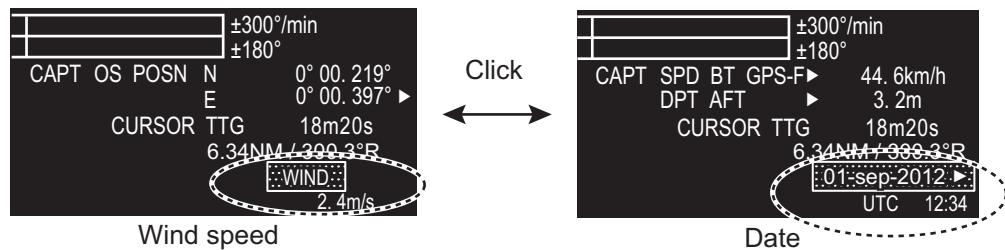


1.33.2 How to show wind data or date alternately

Click the icon shown below to show wind data or date alternately.

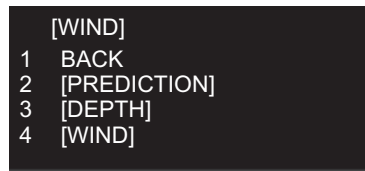
(at the top right corner on the screen)



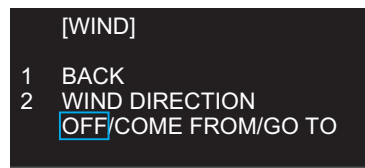
Wind direction format

Wind direction format can be selected on the [NAV DATA] menu, with the [WIND] window.

1. Open [MAIN MENU], click [NAV DATA].
2. Click [WIND].



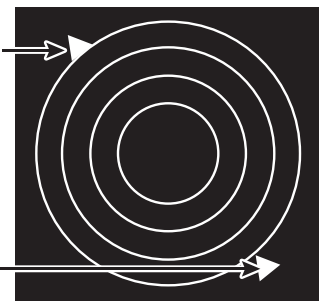
3. Click [WIND].



4. Click [WIND DIRECTION] then click [GO TO] or [COME FROM], referring to the figure right. [OFF] hides the wind direction.

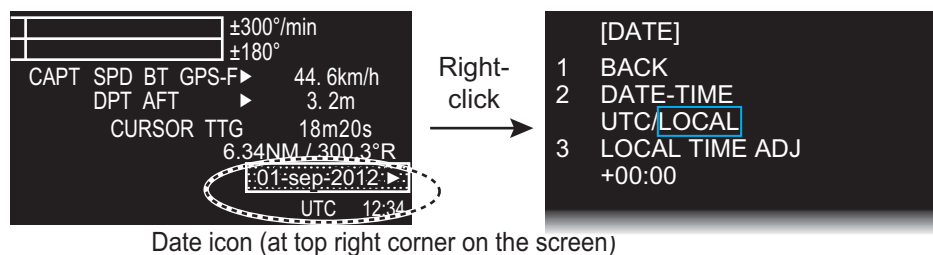
Wind direction symbol:
[GO TO]

Wind direction symbol:
[COME FROM]



Date menu

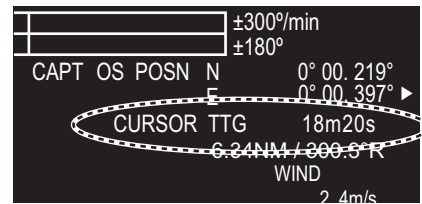
The [DATA] menu lets you select the time to display, [UTC] or [LOCAL]. Right-click the Date icon to show the [DATE] window.



- [DATE-TIME]: Select how to display format of date and time, [UTC] or [LOCAL].
Note: If [LOCAL] is selected, the indication [LOCAL] is not shown.
- [LOCAL TIME ADJ]: If [LOCAL] is selected at [DATE-TIME], set the time difference between local time and UTC time.

1.33.3 Time to the cursor position

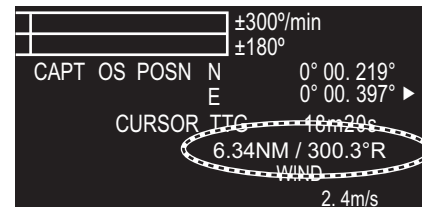
The time from own ship to the cursor position (TTG: time-to-go) is shown at the top right corner on the screen.



1.33.4 Cursor position

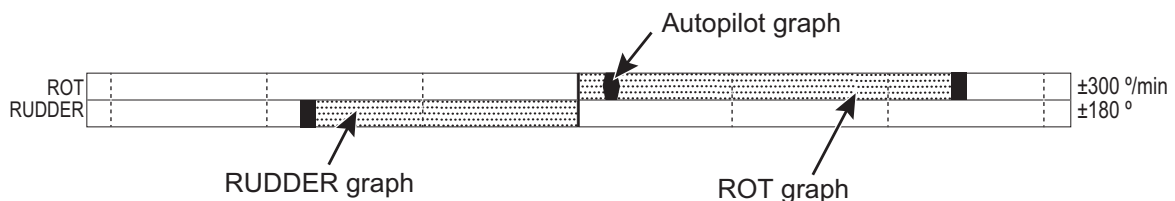
The cursor position (range and bearing of cursor from the own ship) is shown at the top right corner on the screen.

The bearing reference is changed simultaneously with the EBL1 reference. To change the cursor position's bearing reference, click EBL1's bearing reference icon. See section 1.19 for details.



1.33.5 ROT, Rudder and Autopilots Graphs

The ROT (Rate of Turn), RUDDER and AUTOPILOT graphs appear at the top of the screen.



ROT graph

The ROT graph displays ship's rate of turn (degrees/min), using the ROT signal fed from an ROT sensor. There is no NMEA signal and also no indication.

To set the ROT graph scale:

1. Open [MAIN MENU] then click [NAV DATA].
2. Click [ROT SCALE].
3. Click the desired scale among 30 degrees, 90 degrees and 300 degrees.

Rudder graph

The rudder graph shows the rudder angle. There is no NMEA signal and also no indication.

To set the rudder graph scale:

1. Open [MAIN MENU] then click [NAV DATA].
2. Click [RUDDER SCALE].
3. Click the desired scale among 30 degrees, 90 degrees, 120 degrees and 180 degrees.

Autopilot graph

1) **Follow-up (FU) mode**

When the autopilot is in the follow-up mode, the follow-up rudder command is indicated on the RUDDER scale. In addition, "▽FOLLOW UP" is indicated at the top of the screen. In follow-up mode, the autopilot controls the rudder so that actual rudder angle becomes same as commanded one.

2) **Autopilot (AP) mode**

When the autopilot is in the "autopilot" mode and a ROT signal is available from the autopilot, the autopilot graph shows ROT command. The actual ROT command set on the autopilot is represented by a small circle on the ROT scale. In addition, "△ AUTOPILOT" is indicated at the top of the screen. In "autopilot" mode, the autopilot controls the ROT so that actual heading becomes same as commanded one.

3) **Neither FU nor AP mode**

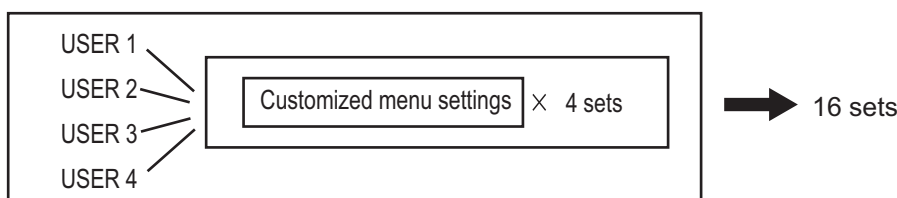
When the autopilot is in neither FU nor AP mode, the autopilot graph shows ROT command as default.

4) **No autopilot or on standby**

There is no NMEA signal and also no indication.

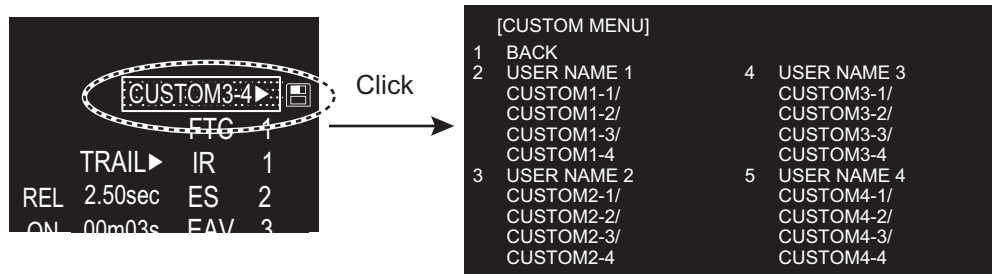
1.34 Customized Menus

The customized menu settings of four users are programmed individually. A user can have the four sets of the menu settings. That is, there are 16 sets of the menu settings.



