

WinFrog Device Group:	ROV
Device Name/Model:	CMR2 ROV
Device Manufacturer:	
Device Data String(s) Output to WinFrog:	See Telegram Specification section below.
WinFrog Data String(s) Output to Device:	See Telegram Specification section below.
WinFrog Data Item(s) and their RAW record:	PLOWDATA 490 HEADING 409 ATTITUDE 413 BOTTOMDEPTH 411 ROV REF VEH NONE

DEVICE DESCRIPTION:

This is a driver designed to read the above-mentioned data from the CMR2 ROV. The PLOWDATA data item is included to allow WinFrog to read burial depth data from the CMR2.

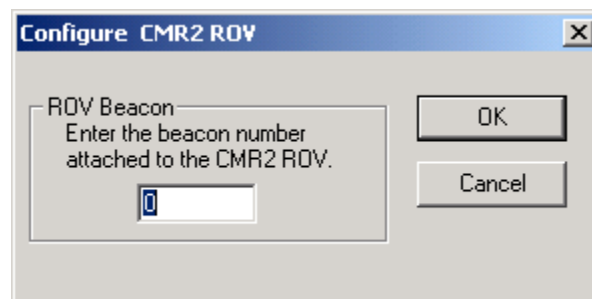
DEVICE CONFIGURATION INSTRUCTIONS

WINFROG I/O DEVICES > EDIT I/O:

Serial
Configurable Parameters

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 Configure CMR2 ROV dialog box appears, as seen below.



The x,y,z coordinates from the USBL are included as part of the data string output from WinFrog to the ROV. You must enter the number of the USBL beacon currently being used to track the ROV in order for WinFrog to output the desired x,y,z coordinates to the ROV. If you switch beacons during ROV operations, the beacon number must be changed in this dialog box as well.

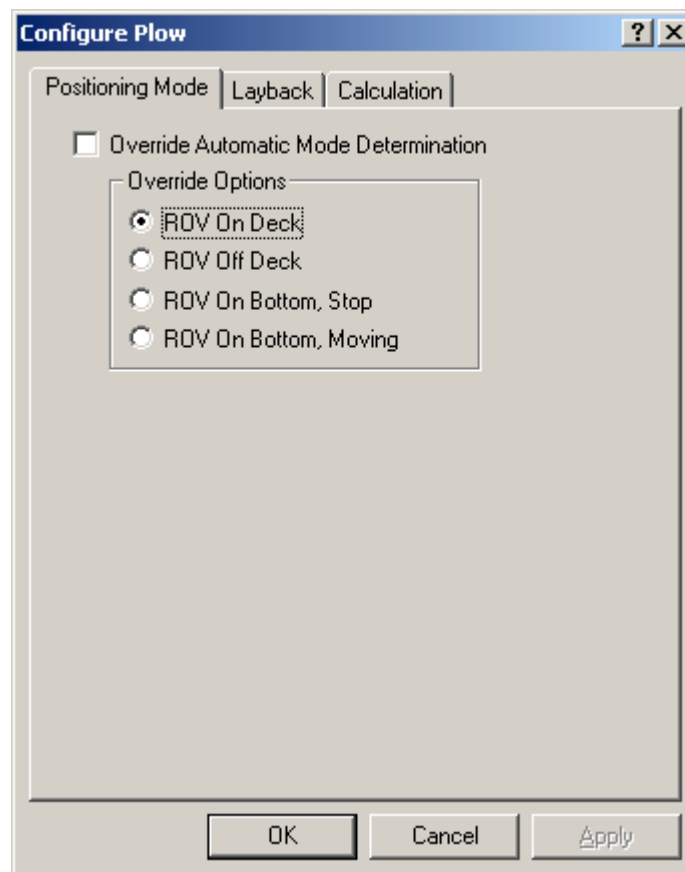
WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:

Adding the CMR2 ROV device creates five data items: PLOWDATA, HEADING, ATTITUDE, BOTTOMDEPTH and ROV REF VEH. Once the data items have been added to the vehicle, they must be edited to suit the application.

Data item: ROV, CMR2 ROV, PLOWDATA

This data item is attached to the ROV vehicle in WinFrog. It is typically used to read data from the plow or ROV, in this case burial depth and trench depth data, from the CMR2.

Highlight the PLOWDATA data item in the vehicle's device list and click the Edit button to open the Configure Plow dialog box as seen below.



Positioning Mode tab

This tab is used for towed vehicles such as plows. ROV's such as the CMR2 are typically positioned by acoustic devices such as USBL systems, therefore the options on this tab are not used for this device.

