Menu items	Description
[7 VECTOR TIME LINK]*1	• [NO LINK]: Vector time is not linked with changes in range. • [LINK RANGE]: Link vector time with the range. As the range changes, the trail time is also automatically adjusted. When linked, the vector time indication appears in yellow color. **Note:** When using a range that is valid only when transmitting, the vector time is automatically adjusted to match either the maximum or minimum available range.
*1: For C-types only; *2: For IMO-types only.	

5. Select the required setting by pressing the menu item number, or spinning the scrollwheel.
   Note: Regarding input for [8 HDG FINE ADJUST], when using the number keys, the indication is first selected as a whole. At this time, you can toggle between plus "+" or minus "-". Press the **8 VECTOR MODE** key for "-", press the **2 EBL OFFSET** key for "+". If single digits are highlighted, toggle is not possible. In this case, press the **CANCEL TRAILS** key to re-highlight the whole indication.
6. Press the **ENTER MARK** key to confirm and apply the selection.
7. Close the menu.

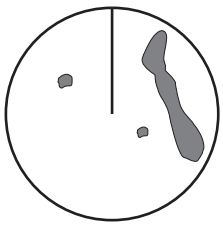
Shuttle ferry mode (IMO-types only)

The shuttle ferry mode changes the orientation of the display when the external switch is turned on. (The external switch should be connected to the RS-232C port on the processor unit at installation.)

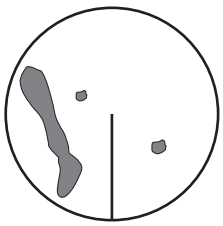
There are two variations: Standard display ([SHUTTLE FERRY] is set to [OFF]) and reversed display ([SHUTTLE FERRY] is set to [MODE1] or [MODE2]).

When the display is reversed for shuttle ferry mode, the following changes also occur:

- Echoes are displayed 180° opposite to normal display.
- Bearing for speed data is re-calibrated to 180° opposite to normal.
- Wind direction based on speed input is re-calibrated to 180° opposite to normal.
- Where [Mode2] is selected, data input from the gyrocompass is re-calibrated to 180° opposite to normal.
  Note: Gyrocompass data input is not re-calibrated for [Mode1].



Standard display: Gyro input is displayed normally.



Reversed display: Gyro input is displayed in reverse.

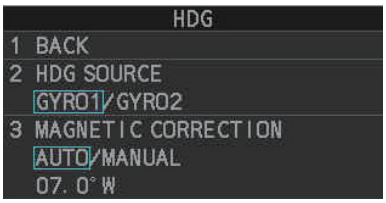
1.10 Heading Input

1.10.1 How to select the data source for heading input

When a gyrocompass is connected, the ship's heading appears on the right side of the screen, in the data display area.

Heading input format can be selected as follows:

1. Open the menu.
2. Select [7 INFORMATION BOX].
3. Select [2 OWN SHIP INFO].
4. Select [2 HDG]. The [HDG] menu appears.
   Note: You can also access the HDG menu from the on-screen box. Place the cursor on the [HDG ▶] indication in the heading box at the top-right of the screen, then right-click.



5. Select [2 HDG SOURCE], then press the **ENTER MARK** key.
6. Select [GYRO1] or [GYRO2] as appropriate, then press the **ENTER MARK** key.
7. Close the menu.

Note 1: The heading sensor must be able to follow a minimum ROT of 20° per second. Heading sensors with a lesser capability may degrade the performance of echo averaging, trails and TT. The data refresh rate should also be as short as possible. If the refresh rate is too long, the ability to follow courses lessens, thereby affecting the performance of echo averaging, trails and TT.

Note 2: For IMO-types, Where the heading source is other than the heading sensor (for example, and EPFS device), the sensor indication is displayed in yellow color.

1.10.2 How to adjust for magnetic correction (C-types only)

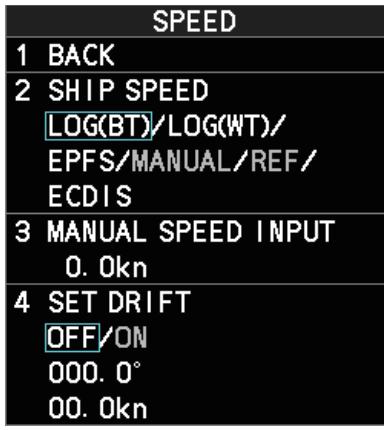
To show true magnetic heading, magnetic data input is required. If your system configuration included a GPS navigator, the corrections required to display correct heading are done automatically. You can also set the magnetic correction manually with the following procedure.

1. Open the menu.
2. Select [7 INFORMATION BOX].
3. Select [2 OWN SHIP INFO].
4. Select [2 HDG].
5. Select [3 MAGNETIC CORRECTION].
6. Select [MANUAL].
7. Enter the required correction value, then press the **ENTER MARK** key.
   Note: To toggle between [E] (East) and [W] (West), spin the scrollwheel.
8. Close the menu.

1.11 How to Set Own Ship's Speed

The TT and azimuth stabilized presentation modes require own ship speed input and compass signal. The speed can be entered from a log (STW, SOG) or EPFS (SOG) or manually on the menu.

1.11.1 Automatic speed input (log or EPFS navigator)



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 the appropriate source for automatic speed input, then press the **ENTER MARK** key.
   Note: Changes to the settings here are also applied to the speed calculations for TT targets, true trails, SOG and STW.

Selection	Explanation	Stabilization Mode
[LOG (BT)]*1	Log, speed over ground (SOG)	Ground stabilization
[LOG (WT)]	Log, Speed Thru Water (STW)	Sea stabilization
[EPFS]	Speed input by GPS navigator	Ground stabilization
[MANUAL]	Manually input speed	Sea stabilization
[REF]	Echo-referenced speed input	Ground stabilization
[ECDIS]*2	Speed input by ECDIS	Ground stabilization or Sea Stabilization (Dependent on ECDIS settings).

*1: Set and drift may be required to display [LOG (BT)] correctly in deep waters. To change set and drift, see section 3.12.

*2: Where [ECDIS] is selected as the speed source, [4 OWN SHIP POSN] in the [OWN SHIP INFO] menu is automatically set to [ECDIS] also. See section 1.12.

7. If you selected [MANUAL] as the speed data source, see section 1.11.2 to set the speed.
8. Close the menu.

Notes on speed input

It should be noted that in determining a target's aspect by radar, the calculation of its true track is dependent on the choice and accuracy of the own ship's course and speed input. A ground-stabilized target plot may accurately calculate the ground track of the target, but the target's heading may be significantly different from its track when experiencing set, drift or leeway. Similarly, a sea stabilized target plot may be inaccurate when own ship and the target, are experiencing different rates of set, drift or leeway.

- IMO Resolution A.823(19) for TT recommends that a speed log to be interfaced with a TT should be capable of providing through-the-water speed (forward speed).
- Be sure not to select a [LOG] option when a speed log is not connected. If the log signal is not provided, the ship speed readout at the top of the screen will be blank. In the event of a log error, enter speed manually.
- When the speed source is set to [LOG(BT)] or [LOG(WT)], and no log signal is present for 30 seconds, the [SPD] is shown as "*.* kn" and the label "NO LOG(BT) SIGNAL" or "NO LOG(WT) SIGNAL" (in yellow-orange) appears and the alert buzzer sounds.
- When the speed input in use is interrupted or lost, the system automatically changes to another speed input (stabilization reference) and outputs the "SPD SOURCE CHG" alert.
- On IMO-type radars with AIS in use, [MANUAL] and [REF] are shown in gray to indicate they are not available for selection.
- A single-axis water log cannot measure speed when the wind is coming from the leeway direction.
- When [ECDIS] is selected as the speed data source and communication with the ECDIS is interrupted or lost for 30 seconds, the Alert "ECDIS COM ERROR" is released.
- When speed stabilization is changed at the ECDIS and [ECDIS] is selected as the speed data source, the Alert "SPD SOURCE CHG" is released.

1.11.2 Manual speed input

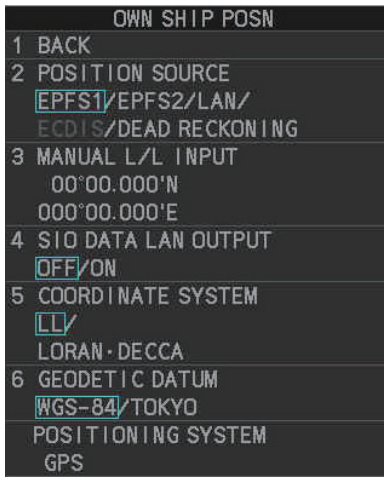
If the speed log is not working, enter speed manually as below. In this case the speed data type is shown as "MANUAL" and is speed thru water (STW). Manual speed input is not available on IMO-type radars when the AIS feature is active.

1. Open the menu.
2. Select [7 INFORMATION BOX].
3. Select [2 OWN SHIP INFO].
4. Select [3 SPEED].
5. Select [2 SHIP SPEED].
6. Select [MANUAL].
7. Select [3 MANUAL SPEED INPUT].
8. Spin the scrollwheel to set the speed.
9. Press the **ENTER MARK** key to confirm the new setting.
10. Close the menu.

1.12 Own Ship Position

1.12.1 How to set the Own Ship position

You can select the data source for own ship's position as follows:



1. Open the menu.
2. Select [7 INFORMATION BOX].
3. Select [2 OWN SHIP INFO].
4. Select [4 OWN SHIP POSN].
   Note: You can also access the [OWN SHIP POSN] menu from the on-screen box. Place the cursor on the [POSN ▶] indication in the position box at the top-right of the screen, then right-click.
5. Select [2 POSITION SOURCE] or [3 MANUAL L/L INPUT] as appropriate, then press the **ENTER MARK** key.
6. If [2 POSITION SOURCE] is selected at step 2, select the appropriate position source, referring to the list below, then press the **ENTER MARK** key.
   [2 POSITION SOURCE] uses navigational aids. Select the navigational aid to use. Available options are listed with a brief description in the table below:

Available options	Description
[EPFS1]	Use the device assigned as EPFS1 for position data.
[EPFS2]	Use the device assigned as EPFS2 for position data.
[LAN]	Use the device connected to the LAN1 port for position data.
[ECDIS]	Use the connected ECDIS for position data.
[DEAD RECKONING]	Position data is derived from dead reckoning (manual input)

   Note 1: When [2 POSITION SOURCE] is set to [DEAD RECKONING], the indication "DR" appears at the bottom of the [OS POSN] box.

   Note 2: When [2 POSITION SOURCE] is set to [DEAD RECKONING] or [MANUAL L/L INPUT], the AIS function cannot be used.

   Note 3: When [2 POSITION SOURCE] is set to [ECDIS], the source for own ship speed data is automatically set to [ECDIS] also.

   Note 4: On IMO-type radars with AIS in use, [DEAD RECKONING] is shown in gray to indicate it is not available for selection.

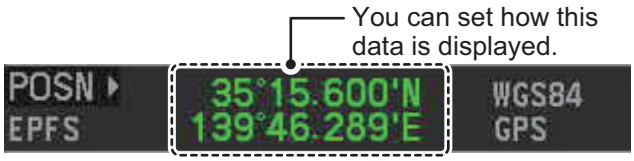
   Note 5: Speed and heading data is required in order to correctly display [DEAD RECKONING] position data.
7. To set [3 MANUAL L/L INPUT], do the following:
   1) Select [3 MANUAL L/L INPUT]. The first digit of the latitude is highlighted.
   2) Spin the scrollwheel to set the value, then left-click. The cursor moves to the next digit.
      You can also use the number keys on the Control Unit to input the value.
   3) Repeat step 2 to set the latitude and longitude.

8. To share [OS POSN] data across the same network, do the following:
   1) Select [SIO DATA LAN OUTPUT], then press the **ENTER MARK** key.
   2) Select [ON], then press the **ENTER MARK** key to share data. To disable [OS POSN] data sharing, select [OFF], then press the **ENTER MARK** key.

   Note: A navigational aid must be selected at [2 POSITION SOURCE] to share [OS POSN] across the same network.
9. Close the menu.

1.12.2 How to set the display format for position data (C-types only)

You can set the display format for your position data with the following procedure.



