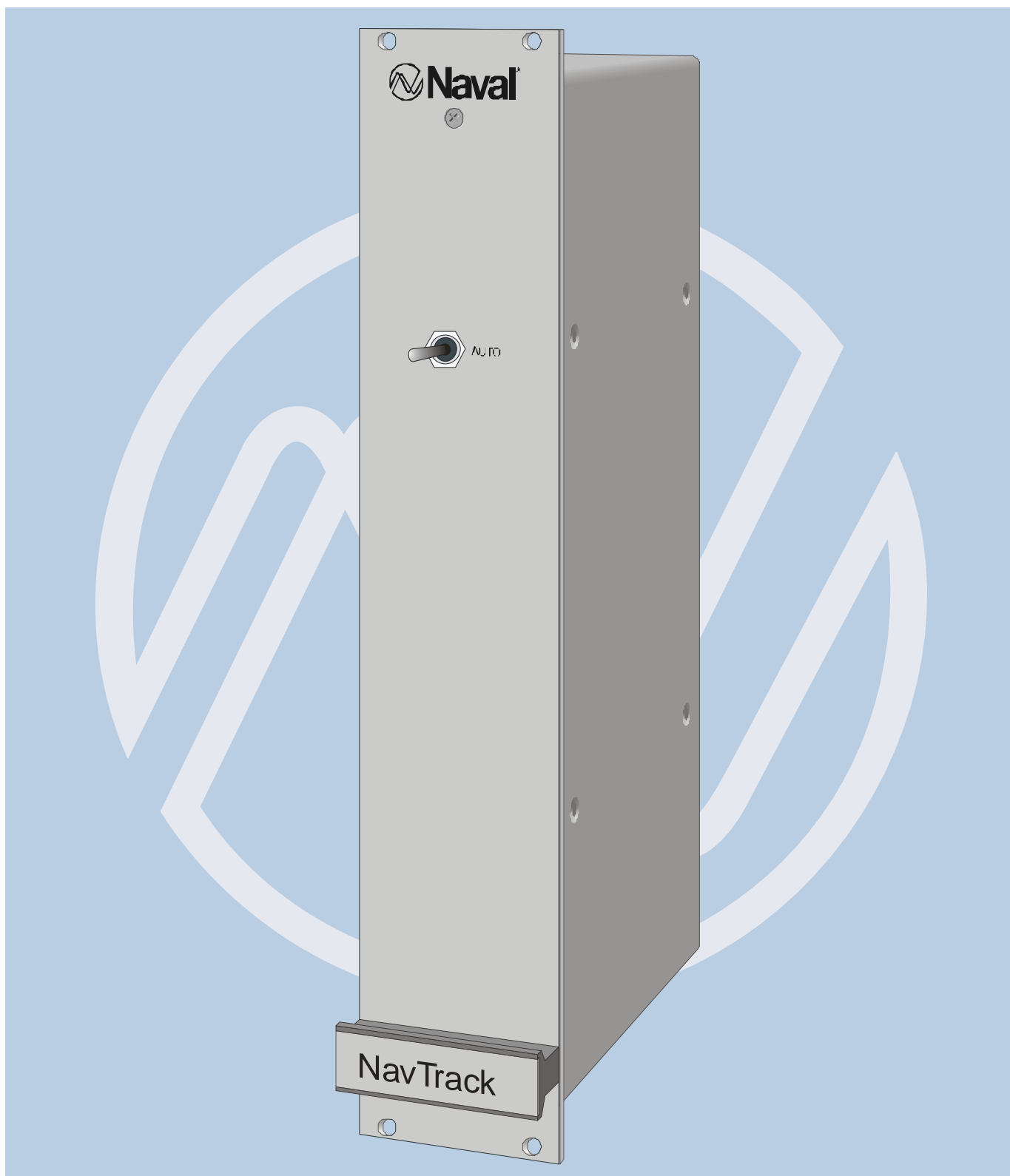


# Installation and Operation Manual

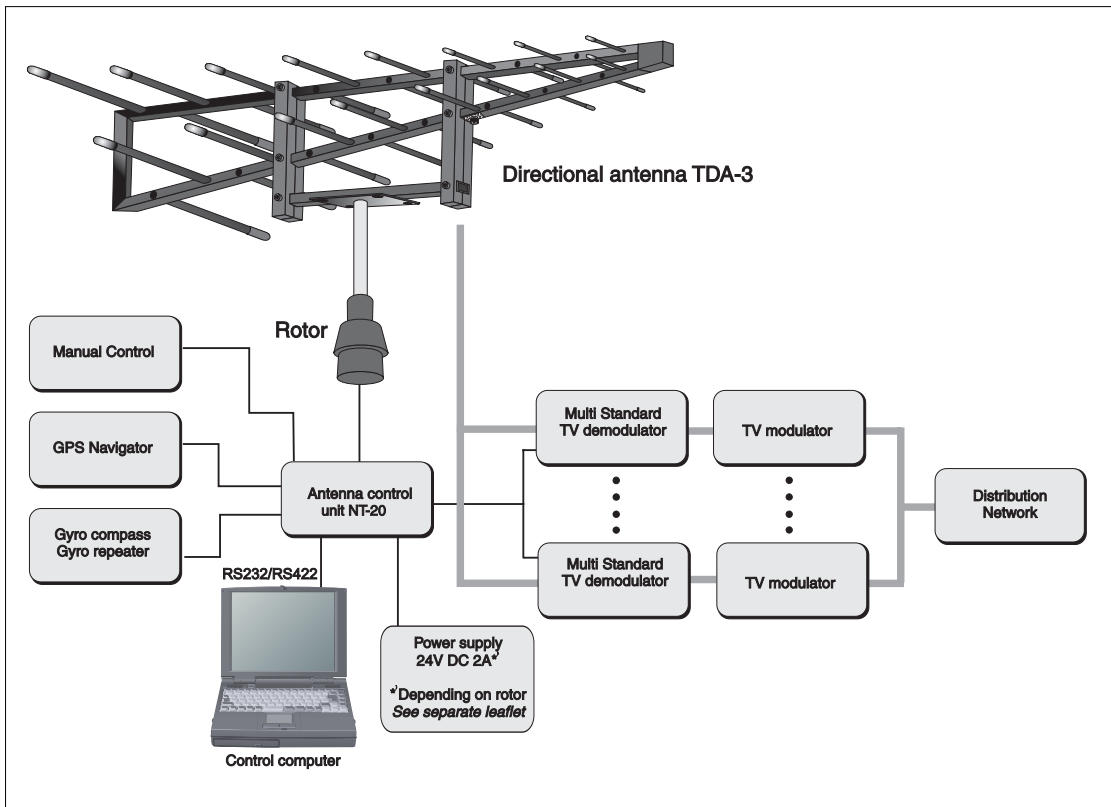
## NavTrack NT20



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## Schematic function



## Installation of the software in PC

Windows95(98) or Windows 3.11 must already be installed on the PC.

Create a folder (directory) named Navtrack on your hard drive C:\.

Copy all the files on the two diskettes into it.

If you want to put a shortcut to your Navtrack program follow the procedure below (win95/98).

1. Place the cursor on the desktop and click the right mouse button.
2. Choose "New/Shortcut"<Dialog box create shortcut>
3. Push the browse button and find device C:\ Double-click on the folder "Programs"
4. Select file "navtrack.exe", push the button "Open".
5. Push the button "Next". Enter name "Navtrack" Push the button "Finish"

## Installation of the Rotor

Mechanically it should be mounted according to the instructions delivered with the rotor.

However it is important for the Navtrack system to know where the bow is. The rotor should therefore be mounted in a way, that when it is in the most counter clockwise position, the antenna should point at the bow.