Layback tab

The screenshot shows a software window titled "Configure Plow" with three tabs: "Positioning Mode", "Layback", and "Calculation". The "Layback" tab is currently selected. Inside the tab, there is a section titled "Layback Calculation Method" with two radio buttons: "Pythagorean" (which is selected) and "Catenary". To the right of these is a text field labeled "Tow Cable Constant:" containing the value "73.29051" and the unit "N/m". Below this, there are three groups of radio buttons: "Use ROV Depth" with "Yes" and "No" (where "No" is selected), "Use ROV Speed" with "Yes" and "No" (where "No" is selected), and "Use ROV Tow Angle" with "Yes" and "No" (where "No" is selected). To the right of these is a text field labeled "Trench Depth Offset:" containing the value "0.0cm". At the bottom of the window are three buttons: "OK", "Cancel", and "Apply".

This tab is used for towed vehicles such as plows. ROV's such as the CMR2 are typically positioned by acoustic devices such as USBL systems, therefore the only option on this tab that may be used for this device is the Trench Depth Offset.

Trench Depth

Offset – If the Trench depth checkbox is selected on the Calculation tab (see below), then this value, 0.0 or otherwise, will be assigned as this vehicle's trench depth.

Calculation tab

The screenshot shows the 'Configure Plow' dialog box with the 'Calculation' tab selected. The dialog has three tabs: 'Positioning Mode', 'Layback', and 'Calculation'. The 'Calculation' tab contains several sections: 'Calculation' with radio buttons for 'Primary' and 'Secondary' (selected); 'Accuracy' with a text box showing '10.00m'; 'Graphics' with radio buttons for 'Off' and 'On' (selected); 'Offsets' with three text boxes for 'Fore/Aft', 'Port/Stbd', and 'Depth', all showing '0.00m'; 'Real-Time Navigation Updates' with a grid of checkboxes for 'Tel. Cable Tension', 'Tow Tension', 'Tel. Cable Count', 'Tow Wire Out', 'Stinger Angle', 'Burial Depth' (checked), 'Trench Depth' (checked), 'Altitude', 'Depressor Angle', and 'Pitch and Roll'; and 'Real-Time Calculations' with a checkbox for 'Calculate Toe Position'. A note at the bottom states: 'Note: The CRP of the plow must be the cutter's forward pivot point.' At the bottom of the dialog are 'OK', 'Cancel', and 'Apply' buttons.

Calculation

Primary – when selected, the layback described above will be used to calculate this vehicle's position, which will be assigned to it. However, since the CMR2 is typically positioned by acoustic devices, this should be set to Secondary.

Secondary – when selected, this device will not determine this vehicle's position. However, selecting Secondary and the relevant options on this tab from the Real Time Navigation updates section will allow for the recording of relevant data.

Accuracy

This option is not used by this device.

Graphics

Select the On radio button to display a square in the Graphics and Bird's Eye windows at the offset position below.

Offsets

These options are not used by this device.

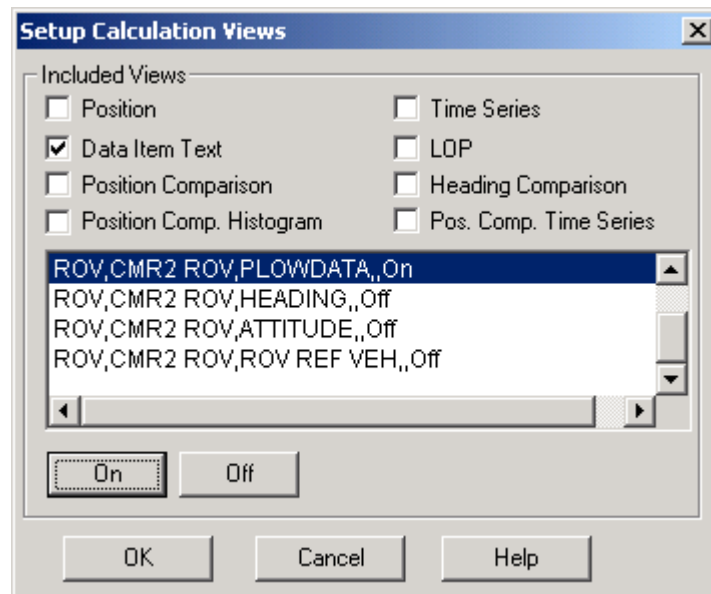
Real-Time Navigation Updates

The CMR2 ROV has the ability to provide real-time data updates via an umbilical. The only relevant data from this device is the burial depth and trench data. You should only select these two checkboxes for data output by the device, as leaving the other checkboxes selected causes data to be assigned to the vehicle. Since the CMR2 does not output the other types of data, 0 will be assigned for each item left selected and this will cause values from other devices to be overwritten.

