not be considered as a document with which CT Systems could have any responsibility, legal liability or contractual obligations.

WARNING

WARNING!

Before powering on the unit, make sure that the external UHF antenna is connected. If the antenna is not connected and the unit starts up, it could damage the internal radio modem

The CT-Tide with an internal radio modem has been designed to operate on specific frequency ranges, the exact use of which differs from one region and/or country to another. The user of a radio modem must take care that the device is not operated without the permission of the local authorities on frequencies other than those specifically reserved and intended for use without a specific permit.

A CT-Tide with an internal radio modem is allowed to be used in the following countries, either on licence free channels or on channels where the operation requires a licence. More detailed information is available at the local frequency management authority.

Countries: AT, AU, BE, BG, CA, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IL, IN, IT, KZ, LT, LU, LV, MX, MT, NL, NO, OM, PL, PT, RU, RO, SE, SG, SI, SK, TR, UA, US, VN and ZA.

WARNING!

Users of the CT-Tide with an internal radio modem in North America should be aware, that due to the allocation of the frequency band 406.0 – 406.1 MHz for government use only, the use of radio modem on this frequency band without a proper permit is strictly forbidden.

A CT-Tide with an internal 8xxMHz radio modem has been designed to operate on 869.4125 – 869.6375 MHz, the exact use of which differs from one region and/or country to another. The user of a radio modem must take care that the device is not operated without the permission of the local authorities on frequencies other than those specifically reserved and intended for use without a specific permit.

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Countries: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MT, NL, NO, PL, PT, RO, SE, SI, SK and TR.

TABLE OF CONTENTS

Chapter 1: Introduction

1.1 About The CT-Tide Unit

The CT Tide is an all-in-one compact and rugged solution for monitoring the water level at every type of marine location.

The data can be both stored in the unit itself and can be transmitted via telemetry by its built in UHF radio modem.

The built in radio modem can be supplied according to local radio transmission laws around the world. The radio signal itself has a range of well over 30 kilometres.

The tidal unit consist of a rugged and watertight Peli Case and uses watertight highly durable Lemo connectors.

Specifications:

- Measurement range 0 – 1 Bar standard, other options on order
- Power supply 9 – 30 Volts DC, Main Fuse – 2A maximum
- Power consumption Max. 12 Volts DC, 0.80 A
- Transmitting power 0.1 – 1 Watt (optional 10 Watt)
- Temp range 0 – 70 degrees Celsius
- Connectors Rugged Lemo IP68
- Frequency UHF 403 – 470 mHz (other options available)
- Cable length 50 meter (standard), maximum cable length 500 meter
- GSM/GPRS modem (optionally available)

1.2 About This Manual

This manual is intended as a guide for installation, setting up, and using the CT-Tide unit. Using the alphabetical index features and settings can be easily looked up.

We recommend reading this manual fully in order to get acquainted with the workings of the CT-Tide unit and its software.

Chapter 2: Preparations

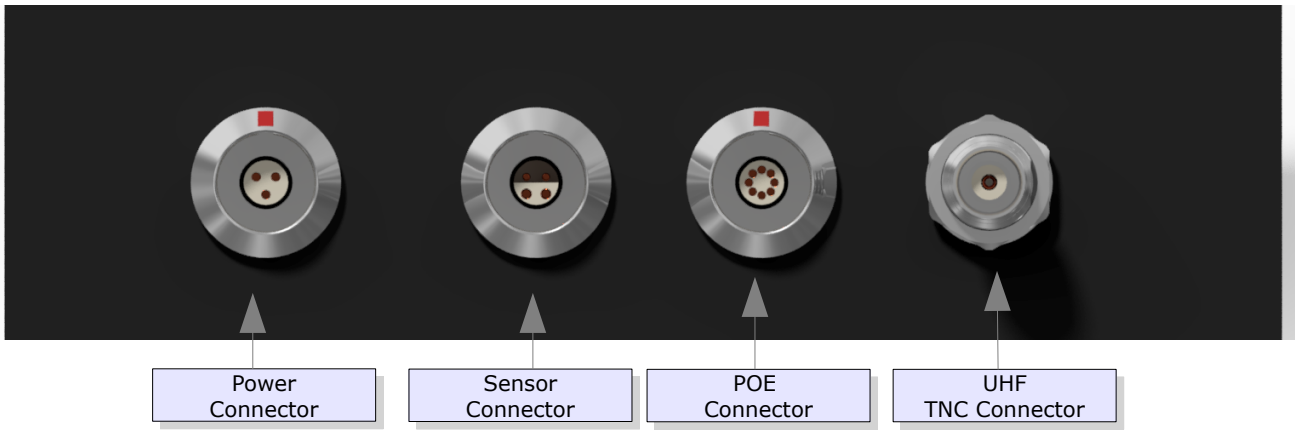
2.1 Preparations

Setting up a CT-Tide unit requires the following:

1. **Do not power up the unit without an antenna connected.**
2. The CT-Tide pressure sensor should be mounted to a fixed point under the water level.
3. The power input should be at least 12 volts DC with a maximum of 30 volts DC.
4. Place the unit outside of direct sun-light and away from external heat sources.
5. It's highly advised to read this manual fully.

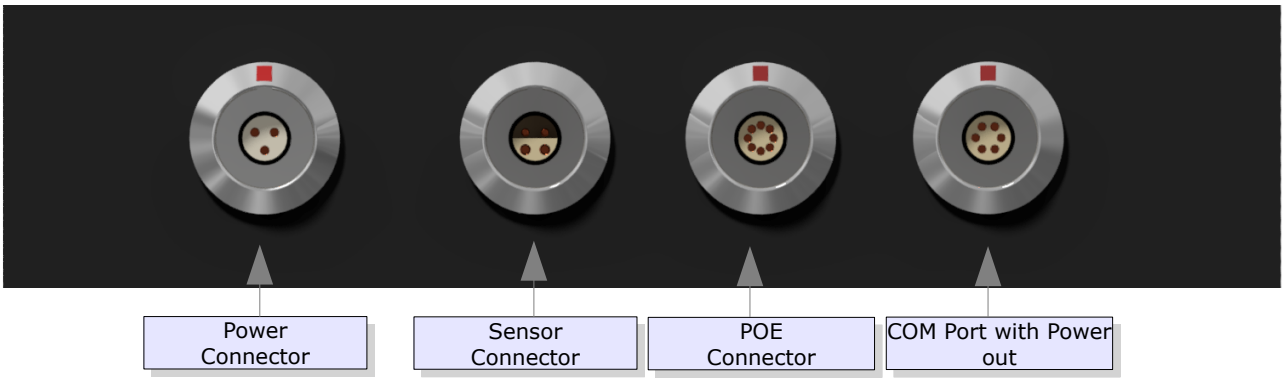
2.2 CT-Tide Connector Overview Right Side

The power input and sensor input connectors are located on the right side of the unit, below is an overview. The UHF TNC connector is for the antenna connection.



