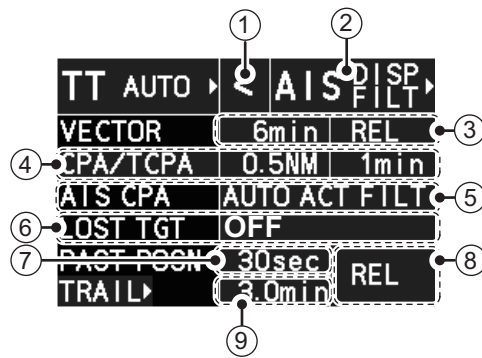
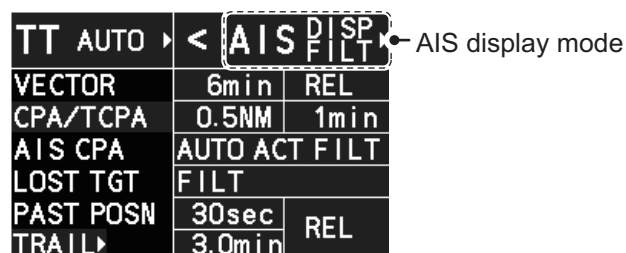


4.2 AIS Box Overview



No.	Indication name	Description/remarks
1	Association indication	Shows the association setting. See section 4.15 for details.
2	AIS mode setting	Shows the current filter setting for AIS target display. • [FUNC OFF]: AIS display is disabled. • [DISP OFF]: AIS symbols are hidden. • [DISP FILT]: Only filtered AIS targets are displayed. • [DISP ALL]: All AIS symbols are displayed.
3	[VECTOR]	• Adjusts the vector time for the selected target. • True, Relative referencing for this target's vector. See section 3.12 for details.
4	[CPA/TCPA]	Adjusts the CPA/TCPA settings.
5	[AIS CPA]	Adjusts the AIS auto activate settings.
6	[LOST TGT]	Adjusts the settings for lost targets and related alerts.
7	[PAST POSN]	Adjusts the setting for past position tracks. See section 3.13 for details.
8	Trail mode	Changes the trail mode in use. See section 1.37 for details.
9	Trail time	Shows the interval setting for trails. See section 1.37.2 for details.

4.3 How to Select the AIS Display Mode



- [DISP OFF]: AIS symbols are hidden.
- [DISP FILT]: Only filtered AIS targets are displayed.
- [DISP ALL]: All AIS symbols are displayed.

To disable the AIS function, put the cursor on the AIS display mode indication, then long right-click. The AIS display mode indication shows [FUNC OFF] when the AIS function is disabled.

4.4 AIS Symbols and Their Meanings

When the AIS display is active, each AIS target is marked with a symbol that indicates the target's status. For the meaning of each AIS symbol, see "AIS symbols" on page AP-44.

Note 1: The equipment continues to process AIS targets when the AIS feature is deactivated. When the AIS is activated again, symbols are immediately displayed.

Note 2: AIS symbols are momentarily erased and the screen is redrawn after the heading is changed in the HEAD UP mode.

Note 3: When no AIS data is received, the message "LOST AIS COM" appears in the Alert Box. Check connection with the AIS transponder.

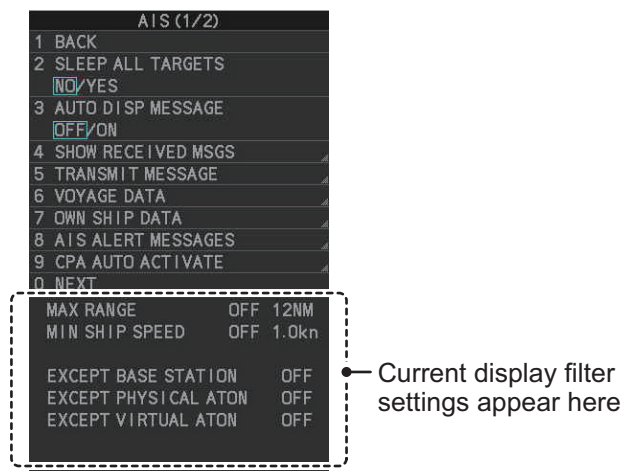
When the AIS function is disabled: Above message is prioritized as a Caution level alert for IMO/R-types. A/B/W-types do not show this alert.

When the AIS function is active: Above message is prioritized as a Warning level alert for all radar types.

4.5 How to Use the AIS Display Filter

If there are too many AIS targets on the screen you may wish to remove unnecessary ones. You can remove sleeping targets class A/B by distance from own ship, speed and class. For example, you might want to remove slow moving targets, as they normally do not require close monitoring.

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].

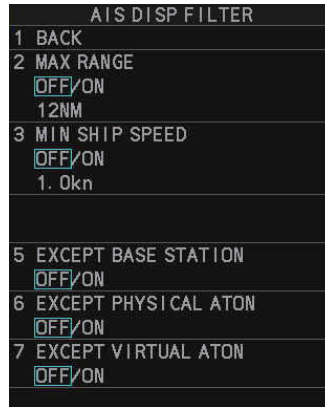


Note: You can also right-click the AIS indication in the [TT•AIS] box to open the [TT] menu.

4. Select [0 NEXT] to show the next menu page.



5. Select [2 AIS DISP FILTER].



6. Referring to the table below, select the appropriate filter.

Filter type	Definition
[MAX RANGE]	Any sleeping AIS targets class A/B beyond the range set here will not be shown.
[MIN SHIP SPEED]	Any sleeping AIS targets class A/B slower than this setting will not be shown.
[EXCEPT CLASS B]*	Select [ON] to remove sleeping AIS targets class B.
[EXCEPT BASE STATION]	Select [ON] to remove the BASE STATION symbol.
[EXCEPT PHYSICAL ATON]	Select [ON] to remove the AIS PHYSICAL ATON symbol.
[EXCEPT VIRTUAL ATON]	Select [ON] to remove the AIS VIRTUAL ATON symbol.

*: This menu item appears only on B/W-type radars.

7. Do one of the following depending on your selection at step 6.
- [MAX RANGE]: Select [ON], spin the scrollwheel to set the maximum range (00 to 99 NM), then click to confirm selection.
 - [MIN SHIP SPEED]: Select [ON], spin the scrollwheel to set the minimum speed (0.0 to 9.9 kn), then click to confirm selection.
 - [EXCEPT CLASS B], [EXCEPT BASE STATION], [EXCEPT PHYSICAL ATON], [EXCEPT VIRTUAL ATON]: Select [ON] to hide the corresponding AIS target.

8. Close the menu.

Set the AIS display mode to [DISP FILT] to show only the AIS symbols selected for display on the [AIS DISP FILTER] menu.

Note: This function is not available for an activated target.

4.6 How to Activate AIS Targets

When you convert a sleeping target to an activated target, that target's course and speed are shown with a vector. You can easily judge target movement by monitoring the vector.

Sleeping targets within an acquisition zone are automatically changed to activated targets and are colored red. See section 3.15 for how to use acquisition zones.

4.6.1 How to activate specific targets manually

Note: Enable target data and acquisition beforehand.

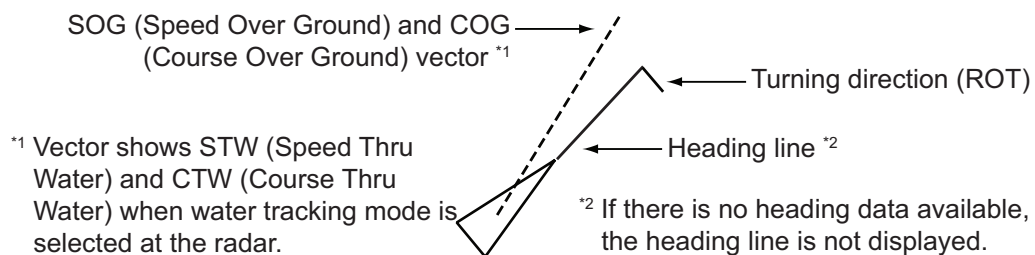
Right click to show the [CURSOR] menu→[0 NEXT]→[TGT DATA/ACQ SETTING]→[ANY] or [AIS ONLY].

Activate an AIS target from the control unit (RCU-014)

Put the cursor on the symbol of the AIS target to activate, then press the **TARGET DATA** key.

Activate an AIS target from the trackball unit

Place the cursor on the target you wish to activate for AIS tracking, then press the **left button**.



4.6.2 How to set the AIS auto activate function

You can limit the function of the AIS auto activate function by distance from own ship, ship's speed, ship class, and ship's length.

How to set the AIS auto activate function

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Select [9 CPA AUTO ACTIVATE] to show the [CPA AUTO ACTIVATE] menu.
5. Referring to the table below, select the appropriate filter.

CPA AUTO ACTIVATE	
1	BACK
2	MAX RANGE OFF/ON 00NM
3	MIN SHIP SPEED OFF/ON 1. 0kn
4	EXCEPT CLASS B OFF/ON

Filter type	Definition
[MAX RANGE]	Any AIS targets beyond the range set here will not be automatically activated.
[MIN SHIP SPEED]	Any AIS targets slower than this setting will not be automatically activated.
[EXCEPT CLASS B]	Select [ON] to prevent activation of AIS targets class B.

6. Do one of the following depending on your selection at step 5.
 - [MAX RANGE]: Select [ON], spin the scrollwheel to set the maximum range (00 to 99 N), then click to confirm selection.
 - [MIN SHIP SPEED]: Select [ON], spin the scrollwheel to set the minimum speed (0.0 to 9.9 kn), then click to confirm selection.
 - [EXCEPT CLASS B], [EXCEPT BASE STATION], [EXCEPT PHYSICAL ATON], [EXCEPT VIRTUAL ATON]: Select [ON] to hide the corresponding AIS target.
7. Close the menu.

How to enable/disable the AIS auto activate function

Use the [CPA AUTO ACTIVATE] box at the bottom right corner to enable or disable the AIS auto activate function.

TT AUTO >	< AIS DISP	FILT >
VECTOR	3min	REL
CPA/TCPA	0.5NM	3min
AIS CPA	OFF	
LOST TGT	OFF	
PAST POSN	30sec	TRUE-G
TRAIL > 00:00	OFF	

Place the cursor on the [CPA AUTO ACTIVATE] box, then left-click to cycle through the auto activate settings.

Filter type	Definition
[OFF]	Disable the AIS auto activate function.
[AUTO ACT FILT]	Activation against AIS targets which meet the following criteria: • AIS target that meets the criteria set with [CPA AUTO ACTIVATE] on the [TT•AIS] menu. • CPA or TCPA of an AIS target is smaller than that set in section 3.15.

Filter type	Definition
[AUTO ACT ALL]	Activation against AIS targets whose CPA or TCPA is less than set in section 3.15

4.7 How to Sleep AIS Targets

You can “sleep” an AIS target as below when the screen becomes filled with radar echoes and TTs, which might prevent important radar and AIS displays from being identified.

Note: Dangerous targets and targets that have been activated automatically cannot be “slept”.

4.7.1 How to sleep individual AIS targets

Note: Enable target data and acquisition beforehand.

Right click to show the [CURSOR] menu→[0 NEXT]→[TGT DATA/ACQ SETTING]→[ANY] or [AIS ONLY].

Sleep a AIS target from the control unit keyboard (RCU-014)

Place the cursor on the symbol of the AIS target to sleep, then press the **TARGET CANCEL** key.