1. Open the menu.
2. Select [7 INFORMATION BOX].
3. Select [2 OWN SHIP INFO].
4. Select [4 OWN SHIP POSN].
5. Select [5 COORDINATE SYSTEM].
6. Select [LL] (Latitude/Longitude) or [LORAN•DECCA] as required.
   See section 1.57 for details regarding LORAN•DECCA settings.
7. Close the menu.

1.12.3 How to select the datum to use for positioning (C-types only)

You can set the data used for navigation to match the datum used for your charts. If you use different datums, the position (coordinates) indicated on-screen may be different from those shown on your charts. You can change the datum with the following procedure.

1. Open the menu.
2. Select [7 INFORMATION BOX].
3. Select [2 OWN SHIP INFO].
4. Select [4 OWN SHIP POSN].
5. Select [6 GEODETIC DATUM].
6. Select [WGS-84] or [TOKYO] as required.
   Note: For configurations with an AIS transponder, select [WGS-84].
7. Close the menu.

1.13 Date and Time

1.13.1 How to switch between UTC and local date/time

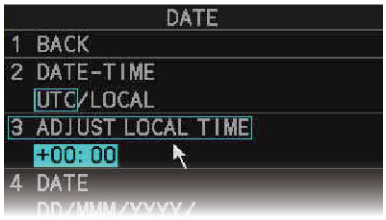
Date and time are displayed at the top-right of the screen in the [DATE/TIME] box. You can left-click the date/time indication to toggle between [UTC] format and [LOCAL] format.

1.13.2 How to adjust the local time

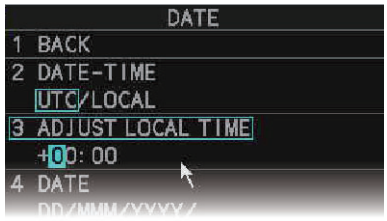
You can adjust the local time and switch between UTC/local time from the menu.

To adjust the local time, follow the procedure below.

1. Open the menu.
2. Select [7 INFORMATION BOX].
3. Select [2 OWN SHIP INFO].
4. Select [5 DATE].
5. Select [2 DATE-TIME], then select [UTC] or [LOCAL] as appropriate.
   - [UTC]: Date and time are displayed in UTC format.
   - [LOCAL]: Date and time are shown with the local time offset applied.
6. Select [3 ADJUST LOCAL TIME], then press the **ENTER MARK** key.



Time indication highlighted as a whole. Toggle between "+" and "-" is possible.



Single digit is highlighted. Toggle between "+" and "-" is not possible.

7. Spin the scrollwheel, or use the number keys to input the desired offset. The offset must be in 30 minute increments.
   Note: Regarding input for [3 ADJUST LOCAL TIME], when using the number keys, the indication is first selected as a whole. At this time, you can toggle between plus "+" or minus "-". Press the **8** key for "-", press the **2** key for "+". If single digits are highlighted, toggle is not possible. In this case, press the **CANCEL TRAILS** key to re-highlight the whole indication.
8. Close the menu.

1.13.3 How to change the date/time display format (C-types only)

You can change the manner in which time and date data is displayed.

1. Open the menu.
2. Select [7 INFORMATION BOX].
3. Select [2 OWN SHIP INFO].
4. Select [5 DATE].
5. Select [4 DATE], then select the required display format for the date.
   - [DD/MMM/YYYY]: date appears as “04/JUL/2018”.
   - [YYYY/MM/DD]: date appears as “2018/07/4”.
   - [YYYY/MMM/DD]: date appears as “2018/JUL/04”.
   - [MMM/DD/YYYY]: date appears as “JUL/04/2018”.
6. Select [5 TIME], then select the required display format for the time.
7. Close the menu.

1.14 User Settings (IMO-types only)

The user functions shown in the table below can be reset to their default settings by enabling the [PILOT SETTING] option in the [USER SET] menu. Functions not shown in the table below maintain their previous setting.

The unit can store two separate user settings, for the functions listed below, in the internal memory. These settings can also be recalled. Functions not shown in the table below cannot be stored or recalled.

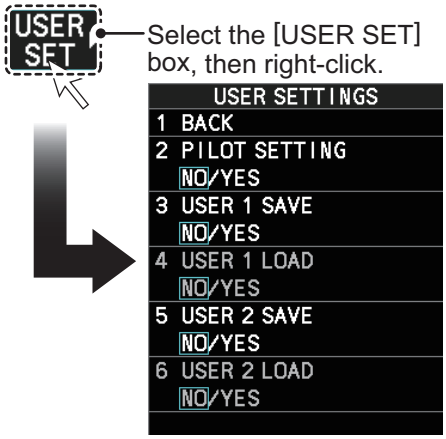
Function		Setting(s)	Menu/On-screen box
GAIN		Maintained as per previous setting.	[GAIN] box
SEA		[AUTO]	[SEA] box
RAIN		[AUTO]	[RAIN] box
TUNE		[AUTO]	[TUNE] box (Magnetron radars only)
TX CH		Maintained as per previous setting. (Solid State radars only)	
Range		[6 NM]	[RANGE] box
Range rings		[OFF]	[MAIN MENU] → [NAV TOOLS] → [RANGE RINGS]
VRM1	Display	[ON]	[VRM1] box
	Distance	[0.250 NM]	
VRM2	Display	[OFF]	[VRM2] box
	Distance	[0.000 NM]	
EBL1	Display	[ON]	[EBL1] box
	Bearing	Maintained as per previous setting.	
	Reference	Maintained as per previous setting.	[MAIN MENU] → [NAV TOOLS] → [EBL•VRM•CURSOR SET] → [EBL•CURSOR BEARING]
EBL2	Display	[OFF]	[EBL2] box
	Bearing	Maintained as per previous setting.	
	Reference		[MAIN MENU] → [NAV TOOLS] → [EBL•VRM•CURSOR SET] → [EBL•CURSOR BEARING]

Continued on following page

Function		Setting(s)	Menu/On-screen box
Continued from previous page			
PI Lines	Display	[OFF]	[PI Line] box
	Interval		
	Orientation		
	Bearing (True or Relative)	Fixed to [TRUE].	-
	Number of PI lines	[OFF]	[MAIN MENU] → [NAV TOOLS] → [PI LINES] → [SET MAXIMUM PI LINE]
	Mode (Parallel or Perpendic-ular)		[MAIN MENU] → [NAV TOOLS] → [PI LINES] → [PI LINE MODE]
Presentation Mode		[NORTH UP TM]	[PRESENTATION MODE] box
Stabilization mode (Sea/Ground)		[EPFS] (Ground)	[SPEED] box → [SHIP SPEED]
Off-centering		On-centering	**OFF CENTER** key.*
Target trails	Display, time	[ON], [6 MIN]	[TRAIL MODE] box
	Mode	[TRUE]	[PAST POSN] box
Past position		[OFF]	[PAST POSN] box
Vector mod		[REL]	[VECTOR] box
Vector time		[6 MIN]	
AZ1		[OFF]	[AZ1] box
AZ2		[OFF]	[AZ2] box
TT acquisition mode		[MAN100]	[TT TARGET] → [TT SELECT]
AIS display		[DISP ALL]	[AIS] box
Association		[ON] (TT > AIS)	[MAIN MENU] → [TT•AIS] → [TARGET ASSOCIA-TION] → [ASSOCIATION TGT TYPE]
Lost Target Alert		[OFF] (Disabled)	LOST TARGET ALERT box
CPA/ TCPA alarm	ON/OFF	[ON]	[CPA LIMIT] box
	CPA	[2 NM]	
	TCPA	[12 MIN]	
*: Has the same effect as selecting the True Motion presentation mode.			

1.14.1 How to reset the user settings

1. Open the menu.
2. Select [9 INITIAL SETTINGS].
3. Select [4 USER SETTINGS].
4. Select [PILOT SETTING], then press the **ENTER MARK** key.
5. Select [YES], then press the **ENTER MARK** key.
6. Close the menu.



Note 1: Items not shown in the above table keep their previous settings when [PILOT SETTING] is activated.

Note 2: TT tracking is continued after [PILOT SETTING] is activated.

Note 3: The radar map displays the same map as before [PILOT SETTING] is activated.

1.14.2 How to save/load user settings

1. Open the menu.
2. Select [9 INITIAL SETTINGS].
3. Select [4 USER SETTINGS].
4. Select [USER1(2) LOAD] or [USER1(2) SAVE] to recall or save user settings, respectively, then press the **ENTER MARK** key.
5. Select [YES], then press the **ENTER MARK** key.
6. Close the menu.

When loading settings, the following points apply:

- If the newly loaded settings cannot be applied to items not listed in the table above, then these items keep their previous settings.
- TT tracking is continued after the settings are loaded.
- The radar map displays the same map as before the settings were loaded.

1.15 How to Start/Stop Transmission

The radar is ready to transmit when the message "STBY" (C-types) or "RADAR STBY" (IMO-types) appears in the operational display area. Transmission can be started using one of the following procedures:

- **Using the control unit**: Press the **STBY TX** key.
- **Using the on-screen box**: Left-click the

button on the InstantAccess bar™.

When the radar is switched to TX (transmit) status, most settings (such as brilliance, range, pulse width, etc) are restored with the same settings as before standby.

For magnetron radars, it is recommended to place the radar in standby when transmission is not required, to reduce wear on the magnetron. You can also set a “blank sector” where transmission is stopped (see the Installation Manual for details).

How to stop antenna rotation

Antenna rotation can be stopped using one of the following procedures:

- Turn the antenna switch off.
- Turn antenna rotation off from the menu (See installation manual).

Screen freeze

The screen is not refreshed if the screen has frozen. An audio alarm is released 30 seconds after a screen freeze. The **ALARM ACK** (RCU-014) or **ALERT ACK** (RCU-031) key flashes and a contact alert signal is also released. To return the radar to normal operation, turn the radar off, then on again.

Quick start

Provided that the radar was in use and the magnetron (transmitter tube) is still warm, you can switch to transmit mode without the three minute warm-up time. If the radar was turned off by mistake or you wish to restart the radar promptly, wait several seconds before you press the **POWER** switch.

1.16 How to Tune the Receiver (Magnetron Radars Only)

Your magnetron radar has a tuning function (automatic or manual). For solid-state radars, tuning is not available.

1.16.1 How to select the tuning method

1. Select the [TUNE] button, at the top of the InstantAccess bar™, to change the tuning method. The tuning box is displayed as "TUNE AUTO" or "TUNE MAN", depending on the currently selected tuning method.
2. Left-click to toggle between automatic and manual tuning.

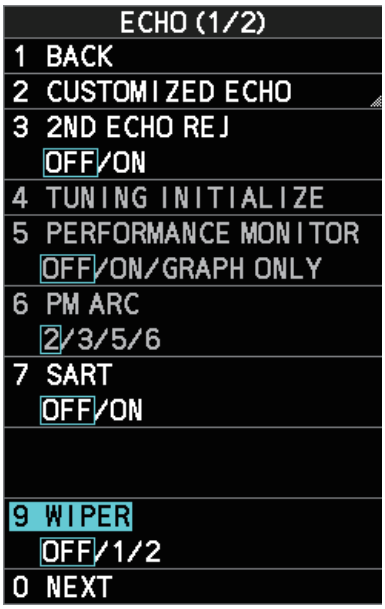
Note: The [Tune] button is grayed out and inoperable on FAR-2x58 and FAR-2268DS monitors which are assigned as [SUB] at installation.

1.16.2 How to initialize tuning

Automatic tuning is initialized at installation or after replacing the magnetron. However, if you feel that the automatic tuning is not functioning properly, re-initialize it by following the procedure below.

Note: Automatic tuning is not available on FAR-2x58 and FAR-2268DS monitors which are assigned as [SUB] at installation.

1. Open the menu.
2. Select [2 ECHO], then press the **ENTER MARK** key.



3. Select [4 TUNING INITIALIZE], then press the **ENTER MARK** key.
   The indication "TUNE INIT" appears in yellow characters at the top of the display during the initialization.
4. Close the menu.

1.16.3 How to tune the receiver manually

1. Select the 48-mile range from the [RANGE] box. Left-click to lower the range; right-click to raise the range.
2. Select manual tuning following the procedure in section 1.16.1.
3. Place the arrow on the tuning level indication.
4. Spin the scrollwheel to adjust tuning. The best tuning point is where the bar graph swings maximum. The tuning control position is indicated with a triangle, displayed inside the tuning bar.