2.3 CT-Tide Connector Overview Right Side Without Internal Radio

If the unit has no internal radio, the TNC connector is replaced by a COM Port lemo.
The COM Port lemo also has a power passthrough option, this power out is the same voltages as the input. The baud-rate is hard coded to 9600 baud 8-N-1.

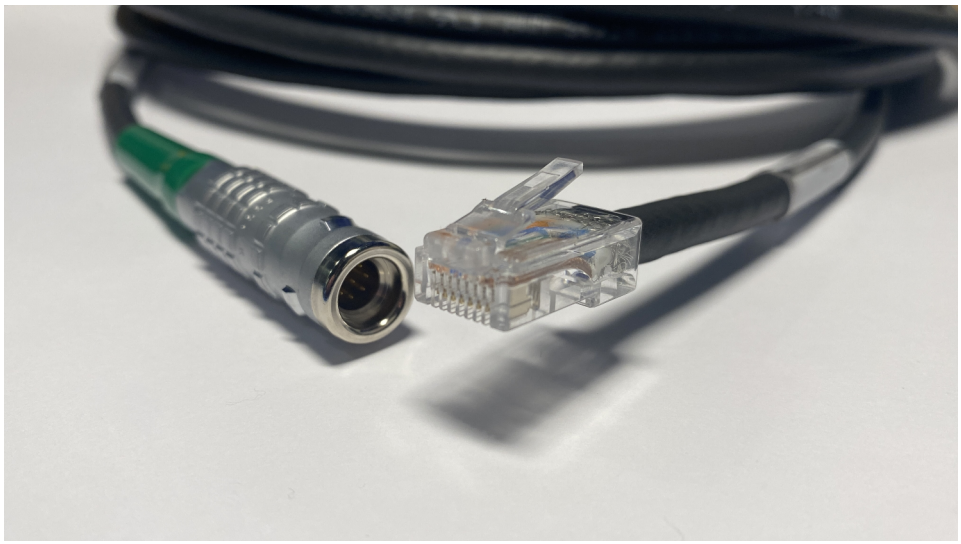


2.4 CT-Tide TCP/IP & POE Output

The unit is supply with a TCP/IP connector that can also supply's a Power Over Ethernet output.
The POE output is determines with the cable, the cable with a female RJ45 connector doesn't supply power because the pins that will give the power are not connected.

The POE is based on a passthrough power option, this power out voltage is the same voltages as the input.

TCP/IP cable without POE option connected



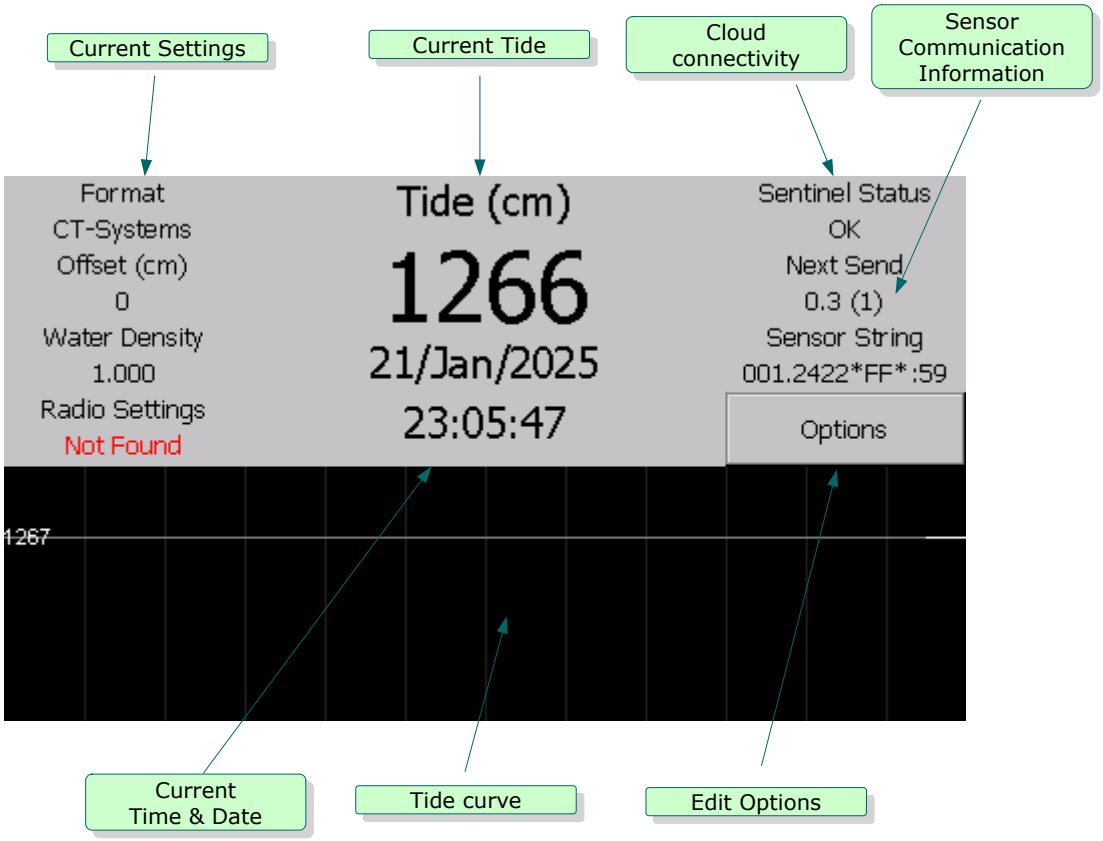
TCP/IP cable with POE option

Chapter 3: General Usage

3.1 Main Screen

CT-Tide has a clean and simple graphical user interface. The main screen gives a good overview of all necessary information without overloading the user with information.