How to select the customized set

1. Click the [CUSTOM] icon at the bottom right corner on the screen to show the [CUSTOM MENU] window.

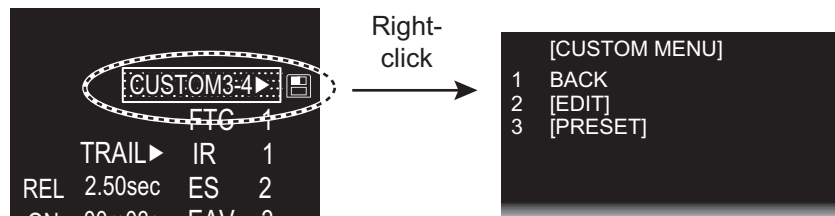


2. Click the required user name.
3. Click the required menu set.
4. Click outside the menu window to close the menu.

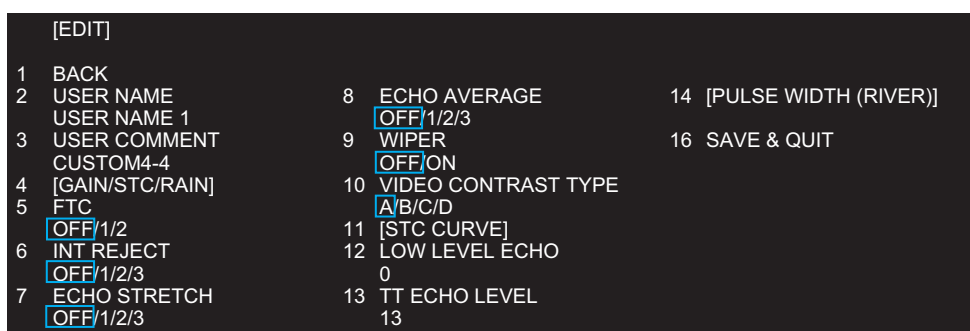
How to edit the [CUSTOM MENU]

Note: The [CUSTOM1-1] setting is fixed as a default setting. You can edit the setting, but when the system is turned off, the default setting is restored. To save a customized set, select a setting other than [CUSTOM1-1].

1. Right-click the [CUSTOM] icon at the bottom right corner on the screen to show the [CUSTOM MENU] window.



2. Click [EDIT].



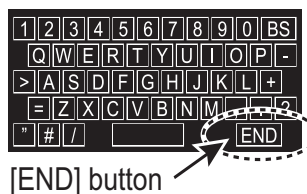
#15 [PULSE WIDTH (SEA)] for [SEA] mode instead of #14

3. Click [USER NAME] to edit.



4. To edit the name, click the name column then enter the name with the software keyboard. Click the [END] button to finish.

- Change the digit: Rotate scrollwheel.
- Delete a character: Use the [BS] button on the software keyboard.

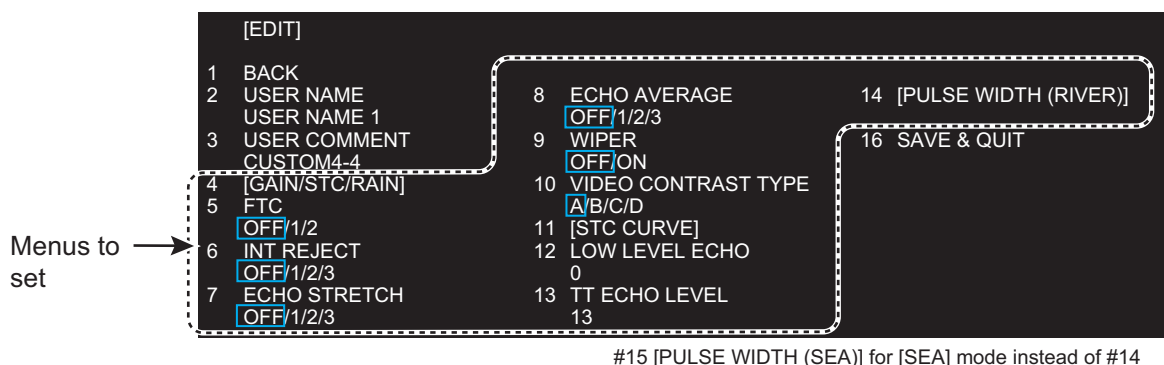


5. Click [USER COMMENT] to edit. The editing procedure is the same as that for [USER NAME]. Refer to step 4



6. To edit the name, press the name column then enter the name with the software keyboard. Click the [END] button to finish.

7. Click the menu to set in the [EDIT] menu.



8. Click the setting for each menu.
9. Click [SAVE & QUIT] to save the setting.

1.35 SD Cards

The SD card (including SDHC card) stores the mark data etc.

1.35.1 About the SD cards

- Use SD cards carefully. Wrong use can damage the card and destroy its contents.
- Make sure the cover of the card drive is closed at all times.
- Remove a card with only your fingers. Do not use metal tools (like tweezers) to remove the card.
- Do not remove a card during the reading of the card or writing to the card.
- If there is water at the bottom of the card cover, DO NOT open the cover. Remove the water with a dry cloth completely and then open the cover.
- The SD cards with the SD or SDHC logo can be used (max. 32 GB). Some SD cards may not work correctly depending on the card type or maker. The memory cards in the table below have been tested and confirmed:

Type	Capacity	Maker	Class
SDSDB-8192-J95A	8 GB	SanDisk	4
SDSDX-008G-J95	8 GB	SanDisk	10
SD-E008G4	8 GB	TOSHIBA	4
RP-SDW08GJ1K	8 GB	Panasonic	10
SDSDX-016G-J35	16 GB	SanDisk	10
RP-SDWA16GJK	16 GB	Panasonic	10

How to format an SD card

You need to format an SD card for use with your PC. If the card becomes corrupted, format the card with a formatting program that is compatible with the specifications of the SD card. The SD Memory Card Formatting Software made by Panasonic is an example.



How to set an SD card

The processor unit has two slots for SD cards. The [SD-1] is upper slot and [SD-2] is lower.

1. Pull the tab on the card drive on the processor unit to open the card drive.
2. Put the SD card in the either card drive, [SD-1] or [SD-2], with the label upward. If the card does not set easily, do not use force.
3. Push the card until the card is in position.

How to remove an SD card

To remove an SD card, select [SD-1] or [SD-2] from the [REMOVE EXTERNAL MEDIA] menu. There are two methods to open [REMOVE EXTERNAL MEDIA] as follows.

- [MAIN MENU]–[FILES]–[REMOVE EXTERNAL MEDIA]
 - [MAIN MENU]–[CAPTURE]–[REMOVE EXTERNAL MEDIA]
1. On [FILES] or [CAPTURE] menu, select [REMOVE EXTERNAL MEDIA].
 2. Select the SD card to remove, [SD-1] or [SD-2].
Note: Select the same card as the card selected on the [DRIVE SELECT] menu.
 3. Pull the tab on the card drive cover to open the card drive.
 4. Push the card to release the card from the card drive.
 5. Remove the card with your fingers then close the cover.

Note: Always remove an SD card by this method to prevent non-recognition of the card the next time when it is inserted. If a card is not recognized, insert the card again and do the above operation.

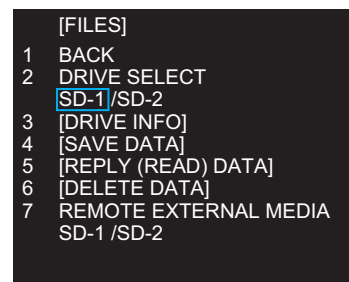
1.35.2 How to save and replay the data

All SD card operations begin from the [FILES] menu. The [FILES] menu is available in stand-by mode.

The data which is saved in the FR-1908V-BB do not have the compatibility with other models. Do not let the data read to the other models, and also do not let other models read the data of the FR-1908V-BB. It may cause the malfunction.

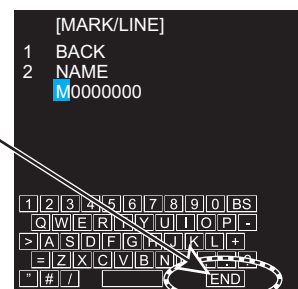
Note: All settings, except for [BRILL 1-1] and [CUSTOM 1-1], are stored when the radar is turned off. If you want to keep all settings, including [BRILL 1-1] and [CUSTOM 1-1], save the settings to an SD card before turning off the radar. Then replay the saved settings after turning on the radar.

- [DRIVE SELECT]: Click the drive [SD-1] or [SD-2] to use. The [SD-1] is upper slot and [SD-2] is lower.
- [DRIVE INFO]: Confirm the remaining capacity of the SD card selected at [DRIVE SELECT].