1.17 How to Select a Pulselength

The pulselength in use is indicated on the [PULSE] button of the InstantAccess bar™, at the top-left of the screen.

[PULSE] button

Current pulse length appears here.

Appropriate pulselengths are preset to individual range scales and function keys. If you are not satisfied with the current pulselength settings, you can change them as shown in the procedure below.

Note: The [Pulselength] button is not shown on FAR-2x58 and FAR-2268DS monitors which are assigned as [SUB] at installation; instead the button is replaced with the indication "SUB".

1.17.1 How to select a pulselength

The pulselength can be changed using the procedure below.

1. Place the cursor in the [PULSE] box at the top left corner of the screen.
2. Left-click to decrease, right-click to increase the pulselength; or spin the scrollwheel to cycle through pulselengths.

Range	Radar model	(PULSE) indication
0.5 NM	Other than FAR-2x58 and FAR-2268DS	S1, S2
	FAR-2x58 and FAR-2268DS	S
0.75 NM	Other than FAR-2x58 and FAR-2268DS	S1, S2, M1
	FAR-2x58 and FAR-2268DS	S, M1
1.5 NM	Other than FAR-2x58 and FAR-2268DS	S1, S2, M1, M2
	FAR-2x58 and FAR-2268DS	S, M1
3 NM	Other than FAR-2x58 and FAR-2268DS	S2, M1, M2, M3
	FAR-2x58 and FAR-2268DS	S, M1, M2, L
6 NM/12 NM	Other than FAR-2x58 and FAR-2268DS	M1, M2, M3, L
	FAR-2x58 and FAR-2268DS	M1, M2, L
24 NM	Other than FAR-2x58 and FAR-2268DS	M2, M3, L
	FAR-2x58 and FAR-2268DS	M1, M2, L

1.17.2 How to change the preset pulselength

To change the preset pulselength for a range setting, follow the procedure below.

Note: Pulselength presets are not available from FAR-2x58 and FAR-2268DS monitors which are assigned as [SUB] at installation.

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
4. Select [9 PULSE].
5. Select the desired range, then select the required pulselength.
   Note: The example figure to the right is taken from a model other than the FAR-2x58 and FAR-2268DS. Available pulselengths for FAR-2x58 and FAR-2268DS differ from those shown in this example.
6. Close the menu.

1.18 MOB Mark

The MOB mark is used to mark the location where a man-over-board situation has occurred. The are two methods to enter a MOB, as listed below:

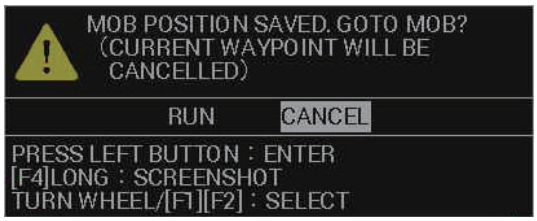
- Press the function key assigned with the [MOB] function. For how to assign functions, see section 1.8.3.
- Left-click the [MOB] button on the InstantAccess bar™. (C-types only)

When a MOB mark is inserted, a MOB symbol is immediately inscribed at the own ship location. You can only insert one MOB mark at a time. If a new MOB mark is inserted, the old MOB mark is deleted.

MOB symbol (C-types)

MOB symbol (IMO-types)

For C-types, the following message appears when a MOB mark is inserted.



To navigate directly to the MOB, select [RUN]. A course line appears between your vessel and the MOB symbol, on the screen. The line represents the shortest course to the MOB and the arrows on the line indicate the direction of travel.

How to see the MOB pop-up data (C-types only)

Place the cursor on the MOB symbol to show the data pop-up (see example figure to the right). The pop-up data shows the MOB coordinates, ETA and range from own ship.

How to remove the MOB mark

You can remove the MOB mark with one of the following procedures.

- **For C-types**, do one of the following:
  - Press and hold the function key assigned with the MOB function.
  - Place the cursor on the MOB button on the InstantAccess bar™, then left-click.
- **For IMO-types**, do the following:
  1. Place the cursor inside the operational display area, then right-click. The [CURSOR] menu appears.
  2. Select [MARK DELETE].
  3. Select the MOB mark.
  4. Right-click the operational display area to complete the procedure.

1.19 How to Adjust Sensitivity

The gain control adjusts the sensitivity of the receiver.

The proper setting is such that the background noise is just visible on the screen. If you set up for too little sensitivity, weak echoes may be missed. On the other hand excessive sensitivity yields too much background noise; strong targets may be missed because of the poor contrast between desired echoes and the background noise on the display.

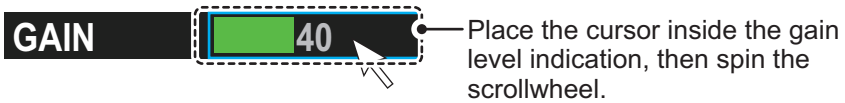
To adjust receiver sensitivity, adjust the gain control so background noise is just visible on the screen.

How to adjust the GAIN from the control unit (RCU-014/RCU-031)

Rotate the **GAIN** knob. Rotate anticlockwise to decrease the gain, or clockwise to increase the gain.

How to adjust the GAIN from the on-screen box

1. Place the cursor in the [GAIN] box at the top of the screen.



2. Spin the scrollwheel to adjust the gain. The setting range is [0] to [100].

1.20 How to Reduce Sea Clutter

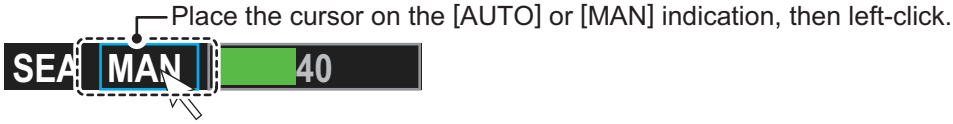
Echoes from waves cover the central part of the display with random signals known as sea clutter. The higher the waves, and the higher the antenna above the water, the further the clutter extends. When sea clutter masks the picture, reduce it with the A/C SEA control, either manually or automatically.

Note 1: When both sea clutter and rain clutter are reduced, the sensitivity is decreased more than when only one is changed. For that reason adjust them carefully.

Note 2: The echo average function (see section 1.24) is useful for reducing reflections from the sea surface. However, high-speed targets are harder to detect than stationary ones when echo average is active.

1.20.1 How to select the method of clutter adjustment

1. Place the cursor in the [SEA AUTO] or [SEA MAN] (whichever is shown) level indication at the top of the display.



2. Left-click to display [SEA AUTO] or [SEA MAN] as appropriate.

Note: For RCU-031 users, you can also push the **A/C SEA** knob to toggle between automatic and manual clutter reduction.

1.20.2 How to fine-tune sea clutter reduction

Auto A/C SEA allows for fine tuning of the A/C SEA circuit, within ±20 dB. Accordingly, with the bar reading set to 50, gain is not lowered to minimum as with manual A/C SEA on close-in ranges. Further, the auto A/C SEA level is low because the average value of the original input echo is low in areas where there are no sea surface reflections. For example, when the ship is alongside a quay and the radar picture shows echoes from both land and sea, you can observe the size of the echoes because the STC curve changes with the size of the echoes.

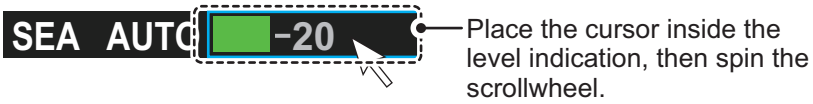
Note: The auto A/C function can erase weak target echoes. Adjust the control carefully, watching the display.

How to fine-tune sea clutter reduction from the control unit (RCU-014/RCU-031)

Rotate the **AC/SEA** knob. Rotate anticlockwise to decrease the AC/SEA, or clockwise to increase the A/C SEA.

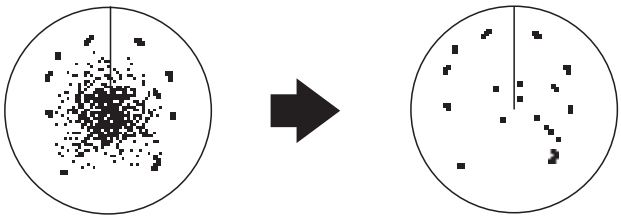
How to fine-tune sea clutter reduction from the on-screen box

1. Select [SEA AUTO], following the procedure in section 1.20.1.
2. Place the arrow on level indicator inside the A/C SEA box at the top of the display.



3. While observing the A/C SEA level indicator, spin the scrollwheel to adjust the clutter reduction. The setting range is [-50] to [50].

1.20.3 How to manually reduce sea clutter



Sea clutter at screen center

A/C SEA control adjusted; sea clutter reduced

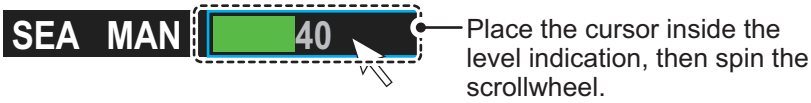
Note: The proper setting of the A/C SEA should be such that the clutter is broken up into small dots, and small targets become distinguishable. If the setting is set too low, targets will be hidden in the clutter, while if the setting is too high, both sea clutter and targets will disappear from the display. In most cases adjust the control until clutter has disappeared to leeward, but a little is still visible windward. Be careful not to remove all sea clutter, because you may erase weak echoes. Further, the possibility of losing weak echoes is greater when you use both A/C SEA and A/C RAIN to reduce clutter.

How to reduce sea clutter manually from the control unit (RCU-014/RCU-031)

Rotate the **AC/SEA** knob. Rotate anticlockwise to decrease the AC/SEA, or clockwise to increase the A/C SEA.

How to reduce sea clutter manually from the on-screen box

1. Select [SEA MAN], following the procedure in section 1.20.1.
2. Place the arrow on level indicator inside the A/C SEA box at the top of the display.



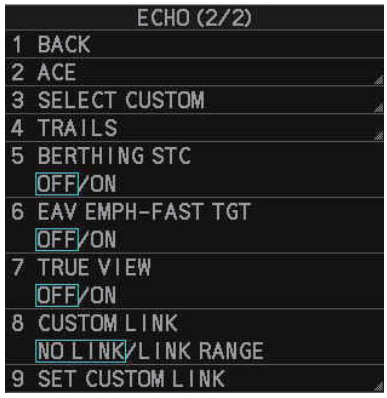
3. While observing the A/C SEA level indicator, spin the scrollwheel to adjust the clutter reduction. The setting range is [0] to [100].

1.20.4 How to use the BERTHING STC function

The [BERTHING STC] function allows you to show the main bang echo, even with the range set at 0.5 NM or less with AUTO SEA at maximum setting. This is particularly useful when attempting to berth, as it gives a clearer view of the berthing area and your ship's location.

To use the [BERTHING STC] function, follow the procedure below.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT]. The second page of the [ECHO] menu appears.
4. Select [5 BERTHING STC].
5. Select [ON] to activate, or [OFF] to deactivate, this function.



1.21 How to Reduce Rain Clutter

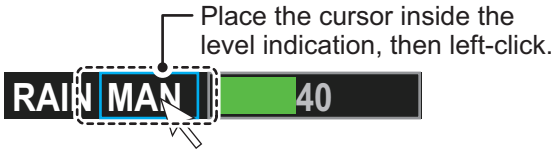
You can reduce clutter caused by rain, either automatically or manually.

Note 1: When both sea clutter and rain clutter are reduced, the sensitivity is decreased more than when only one is changed. For that reason adjust them carefully.

Note 2: The echo average function (see section 1.24) is useful for reducing reflections from the sea surface. However, high-speed targets are harder to detect than stationary ones when echo average is active.

1.21.1 How to select the method of rain clutter reduction

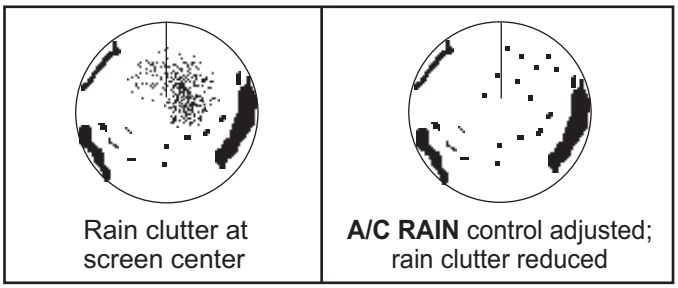
1. Place the cursor in the [RAIN AUTO] or [RAIN MAN] (whichever is shown) level indication at the top of the display.



