WinFrog Device Group:	**ROV**
Device Name/Model:	**CapJet Trencher**
Device Manufacturer:	Nexans Norway
Device Data String(s) Output to WinFrog:	Space delimited ASCII telegram described below.
WinFrog Data String(s) Output to Device:	Space delimited ASCII telegram described below.
WinFrog Data Item(s) and their RAW record:	ROV DATA 502 (Unique to this driver) HEADING 409 ATTITUDE 413

DEVICE DESCRIPTION:

This driver is for interfacing to a CapJet Trencher for data logging and to provide it with data necessary for its operation. It requires the line segment heading and if the trencher is on a curve it requires the heading tangent to the curve.

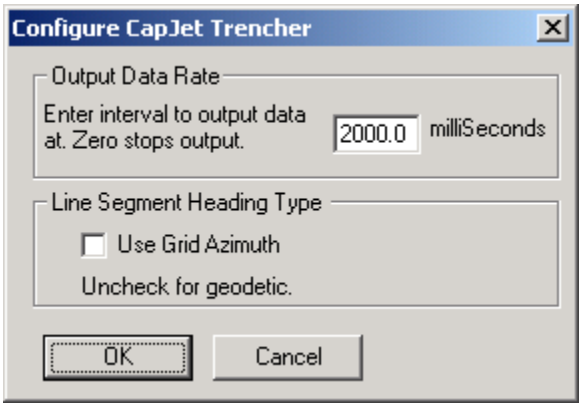
DEVICE CONFIGURATION INSTRUCTIONS

WINFROG I/O DEVICES > EDIT I/O:

Requires two RS232C Serial ports, one for input and one for output.
Configurable Parameters

WINFROG I/O DEVICES > CONFIGURE DEVICE:

When the Configure Device menu is selected the following dialog will appear.



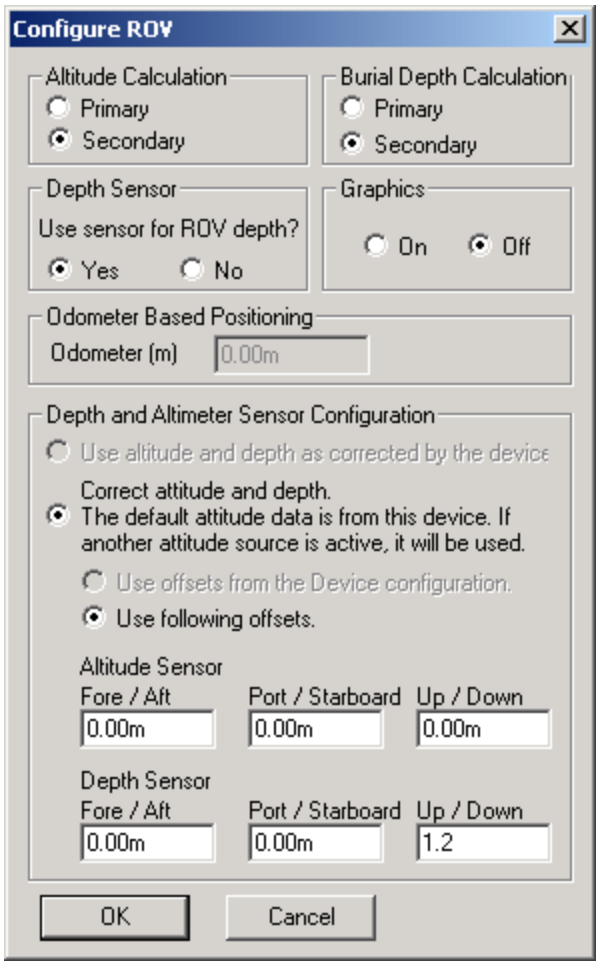
Output Data Rate: This is the interval, in milliseconds, that the output string is to be transmitted at. Enter 0 to inhibit output.

