WinFrog Device Group:	GYRO
Device Name/Model:	NR 230
Device Manufacturer:	**DSNP** 16, rue de Bel-Air – B.P. 433 44474 CARQUEFOU CEDEX, FRANCE Tel: 33 2 40 30 59 00 Fax: 33 2 40 30 58 92 E-mail: Info-DSNP@DSNP.com
Device Data String(s) Output to WinFrog:	For Position: NMEA $GPGGA String For Heading: ASCII Heading For Attitude: $PSER and $A strings. Data Output to WinFrog includes: GPS Time, Attitude Time, Roll, Pitch, GDOP, #SVS, RMS, Status (Sercel type)
WinFrog Data String(s) Output to Device:	Nil
WinFrog .raw Data Record Type(s):	Heading: Type 910 (Type 410 if data repeated 15 times) Position: Type 303 Attitude: Type 413

DEVICE DESCRIPTION:

The NR 230 GPS Attitude sensor is a 30-channel GPS receiver which uses kinematic GPS techniques to determine the heading, pitch and roll of a triple antenna array. The NR230 also has HF differential reception capability to produce DGPS position data. The NR230 can output DGPS positions and attitude data at rates up to 10Hz.

The SERCEL NR 230 provides real time heading with an accuracy of less than 0.1^o, pitch and roll with an accuracy of less than 0.24^o. (Accuracy values are based on manufacturer's claims).

The NR 230 also has raw data recording capabilities for potential static or dynamic post-processing. The NR230's outputs are user configurable.

The NR 230 System

DEVICE CONFIGURATION INSTRUCTIONS (Suggested 19200-8-N-1):
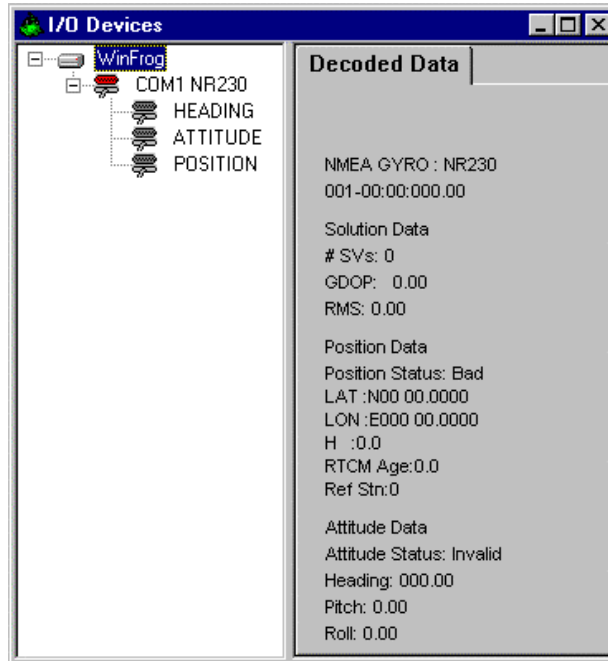Baud Rate: Configurable
Data Bits: Configurable
Stop Bits: Configurable
Parity: Configurable

WINFROG I/O DEVICES > CONFIG OPTIONS:
The NR230 is added to WinFrog from the Gyro device category. Adding a NR230 device to WinFrog creates 3 Data Items: Heading, Attitude and Position.


When adding the NR230 to WinFrog, the appropriate Comm Data must be set to match the communication settings in the unit. Note that although the NR230 can provide WinFrog with up to 3 Data Items (Heading, Attitude and Position), they are all interfaced via the same single comm port.

No configuration is required or available at the I/O Device window level.

WINFROG VEHICLE - DEVICE > EDIT OPTIONS:
As mentioned above, the NR230 provides Heading, Altitude and Position Data Items that can be added to the vessel's device list. Once added to a vehicle's device list, each of these Data Items must be edited to suit the application: Highlight the Data Item in the vehicle's device list, then click the Edit button. A different configuration dialog box will appear for each Data item.

1. Configure Gyro
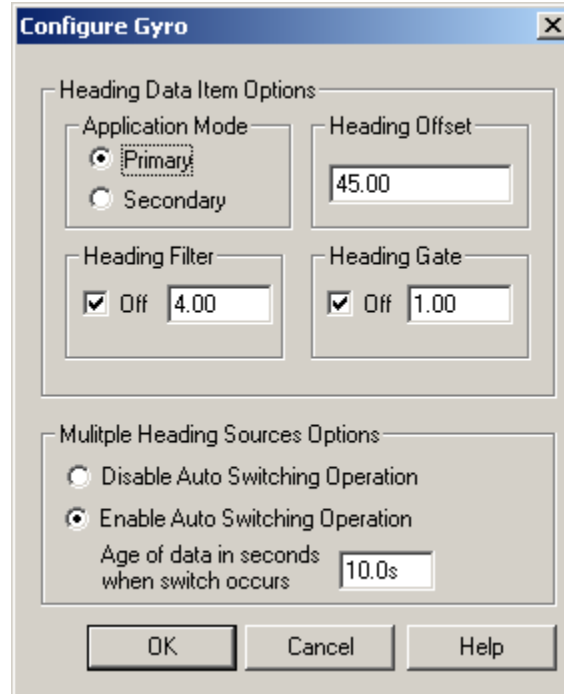
Heading Data Item Options:
Application Mode (Primary/Secondary):
Set the type of calculation to Primary or Secondary by selecting the appropriate
radio button. Devices set to Primary are used to provide the vehicle heading
information. Devices set to Secondary are simply monitored, and are not used in the
vehicle's calculations.