Sleep a AIS target with the trackball

1. Place the cursor inside the operational display area, then right-click. The [CURSOR] menu appears.
2. Select [TARGET CANCEL].
3. Place the cursor on the symbol of the AIS target to sleep, then click.

4.7.2 How to sleep all AIS targets

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Select [2 SLEEP ALL TARGETS].
5. Select [YES] or [NO] as appropriate.
6. Close the menu.

4.8 How to Set Up For a Voyage

At the start of a voyage, following five items must be input from the [VOYAGE DATA] menu: navigational status, ETA, destination, draught and crew.

4.8.1 How to access the [VOYAGE DATA] menu

There are two methods by which you can access the [VOYAGE DATA] menu: from the InstantAccess bar™, or from the menu. The following procedure shows the menu method. If you click the [OWN AIS] button on the lower half of the InstantAccess bar™, skip to step 5 in the below procedure.

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Select [6 VOYAGE DATA].

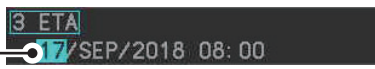
VOYAGE DATA	
1	BACK
2	NAV STATUS 05 MOORED
3	ETA --/---/---- --:--
4	DESTINATION
5	DRAUGHT 0. 0m
6	PERSONS 0000
7	OPEN DESTINATION 1
8	SAVE DESTINATION 1

5. Select [2 NAV STATUS].
6. Spin the scrollwheel to select the navigation status number, then left-click.

Nav Status No.	Meaning
00	UNDERWAY USING ENGINE
01	AT ANCHOR
02	NOT UNDER COMMAND
03	RESTRICTED MANEUVERABILITY
04	CONSTRAINED BY HER DRAUGHT
05	MOORED (DEFAULT)
06	AGROUND
07	ENGAGED IN FISHING
08	UNDER WAY SAILING
09	RESERVED FOR HIGH SPEED CRAFT (HSC)
10	RESERVED FOR WING IN GROUND (WIG, FOR EXAMPLE, HYDROFOIL)
11	POWER-DRIVEN VESSEL (AHEAD/ASTERN)
12	POWER-DRIVEN VESSEL (AHEAD/ALONGSIDE)
13	RESERVED FOR FUTURE USE
14	SART ACTIVE
15	UNDEFINED

4. AIS OPERATION

7. Select [3 ETA].
8. Spin the scrollwheel to set the estimated day of the month to arrive, then left-click.

Currently selected digit is  highlighted by the cursor.
Spin the scrollwheel to adjust the day.
Left-click to move to the next digit.

9. Select [4 DESTINATION], then left-click. The software keyboard appears.
10. Use the trackball to highlight a letter or digit on the software keyboard, then left-click. Repeat until the destination name is entered. (Max. 20 characters)
11. Use the trackball to highlight [END] on the software keyboard, then left-click.
12. Spin the scrollwheel to assign a destination number (1 to 10) to the destination entered at step 9, then left-click. The next time you use this place as your destination, simply select the corresponding destination number.
13. Select [5 DRAUGHT].
14. Spin the scrollwheel to set the ship's draught (0.0 to 25.5 m), then left-click.
15. Select [6 PERSONS].
16. Spin the scrollwheel to set the number of people on-board (0000 to 8191), then left-click.
17. Close the menu.

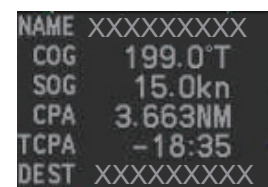
4.9 How to Display AIS Target Data

You can display an AIS target's data by selecting it on the display, when the AIS function is set for [DISP FILT] or [DISP ALL].

4.9.1 AIS pop-up information

The AIS pop-up shows abbreviated AIS data (Vessel name, COG, SOG, CPA, TCPA and destination*) for the selected AIS target. Simply put the cursor on the AIS target to show the pop-up.

*: Destination appears for Class A targets only.



Pop-up AIS data

Note: When the received AIS sentence does not contain certain data, the appropriate section of the pop-up shows "missing".

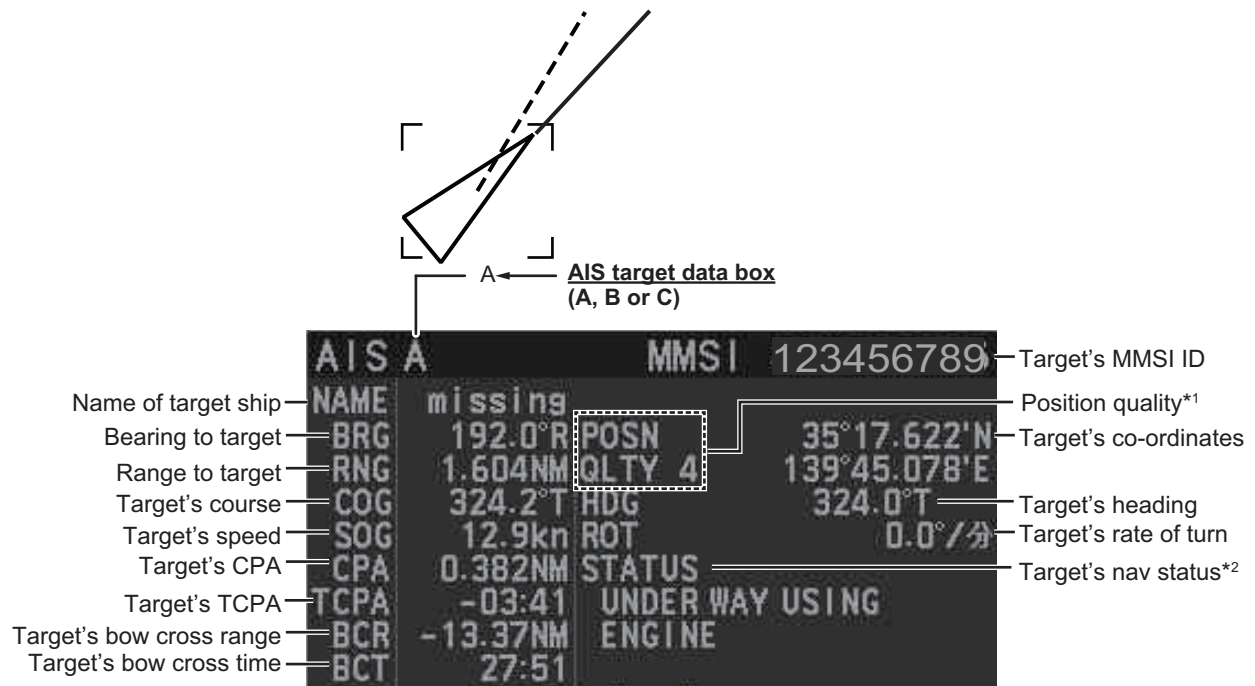
The pop-up can be enabled or disabled with the following procedure.

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [4 TT•AIS SYMBOL].
4. Select [8 AIS POP UP INFO].
5. Select [ON] or [OFF] as appropriate.
6. Close the menu.

TT•AIS SYMBOL	
1	BACK
2	TT•AIS SYMBOL COLOR GRN/BLU/CYA/MAG/WHT
3	ATON SYMBOL COLOR GRN/BLU/CYA/MAG/WHT
4	AIS ROT TAG LIMIT 000. 0°/min
5	TT•AIS PAST POSN PTS 5/10
6	AIS SCALED SYMBOL OFF/ON
7	TT POP UP INFO OFF/ON
8	AIS POP UP INFO OFF/ON

4.9.2 How to display basic AIS target data

Place the cursor on a desired AIS target and press the **TGT ACQ** key. The target is highlighted with a square box and the selected AIS target's data is shown in AIS target data box inside the information box, on the right side of the screen.



*1: Position quality indicates overall accuracy, and is calculated and displayed as shown below.

POSN QLTY value	Position accuracy
1	Position > 10 m
2	Position with RAIM > 10 m
3	Position ≤ 10 m
4	Position with RAIM ≤ 10 m

*2: For Class B targets, "CLASS B" appears in place of nav status.

4.9.3 How to display expanded AIS target data

The expanded AIS data display provides additional information about an AIS target, including call sign, IMO No., etc. To display expanded AIS data, show the basic data for a target, then left-click the target data display. The expanded data appears.

EXPANDED DATA	
Vessel name	NAME 12345678901234567890
Call sign	CALL SIGN 1234567
Position	LAT 35°22.604'N LON 139°42.153'E
Type of position sensor	POSN SENSOR GPS GLONASS
Position accuracy	POSN ACC HIGH
Navigation status	STATUS POWE-DRIVEN VESSEL (AHEAD/ALONGSIDE)
MMSI number	MMSI No. 123456789
IMO number	IMO No. 123456789
Vessel dimensions	SHIP LENGTH 72m
	SHIP WIDTH 11m
	SHIP DRAUGHT 25.4m
Destination	DESTINATION 12345678901234567890
ETA at destination	ETA 23:59 31/DEC
AIS transponder version	AIS VERSION 1
Association (ON or OFF)	ASSOCIATION OFF
Ship and cargo type	SHIP AND CARGO TYPE CARGO SHIPS ALL SHIPS OF THIS TYPE
Repeat indicator	REPEAT INDICATOR 1

Note: Navigation status is not available for Class B targets. Where the selected AIS target is an aircraft, the [STATUS] box shows the aircraft's altitude.

If data for an item is unknown, "missing" appears.

4.9.4 How to remove target data from the display area

Place the cursor on a desired tracked target and press the **TARGET CANCEL** key. The select target's data is no longer displayed in the data display area.

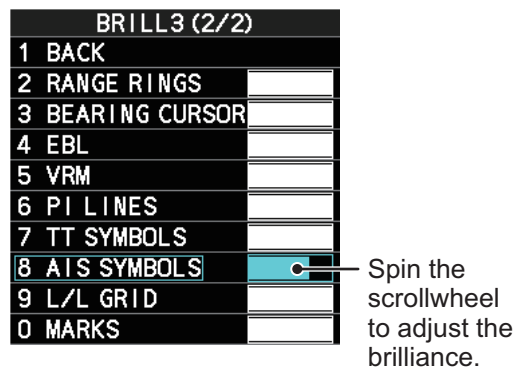
4.10 How to Change AIS Symbol Attributes

To change the brilliance, size and color of AIS symbols follow the appropriate procedure in this section.

4.10.1 How to adjust the AIS symbol brilliance

Note: The brilliance of the AIS symbols can be adjusted from the [PLT] button on the Instant Access bar™. See section 1.45.1.

1. Open the menu.
2. Select [9 INITIAL SETTINGS].
3. Select [2 BRILL]. The [BRILL] menu appears.
4. Select [0 NEXT] to show the next menu page.
5. Select [8 AIS SYMBOLS]. The settings are highlighted and can now be adjusted.



6. Spin the scrollwheel to select the desired brilliance, then left-click to apply the setting.
7. Close the menu.

4.10.2 How to change the color of the AIS symbol

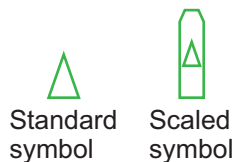
1. Open the menu.
2. Select [5 TT•AIS].
3. Select [4 TT•AIS SYMBOL].
4. Select [2 TT•AIS SYMBOL COLOR].
5. Select the appropriate color.
6. Close the menu.

4.10.3 How to change the color of the ATON symbol

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [4 TT•AIS SYMBOL].
4. Select [3 ATON SYMBOL COLOR].
5. Select the appropriate color.
6. Close the menu.

