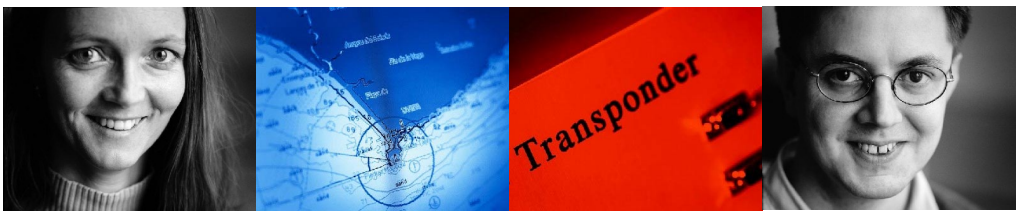
Saab TransponderTech

OPERATOR'S MANUAL

R4-AIS Class A Transponder System



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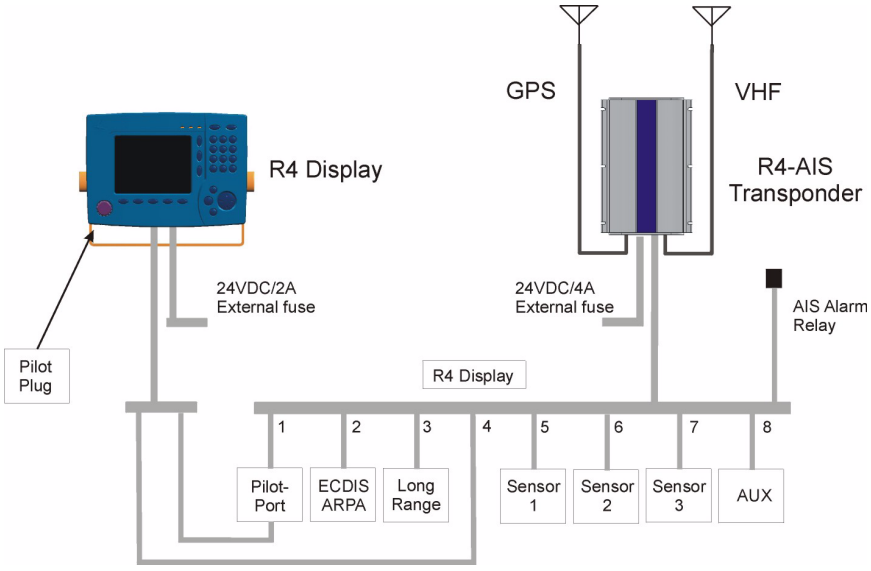
Product Description

System Overview

The R4-AIS Class A Transponder System consists of a radio transceiver unit, a GPS receiver, a controller unit and a separate display (MKD) unit. The transceiver contains three independent VHF receivers; two TDMA tunable receivers, one DSC receiver and one transmitter, which alternate its transmissions between the two operating TDMA channels. The transmitter can also be used to reply a DSC interrogation (ITU-R M.825 -3, Annex 1). The controller creates and schedules data packets for transmission based on Dynamic, Static and Voyage related data as defined in the IMO performance standard for AIS.

The R4-AIS shall be connected to the ship's sensors as required by the installation guidelines published by IALA. The R4-AIS can interface external navigation and presentation systems that support required IEC 61162-1 sentences as set out in R4-AIS Installation Manual. The R4 Transponder is prepared for connection to Long Range systems like Inmarsat C.

The R4 Display has a user-friendly interface for plotting of other ships on a radar like display, as well as a display of listed information about other vessels sorted by range or by bearing. The display is also used for configuration and sending/receiving of messages.



Main Features

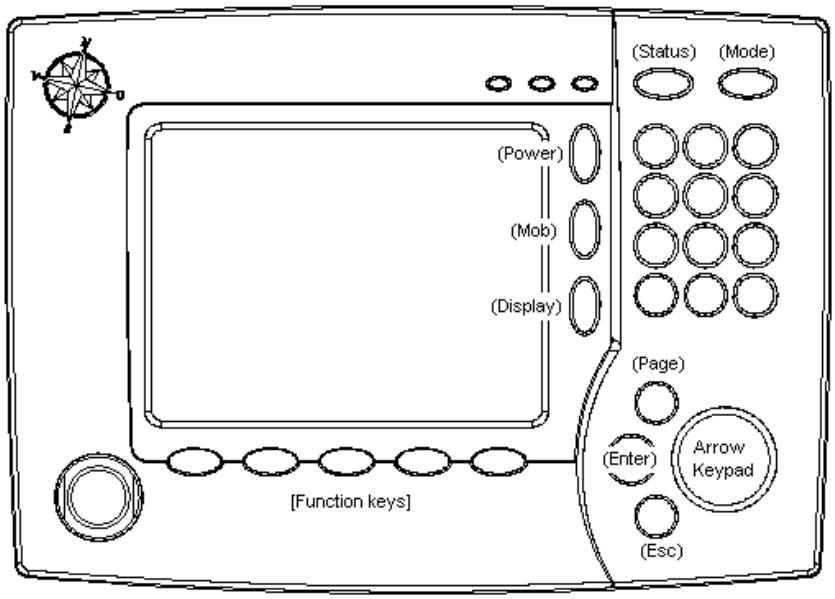
- Broadcast of Dynamic, Static and Voyage related information.
- Standardized interface for connection to ship sensors e.g.GNSS, Gyro, Rate of Turn Indicator, ECDIS/ECS and ARPA.
- High resolution 6 " graphic day and night display providing for example a radar like display presenting up to 500 targets in vicinity of own ship, situation display with capability to view vessels in the most interesting bearing and range, messaging display for generation and presentation of safely related text messages.
- The mandatory pilot plug is integrated in the display.
- Upgradeable without hardware modifications due to fully integrated DSP solution.
- VHF transceiver with one transmitter, three receivers.
- Channel management capability for areas without access to the worldwide allocated AIS frequencies.
- Possibility to generate Long Range AIS reply over satcom equipment for example Inmarsat C.

Optional

- DGNSS capability (New DGNSS standard).

Getting Started

Front Panel Keys



- **(Power)** Used for turning the R4 Display on and off. To turn the power off press and hold the key for 3 seconds.
- **(Mob)** No function.
- **(Display)** Displays the controls for backlight and contrast.
- **(Status)** Used for display and change navigational status for the own ship.
- **(Mode)** Used for toggling between AIS mode and Configuration mode.
- **(Alphanumeric keys)** These keys are used for entering messages, passwords etc. To write a number press the key once. To write a character press the key multiple times. Press once for the first character (before the cursor appears), twice times for the second character and so on.
- **(Page)** Retrieves function keys to show main view alternatives.
- **(Enter)** Used to start editing and for confirming data entry.
- **(Esc)** Returns display to previous page, or restores a data field's previous value.
- **(∧ ∨)** Moves the field highlight up and down from field to field (arrow keypad).
- **(< >)** Moves the field highlight left and right from field to field (arrow keypad).
- **[Function keys]** These keys have different functions depending on the current view. The function is displayed above each key on the screen.

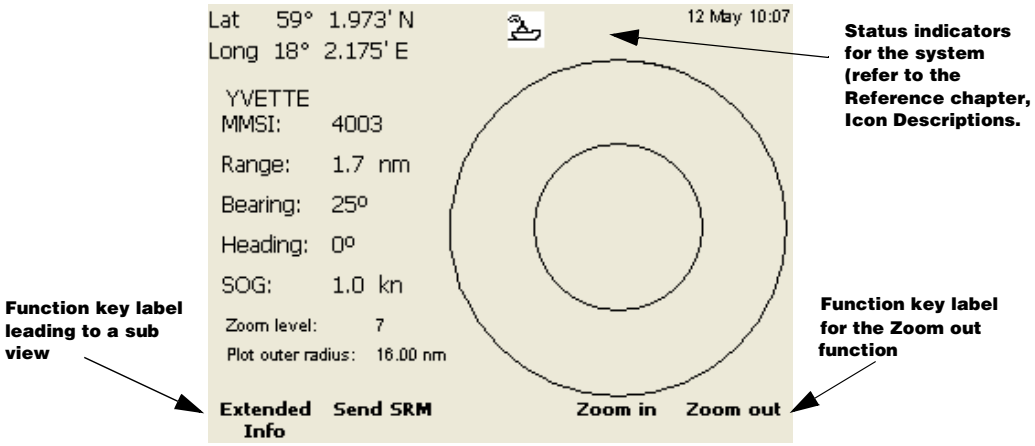
How to Operate the R4 Display

Views and Function Keys

The user interface is built upon a number of *views*. Navigation between different views is done with the *function keys* below the screen and the **(Esc)** and **(Page)** keys on the right side of the front panel.

Use the function keys to step into a specific view, and **(Esc)** to get back up one level. Pressing **(Page)** will retrieve function keys to show main view alternatives. An example view is shown below. In the following sections of the manual the most frequently used views are described.

The function keys are view specific and the function of each key is specified with a label on the screen. Note that unlabelled keys are not active in that specific view. Also, in some views the function keys might serve as switches, e.g. toggling a parameter.



Change Settings

Some views have a specific *Change Settings* function key used for entering text and numerical data.

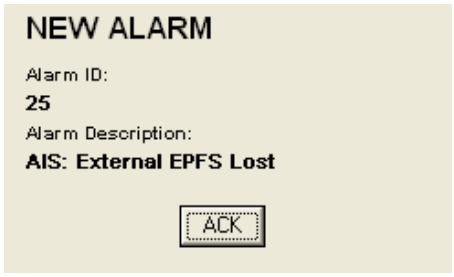
To change one or more parameters press function key **[Change Settings]** and select the desired parameter by using the **(∧ ∨ < >)** key. Press **(Enter)** to enter data in one of three ways:

- **Numbers and characters**: Use the **(Alphanumeric keys)** keys according to "Front Panel Keys" on page 7. To delete a character, press function key **[Backspace]**.
- **List of predefined values:** Use the **(∧ ∨)** key to select between the predefined values.
- **Bar graph data:** Use the **(< >)** key to increment or decrement the parameter.

Press **(Enter)** when ready. If desired, use the **(∧ ∨ < >)** key to select a new parameter to be edited, else press function key **[Apply and Exit]**.

Alerts

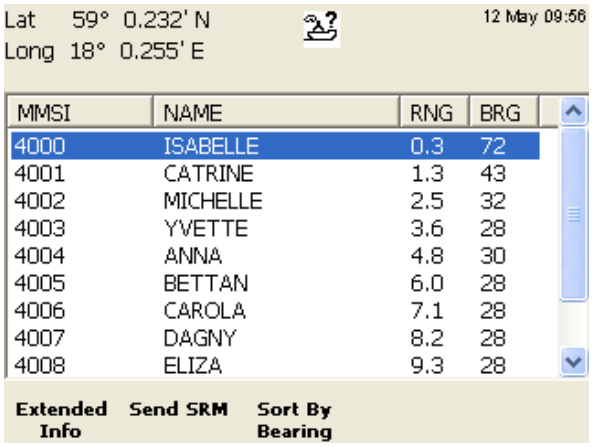
The R4 Display has two different alert pop-up windows that can appear at any time, *New Alarm* and *New LR Message*. To acknowledge the alert and close the pop-up window, press **(Enter)**.



