| WinFrog Device Group: | INS |
|---|---|
| Device Name/Model: | CDL MiniPOS3 |
| Device Manufacturer: | CDL<br>Silverfield House,<br>Claymore Drive,<br>Bridge Of Don,<br>Aberdeen AB23 8GD<br>T: +44 (0) 1224 706655<br>M: +44 (0) 7803 034261<br>Web site: http://www.cdltd.net |
| Device Data String(s) Output to WinFrog: | MiniPOS1 Message<br>MiniPOS2 message<br>Navigation Message |
| WinFrog Data String(s) Output to Device: | USBL Position and Control Input Message |
| WinFrog Data Item(s) and their RAW record: | POSITION 303<br>HEADING 408, 409<br>ATTITUDE 413<br>INERTIAL 401<br>INERTIAL_2 400<br>DATA OUTPUT 450 |

## DEVICE DESCRIPTION:

The MiniPOS3 is a solid state gyro compass utilizing the Kearfott ring laser gyro system. When interfaced with WinFrog it can be used to provide heading, attitude and INS aided position. For further information regarding the MiniPOS3, please refer to the manufacturer's documentation.

## *DEVICE CONFIGURATION INSTRUCTIONS*

**WINFROG I/O DEVICES > EDIT I/O:**

Serial: Configurable Parameters
Default: 38400 8-N-1

**WINFROG I/O DEVICES > CONFIGURE DEVICE:**

This device must be configured at the I/O Device window level. In the I/O Devices window, click the device name to select it, then right-click and select Configure Device. The **CDL MiniPOS3 Configuration** dialog box appears, as seen below.
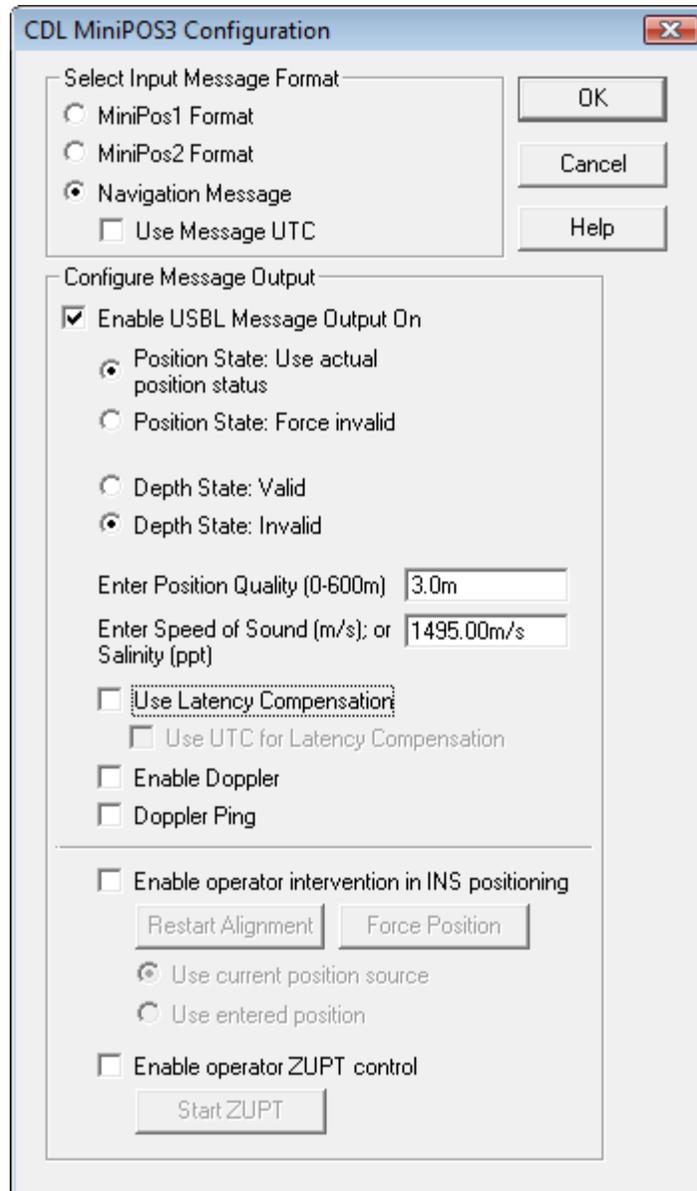
**Select Input Message Format**

Select the format of the message being output from the MiniPOS3. It is recommended that the Navigation Message be used to optimize the interface with WinFrog.

