The GOTO points is automatically assigned the name “QP<001”. The GOTO point also appears in the [WAYPOINTS LIST].

Note 1: If a new single GOTO destination is entered, the old one is deleted.
Note 2: Waypoint data received from a connected navigator is given priority. If a GOTO destination is entered at the navigator, the GOTO point set in the previous procedure is overwritten.

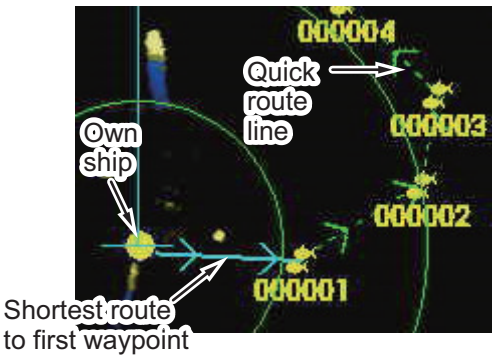
Creating a quick route

Note: The following procedure requires [ROUTE DATA SOURCE] in the [ROUTE•WAYPOINTS] menu to be set to [INTERNAL].

1. Set the GOTO method as 1POINT, referring to "Setting the GOTO method" on page 6-58.
2. Right-click within the radar effective radius to show the [CURSOR] menu.
3. Select [GOTO]. The [CREATE QUICK ROUTE] window appears.

Note: For RCU-031 users, you can also press **GOTO** to open the [CREATE QUICK ROUTE] window.

4. Click an existing waypoint, or new location on the screen, to set the quick route’s starting point. If you selected an existing waypoint, the waypoint’s name and icon change to yellow color. If you selected a new location, the GOTO point “QP<001” appears.
5. Repeat step 4 as required, leaving the final point unselected.
   A route line with arrows indicating the direction of travel appears between each waypoint. You can delete a waypoint immediately after entering it by pressing the **F3** key.
6. At the final waypoint (destination), press the **left button** twice in quick succession (double-click). The quick route is now complete.



A line indicating the shortest route to the first waypoint appears between your vessel and the first waypoint. The remainder of the quick route is indicated with a green dashed line and arrows showing the direction of travel. The quick route also appears in the ROUTES LIST with the name “Q<RTE”.

Note: If a new single quick route is entered, the old one is deleted. Futher, if a new GOTO point is entered, the first point of the quick route, “QP<001” is removed from the quick route.

6.6.2 How to set a waypoint as a destination

You can set a waypoint as a destination with one of the following methods:

- Select the waypoint on the screen.
- Select the waypoint from the WAYPOINTS LIST.
- Enter the waypoint number (for waypoints with numeric names only)
- Select the waypoint from the waypoint log.

Note: The above methods require [ROUTE DATA SOURCE] in the [ROUTE•WAYPOINTS] menu to be set to [INTERNAL].

Selecting an on-screen waypoint as the destination

1. Set the GOTO method as [1POINT], referring to "Setting the GOTO method" on page 6-58.
2. Do one of the following:
   - For RCU-031 users only: Place the cursor on the waypoint you want to go to, then press the **GOTO** key.
   - Use the cursor menu:
     1) Right-click within the radar effective radius to show the [CURSOR] menu.
     2) Select [GOTO].
     3) Place the cursor on the waypoint you want to go to, then left-click.

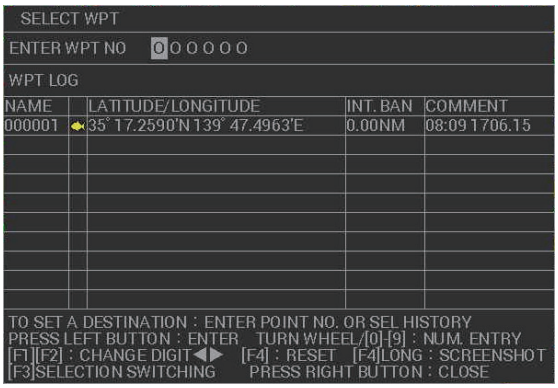
A quick route line appears between your vessel and the selected waypoint.

Selecting a waypoint from the [WAYPOINTS LIST] as the destination

1. Open the menu.
2. Select [ROUTES•WAYPOINTS].
3. Select [SHOW WAYPOINTS LIST]. The [WAYPOINTS LIST] appears.
4. Select the waypoint you want to set as a destination, the press and hold the **F2** key. The second line of the title bar shows “SET DEST.: WPT ××××××” and a quick route to the selected waypoint appears on the screen.
5. Close the window.

Entering the waypoint number as a destination

1. Referring to section 1.7.3, hide the cursor.
2. Right-click within the radar effective radius to show the [CURSOR] menu.
3. Select [GOTO]. The [SELECT WPT] window appears.



Note: For RCU-031 users, you can also press the **GOTO** key to show the [SELECT WPT] window.

4. Enter the waypoint number for the waypoint you want to set as a destination. Spin the scrollwheel to select a numeral, press **F1** or **F2** to move the input cursor. Press the **left button** to confirm the selection. A quick route line appears on-screen, between your vessel and the selected waypoint.

Selecting a destination from the waypoint log

Up to 10 waypoints, selected previously as a destination, are stored in the waypoint log. You can select a destination from the log. When the log becomes full, the oldest waypoint is removed from the log and the newest waypoint is stored.

1. Referring to section 1.7.3, hide the cursor.
2. Right-click within the radar effective radius to show the [CURSOR] menu.
3. Select [GOTO]. The [SELECT WPT] window appears.
4. Press **F3** to move the cursor into the lower half of the window.
5. Select the waypoint you want to use as a destination. A quick route line appears on-screen, between your vessel and the selected waypoint.

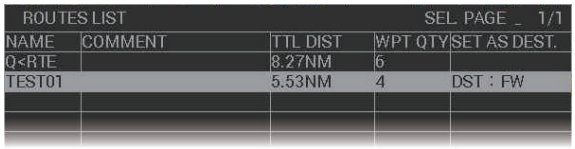
6.6.3 How to set a route as a destination

Selecting the route

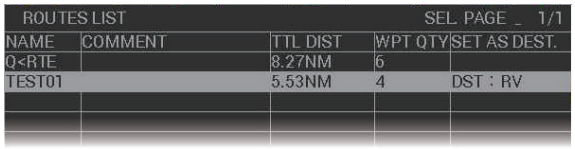
Note: This procedure requires [ROUTE DATA SOURCE] in the [ROUTE•WAYPOINTS] menu to be set to [INTERNAL].