- [SAVE DATA]: Save the file stored on the following file group set at [NAME]. Set the name with the software keyboard. Click the [END] key to complete the name setting.
[MARK/LINE]* (see the figure shown right)
[SETTING DATA]
[ALARM HISTORY]
[LOG FILE]

[END] key



- [REPLAY (READ) DATA]: Select the data group in the SD card, [MARK/LINE]* or [SETTING DATA], then select the file to replay (read).
- [DELETE DATA]: Select the data group to delete from SD card, [MARK/LINE]*, [SETTING DATA], [ALARM HISTORY] or [LOG FILE], then select the file to delete.
- [REMOVE EXTERNAL MEDIA]: Select the SD card ([SD-1] or [SD-2]) to remove from the card slot safely.

Note: Select the same card as the card selected on the [DRIVE SELECT] menu.

*: [RIVER] mode only

1.36 How to Set Menu and Icon Behavior

1.36.1 Auto closing of menu window

In the [SEA] mode, the menu window can be set to close automatically if there is no menu operation within the specified period.

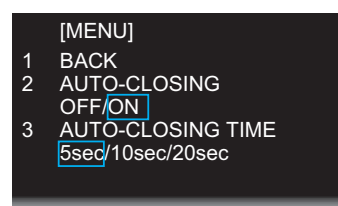
You can close the menu window automatically after a certain period with no operation.

Note: This function is for the [SEA] mode only.

1. Open [MAIN MENU], click [DISPLAY].
2. Click [MENU].
3. Click [AUTO-CLOSING].

Note: In the [RIVER] mode, auto closing is fixed to [ON]. Go to step 5 to select the closing time.

4. Click the [ON] or [OFF] as applicable.
5. Click [AUTO-CLOSING TIME].
6. Click the appropriate time to close the menu window automatically among 5 sec, 10 sec and 20 sec.
7. Click outside the menu window to close the menu.



1.36.2 Icons

You can show or hide some labels and auto hide them after the specified period elapsed.

How to select the menu icons to display

1. Open [MAIN MENU], click [DISPLAY].
2. Click [HIDDEN ICON].



3. Click each item (from 4 [RANGE] to 13 [DOCKING]) then click [ON] to display the icon, or [OFF] to hide the icon.
4. Click outside the menu window to close the menu.

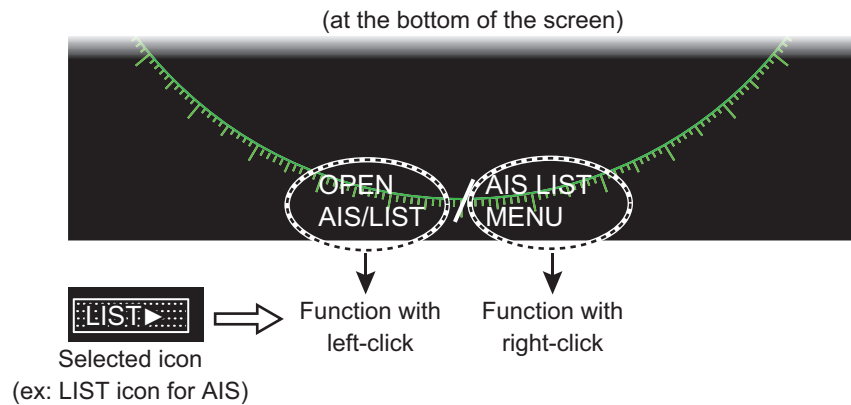
How to hide the menu icons automatically

1. Open [MAIN MENU], click [DISPLAY].
2. Click [HIDDEN ICON].
3. Click [AUTO-HIDDEN].
4. Click [ON] to enable automatic hiding of the icons. Any icon selected to [OFF] (on [HIDDEN ICON]) is automatically hidden.
5. Click [AUTO-HIDDEN TIME].
6. Click the appropriate time to hide the menu icons automatically among 5 sec, 10 sec and 20 sec.
7. Click outside the menu window to close the menu.

1.37 Other Features

1.37.1 Guidance box (Help function)

The Guidance box provides operating guidance for a cursor-selected item. You can show or hide the guidance as follows:



1. Open [MAIN MENU], click [CONFIGURATION].
2. Click [OPERATION].



3. Click [GUIDANCE].
4. Click [ON] or [OFF] as appropriate.
5. Click outside the menu window to close the menu.

1.37.2 Menu transparency

You can make the menu window transparent or opaque as follows:

Note: Alpha blending technology is used for transparency effects.

1. Open [MAIN MENU], click [DISPLAY].
2. Click [TRANPARENCY].
3. Click [ON] or [OFF] as appropriate.
[ON]: Menu window is transparent.
[OFF]: Menu window is opaque. Echoes are hidden behind the menu.
4. Click outside the menu window to close the menu.

1.37.3 Display capture

You can capture the screen shots to replay them on the PC. The setting for the display capture is set on the [CAPTURE] menu. To open the [CAPTURE] menu, open [MAIN MENU] then click [CAPTURE]. The [CAPTURE] menu is available in the stand-by mode.

[CAPTURE]

- 1 BACK
- 2 DRIVE SELECT
SD-1 /SD-2
- 3 [DRIVE INFO]
- 4 [AUTO CAPTURE]
- 5 [DELETE CAPTURE DATA]
- 6 REMOVE EXTERNAL MEDIA
SD-1 /SD-2

Manual capture

You can capture the screen manually by clicking the [CAPT] icon. The screen shots captured are saved to the SD card.

Automatic capture

Automatic capture functions to save images in two data groups ([NORMAL], [FAST]) automatically. The captured data are automatically saved to the SD card.

Data group	Contents of files
NORMAL	Captured files at specified interval set in the [INTERVAL] menu, for the last 24 hours.
FAST	Captured files at 10 seconds interval, for the last one hour.

1. Open [MAIN MENU], click [CAPTURE].
2. Click [AUTO CAPTURE].

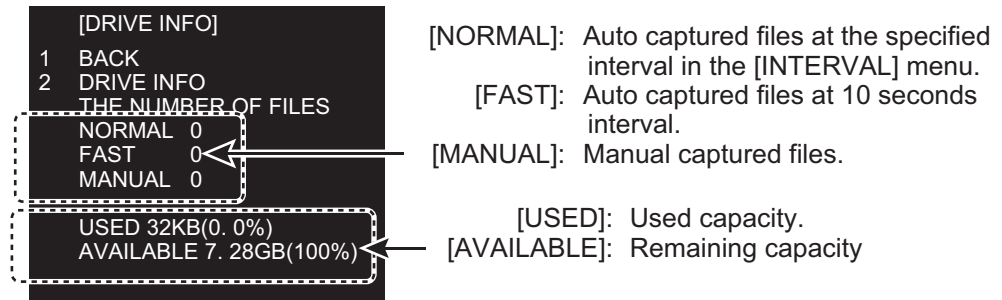
[AUTO CAPTURE]

- 1 BACK
- 2 AUTO CAPTURE
OFF/ON
- 3 INTERVAL
000min

3. Click [AUTO CAPTURE] then [ON].
4. Click [INTERVAL].
5. Set the time interval for the capture. The setting range is from 1 min to 999 min.
6. Click outside the menu window to close the menu.

[CAPTURE] menu items

- [DRIVE SELECT]: Click the drive [SD-1] or [SD-2] to use. The [SD-1] is upper slot and [SD-2] is lower.
- [DRIVE INFO]: Confirm the number of screen shots saved and the remaining capacity of the SD card selected at [DRIVE SELECT].

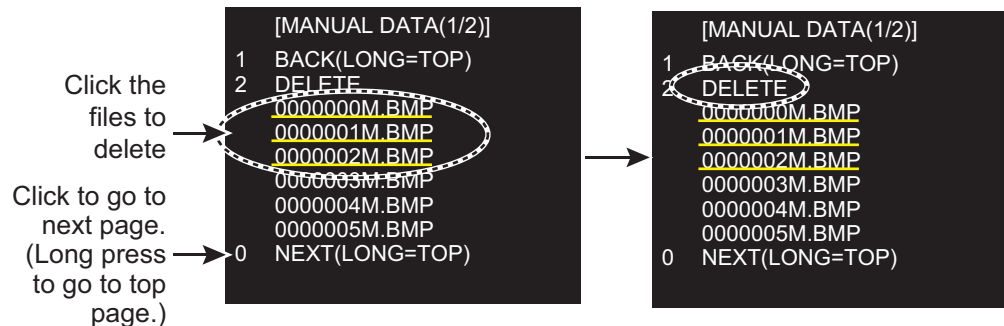
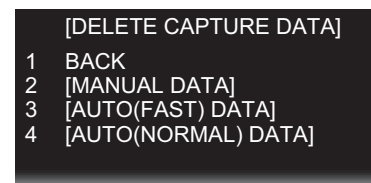


The duration to save the captured files depends on the capacity of an SD card.