2. Left-click to display [RAIN AUTO] or [RAIN MAN] as appropriate.
   Note 1: For RCU-031 users, you can also push the **A/C RAIN** knob to toggle between automatic and manual clutter reduction.
   Note 2: Unlike sea clutter reduction, rain clutter cannot be finely adjusted when set to [AUTO].

1.21.2 How to manually reduce the rain clutter

The vertical beam width of the antenna is designed to see surface targets even when the ship is rolling. However, by this design the unit will also detect rain clutter (rain, snow, or hail) in the same manner as normal targets.



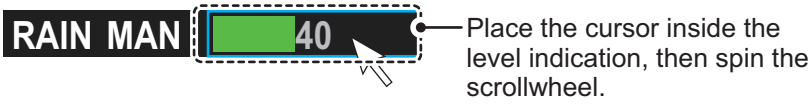
Note: The **A/C RAIN** control adjusts the receiver sensitivity as the **A/C SEA** control does but rather in a longer time period (longer range). The higher the setting the greater the anti-clutter effect. When echoes from precipitation mask solid targets, adjust the **A/C RAIN** control to split up these unwanted echoes into a speckled pattern, making recognition of solid targets easier. Be careful not to remove all rain clutter, because you can erase weak echoes. Further, the possibility of losing weak echoes is greater when you use both **A/C RAIN** and **A/C SEA** to reduce clutter.

How to fine-tune rain clutter reduction from the control unit (RCU-014/RCU-031)

Rotate the **A/C RAIN** knob. Rotate anticlockwise to decrease the A/C RAIN, or clockwise to increase the A/C RAIN.

How to fine-tune rain clutter reduction from the on-screen box

1. Select [RAIN MAN], following the procedure in section 1.21.1.

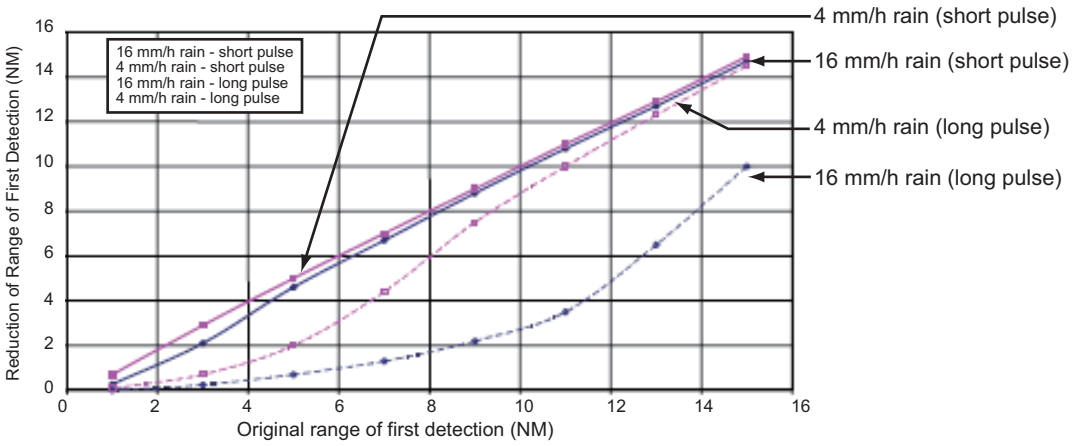


2. While observing the A/C RAIN level indicator, spin the scrollwheel to increase or decrease the level. 100 levels (0-100) are available.

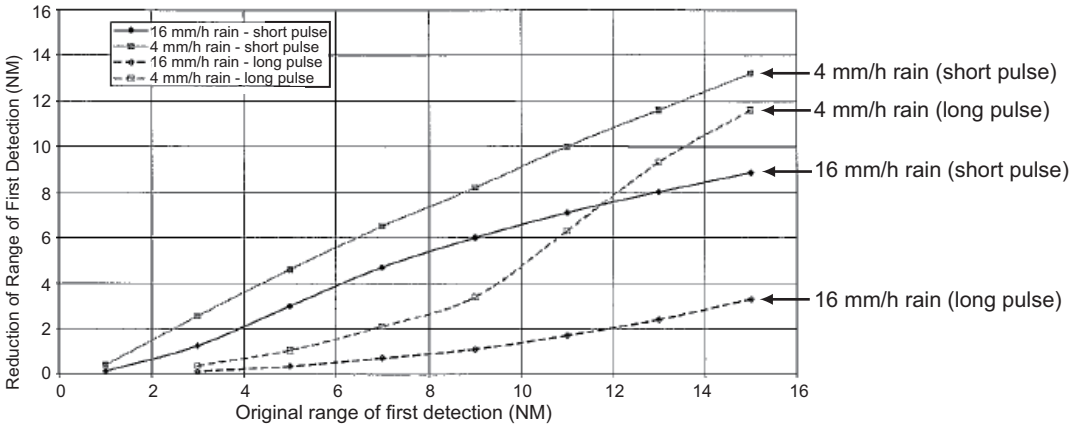
Note: The detection range is reduced when the RAIN is used to show targets in rain. Generally, the amount of rain, TX pulse length and TX frequency are factors in determining how the detection range is affected. The figure below illustrates this.

How to interpret the graph

Using the graph below as an example, a radar target originally detected on the 8 NM range can only be detected in rain at the ranges shown below:



Reduction of rain to first detection due to rain at S-band



Reduction of rain to first detection due to rain at X-band

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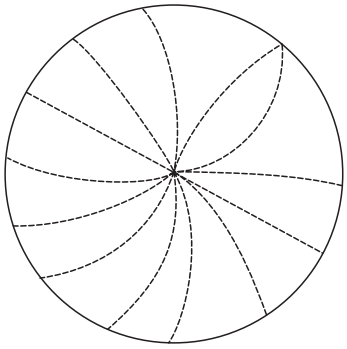
Accordingly, the short pulse may be preferable in rain on ranges less than 10 NM.

1.22 Interference Rejector



Mutual radar interference can occur in the vicinity of another shipborne radar operating in the same frequency band. It is seen on the screen as a number of bright spikes either in irregular patterns or in the form of usually curved spoke-like dotted lines extending from the center to the edge of the picture. Activating the interference rejector circuit can reduce this type of interference. The interference rejector is a kind of signal correlation circuit. It compares the received signals over successive transmissions and reduces randomly occurring signals. There are three levels of interference rejection depending on the number of transmissions that are correlated.

You can access this feature from the InstantAccess bar™, or from the menu. The available settings are: [OFF], [1], [2] or [3].

How to reject interference from the InstantAccess bar™

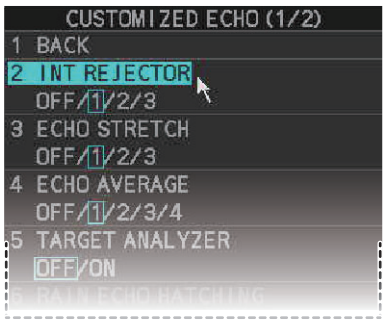
To adjust the interference rejector, select the [IR] button (IR OFF) on the InstantAccess bar™, then left-click to cycle through the rejection levels.

The available settings, in cyclic order, are: [OFF] → [1] → [2] → [3] → [OFF]...

Level [3] provides the highest level of rejection.

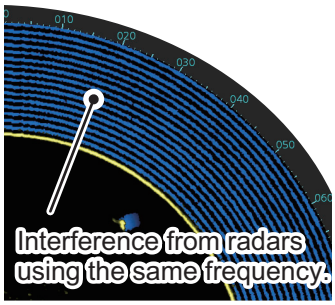
How to reject interference from the menu

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
   Note: You can also right-click the [PICTURE] box to access this menu.
4. Select [2 INT REJECTOR].
5. Select the required setting.
6. Close the menu.



Note: When multiple radars using the same frequency are nearby, interference may appear in a similar manner to that shown in the figure to the right. If this kind of interference appears, do one of the following:

- Press the **HL OFF** key, or click the [HL OFF] button on the InstantAccess bar™.
- Change the range.



1.23 Echo Stretch

The echo stretch feature enlarges targets in the range and bearing directions to make them easier to see, and it is available on any range. There are three types of echo stretch, 1, 2 and 3, and the higher the number the greater the amount of stretch.

Note: The echo stretch magnifies not only small target pips but also returns (clutter) from sea surface, rain and radar interference. For this reason, make sure these types of interference have been sufficiently reduced before activating the echo stretch.

You can access this feature from the InstantAccess bar™, or from the menu. The available options are: [OFF], [1], [2] or [3].

How to use echo stretch from the InstantAccess bar™

To set echo stretch, select the [ES] button (

) on the InstantAccess bar™, then left-click to cycle through the settings.

The available settings, in cyclic order, are: [OFF] → [1] → [2] → [3] → [OFF]...

How to use echo stretch from the menu

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
4. Select [3 ECHO STRETCH].
5. Select the required setting.
6. Close the menu.

1.24 Echo Averaging

The echo averaging feature effectively reduces sea clutter. Echoes received from stable targets such as ships appear on the screen at almost the same position every rotation of the antenna. On the other hand, unstable echoes such as sea clutter appear at random positions.

To distinguish real target echoes from sea clutter, echoes are averaged over successive picture frames. If an echo is solid and stable over successive frames, it is presented in its normal intensity. Sea clutter is averaged over successive scans and its brilliance reduced, making it easier to discriminate real targets from sea clutter.

Echo averaging uses a scan-to-scan signal correlation technique based on the true motion over the ground of each target. Thus, small stationary targets such as buoys will be shown while reducing random echoes such as sea clutter. However, true echo averaging is not effective for picking up small targets running at high speeds over the ground.

Note 1: With echo average active it is harder to detect high-speed targets than stationary ones.

Note 2: Do not use the echo averaging function under heavy pitching and rolling; loss of targets can result.

Note 3: Echo averaging requires heading, position and speed data.

Before using the echo averaging function, reduce sea clutter with the A/C SEA control. Leave a little sea clutter on the screen so as not to erase weak targets. The available settings options are shown in the table below.

Setting (level)	Description
[OFF]	Echo averaging is not enabled
[1], [2]	Detects targets hidden in sea clutter. [2] is more effective than [1] in detecting targets hidden in strong sea clutter. However, [1] is more effective than [2] in displaying high-speed targets. Select the setting best suited to current conditions. For effective monitoring of high-speed craft, you should use [2] together with the Wiper function.
[3]	Stably displays unstable targets; distinguishes high-speed craft.
[4]	Assists in distinguishing net floats better.

Note: Setting level [4] is available for C-types only.

You can access this feature from the InstantAccess bar™, or from the menu.

How to adjust the echo average function from the InstantAccess bar™

Select the [EAV] button (EAV OFF) on the InstantAccess bar™, then left-click to select the desired level of echo averaging.

How to use the echo average function from the menu

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
4. Select [4 ECHO AVERAGE].
5. Select the required setting.
6. Close the menu.

How to highlight fast-moving targets

Normally, when echo averaging is in use, fast-moving targets may be displayed weakly, or not at all. The fast target emphasis function highlights fast-moving targets, but can also highlight sea-surface reflections and other noise.

To use the fast target emphasis function, follow the procedure below.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT].
4. Select [6 EAV EMPH-FAST TGT].
5. Select [ON] or [OFF] as appropriate.
6. Close the menu.

1.25 Automatic Clutter Elimination (ACE) Function

This radar has the Automatic Clutter Elimination (ACE) function. This function detects sea and rain clutter from received echoes' and automatically reduces sea and rain clutter according to the Automatic Clutter Elimination (ACE) threshold setting.

Note: Use this function with caution. Weak target echoes may disappear from the screen.

1.25.1 How to turn the Automatic Clutter Elimination (ACE) function on/off

You can activate/deactivate the ACE function with one of the two methods outlined below.

From the InstantAccess bar™

Place the cursor on the [ACE] button (ACE OFF), then left-click to toggle between [ON] and [OFF].