1. Open the menu.
2. Select [ROUTES•WAYPOINTS].
3. Select [SHOW ROUTES LIST].
4. Select the route you want to use.
   You can change the direction of navigation if required. Press and hold **F1** to toggle between [FWD] (forward) and [REV] (reverse). The navigational direction appears in the bottom-right section of the list.

5. Press and hold **F2** to register the navigational direction to the route. The ROUTES LIST shows the navigational direction in the upper section once registered.



Navigational direction set to [FWD]

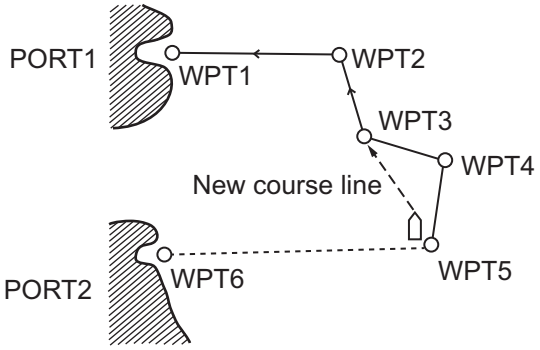


Navigational direction set to [REV]

6. Close the window.

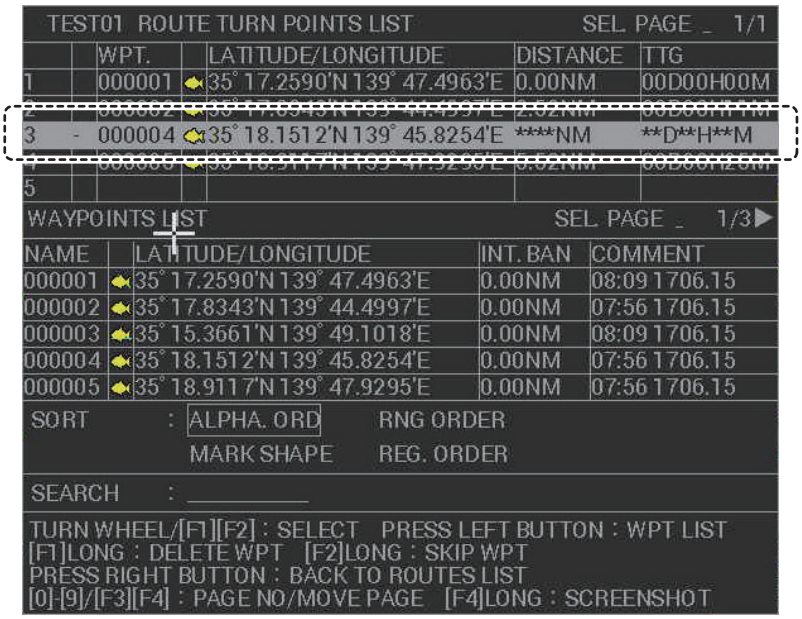
Skipping waypoints

There are occasions, such as the example shown below, where you may want to skip a waypoint without having to stop and restart navigation. You can skip waypoints with the following procedure.



Note: This procedure requires [ROUTE DATA SOURCE] in the [ROUTE•WAY-POINTS] menu to be set to [INTERNAL].

1. Open the menu.
2. Select [ROUTES•WAYPOINTS].
3. Select [SHOW ROUTES LIST].
4. Select the route whose waypoint you want to skip.
5. Select [RUN]. The route details appear in the [ROUTE TURN POINTS LIST].
6. Select the waypoint to skip, the press and hold **F2**. The waypoint and its details appear with asterisks, as shown in the following example.



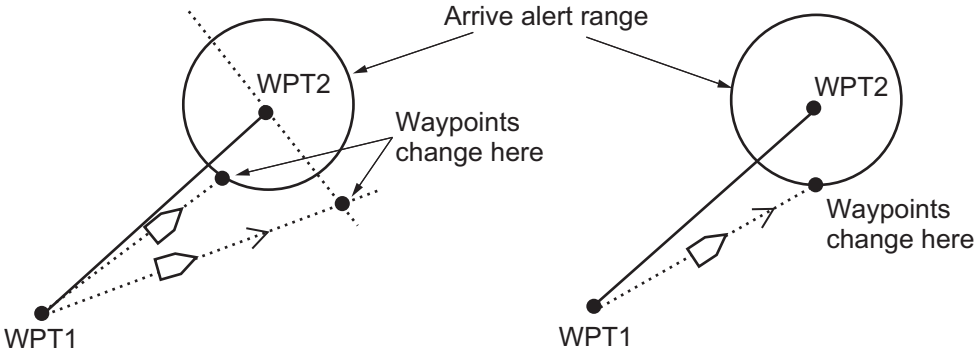
You can reactivate the waypoint in the same manner. Select the skipped waypoint, then press and hold **F2**.

7. Close the window.

Selecting when to switch waypoints

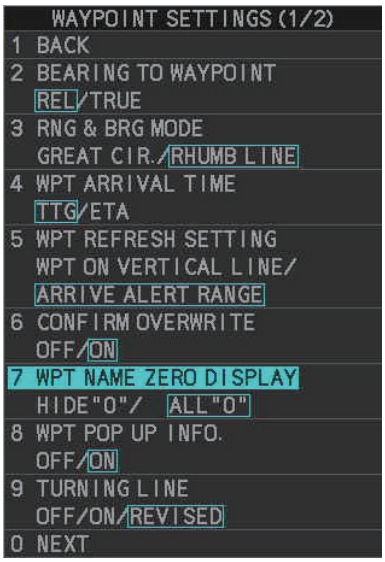
When navigating a route, you change waypoints each time you arrive at a waypoint. The system has two methods of changing the waypoints:

- [WPT ON VERTICAL LINE]: Waypoints change over as you pass the waypoint, or when the arrival alert is triggered, whichever of the two is earlier.
- [ARRIVAL ALERT RANGE]: Waypoints change at the same time as the arrival alert is triggered.



[WPT ON VERTICAL LINE] [ARRIVE ALERT RANGE]

1. Open the menu.
2. Select [ROUTES•WAYPOINTS].
3. Select [WAYPOINT SETTINGS]. The [WAYPOINT SETTINGS] menu appears.

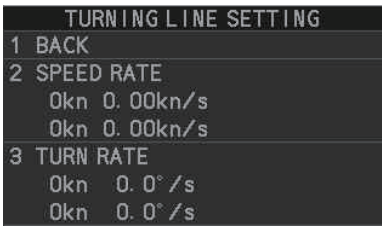


4. Select [WPT REFRESH SETTING].
5. Select [WPT ON VERTICAL LINE] or [ARRIVAL ALERT RANGE] as required.
6. Close the menu.