*All specifications stated are subject to change without notice.*

## Calibration

The switch on the front panel of the control unit can be set in two positions. If set in Auto mode, all signals go to the control unit. Otherwise all signals from the antenna is bypassed to the manual unit connector at the back. If such a device is connected, the antenna can be manually controlled without any interference from the Navtrack control unit. Through all examples in this manual it is expected that the switch is in the Auto mode position. Since there are differences in different brands of rotors, a calibration of your actual unit must be performed, to get the highest possible accuracy. Start the program and Click on the **Service** button to enter the service form.

The screenshot shows the 'Service/Calibration' window with the following fields and buttons:

- Set pos/course:** Position (N56:20,123, E013:30,122), Course (30). Buttons: Set, Read.
- GPS/Gyro string:** Gyro (\$HEHDT,%le), GPS (\$GPGLL,%2d%le,%c,%3d%le,%c). Buttons: Set, Read.
- GPS/Gyro baudrate:** Gyro (4800), GPS (4800). Buttons: Set, Read.
- Calibrate:** Bow, Rot. angle (450), Min (<), Max (>), Set.
- Parameters:** Load from PC, Save on PC.
- Close** button.

Use the **Left arrow** to turn the rotator to the most counter clock wise position, all the way until the mechanical stop. Click on **Min (<)** and **Bow**. The antenna should now point at the bow of the ship. Use the **Right arrow** to turn the rotator in its most clockwise position.

Click on **Max (>)**.

Enter the total rotation angle of your rotator, e.g. 450 degrees and click **Set**.

If your GPS and Gyro equipment don't use the baudrate 4800 enter new values (1200, 2400 or 9600) and click the corresponding **Set** button. Look in the appendix at the back in this manual to get the strings to interpret your gyro and GPS. Enter them in the relevant fields and press **Set**. Calibration is finished.

## Entering station data

On Station name

Station1

Station2

Station3

Station4

Double click on the name of a station. A form pops up on the screen.

Enter the name of the station, and then use the mouse to select High (30 km), Medium (20 Km) or Low (10 Km) power range of the station. Enter Latitude and Longitude. It is important to enter the position in the same format it is presented in the example. (N55:35,000 E013:40,000).

Tuner	TV-Standard	Channel	Tuner	TV-Standard	Channel
0	PAL B/G	50	8		
1	PAL B/G	112	9		
2	PAL I	30	10		
3	SECAM D/K	98	11		
4	SECAM L	96	12		
5	NTSC N/M	94	13		
6			14		
7			15		

TV station data as channels a.s.o can be found on the web for each country.  
 For e.g Sweden look at: [www.teracom.se](http://www.teracom.se)  
 For International look at: [www.wrth.com](http://www.wrth.com) or your national telecom organization.

If a DM-1, Multi standard TV Demodulator (*no longer in production*) is used, TV standards and channels also can be set for this station. Up to 16 DM-1 units can be loop-connected via the RS-232 serial channel.

The following standards are available:

Video standard	Video polarity	Sound standard	Sound subcarrier	Channel
PAL B/G	Negative	FM	5.5MHz	0-100
PAL I	Negative	FM	6.0MHz	0-99
SECAM D/K	Negative	FM	6.5MHz	0-99
SECAM L	Positive	AM	6.5MHz	0-99
NTSC N/M	Negative	FM	4.5MHz	0-100

See DM-1 manual for more details about the demodulator.

**IMPORTANT:** When a station is **updated** the information will be sent to the control unit. This might take a few seconds. In this way, up to 15 different station standards can be preset.

**VERY IMPORTANT!! If the navtrack unit has been out of power supply, then all the stations must be updated before the unit can work properly.**

## Operation

When power is applied to the control unit, it starts positioning the rotator as soon as it has detected course and position from the GPS and gyro. If no GPS and gyro are connected, this can be entered in the **Service** form. This will, however, only work as long as the ship is not moving. For automatic function, information of position and course are continuously needed for operation. By pressing the button **Manual** the unit can be manually controlled by using the arrow buttons. Press **Auto** to get into automatic mode again.

## Tracking

The position and course of the ship are received from the GPS and gyro. From the station settings the system gets the position and power for the different stations.