4.10.4 How to change the size of the AIS symbol

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [4 TT•AIS SYMBOL].
4. Select [6 AIS SCALED SYMBOL].
5. Select [OFF] or [ON] as appropriate.
[OFF]: All AIS symbols are displayed in the same size.
[ON]: AIS symbols are displayed in scale, according to the ship length.



The figure above shows examples of standard and scaled symbols.

6. Close the menu.

4.11 Past Position Display

The past position display shows equally time-spaced dots marking past positions of activated AIS targets. A new dot is added at preset time intervals until the preset number is reached. If a target changes its speed, the spacing will be uneven. If it changes course, its plotted course will not be a straight line.

Below are examples of past position displays.



(a) Ship turning

(b) Ship running straight

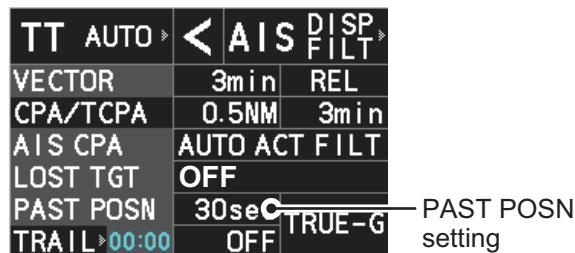
(c) Ship reduced speed

(d) Ship increased speed

4.11.1 How to display past position points and select the plotting interval

Select the [PAST POSN] setting, then left-click to cycle through the following settings.

[OFF] → [30sec] → [1min] → [2min] → [3min] → [6min] → [OFF]...



The past positions are displayed in accordance with the selected setting.

4.11.2 How to select the number of past position points to be displayed

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [4 TT•AIS SYMBOL].
4. Select [5 TT•AIS PAST POSN POINTS].
5. Select [5] or [10] as appropriate.
6. Close the menu.

4.11.3 Past position display orientation

Past position orientation, true or relative, is controlled with [TRAIL MODE] in the [TRAIL] context menu. To adjust the trail orientation, see section 1.37.1.

4.11.4 Stabilization in true motion

True motion past position display can be ground stabilized or sea stabilized. The [TRAIL] box shows current stabilization as "TRUE-G" or "TRUE-S". To change stabilization mode, open the [SHIP SPEED MENU] menu and set [SHIP SPEED] to [LOG(BT)] (ground stabilization) or [LOG(WT)] (sea stabilization).

4.12 Lost Target

A target is declared a lost target when it fails to produce data for six minutes or five reporting intervals, whichever is the shorter. When this occurs, the target is marked with the (flashing) lost target symbol and the message "AIS TARGET LOST" appears in the Alert Box. To acknowledge a lost target, press the **ALARM ACK** key, or use the trackball to select the [ALERT] box then press the **left button**.

4.12.1 How to set the lost target filter

If there are a lot of AIS targets in your area, the lost target alert can sound frequently. In this case you may wish to have the alert ignore lost targets whose range, speed, class or length are below the threshold value you specify.

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Select [0 NEXT].
5. Select [3 AIS LOST TGT FILTER].
6. Referring to the following table, select the appropriate filter.

AIS LOST TGT FILTER	
1	BACK
2	MAX RANGE OFF/ON 12NM
3	MIN SHIP SPEED OFF/ON 1. 0kn
4	EXCEPT CLASS B OFF/ON

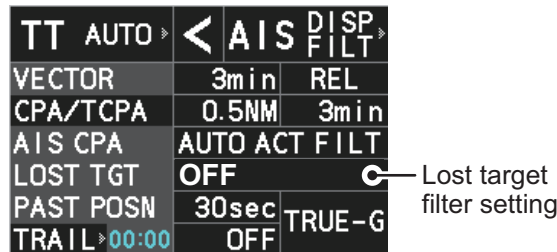
Filter type	Definition
[MAX RANGE]	Any AIS targets beyond the range set here will not trigger the lost target alert.
[MIN SHIP SPEED]	Any AIS targets slower than this setting will not trigger the lost target alert.
[EXCEPT CLASS B]	Select [ON] to prevent class B AIS targets from triggering the lost target alert.

7. Select [ON] to activate the filter, or select [OFF] to deactivate the filter. The setting range for [MAX RANGE] and [MIN SHIP SPEED] are listed below.
 - [MAX RANGE]: [00NM] to [99NM]
 - [MIN SHIP SPEED]: [0.0kn] to [9.9kn]
8. Spin the scrollwheel to adjust the setting as required, then left-click to apply the setting.
9. Close the menu.

4.12.2 How to enable/disable the lost target alert

The [LOST TARGET] box, located at the bottom-right corner of the screen, enables and disables the lost target alert.

Select the box with the cursor, then left-click to cycle through the settings in the following order: [OFF] → [FILT] → [ALL] → [OFF]...

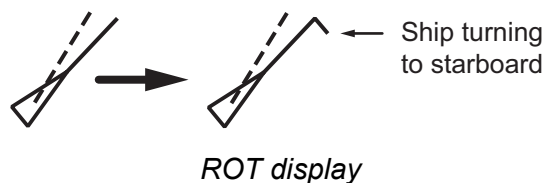


- [OFF]: Disable the alert.
- [FILT]: Enable the alert for all lost targets, excluding filtered targets.
- [ALL]: Enable the alert for all lost targets, including filtered targets.

Note: The filter setting is applied to both TT and AIS lost targets.

4.13 ROT Setting

You can set the lower limit of the ROT (Rate Of Turn) at which the heading line on target symbols will point in direction which the vessel is turning.



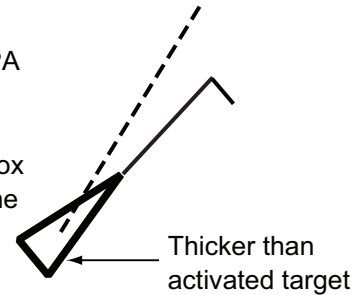
1. Open the menu.
2. Select [5 TT•AIS].
3. Select [4 TT•AIS SYMBOL].
4. Select [4 AIS ROT TAG LIMIT], then left-click. The settings can now be adjusted.
5. Spin the scrollwheel to adjust the ROT as appropriate, then left-click. The setting range is 000.0°/min to 720.0°/min.
6. Close the menu.

4.14 AIS Collision Alarm (CPA, TCPA)

This radar calculates CPA and TCPA by using own ship and relative target positions. An AIS dangerous target is one whose CPA and TCPA are within the range of the CPA and TCPA limits set in the TT/AIS box. The AIS symbol of an AIS dangerous target is red and flashing, and is announced with the Alert "CPA/TCPA". After the alert is acknowledged the target symbol is displayed in red color.

Dangerous target

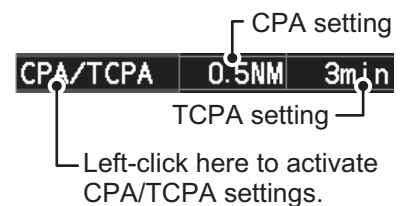
When a sleeping or an activated target violates the CPA/TCPA alarm setting its symbol changes to the dangerous target symbol (red and flashing) and the message "CPA/TCPA" appears. Press the **ALARM ACK** key (or click the [ALERT] box with the left button) to acknowledge the CPA/TCPA alarm. The audible alarm is silenced and the symbol stops flashing. Take appropriate action to avoid collision.



4.14.1 How to set the CPA and TCPA ranges

CPA and TCPA ranges can be adjusted from the appropriate indication in the [TT] box.

1. Left-click the [CPA/TCPA] indication to activate the feature.
2. Place the cursor on the indication you wish to adjust.
3. Left-click, or spin the scrollwheel, to adjust the settings as required. The settings options are outlined in the table below.



Indication	Method	Settings options
CPA	Left-click	0.5, 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0 (NM)
	Scrollwheel	0.1 to 20; 0 to 10 in 0.1 NM increments, 1 NM increments thereafter
TCPA	Left-click	1, 2, 3, 4, 5, 6, 12, 15 (minutes)
	Scrollwheel	1 to 60 minutes in 1-minute increments

4.15 How to Associate TT and AIS Targets

An AIS-equipped ship is usually displayed by two symbols on the radar display. This is because the AIS ship position is measured by a GPS navigator (L/L) whereas the radar detects the same ship by PPI principle (range and bearing relative to own ship radar antenna).

To avoid the presentation of two target symbols for the same physical target, use the "association" function. If target data from both AIS and TT are available and if the association criteria are fulfilled, either the AIS or TT symbol is presented according to the association method selected.

Association will not happen between AIS and TT if the AIS target is sleeping or the AIS target is lost.

1. Confirm that the [TT ACQ MODE] indication shows "AUTO", "AUTO MAN" or "MAN".

TT ACQ MODE
indication



2. Open the menu.
3. Select [5 TT•AIS].
4. Select [7 TARGET ASSOCIATION].
5. Select [2 ASSOCIATION TGT TYPE].
6. Select [OFF], [AIS] or [TT], as appropriate, to select which symbols and data to display when the association criteria are met.

[OFF] : Disable association.

[AIS] : Use AIS symbols and AIS data.

[TT] : Use TT symbols and TT data.

Note: Association can also be switched on and off from the screen by left-clicking the Association Usage icon, shown below.

TARGET ASSOCIATION	
1	BACK
2	ASSOCIATION TGT TYPE OFF/AIS/TT
3	GAP 0. 050NM
4	RANGE 0. 100NM
5	BEARING 9. 9°
6	SPEED 6. 0kn
7	COURSE 25. 0°



Left-click the association icon to change the association setting.

>: Use TT Symbols and data.

<: Use AIS symbols and data.

No indication: Association is disabled.

7. Referring to the list below, set the association criteria. Spin the scrollwheel to adjust the value, then left-click to confirm the setting.
 - [3 GAP]** : Range between AIS target and tracked target.
(setting range: 0.000-0.050 (NM))
 - [4 RANGE]** : Range direction difference from own ship to AIS target and tracked target. (setting range: 0.000-0.100 (NM))
 - [5 BEARING]** : Bearing difference from own ship to AIS target and tracked target. (setting range: 0.0-9.9 (°))
 - [6 SPEED]** : Speed difference between AIS target and tracked target. (setting range: 0.0-6.0 (kn))
 - [7 COURSE]** : Course difference between AIS target and tracked target. (setting range: 0.0-25.0 (°))
8. Close the menu.

4. AIS OPERATION

When the association criteria (gap, range, bearing, speed, and course) is met, and the ASSOCIATION TARGET setting is [AIS], the TT symbol is erased and only the AIS symbol is displayed.

All default association settings are restored whenever the power is turned on.

To show the association information, place the cursor on the target data box at the right side of the screen, then press the **ACQ** key. The selected target's AIS and TT data are displayed together as shown in the examples below.