Setting up the turning line

The turning line indicates the position at which your vessel should turn towards the next waypoint. You can show or hide the line, and also select whether or not to show the line with course offsets.

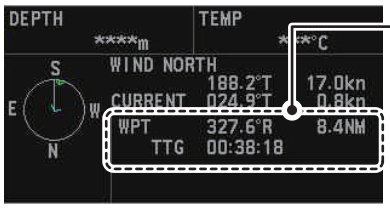
1. Open the menu.
2. Select [ROUTES•WAYPOINTS].
3. Select [WAYPOINT SETTINGS].
4. Select [TURNING LINE].
5. Select the desired setting.
   - [OFF]: turning line is hidden.
   - [ON]: turning is shown with no offsets.
   - [REVISED]: turning line is shown with offsets, factoring for speed, rate of turn and position after the turn.
6. Select [NEXT] to show the second page of the [WAYPOINT SETTINGS] menu.
7. Select [TURNING LINE SETTING]. The turning line settings appear.



8. Select [SPEED RATE].
9. Set the turn rate (ROT) for low speeds at the top setting.
   Set the bottom setting for high speeds.
10. Select [TURN RATE].
11. Set the speed and acceleration rate for low speeds at the top setting.
    Set the bottom setting for high speeds.
12. Close the menu.

6.6.4 How to set up the waypoint data display

When [WPT DATA] in the [NAV DATA SETTINGS] menu is set at [ON] (see section 1.47.1), waypoint data appears in the information box. You can change how the data appears with the following procedure.



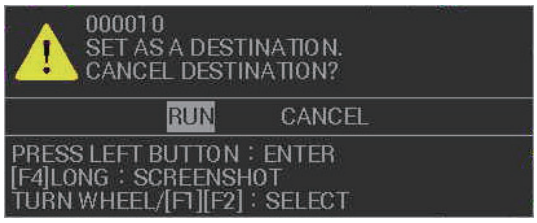
Waypoint data shows:
- Bearing from own ship to WPT
- Range (distance) from own ship to WPT
- Time to go to WPT from current location, or estimated time of arrival (selected from the menu)

1. Open the menu.
2. Select [ROUTES•WAYPOINTS].
3. Select [WAYPOINT SETTINGS].
4. Select [BEARING TO WAYPOINT].
5. Select [REL] (relative) or [TRUE] as required.
6. Select [BEARING MODE].
7. Select the appropriate mode.
   - [GREAT CIR.]: This course line is the shortest course between two points on the surface of the earth, like stretching a piece of string between two points on earth. Frequent bearing changes are required to navigate by this method. For long-range navigation, divide the Great Circle route into several routes, and navigate each route by rhumb Line.
   - [RHUMB LINE]: This method calculates the range and bearing between two points drawn on a nautical chart. Since the bearing is kept constant it is ideal for short-range navigation.

   Note: The setting selected here is also applied to the overall route distance calculation.
8. Select [WPT ARRIVAL TIME].
9. Select the appropriate setting.
   - [TTG]: arrival time appears as “time to go” from your current location.
   - [ETA]: arrival time appears as an “estimated time of arrival” at the destination.
10. Close the menu.

6.6.5 How to stop navigation to a destination

1. Do one of the following to stop navigation to the set destination:
   - For RCU-031 users only: Press the **GOTO** key.
   - Use the cursor menu:
     1) Right-click within the radar effective radius to show the [CURSOR] menu.
     2) Select [GOTO].
     3) Place the within the radar effective radius, then left-click. A confirmation message appears.



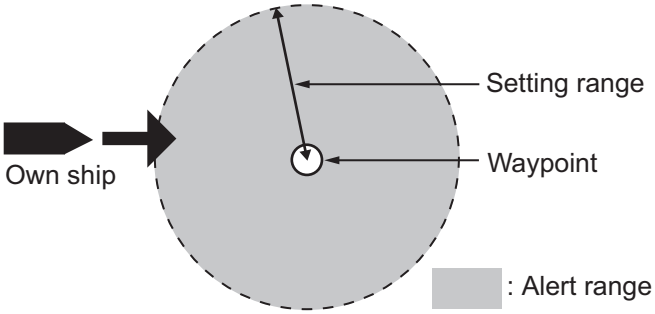
2. Select [RUN] to stop navigating to the destination, or select [CANCEL] to continue navigating to the destination.
   The confirmation window closes automatically when you select an option.

6.7 Plotter-related alerts

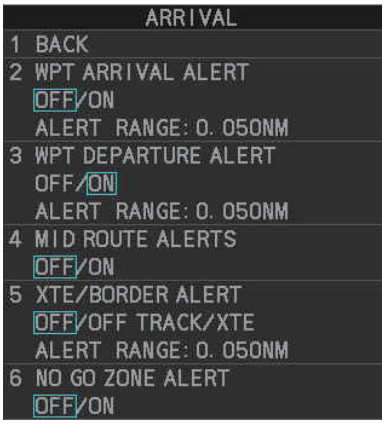
6.7.1 How to set waypoint arrival/departure alerts

Setting the arrival alert

The arrival alert informs you that your vessel is approaching a waypoint. The alert area is a circle, with the waypoint at the center. The alert is released if your vessel enters the circle. When the arrival alert is active, a red dashed circle marks the alert range.



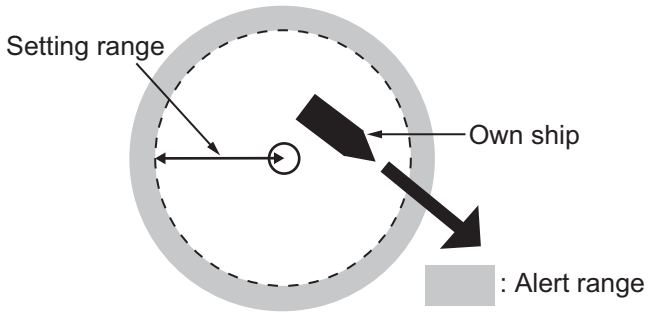
1. Open the menu.
2. Select [ALERTS].
3. Select [ARRIVAL]. The [ARRIVAL] menu appears.
4. Select [WPT ARRIVAL ALERT].
5. Select [ON] to activate the alert area. The cursor moves to the [ALERT RANGE] setting.
6. Set the alert range. This sets the radius for the alert area circle around each waypoint.
7. Close the menu.