Capacity of SD card	Duration (for blank SD card)
8 GB	Latest approx. 21 hours
16 GB	Latest 24 hours

- [DELETE CAPTURE DATA]: Delete the selected files. You can select more than one file to delete.

- 1) Click the data group including files to delete, [MANUAL DATA], [AUTO (FAST) DATA] or [AUTO (NORMAL) DATA].
- 2) Select the files to delete. The yellow lines appear under the names of selected files.
- 3) Select [DELETE].



- [REMOVE EXTERNAL MEDIA]: Select the SD card ([SD-1] or [SD-2]) to remove from the card slot safely.

Note: Select the same card as the card selected on the [DRIVE SELECT] menu.

1.37.4 How to customize the operation

You can customize the operation on the [OPERATION] menu.

Open [MAIN MENU], click [CONFIGURATION]. Then click [OPERATION] to open the [OPERATION] menu.

[OPERATION]	
1	BACK
2	REF POINT ANT /CCRP
3	KEY BEEP OFF /LOW/MID/HIGH
4	OWN SHIP VECTOR OFF /COURSE/HDG
5	CURSOR SIZE SMALL /LARGE
6	GUIDANCE OFF /ON
7	[TOUCH-PAD]
8	[POINTING-DEVICE]

[REF POINT]: The reference point for measurements (range, bearing, etc.) and markers (heading line, stern mark, etc.) can be antenna point or consistent common reference point (CCRP), which is a location on own ship to which all horizontal measurements, for example range, bearing, relative course, relative speed, closest point of approach (CPA) or time to closest point of approach (TCPA), are normally referenced. Select reference point, [ANT] or [CCRP], as appropriate.

[KEY BEEP]: A beep sounds when a keying sequence has been correctly executed.

[OFF]: No key beep

[LOW], [MID], [HIGH]: Loudness of key beep

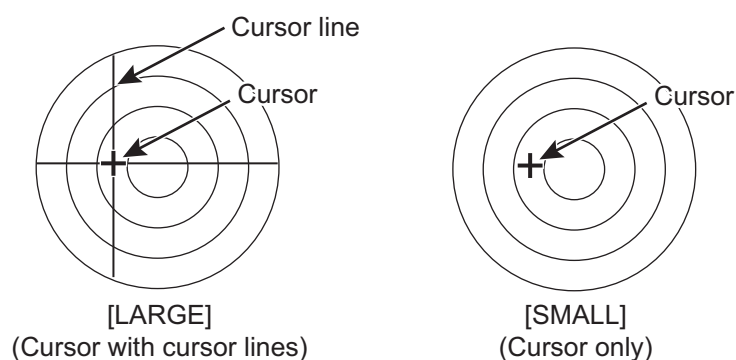
[OWN SHIP VECTOR]: Select what the own ship vector displays.

[OFF]: No own ship vector

[COURSE]: Vector shows course.

[HEADING]: Vector shows heading direction.

[CURSOR SIZE]: Select the size of the cursor, [SMALL] or [LARGE].



[GUIDANCE]: See paragraph 1.37.1.

[TOUCH-PAD]: Touch pad settings.

[TOUCH-PAD]: Activate or deactivate the touch-pad.

[SENSITIVITY]: Adjust the sensitivity of the touch-pad operation. [5] is the highest sensitivity.

[POINTING-DEVICE]: Pointing device (mouse) settings.

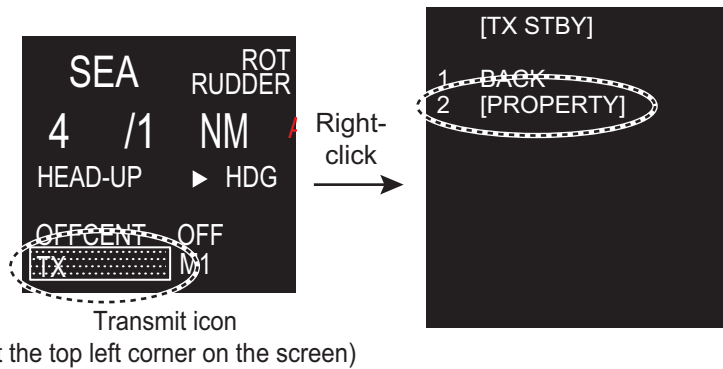
[POINTING-DEVICE]: Activate or deactivate the pointing device.

[SENSITIVITY]: Adjust the sensitivity of the pointing device operation. [5] is the highest sensitivity.

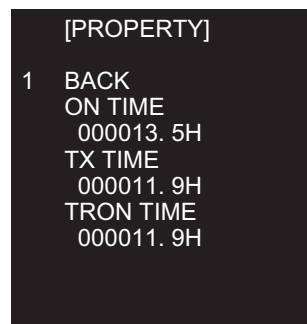
1.37.5 Transmit time

ON time, TX time and TRON time are shown on the stand-by display. You can also show these values by using the Transmit icon.

1. Right-Click the transmit icon ([TX] or [STBY]) to open the [TX STBY] menu.



2. Click [PROPERTY] to open the [PROPERTY] window.



- [ON TIME]: Total operation time
- [TX TIME]: Total transmission time
- [TRON TIME]: Total magnetron usage time

1. OPERATION

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2. TARGET TRACKING (TT)

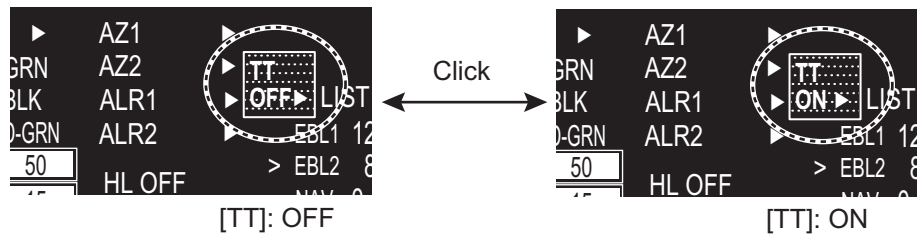
The Target Tracking function requires the heading data and ship's speed data.

2.1 TT Display On/Off

To show or hide the TT display, click the [TT] icon at the bottom left corner on the screen.

[TT OFF]: Deactivates TT.

[TT ON]: Activates TT.



The plotting symbol is drawn by broken circles during the initial acquisition stage. A vector appears in about one minute after acquisition indicating the target's motion trend. If the target is consistently detected for three minutes, the plotting symbol changes to a solid circle. If acquisition fails, the target plotting symbol blinks and disappears shortly.

2. TARGET TRACKING (TT)

TT symbols

	Symbol	Status	Remarks
Automatically acquired targets		Initial stage	Broken circles enclose an echo to indicate the target under acquisition and initial stage of tracking, before steady-state tracking
			Within one minute after acquisition (vector still unreliable).
		Steady tracking	Solid circle with vector indicating steady state tracking (within three minutes after acquisition).
	 (flashing)	CPA alarm	Plotting symbol (red) flashes to indicate the target whose CPA or TCPA is less than the CPA alarm setting.
		CPA alarm acknowledge	Shown in red and flashing. The flashing stops after CPA/TCPA alarm is acknowledged.
	 (flashing)	Lost target	A red X is put on the TT symbol to indicate that it is a lost target. Flashing stops after lost target alarm is acknowledged.
Manually acquired targets (the width of the circle for "steady tracking" TT is thicker than that of the automatically acquired target.)		Initial stage	Plotting symbol selected for a target acquired manually is shown in bold broken lines.
			Within one minute after acquisition (vector still unreliable).
		Steady tracking	Manual plotting symbol in a bold solid circle (within three minutes after acquisition).
	 (flashing)	CPA alarm	Plotting symbol (red) flashes to indicate the target whose CPA or TCPA is less than the CPA alarm setting.
		CPA alarm acknowledge	Flashing stops after CPA/TCPA alarm is acknowledged.
	 (flashing)	Lost target	A red X is put on the TT symbol to indicate that it is a lost target. Flashing stops after lost target alarm is acknowledged.
Acquisition zone	 (flashing)	On target passing through operator-set acquisition zone	Symbol is red and flashing.
Target selected for data readout		On selected target	Target selected data to display its data (range, bearing, course, speed, CPA, TCPA, BCR, BCT, etc.).
Reference target	 After three minutes, changes to 	On reference target	Used to calculate own ship's over-the-ground speed (echo-referenced speed) for ground stabilization.

2.2 How to Acquire and Track Targets

This radar can acquire a maximum of 100 targets, the number of automatically and manually acquired targets determined by the [TT TARGET MENU] setting.