TT/AIS DATA		
	TT	AIS
	001	A
BRG	085.1°R	085.1°R
RNG	2.377NM	2.377NM
T COG	085.1°R	085.1°R
T SOG	34.0kn	34.0kn
CPA	2.377NM	2.377NM
TCPA	00:00	00:00
BCR	2.377NM	2.377NM
BCT	00:00	00:00
AIS		
NAME		
12345678901234567890		
MMSI No. 123456789		
LAT 12°34.567'N		
LON 123°45.678'E		
HDG 359.9°		
ROT +359.9°/min		
STATUS		
POWER-DRIVEN VESSEL		
(AHEAD/ALONGSIDE)		

Combined TT/AIS data
for a CLASS A vessel

TT/AIS DATA		
	TT	AIS
	001	A
BRG	085.1°R	085.1°R
RNG	2.377NM	2.377NM
T COG	085.1°R	085.1°R
T SOG	34.0kn	34.0kn
CPA	2.377NM	2.377NM
TCPA	00:00	00:00
BCR	2.377NM	2.377NM
BCT	00:00	00:00
AIS		
NAME		
12345678901234567890		
MMSI No. 123456789		
LAT 12°34.567'N		
LON 123°45.678'E		
CLASS B		

Combined TT/AIS data
for a CLASS B vessel

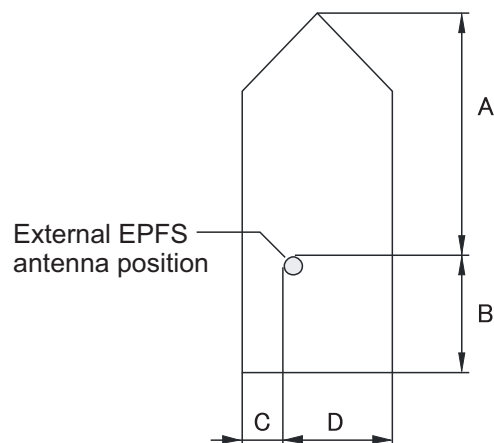
4.16 How to View Own Ship Data

Own ship's static data (type of ship, call sign, etc.) can be viewed as follows:

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Select [7 OWN SHIP DATA]. The [OWN SHIP DATA] menu appears.

OWN SHIP DATA	
1 BACK	
Name of your ship	NAME FURUNOMARU
Ship's callsign	CALLSIGN AZ1234567
Current location	LAT 35°15.004'N
	LON 139°46.360'E
Course/Speed	COG 180.0°T
	SOG 12.9kn
Heading/Rate of Turn	HDG 180.0°T
	ROT 0.0°/min
Positioning source and quality of positioning data	POSN SENSOR INTERNAL GNSS
	POSN QLT 4
Ship's MMSI number	MMSI No. 431008509
Ship's IMO number	IMO No. 009791119
Ship's dimensions	SHIP LENGTH 149m
	SHIP WIDTH 24m
	SHIP DRAUGHT 6.8m
External EPFS device's installation location	EXT EPFS ANT POSN A: 028 B: 121m
	C: 06 D: 18m
AIS transponder version	AIS VERSION 1
Ship and cargo type	SHIP AND CARGO TYPE
	CARGO SHIPS
	ALL SHIPS OF THIS TYPE

Note: The indications "A", "B", "C" and "D" at [EXT EPFS ANT POSN] show the location of the external EPFS antenna, calculated in the following manner:



5. Close the menu.

4.17 How to Use AIS Messages

You can transmit and receive messages via the AIS, to a specified destination (MMSI) or all ships in the area. Messages can be sent to warn of safety of navigation, for example, an iceberg sighted. Routine messages are also permitted.

Short safety related messages are only an additional means to broadcast safety information. They do not remove the requirements of the GMDSS.

4.17.1 How to create and save messages

Up to ten messages can be saved at any time. To create and save a message, do the following:

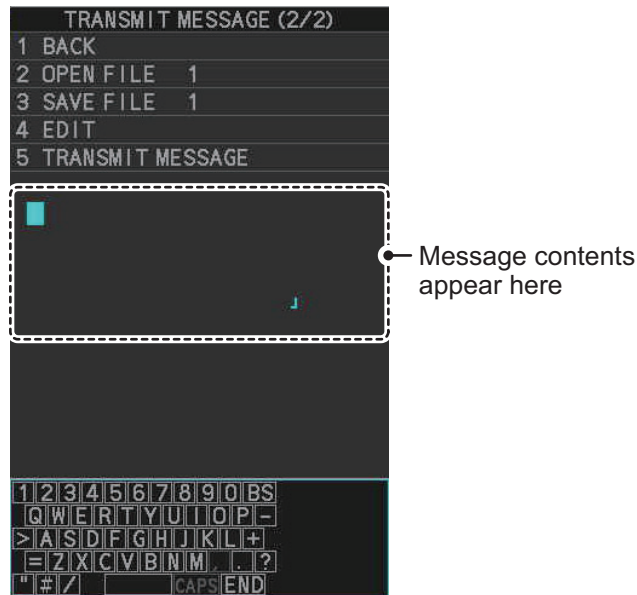
Note: The MMSI of the receiving ship can be automatically set by selecting [TRANSMIT MESSAGE] from the pop up menu. To show the pop up menu, select the receiving ship's data in the AIS data display area, then press the **right button**.

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Select [5 TRANSMIT MESSAGE].

TRANSMIT MESSAGE (1/2)	
1	BACK
2	ADDRESS TYPE ADDRESSED/BROADCAST
3	MESSAGE TYPE SAFETY/BINARY
4	MMSI NO. 000000000
5	CHANNEL A/B/A or B/A and B
0	NEXT

5. Select [2 ADDRESS TYPE].
6. Select [3 MESSAGE TYPE].
7. Select [SAFETY] (for safety messages) or [BINARY] (for routine messages).
8. For [ADDRESSED] message, do this step. For [BROADCAST] message, or if [TRANSMIT MESSAGE] was selected from the AIS data display pop up menu, go to step 8.
 - 1) Select [4 MMSI No.].
 - 2) Use the number keys to set the receiving ship's MMSI.
9. Select [5 CHANNEL].
10. Select the AIS channel to transmit your message over: [A], [B], [A or B], or [A and B].
11. Select [0 NEXT] to show the next menu page.
12. Select [4 EDIT]. A software keyboard appears at the bottom of the menu.
13. Select the character desired, then left-click.
The maximum of 80 characters can be entered for the message.

14. Select [END] to complete message input, then left-click.



15. Select [3 SAVE FILE].
16. Spin the scrollwheel to select the appropriate number, then left-click.
17. Close the menu.

4.17.2 How to transmit messages

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Do one of the following:
 - a) Create a message, as described in subsection 4.17.1.
 - b) Use a file saved in the memory by selecting [5 TRANSMIT MESSAGE] followed by [2 OPEN FILE] from the second page of the [TRANSMIT MESSAGE] menu.
5. Select [5 TRANSMIT MESSAGE] from the second page of the [TRANSMIT MESSAGE] menu to transmit the message.
During transmission, the message "AIS TRANSMITTING" appears in the guidance box. The message disappears when the message is sent successfully. "AIS MSG SEND ERR" appears in the alert box if an error occurred while transmitting the message.
6. Close the menu.

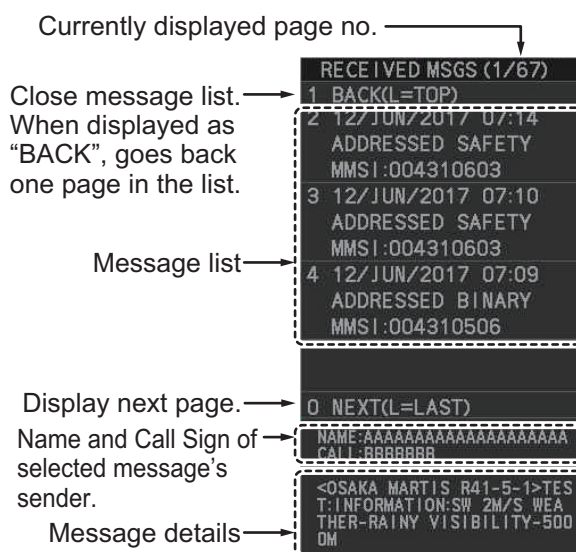
4.17.3 How to view messages

When an AIS message is received, the system automatically stores the message in the message list. If [AUTO DISP MESSAGE] in the [AIS TARGET MENU] is set to [ON], the envelope icon on the [AIS message] button, on lower half of the InstantAccess bar™, changes to a blue color to indicate a new, unread message is stored.

The system stores up to 200 AIS messages. When the storage capacity is reached the oldest AIS message is automatically erased to make room for the latest. Note that only received messages are backed up when the power is turned off. AIS alert messages are not backed up.

You can access the received messages from the InstantAccess bar™, or from the menu. The following procedure shows the menu method. **If you click the [AIS message] button on the lower half of the InstantAccess bar™, skip to step 5.**

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Select [4 SHOW RECEIVED MSGS].
5. Select the message to be displayed, then left-click.
6. The message details are displayed below the message list.
7. Close the menu.



4.17.4 How to set up the AIS message notification

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Select [3 AUTO DISP MESSAGE].
5. Select [ON] to show the received message indication (blue envelope icon) when a new message is received, [OFF] to disable the notification.



No unread messages,
or [3 AUTO DISP MESSAGE]
is set to [OFF].



[3 AUTO DISP MESSAGE] is
set to [ON] and at least one
unread message is stored.

6. Close the menu.

4.17.5 How to display AIS alert messages

The AIS transponder outputs various alert messages. To view the alert list:

1. Open the menu.
2. Select [5 TT•AIS].
3. Select [5 AIS].
4. Select [8 AIS ALERT MESSAGES].
5. Select the message to display.
6. Close the menu.



Message contents
appear here

4.18 AIS System Messages

AIS system messages are displayed at the bottom right corner of the screen. The table below shows the AIS system messages, their alert priority and their meanings.

Message	Priority	Meaning
CPA/TCPA	Alarm	CPA and TCPA of an activated AIS target are below value set on the menu.
AIS NEW TARGET	Warning	AIS target has entered an acquisition zone.
AIS TARGET LOST	Warning	Lost target. An activated target is declared a lost target when it fails to produce data for six minutes or five reporting intervals, whichever is the shorter.
AIS DISPLAY FULL	Warning	The radar only displays the closest 350 AIS targets from own ship.
ACTIVE AIS FULL	Warning	Number of active AIS targets has reached 50.
LOST AIS COM	Warning	Not receiving AIS data from own AIS (VDO message). Note: When no AIS data is received, the message "AIS COM ERROR" appears in the Alert Box. Check connection with the AIS transponder. When the AIS function is disabled: Above message is prioritized as a Caution level alert for IMO/A/R-types. B/W-types do not show this alert. When the AIS function is active: Above message is prioritized as a Warning level alert for all radar types.
AIS CAPACITY 95%	Caution	Number of AIS targets has reached 1140. (Appears for R-types only.)
AIS CPTY FULL	Caution	Number of AIS targets has reached 1200. (Priority is set to Warning for R-types.)
AIS DISPLAY 95%	Caution	Number of displayed AIS targets has reached 333.
ACTIVE AIS 95%	Caution	Number of active AIS targets has reached 48.
AIS MSG SEND ERR	Caution	Could not send AIS message.

5. VIDEO PLOTTER OPERATION

The video plotter has the following functions:

- Enter waypoints (up to 198) and marks.
- Creates and displays radar maps.
- Own ship track plotting.
- Display charts and chart-related information (requires a valid chart card).

5.1 Orientation Modes

Six orientation modes are available: [HEAD UP RM], [STAB HEAD UP RM],[STERN UP RM], [COURSE UP RM], [NORTH UP RM], [NORTH UP TM] (True Motion).

Note 1: The [STERN UP RM] orientation mode is only available if it has been set to [ON] in [STERN UP RM] in the [INITIAL SETTING] → [OPERATION] menu.

Note 2: The screen may flash when the heading is changed more than one degree in the [HEAD UP RM] or [STAB HEAD UP RM] mode.