To deactivate the alert, select [OFF] at step 5 of the above procedure.

Setting the departure alert

The departure alert works informs you when your vessel passes a set distance from the waypoint. When the departure alert is active, an orange dashed circle marks the alert range.



1. Open the menu.
2. Select [ALERTS].
3. Select [ARRIVAL]. The [ARRIVAL] menu appears.
4. Select [WPT ARRIVAL ALERT].
5. Select [ON] to activate the alert area. The cursor moves to the [ALERT RANGE] setting.
6. Set the alert range. This sets the radius for the alert area circle around each waypoint.
7. Close the menu.

To deactivate the alert, select [OFF] at step 5 of the above procedure.

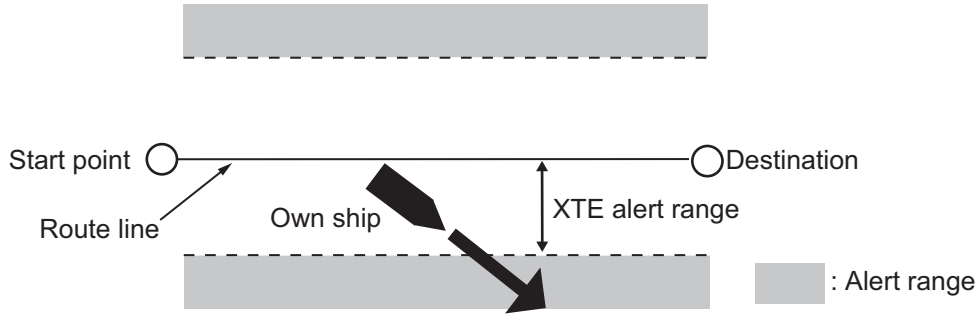
6.7.2 How to set mid-route alerts

You can collectively enable, or disable mid-route alerts such as the arrival and departure alerts.

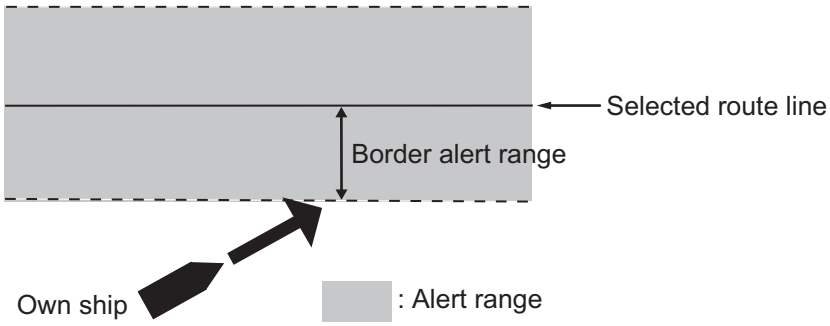
1. Open the menu.
2. Select [ALERTS].
3. Select [ARRIVAL]. The [ARRIVAL] menu appears.
4. Select [MID ROUTE ALERTS].
5. Select [ON] to enable, or [OFF] to disable the mid-route alerts.
6. Close the menu.

6.7.3 How to set XTE/border route alerts

The XTE (cross-track error) alert informs you when your vessel deviates more than the set distance from the intended route.



Border alerts use a registered route as a reference line, setting a range to either side of the line as a “border”.



Note 1: You can only activate either the XTE alert or the border alert. Simultaneous use of these alerts is not possible.

Note 2: Both the XTE alert and the border alert are only displayed when you have an active route. If there is no active route, the XTE/border line do not appear on the screen.

1. Open the menu.
2. Select [ALERTS].
3. Select [ARRIVAL]. The [ARRIVAL] menu appears.
4. Select [XTE/BORDER ALERT].
5. Select the appropriate setting.
   - [OFF]: XTE and border alerts are disabled.
   - [BORDER]: use the border alert.
   - [XTE]: use the XTE alert.

   When you select either [BORDER] or [XTE], the cursor moves to the [ALERT RANGE] setting.
6. Set the range for the alert.
7. Close the menu.

6.7.4 How to active/deactivate intrusion alerts

Intrusion alerts inform you when you enter a “no-go-zone”, defined by a waypoint with an intrusion alert value of more than [0.00NM] assigned (see section 6.4.1). No-go-zones appear as a red dashed circle around the waypoint when the alert is active.

You can activate the intrusion alert with the following procedure.

1. Open the menu.
2. Select [ALERTS].
3. Select [ARRIVAL]. The [ARRIVAL] menu appears.
4. Select [NO GO ZONE ALERT].
5. Select [ON].
6. Close the menu.

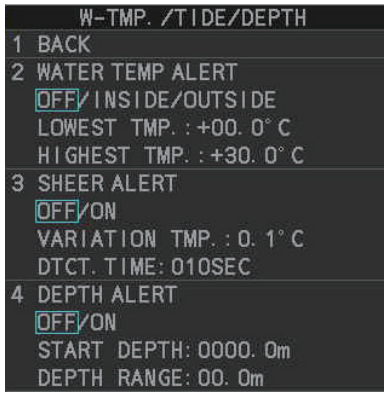
To deactivate the alert, select [OFF] at step 5 of the above procedure.

6.7.5 How to set temperature alerts

Temperature alerts inform when the water temperature is within a specified temperature range, or outside the specified range.

Note: This feature requires water temperature data.

1. Open the menu.
2. Select [ALERTS].
3. Select [W-TMP./TIDE/DEPTH]. The [W-TMP./TIDE/DEPTH] menu appears.
4. Select [WATER TEMP ALERT].
5. Select the appropriate setting.
   - [OFF]: temperature alerts are disabled.
   - [INSIDE]: temperatures which are higher then the setting for [LOWEST TMP] and lower than the setting for [HIGHEST TMP] trigger the alert. All other temperatures are ignored.
   - [OUTIDE]: temperatures which are lower then the setting for [LOWEST TMP] or higher than the setting for [HIGHEST TMP] trigger the alert. All other temperatures are ignored.
6. Select [LOWEST TMP].
7. Set the temperature to use as the bottom of the range.
8. Select [HIGHEST TMP].
9. Set the temperature to use as the top of the range.
10. Close the menu.



To deactivate the alert, select [OFF] at step 5 of the above procedure.

