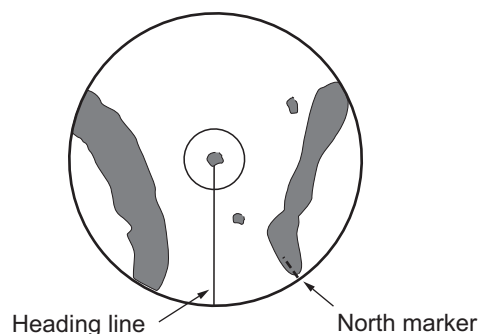


STERN UP mode

The STERN UP mode rotates the HEAD UP mode picture, relative and true bearings and display graphics 180°. This mode is useful on dual-radar tugboats when backing up; one radar shows HEAD UP and another shows STERN UP. To enable the STERN UP mode, turn on [STERN UP] on the [OPERATION] menu.

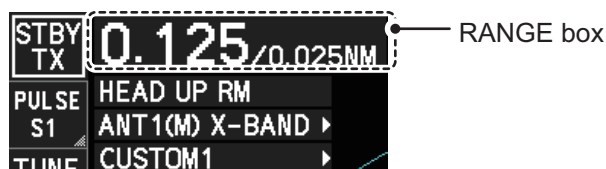
Note: STERN UP mode is only available for C-types.



1.31 How to Select a Range Scale

The selected range scale and range ring interval are shown at the upper left corner on the screen. When a target of interest comes closer, reduce the range scale so that it appears in 50-90% of the display radius.

1. Place the cursor in the [RANGE] box at the top left corner of the screen.



In the above example, the range scale is set to 0.125 NM and the interval between range rings is set to 0.025 NM.

2. Left-click to lower the range; right-click to raise the range.

You can also select the range with the **RANGE** key on the control unit (not available for RCU-015/RCU-016). Press "+" to increase the range, or press "-" to reduce the range. Press and hold a key to successively change the range upwards or downwards.

Changing the plotter range (C-types only)

With the radar in standby (STBY) mode, you can change the plotter range by pressing the **RANGE** key. In this case, "range" means the on-screen displayed distance from the left-hand edge of the screen to the right-hand edge of the screen.

"+": expands the range scale with the cursor location as the center.

"-": reduces the range scale with the cursor location as the center.

Press and hold the + or - key to change the range scale continuously.

1.32 How to Measure Range

The range to a target can be measured three ways: with the fixed range rings, with the cursor, or with the VRM.

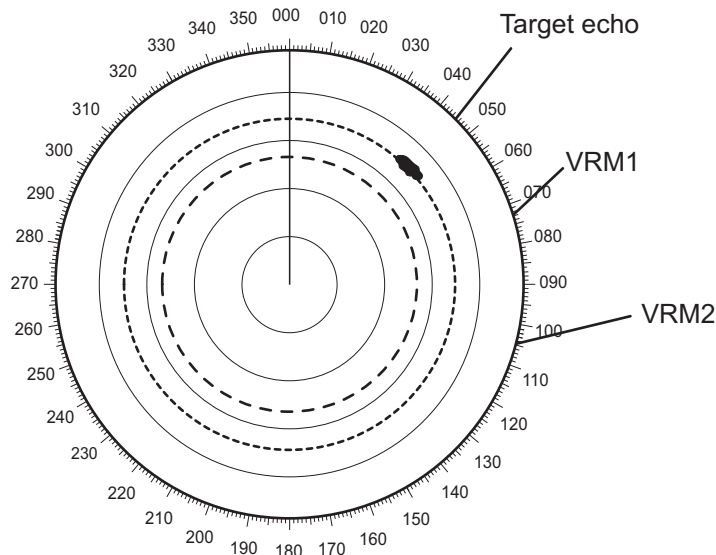
Use the fixed range rings to get an estimate of the range to a target. The rings are the concentric solid circles on the display. The number of rings is automatically set by the current range scale. The distance between the rings is the range ring interval, and the current interval appears at the upper-left position on the screen. To measure the range to a target with the range rings, count the number of rings between the center of the display and the target. Check the range ring interval and estimate the distance of the echo from the inner edge of the nearest ring.

1.32.1 How to show/hide the range rings

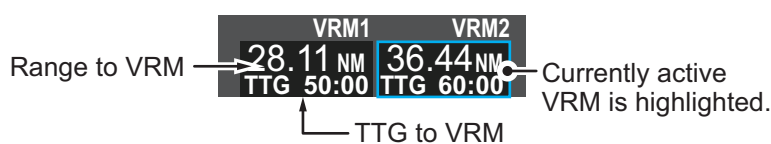
1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS] to show the [NAV TOOLS] menu.
For C-types, select [3 CURSOR•EBL•VRM] to show the [CURSOR•EBL•VRM] menu.
3. **For IMO-types**, select [4 RANGE RINGS].
For C-types, select [6 RANGE RINGS].
4. Depending on your radar type, select the appropriate setting.
For IMO-types: Select [ON] or [OFF] as appropriate.
For C-types: Select the appropriate setting, referring to the following list.
 - [OFF]: Hide the range rings.
 - [STD]: Range rings increase/decrease in number, according to the selected radar range.
 - [MANUAL]: Set a number of range rings that are not linked with the radar range.
5. Close the menu.

1.32.2 How to measure range with the variable range marker (VRM)

There are two VRMs, No. 1 and No. 2, which appear as dashed rings so that you can distinguish them from the fixed range rings. The two VRMs can be distinguished from each other by the different lengths of their dashes; the dashes on the No. 2 VRM are longer.



There are two methods for measuring range with the VRMs, using the **VRM** key and on-screen menu box operation.



Note: You can hide the [TTG] indication.
See section 1.32.5.

Using the VRM keys on the control unit (RCU-014/RCU-031)

1. Press the **VRM ON** key to activate the VRM1 box. Press the **VRM ON** key again to activate the VRM2 box. Press the **VRM ON** key again to switch between active VRMs. The currently active VRM marker is displayed as shown in the above figure.
2. Rotate the **VRM** knob to align the active VRM with the inner edge of the target, then read the distance at the lower right of the screen. In the above figure, the active VRM reads "36.44 NM".
Each VRM remains at the same geographical distance when you operate the **RANGE** key or the [RANGE] box. This means that the apparent radius of the VRM ring changes in proportion to the selected range scale.
3. Press the **VRM OFF** key to hide the VRMs.

On-screen menu box operation

1. Select the appropriate [VRM] box.
2. The guidance box reads "VRM ON/".
Left-click to turn on the VRM.
The guidance box now reads "VRM SET L = DELETE /".
Further, the box is highlighted and the corresponding VRM appears.
3. Left-click again and the cursor jumps to inside the operational display area. The guidance box now reads "VRM FIX L = DELETE / EXIT".
4. Move the trackball to adjust the VRM.
Note: The maximum VRM distance is set by the current display range and can be set as high as twice the distance of the display range.
5. Left-click to anchor the VRM and fix its readout, or right-click to cancel and return the VRM to its previous location (range).
6. To hide the VRM, left-click the [VRM] box to show "VRM SET L = DELETE /" in the guidance box, then press and hold the **left button** on the trackball.

1.32.3 How to set the VRM unit of measurement (C-types only)

VRMs can be displayed in the following units of measurement:

- NM (Nautical Miles)
- km (Kilometers)
- SM (Statute Miles)
- kyd (Kiloyards)

To change the unit of measurement, do the following:

1. Open the menu.
2. Select [3 CURSOR•EBL•VRM].
3. Select [3 EBL•VRM].
The [EBL•VRM] menu appears.
4. Select [VRM1] or [VRM2] as appropriate.
5. Select the required unit of measurement.
6. Close the menu.

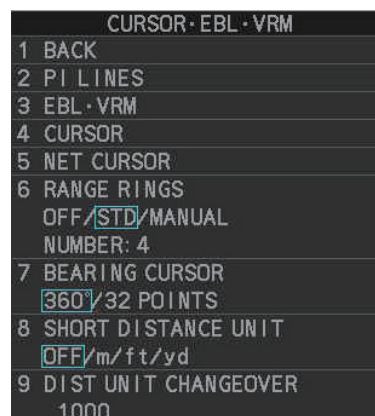
Note: Changes made to the measurement units also affect the active VRMs.



1.32.4 How to set the short distance measurement unit (C-types only)

You can set a different unit of measurement to use within a pre-determined range from your vessel. This setting affects the VRM indication as well as the cursor indication.

1. Open the menu.
2. Select [3 CURSOR•EBL•VRM].
The [CURSOR•EBL•VRM] menu appears.
3. Select [8 SHORT DISTANCE UNIT].
4. Select the unit to want to use for short distances, or select OFF to disable this feature.
5. Select [9 DIST UNIT CHANGEOVER].
6. Spin the scrollwheel, or enter the distance using the control unit.
Echoes selected within this distance (range) from your vessel have their distance shown with the selected measurement unit.
7. Close the menu.



1.32.5 How to show TTG to VRM

TTG (Time To Go) to a selected VRM can be displayed as follows:

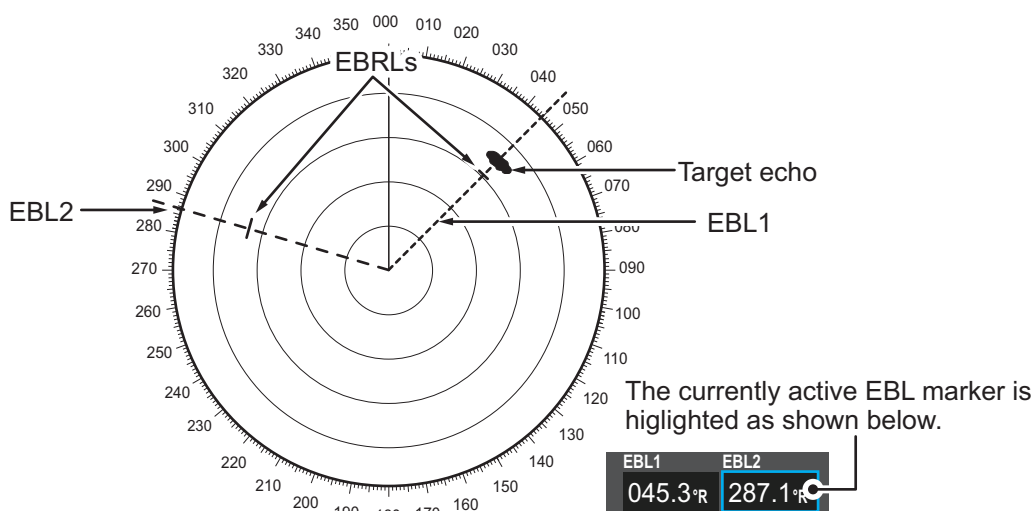
1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS] to show the [NAV TOOLS] menu.
For C-types, select [3 CURSOR•EBL•VRM] to show the [CURSOR•EBL•VRM] menu.
3. **For IMO-types**, select [3 EBL•VRM•CURSOR SET].
For C-types, select [3 EBL•VRM].
4. **For IMO-types**, select [3 VRM TTG.]
For C-types, select [7 VRM TTG.]
5. Select the appropriate setting.
 - [OFF]: TTG is not displayed.
 - [1]: TTG from own ship to VRM 1 only is displayed.
 - [2]: TTG from own ship to VRM 2 only is displayed.
 - [1and2]: TTG from own ship to both VRMs is displayed.
6. Close the menu.

1.33 How to Measure Bearing

The Electronic Bearing Lines (EBLs) are used to take bearings of targets. There are two EBLs, EBL1 and EBL2. Each EBL is a straight dashed line extending out from the own ship position up to the circumference of the radar picture. The two EBLs can be distinguished from each other by the different lengths of their dashes; the dashes on EBL2 are longer.

Each EBL has an EBRL (Electronic Bearing Range Line, indicated as a short line, crossing the EBL at right angles). When VRM is not displayed and only EBL is displayed, the EBRL shows the range from the EBL origin.

When VRMs are displayed with EBLs the VRM overlaps the EBRL. The value for EBRL and VRM is the same and is displayed in the VRM box at the bottom-right of the screen.



1.33.1 Methods to measure bearing

There are two methods for measuring bearing, using the **EBL** key and on-screen menu box operation.

Using the EBL keys on the control unit (RCU-014/RCU-031)

1. Press the **EBL ON** key to activate the [EBL1] box. Press the **EBL ON** key again to activate the EBL2 box. Press the **EBL ON** key again to switch between active VRMs.
2. Rotate the **EBL** knob clockwise or counterclockwise until the active EBL bisects the target of interest, then read its bearing at the lower-left corner of the screen.
3. Press the **EBL OFF** key to erase the active EBL.