Automatic resetting of own ship mark in true motion mode

In the true motion mode, the own ship mark is automatically returned stern-ward 75% from the screen center when it reaches a location 50% of the display radius.

To select an orientation mode, see section 1.30.

Marks can be entered at any location inside the operational display area, however, no mark can be entered at the location of an on-screen box. A total of 20,000 marks can be inscribed at any one time.

5.2 How to select a mark type

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, this menu appears as [2 MARKS•CHART].
3. Select [5 RADAR MAP].
The [RADAR MAP] menu appears.
Note: You can also right-click the [MARK] box to open the [RADAR MAP] menu.
4. Select [3 MARK TYPE].
5. Select the appropriate type of marker, referring to the list below.
 - [ORIGIN MARK(No.)]: Inscribes the standard origin mark symbol (◆), with mark number (1 to 10). For detailed information regarding origin marks, see section 5.5.

RADAR MAP (1/2)	
1 BACK	
2 ORIGIN MARK STAB	
[GND]/SEA	
3 MARK TYPE	
[ORIGIN MARK(No.)]/	
ORIGIN MARK(SYM)/	
MAP MARK/	
WP 1~ 50/	
WP 51~100/	
WP101~150/	
WP151~198/	
OWN SHIP SHAPE	
4 MARK POSITION	
[CURSOR]/OS/L/L	
*****N	
*****E	
RADAR-MAP	20/20000
OWN TRACK	41/20000
0 NEXT	

5. VIDEO PLOTTER OPERATION

- [ORIGIN MARK(SYM)]: Inscribes an origin mark symbol, with no mark number. You can set one of the following symbols as the origin mark. See section 5.5 for details.



- [MAP MARK]: Inscribes the selected map mark.
 - [WP1-50], [WP51-100], [WP101-150], [WP151-198]: Inscribes a waypoint marker number within the selected range. For detailed information regarding waypoints, see section 5.9.
 - [OWN SHIP SHAPE]: Inscribes a mark with the same shape as own ship. For detailed information regarding the own ship mark, see section 5.6.
6. Close the menu.

5.3 How to select the mark inscription position

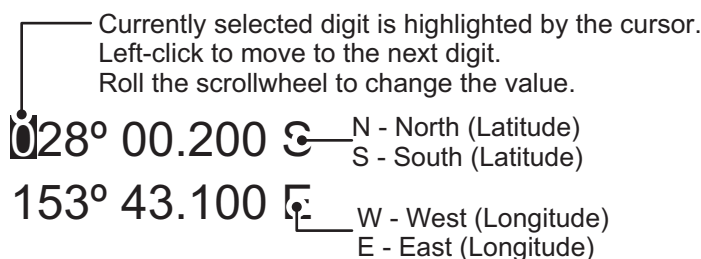
You can select the location at which the marker is inscribed.

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, this menu appears as [2 MARKS•CHART].
3. Select [5 RADAR MAP].
The [RADAR MAP] menu appears.
Note: You can also right-click the [MARK] box to open the [RADAR MAP] menu.
4. Select [4 MARK POSITION].
5. Referring to the table below, select the appropriate location.

Location	Description
[CURSOR]	You can select the location using the Control Unit.
[OWN SHIP]	Marker is placed at own ship position.
[L/L]	Marker is placed at the co-ordinates selected.

How to set the co-ordinates

Where [4 MARK POSITION] is set to [L/L], the co-ordinates settings are displayed. Co-ordinates can be set one digit at a time, as shown in the figure below.



- 1) Spin the scrollwheel to change the value, then left-click to move to the next digit.
 - 2) Repeat step 1 to adjust the Latitude and Longitude as appropriate.
6. Close the menu.

5.4 Radar Map

A radar map is a combination of map lines and symbols whereby the user can define and input the navigation data, route planning and monitoring data. The radar map can contain 20,000 points of data. Inscribed marks are retained when the power is turned off.

The radar map is referenced to the WGS-84 datum and appears only when there is valid position data input. The radar map does not affect any radar functions.

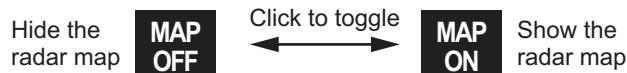
Note: The location and orientation of mark symbols and mark lines can change, depending on the display presentation mode, as shown in the table below.

Presentation mode	Mark symbol	Mark line
HEAD UP RM STERN UP RM STAB HEAD UP RM	Location is changed according to heading and own ship position. Orientation is unchanged.	Location and orientation are changed according to heading and own ship position.
COURSE UP RM NORTH UP RM NORTH UP TM	Location is changed according to own ship position. Orientation is unchanged.	Location and orientation are changed according to own ship position.

5.4.1 How to show/hide radar map marks

You can show or hide marks on the radar map.

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, this menu appears as [2 MARKS•CHART].
3. Select [5 RADAR MAP].
The [RADAR MAP] menu appears.
Note: You can also right-click the [MARK] box to open the [RADAR MAP] menu.
4. Select [0 NEXT] to show the next menu page.
5. Select [2 MAP DISPLAY].
6. Select [ON] or [OFF] as appropriate.
Note: You can also show/hide the radar map marks from the Radar Map button on the InstantAccess bar™.



7. Close the menu.

5.4.2 How to select the mark color (B/W-type only)

type radars of this series allow the change of mark colors. For all other types, the color is fixed and cannot be changed.

1. Open the menu.
2. Select [2 MARKS].
For B/W-types with Radar Plotter functionality, this menu appears as [2 MARKS•CHART].
3. Select [5 RADAR MAP].
The [RADAR MAP] menu appears.
Note: You can also right-click the [MARK] box to open the [RADAR MAP] menu.
4. Select [0 NEXT] to show the next menu page.
5. Select [3 MARK COLOR].
6. Select the appropriate color. Available options are shown in the table below.

Menu indication	Color	Menu indication	Color	Menu indication	Color
RED	Red	CYA	Cyan	BLU	Blue
GRN	Green	MAG	Magenta	YEL	Yellow
WHT	White				

7. Close the menu.

5.4.3 How to inscribe marks

You can inscribe marks anywhere inside the operational display area, however, marks cannot be inscribed in the same location as a menu box.

Depending on the setting for [4 MARK POSITION] the method to inscribe a mark is slightly different.

Where [4 MARK POSITION] is set to [CURSOR]

1. Referring to section 5.2, select the mark type you want to use.
2. Place the cursor on the [MARK] box, at the bottom-left of the screen.
3. Spin the scrollwheel to select the appropriate mark, then left-click. The cursor moves inside the operational display area.
4. Place the cursor on the location (inside the operational display area) you wish to inscribe the mark, then left-click to anchor the mark.
5. Repeat steps 3 to 4 for multiple mark inscription.
6. Right-click to complete the procedure.

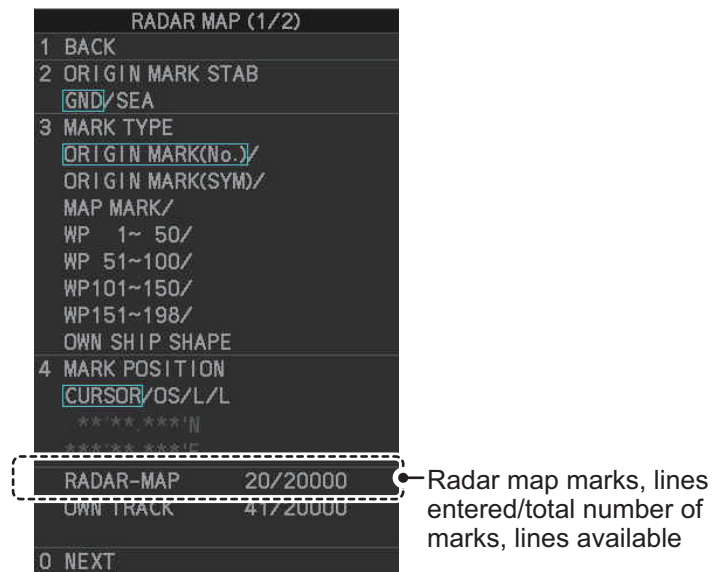
Where [4 MARK POSITION] is set to [OWN SHIP]

1. Referring to section 5.2, select the mark type you want to use.
2. Place the cursor on the [MARK] box, at the bottom-left of the screen.
3. Spin the scrollwheel to select the appropriate mark, then left-click. The selected mark is inscribed at the OS position.
4. Repeat steps 1 to 2 for multiple mark inscription, or right-click to complete the procedure.

Where [4 MARK POSITION] is set to [L/L]

1. Referring to section 5.2, select the mark type you want to use.
2. Place the cursor on the [MARK] box, at the bottom-left of the screen.
3. Spin the scrollwheel to select the appropriate mark, then left-click. [RADAR MAP] menu appears and the first digit of the latitude is selected.
4. Referring to section 5.3, set the latitude and longitude.
5. Repeat steps 1 to 3 for multiple mark inscription, or right-click to complete the procedure.

Note: You can see the number of radar map marks, lines used, on the [RADAR MAP] menu: [MENU]→[2 MARKS*]→[5 RADAR MAP].



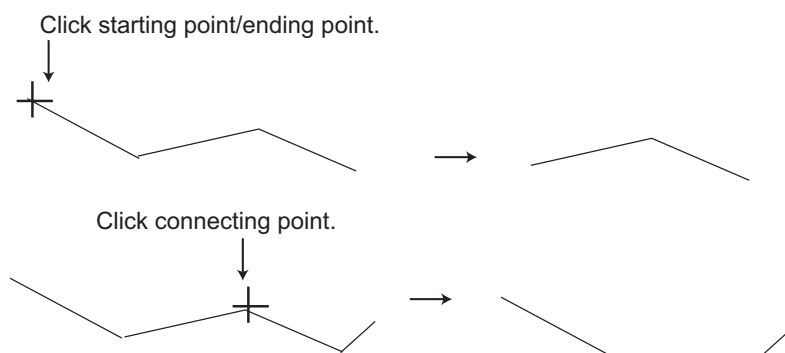
*: Appears as [2 MARKS•CHART] for A/B/W-types with Radar Plotter functionality.

5.4.4 How to delete marks

Marks can be deleted one at a time, or all at once.

How to delete marks individually

1. Select the operational display area, then right-click to show the [CURSOR] context menu.
2. Select [MARK DELETE]. The cursor changes to a highlighted cursor.
3. Place the highlighted cursor on the mark to be deleted, then left-click.
Note: The position of the cursor determines how lines are deleted. To delete a line segment, put the cursor on the starting point (or end point). To delete consecutive line segments, put the cursor on the connecting point.



4. Repeat step 3 to delete another mark, or press the **right button** to return the cursor to normal function.

How to delete all marks

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, this menu appears as [2 MARKS•CHART].
3. Select [8 DELETE DATA].
4. Select [2 ALL MARKS].
5. Select [YES].
6. Close the menu.

*1: Color selection available for A/B/W-types only.

*2: Shown only on IMO/R-types.

*3: Shown only for B/W-types.

DELETE DATA	
1	BACK
2	ALL MARKS NO/YES
3	ALL WAYPOINTS NO/YES
4	ALL NAV LINES NO/YES
5	OS TRACK-COLOR/TIME RED/GRN/BLU/YEL/ CYA/MAG/WHT/30%/ 50%/80%/ALL
6	TGT TRACK-COLOR/TIME RED/GRN/BLU/YEL/ CYA/MAG/WHT/30%/ 50%/80%/ALL
7	OS TRACK-AREA 2POINTS/AREA
8	TGT TRACK-AREA 2POINTS/AREA

*1 { 5, 6 }
 *2 { 6 }
 *3 { 7, 8 }

5.4.5 How to align the radar map

When there is positional error between the radar screen and radar map marks and lines, do the following to correct it.