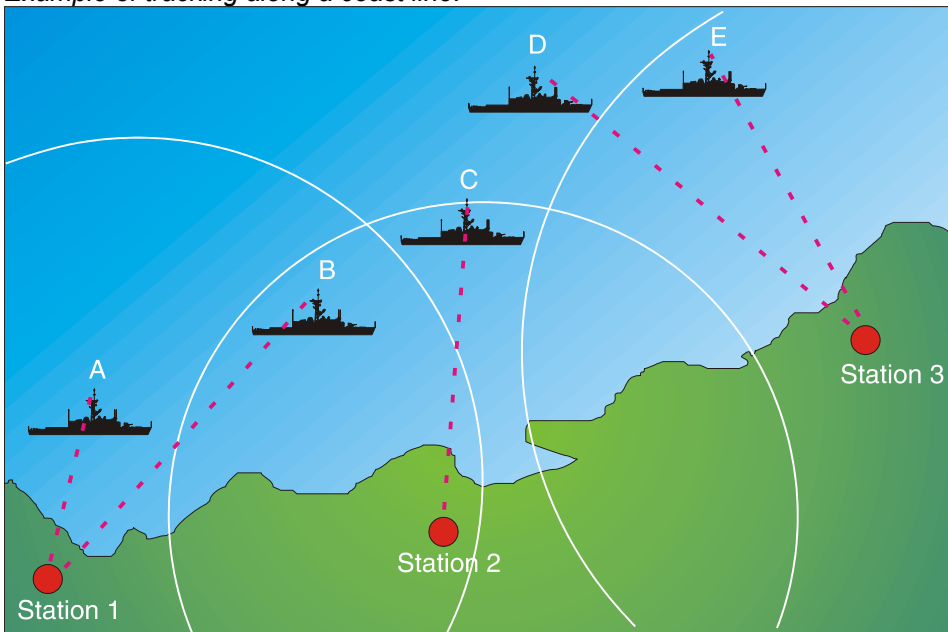
When the system is put into **Auto** mode the antenna will be pointed at the station in whose power range the ship is located. A red arrow will indicate which station is being tracked. If the ship is outside of all stations power range, it will be directed towards the closest one. A blinking red arrow will indicate this. If conditions are good, there might still be a chance of receiving enough signal to get an acceptable reception.

Notice, the system is never tracking for the best signal strength. The antenna is always directed towards the position of the station set in the **Station settings**. Due to this, it is very important that the positions of the stations are correctly entered.

When the ship leaves the power range of a station the antenna redirects for a new station. If the ship has made a continuous turn for more than 450 degrees, the antenna has to do an unwind. This is done automatically and within 1 minute it will be back in correct direction. If for any reason a station, normally used, is not wanted at the moment, the station can be disabled by a click in the option box for the station. Another click enables it again.

This can be useful when the ship is leaving a station's estimated power range, but still has good reception. If one does not want an automatic change to next station, which perhaps doesn't have the same channels, this can be manually disabled as mentioned above.

*Example of tracking along a coast line.*



A: Antenna is directed at Station 1

B: Ship has entered the power range of Station 2 but is still within Station 1 power range.

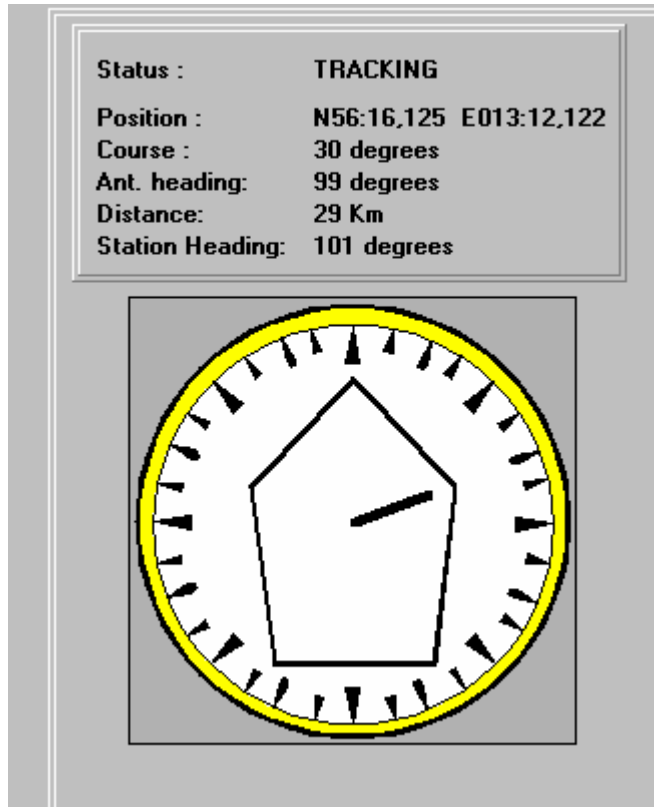
C: Ship has left Station 1 power range and changes to Station 2.