Main Screen Explained

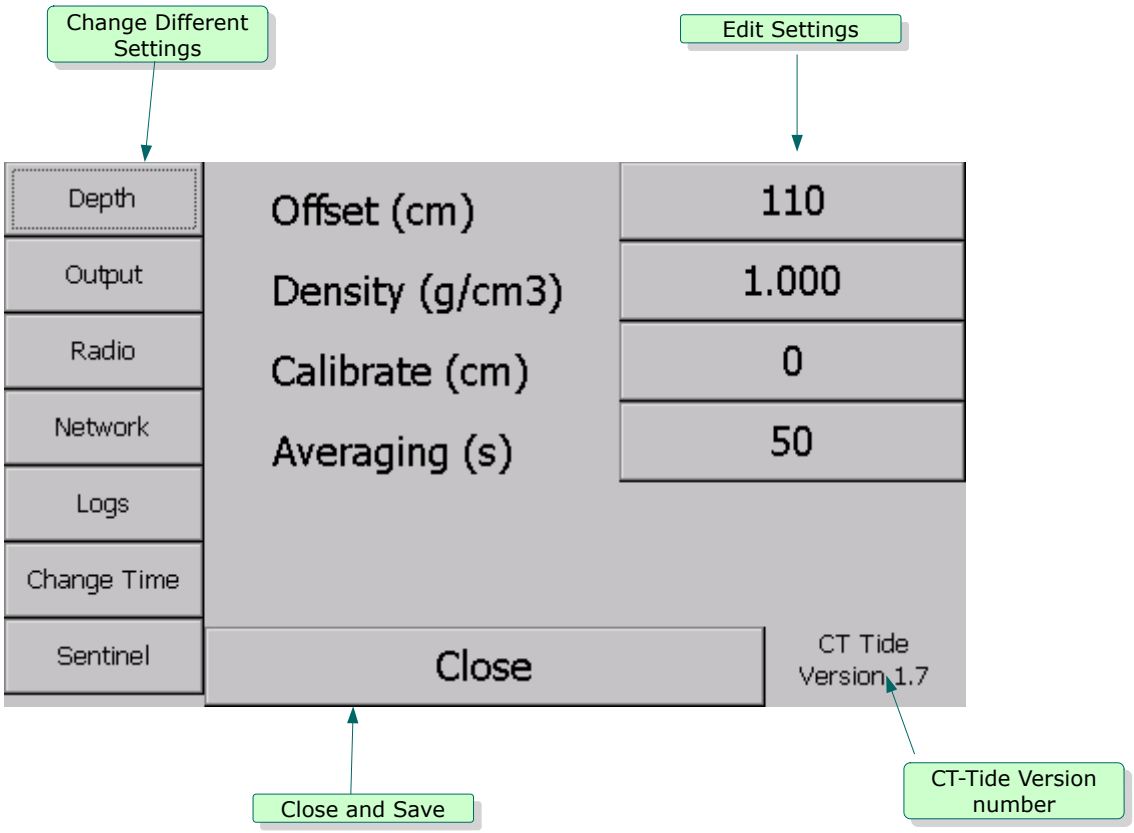


The Options Button will open a new screen as explained in the page below.

3.2 Option Screen

The option screen enables the settings of all necessary settings for the CT-Tide unit.

Option Screen Explained



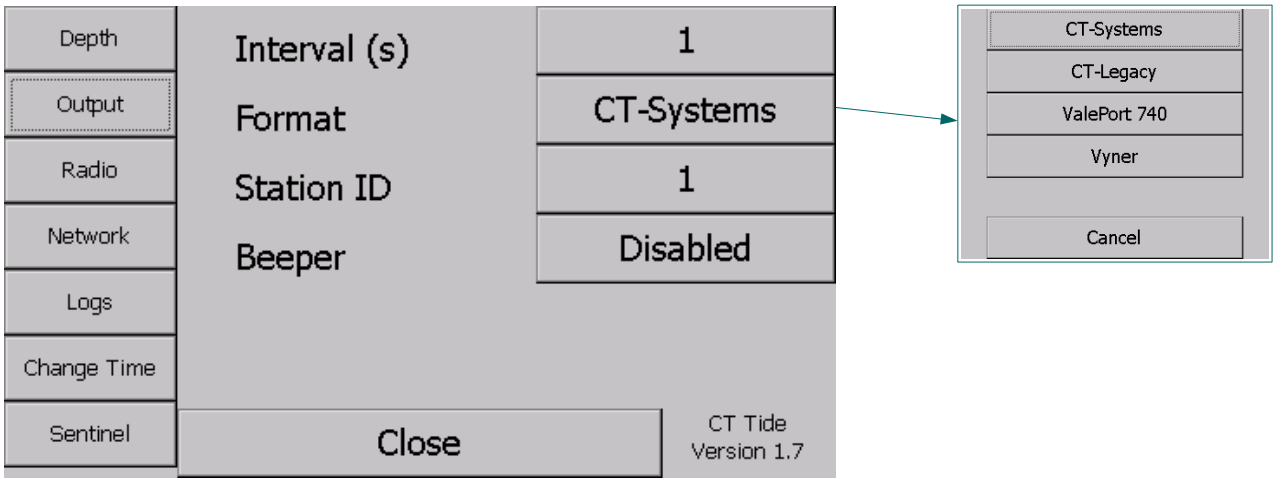
Starting with the Depth Settings, this setting can be edited at the start of the option screen.

Offset (cm)	Click the button to give the offset between sensor value and the current tide height.
Density (g/cm3)	This value must be around 1.000 for fresh water and a value of 1.025 for salt water.
Calibrate (cm)	Click the button to change the value to the current height of the tide in centimetres, this option will modify the Offset value to match with the calibrate value
Averaging (s)	If set to more than 0, instead of just using the reading from the sensor, use the average of all measurements done in the set time (in seconds)

Press Close to save the settings. Please note, the radio will stop transmitting data for 10 seconds

3.3 Output Options

In the option screen click on "Output" to get the output options.



Output Screen Explained

Interval (s)	Set the interval of transmission of the tide data, the transmission interval is in seconds.
Format	There is a pre-selected list of output formats list in a new window. For the older CT-Tide unit output choose CT-Legacy.
Station ID	When using Viking software it's possible to use a tidal network. Therefore the stations must have different IDs.
Beeper	Enable or disabled a beep sound every time the unit sent data.