Line Segment Heading Type: Select the type of line segment heading to place in the telegram that is to be output to the CapJet Trencher. This will be either a grid or geodetic azimuth.

WINFROG VEHICLE TEXT WINDOW > CONFIGURE VEHICLE DEVICES > DEVICE > EDIT OPTIONS:

The **ROVDATA**, **HEADING,** and **ATTITUDE** data items can be added to the CapJet ROV vehicle. This will permit WinFrog to log raw data and to output data to the CapJet. All of the data items can be edited from the Configure Vehicle-Devices dialog box.

Data item: ROV, CapJet Trencher, ROVDATA



Altitude Calculation/Burial Depth Calculation:
Since the telegram from this device contains neither altitude nor depth of burial, these should be set to Secondary.

Graphics:
Turning on the Graphics will display the device name and a square at the location of the hydrophone, within the Graphics and Bird's Eye windows.

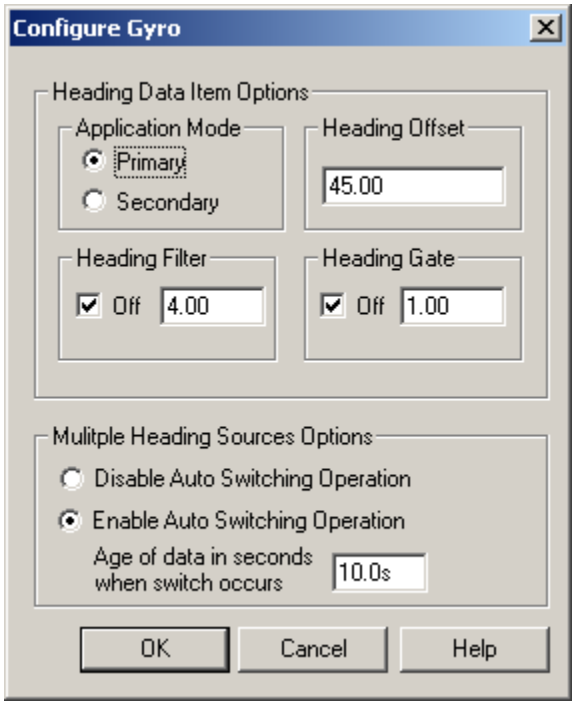
Use Sensor for ROV depth:
If Yes is selected, the depth found in the telegram for this device will be assigned to this vehicle. See below for corrections to this value. If No is selected, the depth must come from another data item for this vehicle to be assigned a depth.

Odometer Based Positioning:
The odometer based positioning option is not used for this device.

Depth and Altimeter Sensor Configuration:
Altitude is not part of the telegram from the CapJet, so leave these three values at 0.0. Offsets of the depth sensor, relative to the CRP, can be input here. The Depth Offset is the vertical distance from the ROV's CRP to the sensor that provides depth information of the ROV. By entering horizontal offsets for the depth sensor, a depth correction due to pitch and roll can be applied. Add the ATTITUDE data item to the vehicle and set it to On and enter any pitch or roll correction as required. If the ATTITUDE data item is not added to the vehicle, the pitch and roll correction will be applied but with no pitch and roll corrections.

Data item: ROV, CapJet Trencher, HEADING

The configuration of the Heading is accomplished using the Configure Gyro dialog box. The device driver supplies a heading value for the ROV.



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 event 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 device 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 one 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.