6.7.6 How to set sheer alerts

A sheer point is the location where two current of different temperatures, and in some cases direction, meet. This location is often regarded as a good fishing spot. You can set an alert to inform you when a sheer is detected.

Note: This feature requires water temperature data.

1. Open the menu.
2. Select [ALERTS].
3. Select [W-TMP./TIDE/DEPTH].
4. Select [SHEER ALERT].
5. Select [ON]. The cursor moves to the [VARIATION TMP.] setting.
6. Set the change in temperature, then left-click.
   When you left-click, the cursor moves to the [DTCT. TIME] setting.
7. Set the detection time, then left-click.

When a change in water temperature is detected that exceeds the values set for [VARIATION TMP.] and [DTCT. TIME], the alert is triggered.

To deactivate the alert, select [OFF] at step 5 of the above procedure.

6.7.7 How to set depth alerts

Depth alerts inform you when the seabed is detected within the set range.

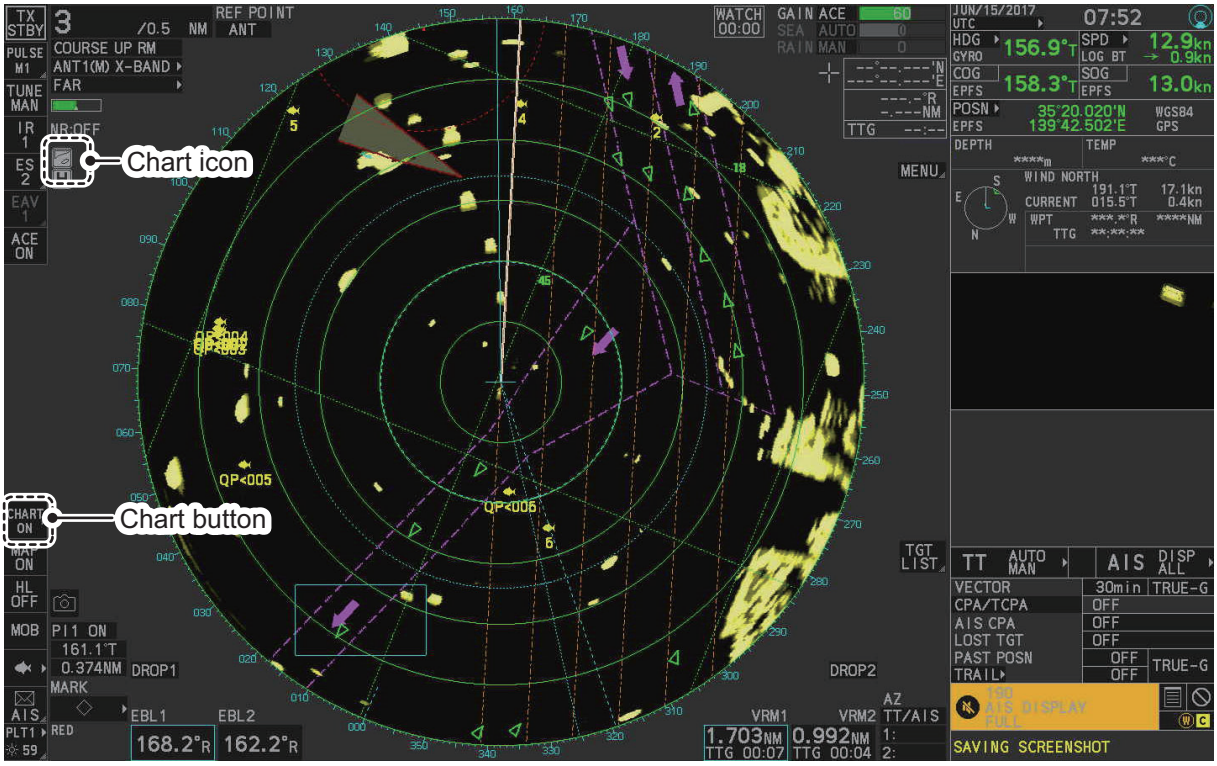
Note: This feature requires depth data.

1. Open the menu.
2. Select [ALERTS].
3. Select [W-TMP./TIDE/DEPTH].
4. Select [DEPTH ALERT].
5. Select [ON]. The cursor moves to the [START DEPTH] setting.
6. Set the starting depth for the alert range, then left-click.
   When you left-click, the cursor moves to the [DEPTH RANGE] setting.
7. Set the [DEPTH RANGE], then left-click.

When the detected depth is within the set range, the alert is triggered.

To deactivate the alert, select [OFF] at step 5 of the above procedure.

6.8 Chart Functions



6.8.1 How to show/hide the chart

The [CHART DISPLAY] menu item is [ON] as a factory default. There are two methods to show/hide the chart.

Show/hide the chart using the InstantAccess bar™

Click the Chart button to toggle between [CHART ON] (shows the chart) and [CHART OFF] (hide the chart).

Show/hide the chart from the menu

1. Open the menu.
2. Select [MARKS•PLOTTER].
3. Select [CHART] to show the [CHART] menu.
   Note: You can also show the chart by clicking the [CHART] button on the InstantAccess bar™.
4. Select [CHART DISPLAY].
5. Select [ON] to display the chart, or select [OFF] to hide the chart, then left-click.
6. Close the menu.

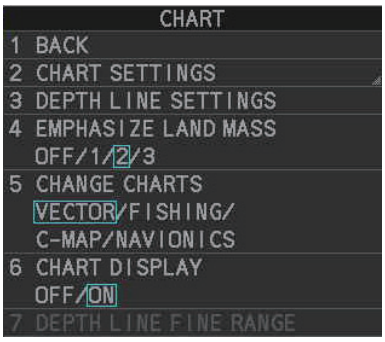


Chart Icons

The chart icon appears at the top-left section of the screen. The icon changes depending on the chart status, as shown below.

Chart Icons	Meaning
	Suitable chart scale.
	Unsuitable chart scale. Press the **ZOOM IN** or **ZOOM OUT** key to adjust the chart scale.
	No chart file.

6.8.2 How to align the chart position

When the radar target and the chart are not overlaid correctly, align the chart position.

Note 1: When you activate or deactivate the [MAP ALIGN] function, trails for both own ship and other ships are not reset.
Note 2: Chart alignments are not retained when the radar power is turned off.

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

Display indications unaffected by map alignment

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

- Radar echoes
- TT symbol vector display
- PI lines
- Own ship mark
- TT symbols
- EBL/VRM reference point
- OS coordinates ([POSN]) display
- Barge mark

How to disable the map alignment

1. Right-click the operational display area to show the [CURSOR MENU].
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.