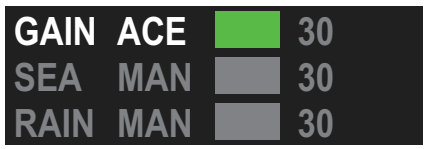
From the menu

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
4. Select [0 NEXT].
5. Select [4 ACE].
6. Select [ON] or [OFF] as appropriate, then press the **ENTER MARK** key.
7. Close the menu.

When [ACE] is activated, the [SEA] box and [RAIN] box are gray colored and cannot be adjusted, and the echo averaging function is disabled. The [GAIN] box changes to [GAIN ACE], as shown in the figure below.

ACE turned off.

ACE turned on.



Note: When [PERFORMANCE MON] (see section 1.50) or [SART] (see section 2.3) is [ON], [ACE] is disabled and cannot be activated.

1.25.2 How to adjust the gain in Automatic Clutter Elimination (ACE) mode

Rotate the **GAIN** knob to adjust the sensitivity.

ACE can also be adjusted by placing the cursor inside the [GAIN ACE] level indication, then spinning the scrollwheel.

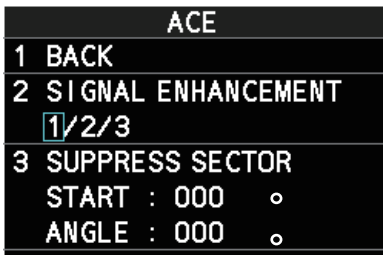
1.25.3 How to get high sensitivity

When the ACE function is [ON], the high sensitivity mode is also available. High sensitivity mode has three levels ([1], [2], [3]), with [3] applying the highest gain.

To use high sensitivity mode, a function key must be assigned with the [ACE HIGH SENSITIVITY] function (see section 1.8). To activate the ACE feature, press the assigned function key.

You can select the level of sensitivity for high sensitivity mode as follows:

1. Open the menu.
2. Select [1 ECHO], then press the **ENTER MARK** key.
3. Select [0 NEXT].
4. Select [2 ACE], then press the **ENTER MARK** key. The [ACE] menu appears.
5. Select [2 SIGNAL ENHANCEMENT], then press the **ENTER MARK** key.
6. Select the level from [1], [2] or [3].
7. Close the menu.



1.25.4 How to suppress false echoes

When the ACE function is [ON], the echo signals can appear on the screen at positions where there is no target or disappear when there are targets (see section 2.2). You can suppress these false echoes.

Note: This procedure is only available when the Automatic Clutter Elimination (ACE) function is [ON].

1. Open the menu.
2. Select [1 ECHO], then press the **ENTER MARK** key.
3. Select [0 NEXT].
4. Select [2 ACE], then press the **ENTER MARK** key.
5. Select [3 SUPPRESS SECTOR], then press the **ENTER MARK** key.
6. Spin the scrollwheel, or use the number keys, to set the start angle for sector suppression.
   If you use the number keys, the cursor moves from left to right. When all three digits are input, the cursor moves to the ANGLE item.
   If you use the scrollwheel, left-click when the start angle is set.
   To cancel any changes, press the **ENTER MARK** key.
7. Left-click, or press the **ENTER MARK** key to confirm the start angle. The cursor moves to the [ANGLE] item.
8. Spin the scrollwheel, or use the number keys, set the angle range of the sector to be suppressed.
   If you use the number keys, the cursor moves from left to right. When all three digits are input, the setting process is complete.
   If you use the scrollwheel, left-click when the angle range is set.
   To cancel any changes, press the **ENTER MARK** key.
9. Close the menu.

1.26 Noise Rejector

White noise can show itself on the screen as random “speckles” spread over the entire radar image. This equipment reduces the white noise, then improves the on-screen S/N ratio by processing the weighted moving average filter for the received echoes in the range direction.

Note: Use this function with caution. Weak target echoes may disappear from the screen or the range resolution may worsen.

To remove this noise do the following:

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
4. Select [7 NOISE REJECTOR].
5. Select [OFF] or [ON] as appropriate, then press the **ENTER MARK** key. The indication for noise rejection is located at the top-left of the screen.
   The indication changes according to the selected setting.
6. Close the menu.

Noise Rejector indication

1.27 Wiper

The wiper feature automatically reduces the brilliance of weak signals (noise, sea clutter, rain clutter, etc.) and unwanted signals such as radar interference to clear the picture of unwanted echoes. Its effect depends on the wiper setting used and whether each averaging is turned on or off, as described below.

	Wiper setting 1	Wiper setting 2
Echo averaging [OFF]	Condition A	Condition A
Echo averaging on([1] through [4])	Condition A	Condition B

Condition A: The brilliance of unwanted weak echoes, such as noise, sea clutter and rain clutter, is reduced to clear up the picture.
Condition B: Echo averaging is automatically activated when the wiper feature is turned on, allowing you to instantly see how the picture is affected with echo averaging turned off and turned on.
Note 1: The [WIPER] function is not available when [TRUE VIEW] (located on page 2 of the [ECHO] menu) is set to [ON].
Note 2: The [WIPER] function requires valid data input for position, speed and heading.

To activate the wiper feature, do the following:

1. Open the menu.
2. Select [1 ECHO].
3. Select [9 WIPER].
4. Select the desired setting.
   The options are: [OFF], [1] or [2].
5. Close the menu.

1.28 How to Preset Controls for a Specific Navigation Purpose

Every time your navigating environment or task changes, you must adjust the radar, which can be a nuisance in a busy situation. Instead of changing radar settings case by case, it is possible to assign the function keys to provide optimum settings for often-encountered situations.

The radar's internal computer offers several picture preset options to be assigned to each function key for your specific navigating requirements. For instance, one of the presets is [ROUGH SEA], and is designed to be used in heavy rain.

Three user-programmable presets are also provided (labeled as [CUSTOM1], [CUSTOM2] and [CUSTOM3]), so that you can have the radar automatically set to those conditions which are not covered by the provided setup options.

Below are the preset options provided with this radar.

Preset	Description
[CUSTOM1], [CUSTOM2] and [CUSTOM3]	User-defined custom settings.
[NEAR]	Optimum setting for short range detection using a range scale of 3 NM or less on calm seas.
[FAR]	Optimum setting for long range detection, on a range scale of 6 NM or larger.
[NEAR BUOY]	Optimum setting for detecting buoys within 3 NM range.
[FAR BUOY]	Optimum setting for detecting buoys on a range scale of 6 NM or larger.
[ROUGH SEA]	Optimum setting for rough weather or heavy rain.
[SHIP]	Optimum setting for detecting other vessels.
[HARBOR]	Optimum setting for harbor berthing.
[BIRD]	Optimum setting for detecting birds.
[COAST]	Optimum setting for coastal travel.

Note: For C-types, you can change the name of the presets (see section 1.28.5). This section uses the default names for all procedures and examples.

Each picture option defines a combination of several radar settings for achieving optimum setup for a particular navigating situation. These include gain, target analyzer, hatching, ACE, ACE gain, interference rejector, echo stretch, echo average, noise rejector, automatic anti-sea and anti-rain clutter, video contrast, near STC range/curve, pulse length and sea and radar conditions.

Changing these features from the [CUSTOMIZED ECHO] menu changes the original function key settings. To restore the original settings for a particular customize option, it is necessary to select the default setting. For this reason, we recommended that you use the user-programmable presets ([CUSTOM1], [CUSTOM2] or [CUSTOM3]) when frequent adjustment of the radar image is necessary.

The default settings for the custom presets are listed on the following pages.

Default settings - models other than FAR-2x58 and FAR-2268DS

	IR	ES	EA	NR	AUTO SEA	AUTO RAIN	TARGET ANALYZER*	HATCHING*
CUSTOM1	1	1	1	OFF	MAN-30	MAN-0	OFF	OFF
CUSTOM2	1	1	1	OFF	AUTO-30	MAN-0	OFF	OFF
CUSTOM3	1	1	1	OFF	MAN-30	MAN-0	OFF	OFF
NEAR	1	1	1	OFF	MAN-30	MAN-0	OFF	OFF
FAR	1	2	1	OFF	AUTO-40	MAN-0	OFF	OFF
NEAR BOUY	1	1	2	OFF	MAN-30	MAN-0	OFF	OFF
FAR BUOY	1	2	2	OFF	AUTO-30	MAN-0	OFF	OFF
ROUGH SEA	1	OFF	2	OFF	MAN-50	MAN-40	OFF	OFF
SHIP	1	2	1	OFF	MAN-30	MAN-0	OFF	OFF
HARBOR	1	OFF	1	OFF	MAN-30	MAN-0	OFF	OFF
BIRD	1	OFF	1	OFF	MAN-30	MAN-0	OFF	OFF
COAST	1	OFF	OFF	OFF	MAN-30	MAN-0	OFF	OFF

	STC CURVE	STC RANGE	LOW LEVEL ECHOES	NEAR STC CURVE*	NEAR STC RANGE*	GAIN	ACE	ACE GAIN	VIDEO CONTRAST
CUSTOM1	3	8	0	3.5	2.0	85	OFF	50	2-B
CUSTOM2	3	8	0	3.5	2.0	85	OFF	50	2-C
CUSTOM3	3	8	0	3.5	2.0	85	ON	50	2-B
NEAR	3	8	0	3.5	2.0	85	OFF	50	1-B
FAR	3	8	0	3.5	2.0	85	ON	60	4-B
NEAR BOUY	3	8	0	3.5	2.0	85	OFF	50	1-C
FAR BUOY	3	8	0	3.5	2.0	85	OFF	50	4-C
ROUGH SEA	3	9	0	3.5	3.0	85	OFF	35	2-C
SHIP	3	8	0	3.5	2.0	85	ON	50	2-B
HARBOR	3	8	0	3.5	2.0	75	ON	50	1-C
BIRD	3	8	0	3.5	2.0	85	OFF	50	3-C
COAST	3	8	0	3.5	2.0	85	OFF	50	2-C

*: Available for C-type radars only.

Default settings - FAR-2x58

	IR	ES	EA	NR	AUTO SEA	AUTO RAIN	TARGET ANALYZER*	HATCHING*
CUSTOM1	2	OFF	OFF	OFF	MAN-30	MAN-0	OFF	OFF
CUSTOM2	2	2	1	OFF	MAN-30	MAN-0	OFF	OFF
CUSTOM3	2	OFF	2	OFF	MAN-30	MAN-0	OFF	OFF
NEAR	2	OFF	OFF	OFF	MAN-60	MAN-0	OFF	OFF
FAR	2	OFF	OFF	OFF	MAN-30	MAN-0	OFF	OFF
NEAR BOUY	2	2	3	ON	MAN-30	MAN-0	OFF	OFF
FAR BUOY	2	OFF	OFF	OFF	MAN-30	MAN-0	OFF	OFF
ROUGH SEA	2	OFF	OFF	OFF	MAN-30	MAN-0	OFF	OFF
SHIP	2	OFF	2	OFF	MAN-60	MAN-0	OFF	OFF
HARBOR	2	OFF	OFF	OFF	MAN-30	MAN-0	OFF	OFF
BIRD	2	OFF	OFF	OFF	MAN-30	MAN-0	OFF	OFF
COAST	2	OFF	OFF	OFF	MAN-30	MAN-0	OFF	OFF

	STC CURVE	STC RANGE	LOW LEVEL ECHOES	NEAR STC CURVE*	NEAR STC RANGE*	GAIN	ACE	ACE GAIN	VIDEO CONTRAST
CUSTOM1	3	8	0	3.5	3.0	80	OFF	50	1-B
CUSTOM2	3	8	0	3.5	3.0	80	OFF	50	2-B
CUSTOM3	3	8	0	3.5	3.0	80	OFF	50	1-B
NEAR	3	8	0	3.5	3.0	80	OFF	50	2-A
FAR	3	8	0	3.5	3.0	80	OFF	50	1-B
NEAR BOUY	3	8	0	3.5	3.0	80	OFF	50	3-B
FAR BUOY	3	8	0	3.5	3.0	80	OFF	50	1-B
ROUGH SEA	3	9	0	3.5	3.0	80	OFF	50	1-B
SHIP	3	8	0	3.5	3.0	80	OFF	50	2-A
HARBOR	3	8	0	3.5	3.0	80	OFF	50	1-B
BIRD	3	8	0	3.5	3.0	80	OFF	50	2-B
COAST	3	8	0	3.5	3.0	80	OFF	50	2-B

*: Available for C-type radars only.