D: Ship is outside of all stations power range, and is directed towards the closest one.

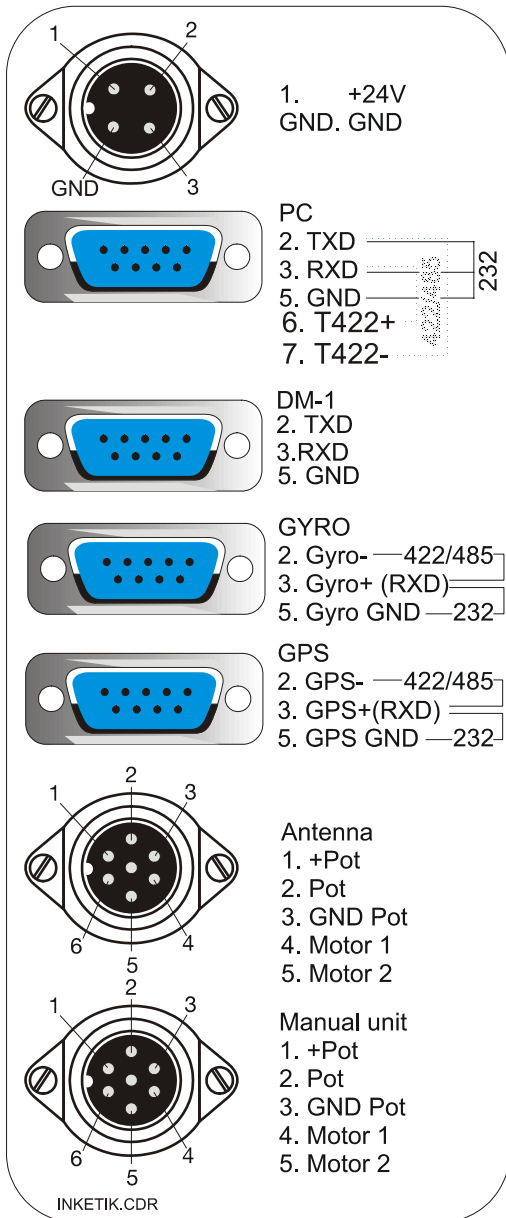
E: Antenna is within Station 3 power range.