On-screen menu box operation

1. Select the appropriate EBL box.
2. The guidance box reads "EBL ON/". Press the **left button** to turn on the EBL. The guidance box now reads "EBL SET L=DELETE /".
3. Press the **left button** again and the cursor jumps to inside the operational display area. The guidance box now reads "EBL FIX L=DELETE/".
4. Rotate the **EBL** knob clockwise or counterclockwise until the active EBL bisects the target of interest. Read the bearing at the lower-left corner of the screen.
5. To erase the EBL(s), place the cursor on the box for the EBL you want to erase, then press and hold the **left button**.

1.33.2 True or relative bearing

The EBL readout is affixed by "R" (relative) if it is relative to own ship's heading, "T" (true) if it is referenced to the north. True or relative indication is available regardless of presentation mode.

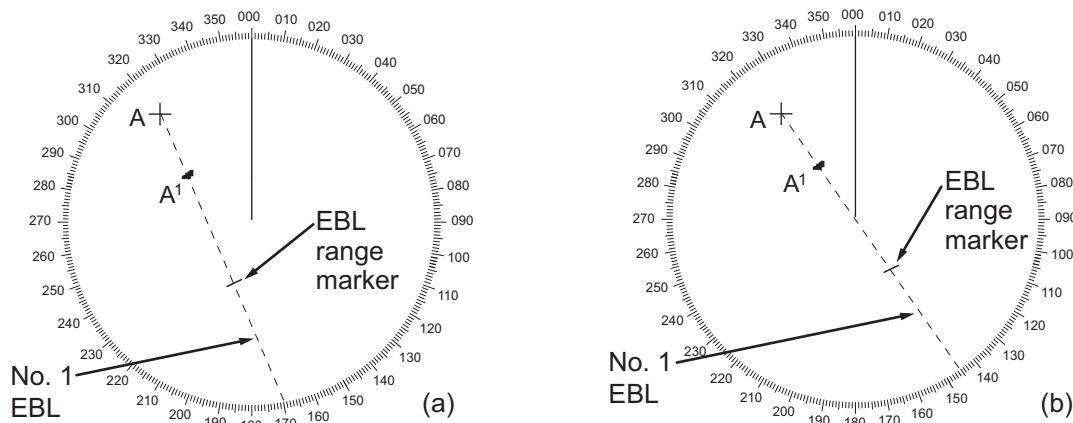
1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS].
For C-types, select [3 CURSOR•EBL•VRM].
3. **For IMO-types**, select [3 EBL•VRM•CURSOR SET].
For C-types, select [3 EBL•VRM].
4. **For IMO-types**, select [5 EBL•CURSOR BEARING].
For C-types, select [2 EBL1] or [3 EBL2] as appropriate.
5. Select the [REL] or [TRUE] as required, then press the **ENTER MARK** key.
6. Close the menu.

Note: The EBL and its indication change according to gyrocompass changes as follows:

Gyro heading	EBL changes
HEAD UP / relative	EBL indication and EBL marker are unchanged.
HEAD UP / true	EBL indication does not change, however the EBL marker moves accordingly
COURSE UP / relative	EBL indication does not change, however the EBL marker moves accordingly.
COURSE UP / true	EBL indication and EBL marker are unchanged.
NORTH UP / relative	EBL indication does not change, however the EBL marker moves accordingly
NORTH UP / true	EBL indication and EBL marker are unchanged.

1.34 Collision Assessment by Offset EBL

The origin of the EBL can be placed anywhere to enable measurement of range and bearing between any two targets. This function is also useful for assessment of the potential risk of collision. It is possible to read CPA (Closest Point of Approach) by using the EBL range marker as shown in (a) in the illustration below. If the EBL passes through the sweep origin (own ship) as shown in (b) in the illustration below, the target ship is on a collision course.



1.34.1 How to assess risk of collision using the offset EBL

There are two methods for assessing risk collision. You can use the control unit or the [CURSOR] menu.

Using the control unit (RCU-014/RCU-031)

1. Press the **EBL ON** key to display or activate an EBL (EBL1 or EBL2).
2. Place the cursor on a target appearing as threatening (indicated as "A" in the example figure on the previous page).
3. Press the **EBL OFFSET** key and the origin of the active EBL shifts to the cursor position.
4. Press the **EBL OFFSET** key again to anchor the EBL origin.
5. After waiting for a few minutes (at least 3 minutes), operate the **EBL** knob until the EBL bisects the target at the new position (A^1). The EBL readout shows the target ship's course, which can be true or relative depending on the EBL bearing reference setting.

Note: If relative motion is selected, it is also possible to read CPA by using the range marker as shown in left-hand figure at the top of the next page. If the EBL passes through the sweep origin (own ship) as illustrated in the right-hand figure above, the target ship is on a collision course.

6. To return the EBL origin to the own ship's position, then press the **EBL OFFSET** key.

Using the on-screen box

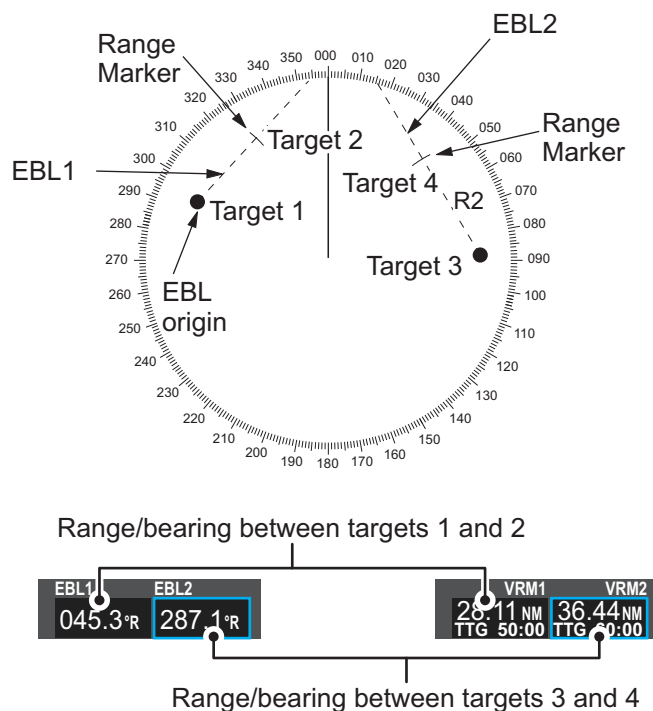
1. Select the operational display area, then right-click. The [CURSOR] context menu appears.
2. Select [EBL OFFSET].
3. Select the operational display area, then left-click. The EBL line is attached to the cursor.
4. Place the offset EBL on the target appearing as threatening, then left-click.
5. After waiting for a few minutes (at least 3 minutes), operate the EBL used in step 4 until it bisects the target at the new position (A¹). The EBL readout shows the target ship's course, which can be true or relative depending on the EBL bearing reference setting.
6. To return the EBL origin to the own ship's position, repeat steps 1 to 3.
7. Close the menu.

1.34.2 How to set the origin point reference for EBL OFFSET

The origin point of the offset EBL can be ground stabilized (geographically fixed), north stabilized (true) or referenced to own ship's heading (relative).

1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS].
For C-types, select [3 CURSOR•EBL•VRM].
3. **For IMO-types**, select [3 EBL•VRM•CURSOR SET].
For C-types, select [3 EBL•VRM].
4. **For IMO-types**, select [2 EBL OFFSET BASE].
For C-types, select [6 EBL OFFSET BASE].
5. Select [STAB GND], [STAB HDG] or [STAB NORTH] as appropriate, then press the **ENTER MARK** key.
 - [STAB GND]: Reference to latitude and longitude. Origin position is always fixed regardless of your ship's movement.
 - [STAB HDG]: Reference to heading. The relationship between origin position and own position is kept always.
 - [STAB NORTH]: Reference to North. The origin position changes with North position.
6. Close the menu.

1.35 How to Measure Range and Bearing Between Two Targets



How to measure range and bearing from the [CURSOR] menu

This procedure uses EBL1 and VRM1 as an example and is written on the premise that neither of the EBLs or VRMs is active.

1. Place the cursor on the EBL1 box, then left-click. EBL1 is now active.
2. Place the cursor inside the operational display area, then right-click to show the [CURSOR] context menu.
3. Select [EBL OFFSET]. The cursor is displayed with a red surround, indicating that the [EBL OFFSET] mode is now active.
4. With the cursor in the operational display area, left-click. EBL1 moves to the cursor location.
5. Place the offset EBL on the target of interest (Target 1), then left-click.
6. Right-click to deactivate the [EBL OFFSET] mode. The red surround on the cursor disappears.
7. Place the cursor on the [EBL1] box, then spin the scrollwheel until EBL1 intersects the secondary target (Target 2 in the example figure).
8. Place the cursor on the [VRM1] box, then spin the scrollwheel until the range marker on EBL1 aligns with Target 2. The readouts for EBL1 and VRM1, at the bottom of the screen, indicate the bearing and range between the Target 1 and Target 2.
9. You can repeat the same procedure on third and fourth targets (shown as "Target 3" and "Target 4" in the above example) by using EBL2 and VRM2.

Bearing is shown relative to own ship with suffix "R" or as a true bearing with suffix "T" depending on EBL relative/true settings in the [EBL•VRM•CURSOR SET] menu.

How to measure range and bearing from the control unit (RCU-014/RCU-031))

Range and bearing can be measure using the **EBL OFFSET** key.

1. Press the **EBL ON** key to activate EBL1.
2. Place the cursor inside the operational display area, then press the **EBL OFFSET** key. EBL1 moves to the cursor.
3. Place the cursor (EBL1 moves with the cursor) on a target of interest. (Shown as "Target 1" in the above example), then press the **EBL OFFSET** key.
4. Rotate the **EBL** knob to move the EBL until it passes through another target of interest. (Shown as "Target 2" in the above example).
5. Place the cursor on the [VRM1] box.
6. Rotate the **VRM** knob until the range marker on the EBL is on the inside edge of Target 2. The readouts for EBL1 and VRM1, at the bottom of the screen, indicate the bearing and range between the Target 1 and Target 2.
7. You can repeat the same procedure on third and fourth targets (shown as "Target 3" and "Target 4" in the above example) by using the No. 2 EBL and the No. 2 VRM.

Bearing is shown relative to own ship with suffix "R" or as a true bearing with suffix "T" depending on EBL relative/true settings in the [EBL•VRM] menu.

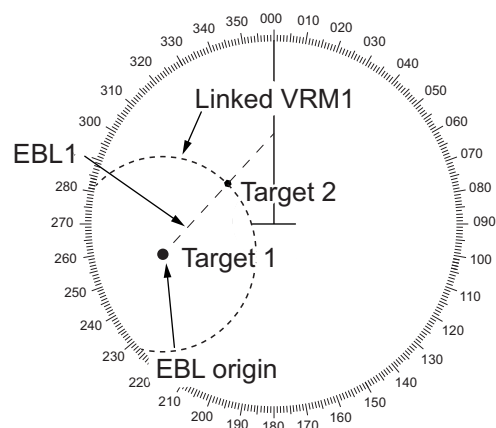
How to reset the EBL origin to the center of the screen

1. Place the cursor on the box for the EBL to reset, then left-click. The selected EBL is now active and highlighted.
2. Place the cursor inside the operational display area, then right-click. The [CURSOR] context menu appears.
3. Select [EBL OFFSET]. The cursor is now displayed with a red surround.
4. Left-click to return the EBL to the center of the display.
5. Right-click to deactivate the [EBL OFFSET] mode. The red surround on the cursor disappears.

How to link EBL and VRM OFFSET

You can link the EBL and VRM offset to show the VRM range ring with one target as the center-point. This may helpful if the range marker on the EBL is difficult to see.

1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS].
For C-types, select [3 CURSOR•EBL•VRM].
3. **For IMO-types**, select [3 EBL•VRM•CURSOR SET].
For C-types, select [3 EBL•VRM].
4. **For IMO-types**, select [4 VRM OFFSET].
For C-types, select [8 VRM OFFSET].
5. Select [LINK EBL] to link the offset EBL is now displayed with the VRM range ring, as indicated in the figure below.

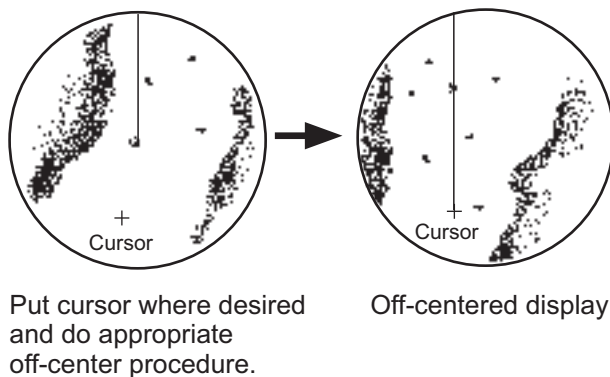


Select [OFF] to deactivate the link between the offset EBL and the VRM.