In the case of the navigation message, if WinFrog is synchronized to an external time source such as a GPS receiver the UTC time that is included in the message can be used as the data time stamp. To enable this, check the **Use Message UTC** box.

In all other cases, the WinFrog time of the data reception is used as the time stamp for the received data. This includes the case of the navigation message

being used and the **Use Message UTC** box previously being checked but WinFrog since being reconfigured to not synchronize to an external source.

**Note:** The **Use Message UTC** checkbox is only enabled for selection if WinFrog is configured to synchronize to an external time source. If this option was previously checked but WinFrog has since been reconfigured to not be synchronized, the option will still appear checked but the checkbox will be disabled and the UTC time will not be used as the data time stamp.

**Note:** In order for the UTC time in the MiniPOS3 Navigation message to be valid and useable, the MiniPOS3 must be synchronized to UTC via an input other than WinFrog. WinFrog does not support synchronizing the MiniPOS3 to UTC.

**Note:** The position output by the MiniPOS3 is WGS84 latitude and longitude.

**Note:** The input message selection affects the data items available for use. MiniPos1 and MiniPos2 support POSITION, HEADING, ATTITUDE and DATA OUTPUT. Navigation Message supports these plus INERTIAL and INERTIAL_2. See below for details.

## Configure Message Output

In order for the MiniPOS3 to provide inertial aided position output, WinFrog must provide it with a USBL Message. This must also be enabled to allow use of the control settings.

### Enable USBL Message Output On

Check this box to enable WinFrog's output to support the unit's inertial positioning capability. It is important to note that despite the use of the USBL term in the message name, the position data can be provided by any vehicle and therefore any positioning source, e.g. LBL.

When this option is enabled, WinFrog constantly monitors the position of the vehicle DATA OUTPUT data item (see below) for updates. When one is received, e.g. a USBL update, the position is used to generate the appropriate message. If no new position updates are received, this message is not output.

**Note:** The exceptions to this are as follows:

1. A change in one of the control settings, e.g. Enable Doppler, in which case a message is output immediately regardless of the status of the associated position status, with the respective position and depth status set to invalid so the MiniPOS3 receives the control setting but does not use invalid position or depth data.

2. The Restart Alignment or Force Position option are executed using a manually entered position in which case the respective message is output immediately with the manually entered position and depth and these two valid bits set.

**Note:** The settings controlled by the following options are as set in WinFrog. WinFrog does not check the respective information provided in the input messages for these settings.

The following details the options associated with the output message. For details concerning these settings/actions, refer to the MiniPOS3 documentation.

**Note:** Changes to the settings/entries for the Position State, Depth State, Position Quality, Speed of Sound/Salinity, Use Latency and Use UTC Latency are not accepted and applied until the dialog is exited with OK.

**Position State**:

Controls the setting of the position valid/invalid control bit

**Use actual position status**

Selecting this option allows WinFrog to set the bit based on the actual position status, i.e. if WinFrog determines the position is valid, the bit is set, otherwise it is not set. Note that this does not override the aforementioned exception.

**Force Invalid**

Selecting this option results in WinFrog never setting the valid position bit regardless of its actual status. The exception is if Restart Alignment or Force Position is being executed and a valid or manually entered position is available.

**Depth State**

Controls the setting of the depth valid/invalid control bit

**Valid**

Select this option to set the depth valid bit.

**Invalid**

Select this option to not set the depth valid bit. The exception is if Restart Alignment or Force Position is being executed and a valid or manually entered depth is available.

**Enter Position Quality**

The MiniPOS3's INS algorithms and filter require a position quality value, e.g. standard deviation. Enter this value here in metres. Note the acceptable range is 0 to 600m. Entry of 0 will result in the Kearfott using its factory set default.

The default is 3.0m.

### Enter Speed of Sound (m/s) or Salinity (ppt)

Entry of either of these values supports the respective input from a Doppler speed log. The acceptable ranges are 100m to 1900m and 0 to 35 ppt respectively. WinFrog determines within which range the entry lies and uses this to determine which data type the entry is.

The default is Speed of Sound, 1495.0m/s.

### Use Latency Compensation

Check this box to instruct the MiniPOS3 to use the position latency encoded in the output message.