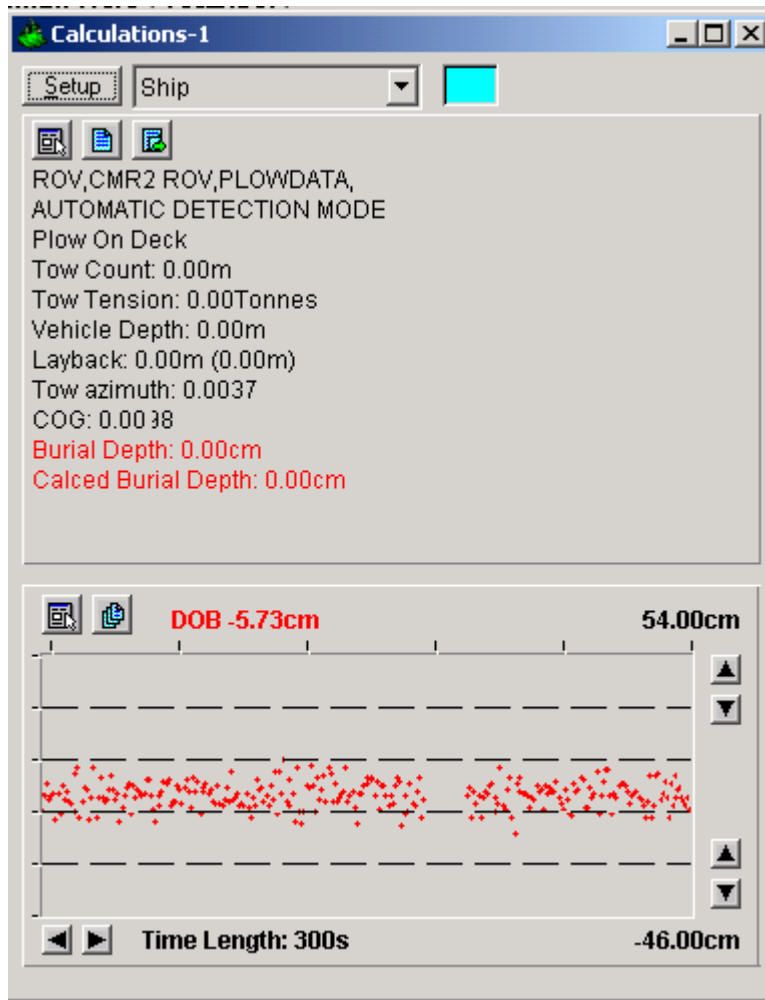
Real-Time Calculations

Calculate Toe Position – This option is not used by this device.

The burial depth data can be viewed in a Calculations window. To display the Calculations window, select View > Calculations from the main menu. Select the appropriate vehicle from the dropdown list and click the Setup button. Select the **Data Item Text** and **Time Series** options and turn the data item **ROV, CMR2 ROV, PLOWDATA** on by highlighting it and clicking the **ON** button as seen below.



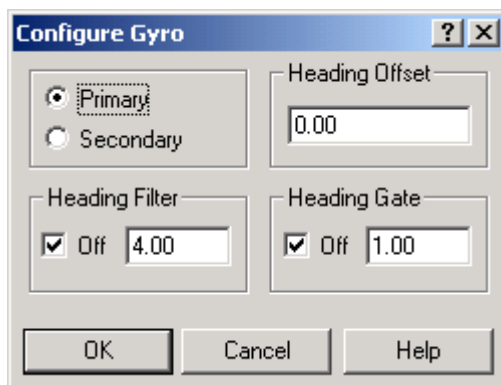
Exit with OK to display the Calculations window as seen below.



From this window you can monitor the burial depth data both numerically and graphically. This Calculation window also provides a shortcut to the Configure Plow dialog box by clicking the  button.

Data item: ROV, CMR2 ROV, HEADING

If the heading data from the CMR2 ROV is deemed to be accurate, this data item can be used to orient the vehicle. Highlight this data item in the vehicle's device list and click the Edit button to open the Configure Gyro dialog box as seen below.



Calculation (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 with heading information. However, unlike the Position data items, WinFrog does not calculate a weighted mean solution for multiple Heading data items. If more than one Heading data item is set to primary, the vessels heading, in WinFrog, will jump back and forth between the two. Devices set to Secondary are simply monitored, and are not used in the vehicle's calculations.

In the case of Primary device failure, WinFrog will not automatically use the Secondary device(s). You must manually change a Secondary device to Primary status in order for it to be used in the vehicle's calculations.