Note that WinFrog supports automatic switching from a designated Primary to a
Secondary in the case that data from the Primary fails (see Multiple Heading
Sources Options).

Heading Offset:
A correction value (as determined from a gyro calibration) can be input in the
Heading Offset box. This value is added to the heading value from the NR 230 to
provide a corrected heading for the vehicle. Note that positive or negative values can
be entered.

Heading Filter/Heading Gate:
The Heading Filter is used to "smooth" heading values used by the vehicle. The
value entered in the Heading Filter indicates the number of headings that will be
used to predict the next heading value. The larger the value entered, the "heavier"
the filter will be – i.e. the slower the vehicle's heading will respond to changes.

The Heading Gate defines a tolerance value to limit the use of anomalies in gyro readings. If the next observed gyro value received falls outside the specified range of predicted values (i.e. plus or minus the entered value), the value will not be used.

Multiple Heading Sources Options:
WinFrog supports automatic switching from a designated Primary source to an alternate Secondary source in the event that the Primary fails. The first Secondary source to receive data after the Primary has failed becomes the alternate Primary providing the heading for the vehicle. When the designated Primary is detected as active again, the alternate Primary source reverts to Secondary and the designated Primary provides the heading data to the vehicle.

If an alternate Secondary fails and there are additional Secondary sources, it in turn is detected by the first of the remaining operational Secondary sources to receive data after the failure at which time this Secondary becomes the alternate Primary.

Note that this option is only available if more than 1 HEADING source is associated with the respective vehicle. Changes made to the Auto Switching options for any one of the HEADING data items are automatically assigned to the others upon exiting this dialog with OK. If the Auto Switching option is enabled and the respective HEADING source has been set to Primary, all others are automatically set to Secondary. The exception to this is when configuring a WinFrog Controlled Remote (WinFrog with a Remote module) from a Controller. In this case, changes made to one HEADING source are not automatically made to other HEADING sources. The operator must explicitly make them for each HEADING source.

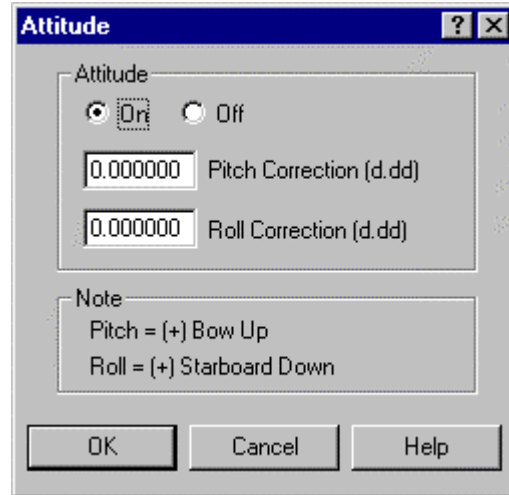This option is not available in the WinFrog Remote package.

Disable/Enable Auto Switching Operation:
Select the mode you wish to operate WinFrog.

Age of data in seconds when switch occurs:
Enter the age of data that is permitted before the source is considered to have failed.

2. Configure Attitude

Attitude:
On/Off – Select the On button to enable the use of Attitude data. By enabling the Attitude, vessel and sensor offset calculations utilize the vessel's pitch and roll.

Pitch Correction
Enter a Pitch correction value in units of degrees and decimal degrees. This value is added to the pitch values received from the NR 230. Sign of the entry must relate to the convention of positive values referring to stern down (i.e. bow up).

Roll Correction
Enter a roll correction value in units of degrees and decimal degrees. This value is added to the roll values received from the NR 230. Sign of the entry must relate to the convention of positive values referring to starboard down (i.e. port up).