Reading Remote Ship Information

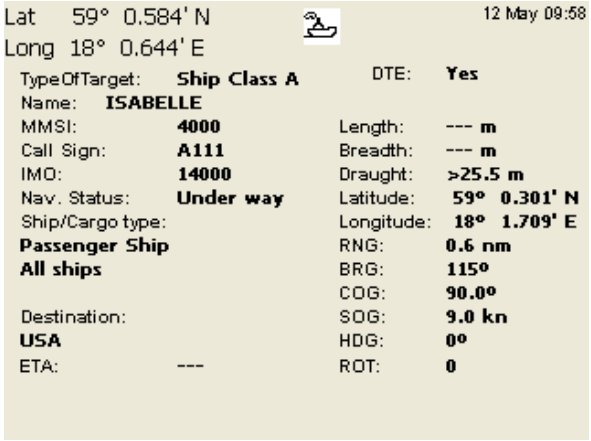
Target List View

The R4 Display will power up in *Target List* view. This view, also referred to as the *minimal display*, displays a list of all targets sorted by range from own ship (closest first). The list includes MMSI, ship's name, range (RNG) and bearing (BRG). By toggling the **[Sort By Bearing] / [Sort By Range]** function key the list will be sorted either by range or by bearing. If the list is sorted by bearing, the start bearing will be in own COG direction. Each bearing sector covers 30° and moving through the sectors is done in 15° steps by using the function keys **[-15° ←]** and **[+15° →]**.



For extended information about a target in the list, select the ship with the **(∧ ∨)** key and press function key **[Extended Info]**.

The *Extended Information* view includes static, dynamic and voyage related data for the selected target.

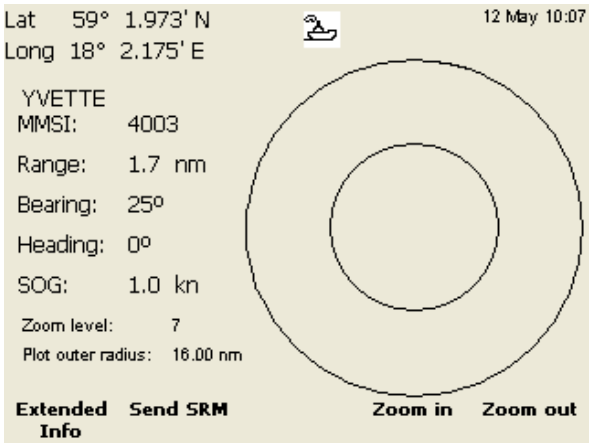


Press **(Esc)** to return to *Target List* view.

Back in *Target List* pressing function key **[Send SRM]** is used to send a safety related message (SRM) to the currently selected target. For more information about sending SRMs, see Reference chapter, section “Safety Related Messages (SRM)” on page 25.

Plot View

Plot view displays the targets closest to your ship. Use the **(∧ ∨ < >)** key to select any of the targets on the display. Brief information about the selected target is shown to the left. Use the **[Zoom in]** and **[Zoom out]** function keys to zoom in or out.

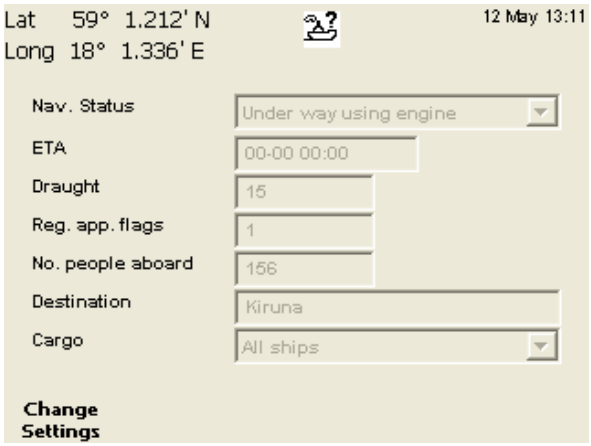


For extended information about a target, select the ship with the **(∧ ∨ < >)** key and press function key **[Extended Info]**.

Pressing the function key **[Send SRM]** sends a safety related message (SRM) to the currently selected target. For more information about sending SRMs, see Reference chapter, section “Safety Related Messages (SRM)” on page 25.

Set and Read Voyage Related Information

Voyage related information is displayed in *Voyage* view, and is accessed by pressing **(Page)** and then function key **[Voyage]**. Voyage related data includes information such as destination, estimated time of arrival (ETA) and number of people aboard.



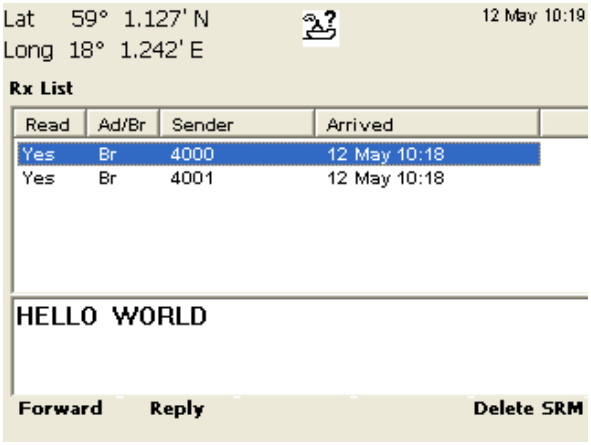
For more information about changing voyage related data, see Reference chapter, section “Voyage” on page 24.

Handling Safety Related Messages (SRM)

Safety related messages (SRM) can be sent to a specific target (addressed message), or broadcast. Maximum length for an addressed message is 156 characters and for a broadcast message it is 161.

Read Received SRMs

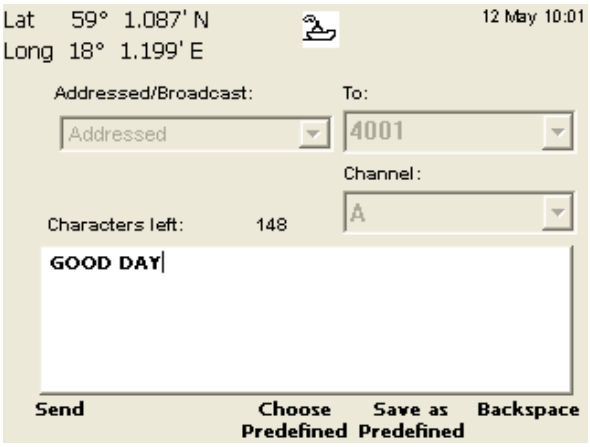
The received SRMs can be accessed in the view *Received SRMs*. To get to this view, press **(Page) - [SRMs] - [Rx list]**.



Select an SRM with **(∧ ∨)** to see the entire message. For more information about sending SRMs, see Reference chapter, section “Safety Related Messages (SRM)” on page 25.

Send SRMs

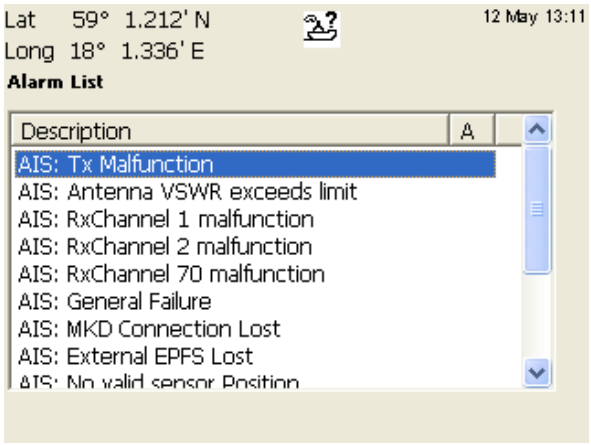
SRMs are composed and sent in the *Send SRM* view. To get to this view, press **(Page) - [SRMs] - [Send SRM]**.



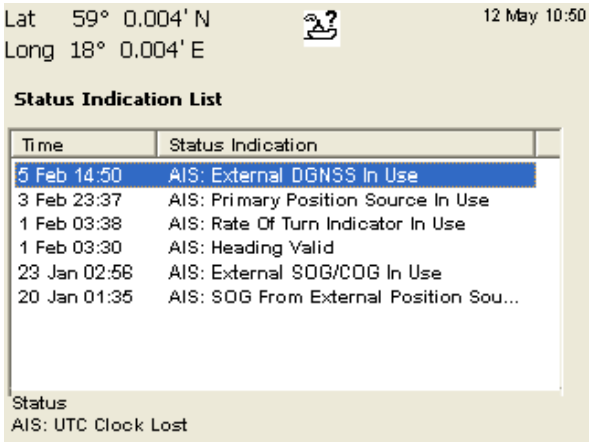
The message can either be composed manually, or taken from a predefined list. For more information about how to create and send a safety related message see Reference chapter, section “Safety Related Messages (SRM)” on page 25.

Alarms and Status Lists

Current alarm status can be viewed under the *Alarm List* view. To enter this view, press **(Page) - [Auxiliary Info] - [Alarm List]**.

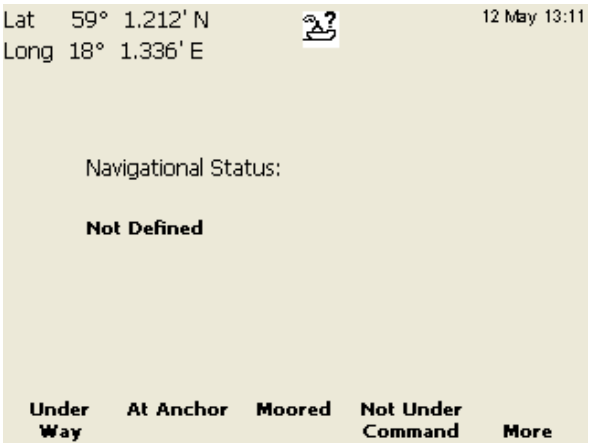


Current status of indications and the latest events are listed in the *Status List*. To enter this view, press **(Page) - [Auxiliary Info] - [Status List]**.



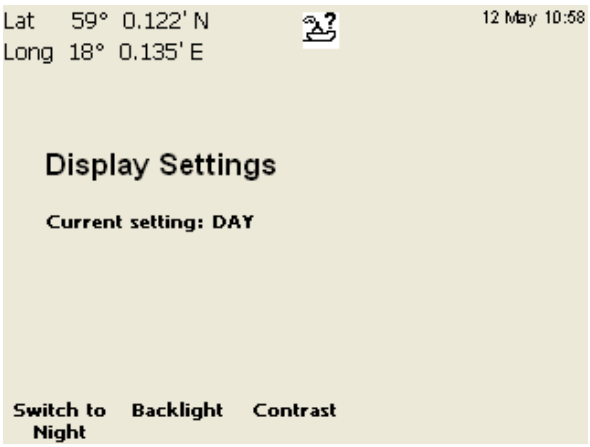
Setting the Navigational Status

The ship's navigational status can be configured in the *Navigational Status* view. This view is reached by pressing the **(Status)** key. The status information is selected by pressing the appropriate function key. Use the **[More]** function key to toggle between the different status messages alternatives.

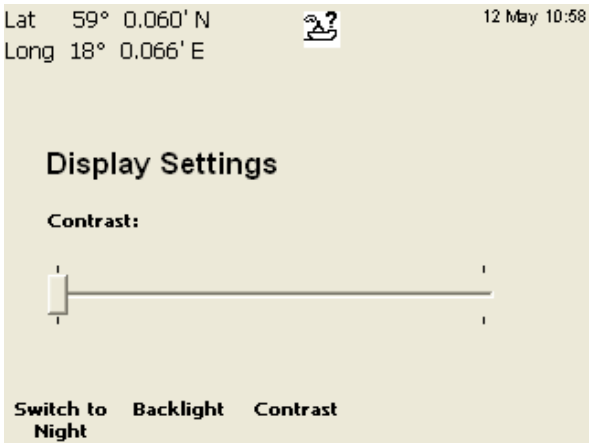


Display Settings

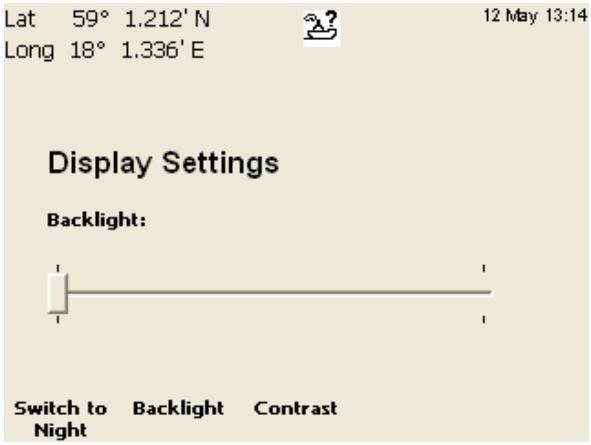
The display backlight, contrast and day or night mode can be changed in the *Display Settings* view. To enter this view, press **(Display)**.