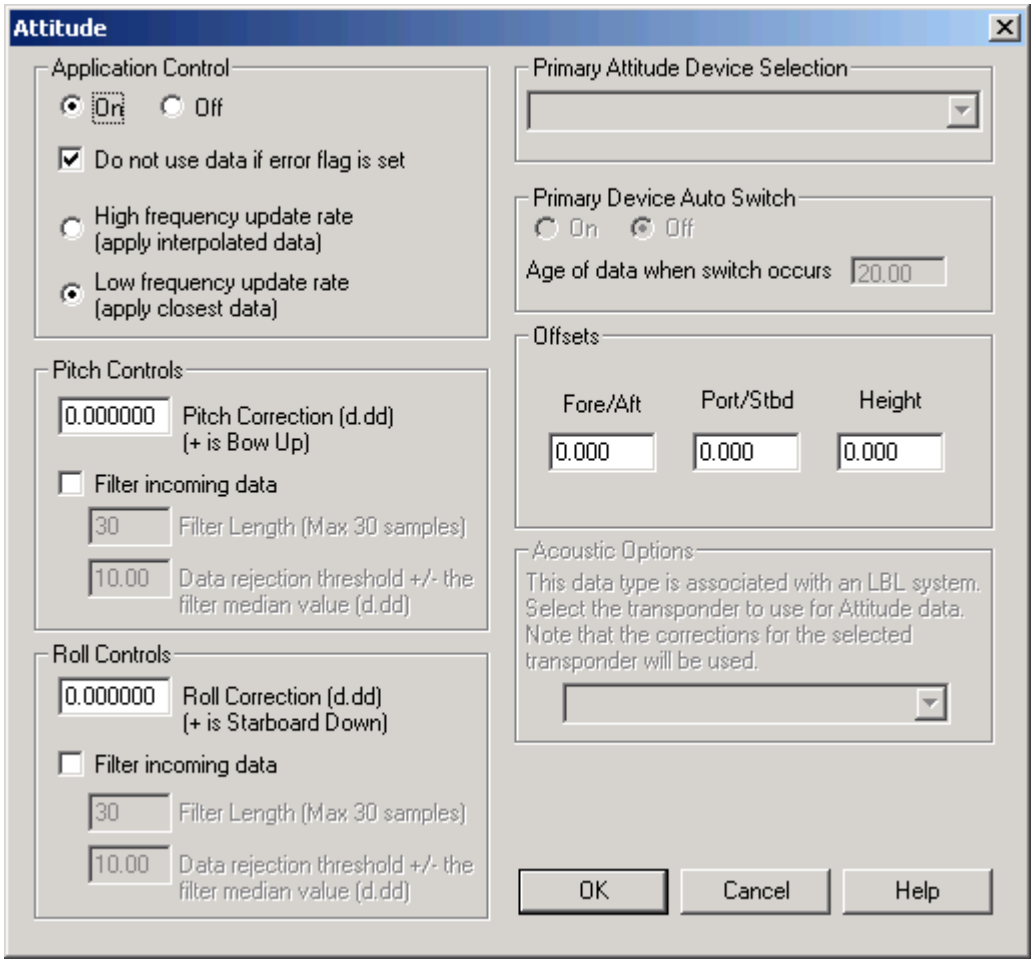
This option is not available in the WinFrog Remote package.

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.

Data item: ROV, CapJet Trencher, ATTITUDE

When the ATTITUDE data item is edited, the Attitude dialog box appears as seen below.



Attitude
By default, the sensor mode is off, meaning that data from the device will not be used in the vehicle's calculations. To turn the sensor on, and begin using the inclination corrections in the position output, click the 'On' radio button.

Error flag testing
The error flag check box is applicable to those devices that output a code indicating the data is either good or bad. If checked and the device supports such a code in its telegram, WinFrog will look at the code and if the data is indicated as bad, WinFrog will not use the data.

Sensor Update Frequency Rate
If the associated attitude sensor has a high frequency update rate (e.g. 10Hz and higher) it is appropriate to extract attitude data for application by either interpolating or extrapolating for a given epoch. In this case, the *High frequency update* option should be selected. Some attitude sensors have slow update rates, in particular those installed in acoustic transponders that require interrogation. For these sensors interpolation/extrapolation can produce a bad value as there is insufficient information to determine the correct shape of the curve (aliasing). Thus the most current attitude needs to be used. In this case, select the *Low Frequency update* option. This option applies to the use of the attitude data by the following data items:

- POSITION
- ELEVATION
- ALTITUDE
- XPONDER
- LBL TRANSCEIVER
- PROFILE

Pitch and Roll
There are two control groups, one for each of pitch and roll. Correction values can be added in this section of the window. The correction values (entered in units of degrees-decimal degrees) are added to the raw pitch and roll values received from the device before the data is applied to the vehicle's calculations. Ensure that entered values adhere to the sign convention used by WinFrog. You can verify that the corrections are entered properly by viewing the pitch and roll values in the I/O Device window and the Vehicle Text window.