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.

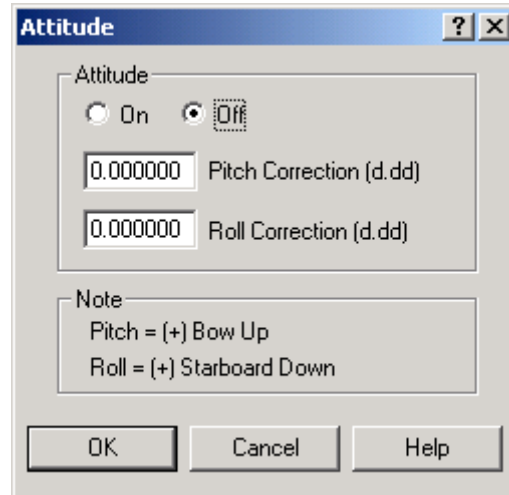
Heading Filter/Heading Gate:

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.

Data item: ROV, CMR2 ROV, ATTITUDE

If the pitch and roll data is to be used, then this data item can be added to the ROV's device list. Highlight the ATTITUDE data item and click the Edit button to open the Attitude dialog box as seen below.



Attitude

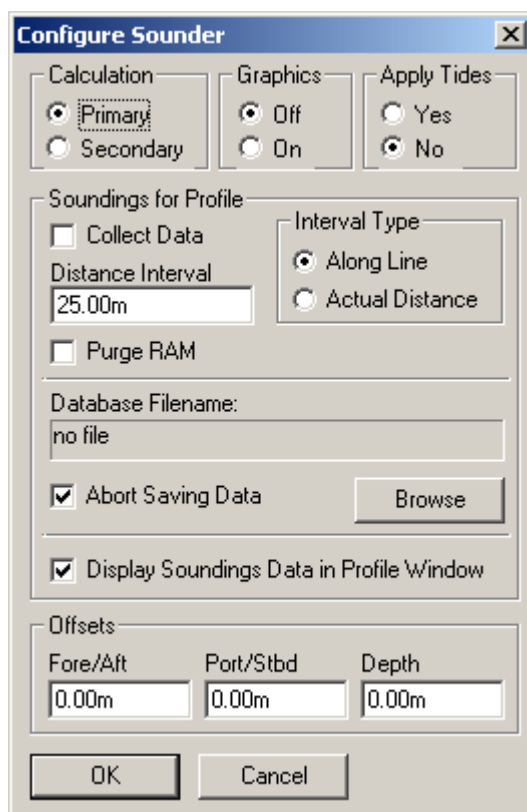
By default, the sensor mode is off, meaning that data from the Attitude device will not be used in the vehicle's calculations. Select 'On' to turn the sensor on and begin using the inclination corrections in the position output.

Correction values can also 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 Attitude 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.

Data item: ROV, CMR2 ROV, BOTTOMDEPTH

If the bottom depth data from this device is deemed accurate, then this data item can be added to the ROV's device list. Highlight the BOTTOMDEPTH data item in the vehicle's device list and click the Edit button to open the Configure Sounder dialog box as seen below.



The image shows a 'Configure Sounder' dialog box with the following sections and controls:

- Calculation:** Radio buttons for 'Primary' (selected) and 'Secondary'.
- Graphics:** Radio buttons for 'Off' (selected) and 'On'.
- Apply Tides:** Radio buttons for 'Yes' and 'No' (selected).
- Soundings for Profile:**
 - ☐ Collect Data
 - Distance Interval: 25.00m
 - ☐ Purge RAM
 - Database Filename: no file
 - ☒ Abort Saving Data
 - ☒ Display Soundings Data in Profile Window
- Interval Type:** Radio buttons for 'Along Line' (selected) and 'Actual Distance'.
- Offsets:** Three text boxes for 'Fore/Aft', 'Port/Stbd', and 'Depth', all containing '0.00m'.
- Buttons:** 'OK' and 'Cancel' at the bottom.

Calculation:

Set the type of calculation to Primary or Secondary using the appropriate radio button. WinFrog will only utilize (i.e. display and record) data from a Primary sounder device. If there is more than one Primary sounder attached to a vehicle's device list, WinFrog will not mean the data (as is done with positional devices), but rather alternate between the devices. Data from a Secondary status sounder will simply be monitored.

Graphics:

Select the On radio button to display a labeled square representing the location of the sounder in the Graphics and/or Bird's Eye windows.