1. Right-click the [TT] icon to show the [TT TARGET MENU] window.



2. Click [TT SELECT] then the distribution between manually and automatically acquired targets.
 [MANUAL 100]: 100 for manual tracking
 [AUTO 25]: 25 for automatic tracking, 75 for manual tracking
 [AUTO 50]: 50 for automatic and manual tracking
 [AUTO 75]: 75 for automatic tracking, 25 for manual tracking
 [AUTO 100]: 100 for automatic tracking
3. Click outside the menu window to close the menu.

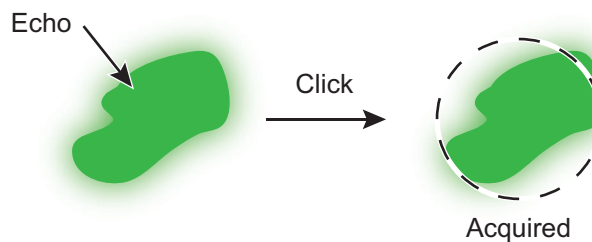
2.3 Manual Acquisition

You can acquire targets manually as follows:

1. Right-click anywhere in the radar display to open [CURSOR MENU].



2. Click [ACQUIRE].
3. Click the target to acquire. You can select several targets by clicking consecutively.



4. Right-click to quit.

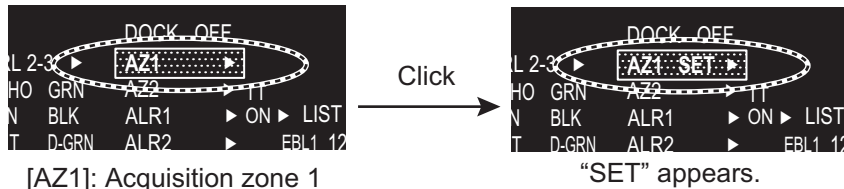
2.4 Automatic Acquisition

Targets which enter an acquisition zone (two zones possible) are automatically acquired. Set an acquisition area as follows:

2.4.1 How to set an acquisition zone

Note: The acquisition zone can not be set within 3 NM from own ship.

1. Click the [AZ1] icon. The [AZ1] icon now reads "AZ1 SET".

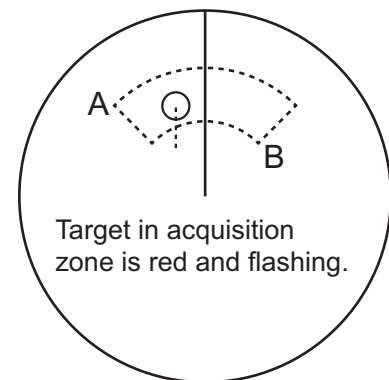


Acquisition zone status

[AZ1]:	No acquisition zone.
[AZ1 SET]:	Set acquisition zone.
[AZ1 WORK]:	Activate acquisition zone.
[AZ1 SLP]:	Sleep acquisition zone.

2. Click the point A.
3. Click the point B. The [AZ1] icon now reads "AZ1 WORK".

Note: [AZ2] can be set when [AZ1] is active. The dashed lines are longer on [AZ2].



2.4.2 How to sleep an acquisition zone

1. Click the appropriate [AZ] icon.
2. Click the [AZ] icon to change from [AZ1 (2) WORK] to [AZ1 (2) SLP]. The acquisition zone disappears from the screen. To reactivate and display the acquisition zone, repeat this procedure to display [AZ1 (2) WORK].

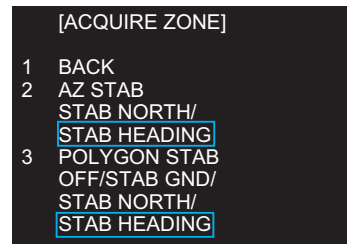
2.4.3 How to delete an acquisition zone

1. Click the appropriate [AZ] icon.
2. Press and hold down the left button until the [AZ] icon goes blank. The acquisition zone is deleted from the screen.

Note: If both acquisition zones are the active [AZ1] can not be deleted unless the [AZ2] is deleted.

2.4.4 Acquisition zone reference

1. Open [MAIN MENU], click [TT-AIS].
2. Click [ACQUIRE ZONE].



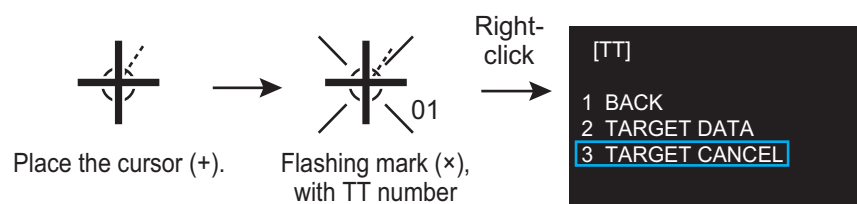
3. Click [AZ STAB] then the acquisition zone reference as appropriate.
[STAB NORTH]: Acquisition zone is fixed to North.
[STAB HEADING]: Acquisition zone keeps position related to your ship.
4. Click [POLYGON STAB] then the acquisition zone shape and stabilization as appropriate.
[OFF]: Acquisition zone is a sector; number of points is limited to four. Stabilized against land.
[STAB GND]: Polygon having 3-10 points. Stabilized against ground.
[STAB NORTH]: Polygon having 3-10 points. Stabilized against north.
[STAB HEADING]: Polygon having 3-10 points. Stabilized against heading.
5. Click outside the menu window to close the menu.

2.5 How to Stop Tracking a Target

You can stop tracking specific targets or all targets.

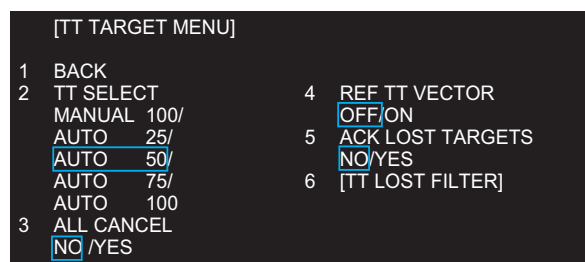
How to cancel tracking on individual targets

1. Place the cursor (+) on the target. The mark (x) flashes behind the target.
2. Right-click the target to show the [TT] window.
3. Click [TARGET CANCEL] to stop tracking the target.



How to stop tracking all targets

1. Right-click the [TT] icon to show the [TT TARGET MENU].

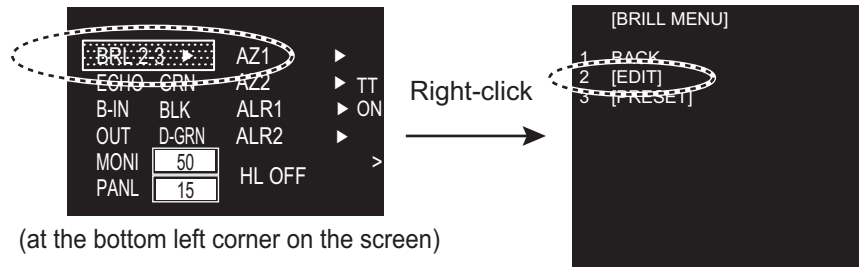


2. Click [ALL CANCEL].
3. Click [YES].
4. Click outside the menu window to close the menu.

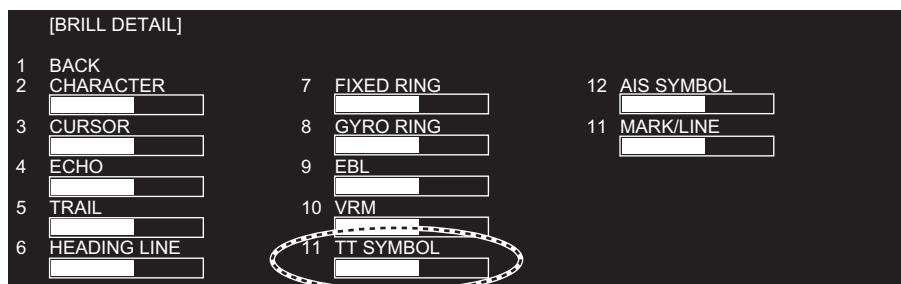
2.6 TT Symbol Attributes

2.6.1 TT symbol brilliance

1. Right-click the [BRL] icon to show the [BRILL MENU] window.



2. Click [EDIT].
3. Click [BRILL DETAIL] to show the [BRILL DETAIL] window.

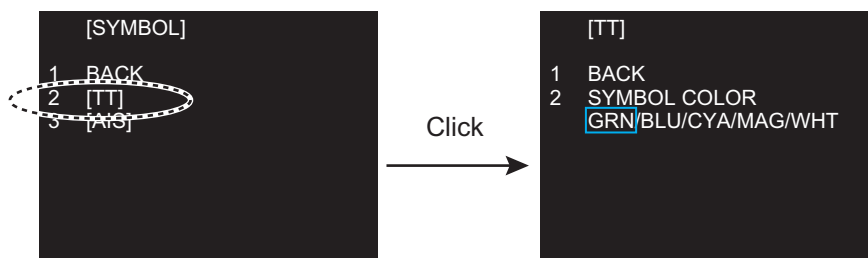


4. Click [TT SYMBOL].
5. Click the slide bar for [TT SYMBOL] then set the brilliance as appropriate with the setting knob.
6. Click outside the menu window to close the menu.