Default settings - FAR-2268DS

	IR	ES	EA	NR	AUTO SEA	AUTO RAIN	TARGET ANALYZER*	HATCHING*
CUSTOM1	2	2	1	OFF	MAN-50	MAN-0	OFF	OFF
CUSTOM2	2	2	1	OFF	MAN-40	MAN-0	OFF	OFF
CUSTOM3	2	2	1	OFF	MAN-45	MAN-60	OFF	OFF
NEAR	2	OFF	1	OFF	AUTO	MAN-30	OFF	OFF
FAR	2	2	1	OFF	MAN-50	MAN-0	OFF	OFF
NEAR BOUY	1	OFF	1	OFF	AUTO	MAN-0	OFF	OFF
FAR BUOY	1	3	1	OFF	MAN-40	MAN-0	OFF	OFF
ROUGH SEA	2	OFF	2	OFF	MAN-50	MAN-60	OFF	OFF
SHIP	2	2	1	OFF	MAN-50	MAN-40	OFF	OFF
HARBOR	2	OFF	1	OFF	MAN-40	MAN-30	OFF	OFF
BIRD	1	1	4	OFF	MAN-40	MAN-25	OFF	OFF
COAST	2	OFF	1	OFF	AUTO	AUTO	OFF	OFF

	STC CURVE	STC RANGE	LOW LEVEL ECHOES	NEAR STC CURVE*	NEAR STC RANGE*	GAIN	ACE	ACE GAIN	VIDEO CONTRAST
CUSTOM1	3.0	8	0	4.5	1.0	90	OFF	50	3-B
CUSTOM2	3.0	8	0	4.5	1.0	50	ON	50	3-B
CUSTOM3	3.0	8	0	4.5	1.7	90	OFF	50	3-B
NEAR	3.0	8	0	3.0	1.0	90	OFF	50	3-B
FAR	3.0	8	0	4.5	1.7	90	OFF	50	4-B
NEAR BOUY	3.0	8	0	4.5	1.7	90	OFF	50	3-B
FAR BUOY	3.0	8	0	3.0	1.7	80	ON	50	3-B
ROUGH SEA	3.0	9	0	4.5	1.7	85	OFF	50	2-B
SHIP	3.0	8	0	3.0	1.7	85	OFF	50	2-B
HARBOR	3.0	8	0	3.0	1.0	85	OFF	50	2-A
BIRD	3.0	8	0	4.5	1.7	90	OFF	50	3-A
COAST	3.0	8	0	4.5	1.7	85	OFF	50	2-B

*: Available for C-type radars only.

Default settings for [PULSELENGTH] - models other than FAR-2x58 and FAR-2268DS

	0.125 NM to 0.5 NM	0.75 NM	1 NM*	1.5 NM	2 NM*	3 NM
CUSTOM1	S1	S1	S1	S2	S2	M1
CUSTOM2	S1	S1	S1	S2	S2	M1
CUSTOM3	S1	S1	S1	S2	S2	M1
NEAR	S1	S1	S1	S2	S2	M1
FAR	S1	S1	S1	S2	S2	M1
NEAR BOUY	S1	S1	S1	S2	S2	M1
FAR BUOY	S1	S1	S1	S2	S2	M1
ROUGH SEA	S1	S1	S1	S2	S2	M1
SHIP	S1	S1	S1	S2	S2	M1
HARBOR	S1	S1	S1	S2	S2	M1
BIRD	S1	S1	S2	S2	M1	M1
COAST	S1	S1	S1	S2	S2	M1

	4 NM*	6 NM	8 NM*	12 NM	16 NM*	24 NM
CUSTOM1	M1	M2	M2	L	L	L
CUSTOM2	M1	M2	M2	L	L	L
CUSTOM3	M1	M2	M2	L	L	L
NEAR	M1	M2	M2	M3	M3	L
FAR	M1	M3	M3	L	L	L
NEAR BOUY	M1	M2	M2	M3	M3	L
FAR BUOY	M1	M3	M3	L	L	L
ROUGH SEA	M1	M2	M2	M3	M3	L
SHIP	M1	M2	M2	L	M3	L
HARBOR	M1	M2	M2	M3	M3	L
BIRD	M1	M2	M2	M3	L	L
COAST	M1	M2	M2	M3	M3	L

*: Available for C-types only.

Default settings for [PULSELENGTH] - FAR-2x58

	0.125 NM to 0.5 NM	0.75 NM	1 NM*	1.5 NM	2 NM*	3 NM
CUSTOM1	S	S	S	M1	M1	M1
CUSTOM2	S	S	S	M1	M1	M1
CUSTOM3	S	S	S	M1	M1	M1
NEAR	S	S	S	M1	M1	M1
FAR	S	S	S	M1	M1	M2
NEAR BOUY	S	M1	M1	M1	M1	M1
FAR BUOY	S	S	S	M1	M1	M1
ROUGH SEA	S	S	S	M1	M1	M1
SHIP	S	S	S	M1	M1	M1
HARBOR	S	S	S	M1	M1	M1
BIRD	S	S	S	M1	M1	M1
COAST	S	S	S	M1	M1	M2

	4 NM*	6 NM	8 NM*	12 NM	16 NM*	24 NM
CUSTOM1	M1	M2	M2	M2	L	L
CUSTOM2	M1	M2	M2	L	L	L
CUSTOM3	M1	M2	M2	L	L	L
NEAR	M1	M2	M2	L	L	L
FAR	M1	M1	M1	L	L	L
NEAR BOUY	M2	L	L	L	L	L
FAR BUOY	M1	M1	M1	L	L	L
ROUGH SEA	M1	M1	M1	L	L	L
SHIP	M1	M2	M2	L	L	L
HARBOR	M1	M1	M1	L	L	L
BIRD	M1	M2	M2	L	L	L
COAST	M2	M2	M2	L	L	L

*: Available for C-types only.

Default settings for [PULSELENGTH] - FAR-2268DS

	0.125 NM to 0.5 NM	0.75 NM	1 NM*	1.5 NM	2 NM*	3 NM
CUSTOM1	S	S	S	M1	M1	M2
CUSTOM2	S	S	S	M1	M1	M2
CUSTOM3	S	S	S	M1	M1	M2
NEAR	S	S	S	M1	M1	M2
FAR	S	S	S	M1	M1	M2
NEAR BOUY	S	S	S	M1	M1	M2
FAR BUOY	S	S	S	M1	M1	M2
ROUGH SEA	S	S	S	M1	M1	M2
SHIP	S	S	S	M1	M1	M2
HARBOR	S	S	S	M1	M1	M2
BIRD	S	S	S	M1	M1	M2
COAST	S	S	S	M1	M1	M2

	4 NM*	6 NM	8 NM*	12 NM	16 NM*	24 NM
CUSTOM1	M2	L	L	L	L	L
CUSTOM2	M2	L	L	L	L	L
CUSTOM3	M2	L	L	L	L	L
NEAR	M2	L	L	L	L	L
FAR	M2	L	L	L	L	L
NEAR BOUY	M2	L	L	L	L	L
FAR BUOY	M2	L	L	L	L	L
ROUGH SEA	M2	L	L	L	L	L
SHIP	M2	L	L	L	L	L
HARBOR	M2	L	L	L	L	L
BIRD	M2	L	L	L	L	L
COAST	M2	L	L	L	L	L

*: Available for C-types only.

1.28.1 How to select a customized echo

Left-click the [CUSTOMIZE ECHO] box at the top left of the screen to cycle through the options and select a customized echo option.

The available options depend on the settings selected for [3 SELECT CUSTOM] in the [ECHO] menu. See section 1.28.5.

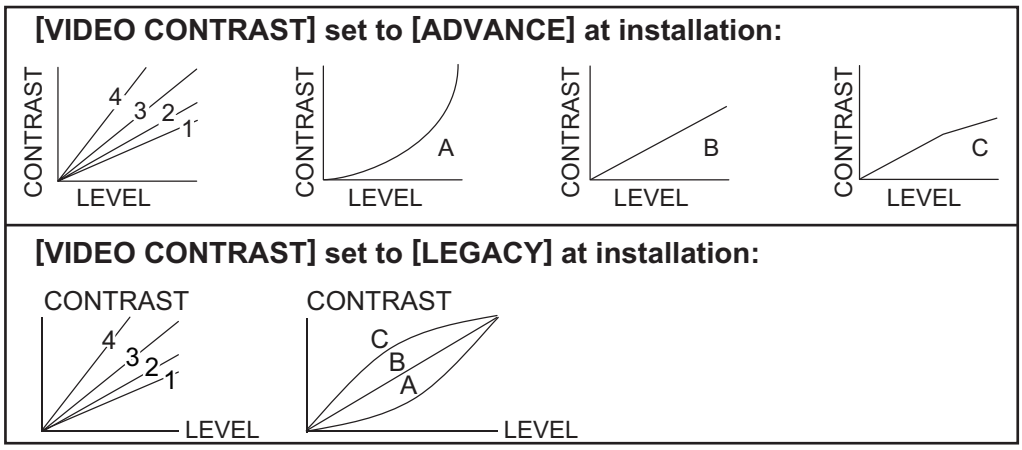
Note: For C-types, if the customization is linked with a range (see section 1.28.7), the indication appears in yellow color.

1.28.2 How to edit a customized echo

1. Select a customize echo option to edit (see section 1.28.1).
2. Open the menu.
3. Select [1 ECHO].
4. Select [2 CUSTOMIZED ECHO].
5. Set the items below referring to the sections shown.
   - [2 INT REJECTOR] : section 1.22
   - [3 ECHO STRETCH] : section 1.23
   - [4 ECHO AVERAGE] : section 1.24
   - [5 TARGET ANALYZER]* : section 1.38
   - [6 HATCHING]* : section 1.38
   - [7 NOISE REJECTOR] : section 1.26
   - [8 VIDEO CONTRAST TYPE]
   - [9 PULSE] : section 1.17
   - [2 CONDITION] : section 1.28.2
   - [4 ACE] : section 1.25

   *: Available for C-type radars only.

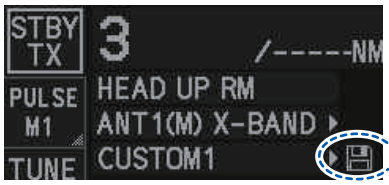
   Note: To set [2 CONDITION] and [4 ACE], select [0 NEXT] to show the second page of the [CUSTOMIZED ECHO] menu.
6. Select [8 VIDEO CONTRAST TYPE], then press the **ENTER MARK** key.
7. Select [1], [2], [3] or [4] (Dynamic Range) or [A], [B], [C] (Curve) as appropriate then press the **ENTER MARK** key. Video contrast and curve change depending on setting for [VIDEO CONTRAST] (set at installation), as shown in the figure below.



1 to 4: Control dynamic range. 1 provides the widest dynamic range; 4 is the narrowest dynamic range.
A: Low level echo brilliance is reduced and noise and clutter are also reduced.
B: Low and high level echoes are displayed evenly.
C: High level echoes' outer edge has gradation to indicate the echo level, with the higher level echo at the core.

8. Select [0 NEXT] to show the next menu page.
9. Select [2 CONDITION].
10. Select [2 STC CURVE].
11. Select the appropriate setting for the current sea conditions, then press the **ENTER MARK** key. A higher setting is recommended for rough weather.

12. Select [3 STC RANGE].
13. Set the distance for STC effectiveness, then press the **ENTER MARK** key. A higher setting eliminates farther surface reflections.
14. If necessary, select [4 LOW LEVEL ECHO] to reject low level echoes. The higher the figure, the stronger the low level echo that is erased.
15. Select [5 NEAR STC CURVE].
16. Select the appropriate setting for close-range sea conditions.
17. Select [5 NEAR STC RANGE].
18. Select the range to which you want to apply the [NEAR STC CURVE] settings.
19. Select [1 BACK] to show the second page of the [CUSTOMIZED ECHO] menu.
20. To save custom settings, select [SAVE] from [3 DEFAULT].
    Note: For C-types, when customized settings are not saved, the “save” floppy disc icon appears. You can click the icon to save the customized settings.