6. Close the menu.

1.36 How to Off-Center the Display

Own ship position, or sweep origin, can be displaced to expand the view field without switching to a larger range scale. The sweep origin can be off-centered to the cursor position, but not more than 75% of the range in use; if the cursor is set beyond 75% of the range scale, the sweep origin will be off-centered to the point of 75% of the limit.



This feature is available between 0.215 M and 48 NM ranges. The feature is not available in true motion mode.

If the conning position is outside the effective radar display, some parts of the bearing scale are not shown. For details, see section 1.51.

Note: When the conditions shown below are met, off-center cannot be canceled. This is because the radar antenna position is located at a position greater than 75% of the effective radar display.

- Own ship marker is large.
- The distance between antenna position and conning position is large.
- Short-distance display range.

To cancel the off-center in these cases, select a larger range, then cancel the off-center.

1.36.1 How to off-center the display from the control unit (RCU-014/RCU-031)

With the cursor shown

1. Place the cursor at the position where you wish to move the sweep origin.
2. Press the **OFF CENTER** key. The sweep origin is now off-centered at the cursor position.
3. To cancel off-centering, press the **OFF CENTER** key again.

With the cursor hidden

Use the trackball to move the center to the desired location. To cancel off-centering, press the **OFF CENTER** key.

The location to which the sweep origin returns depends on the following conditions:

- With the radar in transmit mode, or with the radar in standby mode while off-centering is not active: the sweep origin is returned to the center of the screen.
- With the radar in standby mode while off-centering is active: the sweep origin is returned to the off-center position.

1.36.2 How to off-center the display from the on-screen menu

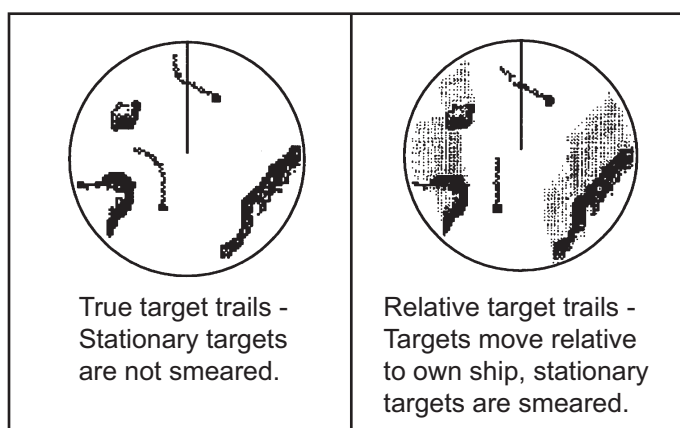
1. Place the cursor inside the operational display area, then right-click to show the [CURSOR] menu.
2. Select [OFF CENTER]. The cursor is now displayed with a red surround, indicating that [OFF CENTER] mode is active.
3. Move the cursor to the position where you wish to move the sweep origin, then left click. The display is now centered at the cursor position.
Note: If you need to move off-center position, you can reset the off-center while the cursor is displayed with the red surround by left-clicking the operational display area.
4. Right-click to cancel [OFF CENTER] mode.
5. To reset the sweep origin to the center of the operational display area, repeat steps 1 to 2, then left-click the operational display area.

1.37 Target Trails

The trails of the radar echoes of targets can be displayed in the form of synthetic afterglow. Target trails are shown either relative or true and can be sea or ground stabilized. True motion trails require a compass signal, and position and speed data. When the range is changed, trails are continued for targets which were already displayed in the previous range. Newly detected targets have no trail when first detected.

1.37.1 True or relative trails

You can display echo trails in true or relative motion. Relative trails show relative movements between targets and own ship. True motion trails present true target movements in accordance with their over-the-ground speeds and courses.



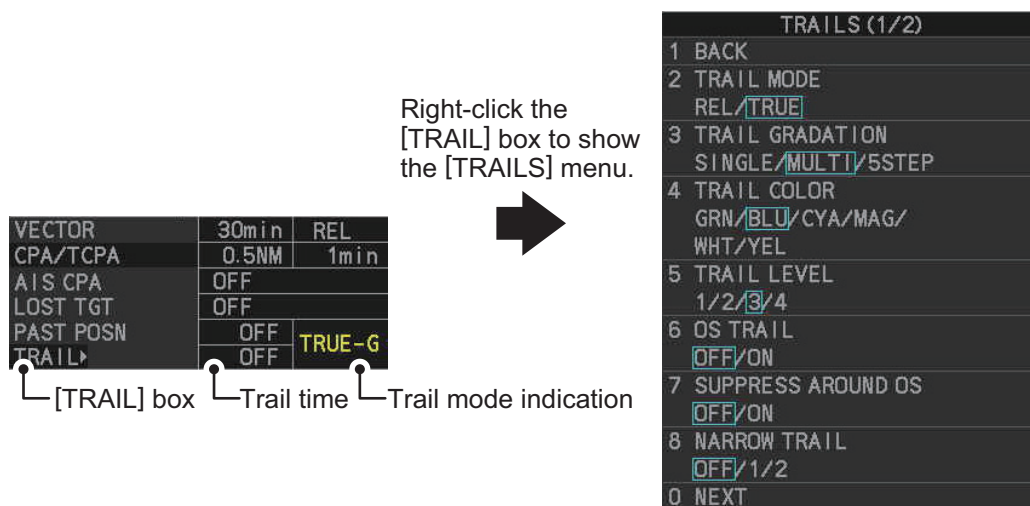
Note: The indication in the [TRAIL MODE] box changes color based on the trail mode and orientation, as shown in the following table.

Trail mode	Orientation	Color
True trails (TRUE-G or TRUE-S)	HEAD UP (relative)	Yellow
	STERN UP (relative)	
	CURSOR GYRO (relative)	White
	COURSE UP (relative)	
	NORTH UP (relative)	

The reference for the past position displays for AIS and TT is also switched whenever the trail reference is switched.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT] to show the next menu page.
4. Select [4 TRAILS]. The [TRAIL MENU] appears.

Note: You can also right-click the [TRAIL] box to access this menu.



5. Select [TRAIL MODE].
6. Select the appropriate trail mode, then press the **ENTER MARK** key.
 - [REL]: Relative target trails. Targets move relative to own ship and stationary targets appear smeared.
 - [TRUE]: True target trails. Targets true movements are shown, stationary targets are not smeared.
7. Close the menu.

You can also click the trail mode indication to toggle between relative and true trails.

1.37.2 Trail time

Trail time is the interval at which the trail is plotted on-screen.

Note: If the trail time is linked with the range (see section 1.9), the trail time is also automatically regulated to show a constant trail. Further, the trail time indication appears in yellow color. To link the trail time with the range, select [NORMAL] in the following procedures; range link is not available if a setting other than [NORMAL] is selected. Also, when using a range that is valid only when in stand-by mode, the trail time is automatically adjusted to match either the maximum or minimum range available in transmit mode.

You can change the trail time as follows:

Using the control unit (RCU-014/RCU-031)

1. Press the **CANCEL TRAILS** key to cycle through and select the desired setting.
For IMO-types, the cyclic order is as follows:
 [OFF] → [15 sec] → [30 sec] → [1 min] → [3 min] → [6min] → [15 min] → [30 min]
 → [CONT] → [OFF]...

For C-types, the available options depend on the setting for [TRAIL LENGTH] in the [TRAILS] section of [ECHO] menu. To set the [TRAIL LENGTH] time, see section 1.37.12.

[TRAIL LENGTH] setting	Available options
[NORMAL]	[OFF], [15 sec], [30 sec], [1 min], [3 min], [6 min], [15 min], [30 min], [CONT].
[12H]	[OFF], [30 min], [1 hr], [3 hr], [6 hr], [12 hr], [CONT].
[24H]	[OFF], [1 hr], [2 hr], [3 hr], [6 hr], [12 hr], [18 hr], [24 h], [CONT].
[48H]	[OFF], [2 hr], [4 hr], [8 hr], [16 hr], [24 hr], [36 hr], [48 h], [CONT].

Using the on-screen box

- Place the cursor on the trail time setting inside the [TRAIL] box, at the bottom-right of the screen.
- Left-click the [TRAIL] box to change the trail time.

For IMO-types, the cyclic order is as follows: [OFF] → [15 sec] → [30 sec] → [1 min] → [3 min] → [6min] → [15 min] → [30 min] → [CONT] → [OFF]...

For C-types, the available options depend on the setting for [TRAIL LENGTH] in the [TRAILS] section of [ECHO] menu. To set the [TRAIL LENGTH] time, see section 1.37.12.



Spin the scrollwheel to change the trail time. The options for each [TRAIL LENGTH] setting are listed the following table.

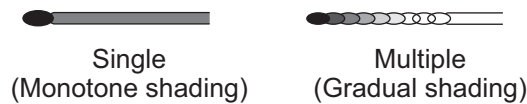
[TRAIL LENGTH] setting	Available options
[NORMAL]	[OFF], [15 sec], [30 sec], [1 min] to [30 min] at one-minute intervals, [CONT].
[12H]	[OFF], [00:30] to [12:00] at 30 minute intervals, [CONT].
[24H]	[OFF], [00:30] to [24:00] at one hour intervals, [CONT].
[48H]	[OFF], [00:30] to [48:00] at two hour intervals, [CONT].

Note 1: The timer displays the elapsed time of the selected trail. Use caution when using this feature, as the displayed time is not the overall trail time. Also, when the trail timer is displayed, the trail accuracy of other ship's echoes may be lowered. When the trail time reaches the preset interval, the timer disappears.

Note 2: The [CONT] option sets the trail time plotting as continuous. When the plotting time reaches 29:59, the timer is hidden. The timer reappears when [TRAIL ALL CLEAR] is selected, or when the range is changed.

1.37.3 Trail gradation

The trail afterglow can be displayed in a single tone or gradual time-based shading.



1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT] to show the next menu page.
4. Select [4 TRAILS]. The [TRAIL MENU] appears.
5. Select [3 TRAIL GRADATION].
6. Select the appropriate setting, referring to the following list.
 - [SINGLE]: Trails are displayed in monotone.
 - [MULTI]: Trails are displayed in multiple colors, based on time.
 - [5STEP]*: Trails are colored in 5 shades, brightest color for new trails, dullest color for old trails.
 - *: C-types only.
7. Close the menu.

1.37.4 Trail level

The level, or intensity, of the afterglow that extends from radar targets can be selected as below.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT] to show the next menu page.
4. Select [4 TRAILS]. The [TRAIL MENU] appears.
5. Select [5 TRAIL LEVEL].
6. Select the appropriate setting, then press the **ENTER MARK** key. The higher the number, the greater the intensity of the afterglow.
7. Close the menu.

1.37.5 Narrow trails (C-type only)

Target trails can be painted with thinner lines if desired. This csection 1.37.2an be useful when there are a lot of targets on the screen and it is hard to distinguish one from another.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT] to show the next menu page.
4. Select [4 TRAILS]. The [TRAIL MENU] appears.
5. Select [8 NARROW TRAIL].
6. Select the appropriate setting from [OFF], [1] or [2], then press the **ENTER MARK** key. A trail with a setting of [2] is thinner than a trail with a setting of [1].
7. Close the menu.

1.37.6 How to hide the trails temporarily

Following the procedure outlined in section 1.37.2, set the trail time to [OFF]. The trails are hidden from view, but are continued. To show the trails again, repeat the procedure, setting the trail time to any interval other than [OFF].

1.37.7 Trail stabilization in true motion

True motion trails can be ground stabilized or sea stabilized. The [TRAIL] box shows current stabilization as "TRUE-G" or "TRUE-S". You can change the stabilization mode with the following procedure.

1. Open the menu.
2. Select [7 INFORMATION BOX].
3. Select [2 OWN SHIP INFO].
4. Select [3 SPEED]. The [SPEED] menu appears.
Note: You can also access the [SPEED] menu from the on-screen box. Place the cursor on the [SPD ►] indication in the speed box at the top-right of the screen, then right-click.
5. Select [2 SHIP SPEED].
6. Select [LOG(BT)] (ground stabilization) or [LOG(WT)] (sea stabilization) as required.
7. Close the menu.

Note: The stabilization mode is applied to own ship speed and TT trails.

1.37.8 How to erase/restart trails

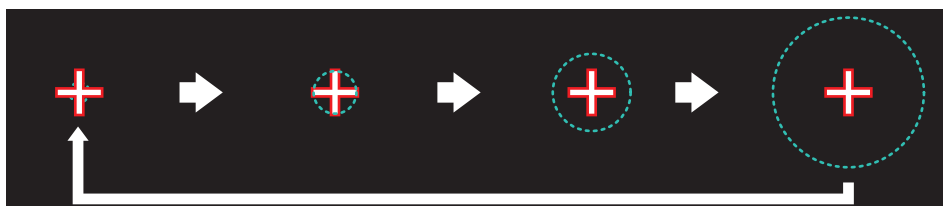
All trails can be erased (including those in the memory) and restarted to start fresh trails. There are three methods you can use to erase trails.