#### Use UTC Latency Compensation

Check this box to instruct the MiniPOS3 to use the Kearfott UTC and UTC in the message to address latency. This option is only available if Use Latency Compensation is checked. It is automatically cleared if Use Latency Compensation is unchecked.

### Enable Doppler

Check this box to instruct the MiniPOS3 to use an external Doppler log system.

### Doppler Ping

Check this box to instruct the MiniPOS3 to ping the external Doppler log system.

### Enable operator intervention in INS positioning

Checking this box enables the Restart Alignment and Force Position options. Poorly executed, these can have a very detrimental effect to the extent of rendering the MiniPOS3 inoperable. For this reason their use has been implemented such that it requires a very conscious action by the operator to perform. Once either the Restart Alignment or Force Position action has been executed, this checkbox is automatically cleared and the options disabled again.

For further information on these options as they impact the MiniPOS3 operation, refer to the manufacturer's documentation.

**Note:** Checking this box will disable the Enable operator ZUPT control option.

#### Restart Alignment

Click this button to instruct the MiniPOS3 to restart its alignment by setting the respective bit in the control byte. WinFrog will automatically clear this bit in the control byte after 2.5 seconds.

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**Note:** During the 2.5 second wait time, the operator cannot access the Restart Alignment, Force Position or ZUPT options.

### Force Position

Click this button to instruct the MiniPOS3 to execute a force position reset by setting the respective bit in the control byte for one message only after which the bit is cleared.

**Note:** Executing this option should not be repeated, though WinFrog will allow it.

### Use current position source

Select this option if the position to use for the Restart Alignment or Force Position action is the current source position and depth. Clicking either of these buttons with this option selected results in a prompt for the operator to confirm the action.



Clicking **No** results in WinFrog aborting the action.

Clicking **Yes** results in WinFrog performing as follows:

- If a Restart Alignment is being executed, a message is output immediately with the position and depth set to 0 and the respective data valid bits cleared. After the elapse of the 2.5 second wait period, the message to reset the restart Alignment is sent when the next valid position and depth are available. However, should a problem arise with the source position, the Restart Alignment can be re-executed using a manually entered position.

- If a Force Position is being executed, the message is output when the next valid position and depth are available. However, should a problem arise with the source position, the Force Position can be re-executed using a manually entered position.

**Use entered position**

Select this option if the position to use for the Restart Alignment or Force Position action is to be a manually entered position and depth. Clicking either of these buttons with this option selected results in a dialog where the position and depth to be used can be entered. Note that the position entry format and the depth units are as configured via the main menu Units option. The position can be entered as a WGS84 or Working Ellipsoid geographic coordinate, or a Working map Projection coordinate. It will be transformed accordingly to be WGS84 when output to the MiniPOS3.
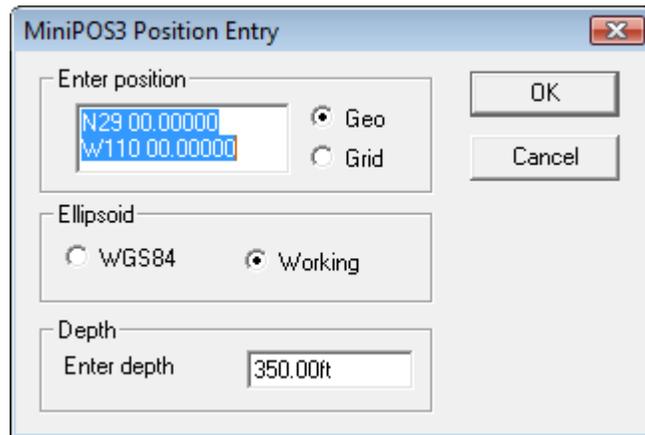


Exiting this dialog without clicking OK will result in WinFrog aborting the process. Completing this dialog and exiting by clicking OK will result in a prompt for the operator to confirm the action, including the entered position.



Clicking **No** results in WinFrog aborting the action.

Clicking **Yes** results in WinFrog performing as follows:

- If a Restart Alignment is being executed, a message is output immediately with the position and depth set to 0 and the respective data valid bits cleared. After the

elapse of the 2.5 second wait period, the message to reset the restart Alignment with the Restart Alignment bit cleared is output with the manually entered position and depth. Subsequent messages revert to the position source.