To change between day and night mode, press **[Switch to Day/Night]**.



To change the contrast setting, press **[Contrast]** and increase/decrease with **(< >)**.



To change backlight setting, press **[Backlight]** and increase/decrease with **(< >)**.

To exit the *Display Settings* view, press **(Display)** or **(Esc)**.

Reference

Icon Description

Miscellaneous Symbols

 Alarm

 Unread SRM

 Unread Long Range messages (AUTO)

 Unacknowledged Long Range interrogations (MAN)

 Engineering mode

 Service Engineering mode

Navigational Status (Own Vessel Icons)

 Navigational status is undefined

 At anchor or moored

 Under way using engine

 Navigational status is one of; Not under command, Restricted manoeuvrability, Constrained by her draught, Aground, Engaged in fishing, Under way sailing, Reserved for future use.

Target Symbols (Target List, Plot View)

 Ship (class A or B)

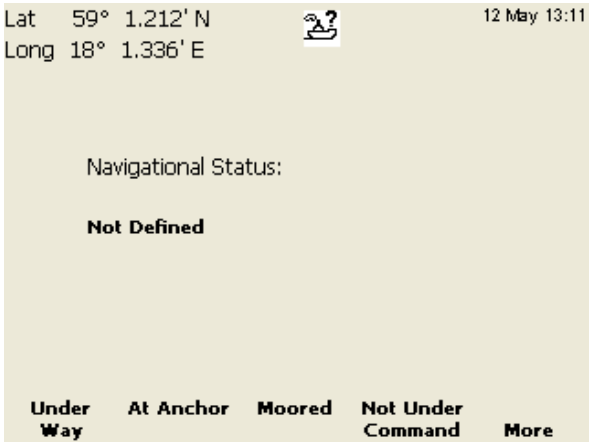
 Base Station

 SAR

 Aids-to-Navigation

Navigational Status

The ship's navigational status can be configured in the *Navigational Status* view. To reach this view press the **(Status)** key.



To change the navigational status, press one of the following function keys:

- **[Under Way]**
- **[At Anchor]**
- **[Moored]**
- **[Not Under Command]**
- **[Restr Manoeuv]** (Restricted Manoeuvrability)
- **[Const By Draught]** (Constrained By Draught)
- **[Aground]**
- **[Engaged in fishing]**
- **[Under Way Sail]**
- **[Not Defined]**

Use the **[More]** function key to toggle between the different navigational status alternatives.

System Modes

The R4 Display has two system modes, *AIS* and *Configuration*. The system modes allows the user to either configure the R4-AIS, in Configuration mode, or to perform normal operations, in AIS mode.

Accessing AIS mode views when in a Configuration mode view

1. Press **(Mode)**.
2. Press function key **[AIS]**. *Target List* view will now be displayed.
3. To continue to other views press **(Page)**.
4. Press the function key associated with the desired view.

Accessing Configuration mode views when in an AIS mode view

1. Press **(Mode)**.
2. Press function key **[CONFIG]**.
3. Press the function key associated with the desired view.

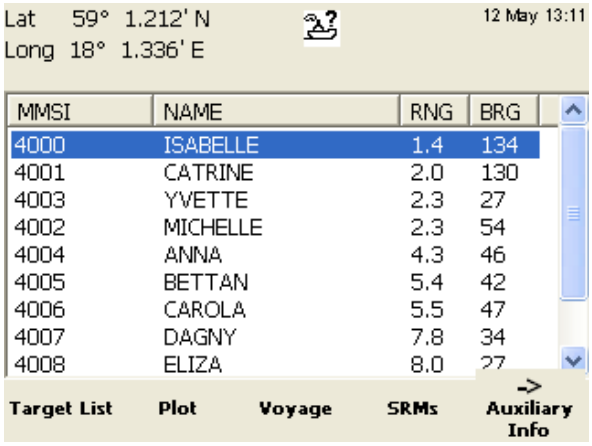
AIS Mode

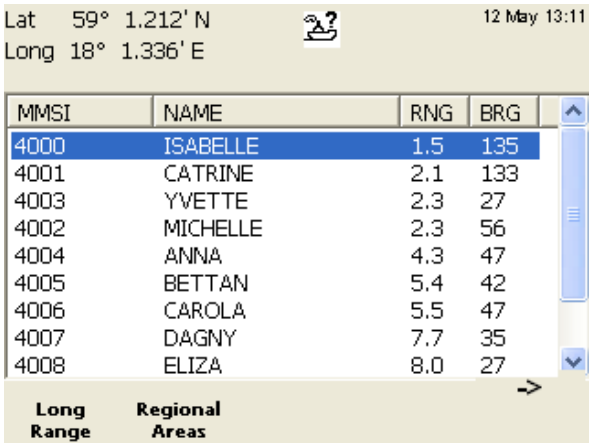
AIS mode is a set of views for displaying remote targets and their related information on a plot or list format, alarms and status/indications, regional area information, read and send safety related (SRM) and long range (LR) messages.

AIS views

- *Target List* lists brief information about the closest targets.
- *Plot* shows the closest targets on a plot and displays external information for the marked target.
- *Voyage* displays the current voyage related settings.
- *SRMs* allows the user to read and send Safety Related Messages (SRM).
- *Auxiliary Info* displays alarms and status/indications.
- *Long Range* allows the user to view and acknowledge long range (LR) interrogations.
- *Regional Areas* allows the user to view and configure regional areas.

The AIS views are accessed using the function keys. If the desired view is not listed, press **(Page)** one or several times until the function key for the view is shown.





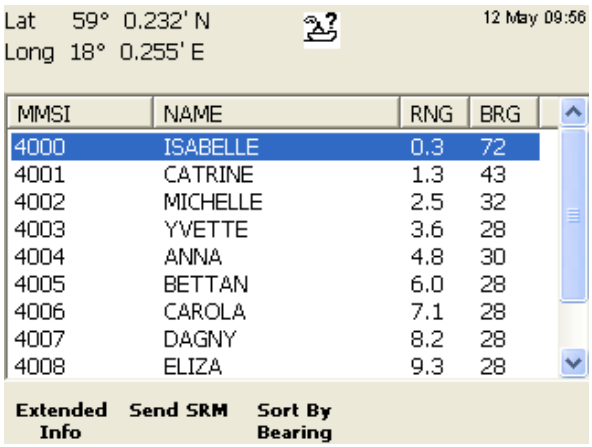
Accessing an AIS view when in another AIS view

1. Press **(Page)**.
2. Press the function key associated with the desired view.

Target List

The *Target List* view displays a list of all targets sorted by range from own ship (closest first). The list includes MMSI, ship's name, range (RNG) and bearing (BRG). By toggling the **[Sort By Bearing]/[Sort By Range]** function key the list will be sorted either by range or by bearing. (If the list is sorted by bearing, the start bearing will be in own COG direction. Each bearing sector covers 30°.)

To get detailed information about a target or to send an SRM to a specific target, enter the subviews *Extended Info* or *Send SRM*.

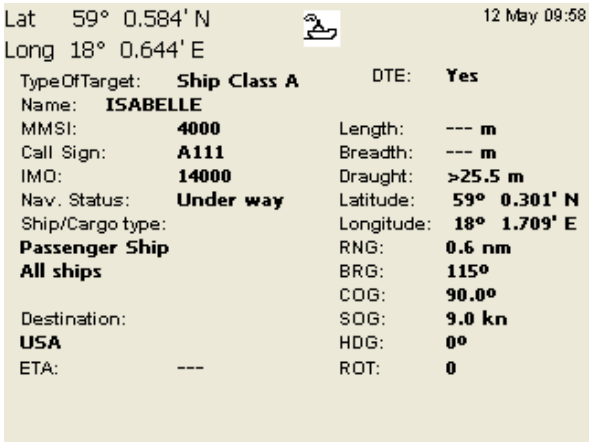


Selecting a target

1. Choose a target using the **(∧ ∨)** key.

To get extended information about a selected target

1. Press function key **[Extended Info]** or **(Enter)**.



Sending an SRM to a selected target

1. Press function key **[Send SRM]**.
2. To send SRMs, refer to “Send SRM” on page 27.

Sorting by bearing (BRG) or by range (RNG)

1. Toggle the function key **[Sort By Bearing]/[Sort By Range]**.

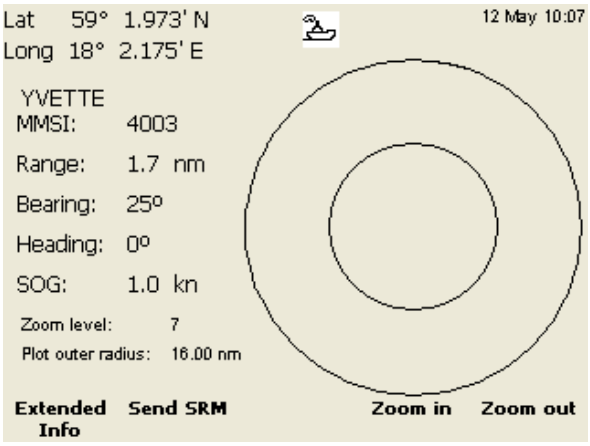
Changing displayed sectors when targets are sorted by bearing

1. Use the function keys **[-15° ←]** and **[+15° →]** to step through the sectors anti-clockwise or clockwise. (Starting sector is in own COG direction.)

Plot

The *Plot* view displays the targets closest to your ship and brief information (MMSI, range, bearing, heading and SOG) about the currently selected target. To get detailed information about a target or to send an SRM to a specific target, enter the subviews *Extended Info* or *Send SRM*.

The inner radius of the plot is at half the distance of the outer radius.



Selecting a target

1. Choose a target using the **(∧ ∨ < >)** key.

To get extended information about a selected target

1. Press function key **[Extended Info]** or **(Enter)**.

Sending an SRM to a selected target

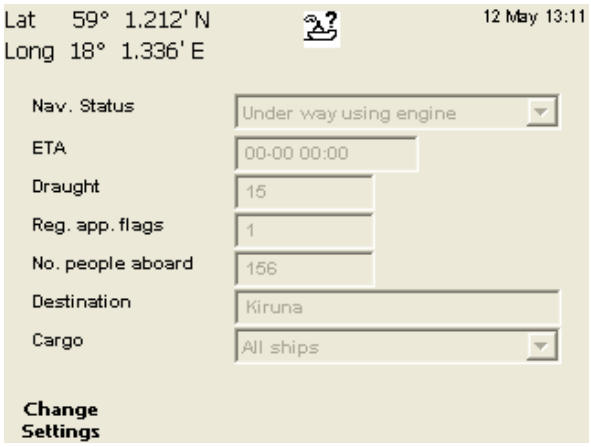
1. Press function key **[Send SRM]**.
2. To send SRMs, refer to “Send SRM” on page 27.

Zooming

1. Use the function keys **[Zoom In]** and **[Zoom Out]** to zoom in and out.

Voyage

Voyage view displays voyage related data such as navigational status, estimated time of arrival (ETA), number of people aboard and destination.



Change settings

1. Press function key **[Change Settings]**.
2. Select parameter using **(∧ ∨)** and press **(Enter)**.
3. Enter desired value using the keypad or if it is a drop down list, select a value using **(∧ ∨)**, and press **(Enter)**.
4. Repeat step 2 and 3 if necessary. When ready press function key **[Apply and Exit]**.