To erase all trails displayed in the operational display area:

- Select the [TRAIL] box, then press and hold the **left button** on the trackball; or
- Press and hold **CANCEL TRAILS** key.

To erase a section of a trail (C-types only):

1. Place the cursor inside the operational display area, then right-click to show the [CURSOR] menu.
2. Select [TRAIL ERASER]. The cursor is now displayed with a red surround and a dashed circle, indicating that [TRAIL ERASER] mode is active.
3. Press the **left button** to change the diameter of the dashed circle, as shown in the figure below.



4. Place the cursor on the trail whose section you want to erase, then press and hold the **left button**.

5. With the **left button** pressed, drag the cursor over the section of the trail you want to erase. The section of trail “covered” by the dashed circle is erased.
6. Release the **left button**.
7. Right-click to deactivate the [TRAIL ERASER] function. The cursor is no longer highlighted and the dashed circle disappears.

1.37.9 How to prevent sea clutter in true trails

You can prevent the display of sea clutter in true trails about your ship to clear the radar picture. Your ship's trails can also be shown or hidden.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT] to show the next menu page.
4. Select [4 TRAILS]. The [TRAIL MENU] appears.
5. Select [7 SUPPRESS AROUND OS].
6. Select [OFF] or [ON] as appropriate.
Note: For IMO-types, when [6 OS TRAIL] is set to [ON], [7 SUPPRESS TRAILS] is automatically fixed at [ON]. To disable the sea clutter suppression feature, change [6 OS TRAIL] to [OFF], then change the setting for [7 SUPPRESS TRAILS].
7. Close the menu.

1.37.10 How to show/hide OS trails

To show or hide the OS trail at any time, follow the procedure below.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT] to show the next menu page.
4. Select [4 TRAILS]. The [TRAIL MENU] appears.
5. Select [6 OS TRAIL].
6. Select [OFF] or [ON] as appropriate.
Note: For IMO-types, when [6 OS TRAIL] is set to [ON], [7 SUPPRESS AROUND OS] is automatically fixed at [ON]. To disable the sea clutter suppression feature, change [6 OS TRAIL] to [OFF], then change the setting for [7 SUPPRESS AROUND OS].
7. Close the menu.

1.37.11 How to show/hide land trails (C-type only)

You can improve the on-screen display visibility by hiding trails generated by land-masses and non-moving objects. Hiding the trails has the following possible benefits:

- Land-masses have no trail, allowing you to use relative trails near coastlines.
- Only moving echoes create a trail, improving target identification.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT].
4. Select [4 TRAILS]. The [TRAIL MENU] appears.
5. Select [0 NEXT] to show the second page of the menu.
6. Select [2 HIDE LAND TRAILS(T)] or [3 HIDE LAND TRAILS(R)] as appropriate.
7. Referring to the table below, select the appropriate setting, then press the **ENTER MARK** key.

TRAILS (2/2)	
1	BACK
2	HIDE LAND TRAILS (T) OFF/1/2
3	HIDE LAND TRAILS (R) OFF/1/2
4	TRAIL LENGTH NORMAL/12H/24H/48H

Setting	Trails for non-moving objects		Trails for moving objects
	Large objects	Small objects	
[OFF]	Trails are shown	Trails are shown	Trails are shown
[1]	Trails are hidden	Trails are shown	Trails are shown
[2]	Trails are hidden	Trails are hidden	Trails are shown

8. Close the menu.

Note: When option [1] or [2] is selected trails for echoes outside the displayed area are not generated. It is important to note that, where the displayed area is moved by functions such as off-centering or true motion, newly displayed echoes do not have trails.

1.37.12 How to set the trail length (C-type only)

You can save up to 48 hours of trails. the [TRAIL LENGTH] can be set to one of the following lengths: [NORMAL], [12H], [24H] or [48H]. To set the trail length, follow the procedure below.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT].
4. Select [4 TRAILS]. The [TRAIL MENU] appears.
5. Select [0 NEXT] to show the second page of the menu.
6. Select [4 TRAIL LENGTH].
7. Select the desired length.

[NORMAL]: Trails are displayed in a single, continuous line with a single color.

[12H], [24H] or [48H]: Trails appear in segments. The interval for each segment change depends on your selection, as shown below.

- 12H: One hour intervals.
- 24H: Two hour intervals.
- 48H: Four hour intervals.

Note: When a length other than [NORMAL] is selected, set [3 TRAIL GRADATION] to [SINGLE]. If you select [MULTI], the interval between each colored segment may be difficult to see clearly.

- Close the menu.

1.37.13 How to set the trail color (C-type only)

The setting for trail coloration depends on the setting for [3 TRAIL GRADATION] and [4 TRAIL LENGTH], as shown in the following table.

Length	Gradation	Setting location
NORMAL	SINGLE	[MAIN] → [2 ECHO] → [0 NEXT] → [4 TRAILS] → [4 TRAIL COLOR]
	MULTI	
[12H], [24H], [48H]	MULTI	[MAIN] → [2 ECHO] → [0 NEXT] → [4 TRAILS] → [0 NEXT] → [6 LONG TRAIL COLOR]
	SINGLE	

Where [TRAIL LENGTH] is set to [NORMAL]

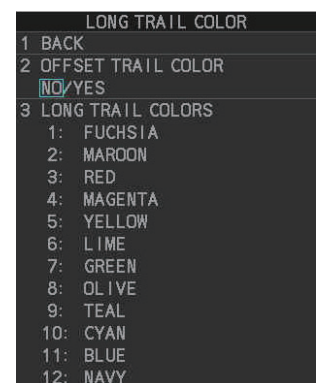
You can assign one of six colors when [4 TRAIL LENGTH] is set to [NORMAL].

- Open the menu.
- Select [1 ECHO].
- Select [0 NEXT].
- Select [4 TRAILS]. The [TRAILS] menu appears.
- Select [4 TRAIL COLOR].
- Select the required color. The available colors are: [GRN] (green), [BLU] (blue), [CYA] (cyan), [MAG] (magenta), [WHT] (white) and [YEL] (yellow).
- Close the menu.

Where [TRAIL LENGTH] is set to other than [NORMAL]

When [4 TRAIL LENGTH] is set to [12H], [24H] or [48H], you can color the trails with one of two methods: one continuous color, or multicolor.

- Open the menu.
- Select [1 ECHO].
- Select [0 NEXT].
- Select [4 TRAILS]. The [TRAILS] menu appears.
- Select [0 NEXT] to show the second page of the menu.
- Select [6 LONG TRAIL COLOR]. The [LONG TRAIL COLOR MENU] appears (see figure to the right).
- Select [3 LONG TRAIL COLORS].
- Set the colors as desired.
Left-click to move the cursor through the colors, spin the scrollwheel to change the highlighted color. The menu shows 12 colors, numbered accordingly from [1] to [12]. The first segment of the trails is assigned the color for number [1].
- Close the menu.



1.37.14 How to remove the colors from a section of a multicolor trail (C-type only)

You can remove the color(s) from a section of a multicolor trail, leaving the selected section as a gray trail. To remove the color(s), follow the procedure below.

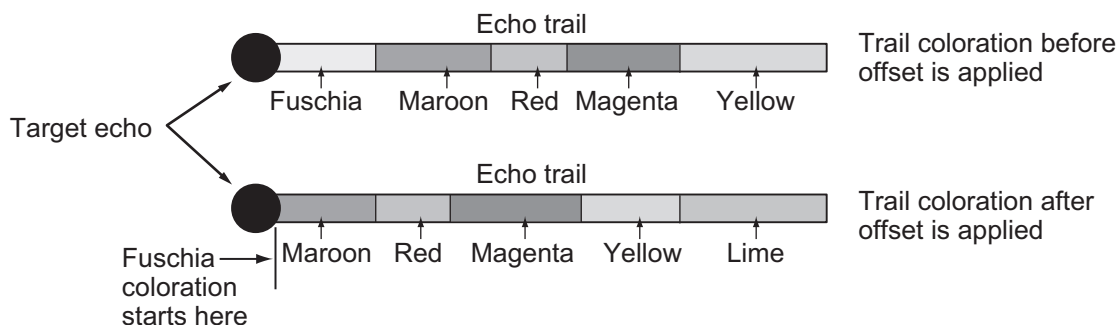
Note: This function is only available when [4 TRAIL LENGTH] is set to other than [NORMAL].

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT].
4. Select [4 TRAILS]. The [TRAIL MENU] appears.
5. Select [0 NEXT] to show the second page of the menu.
6. Select [5 TRAIL GRAY-OUT TIME].
7. Select the start and end times for the period you want to gray-out.
8. Close the menu.

1.37.15 How to offset the colors for multicolored trail (C-type only)

You can “shift” the order of the trail colors. When this function is active, the first color used to paint the trail is changed. For example if you had selected [FUSCHIA] before activating the offset feature, the start color would be [MAROON].

To offset the colors, follow the procedure below.



1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT].
4. Select [4 TRAILS]. The [TRAIL MENU] appears.
5. Select [0 NEXT] to show the second page of the menu.
6. Select [6 LONG TRAIL COLOR].
7. Select [2 OFFSET TRAIL COLOR].
8. **To offset the color by one, select [ON].**
To leave the colors in their original order, select [OFF].
9. Close the menu.

1.38 Target Analyzer (C-type only)

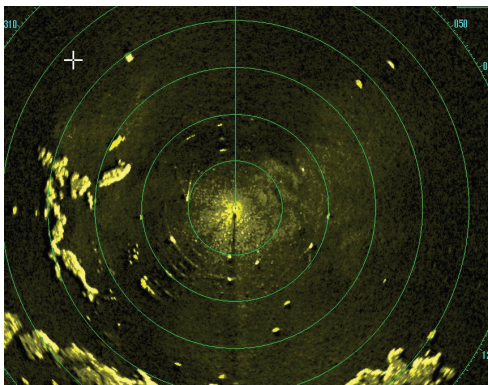
The target analyzer function analyzes echoes and assists the operator to determine dangerous targets. This function is particularly useful under heavy rain/snow or where there is surface reflection, which can cause interference and noise.

The target analyzer function can also place hatching over heavy rain areas, reducing the visible interference and allowing a clearer view of potential targets.

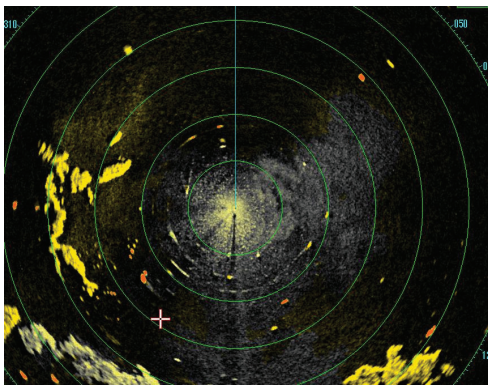
Echoes are displayed in five different colors to assist the operator in identifying targets. The colors and their respective echoes change depending on the echo color selected from the [BRILL] menu (see section 1.46) are shown in the table below.

Echo	Selected echo color					
	YEL	GRN	WHT	AMB	M-GRN	M-CYA
Surface reflection	Green	Green	Green	Green	Green	Green
Rain	Gray	Gray	Gray	Gray	Gray	Gray
Moving target	Red	Red	Red	Red	Pink	Pink
Approaching target	Pink	Pink	Pink	Pink	White	White
Other echoes	Yellow	Green	White	Amber	Red to green	Red to blue

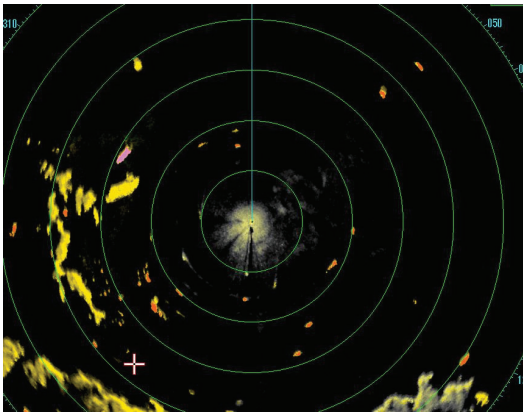
The following example figures show the manner in which this function affects displayed echoes.



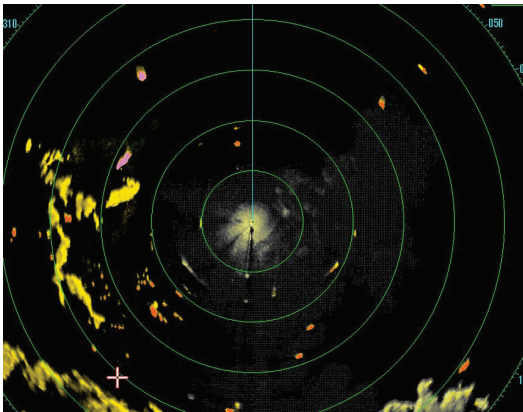
No echo adjustment
(Target analyzer off, EAV off, hatching off)
Rain, moving targets and surface reflections are all displayed with no filtering.