- If a Force Position is being executed, the message is output immediately with the manually entered position and depth.

**Enable operator ZUPT control**

Checking this box enables the ZUPT option. This must only be executed when the MiniPOS3 is stationary. For this reason its use has been implemented such that it requires a very conscious action by the operator to perform. Once the ZUPT action has been executed, this checkbox is automatically cleared and the option disabled again.

For further information on the ZUPT operation, refer to the manufacturer's documentation.

**Note:** Checking this box will disable the Enable intervention in INS positioning option.

**Start ZUPT**

If the ZUPT setting is currently not set, the button displays **Start ZUPT.** Clicking the button initiates the ZUPT process, the respective bit in the control byte is set and the message is output immediately. The button changes to state **Stop ZUPT**.

**Stop ZUPT**

If the ZUPT setting is currently set, the button displays **Stop ZUPT.** Clicking the button stops the ZUPT process, the respective bit in the control byte is cleared and the message is output immediately. The button changes to state **Start ZUPT**.

**Note:** When starting and stopping ZUPT, a prompt confirming that the respective action is indeed desired will appear; click Yes to continue, No to abort.



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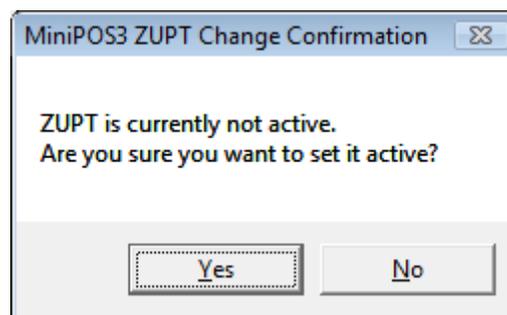
**WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:**

Adding the INS - MiniPOS3 device creates 4 or 6 data items, depending upon the selected input message type. If MiniPos1 or MiniPos2 messages are selected the available data items are POSITION, HEADING, ATTITUDE and DATA OUTPUT. If the Navigation Message is selected the available data items include these plus INERTIAL and INERTIAL_2. Once the data items have been added to the vehicle, they must be edited to suit the application.

**Note:** The INERTIAL_2 data item supports the passing of all data included in the MiniPOS3 Navigation message to the respective vehicle where it is available for application and logging to the 400 raw record.

It is important to note that the use of the position generated by the MiniPOS3 requires a specific setup within WinFrog. It is recommended that two vehicles be created for this purpose, the first to determine an unfiltered position for output to the MiniPOS3, e.g. USBL derived position (using the USBL BEACON data item), and the second to associate the resulting INS position with. The former requires the association of those data items required to generate the unfiltered position and the MiniPOS3 DATA OUTPUT data item. It can also include the MiniPOS3 HEADING and ATTITUDE data item(s) as these are valid data sources for the respective vehicle. The latter requires the association of either the MiniPOS3 POSITION, HEADING and ATTITUDE data items and optionally the INERTIAL data item, or the INERTIAL_2 data item.

**Note:** It is recommended that the INERTIAL_2 data item be used to apply the MiniPOS3 position information to a vehicle.

To associate a data item with a vehicle, access the vehicle's Configure Vehicle-Devices dialog and click the Add button in the bottom panel. Select those data items to be associated with the respective vehicle and click OK.

To configure any data item after association with a vehicle, from the Configure Vehicle-Devices dialog, highlight the data item and click Edit.

The following detail the two primary data items associated with this device.

### Data item: INS, MINIPOS3, DATA OUTPUT

Associate this data item with the vehicle being used to position the respective vehicle using standard methodology, e.g. USBL beacon. Configure the position output to reflect the position of the MiniPOS3 unit on the vehicle.