6.8.3 How to select the chart type

You can select one of four types of charts, depending on your requirements.

1. Open the menu.
2. Select [MARKS•PLOTTER].
3. Select [NEXT] to show the next page of the menu.
4. Select [CHART].
5. Select [CHANGE CHARTS].
6. Select either of the following charts, then left-click.
   [VECTOR]: MapMedia navigational chart.
   [FISHING]: MapMedia fishing chart.
   [C-MAP]: MapMedia chart based on C-MAP chart data.
   [NAVIONICS]: MapMedia chart based on Navionics chart data.
7. Close the menu.

Note: Depth contours for [FISHING] are drawn differently from navigational chart data (bathymetric chart data). The [FISHING] chart does not have the latest shallow information, so select [VECTOR] when sailing into/out of port or sailing along coastlines.

6.8.4 Chart settings menu

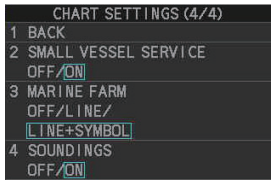
Below is the explanation about the each item of [CHART SETTINGS].

1. Open the menu.
2. Select [MARKS•PLOTTER].
3. Select [CHART].
4. Select [CHART SETTINGS].
   The [CHART SETTINGS] menu has four pages.

Page 1

Page 2

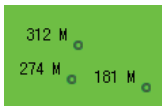
Page 3



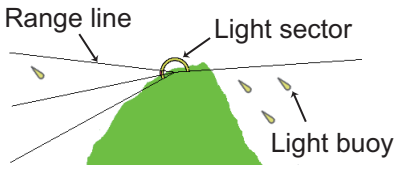
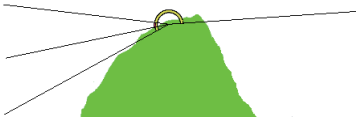
Page 4

5. Select a menu item to change the settings, then left-click.
6. Change the settings, then left-click.
7. Close the menu after changing the settings.
   A description for each item is listed below.
   [LAND COLOR]: Selects color for land from nine available colors.
   [LAND CONTOUR COLOR]: Selects color for edge from 15 available colors.
   [BACKGROUND COLOR]: Selects color for background from six available colors. Change the background color when targets and chart lines are hard to see.
   [CHARACTER(IMPORTANT)]: Turns important text on or off.
   [CHARACTER(OTHER)]: Turns other text on or off.
   [PLACE NAME]: Turns geographical name on or off.
   [NAV AIDS]: Turns navigational data display on or off for navigational aids ([LIGHT BEACON] on page 1, through to [SOUNDINGS] on page 4). Each navigational aid can be turned on or off individually. To show the data for a navigational aid, the individual setting must also be set to [ON].
   Note: When [NAV AIDS] is set to [OFF], no navigational aid data is displayed, regardless of the individual setting for each navigational aid.
   Navigational aid data (see following tables): Turns each mark on or off. To display [MARINE FARM], select [LINE] or [LINE+SYMBOL].

Mark name	Display example	Mark name	Display example	Mark name	Display example
[LIGHT BEACON]		[BUOY]		[DEPTH LINES / CURRENT]	
[LANDMARKS]		[OBSTACLES]		[OBST IN SAFE AREA]	

Mark name	Display example	Mark name	Display example	Mark name	Display example
[FISHING EQUIP-MENT]		[COMP]		[WATER QUALITY]	
[ALARM AREA]		[MOUNTAIN-TOP]		[LANDSCAPE]	
[FOG SIGNAL]		[SIGNALS]		[SERVICE]	
[HARBOR FACILI-TIES]		[SMALL VESSEL SERVICE]		[MARINE FARM]	
[SOUNDINGS]					
Note: If the text is displayed with a mark, the text is difficult to see depending on the background.					

The mark display for light sector differs according to the setting of light beacon. For details, see the table below.

	[LIGHT SECTOR] set to [ON].	[LIGHT SECTOR] set to [OFF].
[LIGHT BEACON] set to [ON].	Light sector and range lines are displayed (lines for range are long). 	Only light sector is displayed (lines for range are short). 
[LIGHT BEACON] set to [OFF].	Light sector and range lines are displayed (range lines are long). 	Light sector is not displayed.

6.8.5 How to show/hide land mass emphasis

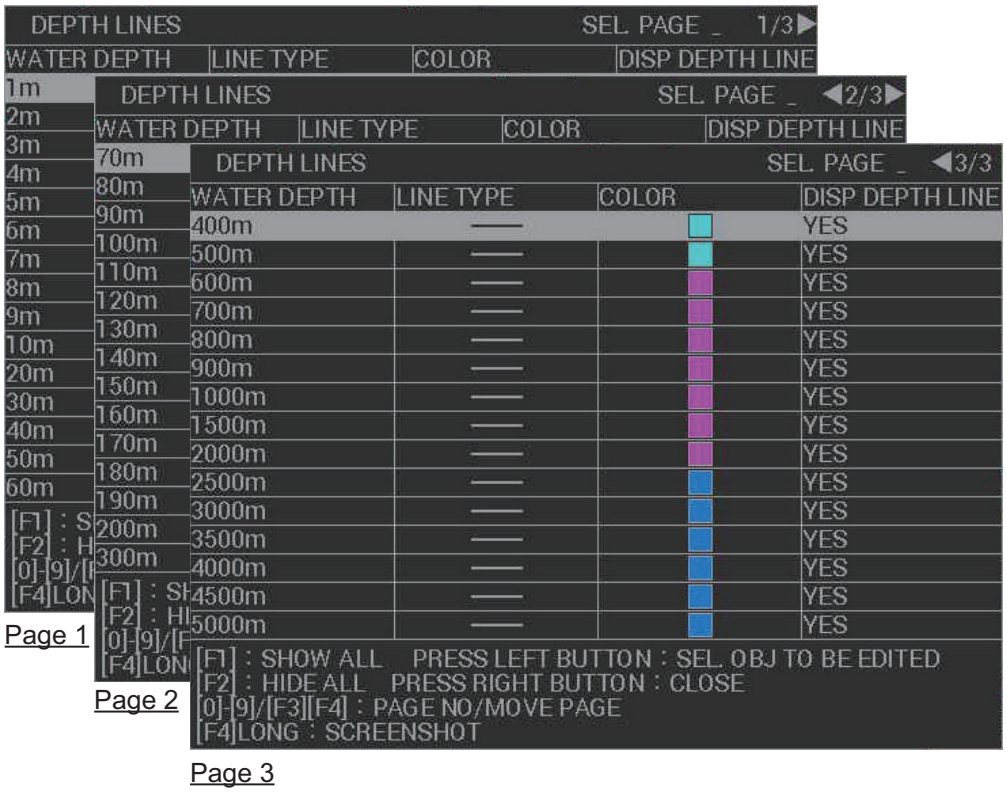
[LAND MASS EPHASIS] sets whether to highlight the outer edge of land masses on the display.