## Main form

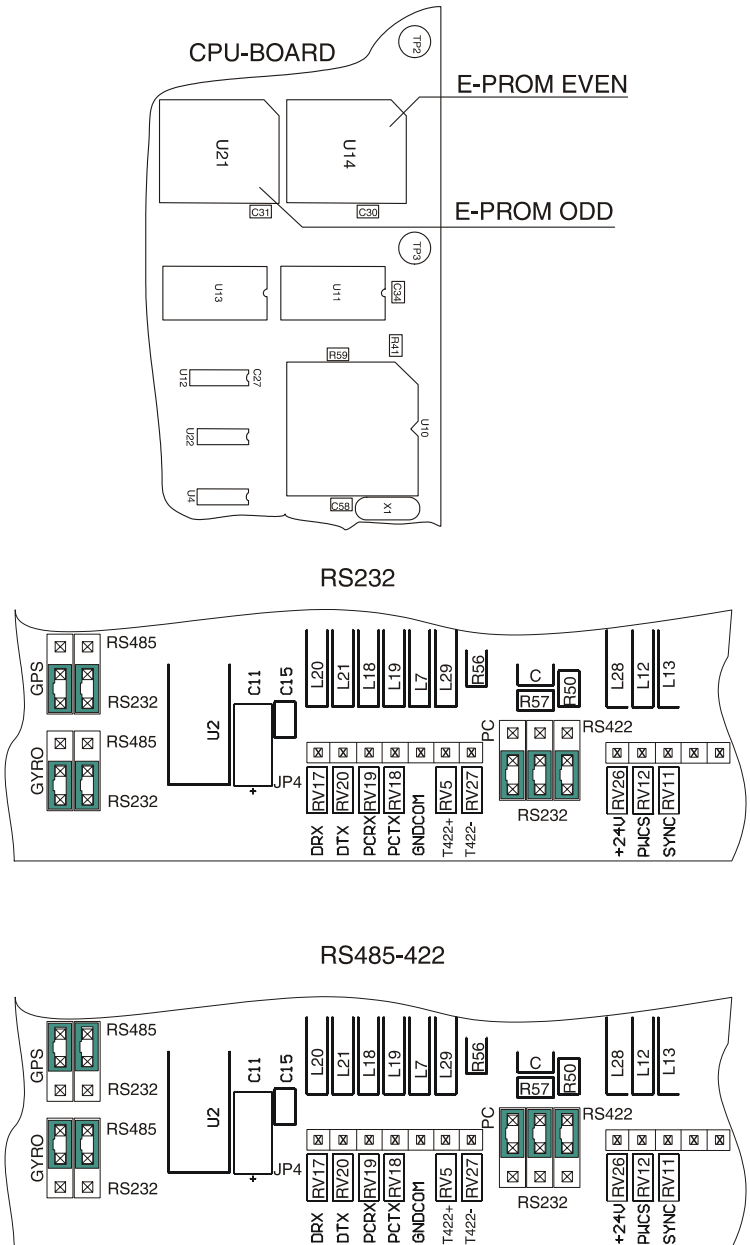
Here all necessary information can be seen. A symbol of the ship shows the antenna bearing.



## Connections of the control unit



## Replacement of E-prom on CPU-board

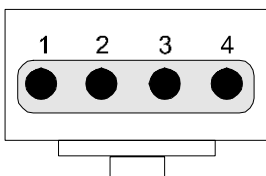


### RS232 connector NavTrack – DM-1

To Navtrack a 9 pin D-SUB female is used.

Pin 2. TXD (From Navtrack) DM-1 pin 3  
Pin 5. GND DM-1 pin 1

To DM-1 a Modular 4/4 connector is used.  
(view is from the back of the connector)



### Jumper settings for RS232 and 422/485 on CPU-board

Signals from Gyro and GPS can be connected via an RS232 or 422/485 interface independently of each other. **PC can only be connected via RS232 or 422.**

### **NOTICE VERY IMPORTANT!**

#### POWER SUPPLY

The 24V DC power supply shall also meet the rotor drain.

See separate leaflet



# Appendix A gyro- and GPS sentences

In order for the system to function properly, it needs heading and position data from the ship's gyro and GPS. This data is read into the control computer by copying parts of the gyro's and GPS's NMEA 0183 data sentences and using standard ANSI-C commands for variables. Commands in question are:

%le	read a decimal number	e.g.	123.456 ⇒ 123.456
%d	read one figure	e.g.	123.456 ⇒ 1
%2d	read two figures	e.g.	123.456 ⇒ 12
%c	read a character	e.g.	ABC.123 ⇒ A
%2c	read two characters	e.g.	ABC.123 ⇒ AB

To disregard characters the command `%*nc` (n=1,2,3...) is used in combination with other commands.