**Note:** The output position will be used in a Kalman type filter and therefore should not be filtered itself, i.e. ensure that the Kalman Filter is set Off (respective box is checked) and the Dead Recon is set off (respective box is unchecked) in the Configure Vehicle-Devices configuration dialog for this vehicle.
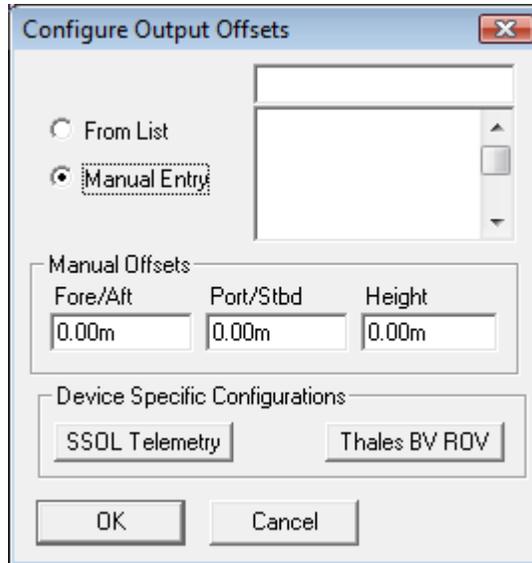
If an offset for the MiniPOS3 location on the vehicle with respect to the vehicle's CRP has been created in the vehicle's Offset list, check the **From List** option and select the respective offset from the list to the right. If the vehicle Offset list does not include the MiniPOS3, select the **Manual Entry** option (default) and enter the offsets relating the MiniPOS3 to the vehicle's CRP. Click OK to exit and apply the offsets.

**Note:** The offsets are applied using the respective vehicle's heading and attitude data, which is not necessarily that output by the MiniPOS3, to translate the CRP position to the designated offset position.

### Data item:  INS, MINIPOS3, INERTIAL_2

Associate the INERTIAL_2 data item with the vehicle that is to use the position generated by the MiniPOS3 inertial system.



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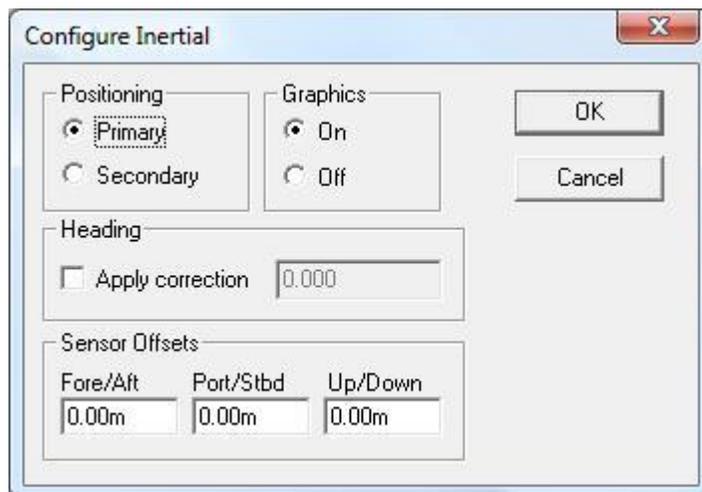
**Positioning**

**Primary**

Select this option if the position from the MiniPOS3 inertial filter is to be the primary position source for this vehicle.

**Secondary**

Select this option if the position from the MiniPOS3 inertial filter is to be the secondary position source for the vehicle. A possible scenario for this is if this data item is associated with the vehicle that is configured to generate the raw position for output to the same MiniPOS3 device to enable a direct comparison of input and resulting position. In this case the impact of the latency must be considered, i.e. output and input positions may not reflect the exact same epoch.

**Graphics**

**On**

Select this option if sensor position is to be displayed with a label in the Graphics window(s).

**Off**

Select this option if sensor position is not to be displayed with a label in the Graphics window(s).

**Heading**

**Apply Correction**

Check this box if there is a known heading correction to be applied to the heading value before being applied to the vehicle. In this case, enter the correction to be *added* to the observed heading value in decimal of degrees.

**Sensor Offsets**

Enter the offsets to relate the MiniPOS3 unit to the vehicle's CRP. Note that the heading and attitude information from the MiniPOS3 is used to translate the sensor position to the CRP.

The following detail those standard WinFrog data items associated with the MiniPOS3 device that can be used individually or together to essentially achieve the net result of using the INERTIAL_2 data item. Note that the configuration information is the generic configuration for these data items regardless of the device they are associated with.