1. Open the menu.
2. Select [MARKS•CHART].
3. Select [CHART].
4. Select [EMPHASIZE LAND MASS].
5. Select [OFF] to disable the emphasis. There are three levels of emphasis available; a higher setting gives a thicker emphasis line around the land mass.
6. Close the menu.

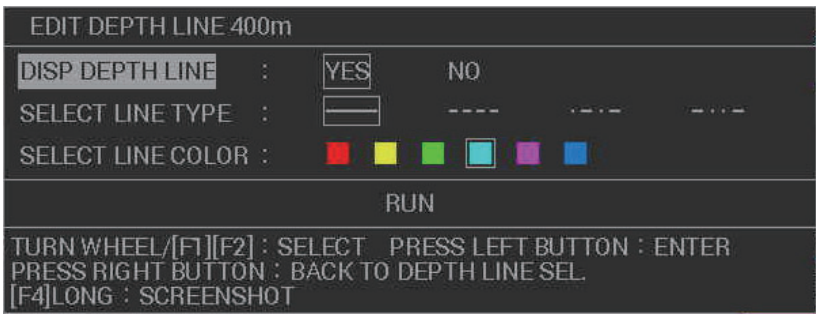
6.8.6 How to set up depth lines

You can turn the depth (bathymetry) lines on/off and select the color/line to use for specified depths.

1. Open the menu.
2. Select [MARKS•PLOTTER].
3. Select [CHART].
4. Select [DEPTH LINES SETTINGS]. The [DEPTH LINES] window appears.



5. Select the depth line you want to set up. The [EDIT DEPTH LINE] window appears.

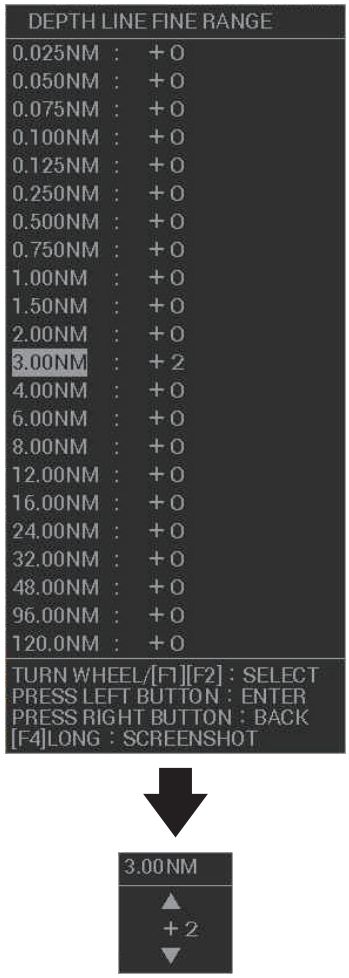


6. Select [DISP DEPTH LINE].
7. Select [YES] to show the depth line on-screen, or [NO] to hide the depth line.
8. Select [LINE TYPE].
9. Select the type of line to use for the selected depth line.
10. Select [LINE COLOR].
11. Select the color for the selected depth line.
12. Select [RUN] to apply the changes to the selected depth line.
13. Set other depth lines in the same manner, then close the window.

6.8.7 How to display detailed depth lines

Depth lines can appear on the screen with what seems to be an excessively large gap between each line. You can display detailed lines, based on range, to “fill in the blanks”.

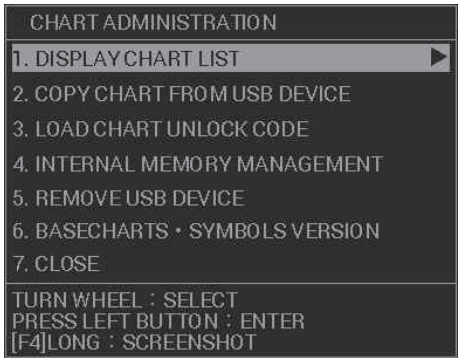
1. Open the menu.
2. Select [MARKS•PLOTTER].
3. Select [CHART].
4. Select [DEPTH LINE FINE RANGE]. The [DEPTH LINE FINE RANGE] window appears.
5. Select the depth line at the range you want to show detailed depth lines. The detailed settings window appears.
6. While watching the screen, set the range at which you want to show detailed lines. The lines appear at the selected range on either side of the existing depth line. For example, if the depth line at 3.00NM and you select [+0], no detailed lines appear; however if you select [+1], two detailed lines appear, one at 2.00NM and one at 4.00NM. As you increase the value for this setting, more lines are added to the depths on either side of the selected depth. In other words, the higher the setting, the more lines that appear on-screen. However, with more lines, the chart redraw time increases.
7. Set other ranges in a similar matter.
   Note: Depending on the selected display range, some depth lines may not appear on the screen.
8. Close the window.



6.8.8 How to check your charts/symbol versions

You can check the version of your charts and symbols from the [CHART ADMINISTRATION] menu.

1. Open the menu.
2. Select [INITIAL SETTINGS].
3. Select [UPDATE CHART]. The confirmation message "OTHER FUNCTIONS WILL STOP DURING THE CHART UPDATE. ARE YOU SURE?" appears.
4. Select [RUN] to access the [CHART ADMINISTRATION] menu.

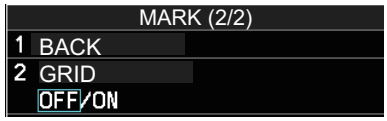


5. Select [BASECHARTS • SYMBOLS VERSION]. The version information for your charts and symbols appears.
6. Right-click to go back to the [CHART ADMINISTRATION] menu.
7. Select [CLOSE]. The confirmation message [CLOSE CHART ADMINISTRATION AND RESTART THE SYSTEM?] appears.
8. Select [RUN]. The system restarts.

6.9 Grid Lines

Grid lines indicate the latitude and longitude. You can show or hide the grid to suit your preference.