3. Configuration of Position

The Position Data Item is configured similarly to a standard positioning sensor (i.e. a NMEA GPS device) using the Configure Position dialog box. The position data from the NR230 is a NMEA GGA Position string.
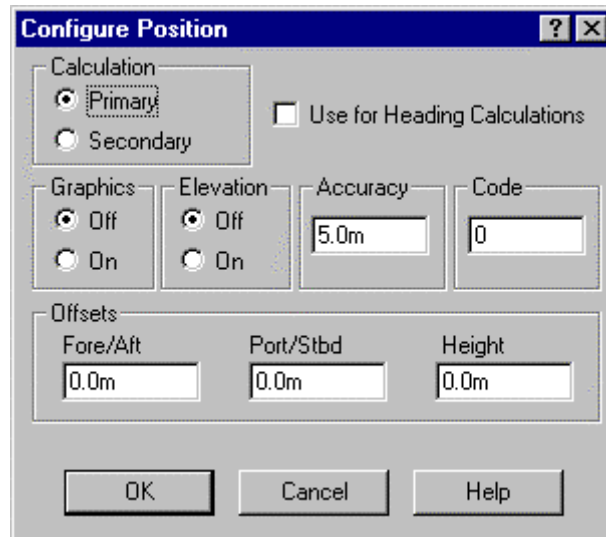
Calculation:
Set the Calculation selection to Primary or Secondary. Devices set to Primary calculation are used to provide a vessel position. Note that more than one Primary positioning device can be added to a vehicle's device list; data from these devices will be combined in a weighted mean solution. (See the paragraph on Accuracy below for more on the weighting of Primary calculation device data).

If the Calculation type is set to Secondary, WinFrog will simply monitor the device's data. WinFrog will not use the position data from the device in the final solution of the vehicles' position.

Note: In the case of Primary device failure, WinFrog will not automatically use the Secondary devices for the vessel's position computation. Instead, the vehicle's positioning will go to dead reckoning (if dead reckoning is turned on). You must manually change a Secondary device to Primary in order for the data to be utilized.

Use For Heading Calculations:
Select this checkbox if the device is to be for determination of the heading of the vessel.

Graphics:
If On is selected, a labeled square will show the raw (offset but unfiltered) location of the GPS antenna in the Graphics and Bird's Eye windows. This provides a means of comparing raw device and filtered vehicle positions.

Elevation:
If On is selected, WinFrog will relate the vehicle's water depth value (as provided by a sounder device added to the vehicle's device list) to the GPS (WGS84) Ellipsoid. This affects the water depth value shown in the Vehicle text window as well as the data recorded in the .DAT, .SRC, and .RCV data files. The sounder data recorded in WinFrog's .RAW data files will not be affected. This option is meant only for those applications where there is no fixed vertical reference, such as on a river. For acceptable results, this option requires the use of high accuracy "RTK" GPS data.

Accuracy:
The Accuracy value entered provides WinFrog with the expected accuracy of the position from this device. This value is used in the weighting of this device compared to other positioning devices that may be added to the vehicle's device list. The smaller the value entered, the more accurate it is considered to be, and hence the more weight that will be applied to the device's data.

The Accuracy parameter can be changed from the suggested values; changes should be made with caution, however, as they will affect the final filtered position of the vehicle.

Code:
This entry window is used when the GPS data is being received by a remote GPS receiver connected via telemetry link. If this is the case, set the Code to coincide with the code parameters associated with the GPS unit being used.
For all other applications, the Code entry must be set to 0.

Offsets:
Offsets are required to associate the GPS antenna position with the vessel's Common Reference Point (CRP). The offsets are applied *from* CRP (of the vehicle) *to* the GPS antenna location.
Forward Offsets are entered as positive values.
Aft Offsets are entered as negative values.
Starboard Offsets are entered as positive values.
Port Offsets are entered as negative values.
Height Offsets are positive upwards. (It is suggested that the vessel's Height origin should be at the water line).

CONFIGURATION DETAILS:
Refer to the operator's manual for information on setting up the NR230. Following are the manufacturer's technical specifications for the unit.

Accuracy:
- **Attitude determination:**
  - From 0.03 to 0.1° for heading, from 0.08 to 0.2° for pitch and roll at 2 for an antenna separation of 0.8 to a few meters.
- **Position - velocity:**
  - Autonomous position <20 m/2 DRMS
  - Differential position <5m/2 DRMS
  - Velocity <5 cm/s + 1%

Update rate of position, velocity and attitude:
- 0.6 s.

Time to first attitude solution:
- 1 to 3 minutes depending on satellite geometry and antenna separation. 4 satellites are required, but the platform does not need to be static during these 1-3 min. of initialization.

Computer:
- PC compatible TOSHIBA 6400 SXC or equivalent, fitted with 4 serial ports.

Receiver
- Power supply: 10-36 V DC
- consumption: 20 W max
- dimension: 250x360x150 mm
- weight: 4 kg
- operating temperature: -10°, +55°C
- storage temperature: -40°, +70°C

Antennae set:
- height: 740 mm
- triangle base: 1000 mm
- weight: 14 kg
- operating temperature: -40°, +70°C
- 3 x GPS antenna
- 3 x 30 m cables