There are different type of output formats:

CT-Systems:
- $CT-TIDE,DD/MM/YYYY-HH:MM:SS,DD.DDD

CT-Legacy:
- V01<S><S><S><S><S>DD.DDD (<S> = Space)

Note: *CT-Legacy is standard used on the older versions of the CT-Tide units without a display*

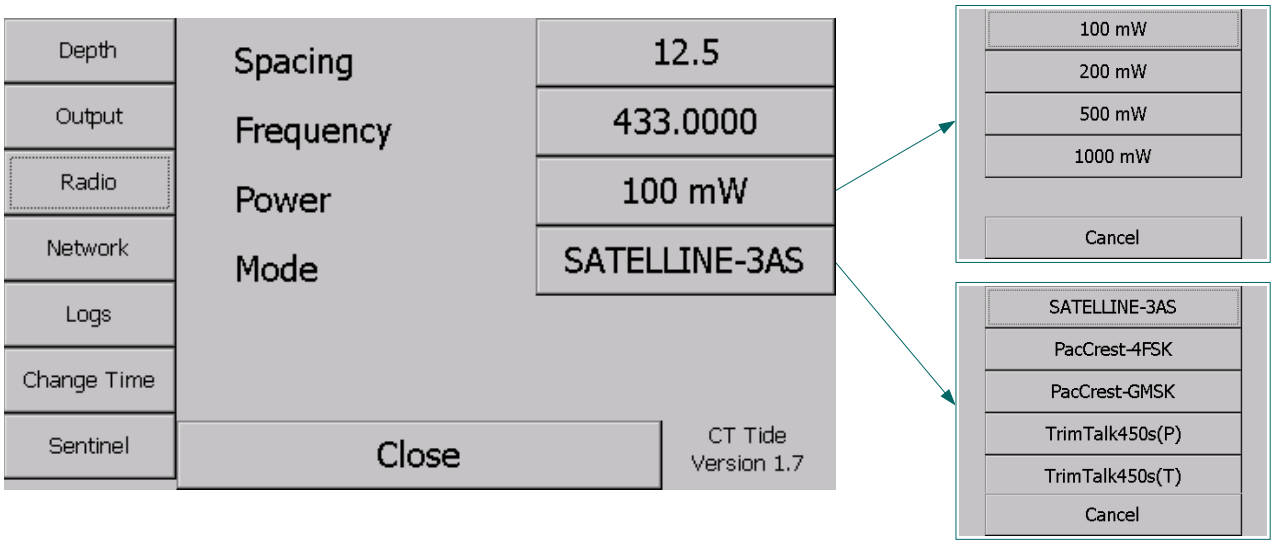
Valeport 740
- pDbar

Vyner
- :DDDD

Press Close to save the settings, the radio will stop transmitting data for 10 seconds

3.4 Radio Setup

In the option screen click on "Radio" to get the radio options.



Spacing To change the spacing settings of the internal radio, 12.5, 20 and 25 KHz.

Frequency To change the frequency from 403 … 473 MHz, make sure that the frequency match with the channel spacing.[1]

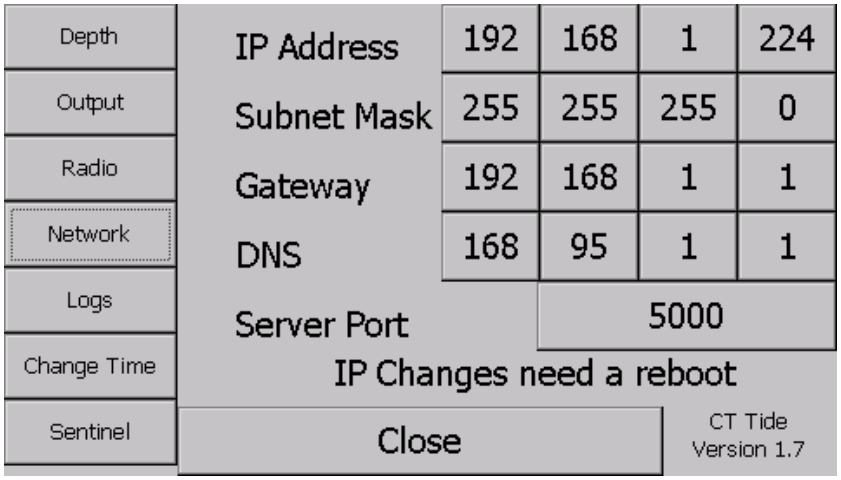
Power To change the power out of the radio, with a high power its possible to get more range.

Mode To change the radio protocol between differed radios.

Press Close to save the settings, the radio will stop transmitting data for 10 seconds

1 **Warning:** This is limited to the UHF antenna that is being used. Standard UHF antenna is 420 – 470 MHz

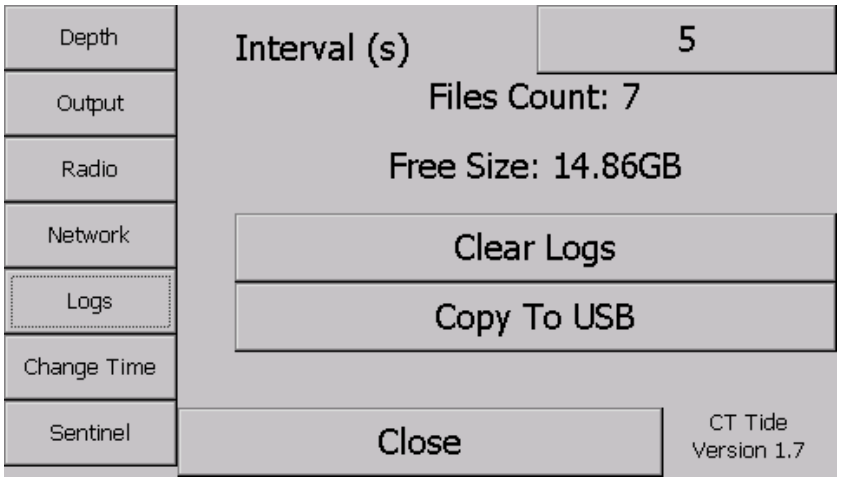
3.5 TCP Server Settings



IP Address	To change IP Address to the wanted IP address for the CT Tide
Subnet Mask	To change Subnet Mask to the wanted Subnet Mask
Gateway	To set the IP address of the router the CT Tide will use to connect to the internet
DNS	To set the IP address of the DNS server the CT Tide will use
Server Port	To change Server Port to the wanted Server Port, this will be the port on witch the unit will output the data.

Press Close and reboot the unit, by removing the power plug and let the unit restart to set the new settings.