### Data item:  INS, MINIPOS3, POSITION

Associate the MiniPOS3 POSITION data item with the vehicle that is to use the position resulting from the inertial filter.
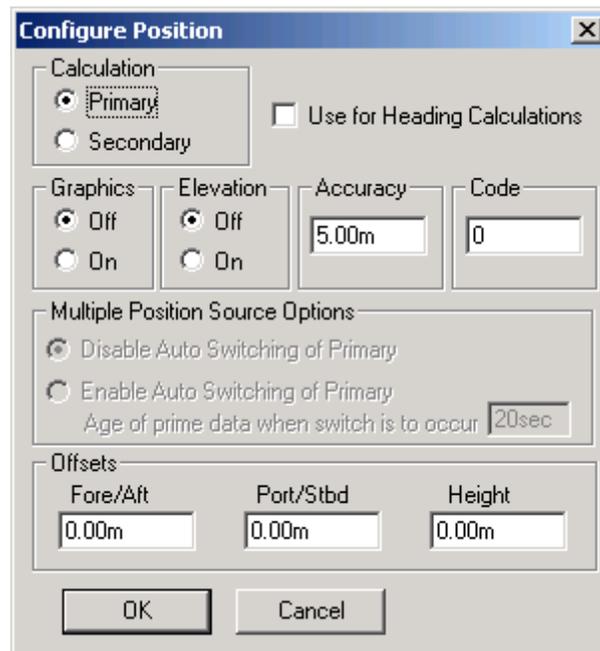


### Calculation:

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 data from a secondary device in the final solution of the vehicle's position.

If auto switching is enabled (see below) a secondary may automatically become a primary should all the primaries fail.

**Use For Heading Calculations:**
Select this checkbox if the device is to be used in conjunction with another GPS device 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:**
Setting the Elevation option to On will result in the elevation determined by GPS to be used as the elevation of the vessel referencing the GPS (WGS84) Ellipsoid. 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 (i.e. mean sea level), 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.

**Multiple Position Source Options:**
This group box allows you to enable automatic switching of a secondary to primary should the data from all POSITION data items set to primary timeout. The **Age** entered is the length of time that the secondary will wait in the absence of data from all primaries, before taking over as primary. This age is only entered for the secondary.

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Note for the auto switching feature to work, there must be at least one primary and one secondary enabled. For example, given two data items, one set to primary with the auto switching disabled and the other set to secondary with the auto switching enabled, if the primary fails the secondary is not set to primary and the vehicle positioning stops until the primary data item recovers.

**Disable Auto Switching of Primary:**
If this data item is not to be involved in the auto switching process, check this box. As stated above, this data item is then not involved in the auto switching process in any way.

**Enable Auto Switching of Primary:**
If this data item is to be involved in the auto switching process, either as a primary or a secondary, check this box. If set to secondary, enter the Age of data the primary data items must reach before this secondary is switched to act as the primary.

Note: This option is not enabled unless WinFrog determines that there is more than one POSITION data item associated with the respective vehicle.

**Offsets:**
Offsets are required to associate the MiniPOS3 sensor 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.

### Data item: INS, MINIPOS3, HEADING

Associate the MiniPOS3 HEADING data item with the vehicle that is to use the heading data.



**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 NMEA Gyro 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.

**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:  INS, MINIPOS3, ATTITUDE

Associate the MiniPOS3 ATTITUDE data item with the vehicle that is to use the attitude data.



#### Attitude
By default, the sensor mode is off, meaning that data from the attitude 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 checkbox 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 – checkboxes 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**
Not applicable.

### Data item:  INS, MINIPOS3, INERTIAL

Associate the MiniPOS3 INERTIAL data item with the vehicle that is to use the inertial data.