1. Right-click the operational display area to show the [CURSOR MENU].
You can also place the cursor in the operational display, then spin the scrollwheel to show [MAP ALIGN L=OFF / EXIT] in the guidance box, then left-click.
2. Select [MAP ALIGN]. The cursor is now highlighted and the [MAP ALIGN] function is active.
3. Left-click the map at the location you want to move. The map is now “anchored” to the cursor.
4. Move the cursor to align the radar map with the radar screen, then left-click. The indication "MAP ALIGN" appears on the right side of the operational display area.
5. Right-click to deactivate the [MAP ALIGN] function.

Display indications affected by map alignment

The following items are also re-aligned when the [MAP ALIGN] function is activated.

- | | |
|------------------------------------|---|
| • Map marks | • MOB marks |
| • Drop marks | • Own ship tracks |
| • Anchor watch settings | • Latitude/Longitude Grid |
| • Target tracks | • AIS symbol vector display |
| • AIS symbols | • Zoom window display (STAB GND mode only) |
| • EBL offsets (STAB GND mode only) | • Cursor position coordinates (when CURSOR L/L ALIGN is set to [ON] only) |
| • Origin marks | |
| • NAV lines and waypoints | |

Display indications unaffected by map alignment

The following items are not re-aligned when the [MAP ALIGN] function is activated.

- | | |
|---|-----------------------------------|
| • Radar echoes | • TT symbols |
| • TT symbol vector display | • EBL/VRM reference point |
| • PI lines | • OS coordinates ([POSN]) display |
| • Own ship mark | • Barge mark |
| • Acquisition zone (STAB GND mode only) | |

How to disable the map alignment

1. Right-click the operational display area to show the [CURSOR MENU].
You can also place the cursor in the operational display, then spin the scrollwheel to show [MAP ALIGN L=OFF / EXIT] in the guidance box, then left-click.
2. Select [MAP ALIGN], then left-click. The cursor is now highlighted and the [MAP ALIGN] function is active.
3. Press and hold the **left button**. The "MAP ALIGN" indication is cleared and the map alignment is cleared.
4. Right-click to deactivate the [MAP ALIGN] function.

5.5 Origin Mark

You can mark any prominent target or a point of particular interest using the origin mark feature. When an origin mark is entered, the distance and bearing from the cursor position to the mark are shown at the bottom of the screen, as in the figure below. Twenty origin marks may be entered.



5.5.1 How to inscribe origin marks

The method in which an origin mark is inscribed depends on the setting of [MARK POSITION] (section 5.3). Below are the procedures for each method.

Heading and position inputs are necessary to inscribe an origin mark.

Where [4 MARK POSITION] is set to [CURSOR]

1. Referring to section 5.2, set [3 MARK TYPE] to [ORIGIN MARK No.] or [ORIGIN MARK SYM].
2. Put the cursor on the [MARK] box at the bottom of the screen.
3. Spin the scrollwheel to select the origin mark to inscribe.
4. Click the [MARK] box.
5. Click the location where to put the origin mark.
The origin mark is inscribed at the location selected. To re-inscribe the origin mark at a different location, click the desired location for the mark.
6. To enter an origin mark at another location, spin the scrollwheel to change the origin mark, then click the desired location for the origin mark.
7. Right click to finish.

Where [4 MARK POSITION] is set to [OWN SHIP]

1. Referring to section 5.2, set [3 MARK TYPE] to [ORIGIN MARK No.] or [ORIGIN MARK SYM].
2. Put the cursor on the [MARK] box at the bottom of the screen.
3. Spin the scrollwheel to select the appropriate origin mark, then left-click. The selected mark is inscribed at the OS position.
4. Repeat steps 1 to 2 for multiple origin mark inscription, or right-click to complete the procedure.

Where [4 MARK POSITION] is set to [L/L]

1. Referring to section 5.2, set [3 MARK TYPE] to [ORIGIN MARK No.] or [ORIGIN MARK SYM].
2. Put the cursor on the [MARK] box at the bottom of the screen.
3. Spin the scrollwheel to select the appropriate origin mark, then left-click. RADAR MAP menu appears and the first digit of the latitude is selected.
4. Referring to section 5.3, set the latitude and longitude.
5. Repeat steps 1 to 3 for multiple origin mark inscription, or right-click to complete the procedure.

5.5.2 How to set origin mark stabilization

Origin marks can be geographically fixed (ground stabilized) or moving (sea stabilized).

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, this menu appears as [2 MARKS•CHART].
3. Select [5 RADAR MAP].
The [RADAR MAP] menu appears.
Note: You can also right-click the [MARK] box to open the [RADAR MAP] menu.
4. Select [2 ORIGIN MARK STAB].
5. Select [GND] or [SEA] as appropriate.
6. Close the menu.

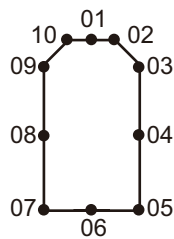
5.5.3 How to delete origin marks

Unlike other marks, you can only delete origin marks individually. To delete origin marks, follow the procedure below.

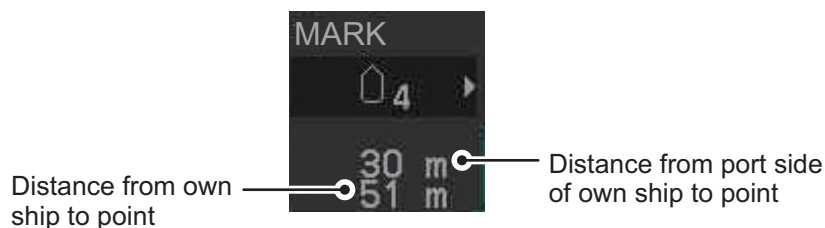
1. Select the operational display area, then right-click to show the [CURSOR] context menu.
2. Select [MARK DELETE]. The cursor changes to a highlighted cursor.
3. Place the highlighted cursor on the origin mark to be deleted, then left-click.
4. Repeat step 3 to delete another origin mark, or press the **right button** to return the cursor to normal function.

5.6 How to Change the Shape of the Own Ship Mark

Ten locations on the own ship mark (section 1.43.4) can be adjusted to depict the shape of own ship more realistically. The ten points are as shown below.



1. Referring to section 5.2, set [3 MARK TYPE] to [OWN SHIP SHAPE].
2. Put the cursor in the [MARK] box at the bottom of the screen.
3. Spin the scrollwheel to select the point no. to change.
The cursor moves to the selected point position.
4. Use the trackball to move the point to the position desired, then click.
Point position information appears in the [MARK] box, as shown in the figure below.



5. Repeat steps 3 to 4 to adjust other points.

5.7 How to Use ECDIS Chart Marks

Note: This function is only available if [ECDIS] is set to [SERIAL] or [LAN] at installation. Consult your dealer for details.

You can display marks received from an ECDIS on the radar screen. If the received mark also contains predicted position data, the predicted position is also displayed on-screen.

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, this menu appears as [2 MARKS•CHART].
3. Select [6 ECDIS MARKS DISPLAY].

ECDIS MARKS DISPLAY	
1	BACK
2	USER CHART OFF/ON
3	CURVED EBL OFF/ON
4	CHART SYMBOL OFF/ON
5	NOTE BOOK OFF/ON/DISPLAY
6	ROUTE OFF/CENT/ALL
7	PREDICTOR OFF/ON

4. Select the appropriate item.
 - [2 USER CHART]: Shows/hides received user charts.
 - [3 CURVED EBL]: Shows/hides the received Curved EBL.
 - [4 CHART SYMBOL]: Shows/hides the received chart symbols.
 - [5 NOTE BOOK]: Shows/hides the received notes. [ON] shows notes only when they are received. [DISPLAY] shows notes continuously. The notes are shown in the information box at the right-side of the screen.
 - [6 ROUTE]: Shows/hides the received route. [CENT] shows only the route line; [ALL] shows both the route line and the route width.
 - [7 PREDICTOR]: Shows/hides the received predicted position with a symbol (dotted line) of the same size as the own ship.

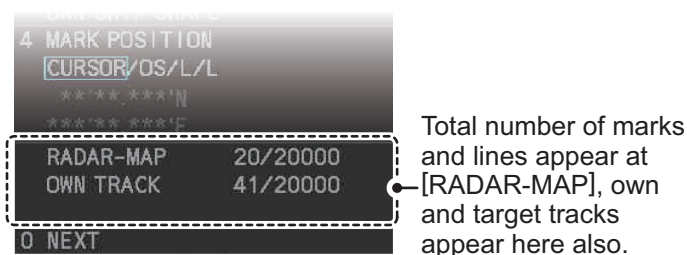
Note: Available only when the FEA-2107/2807 is connected.
5. Select [ON] or [OFF] as appropriate.
[ON] shows the selected item's ECDIS mark when received, [OFF] hides the ECDIS mark.
6. Close the menu.

5.8 Own Ship and Other Ship's Track

A total of 20,000 points are allotted for storage of own ship's track, marks and lines. For target tracks, the total number of points is 15,000.

When this memory becomes full, the oldest track is deleted to make room for the latest. For that reason you may want to adjust the recording interval to conserve the memory.

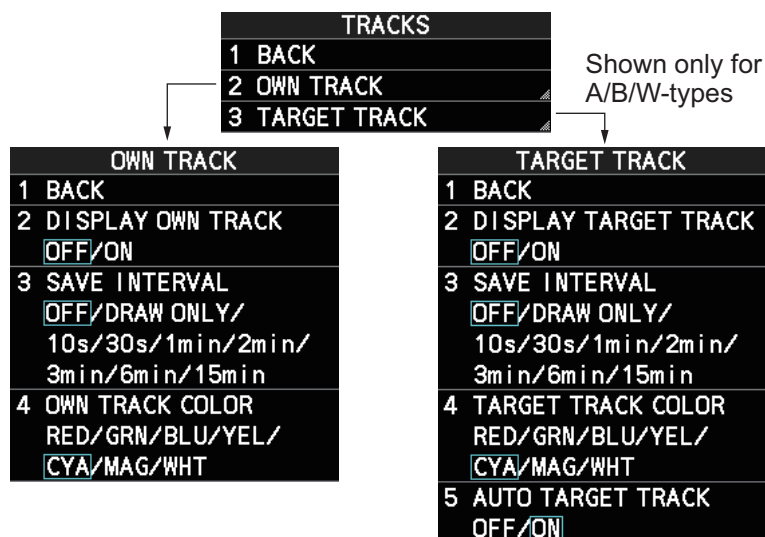
Note: You can check how many tracks are in use from [MAIN MENU] → [2 MARKS*] → [5 RADAR MAP]. (*: For A/B/W-types with Radar Plotter functionality, this menu appears as [2 MARKS•CHART].)



5.8.1 How to show/hide tracks

You can show or hide tracks for own ship or for targets (A/B/W-types only).

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, select [2 MARKS•CHART].
3. Select [7 TRACKS].
4. Select [2 OWN TRACK] or [3 TARGET TRACK] as appropriate.



Note: [3 TARGET TRACK] is available only for A/B/W-type radars.