Minimal echo adjustment
(Target analyzer on, EAV off, hatching off)
Echoes are colored, surface reflections are filtered, rain is displayed.



Moderate echo adjustment
(Target analyzer on, EAV on, hatching off)
Echoes are colored, surface reflections and rain are filtered.



Maximum echo adjustment
(Target analyzer on, EAV on, hatching on)
Echoes are colored, surface reflections are filtered, rain is displayed in gray colored hatching.

Note 1: This function works best when the settings for [GAIN], [STC], [RAIN], [NOISE REJECT] and [VIDEO CONTRAST] are properly adjusted (surface reflections are displayed in green and rain is displayed in gray).

Note 2: This function recognizes moving targets as approaching targets. Buoys and other stationary objects are not recognized as approaching targets by this function.

Note 3: The target analyzer function requires a short period of time to analyze echoes and display them on-screen. If your antenna revolves at more than 40 rpm, moving targets may not be displayed correctly. For this reason, caution is advised when using the target analyzer function.

Note 4: The target analyzer function's performance may be affected by factors such as target size, weather and sea conditions, physical equipment configuration, offset settings and other factors.

What is "hatching"?

Where echo averaging may hide light rain on the display, the hatching feature, when activated, places a gray "veil" over the areas where rain is detected. This allows the operator to see where the rain is without affecting the quality of the displayed echoes.

1.38.1 How to activate/deactivate the target analyzer

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
4. Select [5 TARGET ANALYZER].
5. Select [OFF] to deactivate the function, or [ON] to activate the function.
6. Select [HATCHING].
7. Select [OFF] to deactivate the function, or [ON] to activate the function.
8. Close the menu.

1.39 Target Alarm

The target alarm serves to alert the navigator to targets (ships, landmasses, etc.) entering a specific area, with audiovisual alerts.

The operator can set the alarm zones at any location, with any size, however, the zones must be inside the operational display area.

Note: The target alarm boxes are not displayed when the setting for [AZ/ALR SELECT] in the [TT•AIS] menu is set to the default setting [ACQUISITION ZONE]. To enable this function, set [AZ/ALR SELECT] in the [TT•AIS] menu to [TARGET ALARM ZONE].



CAUTION

- ♦ The alarm should not be relied upon as the sole means for detecting possible collision situations.
- ♦ A/C SEA, A/C RAIN and GAIN controls should be properly adjusted to be sure the alarm system does not overlook target echoes.

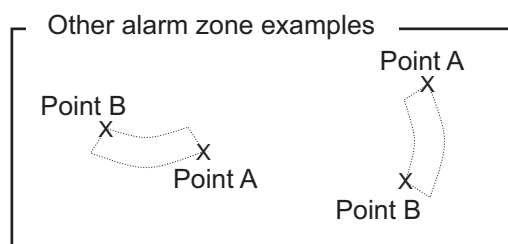
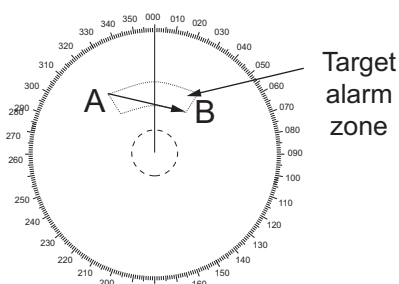
1.39.1 How to set a target alarm

The procedure below shows how to set a target alarm using the figure below as an example. The alarm boxes are labeled [1:] and [2:], and are located at the bottom-right of the screen, near the VRM boxes.



- Alarm zone 1 is selected (highlighted) and inactive.
- Alarm zone 2 is set and active.

1. Select the appropriate alarm box, then left-click. The cursor jumps into the operational display area and the indication "SET" appears inside the target alarm box selected.
2. Using the trackball, move the cursor to Point A, then left-click.
3. Using the trackball, move the cursor to Point B, then left-click. The indication "SET" is replaced with "WORK" in the box. The target alarm zone's lines are shown as dashed lines.



Note 1: To create a 360° alarm zone, set Point B at the same location as Point A.

Note 2: Two alarm zones can be set simultaneously. The second alarm zone is only available when the first alarm zone is active, however.

Note 3: When the target alarm zone is not within the range in use the indication "UP RNG" appears to the right of the target alarm box. In this case select a range that will display the target alarm zone.

1.39.2 How to mute the target alarm

A target in the target alarm zone produces both visual (flashing) and audible (beep) alarms. To silence the audio alarm select the appropriate target alarm box then left-click. The target alarm box indication shows "MUTE". This will deactivate the audio alarm but will not stop the flashing of the offending target. You can also stop the alarm by deactivating the target alarm zone (see section 1.39.3).

To reactivate the audio alarm, select the target alarm box then left-click to show "WORK" in the box.

1.39.3 How to deactivate a target alarm

Select the target box to be deactivated, then press and hold the **left button** on the Control Unit.

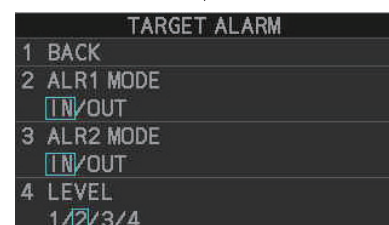
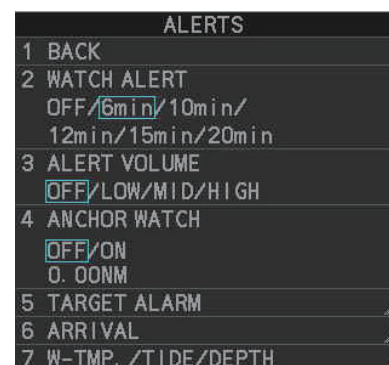
Note: When both alarm zones are active, the second ([2:]) alarm zone must be deactivated before the first ([1:]) can be deactivated.

If both zones are active when you try to deactivate zone [1:], the system releases two audible beeps and shows the message "DELETE ALR2 FIRST".

1.39.4 How to change target alarm attributes

You can select the echo strength level that triggers the alarm, the condition that generates the alarm and the volume of the audio alarm as follows:

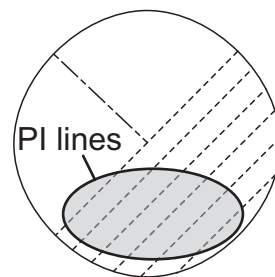
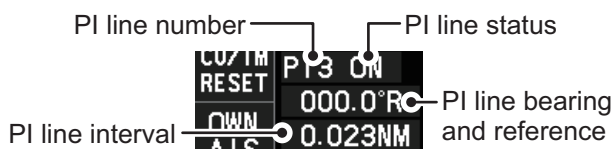
1. Open the menu.
2. Select [4 ALERTS].
3. Select [6 TARGET ALARM].
4. Select [2 ALR1 MODE] or [3 ALR2 MODE] as appropriate, then press the **ENTER MARK** key.
5. Select [IN] or [OUT] as appropriate, then press the **ENTER MARK** key.
[IN]: Targets entering the alarm zone trigger the alarm.
[OUT]: Targets leaving the alarm zone trigger the alarm.
6. Select [4 LEVEL].
7. Select the appropriate level of echo strength to trigger the alarm, then press the **ENTER MARK** key. [1]: weak echoes can trigger the alarm, [4]: only strong echoes trigger the alarm.
8. Select [1 BACK] to return to the [ALERT] menu.
9. Select [3 ALERT VOLUME].
10. Select [OFF], [LOW], [MID] or [HIGH] as appropriate, then press the **ENTER MARK** key.
Note 1: This setting is applied to all alarms output from this radar system.
Note 2: The [OFF] options is not shown for IMO-type radars.
11. Close the menu.



1.40 PI (Parallel Index) Lines

PI lines are useful for keeping a constant distance between own ship and a coastline or a partner ship when navigating.

You can control the presentation and interval of the PI lines from the [PI Line] box, which is at the lower-left corner of the screen (see example figure below).



1.40.1 How to show/hide the PI lines

You can show or hide the PI lines as required with one of the following procedures.

Using the on-screen box

1. Place the cursor on the PI line number or PI line status in the PI line box.
2. Spin the scrollwheel to select the PI line (PI1 to PI6) you want to show or hide.
Note: PI5 and PI6 are only available when [SET MAXIMUM PI LINES] is set to [1].
3. Left-click to toggle between [ON] (PI line is shown) or [OFF] (PI line is hidden).

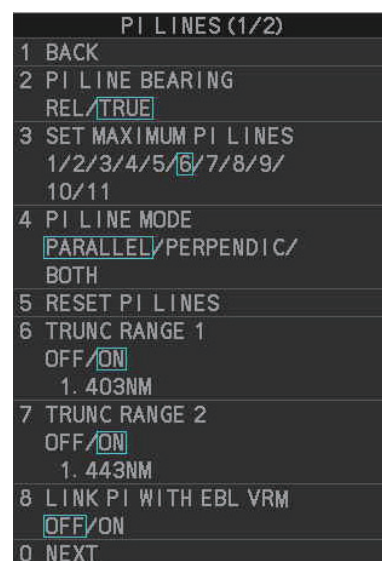
Using the control unit (RCU-031 only)

1. Press **6 INDEX LINE** to select the PI line you want to use (PI1 to PI6).
Note: PI5 and PI6 are only available when [SET MAXIMUM PI LINES] is set to [1].
2. Press and hold **6 INDEX LINE** to toggle the selected PI line on or off.

1.40.2 How to set the maximum number of lines to display

You can select the maximum number of PI lines to display. The actual number of lines visible depends on the line interval (see section 1.40.3).

1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS].
For C-types, select [3 CURSOR•EBL•VRM].
3. Select [2 PI LINES]. The [PI LINES] menu appears.
4. Select [3 SET MAXIMUM PI LINES].
5. Select the appropriate option.
For IMO-types, the maximum number of PI lines available is 6.
For C-types, the maximum number of PI lines available is 11.
If you set [1] as the maximum, PI1 through PI6 are available for use. For all other options, only PI1 through PI4 are available for use. This setting is applied to all PI lines.
6. Close the menu.



1.40.3 How to change PI line bearing and interval

1. If not already displayed, show a PI line, referring to section 1.40.2.
2. Place the arrow on the PI line bearing and reference indication in the [PI Line] box.
3. Spin the scrollwheel to adjust the PI line bearing, between 000.0° to 359.9°.
4. Place the cursor on the PI line interval.
5. Spin the scrollwheel to adjust the PI line interval.
A negative interval value moves to the PI line to one side of the line which intersects the own ship position. A positive interval value moves the line to the other side of the own ship position.

How to link PI lines with the EBL and VRM (C-types only)

You can link the PI line bearing with the EBL's bearing and the PI line interval with the VRM distance; this allows you to adjust the PI lines with the EBL and VRM controls. To link the PI lines with the EBL/VRMs, do the following:

1. Open the menu.
2. Select [3 CURSOR•EBL•VRM].
3. Select [2 PI LINES]. The [PI LINES] menu appears.
4. Select [8 LINK PI WITH EBL VRM].
5. Select [ON] to link the PI lines with the EBL/VRMs, select [OFF] to disable the feature.
If you selected [ON], the PI line bearing and interval indications, in the PI line box, are hidden. To adjust the PI line bearing or interval, adjust the EBL or VRM accordingly.
6. Close the menu.

1.40.4 How to change the PI line bearing reference (C-type only)

PI line bearing reference can be relative to own ship's heading (Relative) or referenced to North (True) as below.

Note: For IMO-types, PI line bearing reference is fixed to North (True).

1. Open the menu.
2. Select [3 CURSOR•EBL•VRM].
3. Select [2 PI LINES]. The [PI LINES] menu appears.
4. Select [2 PI LINE BEARING].
5. Select [REL] or [TRUE] as appropriate, then press the **ENTER MARK** key.
6. Close the menu.

1.40.5 How to change the PI line orientation

PI lines orientation can be selected from parallel or perpendicular. This function is available when [SET MAXIMUM PI LINES] is set for other than [1].

1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS].
For C-types, select [3 CURSOR•EBL•VRM].
3. Select [2 PI LINES]. The [PI LINES] menu appears.
4. Select [4 PI LINE MODE].
5. Select [PARALLEL], [PERPENDIC], or [BOTH]* as appropriate, then press the **ENTER MARK** key.
 - [PARALLEL]: when the PI line bearing is set to 0°, the lines are parallel with the heading line.
 - [PERPENDIC]: when the PI line bearing is set to 0°, the lines are perpendicular with the heading line.
 - [BOTH]: shows PI lines on both sides of the heading line. When the PI line bearing is set to 0°, the lines are perpendicular with the heading line.
6. Close the menu.