Apply Tides:

If the Yes radio button is selected, WinFrog will apply tidal corrections to the observed water depths. Depths displayed in the Vehicle Text window and recorded in automatic event (i.e. .DAT, .SRC, and .RCV) and type 351 raw files will refer to

the datum corrected depths. Note that type 411 raw data records will remain truly raw and will not reflect the tide correction.

The tide information can be supplied by a real time telemetry system or by predicted tide files. Either way, the tide “device” must also be attached to the same vehicle’s device list. For more information, refer to documentation on Tide devices.

Soundings for Profile:

This section of the Configure Sounder dialog permits the collection of sounding data to an .mdb database file for display in WinFrog’s Profile window. This collection is completely separate from automatic event or raw data collection.

Collect Data

Select this checkbox to enable the collection of data to an .mdb database file.

Interval Type

Select to utilize either Along Line or Actual Distance (i.e. between successive position updates) calculations for data collection intervals. Selecting Along Line requires that you also enable survey line tracking.

Distance Interval

Specify the distance interval at which the data will be collected.

Purge RAM

Sounding data is stored in the RAM memory of the computer. Any data collected which will not be required at later time can be deleted by selecting the Purge RAM checkbox, then clicking the OK button to exit the dialog box.

Database filename

Click the Browse button to define where and to what filename the .mdb file will be written. The file name and location are displayed here.

Abort Saving Data

Select this checkbox to abort saving data to the .mdb file. In other words, to save data to the .mdb file ensure that this box is NOT checked.

Display Soundings Data in Profile Window

Select this checkbox to enable the display of this data in WinFrog’s Profile window.

Offsets

This section of the dialog allows for entry of offset values as measured from the vessel’s Common Reference Point (CRP). Note that the Fore/Aft and Port/Stbd offsets are used for “cosmetic” visual purposes only: An echo sounder is not a positioning device, and hence its horizontal offsets have no application. If the echo sounder’s position is to be recorded correctly, you must create and enable a vehicle

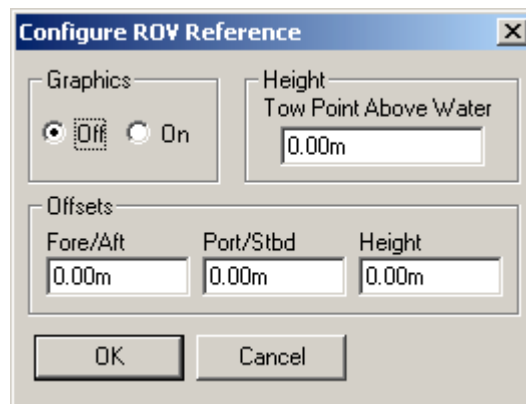
Tracking Offset for that specific location. The offsets entered here can simply be used as a means of graphically confirming that the Tracking Offset values have been entered correctly.

The Depth Offset is applied; the entered value will be added to the received sounder data.

Depths displayed in the Vehicle Text window and recorded in automatic event (i.e. .DAT, .SRC, and .RCV) and type 351 raw files will refer to the corrected depths. Note that type 411 raw data records will remain truly raw and will not reflect the depth offset correction.

Data item: ROV, CMR2 ROV, ROV REF VEH

This data item is added to the ship's device list to allow the ship's position to be transmitted to the ROV control system. As such, this data item is attached to the ship in WinFrog. Highlight the ROV REF VEH data item in the ship's device list and click the Edit button to open the Configure ROV Reference dialog box as seen below.



Graphics:

Select the On radio button to display the device name and a square at the location of the ROV, within the Graphics and Bird's Eye windows.

Tow Point Height:

This option is not used by this device.

Offsets:

The X,Y,Z Offsets are applied from CRP to the offset position the operator desires to transmit to the ROV control system. These values are set similar to values that would be applied to any device offset within WinFrog.

Note: It is advised to use the waterline as the vertical CRP reference when sub-sea positioning devices are employed.

TELGRAM SPECIFICATION:

INPUT STRING

Field	Data
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1	\$ROV
2	roll
3	pitch
4	heading
5	trenchDepth
6	burialDepth
7	cf_offset
8	cf_vertical_dist
9	cf_altitude
10	cf_depth_cover
11	cf_signal1
12	cf_signal2
13	cf_signal3
14	cf_signal4
15	cf_error_code
16	water_depth

OUTPUT STRING

Field	Data
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1	"\$SHIP"
2	usblX
3	usblY
4	usblZ
5	rovDCC
6	shipLatDeg
7	shipLatMin
8	shipLonDeg
9	shipLonMin
10	shipHeading
11	shipPitch
12	shipRoll
13	toolLatDeg
14	toolLatMin
15	toolLonDeg
16	toolLonMin
17	rovKP