<code>%*2c,%c</code>	disregard 2 characters, read one char.	e.g.	ABC.123 ⇒ C
<code>%*4c,%le</code>	disregard 4 characters, read a number	e.g.	ABC.123 ⇒ 123

## Gyro

Required data: Heading in degrees to one or more decimal places, e.g. 298.2

A typical gyro sentence may look like this: `$HEHDT,212.602,T*2A` where 212.602 represents the useful data. In “\$HEHDT” “HE” may be replaced by other two-letter combinations.

Sentence to enter into the computer: `$HEHDT,%le` or `$%*2cHDT,%le`

## GPS-position

Required data: Latitude in degrees (2 digits) minutes with or without decimals, N or S (representing north or south).

Longitude in degrees (3 digits) minutes with or without decimals, E or W (representing east or west)

Useful GPS data comes in either GLL-sentences or GGA-sentences or both. GLL-sentences are easier to use.

A typical GLL data sentence may look like this:  
`$GPGLL,5522.0387,N,01309.2531,E,085643.123,A*2C`

A typical GGA data sentence may look like this:  
`$GPGGA,085643.00,5522.0387,N,01309.2531,E,1,08,00.9,00.....`

The difference is that the GGA sentence begins with a time hhmmss.ddd (number of decimals vary). The two letters ahead of GLL/GGA can vary.

The useful data in the sentences are 5522.0387 {55° 22.0387 minutes} N {north}  
01309.2531 {013° 09.2531 minutes} E {east}

Sentence to enter into the computer: `$GPGLL,%2d%le,%c,%3d%le,%c`

if no GLL information is available then enter `$GPGGA,%*9c,%2d%le,%c,%3d%le,%c` and modify “%\*9c” depending on the number of decimals in the time data.

## Short form for installation and set up

### INSTALLATION

1. Mount the rotor. See Navtrack manual page 3
2. Mount the Navtrack unit in a 19" rack or with two mounting brackets (Naval no:164.144).
3. Connect the 6+1 way connector with cable (delivered with the Navtrack unit) to manual connector on Navtrack. For connection to manual unit, see schematic delivered with manual/rotor unit.
4. Connect cables to the other 6+1 way connector delivered with the Navtrack . For correct connection see connection diagram on Navtrack unit "Antenna". Cable area is depending on rotor type and length of the cables. For correct cable type, consult manual delivered with rotor unit.
5. Connect the ships gyro signal to the 9 pin D-sub connector "Gyro". Connect the GPS connector to the ships GPS signal. The Navtrack default settings for gyro/GPS is RS232 please see Navtrack manual page 8.
6. Connect 24 V DC to the 4-way connector, brown (+). Power supply shall meet the rotor drain. See manual for rotor.
7. Connect the PC laptop with the Navtrack unit. Use the delivered cable with the two 9 pin D-sub connectors.

### START/ SET UP

1. Install the Navtrack software on the PC laptop (2 disks). For correct installation see Navtrack manual page 3.
2. Switch on the Navtrack power supply. Set switch on Navtrack front in position "AUTO".
3. Start Navtrack program on the PC.
4. **Click on "service menu"**
  - 4.1 Calibrate the system, see page 4 in Navtrack manual.
  - 4.2 Enter the position and course for the ship. Don't forget to press button "set" after entering the values.
  - 4.3 For correct input feeding see page 4. Enter gyro string, press "set". For correct input feeding see page 9 in Navtrack manual.
  - 4.4 Enter GPS string, press "set". For correct input feeding see page 9 in Navtrack manual.  
**For correct settings of GPS/gyro baudrate consult the documentation on the ship for GPS and gyro. Before closing the "service menu" press button "save on PC".**
5. **"Entering station data"**. See page 5 in Navtrack manual. Don't forget to press button "update" after entering the values. Close window and repeat the procedure until all stations are entered. **VERY IMPORTANT!! If the navtrack unit has been out of power, then all the stations must be updated before the unit can work properly.**
6. "Main menu". To choose station, tic box in front of station name.
7. The Navtrack unit now starts to search for the station. When found the rotor stops. According to the ships movement the unit now starts to track. If the unit is not tracking, you have to check that the unit receive correct signals from GPS and gyro.