2.6.2 TT symbol color

You may select the color of the TT symbol as follows.

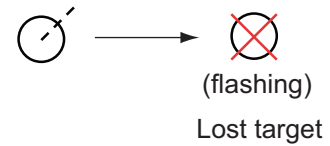
1. Open [MAIN MENU], click [TT·AIS].
2. Click [SYMBOL].
3. Click [TT].



4. Click [SYMBOL COLOR].
5. Click the desired color.
[GRN]: green, [BLU]: blue, [CYA]: cyan, [MAG]: magenta, [WHT]: white
6. Click outside the menu window to close the menu.

2.7 Lost Target

Targets not detected in five consecutive scans become "lost targets." A lost target is shown in the display with a flashing red "X". Flashing stops after the lost target alarm is acknowledged.

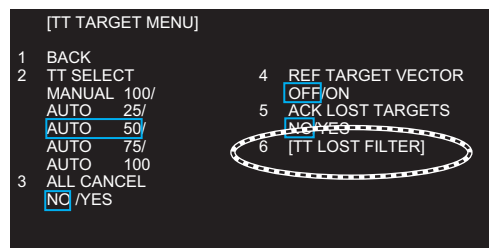


If you are in an area where tracked targets are lost frequently you may want to disable the lost target alarm against tracked targets by maximum range or minimum speed.

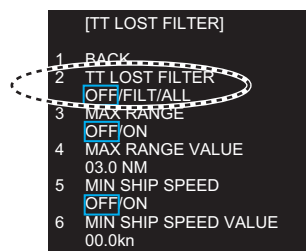
2.7.1 Lost target filter

You can set the lost target alarm to sound against lost TTs that meet a specific range or ship speed. Set the criteria as shown below.

1. Right-click the [TT] icon.
2. Click [TT LOST FILTER].



3. Click [TT LOST FILTER].



4. Select how to enable or disable the lost target alarm.
[OFF]: Disable the alarm.
[FILT]: Get the alarm against the targets whose criteria meet the settings on the [TT LOST FILTER] menu.
[ALL]: Get the alarm against all lost targets.
5. Click [MAX RANGE VALUE] and [MIN SHIP SPEED VALUE] as appropriate, referring to the description below.
[MAX RANGE], [MAX RANGE VALUE]: Any TT lost target beyond the range set here will not trigger the lost target alarm.
[MIN SHIP SPEED], [MIN SHIP SPEED VALUE]: Any TT lost target slower than this setting will not trigger the lost target alarm.

Note: Reference targets are not affected by this filter.

2.7.2 How to acknowledge a lost target

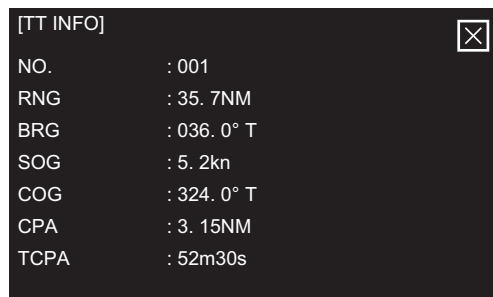
1. Right-click the [TT] icon to show [TT TARGET MENU].
2. Click [ACK LOST TARGETS].
3. Click [YES]. All lost targets disappear from the screen.

2.8 TT Data

The TT target list provides a comprehensive data display of all TT targets being tracked.

How to display TT data

1. Place the cursor (+) on the target to show the target data. The mark (x) flashes behind the target.
2. Right-click the target to show the [TT] window.
3. Click [TARGET DATA] to show the [TT INFO] window. The selected target is enclosed in a broken square.



[TT INFO] window

[NO.]: Target No.

[RNG]: Range

[BRG]: Bearing

[SOG]: Speed over ground

[COG]: Course over ground

[CPA]: Target's CPA

[TCPA]: Target's TCPA

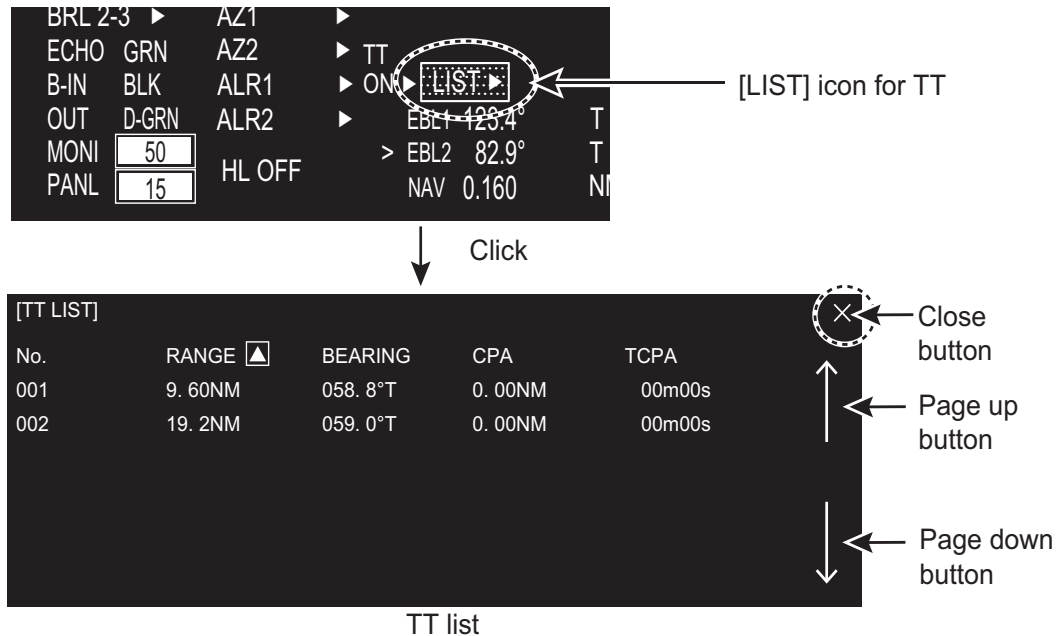
4. Click outside the menu window to close the menu.

2.9 TT List

How to display the TT list

The TT list provides the range, bearing, CPA and TCPA of all tracking targets.

To display the TT list, click the [LIST] icon for TT at the bottom left corner on the screen to show the [TT LIST] window.



To close the [TT LIST] window, click the close button at the top right corner of the window.

[No.]: Target number

[RANGE], [BEARING]: Range and Bearing from own ship to the selected target with suffix "T" (True) or "R" (Relative).

[CPA], [TCPA]: CPA (Closest Point of Approach) is the closest range a target will approach to own ship. TCPA is the time to CPA. Both CPA and TCPA are automatically calculated. A negative TCPA value means that you have already passed the CPA and the target is going away from own ship.

How to display TT data

Click the target on [TT LIST] to show the [TT INFO] window. See section 2.8.

How to sort the TT list

You may sort the TT list by RANGE, CPA, TCPA as follows.

1. Right-click the [LIST] icon for TT to show the [TT-LIST] window.



2. Click [SORT BY].
3. Click the sorting item desired, by [RANGE], [CPA] or [TCPA].
4. Click outside the menu window to close the menu.

2.10 Vector Modes

Target vectors can be displayed relative to own ship's heading (Relative) or north (True).

2.10.1 Description of vectors

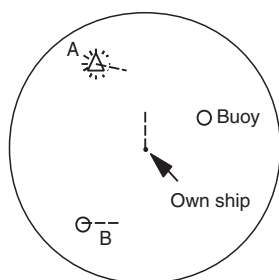
Sea stabilization is a mode where own ship and all targets are referenced to the sea using a compass heading and single-axis log water speed inputs. Ground stabilization is a mode where own ship and all targets are referenced to the ground using the ground track or set and drift inputs. If the accuracy seems unsatisfactory, enter set and drift corrections.

True vector

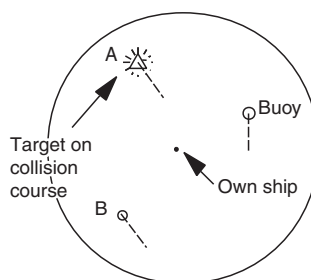
Own ship and other ships move on the display at their true speeds and courses. This mode is useful for distinguishing moving targets from stationary ones.