1W Mode

A special function called “1 W mode” is activated when the own ship is a tanker (i.e., Ship Type is set to Tanker in the *Ship Static data* configuration view).

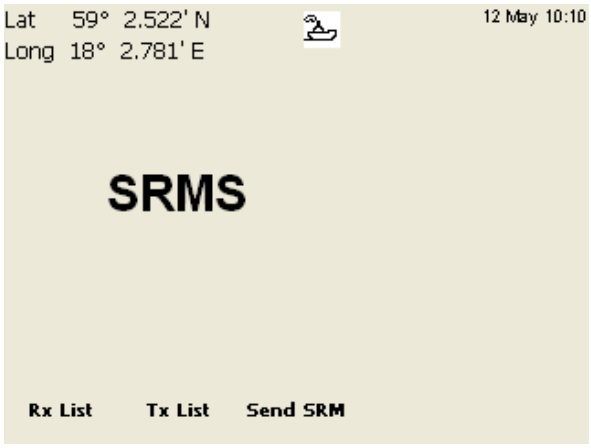
For further information about the “1 W mode” see International Safety Guide for Oil Tankers & Terminals (ISGOTT). For instructions on how to change ship static data, see section “Ship Static Data” on page 48.

Turning the “1 W mode” on or off

1. Toggle the function key **[1 W mode ON]/ [1 W mode OFF]**.

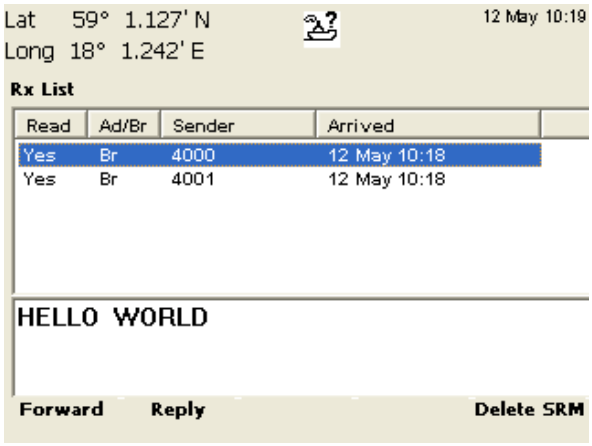
Safety Related Messages (SRM)

Safety related messages (SRM) can be received from remote targets or created and sent to either a specific target (addressed message), or broadcast. Maximum length for an addressed message is 156 characters and for a broadcast message it is 161.



Rx List

The *Rx List* view allows the user to read, delete and reply or forward a received SRM.



Read a received SRM

1. Press function key **[Rx List]**.
2. Select SRM from the list using **(∧ ∨)**.
3. If necessary press function key **[Read]** or **(Enter)** to see the entire message.

Reply to a received SRM

1. Press function key **[Rx List]**.
2. Select SRM from the list using **(∧ ∨)**.
3. Press **(Enter)**.
4. Press function key **[Reply]**.
5. Continue from point 2 under “Send an SRM with manually entered text” on page 27.

Forward a received SRM

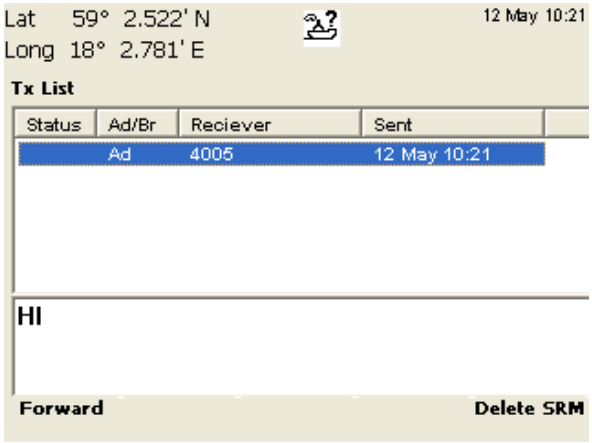
1. Press function key **[Rx List]**.
2. Select SRM from the list with **(∧ ∨)**.
3. Press **(Enter)**.
4. Press function key **[Forward]**.
5. Continue from point 2 under “Send an SRM with manually entered text” on page 27.

Delete a received SRM

1. Press function key **[Rx List]**.
2. Select SRM from the list using **(∧ ∨)**.
3. Press function key **[Delete SRM]**.

Tx List

Sent SRMs are stored and can be retrieved in the *Tx List* view. Use this view to read and delete previously sent messages. Also, an SRM can be used as baseline for a new message by selecting the desired message followed by the function key **[Forward]**. The selected sent SRM’s text field is then copied into the new SRM’s text field.



Send an SRM based on a previously transmitted SRM

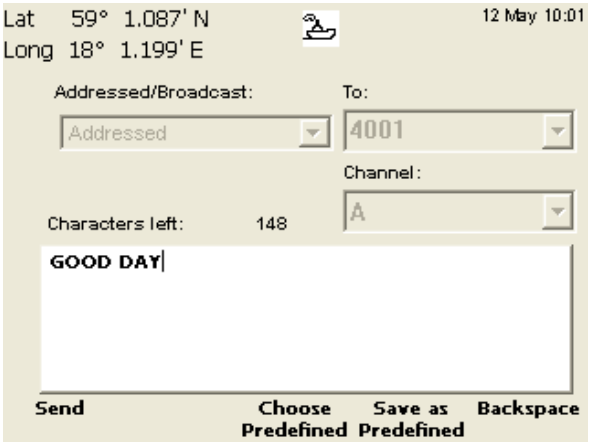
1. Press function key **[Tx List]**.
2. Select SRM from the list using **(∧ ∨)**.
3. Press function key **[Forward]**.
4. Continue from point 2 under “Send an SRM with manually entered text” on page 27.

Delete a transmitted SRM

1. Press function key **[Tx List]**.
2. Select SRM from the list using **(∧ ∨)**.
3. Press function key **[Delete SRM]**.

Send SRM

The *Send SRM* view allows the user to create and send an SRM, addressed or broadcast. The message text can be taken from a predefined list or entered manually. A manually entered text can be stored in the list of predefined SRM texts.



Send an SRM with manually entered text

1. Press function key **[Send SRM]**.
2. Enter message text using the alphanumeric keypad and press **(Enter)**. (To erase characters use the **[Backspace]** function key.)
3. Select the **Addressed/Broadcast** field and press **(Enter)**.
4. Use **(∧ ∨)** to choose **Addressed** if you want to send the SRM to a specific target or **Broadcast** if you want to send the SRM to all targets, then press **(Enter)**.
5. If **Addressed** is selected: Press **(>)** and **(Enter)**. Type in the target address and press **(Enter)**. If you have selected a target in *Target List* or *Plot* view, the target address is already filled in.
6. Select the **Channel** field and press **(Enter)**.
7. Select between **AUTO**, **A**, **B** or **A+B** with **(∧ ∨)** and press **(Enter)**.
8. Send the SRM by pressing function key **[Send]**.

Send a predefined SRM

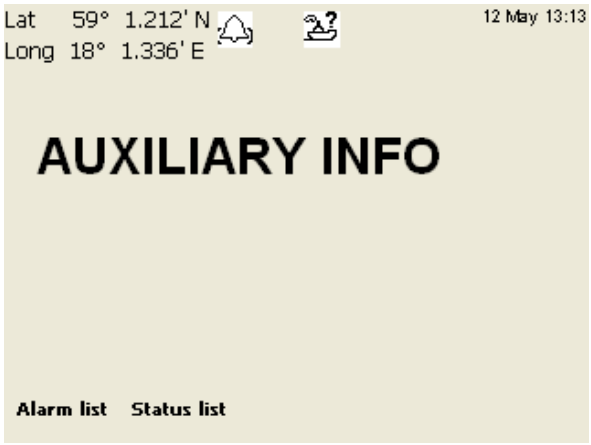
1. Press function key **[Send SRM]**.
2. Press function key **[Choose Predefined]**.
3. Choose SRM text with **(∧ ∨)** and **(< >)**.
4. Press the function key **[Select]**.
5. Continue with the point 3 under “Send an SRM with manually entered text” above.

Save as predefined SRM

1. Press function key **[Send SRM]**.
2. Enter message text, select addressed/broadcast and channel, as described under “Send an SRM with manually entered text” above.
3. Press the function key **[Save as Predefined]**.

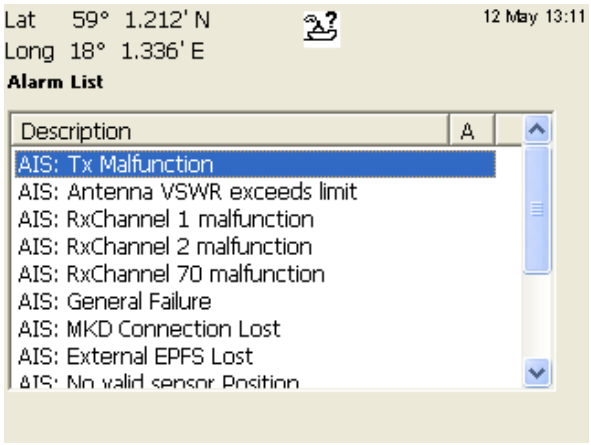
Auxiliary Info

The *Auxiliary Info* view has two subviews, *Alarm List* view displaying a list of current alarm status, and *Status List* view displaying a list of current indication status and latest events.



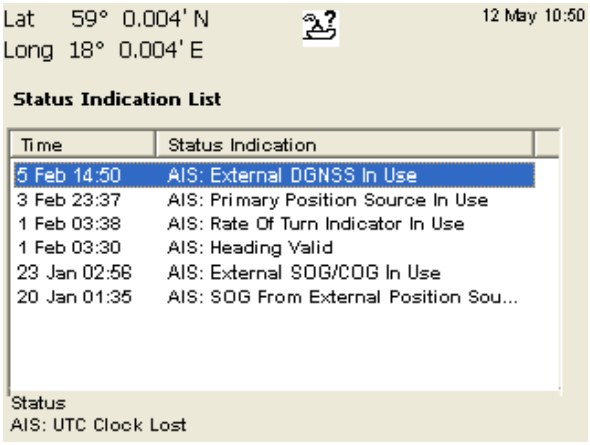
Alarm List

The *Alarm List* view lists current status of all alarms. Active alarms are presented in the top of the list and are marked with an exclamation mark.



Status List

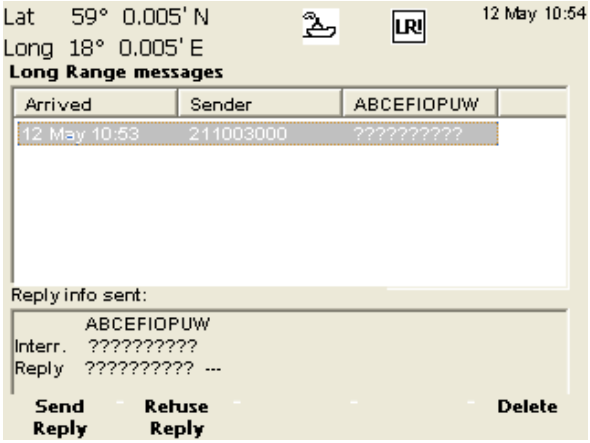
The *Status List* view lists current status of indications and the latest events.



Long Range Messages

Received long range (LR) interrogations and transmitted replies are displayed in the *Long Range* view. The user can delete LRs and manually send replies to LRs that have not been acknowledged.

Note that the reply mode for the R4 can be set up to automatically acknowledge, or to let the user manually acknowledge any LR interrogation. (To change the LR reply mode, see section “Long Range Settings” on page 49.)