Filtering
Additionally you may filter the incoming values to remove extraneous noise or spikes – check boxes are provided to switch this feature on or off. A filter length (up to 30 samples) and a threshold value (applied to the median of the samples in the filter to obtain lower and upper bounds) can be entered. Any pitch or roll values outside of the bounds are rejected and not used in the vehicle calculations, but will be recorded in the RAW files. If either one of pitch or roll is rejected, both values are ignored, although you may set up the filtering parameters for them separately. The status of the filters, including the current valid range for each of pitch and roll, and the percentage of values rejected, can be viewed in the calculations window, selecting the appropriate ATTITUDE data item.

> ***Important:***
> Do not enable filtering unless there is a high enough data rate (say 10hz) to correctly determine the shape of the curve. Essentially, if the low frequency update rate is selected above, do not enable filtering.

Primary Attitude Device Selection
If more than one attitude device is present, you may select one of them to be primary and the others to be secondary and allow WinFrog to automatically switch between them should the primary system stop sending data or has bad data. There must be at least two attitude data items added to the vehicle to use this feature. (Note: The attitude and offset data displayed in this dialog is for the attitude device corresponding to the data item that is being edited. Selecting a Primary Attitude Device from the drop down list does not affect these values for any attitude device in the list. Every attitude device needs to be set up for its own corrections and offsets.)

Primary Device Auto Switch
Select the On radio button to turn on this feature. Then enter the time out time in the edit box. If WinFrog does not receive data from the primary attitude device, or if it receives bad data for this length of time, it will switch to the next secondary that is enabled and has good data.

Auto Switch Feature Usage
To use this feature first turn the sensor on as described in the Attitude section above. Next, select the attitude device that you wish to be primary from the drop down list box. Then turn the primary device auto switch on and enter the time out time. Then edit all the other attitude data items and enable them in the Attitude group box. Note that the same selected primary will be displayed for all attitude data items; similarly, the automatic feature will be turned on and the time out time will be the same. However, you must individually enable each attitude device in the Attitude group box.

Offsets
These are not applicable in this case.

Acoustic Options
This applies to long base line acoustic transponders that have inclinometers. See chapter 17 for more information.

Data Telegram Formats

1) Telegram received FROM the Trencher

A space delimited ASCII string sent at 9600 Baud on a serial communications line

Depth heading pitch roll sworddepthport sworddepthstb speed speed2<CR><LF>

Numeric format : ##.### ##.### ##.### ##.### ##.### ##.### ##.### ##.###CRLF

Depth	Trencher depth positive below sea level	metres
Heading	Trencher heading	degrees
Pitch	Trencher pitch(bow up is positive)	degrees
Roll	Trencher roll(starboard down is positive)	degrees
SwordDepthport	Trencher port 'sword' depth (positive down)	meters
SwordDepthstb	Trencher starboard sword depth(positive down)	meters
Speed	Trencher speed (From Tensioner)	metres/second
Speed 2	Average Trencher Speed (10 minute period)	metres/second

2) Telegram Sent TO the Trencher

A space delimited ASCII string sent at 9600 baud on a second serial communications line

KP Easting Northing Segment_line_heading <CR><LF>

KP	Kilometre post value of Trencher's position on survey line	km
Easting	Trencher easting	metres
Northing	Trencher northing	metres
Line segment heading	heading of the current line segment in degrees, or heading of instantaneous tangent to curve if tracking a curve	degrees