5. Select [2 DISPLAY OWN TRACK] or [3 DISPLAY TARGET TRACK], as appropriate.
6. Select [ON] to show tracks, or [OFF] to hide tracks.
Note: [3 SAVE INTERVAL] must be set to other than [OFF] to show tracks.
7. Close the menu.

5.8.2 How to set the plotting interval

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, select [2 MARKS•CHART].
3. Select [7 TRACKS].
4. Select [2 OWN TRACK] or [3 TARGET TRACK] as appropriate.
Note: For IMO/R-types, [3 TARGET TRACK] is not shown.
5. Select [3 SAVE INTERVAL].
6. Select the appropriate setting, then left-click.

The following tables show the relation between plotting interval settings and maximum track recording time. Note that the maximum recording time is different for own tracks and target tracks.

Own track recording times

Interval	Max. Recording Time	Interval	Max. Recording Time
10 s	56 hours	3 min	1000 hours
30 s	167 hours	6 min	2000 hours
1 min	333 hours	15 min	5000 hours
2 min	667 hours	DRAW ONLY	No track data recorded.

Target track recording times

Interval	Max. Recording Time (One target only)	Max. Recording Time (15 targets)
10 s	42 hours	3 hours
30 s	125 hours	8.5 hours
1 min	250 hours	16.5 hours
2 min	500 hours	33.5 hours
3 min	750 hours	50 hours
6 min	1500 hours	100 hours
15 min	3750 hours	250 hours
DRAW ONLY	No track data recorded.	No track data recorded.

Note: To hide own ship or target past tracks, set the interval to [OFF]. To hide both tracks, set the interval for both own ship and targets tracks to [OFF]. Tracks plotted after the setting is set to [OFF] are hidden. Previously plotted tracks remain on-screen.

7. Close the menu.

5.8.3 How to set the track color (A/B/W-types only)

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, select [2 MARKS•CHART].
3. Select [7 TRACKS].
4. Select [2 OWN TRACK] or [3 TARGET TRACK] as appropriate.
5. Select [4 OWN TRACK COLOR]. The following colors are available.
 - [RED] (Red)
 - [GRN] (Green)
 - [BLU] (Blue)
 - [YEL] (Yellow)
 - [CYA] (Cyan)
 - [MAG] (Magenta)
 - [WHT] (White)
6. Select the appropriate setting.
7. Close the menu.

5.8.4 How to automatically plot target tracks (A/B/W-types only)

You can automatically plot target tracks for TT target numbers 001 to 015.

Note 1: [3 SAVE INTERVAL] must be set to other than [OFF] to show tracks.

Note 2: When this feature is active, only the tracks TT targets 001 through 015 are plotted.

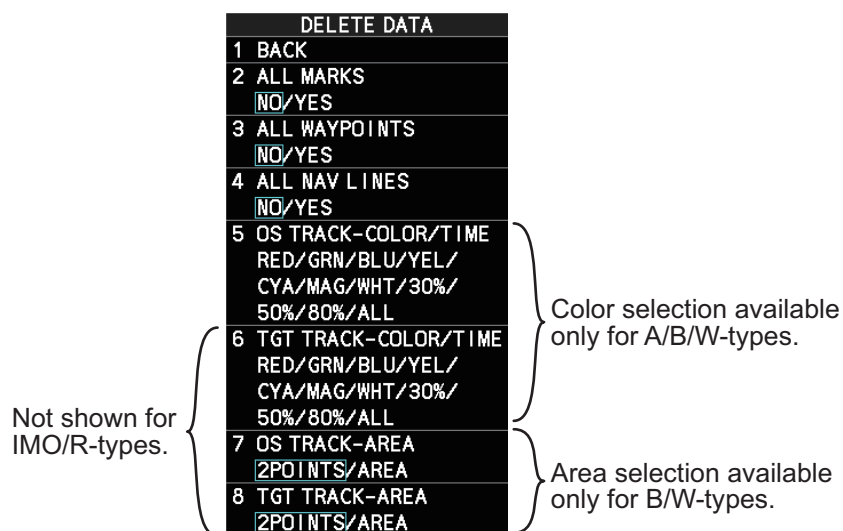
1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, select [2 MARKS•CHART].
3. Select [7 TRACKS].
4. Select [3 TARGET TRACK].
5. Select [5 AUTO TARGET TRACK].
6. Select [OFF] or [ON] as appropriate.
Note: When [5 AUTO TARGET TRACK] is set to [ON], [TARGET TRACK ON] and [TARGET TRACK OFF] are disabled and are not displayed in the [CURSOR] menu.
7. Close the menu.

5.8.5 How to delete tracks

There are three methods to delete tracks: by percentage of track, by track color or by cursor selection.

How to erase tracks by percentage

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, select [2 MARKS•CHART].
3. Select [8 DELETE DATA].



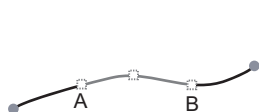
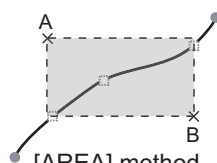
4. Select [5 OS TRACK-COLOR/TIME] or [6 TGT TRACK-COLOR/TIME].
Note: [6 TGT TRACK-COLOR/TIME] is only shown for A/B/W-type radars.
5. Select the percentage of the track you wish to delete, then left-click. The available options are: [30%], [50%], [80%] or [ALL].
6. Close the menu.

How to erase tracks by color (For A/B/W-types only)

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, select [2 MARKS•CHART].
3. Select [8 DELETE DATA].
4. Select [5 OS TRACK-COLOR/TIME] or [6 TGT TRACK-COLOR/TIME].
5. Select the color of the track you wish to delete, then left-click. The available options are: [RED], [GRN], [BLU], [YEL], [CYA], [MAG] or [WHT].
6. Close the menu.

How to erase tracks with the cursor (For B/W-types only)

1. Open the menu.
2. Select [2 MARKS].
For B/W-types with Radar Plotter functionality, select [2 MARKS•CHART].
3. Select [8 DELETE DATA].
4. Select [7 OS TRACK-AREA] or [8 TGT TRACK-AREA].
5. Select [2POINTS] or [AREA] as appropriate, then left-click. The cursor jumps into the operational display area.
[2POINTS]: Delete track between two points. All points between start point to end point change from circle-shaped to square-shaped icons.
[AREA]: Delete all track within an area. Points within the selected area change from circle-shaped to square-shaped icons.

[2POINTS] method[AREA] method

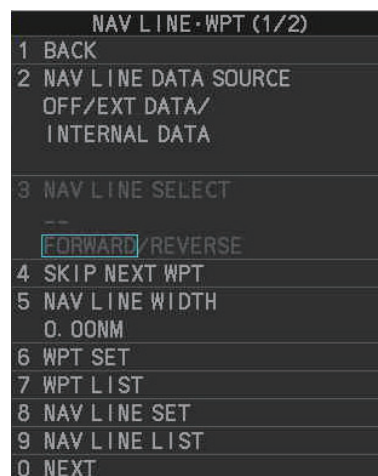
6. Place the cursor on the first point (A), then left-click.
7. Place the cursor on the second point (B), then left-click. If [AREA] was selected at step 5, the two points form a square.
8. Close the menu.

5.9 How to Use Waypoints

A particular location is known as a “waypoint”, whether it be a starting point, a destination point or an intermediate point on a voyage. This radar system can store 200 waypoints. Waypoints 1 to 198 are user set waypoints, waypoint 199 is reserved for external input, waypoint 200 is reserved for MOB (Man Over Board). Waypoints can be entered with the cursor, or from the menu (manual input of latitude and longitude). Waypoints 1 to 198 can be edited from the menu.

5.9.1 How to set the data source for waypoints

1. Open the menu.
2. Select [8 NAVLINE•WPT].
3. Select [2 NAV LINE DATA SOURCE].
4. Select the appropriate data source, referring to the list below.
 - [OFF]: Waypoints and nav lines (such as tracks) are not shown.
 - [EXT DATA]: Use navigational data from an external EPFS device for waypoints and nav lines.
 - [INTERNAL DATA]: Use waypoints and nav lines saved internally.
 - [WPT MARK] (shown only for A/B/W-type radars): Shows the waypoint marks, however received routes are not shown.



5. Close the menu.

5.9.2 How to enter waypoints

How to enter waypoints with the cursor

1. Referring to section 5.2, select the appropriate waypoint number group.
The available groups are: [WP1 to WP50], [WP51 to WP100], [WP101 to WP150] or [WP151 to WP198].
2. Place the cursor on the [MARK] box. Spin the scrollwheel to select the waypoint number for new waypoint, then left-click.
The cursor jumps inside the operational display area.
3. Place the cursor on the location to inscribe the waypoint, then left-click.
4. Repeat steps 2 to 3 to inscribe other waypoints.
5. Right-click the operational display area to complete waypoint inscription.



↑
Spin scrollwheel to select number.

How to enter/edit waypoints from the menu

Note: Waypoints which are part of a route that is currently in use cannot be edited.

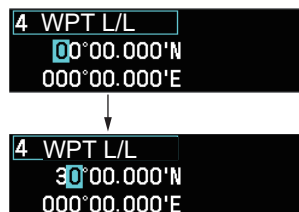
1. Open the menu.
2. Select [8 NAVLINE•WPT].
3. Select [2 WPT SET].
4. Select [2 WPT NO. SELECT].
5. Spin the scrollwheel, or use the control unit numbered keys, to select a waypoint number.
6. **To edit or input a waypoint name**, select [3 WPT NAME], then left-click. The software keyboard appears. Referring to section 1.5.2, name the waypoint.

WPT SET	
1	BACK
2	WPT NO. SELECT

3	WPT NAME
4	WPT L/L
	--°--'---
	---°--'---
5	CLEAR DATA
	NO/YES

To skip naming the waypoint, go to step 7.

7. Select [4 WPT L/L]. The latitude and longitude settings can now be adjusted.
8. Input the latitude and longitude with the number keys, or spin the scrollwheel to select a digit, then left-click to move to the next digit.



Use the scrollwheel to select a numeral, then left-click. The cursor jumps to to next right place. Repeat to enter the latitude and longitude.

9. Close the menu.

5.9.3 How to erase waypoints

There are two methods to erase individual waypoints: cursor selection or from the menu.

How to erase a waypoint by cursor selection

1. Place the cursor inside the operational display area, then right-click.
2. Select [MARK DELETE]. The mark delete function is activated and the cursor is highlighted when inside the operational display area.
3. Select the waypoint you wish to delete, then left-click.
4. Right-click inside the operational display area to deactivate the mark delete function.

How to erase a waypoint from the menu

1. Open the menu.
2. Select [8 NAVLINE•WPT].
3. Select [6 WPT SET].
4. Select [2 WPT NO. SELECT]. Then select the waypoint to erase.
5. Select [5 CLEAR DATA].
6. Select [YES] or [NO] as appropriate, then left-click.
7. Close the menu.