3.6 Logging



Interval (s) To set they interval of the log in seconds

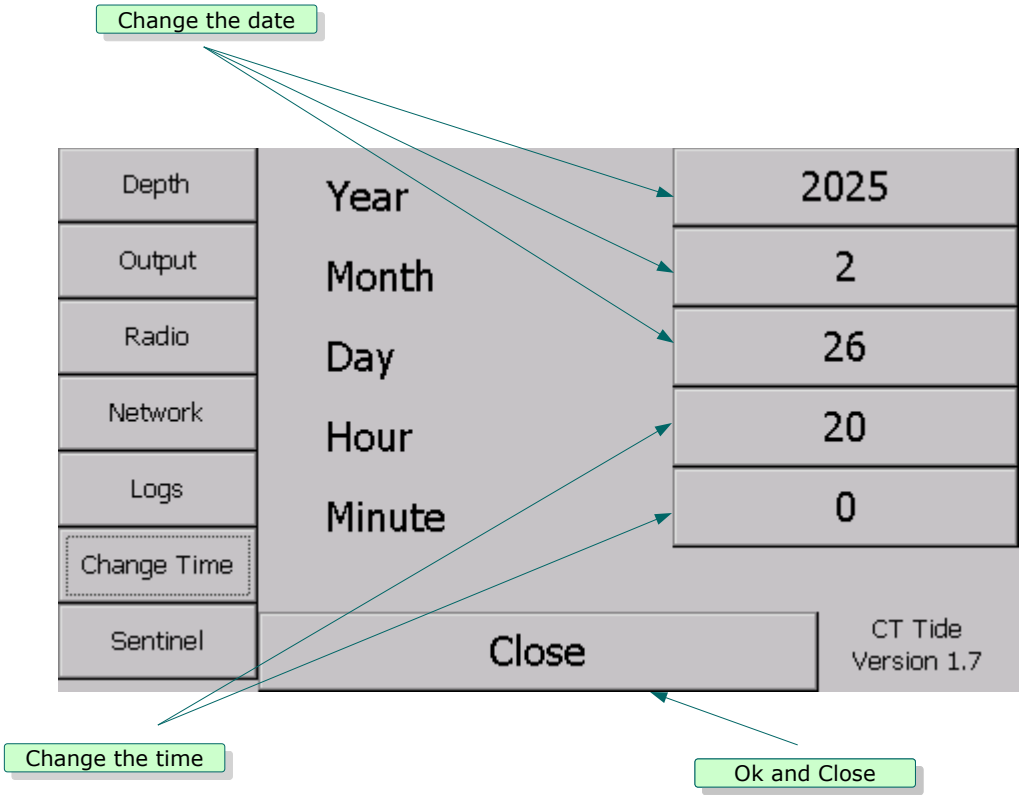
Clear Logs Remove all the logs stored on the CT-Tide unit

Copy to USB All the logs stored on the CT-Tide will be copy to a USB stick

If the option is grey outed, reconnected the USB and re-open this window. Depending on size of the USB stick, it can take a moment before the CT-Tide see the USB stick.

3.7 Change Time And Date

In the option screen click on "Change Time"



The time-stamp is in 24 hour format.

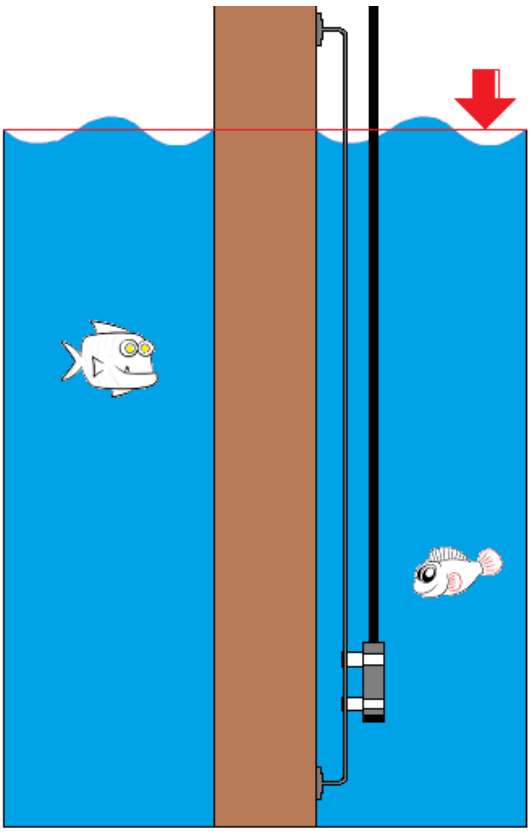
If the time and date are set to the correctly the Apply button will light up, click on the Apply button to confirm the new time and date.

Chapter 4: Unit Installation

4.1 Install The CT-Tide Unit

- Install the tide station on a dry and save place, avoid direct sun-light and other heat sources
- Install the antenna at a good height, free of obstacles and connect the coax cable.
- The N connector is connected to the antenna and the TNC connector is connected to the CT-Tide unit.
- Connect the power cable to a 12 – 30 volt DC battery or power supply 12 -30 Volt DC.
    - The power cable has 2 wires, red positive (+ Vdc) and a black wire negative (- Vdc).