### Configuration Tab
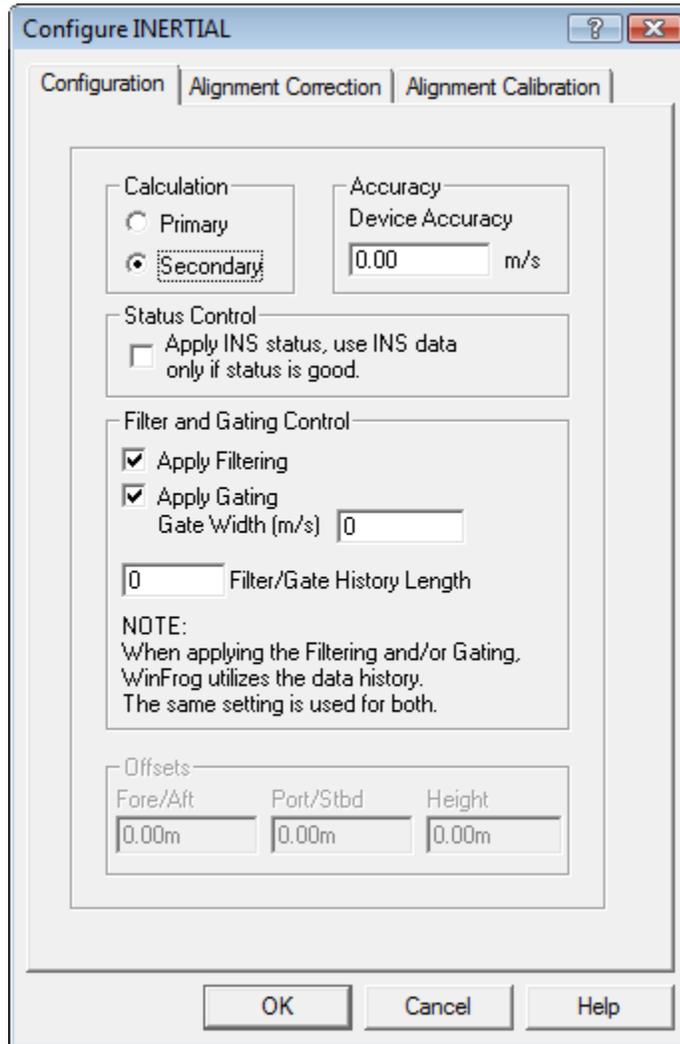


### Calculation

Set to Primary if you wish the inertial data to be used to assist the position of the vehicle.

### Accuracy

Accuracy of the inertial data in m/s. The default is 0.2. For details, refer to the Speed Log and Inertial Devices section in the Special Applications chapter.

**Status Control**

If the respective device is providing data status (valid or not valid) for the INERTIAL data, selecting this option will result in WinFrog monitoring the data status and if it is set to not valid, the data will not be used. This includes not inputting it to the filter and thus potentially skewing the filter performance.

If this option is not selected, the data is used regardless of the data status.

**Apply Filtering**

Controls the filtering of the raw inertial data prior to its use. If selected, a central tendency filter (which seeks the median of the input values) is applied to the data using the number of samples defined in the *Filter/Gate History Length*, the result of which is used for input to the Kalman Filter.

**Apply Gating**

Controls the gating of the raw inertial data prior to its use in the Kalman Filter. If selected, the new data is tested against the data history based upon the number of samples defined in the *Filter/Gate History Length*. If it exceeds the gate limits, the data is rejected.

**Gate Width**

Defines the gating limits in m/s, the value must be determined by monitoring the data.

**Filter/Gate History Length**

Defines the number of samples (minimum 3, maximum 30) to be used for both the central tendency filtering and the gating. This setting must reflect the application, environment and the inertial unit's performance. It depends upon balancing the need to smooth the data and the required responsiveness to real changes in the data. The longer the filter, the smoother the result, however, the result will be less responsive to the actual dynamics of the vehicle. The shorter the filter, the less smooth the results, and the more responsive to the actual dynamics of the vehicle.

It should be noted that if the *Apply Filtering* option is selected, but not the *Apply Gating* option, a default gating value of 10m/s is used for the purpose of utilizing the filtering function.

**Offsets**

Not applicable for this device.