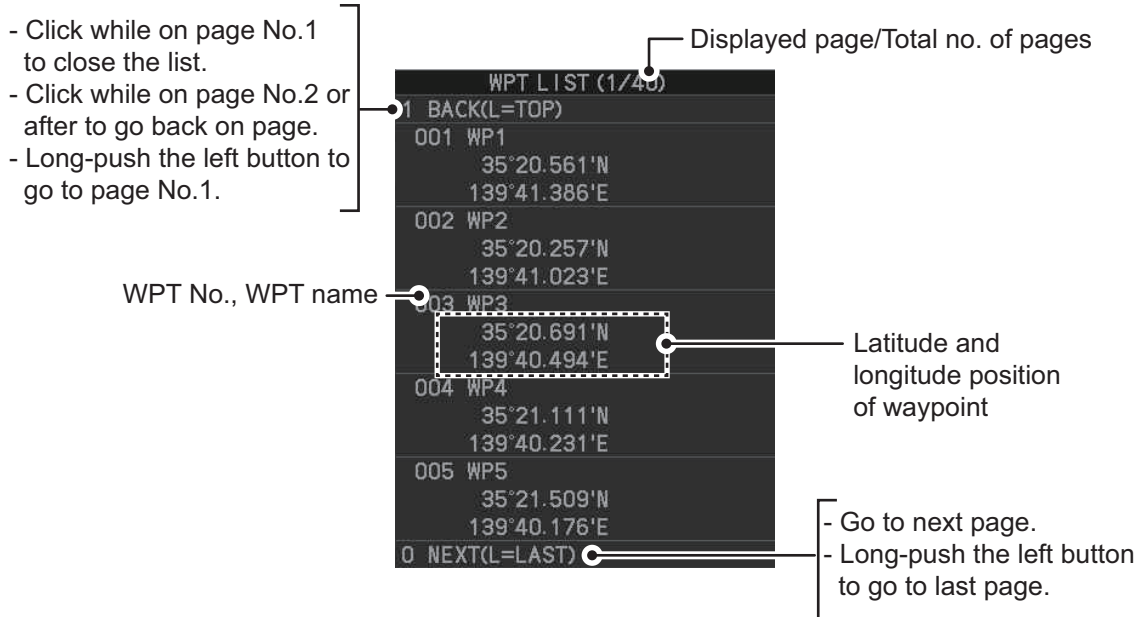
How to erase all waypoints

You can erase all waypoints from the menu. If there is an active route, this procedure cannot be completed.

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, select [2 MARKS•CHART].
3. Select [8 DELETE DATA].
4. Select [3 ALL WAYPOINTS].
5. Select [YES] to erase all waypoints. Select [NO] to cancel the procedure.
Note: All routes are also deleted with this procedure.
6. Close the menu.

5.9.4 How to display the waypoint list

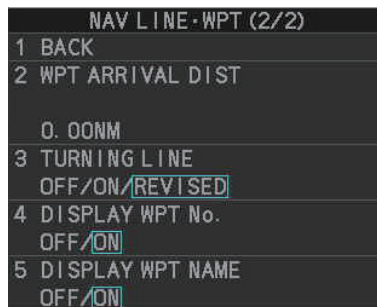
1. Open the menu.
2. Select [8 NAVLINE•WPT].
3. Select [7 WPT LIST] to show the [WPT LIST].



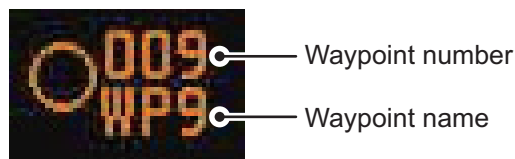
4. Close the menu.

5.9.5 How to show/hide the waypoint name/number

1. Open the menu.
2. Select [8 NAVLINE•WPT], then select [0 NEXT] to show the next page.



3. Select [4 DISP WPT NO.] or [5 DISP WPT NAME] as appropriate.
4. Select [ON] to show the waypoint name/number, or [OFF] to hide the waypoint name/number, then left-click. The waypoint number and/or waypoint name appear to the right of the waypoint mark.



5. Close the menu.

5.10 Routes

You can display one route (NAV LINE), which is either received from a connected EPFS device (GPS, etc), or stored internally.

Note: While a route is active, tracks and waypoints cannot be deleted and data cannot be loaded from an SD card.

5.10.1 How to set/edit an internal route

You can store up to 30 routes, each with up to 20 waypoints, in the internal memory.

The procedure for new routes and route editing is the same. To edit a route, you can skip setting other items and only edit the items you wish to change.

1. Open the menu.
2. Select [8 NAVLINE•WPT].
3. Select [8 NAV LINE SET]. The [NAV LINE SET] menu appears.
4. Select [2 SELECT NAV LINE].
5. Spin the scrollwheel, or input the number from the keyboard, to assign a number to the route. The input areas for [3 NAV LINE], [4 NAV LINE ENTRY] and [5 CLEAR DATA] become active.
6. Select [3 NAV LINE NAME].
7. Referring to section 1.5.2, assign a name to the route. You can use up to 15 characters in the name.
8. Select [4 NAV LINE ENTRY].
9. Spin the scrollwheel to select a waypoint, then left-click.
10. Repeat step 9 until all waypoints for the route are entered.
When the last waypoint is entered, move the cursor to the next blank input area, then left-click, or assign the last waypoint as "000" using the numeric keys. If 30 waypoints are entered, the setting process for waypoints is automatically completed.
11. Close the menu.

NAV LINE SET			
1	BACK		
2	SELECT NAV LINE 02		
3	NAV LINE NAME FURUNO TEST RUN		
4	NAV LINE ENTRY		
	001 -	002 -	003 -
	004 -	005 -	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
	-	-	-
5	CLEAR DATA NO/YES		

5.10.2 How to display routes

To display internal routes or received routes, follow the procedure below.

1. Open the menu.
2. Select [8 NAV LINE•WPT]. The [8 NAV LINE•WPT] menu appears.
3. Select [2 NAV LINE DATA SOURCE].
4. Select the desired source, referring to the list below.
 - [OFF]: No routes are displayed.
 - [EXT DATA]: Routes received from external sources are displayed.
 - [INTERNAL DATA]: Routes saved in the internal memory are displayed.

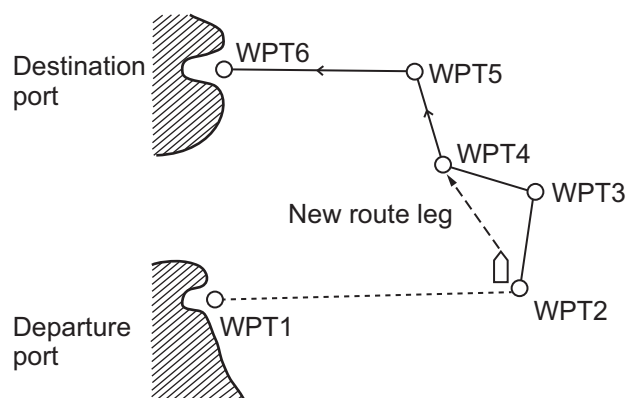
For [INTERNAL DATA], see step 5; for [EXT DATA], see step 8.

5. Select [NAV LINE SELECT].
6. Spin the scrollwheel to select the desired route number, then left-click.
7. Select the direction you want to navigate the route in.
 - [FORWARD]: Navigate the route in the direction in which it was created.
 - [REVERSE]: Navigate the route in reverse of the direction in which it was created.
8. Close the menu.

NAV LINE•WPT (1/2)	
1	BACK
2	NAV LINE DATA SOURCE OFF/EXT DATA/ INTERNAL DATA
3	NAV LINE SELECT -- FORWARD/REVERSE
4	SKIP NEXT WPT
5	NAV LINE WIDTH 0.00NM
6	WPT SET
7	WPT LIST
8	NAV LINE SET
9	NAV LINE LIST
0	NEXT

How to skip a waypoint

On a voyage similar to the below example, you may want to skip a waypoint to save time. You can skip the next waypoint on the current leg of your route by using the procedure below.



1. Open the menu.
2. Select [8 NAV LINE•WPT]. The [8 NAV LINE•WPT] menu appears.
3. Select [4 SKIP NEXT WPT].
4. Close the menu.

How to set the route width

You can set a width for each route (NAV LINE). For example, if you set a 5 NM route width, the route width is 5 NM to port and starboard, with the own ship as the center. The route width is displayed as orange dotted lines to either side of the route line.

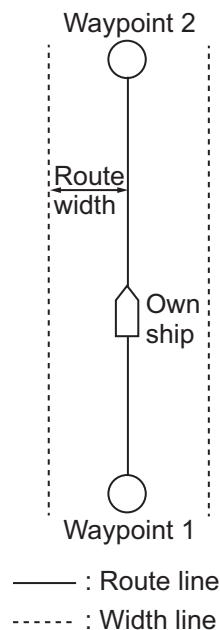
On B/W-type radars, if your vessel deviates from the route and passes the route width, an alert is released and the message "XTD LIM EXCEEDED" appears in the Alert box. To acknowledge this alert, press the **ALERT ACK** key, or click the Alert box.

To set a route width, do the following:

1. Open the menu.
2. Select [8 NAVLINE•WPT].
3. Select [5 NAV LINE WIDTH].
4. Spin the scrollwheel, or use the numeric keys, to set a width for the route. To disable the route width alert and hide the route width lines, set the width to [0.00 NM].

Note: This width is applied to all routes.

5. Close the menu.

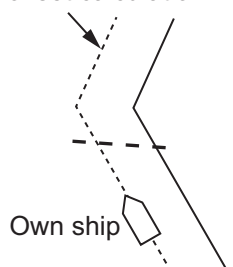


How to show/hide the turning line

You can show or hide the turning line, the point at which your vessel starts a turn in a route.

1. Open the menu.
2. Select [8 NAVLINE•WPT].
3. Select [0 NEXT].
4. Select [3 TURNING LINE].
5. Select the appropriate setting, referring to the list below.
 - OFF: Turning line is hidden.
 - ON: Turning line is displayed.
 - REVISED: Turning line is displayed, but offset based on the route and current own ship position.
6. Close the menu.

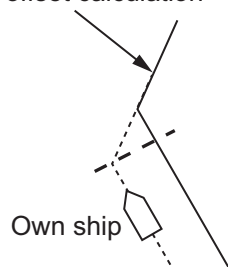
Estimated course with no offset calculation*



[TURNING LINE]
set to [ON]

—— : Route
..... : Track
- - - - : Turning line

Estimated course with offset calculation*



[TURNING LINE]
set to [REVISED]

*: Estimated course is not displayed on-screen.

5.10.3 How to delete internal routes

You can delete a specified route, or all routes.

Note: Active routes and routes from external sources cannot be deleted.

How to delete individual internal routes

1. Open the menu.
2. Select [8 NAVLINE•WPT].
3. Select [8 NAVLINE SET].
4. Select [2 SELECT NAV LINE].
5. Spin the scrollwheel, or input the number from the keyboard, to select the route you want to delete.
6. Select [5 CLEAR DATA].
7. Select [YES] to delete the selected route.
8. Close the menu.

How to delete all internal routes

1. Open the menu.
2. Select [2 MARKS].
For A/B/W-types with Radar Plotter functionality, select [2 MARKS•CHART].
3. Select [8 DELETE DATA].
4. Select [4 ALL NAV LINES].
5. Select [YES] to delete all internal routes.
6. Close the menu.

5.10.4 How to view the routes list

Routes saved to the internal memory can be view by following the procedure below.

1. Open the menu.
2. Select [8 NAVLINE•WPT].
3. Select [9 NAVLINE LIST]. The [NAVLINE LIST] appears.

- Click while on page No.1 to close the list.
- Click while on page No.2 or after to go back on page.
- Long-push the left button to go to page No.1.

NAV LINE LIST (1/30)

1 BACK(L=TOP)

01 FURUNO

001 -	002 -	003 -
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

0 NEXT(L=LAST)

Displayed page/
Total no. of pages

Route No., Route name

Route waypoints
appear here

- Go to next page.
- Long-push the left button to go to last page.

4. Close the menu.