*: Not available for IMO-types.

1.40.6 How to reset the PI lines to default (ship's heading)

You can automatically return PI lines to default orientation. The PI lines are reset in the following manner:

- [PARALLEL] or [BOTH] set as PI line orientation: parallel with the heading line.
- [PERPENDIC] set as PI line orientation: perpendicular with the heading line.

From the PI line box

1. Place the cursor on the PI line number or PI line status in the PI line box.
2. Spin the scrollwheel to select the PI line (PI1 to PI6) whose default orientation you want to reset.
3. Press and hold the **left button**. PI lines which are displayed on-screen are restored to their default orientation.

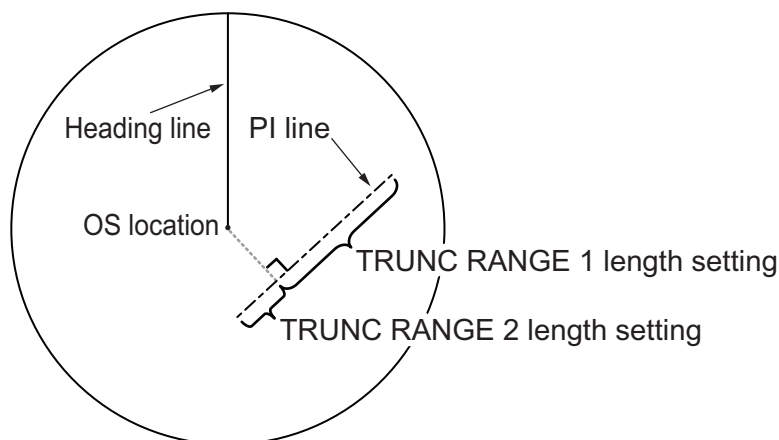
From the menu

1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS].
For C-types, select [3 CURSOR•EBL•VRM].
3. Select [2 PI LINES]. The [PI LINES] menu appears.
4. Select [5 RESET PI LINES]. All PI lines are reset.
5. Close the menu.

1.40.7 How to change PI line length

You can change the length of the PI lines. This function is only available when [SET MAXIMUM PI LINES] is set to [1]. If not already displayed, you can show PI lines for which you wish to change the length by referring to section 1.40.2.

1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS].
For C-types, select [3 CURSOR•EBL•VRM].
3. Select [2 PI LINES]. The [PI LINES] menu appears.
4. Select [6 TRUNC RANGE 1].
5. Select [ON].
6. Spin the scrollwheel to adjust the front PI line length. The available range is 0.000 NM to 24.000 NM. All PI lines beyond this mark will be hidden.
7. Left-click to confirm the setting.
8. Select [7 TRUNC RANGE 2].
9. Select [ON].
10. Spin the scrollwheel to adjust the front PI line length. The available range is 0.000 NM to 24.000 NM. All PI lines beyond this mark will be hidden.
11. To change the length of other PI lines, activate the line you wish to adjust, then repeat steps 1 through 10.
12. Close the menu.



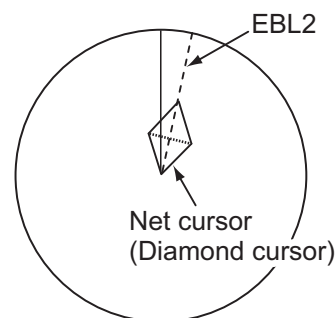
1.40.8 How to change the PI line color (C-types only)

You can change the PI line color with the following procedure.

1. Open the menu.
2. Select [3 CURSOR•EBL•VRM].
3. Select [2 PI LINES].
4. Select [0 NEXT] to show the second page of the menu.
5. Select [2 PI LINE COLOR].
6. Select the desired color from the menu. The options are: [RED] (red), [GRN] (green), [BLU] (blue), [YEL] (yellow), [CYA] (cyan), [MAG] (magenta), [WHT] (white), [ORG] (orange, default).
7. Close the menu.

1.41 How to Use the Net (Diamond) Cursor (C-type only)

The net cursor is used to depict your fishing net on the radar display. It is especially useful for bottom trawlers for knowing where the net is located. Enter the dimensions of your net in the menu to show the net in scale on the display.



1.41.1 How to activate the net cursor

To activate the net cursor, do the following procedure.

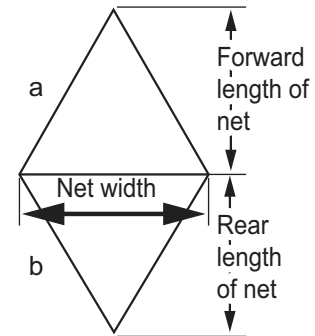
1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS].
For C-types, select [3 CURSOR•EBL•VRM].
3. Select [5 NET CURSOR]. The [NET CURSOR] menu appears.

NET CURSOR	
1	BACK
2	NET CURSOR DISPLAY
	OFF/ON
3	FRONT HALF LENGTH
	0. 0m
4	REAR HALF LENGTH
	0. 0m
5	NET WIDTH
	0. 0m
6	ROTATE STEP
	360/32 POINTS
WARP LENGTH	
	0. 0m

4. Select [2 NET CURSOR DISPLAY].
5. Select [ON] to activate, or [OFF] to deactivate the net cursor.
6. Close the menu.

1.41.2 How to set the net cursor dimensions and orientation

1. Open the menu.
2. **For IMO-types**, select [3 NAV TOOLS].
For C-types, select [3 CURSOR•EBL•VRM].
3. Select [5 NET CURSOR].
4. [3 FRONT HALF LENGTH].
5. Rotate the **scrollwheel**, then left-click to set the length of selected net section.
Note: The length appears in the [WARP LENGTH] indication. Adjust the values so that the total length for front and rear is equal to, or less than 3000m.
6. Select [4 REAR HALF LENGTH].
7. Rotate the **scrollwheel**, then left-click to set the length of selected net section.
Note: The length appears in the [WARP LENGTH] indication. Adjust the values so that the total length for front and rear is equal to, or less than 3000m.
8. Select [5 NET WIDTH].
Select [360°] or [32 POINTS], then left-click.
The net cursor moves in the same manner as EBL2 moves. Select [360°] to move with 0.1° steps, or select [32 POINTS] to move with 11.25° steps.
9. Rotate the **scrollwheel**, then left-click to set the net width.
10. Select [6 ROTATE STEP].
Select [360°] or [32 POINTS], then left-click.
The net cursor moves in the same manner as EBL2 moves. Select [360°] to move with 0.1° steps, or select [32 POINTS] to move with 11.25° steps.
11. Close the menu.
12. Insert the net cursor at the location of the net with the EBL offset function.
 - 1) Press the **EBL OFFSET** key.
 - 2) Move the cursor onto the net location, then left-click.
13. Rotate the **EBL** knob to adjust the orientation the net cursor until the cursor is in line with, or against, the tide direction.

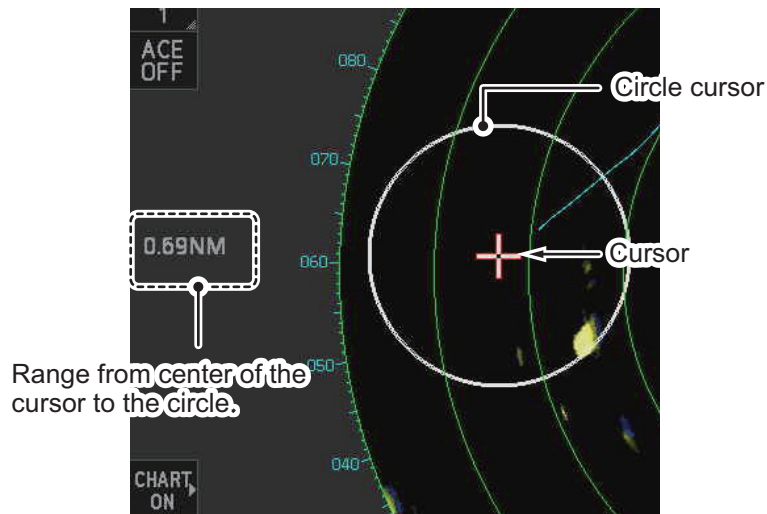


1.42 Circle Cursor (C-types only)

The CIRCLE cursor is a handy measuring tool which works similar to a VRM, in that the circle itself can be used to measure distance. However, where the VRM is fixed to a location on the screen, the circle cursor can be fixed to a geographical location or even another vessel's echo.

Note: Before using this feature, make sure the [MAP ON/OFF] button on the Instant-Access bar™ is set to [ON]. This feature is not available when the map is turned off.

1. If the cursor is hidden, show the cursor. For how to show the cursor, see section 1.7.1.
2. Place the cursor inside the operational display area, then right-click to show the [CURSOR] menu.
3. Select [0 NEXT], then select [4 CIRCLE CURSOR].
The cursor now appears with a large white circle, as shown in the following example.



4. Move the cursor to the location where you want to start measuring from.
5. Spin the scrollwheel to adjust the size (distance) of the circle cursor. The radius (distance from the cursor to the circle cursor) appears at the left-center of the screen.
Note: The size of the circle cursor is directly related to the range at the time it was inserted. If you increase/decrease the range after inserting the circle cursor, the on-screen size of the cursor also changes accordingly.
6. Left-click to fix the circle cursor to that location/echo.
To remove the circle cursor, repeat steps 2 and 3, then right-click.

1.43 Zoom

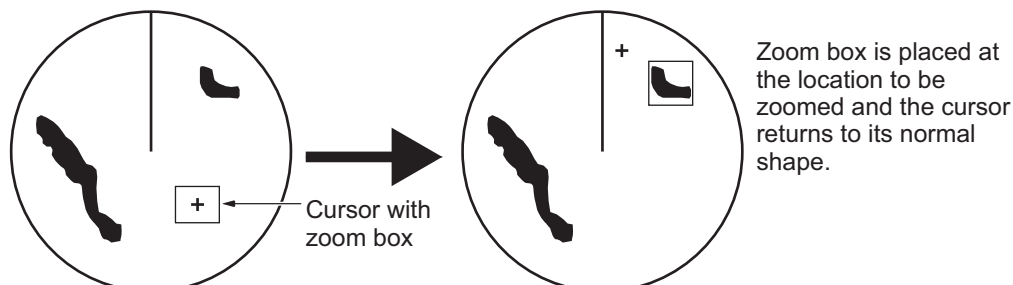
The zoom function enlarges an area of interest as large as twice the normal viewing size, in the [INFORMATION BOX]. Zoom can be selected using the control unit or from a preset function key (see section 1.8 for how to assign functions to the function keys).

Zoom is not available when the [INFORMATION BOX] setting for [TARGET DATA] is [LARGE].

To enable/disable the zoom magnification, select the appropriate zoom setting ([2TIMES]: Enables magnification at 2×, or [3TIMES]: Enables magnification at 3×) from the [ZOOM] option in the [INFORMATION BOX] menu. (See section 1.48.)

Note: The zoom function is not available when the [TRUE VIEW] located on the second page of the [ECHO] menu) is set to [ON].

1. Select the operational display area, then right-click to show the [CURSOR] context menu.
2. Select [ZOOM].
3. Place the cursor inside the operational display area, then left-click. The cursor is now displayed with a zoom box.
4. Place the cursor and zoom box at the location you wish to zoom, then left-click to anchor the box.
If the zoom box is not placed where you intended to place it, left-click twice, then move the box to the correct place. Left-click to anchor the box.
5. Right-click to complete the procedure. The selected area is displayed on the right-side of the screen and the cursor returns to normal shape.



To disable the zoom function, repeat steps 1 to 3. At step 3, the zoom box is removed from the display.

Note 1: Where the zoom function is assigned to a function key, press the function key to cycle through the zoom settings in the following order: [OFF] → [2TIMES] (2× magnification) → [3TIMES] (3× magnification) → [OFF]...

This operation works in direct relation with the settings selected from the [ZOOM] option in the [INFORMATION BOX] menu. To use the zoom function on a different area, do the procedure (step 1 to step 5) listed above.

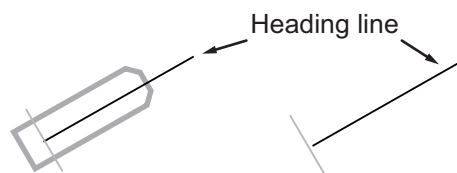
Note 2: For C-types only, some marks can be inserted from the zoom window. Marks inserted in this manner appear on the main screen and are not shown in the zoom window. See the list below for mark availability with this feature.

- **Available:** TT, map mark, waypoints, GOTO point (requires [SET GOTO METHOD] to be set as [1POINT])
- **Not available:** Nav line, drop mark, origin mark, area mark, MOB, GOTO point (when [SET GOTO METHOD] is set as [100POINTS]), mark received from an external source.