Reply to an LR interrogation (only when current LR reply mode is set to manual)

1. Select LR message using **(∧ ∨)**.
2. Press function key **[Send Reply]**.

Refuse to reply to an LR interrogation (only when current LR reply mode is set to manual)

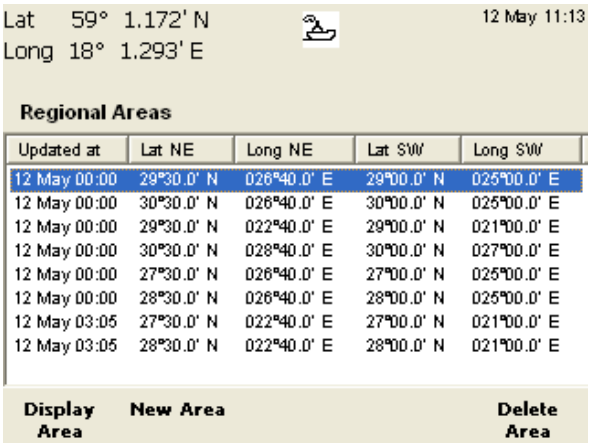
1. Select LR message using **(∧ ∨)**.
2. Press function key **[Refuse Reply]**.

Delete an LR interrogation/message

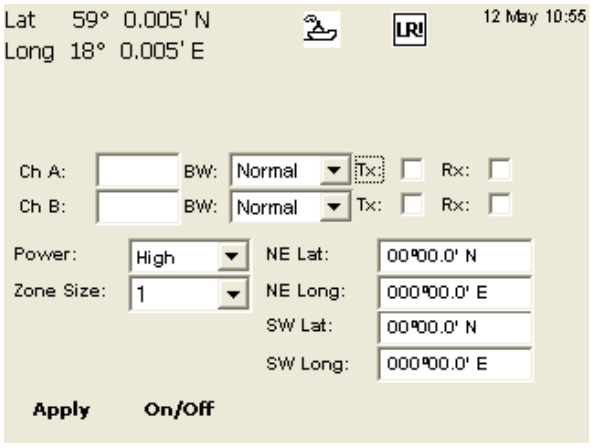
1. Select LR message using **(∧ ∨)**.
2. Press function key **[Delete]**.

Regional Areas

The *Regional Areas* views allows the user to list, edit and delete existing regional areas and to add new regional area definitions.



Create a New Regional Area

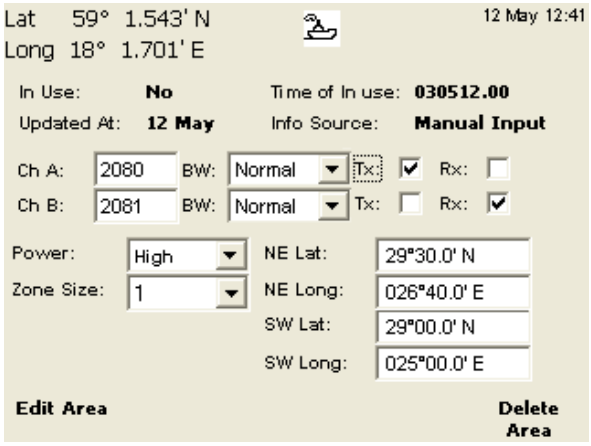


1. Press function key **[New Area]**.
2. Use **(∧ ∨ < >)** to select the parameter to be entered and press **(Enter)**.
3. Enter the value using the keypad, or if it is a drop down list, select a value using **(∧ ∨)** and press **(Enter)**. To check the Tx and Rx check boxes, use the **[On/Off]** function key.
4. Press function key **[Apply]** and confirm with **(Enter)**.

Delete a Regional Area

1. Select Regional Area using **(∧ ∨)**.
2. Press function key **[Delete Area]** and confirm with **(Enter)**.

Edit a Regional Area



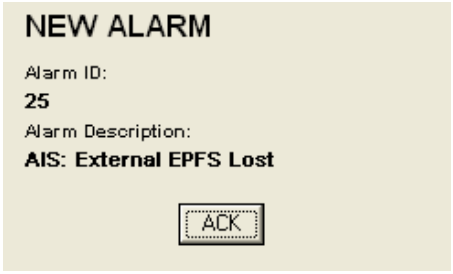
1. Select Regional Area using **(∧ ∨)**.
2. Press function key **[Display Area]**.
3. Press function key **[Edit Area]**.
4. Use **(∧ ∨ < >)** to select the parameter to be edited and press **(Enter)**.
5. Enter the new value using the keypad, or if it is a drop down list, select a value using **(∧ ∨)** and press **(Enter)**. To check or uncheck the Tx and Rx check boxes, use the **[On/Off]** function key.
6. Press function key **[Apply]** and confirm with **(Enter)**.

Alerts

There are four types of alerts that will appear as pop-up windows. To acknowledge the alert and close the pop-up window, press **(Enter)**.

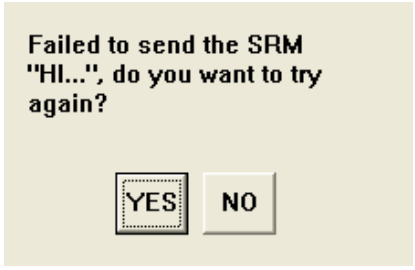
New Alarm

Whenever a new alarm occurs, an alert pop-up window will appear on the R4 Display. Active alarms are listed in the *Alarm List* view.



Failed to send SRM

If an SRM has not reached the addressed target or if it has failed to be sent, the user will be notified and offered to re-send the SRM.



New Long Range Message

In the case a long range (LR) interrogation is to be manually acknowledged at reception of an interrogation, an alert pop-up window will appear on the R4 Display. The LR interrogation is listed in the *Long Range* view, where the user can choose to send a positive acknowledge, a negative acknowledge or simply ignore the interrogation.

Loss of connection to the R4 Transponder

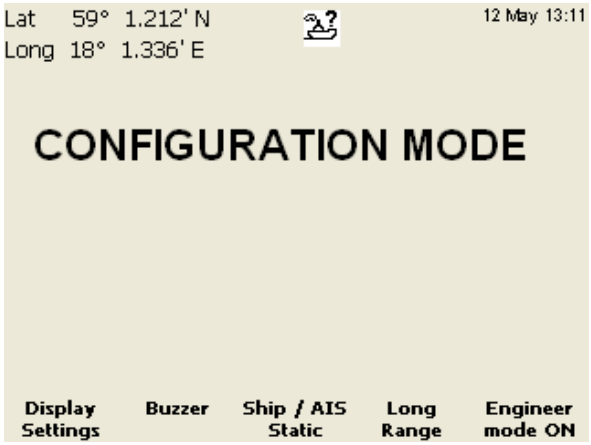
If a loss of connection to the R4 Transponder is detected, a the following pop-up window will appear.

Configuration Mode

Configuration mode is a set of views that allows the user to modify the configuration settings for the R4-AIS. To get to the *Configuration* views, press **(Mode)** followed by function key **[CONFIG]**.

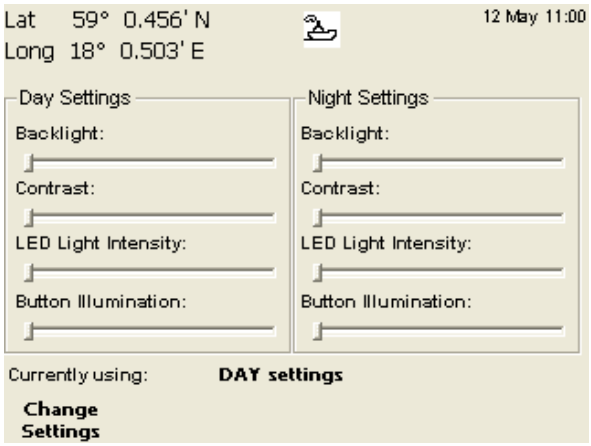
Config views

- *Display Settings* allows the user to configure settings for the R4 Display.
- *Buzzer* allows the user to configure event related sounds.
- *Ship / AIS Static* and its subviews allows the user to see current ship static data, GNSS antenna positions and VHF radio settings. (To configure these parameters, see “Engineering Mode” on page 40.)
- *Long Range* allows the user to see current long range reply mode and filter settings. (To configure these parameters, see “Engineering Mode” on page 40.)



Display Settings

The *Display Settings* view allows the user to adjust display back light and contrast, LED intensity and button illumination. The R4 Display can be set to either day or night operation by changing a day or night settings.



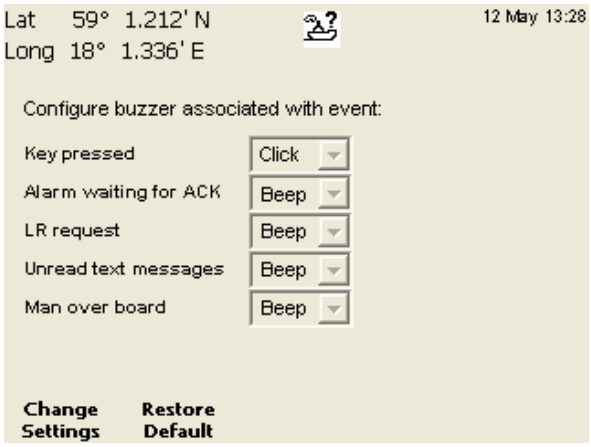
Changing display settings

1. Press function key **[Display Settings]**.
2. Press function key **[Change Settings]**.
3. Select **Day Settings** or **Night Setting**s with **(< >)**.
4. Select the setting you want to change using **(∧ ∨)** and press **(Enter)**.
5. Modify the setting with **(< >)** and press **(Enter)**. Repeat step 3 to 5 if necessary.
6. Press function key **[Apply and Exit]**.

(Note: As previously described in the “Getting Started” chapter, it is also possible to change display settings by pressing the **(Display)** key.)

Buzzer

The *Buzzer* view allows the user to associate an event with a specific sound. The settings can be restored to their default values.



Changing Buzzer settings

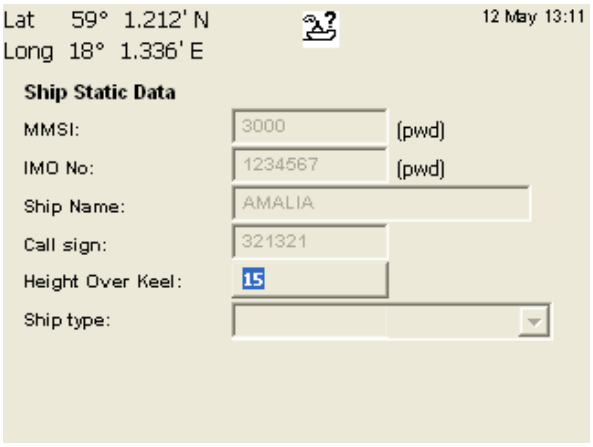
1. Press function key **[Buzzer]**.
2. Press function key **[Change Settings]**.
3. Select the setting you want to change using **(∧ ∨)** and press **(Enter)**.
4. Modify the setting with **(∧ ∨)** and press **(Enter)**
5. Press function key **[Apply and Exit]**.

Ship / AIS Static Data

The *Ship / AIS Static* views allows the user to see current ship static data (MMSI, IMO No, Ship Name, Call Sign, Height Over Keel and Ship Type), GNSS antenna positions and VHF radio settings. To configure these parameters, see “Engineering Mode” on page 40.

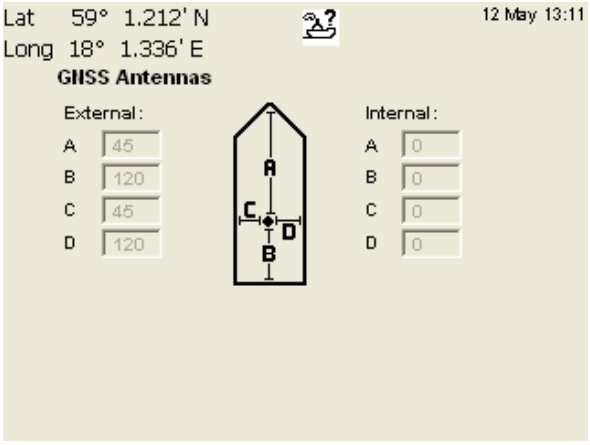
Ship Static Data

Press function key **[Ship Static]**.