Relative vector

Other ships move relative to your ship. This mode is useful for finding ships on a collision course with your ship. A ship whose vector passes through your ship's position is on a collision course.



True vectors in head-up mode

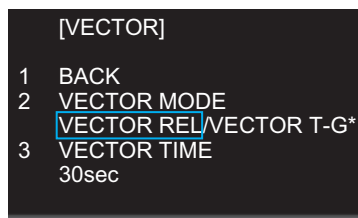


Relative vectors in head-up mode

2.10.2 Vector mode and length

Vectors may be displayed in true or relative mode. Vector time (or the length of vectors) can be set from 30 sec, 1 to 6 minutes.

1. Open [MAIN MENU], click [TT·AIS].
2. Click [VECTOR].



*: For SOG, [VECTOR T-G]
For STW, [VECTOR T-S]

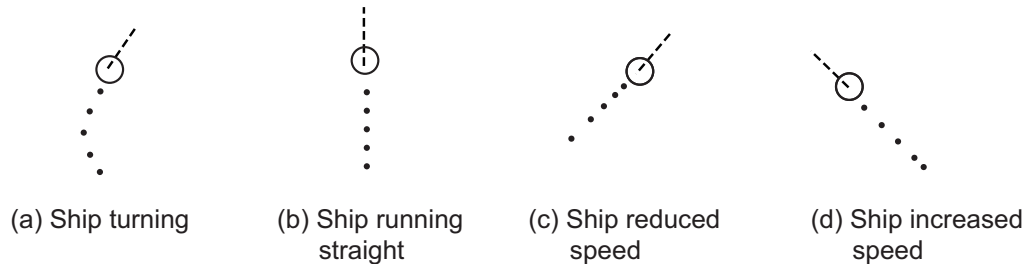
3. Click [VECTOR MODE].
4. Click the appropriate mode.
[VECTOR REL]: Relative mode
[VECTOR T-G], [VECTOR T-S]: True mode
5. Click [VECTOR TIME].
6. Select the time (30 sec to 6 min) with the setting knob.
7. Click outside the menu window to close the menu.

2.11 Past Position Display

Equally time-spaced dots shows the past position display marking the past positions of any targets being tracked.

A new dot is added every minute (or at other preset time intervals) until the preset number is reached. If a target changes its speed, the spacing will be uneven. If it changes the course, its plotted course will not be a straight line.

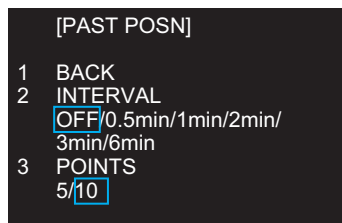
Past position orientation, true or relative, is controlled with [TRAIL MODE] in the [TRAIL] menu. See section 1.25 for the procedure.



2.11.1 How to select the dot number and interval of the past position

You may select the number of past points to display per plotting interval as follows.

1. Open [MAIN MENU], click [TT·AIS].
2. Click [PAST POSN].



3. Click [INTERVAL].
4. Click the plot interval desired (0.5 min to 6 min). Click [OFF] to erase all past position points and deactivate the past position display.
5. Click [POINTS].
6. Click the number of dots to display, 5 or 10.
7. Click outside the menu window to close the menu.

2.11.2 Past position display mode

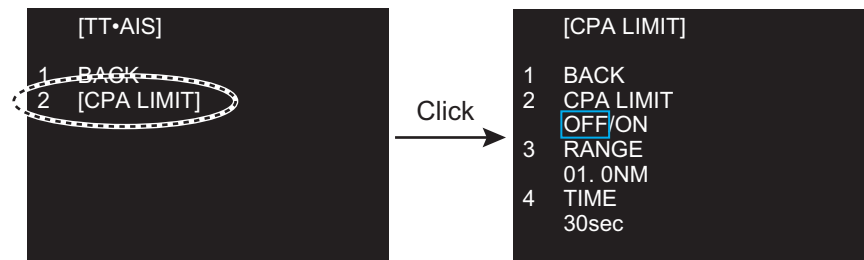
The display mode for the past position display is the same as that set for the TT vector. In the true motion mode, the true vector is displayed. See paragraph 2.10.1.

2.12 CPA/TCPA Alarm

The CPA/TCPA alarm alerts you when both the CPA and TCPA of a TT is within a defined limit.

CPA and TCPA of the target is less than the alarm settings.

1. Open [MAIN MENU], click [ALARM].
2. Click [TT·AIS].
3. Click [CPA LIMIT].



4. Click [CPA LIMIT].
5. Click [ON].
6. Click [RANGE].
7. Select the desired distance for CPA (Setting range: 0.1 to 24 NM) with the setting knob.
8. Click [TIME].
9. Select the desired time for TCPA (Setting range: 30 sec to 15 min) with the setting knob.
10. Click outside the menu window to close the menu.

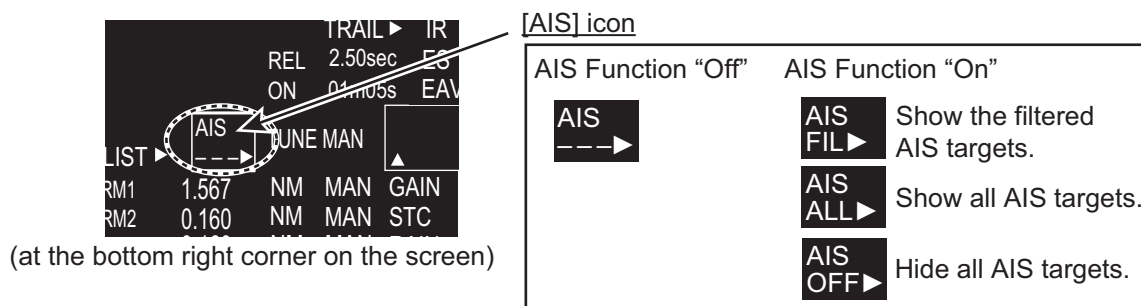
3. AIS OPERATION

The AIS (Automatic Identification System) transponder connected to this radar exchanges all data and information required by the SOLAS 1994 with other AIS-fitted ships. AIS information is graphically indicated together with the radar and TT information.

When AIS is active, manual or reference speed selection is not available.

AIS Function On/Off

You may disable or enable the AIS function from the AIS icon. Long press the AIS icon with the left button to switch function between on and off.



3.1 AIS Display On/Off

To show or hide the AIS display, click the [AIS] icon at the bottom right corner on the screen.

- [AIS OFF]: All AIS symbols are hidden, but tracking continues internally.
- [AIS FIL]: AIS targets are displayed according to the criteria set with [CPA AUTO ACTIVE] in [AIS TARGET MENU]. See section 3.10 for details.
- [AIS ALL]: All AIS targets received by the AIS transponder are displayed with symbols.



When the AIS is turned on, AIS targets are marked with appropriate AIS symbol as shown in the table below.

Note: If the CPA/TCPA alarm is generated while the setting is [AIS OFF], the AIS target is automatically displayed and the setting in the [AIS] box becomes [AIS ALL].

3. AIS OPERATION

AIS symbols

Symbol	Status	Remarks
	Sleeping target	Smaller triangle than an active target
	Activated target	Heading line, ship speed/course vectors are displayed. Color is selectable on the menu.
	Turning target	A turning symbol is displayed.
	Dangerous target	Collision alarm symbol is displayed in red. The symbol flashes until acknowledged.
	Lost target	When a target is lost, a red flashing X mark is attached to the symbol. The symbol disappears after acknowledgement.
	Target whose data are being displayed.	Target selected to display its data is enclosed with a broken square.
	Real AIS track sign	—
	Virtual AIS track sign	—
	AIS base station	—
	Airborne SAR aircraft AIS	—
	AIS-SART	—
	AIS target without heading	—

AIS symbols with Blue sign, Blue cones

Blue sign	Not connected or not available		Not set		Set	
The number of Blue cones	No	1 to 3 (Red mark)	No	1 to 3 (Red mark)	No	1 to 3 (Red mark)
With heading	 (Scaled symbol)	 (Scaled symbol)	 (Scaled symbol)	 (Scaled symbol)	 (Scaled symbol)	 (Scaled symbol)
Without heading						

Note 1: The equipment continues to process AIS targets when the AIS feature is switched off. When the AIS is again turned on, symbols are immediately displayed.

Note 2: AIS symbols are momentarily erased after the screen is redrawn when the orientation mode is changed from the head-up mode.