**Alignment Correction Tab**
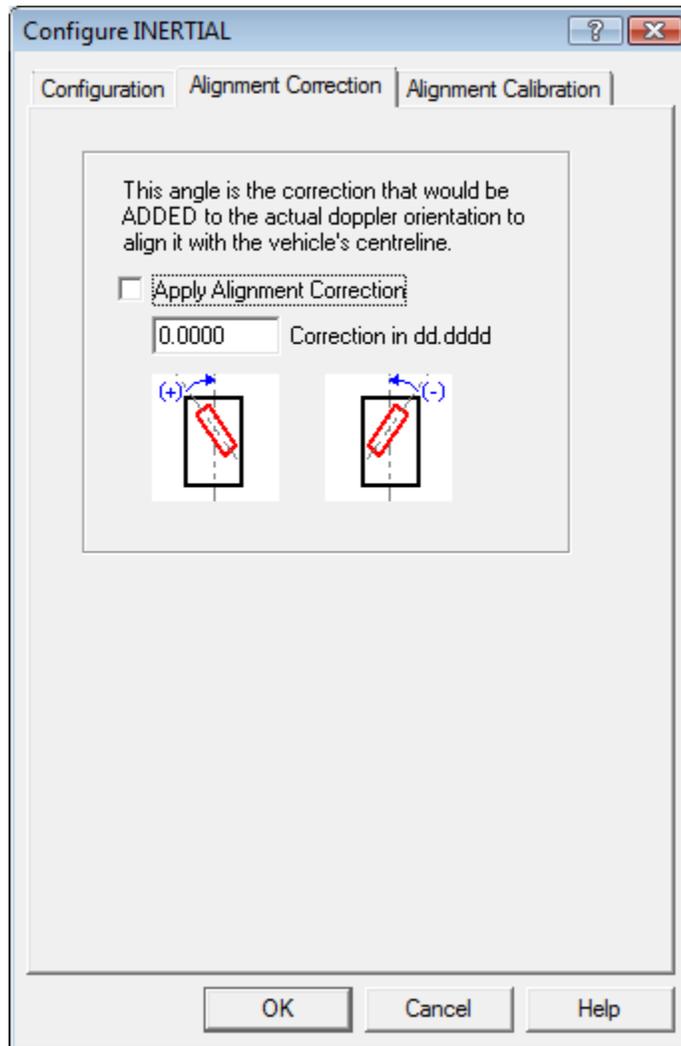


**Apply Alignment Correction**

If the inertial unit has a known misalignment relative to the vehicle, select this option and enter the correction, paying close attention to the sign convention as illustrated in the diagrams. The correction is used to translate the respective speed vectors before use.

### Alignment Calibration Tab
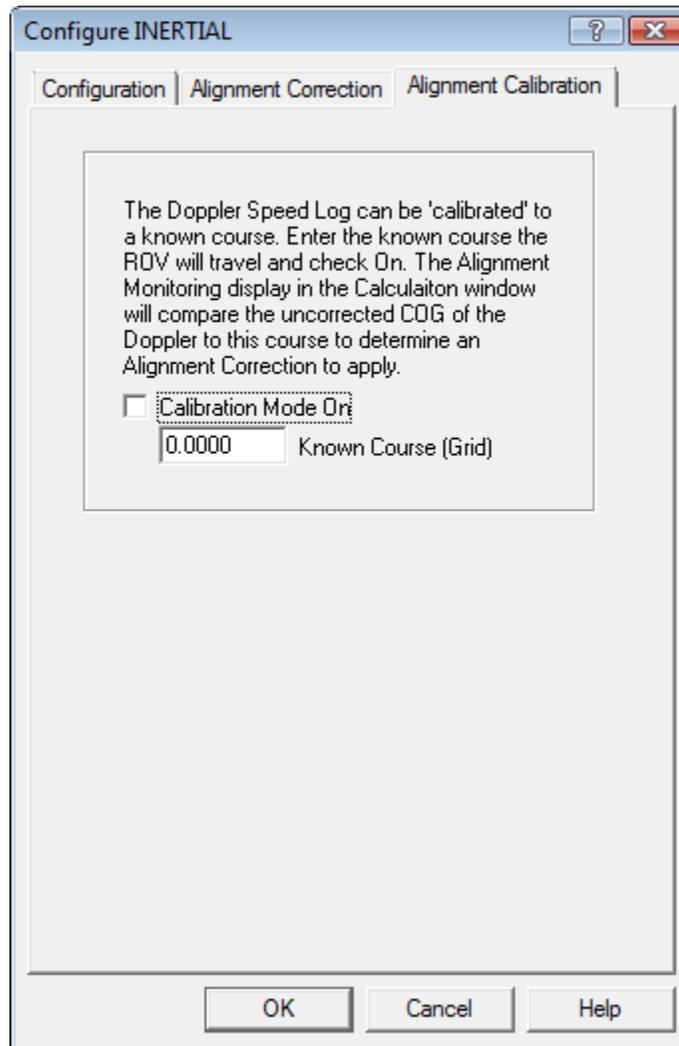


### Calibration Mode On

The INERTIAL data item has a very basic alignment calibration option. If the inertial unit alignment is to be calibrated, select this option and enter the grid bearing of the course (e.g. pipeline) that will be followed during the calibration process.

For details on this operation, refer to the Speed Log and Inertial Devices section in the Special Applications chapter.

## TELGRAM SPECIFICATION:

For details on the input and output messages, refer to the manufacturer's documentation.