GNSS Antennas

Press function key **[GNSS Antennas]**.



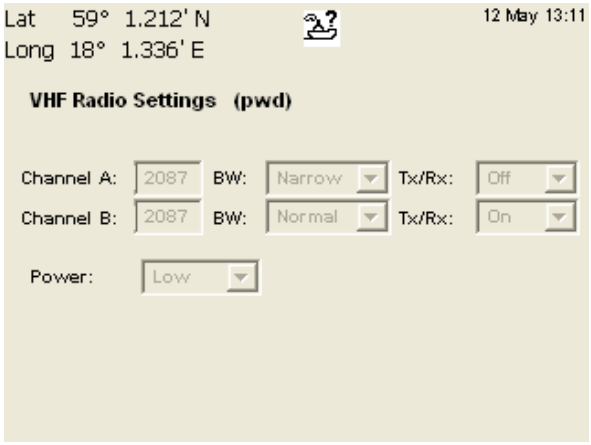
Note:

Dimension	Distance (m)
A	0 - 511; 511 = 511 m or greater
B	0 - 511; 511 = 511 m or greater
C	0 - 63; 511 = 511 m or greater
D	0 - 63; 511 = 511 m or greater

The dimension A should be in the direction of the transmitted heading information (bow).
Reference point of reported position not available, but dimensions of ship are available:
A = C = 0 and B ≠ 0 and D ≠ 0.
Neither reference point of reported position nor dimensions of ship available:
A = B = C = D = 0 (= default)

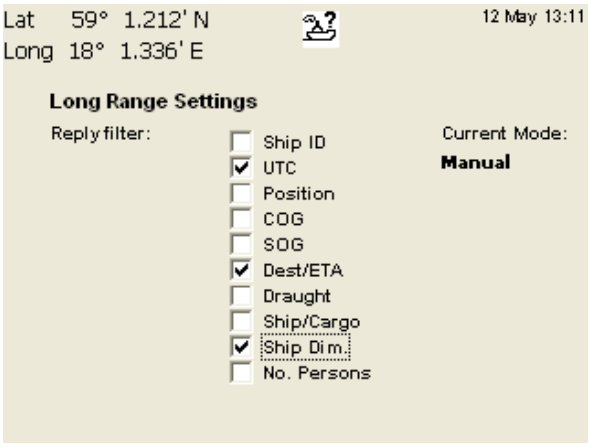
VHF Radio Settings

Press function key **[VHF Radio Settings]**



Long Range Settings

The *Long Range* view allows the user to see the current settings for Long Range (LR) interrogations. To change the settings, see “Engineering Mode” on page 40.



Engineering Mode

In addition to the two system modes (AIS and Configuration) for normal operation of the R4-AIS, the operator can access advanced configuration and information views by entering *Engineering Mode*. The engineering mode has all the views and functions of the normal AIS and Configuration modes plus a number of additional views and functions.

Please note that all necessary views and functions for normal operation of the R4-AIS can be accessed in “normal mode”, that is, when engineering mode is turned off.

Only the additional engineering mode functions are described in this section.

To enter Engineering Mode

1. Press **(Mode)**.
2. Press function key **[CONFIG]**.
3. Press function key **[Engineer Mode ON]**.
4. Confirm with **(Enter)**.

It is recommended to always return to normal mode when finished in engineering mode.

AIS

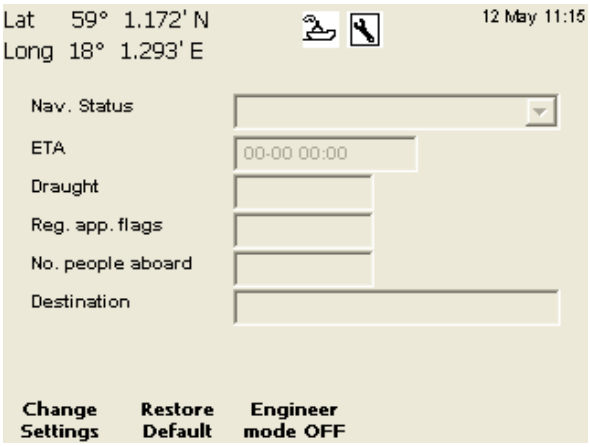
The *AIS* engineering mode additional functions are:

- *Voyage*: **[Restore Default]**
- *Voyage*: **[Engineer Mode OFF]**
- *Auxiliary Info / Alarm List:* **[Restore Log]**

The additional subviews of the AIS engineering mode are all found under the *Auxiliary Info* view. The subviews are:

- *Alarm List:* **[Selected Alarm Log]**
- *Alarm List:* **[Alarm Log]**
- *Own ship data* displays own ship data
- *SW/HW Versions* displays the software and hardware versions for both R4 Display and R4 Transponder
- *Display BIIT Info* displays the result from the built-in self
- *Transpon. NFTR* displays the R4 Transponder non functioning time responses

Voyage



Return to default voyage data settings

1. Press function key **[Restore Default]**.

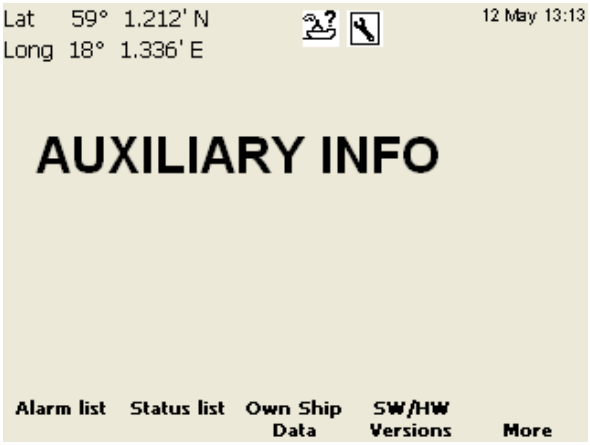
Engineering mode off

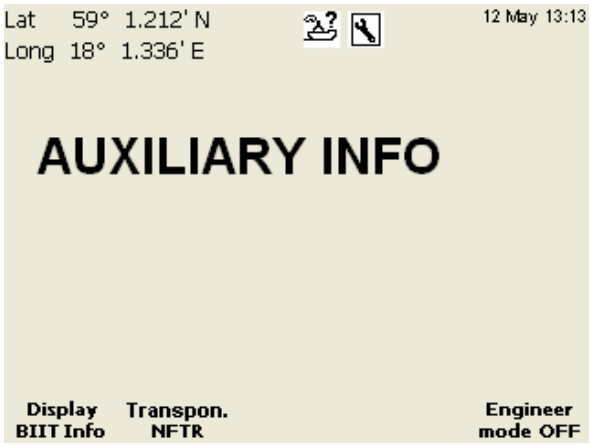
1. To exit engineering mode, press function key **[Engineer Mode OFF]**.

Auxiliary Info

Entering *Auxiliary Info* when Engineering Mode is ON

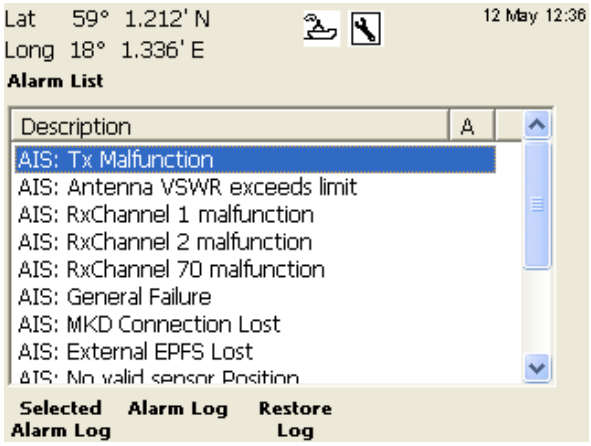
1. Press **(Page)**.
2. Press function key **[Auxiliary Info]**.



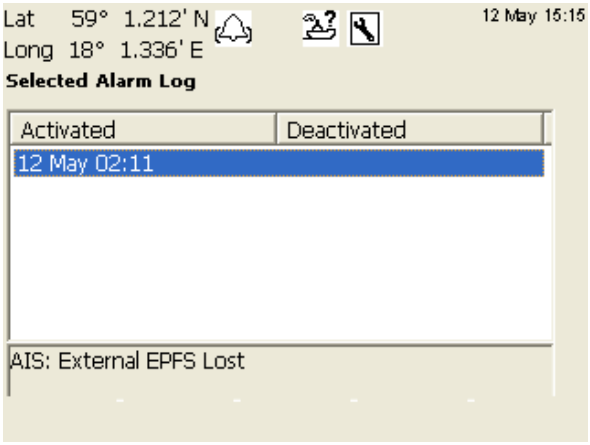


Alarm List

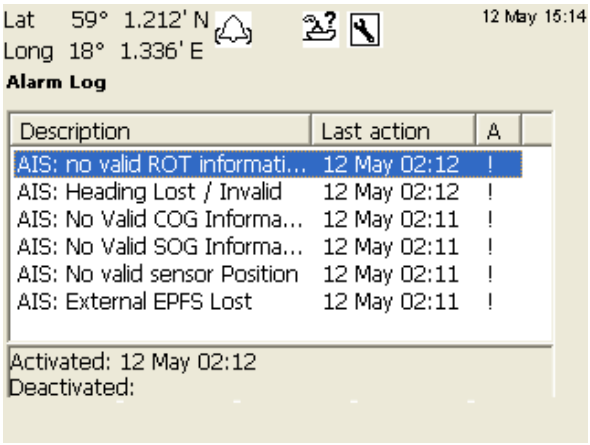
The *Alarm List* view contains information about the alarms and their history.



Selected Alarm Log
To view the history of a specific alarm in the alarm list, use the **(∧ ∨)** key to select the desired alarm and press function key **[Selected Alarm Log].**



Alarm Log
To view the history of all alarms in the alarm list, use the **(∧ ∨)** key to select the desired alarm and press function key **[Alarm Log]**.

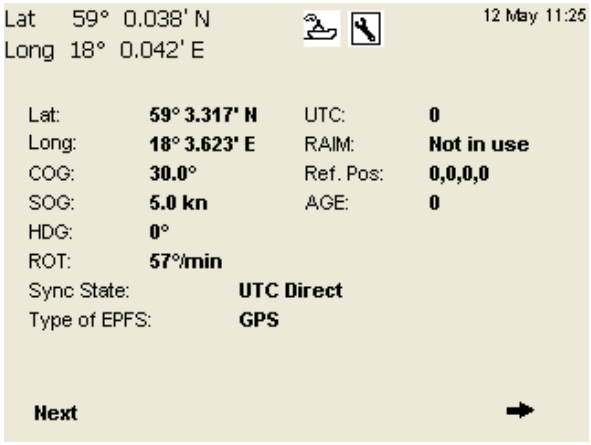


Restore Log

1. Press function key **[Restore Log]** to clear the alarm log memory.

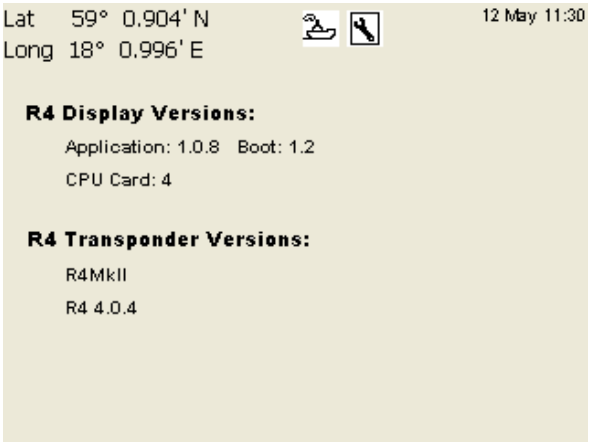
Own Ship Data

The *Own Ship Data* view displays consists of two pages with own ship data from VDO. Use function key **[Next]/[Previous]** to toggle between the two pages.