4.2 Install The CT-Tide Sensor



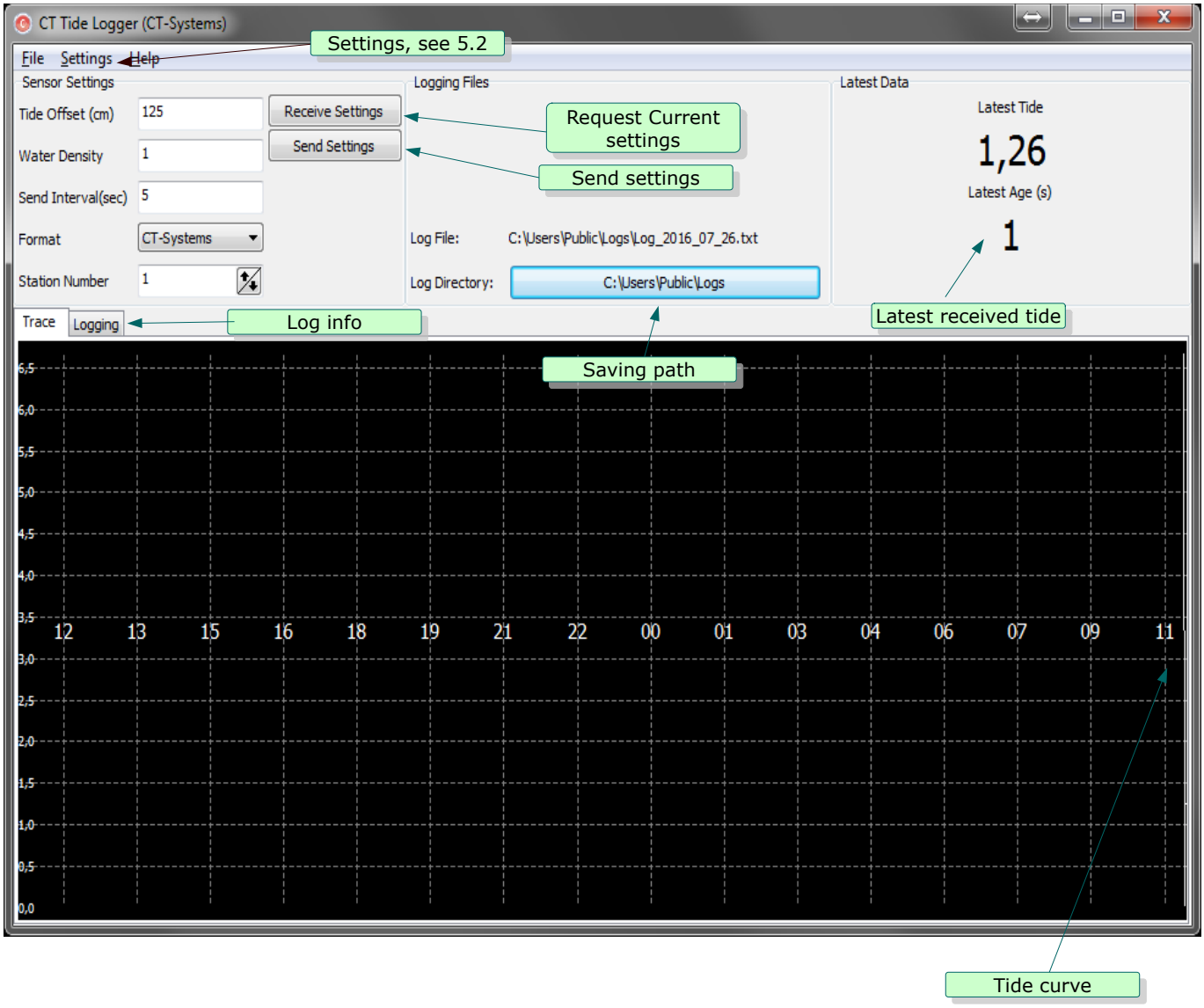
- Mount the tide sensor to a fixed point underneath the water surface.
- With a minimum of one metre underneath the lowest tide level.
- Make sure that the sensor is firmly fixed.
- After mounting the tide sensor to a fixed point, measure the current tide (red line as example)
- Fill-in the measured tide on the unit and press calibrate.

Chapter 5: Tide Logger Software

5.1 The Tide Logger Software

Run the Setup file for the Tide Logger Software on a Windows PC

Home Screen Explained



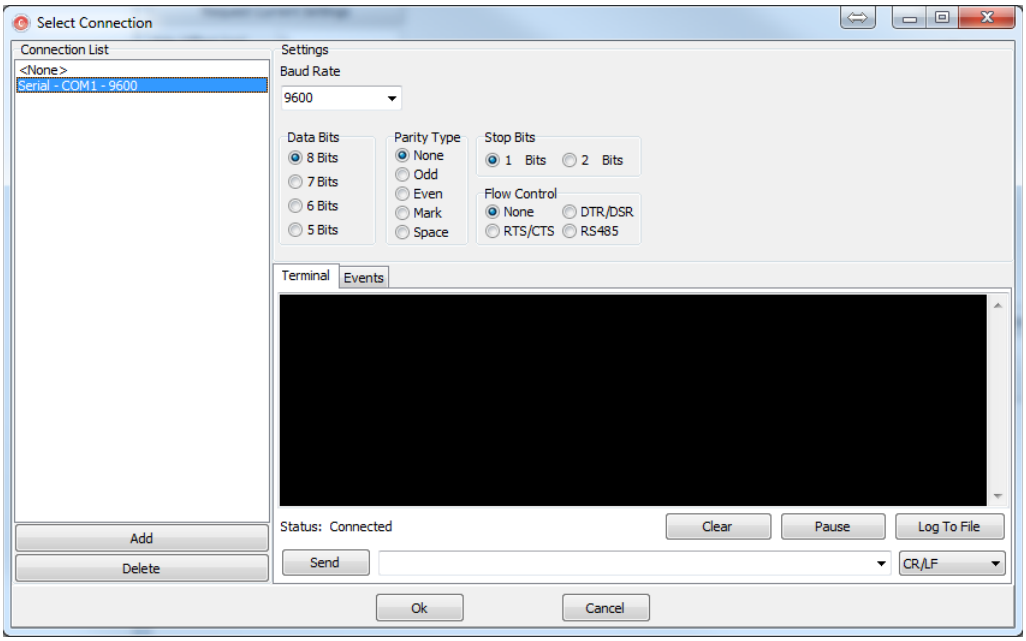
Sensor Settings Is it possible to change the settings remotely with a radio installed to the PC The settings are the same as defined in Error: Reference source not found Option screen explained and 3.3 Output Options

Latest Data Here it will show the latest received Tide data for the unit

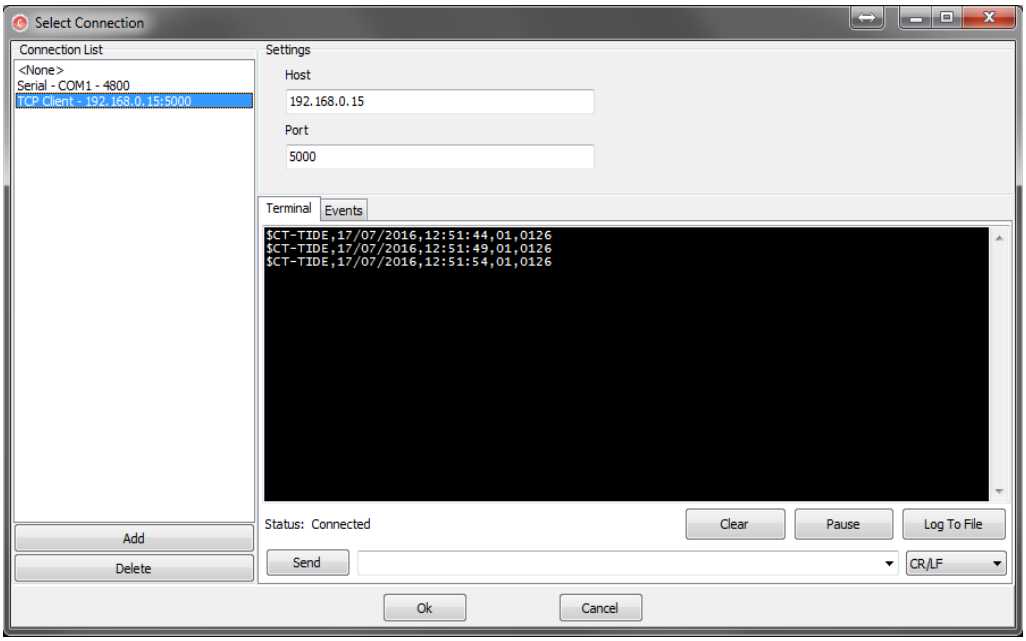
Logging Files With this option it is possible to log the transmitted data from the CT-Tide unit on to the PC, under Settings – Output Directory select a path where the files needs to be saved