“Save” floppy disc icon

21. Close the menu.

1.28.3 How to restore a user customized echo to the saved settings

If you get lost in operation while changing the settings for a user customized echo, you can easily restore the settings for that user customized echo saved at section 1.28.2.

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
4. Select [0 NEXT] to show the next menu page.
5. Select [3 DEFAULT].
6. Select [USER].
7. Close the menu.

1.28.4 How to restore a user customized echo to the factory default settings

You can restore customized echo options to their factory default settings (see the tables on page 1-56 for a list of the default settings).

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
4. Select [0 NEXT] to show the next menu page.
5. Select [3 DEFAULT].
6. Select [FACTORY], then press the **ENTER MARK** key.
7. Close the menu.

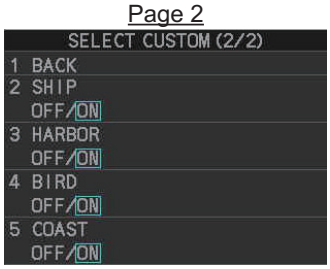
1.28.5 How to edit the available customized echoes

To edit which customizations are available from the [CUSTOMIZE ECHO] box, follow the procedure below.

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT].
4. Select [3 SELECT CUSTOM]. The [SELECT CUSTOM] menu appears.

Page 1

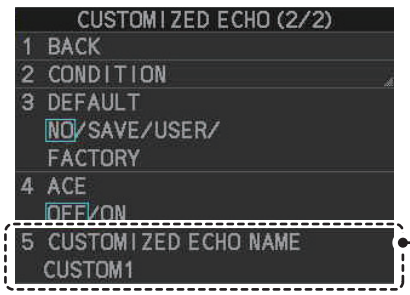
Page 2



5. Select the customization you want to edit.
   The customizations are listed over two menu pages. Select [0 NEXT] to see the next page, or select [1 BACK] to return to the previous menu page.
6. Select [ON] to make the customization available from the [CUSTOMIZE ECHO] box, or select [OFF] to hide the customization from the [CUSTOMIZE ECHO] box.
   Note: The factory default setting for all items in this menu is [ON].
7. Close the menu.

1.28.6 How to change the name of a customization (C-types only)

1. Open the menu.
2. Select [1 ECHO].
3. Select [2 CUSTOMIZED ECHO].
4. Select [0 NEXT] to show the next menu page.



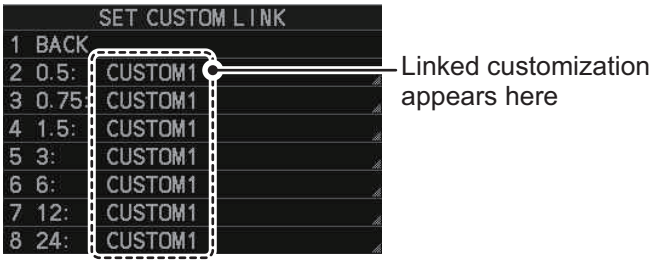
5. Select [5 CUSTOMIZED ECHO NAME]. The software keyboard window appears.
6. Referring to section 1.5.3, change the name of the customization.
7. Close the menu.

1.28.7 How to link the customization with a range (C-types only)

You can set link your customized presets with a specified range to save time. Linked settings are changeable and are also applied if the range is changed while in stand-by mode.

To link customized settings with a range, do the following:

1. Open the menu.
2. Select [1 ECHO].
3. Select [0 NEXT].
4. Select [8 CUSTOM LINK].
5. Select [LINK RANGE].
6. Select [SET CUSTOM LINK]. Linked customizations appear next to their linked range in the [SET CUSTOM LINK] menu. The default setting for all ranges is [CUSTOM 1].



- [0.5]: links the customization to 0.5NM/SM/km/kyd range or lower
- [0.75]: links the customization to ranges between 0.75 and 1NM/SM/km/kyd
- [1.5]: links the customization to ranges between 0.175 and 1NM/SM/km/kyd
- [3]: links the customization to ranges between 3 and 4NM/SM/km/kyd
- [6]: links the customization to ranges between 6 and 8NM/SM/km/kyd
- [12]: links the customization to ranges between 12 and 16NM/SM/km/kyd
- [24]: links the customization to 24NM/SM/km/kyd range or higher

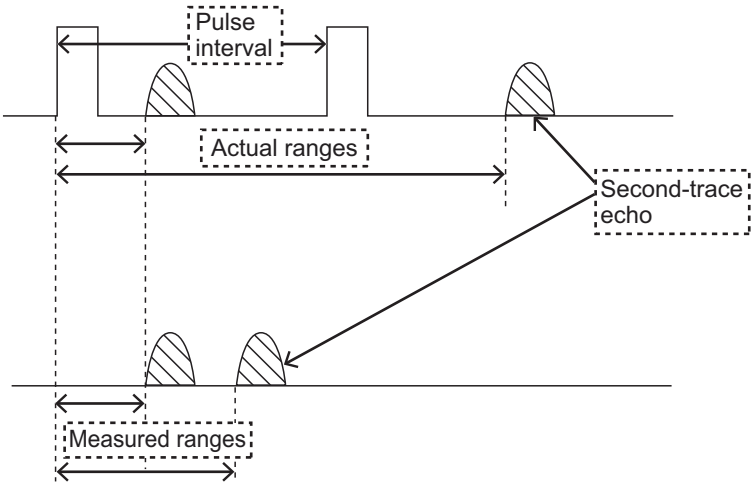
7. Select the range you want to link a customization to. The available options appear.

Note: If the name of a customization is changed (see section 1.28.6), the custom name appears instead of the default.

8. Select the customization you want to link to the selected range.
9. Repeat steps 7 and 8 to link other ranges and customizations.
10. Close the menu.

1.29 How to Reject Second-trace Echoes

In certain situations, echoes from very distance targets can appear as false echoes (second-trace echoes) on the screen. This occurs when the return echo is received one transmission cycle later, or after a next radar pulse has been transmitted.



This equipment lengthens the pulse repetition period to reject false echoes.

Note 1: This function decreases the number of echo hits. Use this function carefully so that the possibility of detecting small targets and high-speed craft does not lessen.

Note 2: This function is not available on FAR-2x58 and FAR-2268DS monitors which are assigned as [SUB] at installation.

To reject second trace echoes, do the following:

1. Open the menu.
2. Select [1 ECHO].
3. Select [3 2ND ECHO REJ].
4. Select [ON], then press the **ENTER MARK** key. Select [OFF] to disable rejection.
5. Close the menu.

1.30 Orientation Modes

This radar has the following orientation modes available:

Mode	Description
Relative Motion (RM) modes	
[HEAD UP RM]	Not stabilized
[STERN UP RM]*	The radar image is rotated 180°. Graphics and relative and true bearings are also rotated 180°.
[STAB HEAD UP RM]	Head-up with compass bearing scale (True Bearing) where the bearing scale rotates with the compass reading.
[COURSE UP RM]	Compass-stabilized relative to ship's orientation at the time of selecting COURSE UP.
[NORTH UP RM]	Compass-stabilized with reference to North.
True Motion (TM) modes	
[NORTH UP TM]	Land objects and sea are stationary. Requires compass and speed data.
*: [STERN UP RM] is only available for C-types.	

1.30.1 How to select an presentation mode

Select the [ORIENTATION MODE] box at the top left corner of the screen, then left-click to cycle through the available orientation modes.

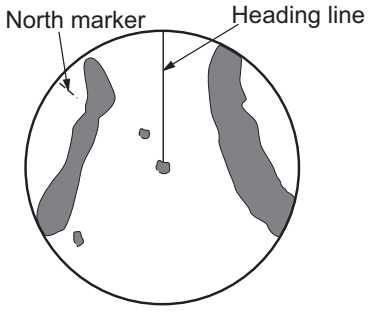
Loss of gyrocompass signal

When the compass signal is lost, "NO GYRO SIGNAL" appears in yellow-orange in the [ALERT] box, the orientation mode automatically becomes HEAD UP, and TT and AIS targets, map and chart are erased. Stop the alert with the **ALARM ACK** (RCU-014) or **ALERT ACK** (RCU-031) key or left-click the [ALERT] box. Check the GYRO data.

1.30.2 Description of presentation modes

HEAD UP mode

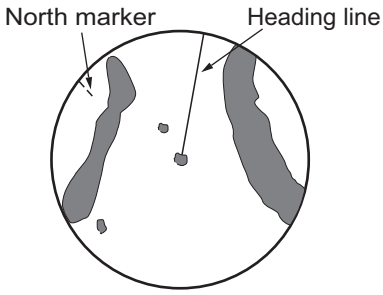
A display without azimuth stabilization in which the line that connects the center with the top of the display indicates your heading. Targets are shown at their measured distances and their directions relative to your heading. The short dotted line on the bearing scale is the north marker.



Note: For C-types, you can make the following adjustment in the menu to show smoother echoes when turning at high speeds. However, with this adjustment, the [WIPER] and [ZOOM] functions are disabled. Set [TRUE VIEW] to [ON] on the second page of the [ECHO] menu.

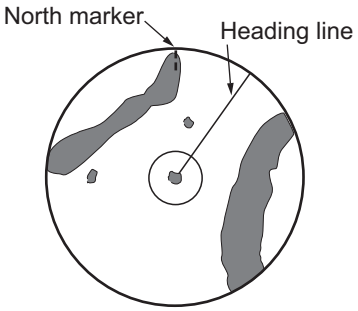
COURSE UP mode

The radar picture is stabilized and displayed with the currently selected course at the top of the screen. When you change the heading, the heading line moves with the course selected. If you select a new course, select the course up mode again to display the new course at the top of the display. Targets are shown at their measured distances and their directions relative to the set course, which is at the 0-degree position. The heading line moves according to the yawing and any course change.



NORTH UP mode

Targets are shown at their measured distances and their true (compass) directions from your ship. North is at the top of the screen. The heading line changes its direction according to your heading.



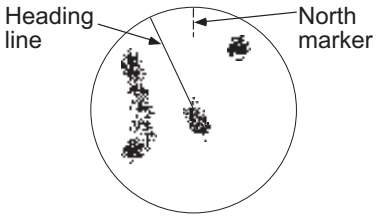
STAB HEAD UP mode

Radar echoes are shown in the same way as in the HEAD UP mode. The difference from normal HEAD UP presentation lies in the orientation of the bearing scale. The bearing scale is heading sensor stabilized. That is, it rotates in accordance with the heading sensor signal, enabling you to know own ship's heading at a glance.

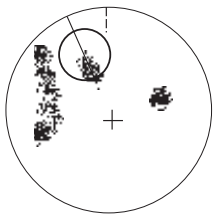
This mode is available when the radar is interfaced with a gyrocompass. If the gyrocompass fails, the bearing scale returns to the state of HEAD UP mode.

True motion mode

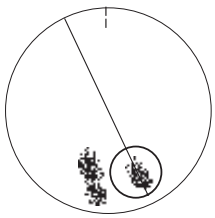
Your ship and other objects in motion move with their true courses and speed. All fixed targets, like landmasses, appear as fixed echoes in ground stabilized TM. When your ship reaches a point that is 50% of the radius of the display, the position is reset. The ship appears at 75% radius opposite to the extension of the current course. You can manually reset your ship symbol if you press the **5 CU/TM RESET** key.



(a) True motion is selected



(b) Your ship has reached a point 50% of display radius



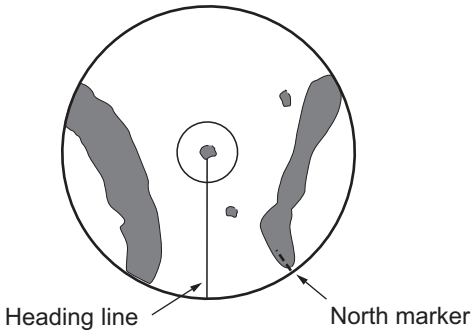
(c) Your ship is automatically reset to 75% of display radius

Note: The position of the own ship marker and bearing scale change according to reference position and off-centering.

- ANT: When OFF CENTER is active, the bearing scale intervals change accordingly.
- CCRP: When the CCRP moves outside the operational display area, the bearing scale intervals may not be displayed correctly.