SW/HW Versions

The *SW/HW Versions* view displays the different software and hardware versions currently installed in the R4 Display and the R4 Transponder.

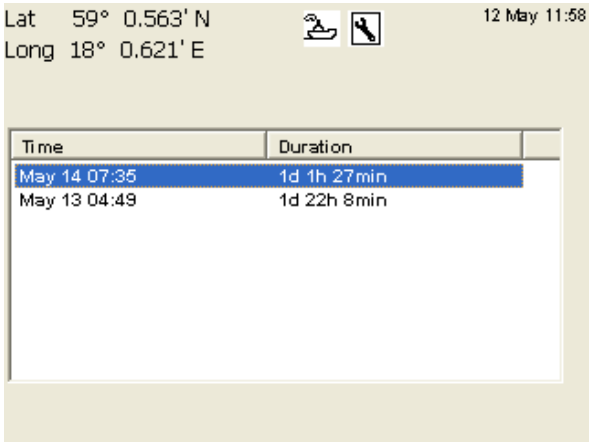


Display BIIT Info

The *Display BIIT Info* view displays the result of the R4 Display built-in integrity test.

Transponder NFTR (Non Functioning Time Responses)

The *Transponder NFTR* view displays information about times where the R4 Transponder has been turned off or in silent mode for more than 15 minutes.



Engineering Mode Off

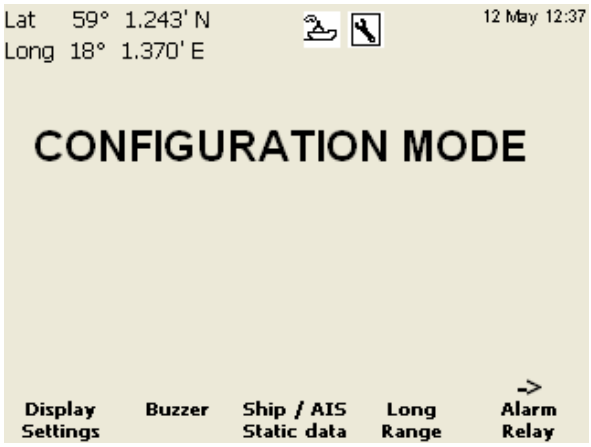
To exit Engineering Mode, press function key **[Engineer Mode OFF]**.

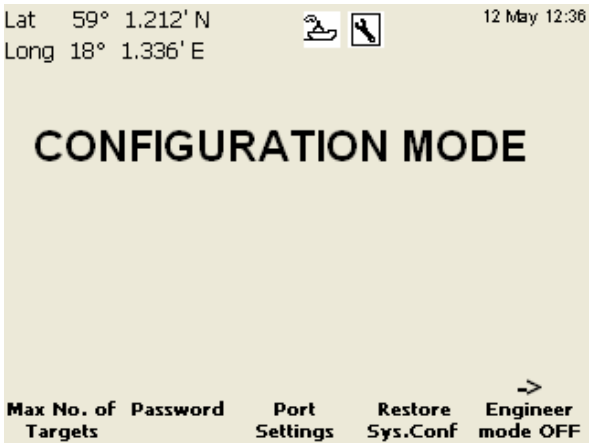
Configuration

The *Configuration* engineering mode additional subviews are:

- *Alarm Relay* allows the user to turn the alarm relay activation on or off for each specified alarm.
- *Max No. of Targets* allows the user to change the maximum number of targets shown in *Plot.*
- *Passwords* allows the operator to change user password.
- *Port Settings* allows the user to change R4 Display and R4 Transponder port settings.
- *Restore Sys.Conf* allows the user to restore display default settings.

When in engineering mode it is also possible to change the ship static data, GNSS antenna position and VHF radio settings), in the *Ship / AIS Static* view.





Engineering Mode On/Off

The Engineering Mode is entered/exited by toggling the function key **[Engineer Mode ON]/[Engineer Mode OFF]**.

Ship Static Data

Change Ship Static Data

1. Press function key **[Ship Static]**.
2. Press function key **[Change Settings]**.
3. Use **(∧ ∨)** to select the data and press **(Enter)**.
4. Enter the desired value/letters using the alphanumeric keys or if it is a drop down list, select a value using **(∧ ∨)**. To delete a character, use the function key **[Backspace]**. Press **(Enter)** when done.
5. Press function key **[Apply and Exit]**.

Return to default Ship Static Data

1. Press function key **[Ship Static]**.
2. Press function key **[Change Settings]**.
3. Press function key **[Restore Default]**.

GNSS Antenna Position(s)

Change GNSS Antenna Position(s)

1. Press function key **[GNSS Antennas]**.
2. Press function key **[Change Settings]**.
3. Use **(∧ ∨ < >)** to select the data and press **(Enter)**.
4. Enter value using the numeric keypad. Press **(Enter)** when done.
5. Press function key **[Apply and Exit]**.

Return to default GNSS Antenna Position settings

1. Press function key **[GNSS Antennas]**.
2. Press function key **[Change Settings]**.
3. Press function key **[Restore Default]**.

VHF Radio settings

Change VHF Radio settings

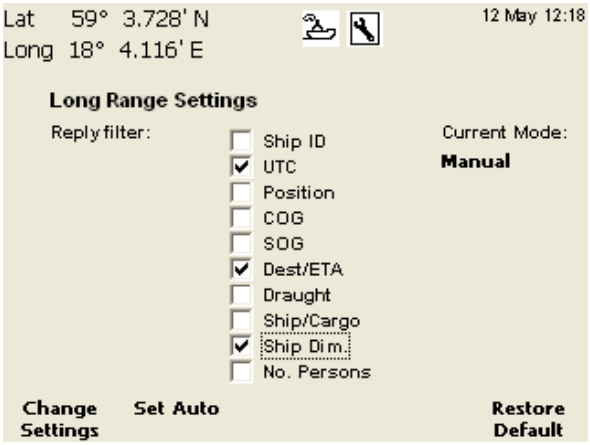
1. Press function key **[VHF Radio Settings]**.
2. Press function key **[Change Settings]**.
3. Use **(∧ ∨ < >)** to select the data and press **(Enter)**.
4. Enter value using the numeric keypad. Press **(Enter)** when done.
5. Press function key **[Apply and Exit]**.

Return to default VHF Radio settings

1. Press function key **[VHF Radio Settings]**.
2. Press function key **[Change Settings]**.
3. Press function key **[Restore Default]**.

Long Range Settings

The user can setup the R4 to automatically acknowledge or to let the user manually acknowledge any Long Range (LR) interrogation.



Change Long Range Settings

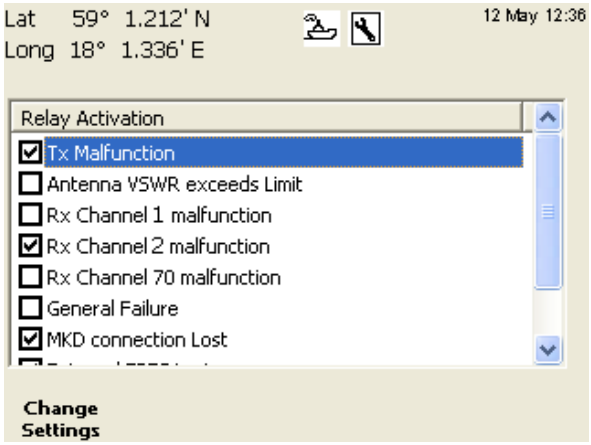
1. Press function key **[Long Range]**.
2. Press function key **[Change Settings]**.
3. Use **(∧ ∨ < >)** to select the data and press **(Enter)**.
4. Use **[Enable/Disable]** to set filter options. Press **(Enter)** when done.
5. Use function key **[Set Auto]/[Set Man]** to toggle between auto and manual reply.
6. Press function key **[Apply and Exit]**.

Return to default Long Range settings

1. Press function key **[Long Range]**.
2. Press function key **[Change Settings]**.
3. Press function key **[Restore Default]**.

Alarm Relay

The *Alarm Relay* view allows the user to turn the alarms relay activation on or off for each specified alarm.

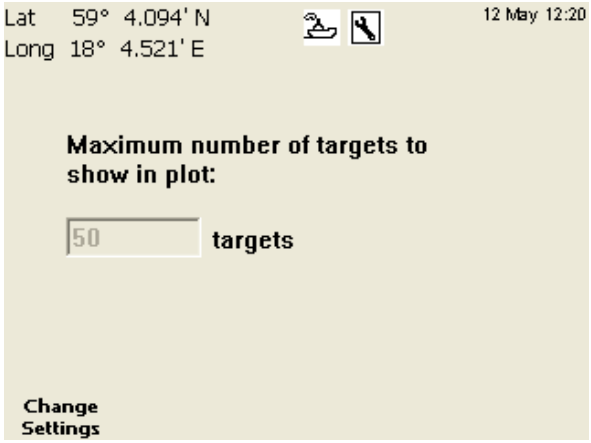


Turn an alarm relay on or off

1. Press function key **[Alarm Relay]**.
2. Press function key **[Change Settings]**.
3. Use **(∧ ∨)** to select an alarm and press **(Enter)**.
4. Turn the alarm on or off by toggling the function key **[Enable/Disable]**. Press **(Enter)** when done.
5. Press function key **[Apply and Exit]**.

Max No. of Targets

The *Max No. of Targets* view allows the user to set the maximum number of targets displayed in *Plot* view.

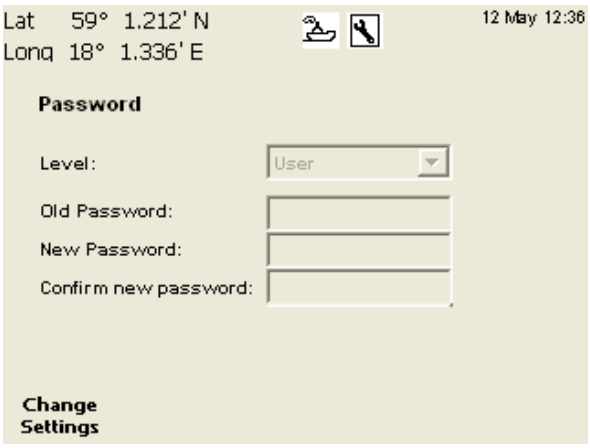


Change maximum number of targets

1. Press function key **[Max No. of Targets]**.
2. Press function key **[Change Settings]**.
3. Press **(Enter)** and enter the value using the numeric keys. Press **(Enter)** when done.
4. Press function key **[Apply and Exit]**.

Passwords

The *Password* view allows the operator to change user password.

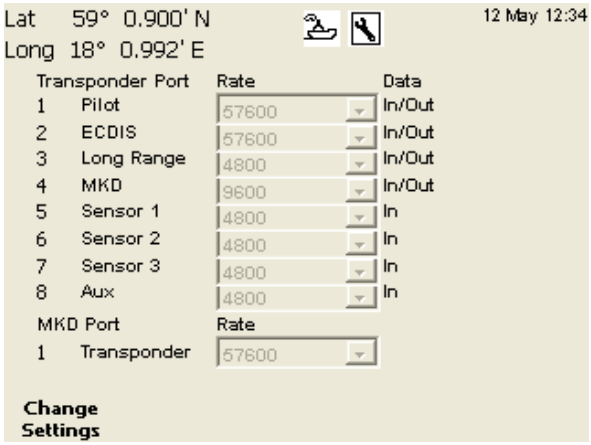


Change Password(s)

1. Press function key **[Password]**.
2. Press function key **[Change Settings]**.
3. Press **(Enter)** and enter present password. Press **(Enter)** when done.
4. Use **(∧ ∨)** to select next row.
5. Press **(Enter)** and enter the new password (4 to 8 characters) by using the alpha-numeric keys and/or **[Capslock]**. Press **(Enter)** when done.
6. Press function key **[Apply and Exit]**.