5.2 Connecting Tide Logger Software

By using the button “Settings” at the home screen, it is possible to change the connection to the correct settings of the UHF radio. The default of the CT-Tide unit is 9600 Bps



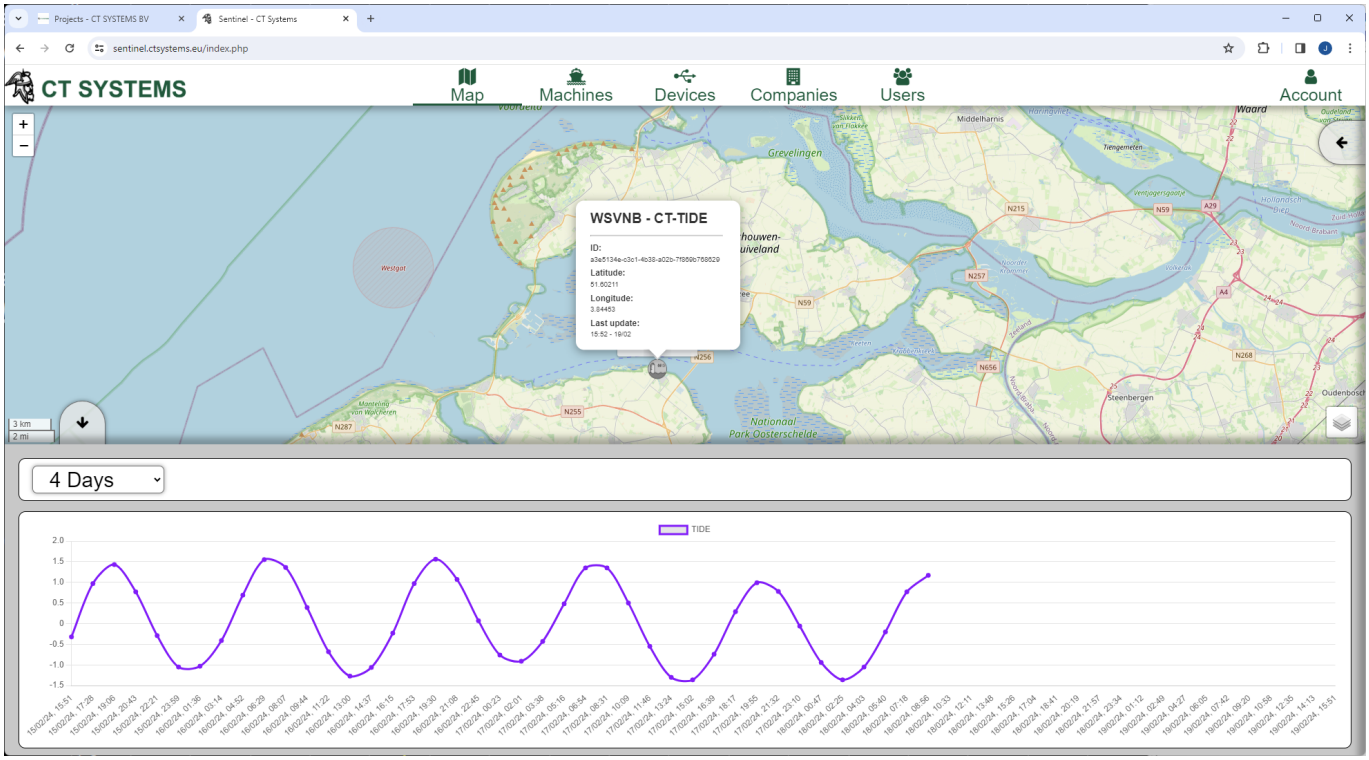
Select the COM-port witch is connected to the radio.



Press add – “TCP Client” to add a TCP client as a connection.
By host add the IP of the CT-Tide unit and by port the port number of the unit.

Chapter 6: Sentinel Cloud

When the CT-Tide is connected to the internet it is possible to have it communicate directly with our Sentinel online cloud platform where data can be logged and displayed.



6.1 Connecting LTE Smart Antenna

The CT-Tide can be supplied with a smart antenna for internet connection. The smart antenna is powered by the PoE Lemo connection of the CT-Tide enabling both power and internet over one connection.

To configure the LTE modem first unplug the PoE Lemo connector and unscrew the four screws on the bottom of the smart antenna. By pushing the large metal bar to the side you can gently move the LTE modem a few centimetres to give access to the SIM slots. Carefully place one or two simcards in the slots. After the sims are placed you can temporarily power up the modem.

While the modem is still accessible plug in a standard RJ45 patch cable into port 2 or 3 of the LTE modem and plug the other end into a computer, make sure the computer is set to DHCP. Access the LTE modem's webinterface using the default webinterface 192.168.1.1, Username: admin Password: Password01. Here both sims can be configured by going to: Network > Mobile > General.

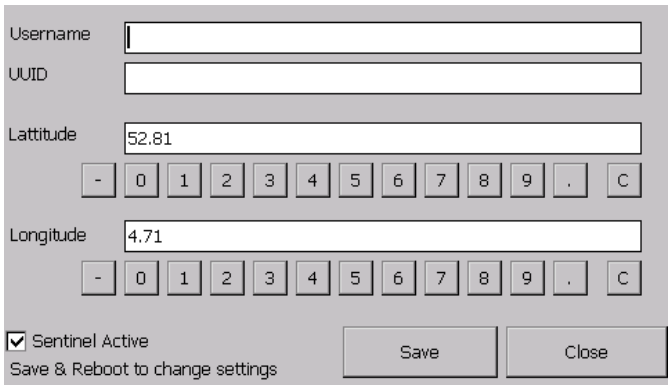
The internet connection can be tested by configuring the sentinel account as described in the chapter below. Once all is working the RJ45 cable to the computer can be removed, and the LTE modem can be placed back in the unit making sure all wires are stress free and not stuck. Screw back all screws holding the bottom in place.

Please note that if the RJ45 cable needs to be removed from the watertight plug in the bottom of the smart antenna that the strain relieve on the outside is removed first.

6.2 Configuring Sentinel Account

For the CT-Tide to work with Sentinel a Sentinel subscription is needed, and a request for a new device UUID has to be sent to the Sentinel administrator.