1.44 How to Use Marks

1.44.1 Heading line mark

The heading line is a line from the own ship position to the outer edge of the radar display area and appears at zero degrees on the bearing scale in HEAD UP mode. The orientation of the line changes depending on the ship orientation in NORTH UP and True Motion modes.



How to hide the heading line temporarily

To temporarily extinguish the heading line to look at targets existing dead ahead of own ship, press and hold the **HL OFF** key, or place the cursor on the [HL OFF] box in the InstantAccess bar™ then left-click and hold.

In addition to the heading line, the stern marker and all graphics within the operational display area are also erased. To redisplay the heading line, etc., release the key or the **left button**.

How to change the heading line thickness (C-types only)

You can change the thickness of the heading with the following procedure.

1. Open the menu.
2. Select [2 MARKS•PLOTTER], then select [0 NEXT].
3. Select [2 HEADING LINE WIDTH].
4. Select the desired thickness.
 - [NORMAL]: the heading line appears at standard width.
 - [X3]: the heading appears three times thicker than at [NORMAL].
 - [X5]: the heading appears five times thicker than at [NORMAL].
 - [X7]: the heading appears seven times thicker than at [NORMAL].
5. Close the menu.

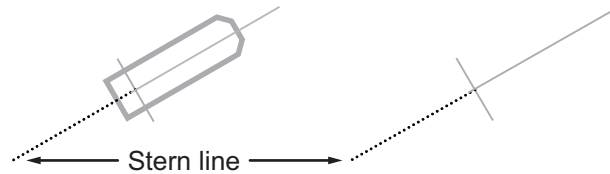
MARKS•PLOTTER (2/2)	
1	BACK
2	HEADING LINE WIDTH [NORMAL]/X3/X5/X7
3	HEADING LINE COLOR RED/GRN/BLU/YEL/ [CYA]/MAG/WHT
4	GRID COLOR RED/[GRN]/BLU/YEL/ CYA/MAG/WHT
5	NORTH MARK WIDTH [NORMAL]/X3/X5/X7

How to change the color of the heading line (C-types only)

1. Open the menu.
2. Select [2 MARKS•PLOTTER], then select [0 NEXT].
3. Select [3 HEADING LINE COLOR].
4. Select the desired color.
5. Close the menu.

1.44.2 How to hide/show the stern mark

The stern marker, which is a dotted line, appears opposite to the heading line.



To display or erase this marker do the following:

1. Open the menu.
2. **For IMO-types**, select [2 MARKS]
For C-types, select [2 MARKS•PLOTTER].
3. **For IMO-types**, select [3 STERN MARK].
For C-types, select [7 STERN MARK].
4. Select [ON] or [OFF] as appropriate.
5. Close the menu.

1.44.3 North mark

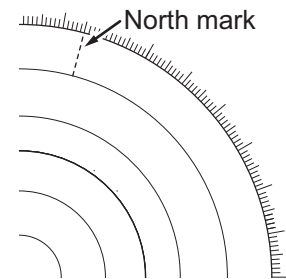
The north mark is displayed as a short dotted line on the inside edge of the operational display area. In HEAD UP mode, the north mark moves according to the own ship bearing.

The north mark is hidden when the radar is in standby mode.

How to change the mark thickness (C-types only)

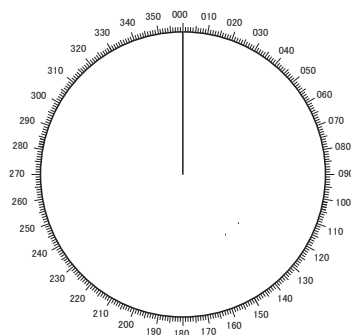
If your radar is a C-type, you can change the thickness of the north mark with the following procedure.

1. Open the menu.
2. Select [2 MARKS•PLOTTER], then select [0 NEXT].
3. Select [5 NORTH MARK WIDTH].
4. Select the desired width.
 - NORMAL: North mark is display with the normal width.
 - X3: Increase width to three times the size of normal.
 - X5: Increase width to five times the size of normal.
 - X7: Increase width to seven times the size of normal.
5. Close the menu.

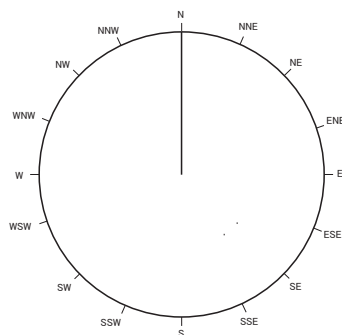


1.44.4 Bearing ring

The bearing ring appears on the outer edge of the operational display area and is used to estimate the bearing of echoes on the screen.



360°



32 point

For IMO-types, the display format for the bearing ring is fixed at [360°] and cannot be changed. **For C-types**, you can select either [360°] or [32 POINTS], however, when using HEAD UP or STERN UP orientation mode, this setting is fixed at [360°].

Changing the display format of the bearing ring (C-types only)

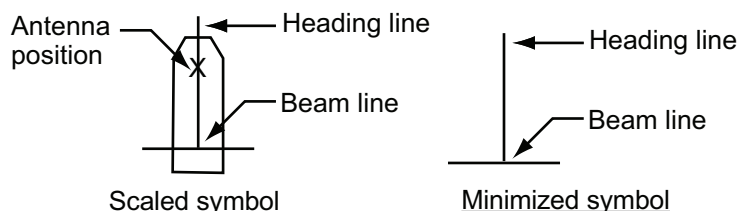
1. Open the menu.
2. Select [3 CURSOR•EBL•VRM].
3. Select [7 BEARING CURSOR].
4. Select [360°] or [32 POINTS] as desired.
5. Close the menu.

Changing the color of the bearing ring (C-types only)

1. Open the menu.
2. Select [3 CURSOR•EBL•VRM], then select [0 NEXT].
3. Select [2 BEARING CURSOR COLOR].
4. Select the desired color.
If you select [OFF], the cursor color is determined by the selected color scheme in use (see section 1.46).
5. Close the menu.

1.44.5 How to set up the own ship mark

The own ship mark indicates own position on the display. It can be turned on or off and its configuration selected from the [MARK] menu. Two configurations are available: minimized symbol and scaled symbol. If the largest dimension of the symbol gets smaller than 6 mm, the scaled symbol will disappear and the own ship mark will be shown as a minimized symbol. The scaled symbol is scaled to indicate the length and beam of the vessel. Ship's dimensions should be entered at installation to use the scaled ship symbol.



1. Open the menu.
2. **For IMO-types**, select [2 MARKS]
For C-types, select [2 MARKS•PLOTTER].
3. **For IMO-types**, select [2 OWN SHIP MARK].
For C-types, select [6 OWN SHIP MARK].
4. Select [MINIMIZED] or [SCALED] as appropriate.
5. Close the menu.

1.44.6 How to set the barge marker

You can mark the locations of barges on the display with icons.

Note: For IMO-types, this function is not available if [ECDIS] is set to [SERIAL] or [LAN] at installation. Consult your dealer for details.

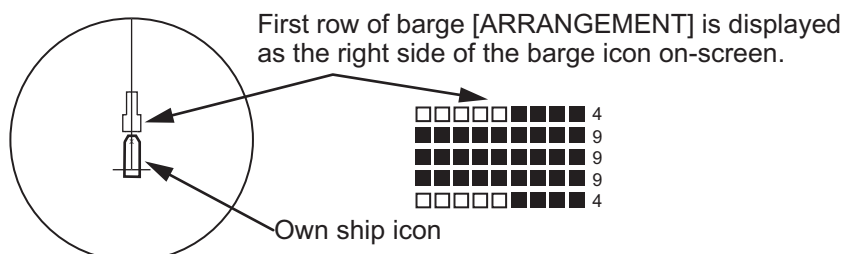
Set up barge information as follows:

1. Open the menu.
2. **For IMO-types**, select [2 MARKS].
For C-types, select [2 MARKS•PLOTTER].
3. **For IMO-types**, select [6 BARGE MARK].
For C-types, select [9 BARGE MARK].
4. Select [2 BARGE MARK DISPLAY].



5. Select [ON] to display barge marks, [OFF] to hide barge marks, as appropriate, then press the **ENTER MARK** key.

6. Select [3 BARGE SIZE]. Spin the scrollwheel, then left-click to enter the [LENGTH] and [WIDTH] of the barge.
7. Select [4 BARGE ARRANGEMENT]. This item lets you set a single barge or a barge chain. Spin the scrollwheel to select a value, then left click to move the cursor to the next line. Select number of barges (max. 9) to display. As you spin the scrollwheel the squares light or extinguish and the number of barges selected appears at the right side.

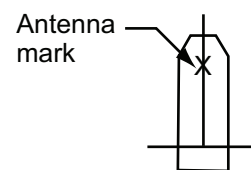


You can also use the number keys on the Control Unit to select the number of barges.

8. Close the menu. The barge mark is now displayed as shown in the example figure on the previous page.

1.44.7 Antenna mark

When the own ship mark menu is set to [SCALED], the antenna location is shown as a blue cross. The location of the antenna, and therefore the antenna mark, is set at installation.

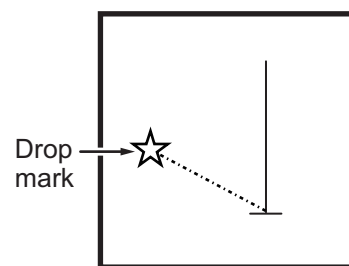


1.45 Drop Mark

The operator can inscribe a drop mark at a selected location to find the range and bearing from own ship to the mark. This can be useful for marking a point to avoid while navigating to a destination.

To active the drop mark feature, do the following:

1. Open the menu.
2. **For IMO-types**, select [2 MARKS].
For C-types, select [2 MARKS•PLOTTER].
3. **For IMO-types**, select [4 DROP MARK].
For C-types, select [8 DROP MARK].
4. Select [ON] to enable [DROP MARK]. Two indications appear at the bottom of the screen.



Drop mark boxes show the mark number, bearing and range to the mark.

5. Close the menu.

1.45.1 How to inscribe a drop mark

1. Select a drop mark box, then left-click.
2. Place the cursor at the location to inscribe the drop mark, then left-click.
The drop mark box shows the range and bearing to the marked location.

1.45.2 How to erase drop marks

Select the drop mark to be erased, then press and hold the **left button**. The mark is erased and the range/bearing indications are no longer shown.

1.46 Brilliance and Color Schemes

Brilliance and color schemes are preset “palettes” that let you change the brilliance and color of on-screen data together.

1.46.1 How to select a brilliance and color scheme

The system has four presets of brilliance and color settings to choose from. Each preset is customizable (see section 1.46.3).

The following list shows each preset along with their default settings.

- [PLT1] (default [DAY-GRY]): preset for use in daylight with a gray background.
- [PLT2] (default [DAY-BLU]): preset for use in daylight with a blue background.
- [PLT3] (default [DUSK-BLU]): preset for use at dusk with a blue background.
- [PLT4] (default [NIGHT-GRY]): preset for use at night with a gray background.

To change the current scheme, do the following:

1. Place the cursor on the [PLT] indication, inside the brilliance settings box at the bottom-left of the screen.

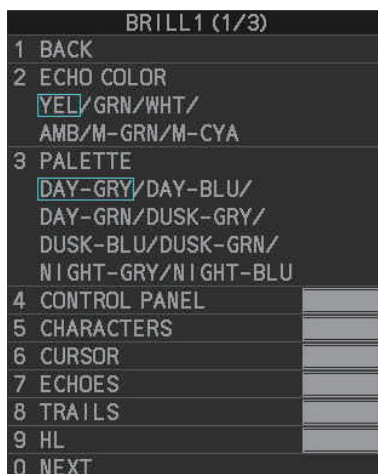
Place cursor here, then left-click to change brilliance preset, right-click to open the [BRILL] menu.



2. Spin the scrollwheel to show the scheme you want to use, then left-click.
You can also left-click the indication to cycle through the schemes.

1.46.2 How to change the color schemes settings

1. Referring to section 1.46.1, select the scheme whose settings you want to change.
2. Open the menu.
3. Select [9 INITIAL SETTINGS].
4. Select [2 BRILL]. The [BRILL] menu appears.