Port settings

The *Port settings* view allows the user to change the baud rate of the R4 Transponder's 8 serial ports and the R4 Display's serial port 1.

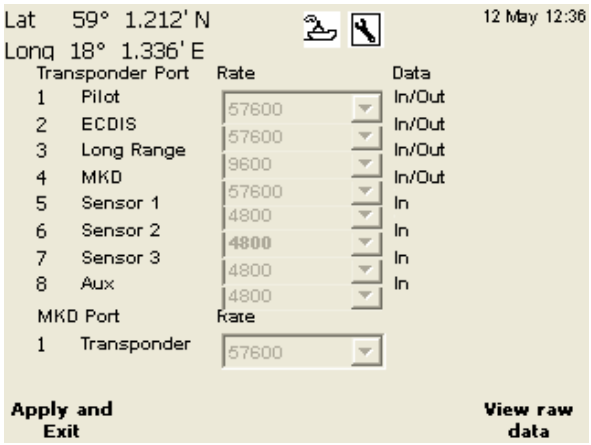


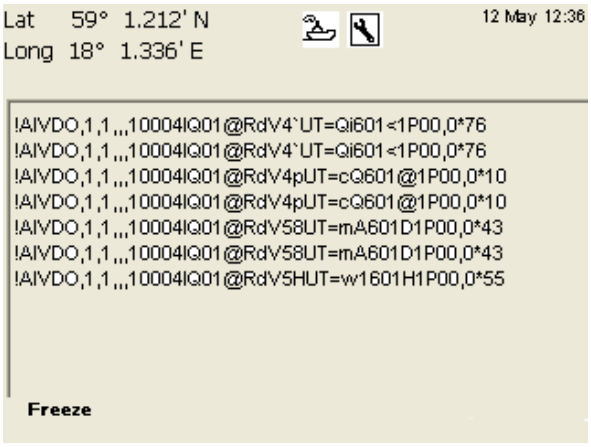
Change port settings

1. Press function key **[Port Settings]**.
2. Press function key **[Change Settings]**.
3. Use **(∧ ∨)** to highlight the data to be changed and press **(Enter)**.
4. Use **(∧ ∨)** to select the value and press **(Enter)**.
5. Press function key **[Apply and Exit]**.

View raw data

1. Press function key **[Port Settings]**.
2. Press function key **[Change Settings]**.
3. Use **(∧ ∨)** to select the desired port and press function key **[View raw data]**.

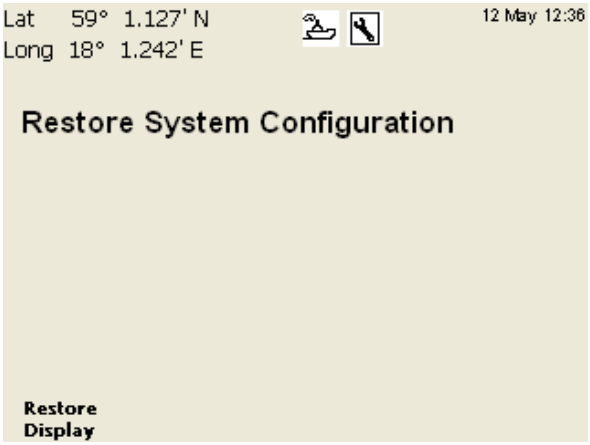




4. To stop the data capture, press function key **[Freeze]** and to resume, press function key **[Resume]**.
5. Press **(Esc)** to return to normal operation.

Restore System Configurations

The *Restore Sys. Conf* view allows the user to restore the display's default settings.



Restore display settings

1. Press function key **[Restore Sys. Conf.]**.
2. Press function key **[Restore Display]**.

Engineering Mode On/Off

The Engineering Mode is entered/exited by toggling the function key **[Engineer Mode ON]/[Engineer Mode OFF]**.

Appendix

Alarm Messages

The alarm messages and the corresponding identities are listed below:

ID	Message text
001	Tx malfunction
002	Antenna VSWR exceeds limit
003	Rx channel 1 malfunction
004	Rx channel 2 malfunction
005	Rx channel 70 malfunction
006	General failure
008	MKD connection lost
025	External EPFS lost
026	No sensor position in use
029	No valid SOG information
030	No valid COG information
032	Heading lost/invalid
035	No valid ROT information

Alarm Description

Tx Malfunction

PLL-Monitoring: The PLL-Lock status of the TX-PLL is checked for every 2.5 seconds and if it is unlocked a Tx malfunction alarm is generated. If the PLL returns to locked state and is locked for 10 seconds the Tx malfunction alarm is cleared.

VSWR-Monitoring: The VSWR of the antenna is checked for every transmission and if the VSWR exceeds 5:1 a Tx malfunction alarm is generated. If the VSWR is below the threshold for 20 seconds the Tx malfunction alarm is cleared.

Antenna VSWR Exceeds limit

The VSWR of the antenna is checked for every transmission and if the VSWR exceeds 3:1 a VSWR alarm is generated.
If the VSWR is below the threshold for 20 seconds the VSWR alarm is cleared.

Rx Malfunctions

PLL-Monitoring: The PLL-Lock status of the three RX-PLL's are checked for every 2.5 seconds and if it is unlocked a Rx malfunction alarm for the corresponding receiver is generated. If the PLL returns to locked state and is locked for 10 seconds the Rx malfunction alarm is cleared.

Indication Messages

The indication messages, with identity and type information, are listed below:

ID	Type	Message text
007	Status	UTC clock lost
021	Status	External DGNSS in use
022	Status	External GNSS in use
023	Status	Internal DGNSS in use (beacon)
024	Status	Internal DGNSS in use (msg 17)
025	Status	Internal GNSS in use
027	Status	External SOG/COG in use
028	Status	Internal SOG/COG in use
031	Status	Heading valid
033	Status	Rate of Turn Indicator in use
034	Status	Other ROT source in use
036	Event	Channel management parameters changed
053	Status	SOG from external position source
054	Status	SOG from log sensor
055	Status	UTC clock OK
056	Event	Channel management zone memory changed
061	Status	Enter semaphore mode
061	Event	Leave semaphore mode
063	Event	NVM Checksum error
064	Event	RATDMA overflow
066	Status	Tanker Low VHF Power Mode

Long Range Definitions

A = Ship's name, call sign, and IMO number
B = Date and time of message composition
C = Position
E = Course over ground (COG)
F = Speed over ground (SOG)
I = Destination and Estimated Time of Arrival (ETA)
O = Draught
P = Ship/Cargo
U = Ship's length, breadth, type
W = Persons on board

GUI Hierarchy

STATUS =>
. . . . . Navigational Status
. . . . . Under Way
. . . . . At Anchor
. . . . . Moored
. . . . . Not Under Command
. . . . . Restricted Manoeuvrability
. . . . . Constrained By Draught
. . . . . Aground
. . . . . Engaged in fishing
. . . . . Under Way Sail
. . . . . Not Defined

MODE => AIS
. . . . . Target List
. . . . . Extended Info
. . . . . Send SRM
. . . . . Sort By Bearing / Sort By Range
. . . . - 15º ? (When Sort By Bearing is chosen)
. . . . + 15º ? (When Sort By Bearing is chosen)
. . . . . Plot
. . . . . Extended Info
. . . . . Send SRM
. . . . . Zoom In
. . . . . Zoom Out
. . . . . Voyage
. . . . . Change Settings / Apply and Exit
. . . . . Restore Default (ENG MODE)
. . . . . Engineer Mode OFF (ENG MODE)
. . . . . 1 W mode ON/OFF (Only displayed if VSD Ship Type = Tanker)
. . . . . SRMs
. . . . . Rx List
. . . . . Read
. . . . . Reply
. . . . . Forward
. . . . . Delete SRM
. . . . . Forward
. . . . . Reply
. . . . . Delete SRM
. . . . . Tx List
. . . . . Read
. . . . . Forward
. . . . . Delete SRM
. . . . . Forward
. . . . . Delete SRM

. . . . . Send SRM
. . . . . .Send
. . . . . .Choose Predefined SRM
. . . . . .Save as User Predefined SRM
. . . . . Auxiliary Info
. . . . . .Alarm List
. . . . . Selected Alarm Log (ENG MODE)
. . . . . Alarm Log (ENG MODE)
. . . . . Clear Log (ENG MODE)
. . . . . .Status / Indication List
. . . . . .Own Ship Data (ENG MODE)
. . . . . .SW/HW Versions (ENG MODE)
. . . . . .Display BIIT Info (ENG MODE)
. . . . . .Transpon. NFTR (ENG MODE)
. . . . . .Engineer Mode Off (ENG MODE)
. . . . . Long Range
. . . . . .Send Reply (only shown for unacknowledged LR)
. . . . . .Refuse Reply
. . . . . .Delete
. . . . . Regional Areas
. . . . . .Display Area
. . . . . Edit Area
. . . . . .Apply
. . . . . Delete Area
. . . . . .New Area
. . . . . Apply
. . . . . .Delete

MODE => CONFIG
. . . . . Display Settings
. . . . . .Change Settings / Apply and Exit
. . . . . Buzzer
. . . . . .Change Settings / Apply and Exit
. . . . . Ship / AIS Static
. . . . . .Ship Static
. . . . . Change Settings / Apply and Exit (ENG MODE)
. . . . . .Restore Default (ENG MODE)
. . . . . .Backspace (ENG MODE)
. . . . . .GNSS Antennas
. . . . . Change Settings / Apply and Exit (ENG MODE)
. . . . . .Restore Default (ENG MODE)
. . . . . .Backspace (ENG MODE)
. . . . . .VHF Radio Settings
. . . . . Change Settings / Apply and Exit (ENG MODE)
. . . . . .Restore Default (ENG MODE)
. . . . . .Backspace (ENG MODE)
. . . . . .Long Range
. . . . . Change Settings / Apply and Exit (ENG MODE)

. . . . . Restore Default (ENG MODE)
. . . . . Enable / Disable (ENG MODE)
. . . . . Set AUTO / Set MAN (ENG MODE)
. . . . . Alarm Relay (ENG MODE)
. . . . Change Settings / Apply and Exit
. . . . . Enable / Disable
. . . . . Max. No. of Targets (ENG MODE)
. . . . Change Settings / Apply and Exit
. . . . . Password (ENG MODE)
. . . . Change Settings / Apply and Exit
. . . . . Port Settings (ENG MODE)
. . . . Change Settings / Apply and Exit
. . . . . View Raw Data
. . . . . Reset Sys. Conf. (ENG MODE)
. . . . Restore Display Default (ENG MODE)
. . . . . Engineer Mode On / Engineer Mode Off

Glossary

AIS . . . . . Automatic Identification System

COG . . . . . Course Over Ground

DGNSS . . Differential Global Navigational Satellite System

EPFS . . . . Electronic Position Fixing System

GNSS . . . . Global Navigational Satellite System

LR . . . . . Long Range

MKD . . . . Minimum Keyboard and Display

MMSI. . . . Maritime Mobile Service Identity

SAR . . . . . Search And Rescue

SOG . . . . . Speed Over Ground

SOLAS. . . International Convention on the Safety of Life at Sea, 1974

SRM . . . . . Safety Related Message

VSWR . . . Vertical Standing Wave Ratio. (A low value indicates a problem with the antenna or connections/cables to the antenna.)

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