When the username and UUID code have been acquired they need to be set in the CT-Tide. This can be done by going to the menu entry "SENTINEL" in the bottom left. To be able to enter the UUID a USB keyboard needs to be connected to the USB port of the CT-Tide.



The acquired UUID Name has to entered at "Username", and the UUID at "Password". Then the exact location of the CT-Tide need to be inserted in Latitude and Longitude in the lower fields.

You can enable or disable Sentinel with the checkbox.

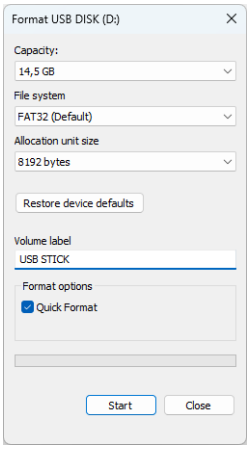
After pressing "Save", and then "Close", and rebooting the CT Tide the data will start transmitting data to the Sentinel Cloud.

Chapter 7: Update CT-Tide Firmware

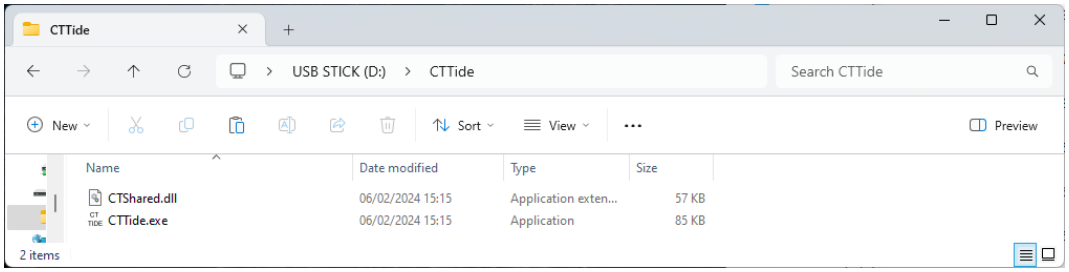
WARNING: As with all firmware updates, its strongly recommended that you backup or make copies of all important files before performing this update.

This firmware update process is done entirely at your own risk. If performed correctly, there will be no loss of system or user data on the drive. However, if the firmware process is interrupted for any reason, your system may not function properly.

7.1 Create A Boot-able USB Drive



- Start with a newly FAT32 formatted USB drive.
- Make a new directory on the USB drive called "CTTide"
- Download and unzip the new CT-Tide firmware on to your computer
- Place the CT-Tide firmware files (CTTide.exe & CTShared.dll) in the directory "CTTide" on the USB drive.



- Place the USB stick in the USB port of the CT-Tide unit and power it up, the launcher below will be shown.
- Press Install Update → Conform → OK.
- After its complete power down the unit, and remove the USB drive.
- Restart the unit, and it will start with the new firmware.

Firmware version is show under the option menu, on the left side (see 3.2 Option screen)

Before using the USB drive again on the CT-Tide unit, remove the "CT Tide" directory!

Chapter 8: Pinout And Cables

8.1 CT Power Cable

Looking into the connector, counting counter clockwise.

Type	Pin	Colour
Plus (+)	**1**	**Red**
Minus (-)	**2**	**Black**
N/C	**3**	**--**

8.2 Sensor Cable

Looking in to the connector, counting counter clockwise

Type	Pin	Colour
Plus (+)	**1**	**Black**
Minus (-)	**2**	**Red**
Data +	**3**	**--**
Data -	**4**	**--**

8.3 COM Port Output Cable

Looking in to the connector, counting counter clockwise

Type	Pin	Colour
Plus (+)	**1**	**Pink**
RXD	**2**	**White**
TXD	**3**	**Green**
GND	**4**	**Yellow**
CTS	**5**	**Grey**
RTS	**6**	**Brown**

8.4 COM Port Output Cable For Satel

Looking in to the connector, counting counter clockwise

Name	Pin Lemo	Pin D15	Colour
Plus (+) 12 VDC	1	1 & 14 & 15	Pink
RXD (INPUT)	2	9	White
TXD (OUTPUT)	3	11	Green
GND	4	7 & 8	Yellow
CTS (OUTPUT)	5	6	Gray
RTS (INPUT)	6	13	Brown
Connected together:		3 & 4	

8.5 TCP/IP Connector With POE

Looking into the connector, counting counter-clockwise the connector is wired as T-568B

Name	Pin	Colour	POE	RJ45 MALE	RJ45 Female
TX+	1	Orange/White		1	1
TX-	2	Orange		2	2
RX+	3	Green/White		3	3
TRD2+	4	Blue	DC+	4	N/A
TRD2-	5	Blue/White	DC+	5	N/A
RX-	6	Green		6	6
TRD3+	7	Brown/White	DC-	7	N/A
TRD3-	8	Brown	DC-	8	N/A

Chapter 9: Troubleshooting

9.1 Troubleshooting

Unit Does Not Start Up

Please check the following:

- Is the power source okay.
- Is the power cable connected from the power source to the CT-Tide unit.
- Is the main fuse still intact, if not do not replace the fuse with more then 2A.

No Data On The Sensor Port

Please check the following:

- Is the sensor connected to the CT-Tide unit
- Is the sensor cable still intact

No Reception On The Receiver Part

Please check the following:

- Is the channel spacing the same on both units
- Is the baud rate the same on both units, the CT-tide unit is 9600 bps hard coded.
- Is the frequency the same on both units
- Is the interval to high on the tide unit
- Is the correct COM-port selected on the receiver part

Not The Correct Tide Height

Please check the following:

- Is the sensor mounted to a fixed point, make sure it is not moving.
- Is the sensor underwater.
- Is the offset correct on the CT-Tide unit.
- Is the Density (g/cm3) correct with the type of water.
- Is the breather value on the sensor cable blocked.

User Manual Revision History

Version 1.0	–	29 September 2014 Initial release.
Version 1.0a	–	9 October 2015 Updated 800MHz radio modem options.
Version 1.1	-	21 July 2016 extra options; Logging, TCP output, CT-Tide updater
Version 1.2	-	10 May 2019 extra connection options, COM Port output, Satel external
Version 1.3	-	24 February 2022 connections: POE, cable and connector pinouts added
Version 1.4	-	December 2023: Support for additional sensor types
Version 1.5	-	February 2024: Support for online cloud Sentinel and Sentinel Settings
Version 1.6	-	January 2025: Sentinel status displayed, more Network settings
Version 1.7	-	Averaging option introduced

Alphabetical Index