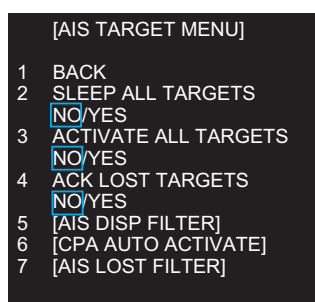
Note 3: When no AIS data is received, the message "AIS RECEIVE ERROR" appears. Check the AIS transponder.

Note 4: An AIS target is declared as lost target if it is not detected in five consecutive reporting periods.

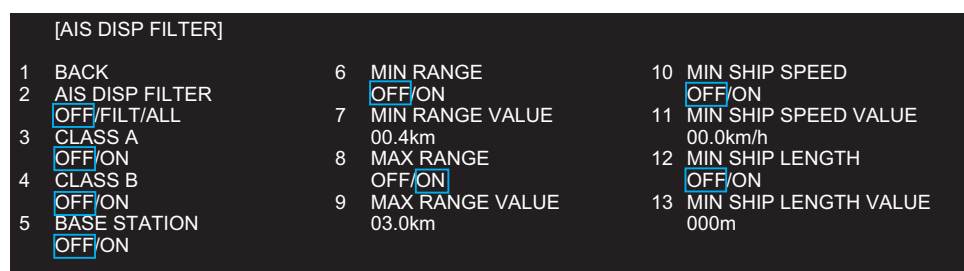
3.2 AIS Display Filter

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

1. Right-click the [AIS] icon.



2. Click [AIS DISP FILTER].



3. AIS OPERATION

3. Set item 3 to 13 referring to the description below.
[CLASS A]: Hide or show the CLASS A AIS targets.
[CLASS B]: Hide or show the CLASS B AIS targets.
[BASE STATION]: Hide or show AIS base stations.
[MIN RANGE], [MIN RANGE VALUE]: If [MIN RANGE] is set to [ON], only AIS targets further than the range set at [MIN RANGE VALUE] are shown.
[MAX RANGE], [MAX RANGE VALUE]: If [MAX RANGE] is set to [ON], only AIS targets nearer than the range set at [MAX RANGE VALUE] are shown.
[MIN SHIP SPEED], [MIN SHIP SPEED VALUE]: If [MIN SHIP SPEED] is set to [ON], only AIS targets faster than the speed set at [MIN SHIP SPEED VALUE] are shown.
[MIN SHIP LENGTH], [MIN SHIP LENGTH VALUE]: If [MIN SHIP LENGTH] is set to [ON], only AIS targets longer than the length set at [MIN SHIP SPEED VALUE] are shown.
4. Click outside the menu window to close the menu.
Note: An AIS target whose data is currently displayed is not affected by the filter setting.

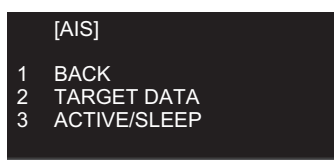
3.3 How to Activate Targets

3.3.1 How to activate specific targets manually

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

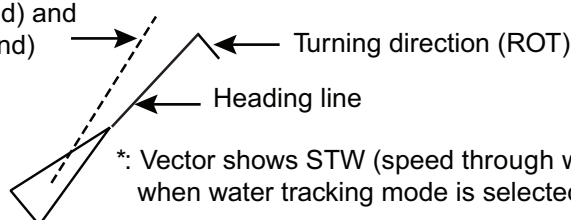
Sleeping targets within an acquisition zone are automatically changed to activated targets and are colored red. See section 3.5 for details.

1. Right-click the [AIS] icon to activate to show the AIS window.



2. Click [ACTIVE/SLEEP].

SOG (Speed over Ground) and
COG (Course over Ground)
vector*



3. Click outside the menu window to close the menu.

3.3.2 How to activate all targets

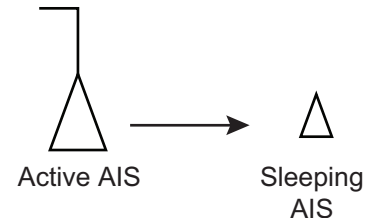
1. Open [AIS TARGET MENU] (see step 1 of section 3.2), click [ACTIVATE ALL TARGETS].
2. Click [YES].
3. Click outside the menu window to close the menu.

3.4 How to Sleep Targets

3.4.1 How to sleep an individual target

You may “sleep” an AIS target as below when the screen becomes filled with targets, which might prevent important radar and AIS displays from being identified. Note that targets that have been activated automatically cannot be “slept”.

1. Right-click the AIS target to sleep to show the AIS window.
2. Click [ACTIVE/SLEEP].



3.4.2 How to sleep all targets

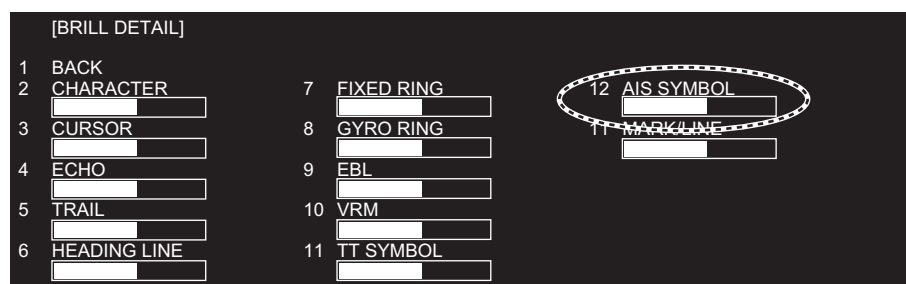
1. Open [AIS TARGET MENU] (see step 1 of section 3.2), click [SLEEP ALL TARGETS].
2. Click [YES].
3. Click outside the menu window to close the menu.

3.5 AIS Symbol Attributes

You may adjust the brilliance and select the size and color of the AIS symbol.

3.5.1 AIS symbol brilliance

1. Right-click the [BRL] (brill) icon to show the [BRILL MENU] window.
2. Click [EDIT].
3. Click [BRILL DETAIL] to show the [BRILL DETAIL] window.



4. Click [AIS SYMBOL].
5. Set the brilliance as appropriate with the setting knob.
6. Click outside the menu window to close the menu.

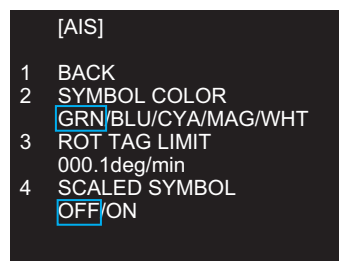
3.5.2 AIS symbol size and color

You may select the size and color of the AIS symbol as follows.

1. Open [MAIN MENU], click [TT·AIS].
2. Click [SYMBOL].

3. AIS OPERATION

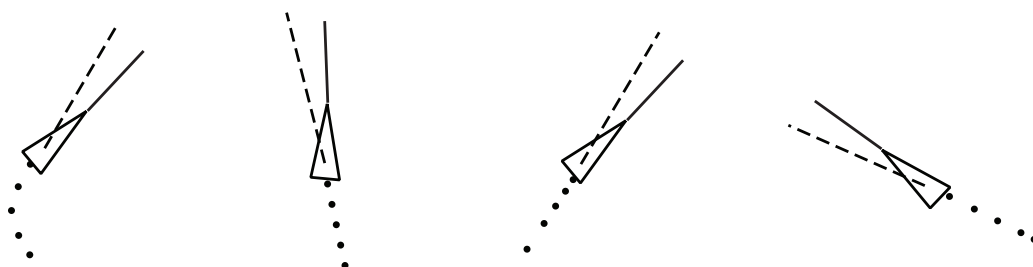
- Click [AIS] to show the [AIS] window.



- Click [SYMBOL COLOR] then the desired color.
- Click [SCALED SYMBOL].
- Click [OFF] or [ON] as appropriate.
[OFF]: All AIS symbols shown in same size.
[ON]: All AIS symbols are scaled according to ships' lengths.
- Click outside the menu window to close the menu.

3.6 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 is be uneven. If it changes course, its plotted course is not shown by a straight line.

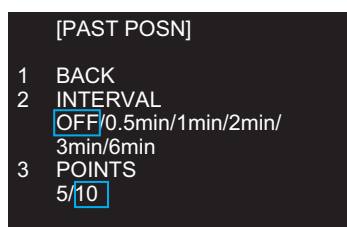


(a) Ship turning (b) Ship running straight (c) Ship reduced speed (d) Ship increased speed

3.6.1 How to select the number and interval of the past position

You may select the number of past points to display per plotting interval as follows.

- Open [MAIN MENU], click [TT·AIS].
- Click [PAST POSN].



- Click [INTERVAL].
- Click the plot interval desired (0.5 min to 6 min). Click [OFF] to erase all past position points and deactivate the past position display.
- Click [POINTS].
- Click the number of dots to display, 5 or 10.
- Click outside the menu window to close the menu.