5. Select the appropriate item to adjust.

Menu item	Description
Page 1	
[2 ECHO COLOR]	Changes the color used to display echoes. The available colors are: [YEL] (yellow), [GRN] (green), [WHT] (white), [AMB] (amber), [M-GRN]* (mutli-green), [M-CYA]* (multi-cyan). *: [M-GRN] and [M-CYA] are not shown on IMO-types. If you select [M-GRN] or [M-CYA], the echo color changes depending on the echo strength. • [M-GRN]: red for strong echoes, ranging through to green for weak echoes. • [M-CYA]: red for strong echoes, ranging through to green for weak echoes.
[3 PALETTE]	Changes the color scheme (see paragraph 1.46.3).
[4 CONTROL PANEL]	Adjusts control panel back-light brilliance.
[5 CHARACTERS]	Adjusts on-screen text brilliance.
[6 CURSOR]	Adjusts cursor brilliance.
[7 ECHOES]	Adjusts the echo brilliance.
[8 TRAILS]	Adjusts echo trail brilliance.
[9 HL]	Adjusts heading line brilliance.
Page 2	
[2 RANGE RINGS]	Adjusts range ring brilliance.
[3 BEARING CURSOR]	Adjusts bearing cursor brilliance.
[4 EBL]	Adjusts EBL line brilliance.
[5 VRM]	Adjusts VRM line brilliance.
[6 PI LINES]	Adjusts PI line brilliance.
[7 TT SYMBOLS]	Adjusts target trail symbol brilliance.
[8 AIS SYMBOLS]	Adjusts AIS symbol brilliance.
[9 L/L GRID]	Adjusts latitude/longitude grid brilliance.
Table continued on the following page.	

1. OPERATIONAL OVERVIEW

Menu item	Description
<i>Table continued from the previous page.</i>	
Page 3	
[2 PLOTTER]	Adjusts latitude/longitude grid brilliance.
[3 CHART]	Adjusts chart brilliance. (C-types only.)
[4 DEPTHLINE]	Adjusts depth line (bathymetry) brilliance. (C-types only.)

- Spin the scrollwheel, or press the appropriate menu number to change or adjust the settings, then left-click, or press the **ENTER MARK** key to confirm the setting.
- Close the menu.

1.46.3 How to change the color schemes settings

This radar provides eight sets of color and brilliance schemes to match any ambient lighting condition and can be assigned to a [BRILL] box preset.

- Place the cursor on the [PLT] indication, inside the brilliance settings box at the bottom-left of the screen.
The indication appears highlighted with a light-blue colored box.
Right-click to show the [BRILL1] box menu.
- Select [3 PALETTE].
- Select the appropriate palette, then press the **ENTER MARK** key. The default settings for each palette are shown in the following table.

Display item	Palette							
	DAY-GRY	DAY-BLU	DAY-GRN	DUSK-GRY	DUSK-BLU	DUSK-GRN	NIGHT-GRY	NIGHT-BLU
Screen brilliance	100	100	100	40	40	40	4	4
Panel brilliance	15	15	15	7	7	7	3	3
Character brilliance	8	8	8	8	8	8	8	8
Cursor brilliance	15	15	15	12	12	12	12	12
Echo brilliance	15	15	15	12	12	12	12	12
Trail brilliance	9	9	9	9	9	9	9	9
Heading Line brilliance	15	15	15	15	15	15	15	15
Stern Line brilliance	15	15	15	7	7	7	15	15
Bearing ring brilliance	15	15	15	6	6	6	15	15
EBL brilliance	15	15	15	12	12	12	12	12
VRM brilliance	15	15	15	12	12	12	12	12
PI Line brilliance	15	15	15	12	12	12	12	12
TT symbol brilliance	15	15	15	12	12	12	12	12
AIS symbol brilliance	15	15	15	12	12	12	12	12
LL Grid brilliance	15	15	15	12	12	12	12	12
Mark brilliance	15	15	15	12	12	12	12	12
Chart brilliance* ¹	7	7	7	6	6	6	6	6
Depth line brilliance* ¹	7	7	7	6	6	6	6	6
Character color* ²	White	White	Green	White	White	Green	Orange	White
<i>Table continued on the following page.</i>								

Display item	Palette							
	DAY-GRY	DAY-BLU	DAY-GRN	DUSK-GRY	DUSK-BLU	DUSK-GRN	NIGHT-GRY	NIGHT-BLU
<i>Table continued from the previous page.</i>								
Background color ^{*2}	Gray/black	Blue/dark blue	Gray/black	Dark gray/dark blue	Dark blue/blue	Dark gray/black	Dark gray/black	Dark blue/blue
ODA color ^{*2}	Black	Dark blue	Black	Dark blue	Blue	Black	Black	Blue

*1: Available for C-types only

*2: This setting is fixed and cannot be changed.

4. Close the menu.

1.47 How to Display and Set Up Navigational Data

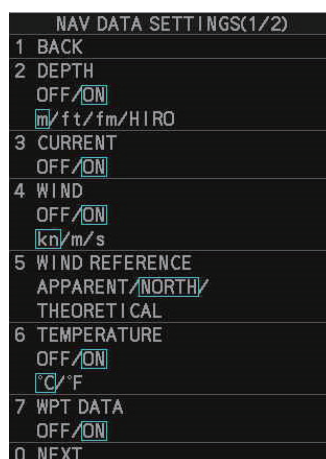
Wind, depth, ocean current, water temperature, date and time and waypoint data can be displayed on this radar, however appropriate sensors are required.

1.47.1 How to set up the navigational data

1. Open the menu.
2. Select [7 INFORMATION BOX].



3. Select [4 NAV DATA SETTINGS].



1. OPERATIONAL OVERVIEW

- Referring to the table below, set the appropriate menu item(s).

Menu item	Available settings
[DEPTH]	[OFF], [ON]; [m], [ft]
[DEPTH GRAPH SCALE]* ¹	[10], [20], [50], [100], [200], [500] (m)
[DEPTH MARK]* ¹	[000] to [500] (m)
[CURRENT]	[OFF], [ON]
[WIND]	[OFF], [ON]; [kn], [m/s]
[WIND REFERENCE]	[APPARENT], [NORTH], [THEORETICAL]
[TEMPERATURE]	[OFF], [ON]; [°C], [°F]
[WPT DATA]* ¹	[OFF], [REL], [TRUE]
[MOB DATA]* ²	[OFF], [ON]
[HIRO SETTING]* ²	[1.0000] to [1.9999]

*¹: IMO-types only.

*¹: C-types only.

- Close the menu.

1.47.2 How to display navigational data

- Open the menu.
- Select [7 INFORMATION BOX].
- Select [3 DISPLAY NAV DATA].
- Select [ON] to display navigational data, [OFF] to hide navigational data, then press the **ENTER MARK** key.
- Close the menu.

1.48 How to Use the Information Box

The information box shows target data, navigational data and zoomed areas of the radar display. To set up the information box, do the following:

- Open the menu.
- Select [7 INFORMATION BOX].
- Select and set the appropriate menu item, referring to the table below.
- Close the menu.

Menu item	Settings	Description
[2 OWN SHIP INFO]	See section 1.10, section 1.11 and section 1.12 for details.	Set up various own ship information, such as sensors used for position fix, date and time format/offsets, heading and speed sensors used.
[3 DISPLAY NAV DATA]	• OFF • ON	• Disable navigational data display. • Enable navigational data display.
[4 NAV DATA SETTINGS]	See section 1.47 for details.	Set up the format in which various navigational data is displayed in the [INFORMATION BOX].
[5 ZOOM]	• OFF • 2TIMES • 3TIMES	• Disable zoom magnification. • Set zoom magnification at 2×. • Set zoom magnification at 3×.

Menu item	Settings	Description
[6 ZOOM DISPLAY]	• STAB GND • STAB HDG • STAB NORTH • TT TRACK	• Ground stabilized zoom (Geographically fixed). • Heading stabilized zoom (Relative). • North stabilized zoom (True). • Tracked targets are zoomed.
[7 TARGET DATA]	• 1BOX • 2BOX • 3BOX • LARGE • TT 5BOX	See the figure on the following page.
[8 DISPLAY TT COORDS]	• OFF • ON	• Disable coordinates display for TT targets. • Enable coordinates display for TT targets. When enabled, the data fields for CPA, TCPA, BCR and BCT are replaced with the coordinates for the TT target:
[9 NAV DATA COLOR]	• STD • CHART COLOR	• Data appears in green color. • Data color is based on chart. Note: When CHART COLOR is selected, invalid data and low-integrity data appear in orange or yellow color respectively, regardless of the chart color.

Zoom and navigational data are displayed here.	Zoom and navigational data are displayed here.	Zoom and navigational data are displayed here, but can be hidden by TT/AIS data.	Zoom and navigational data are displayed here.	Only TT Data is displayed
Zoom and navigational data are displayed here.	Zoom and navigational data are displayed here, but can be hidden by TT/AIS data.	Zoom and navigational data are displayed here, but can be hidden by TT/AIS data.	Only TT/AIS Data is displayed in the large box. Up to three AIS targets or up to six TT targets.	Only TT Data is displayed
Zoom can be displayed here, but can be hidden by TT/AIS data.	Zoom can be displayed here, but can be hidden by TT/AIS data.	Zoom can be displayed here, but can be hidden by TT/AIS data.	For MU-270W configurations, up to two TT targets can be shown.	Only TT Data is displayed
1BOX	2BOX	3BOX	LARGE	TT 5BOX (C-types only)

- TT/AIS data displayed in the information box is shown in order of acquisition in the bottom half of the box.
- When the target data is no longer displayed (TT is cancelled, etc.) in the upper box, the previous display is restored.
- When using the 2BOX or 3BOX setting and the bottom half of the information box is full, the upper half is overlaid with the newly acquired TT/AIS target data.
- Each box may display up to two TT targets or one AIS target. (For MU-270W configurations, up to 3three TT targets can be shown)
- When TT 5 BOX is selected, only TT data is displayed. AIS data, ZOOM and other data are not displayed.

1.49 Interswitch

The interswitch of this radar uses an Ethernet to transfer video and control signals. A digital signal transfers the video and control signals. You can connect up to four antennas and four display units. Set radar display and antenna groups from the [ANTENNA SELECT] display.

When you switch to a different antenna, the heading skew and timing adjustment (set at installation) for that antenna are automatically applied.

The [ANTENNA] box at the upper left position shows current antenna selection.



Antenna box

ANTx: "x" indicates antenna selected.

(M) or (S): indicates antenna is (M)aster or (S)lave.

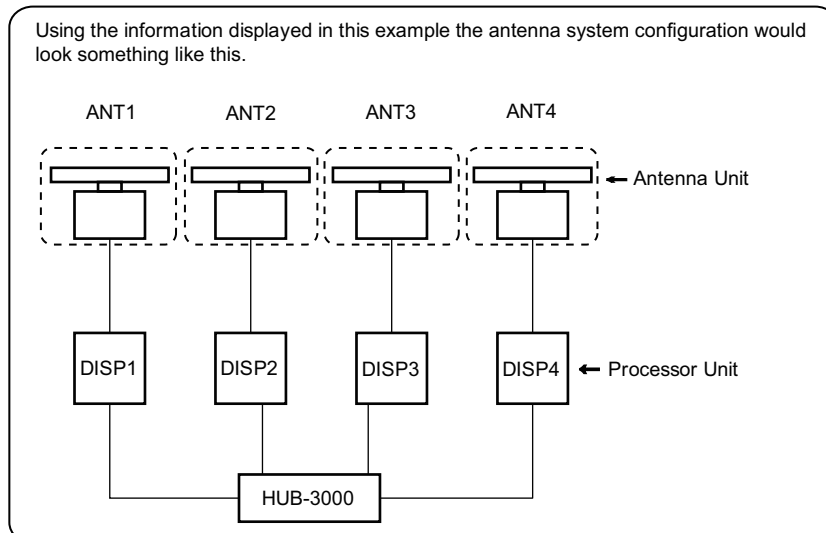
X-Band or S-Band: indicates antenna bandwidth.

1.49.1 How to display antenna information

1. Open the menu.
2. Select [9 INITIAL SETTINGS].
3. Select [3 SELECT ANTENNA]. The [SELECT ANTENNA] menu appears.

Note: You can also access the [SELECT ANTENNA] menu by right-clicking the [ANTENNA] box at the top-left of the screen.

SELECT ANTENNA	
1 BACK	
ANT 1 :	X-BAND
25UP	Main Top
ANT 2 :	S-BAND
30UP	Main 2nd
ANT 3 :	X-BAND
12	Fore
ANT 4 :	X-BAND
12	Aft
OWN RADAR NO.1	
2 DISP1	ANT1
	MASTER
DISP2	ANT2
	MASTER
DISP3	ANT3
	MASTER
DISP4	ANT4
	MASTER
9 SAVE INTER-SWITCH	
NO / YES	
0 CLEAR INTER-SWITCH	
NO / YES	



The following information is displayed in the [SELECT ANTENNA] menu:

- Radar band, output power and antenna position of each antenna currently powered. (If an antenna is not powered, its data area is blank.)
- Own ship radar number (radar in use).
- Current antenna and display combinations.

Note: For configurations with processors assigned as DISP5/DISP6/DISP7/DISP8 at installation, the processor unit automatically connects to the system as [SLAVE] when first turned on. You can change this setting after the first connection. See section 1.49.2.