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.

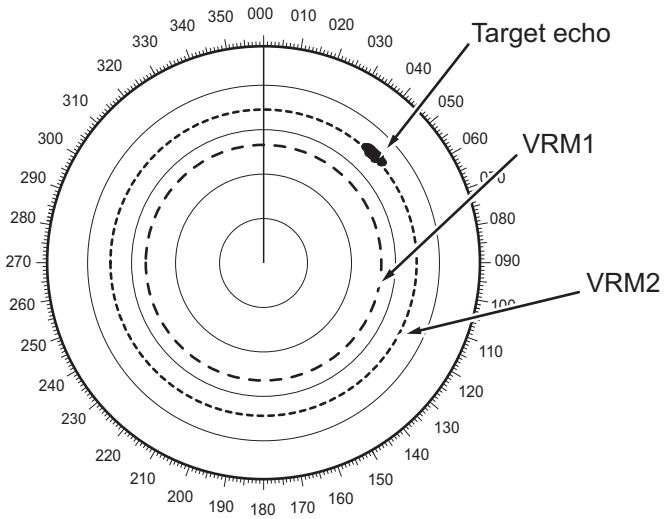
Use the fixed range rings to get an estimate of the range to a target. The rings are the concentric solid circles on the display. The number of rings is automatically set by the current range scale. The distance between the rings is the range ring interval, and the current interval appears at the upper-left 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

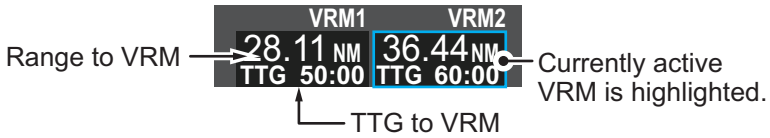
1. Open the menu.
2. **For IMO-types,** select [3 NAV TOOLS] to show the [NAV TOOLS] menu.
   For C-types, select [3 CURSOR•EBL•VRM] to show the [CURSOR•EBL•VRM] menu.
3. **For IMO-types,** select [4 RANGE RINGS].
   For C-types, select [6 RANGE RINGS].
4. Depending on your radar type, select the appropriate 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)
- SM (Statute Miles)
- km (Kilometers)
- kyd (Kiloyards)

To change the unit of measurement, do the following:

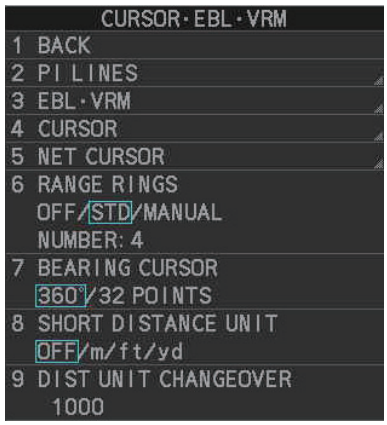
1. Open the menu.
2. Select [3 CURSOR•EBL•VRM].
3. Select [3 EBL•VRM].
   The [EBL•VRM] menu appears.
4. Select [VRM1] or [VRM2] as appropriate.
5. Select the required unit of measurement.
6. Close the menu.

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:

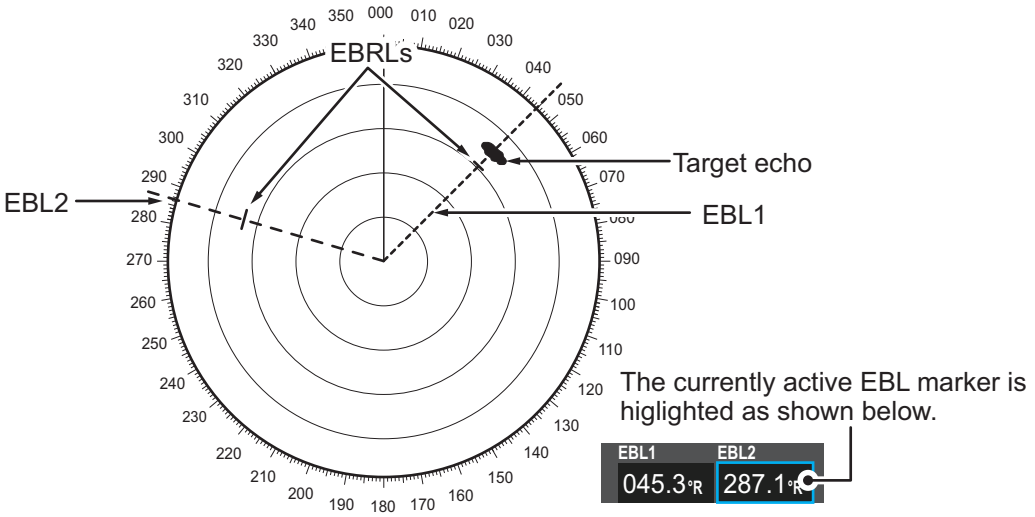
1. Open the menu.
2. **For IMO-types,** select [3 NAV TOOLS] to show the [NAV TOOLS] menu.
   For C-types, select [3 CURSOR•EBL•VRM] to show the [CURSOR•EBL•VRM] menu.
3. **For IMO-types,** select [3 EBL•VRM•CURSOR SET].
   For C-types, select [3 EBL•VRM].
4. **For IMO-types,** select [3 VRM TTG.]
   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.

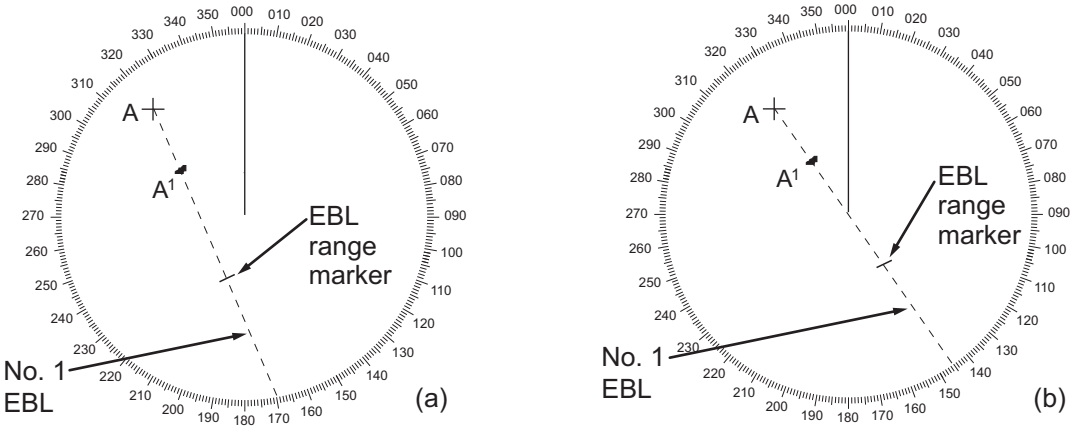
1. Open the menu.
2. **For IMO-types,** select [3 NAV TOOLS].
   For C-types, select [3 CURSOR•EBL•VRM].
3. **For IMO-types,** select [3 EBL•VRM•CURSOR SET].
   For C-types, select [3 EBL•VRM].
4. **For IMO-types**, select [5 EBL•CURSOR BEARING].
   For C-types, select [2 EBL1] or [3 EBL2] as appropriate.
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

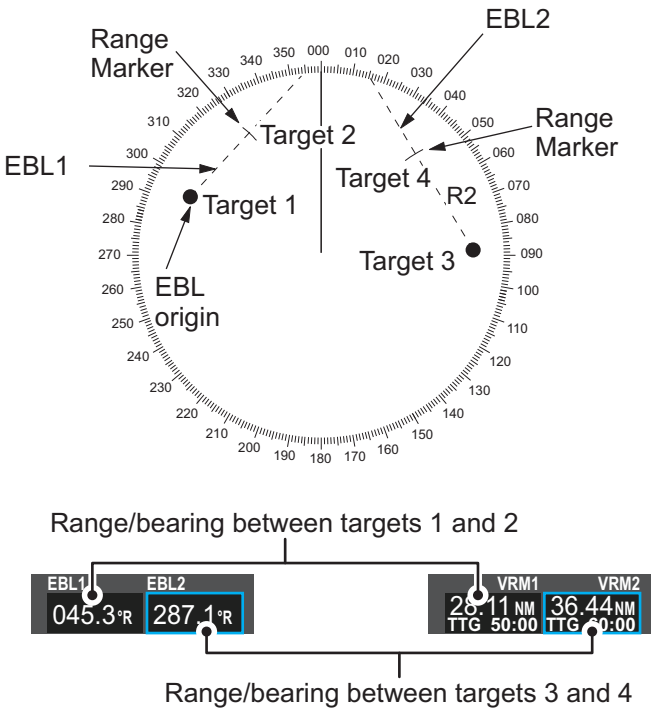
1. Select the operational display area, then right-click. The [CURSOR] context menu appears.
2. Select [EBL OFFSET].
3. Select the operational display area, then left-click. The EBL line is attached to the cursor.
4. Place the offset EBL on the target appearing as threatening, then left-click.
5. After 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 (A^1). 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.

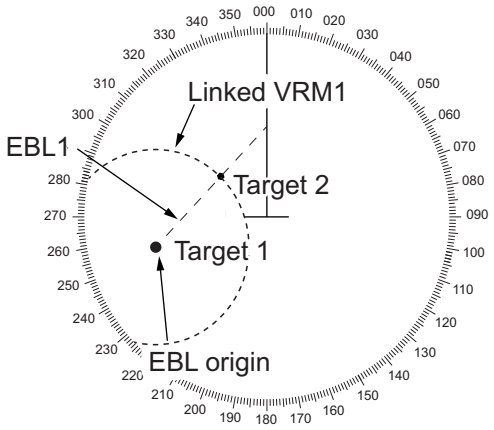
How to reset the EBL origin to the center of the screen

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.

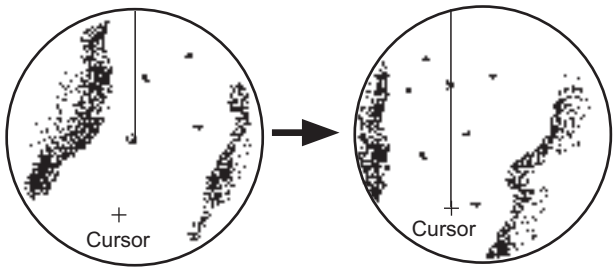
1. Open the menu.
2. **For IMO-types,** select [3 NAV TOOLS].
   For C-types, select [3 CURSOR•EBL•VRM].
3. **For IMO-types,** select [3 EBL•VRM•CURSOR SET].
   For C-types, select [3 EBL•VRM].
4. **For IMO-types**, select [4 VRM OFFSET].
   For C-types, select [8 VRM OFFSET].
5. Select [LINK EBL] to 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.



Put cursor where desired and do appropriate off-center procedure.

Off-centered display

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

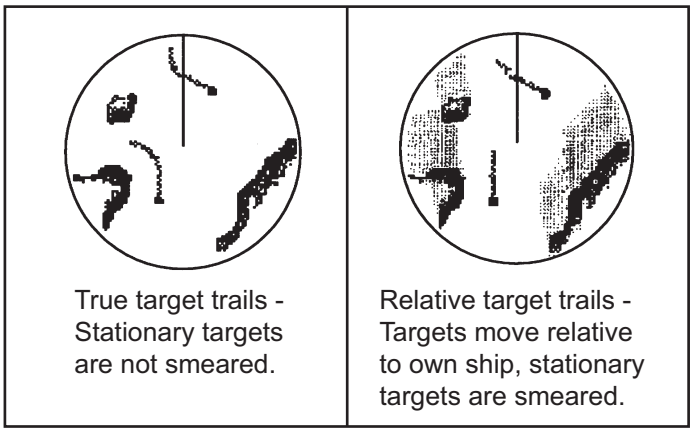
1. Place the cursor inside the operational display area, then right-click to show the [CURSOR] menu.
2. Select [OFF CENTER]. The cursor is now displayed with a red surround, indicating that [OFF CENTER] mode is active.
3. Move the cursor to the position where you wish to move the sweep origin, then left 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.



True target trails - Stationary targets are not smeared.

Relative target trails - Targets move relative to own ship, stationary targets are smeared.

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)	