1. Open the menu.
2. Select [MARKS•PLOTTER].
3. Select [GRID], then select [ON] to show the grid, or [OFF] to hide the grid.
4. Close the menu.



How to change the color of the grid lines

1. Open the menu.
2. Select [2 MARKS•PLOTTER].
3. Select [0 NEXT].
4. Select [3 GRID COLOR].
5. Select the desired color.
6. Close the menu.

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7. MAINTENANCE, TROUBLE-SHOOTING

Periodic checks and maintenance are important for proper operation of any electronic system. This chapter contains maintenance and troubleshooting instructions to be followed to obtain optimum performance and the longest possible life of the equipment. Before attempting any maintenance or troubleshooting procedure please review the safety information below.

⚠ WARNING

Do not open the equipment.

Hazardous voltage which can cause electrical shock exists inside the equipment. Only qualified personnel should work inside the equipment.

Turn off the radar power switch before servicing the antenna unit. Post a warning sign near the switch indicating it should not be turned on while the antenna unit is being serviced.

Prevent the potential risk of being struck by the rotating antenna.

A transmitting radar antenna emits electromagnetic waves, which can be harmful, particularly to the eyes.

Never look directly into the antenna aperture from a close distance while the radar is in operation, or expose yourself to the transmitting radar at a close distance.

Wear a safety belt and hard hat when working on the antenna unit.

Serious injury or death can result if someone falls from the radar antenna mast.

NOTICE

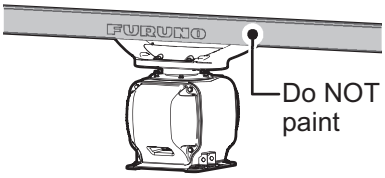
Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment.

Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.

7.1 Periodic Maintenance Schedule

Regular maintenance is essential to good performance. A regular maintenance program should be established and should at least include the items in the table below.

Interval	Check Point	Checks and measures	Remarks
As required	The LCD will in time accumulate a layer of dust which tends to dim the picture	Check that dust or dirt is not on the display. Wipe it carefully to prevent scratching. For difficult to remove dirt or salt deposits, use a cloth made wet with water and neutral detergent (less than 1% detergent). Squeeze the cloth dry then clean the display. When the display is clean, gently wipe the display with a clean, soft, dry cloth, to prevent scratching.	
	Processor unit cleanliness	Dust and dirt may be removed with a soft cloth.	Do not use chemical-based cleaners to clean the processor unit. They can remove paint and markings.
3 to 6 months	Exposed nuts and bolts and sealant compound on cable gland of antenna unit	- Check for corroded or loosened nuts and bolts. If necessary, clean and repaint them thickly. Replace them if heavily corroded. - Check for cracks and peeling in sealing compound on cable gland.	- Sealing compound can be used instead of paint. Apply a small amount of grease between nuts and bolts for easy removal in future. - Apply sealing compound to minor crack or peeling. If the problem is severe, completely remove sealant then reapply.
	Antenna radiator	Check for dirt and cracks on radiator surface. Thick dirt should be wiped off with soft cloth dampened with fresh water. If a crack is found, apply a slight amount of sealing compound or adhesive as a temporary remedy, then call for repair.	Do not use chemical-based cleaners for cleaning. They can remove paint and markings. If you need to remove ice from the antenna unit, use a wooden or plastic head hammer. Cracks on the unit may cause water ingress, causing serious damages to internal circuits.
	Terminal strips and plugs in antenna unit (TECHNICIANS only)	Open antenna cover to check terminal strip and plug connections inside. Also check the rubber gasket of antenna covers for deterioration.	When closing antenna covers in position, be careful not to catch loose wires between covers and unit.
6 months to one year	Terminal strips, sockets, earth terminal on processor unit (TECHNICIANS only)	Check for loose connections. Check contacts and plugs for proper seating, etc.	

Interval	Check Point	Checks and measures	Remarks
Every year	Antenna Unit	Check the antenna unit for corrosion and paint pealing.	If corrosion or paint pealing is found, paint the affected area. Do not paint the antenna (see below), only paint the scanner. 
5 years	Antenna Unit	If the grease dries out, the V-ring may break, allowing water to leak inside the antenna unit.	Have a qualified technician apply the grease oil to the antenna rotary.

7.2 How to Replace the Fuse

Fuses are located as listed in the tables below. Each fuse protects the equipment from reverse polarity of the ship's mains and equipment fault. If a fuse blows, find the cause before replacing it. Use the correct fuse. Using the wrong fuse will damage the equipment and void the warranty.

⚠ WARNING

Use the proper fuse.
Use of the wrong fuse can cause fire or electrical shock.

Note: For monitor units MU-190/MU-231/MU-270W, see the monitor's operator manual for fuse details.

Unit	Fuse type	Code	Remarks
Processor Unit	FGBO-A 250V 7A PBF	000-178-084-10	
	FGBO-A 250V 7A PBF	000-178-084-10	For High Speed Kit only*
Antenna Unit	FGBO-A 250V 3A PBF	000-155-841-10	For Deicer Kit only
Antenna Power Supply Unit	FGBO-A 250V 5A PBF	000-188-540-10	For 100 V AC
	FGBO-A 250V 3A PBF	000-155-841-10	For 220 V AC

*: High Speed Kit is available for S-Band radars only.

7.3 Life Expectancy of Major Parts

This radar has consumable parts, and the table that follows shows the estimated life expectancy for the consumable parts. Life expectancy estimates are based on use under normal conditions. Request a FURUNO agent or dealer to replace the consumable parts, to get the best performance and longest possible life from the equipment.

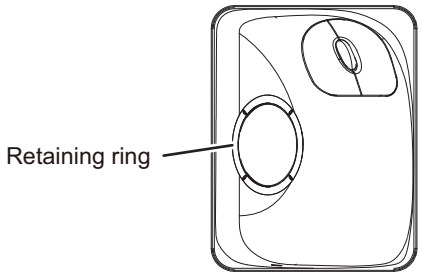
Part	Type	Life expectancy	Remarks
Antenna Unit			
Motor	BV2-K155	10,000 hours	For S-Band radar
	BV2-K156		For X-Band radar (other than FAR-2x58)
	VGKC18-20N200L4AX		For X-Band radar (FAR-2x58 only)
Magnetron	FNE1201	5,000 hours	Check number of hours used at TX time.
	MG5436	5,000 hours	
	MG5223F	7,000 hours	
	9M31	2,000 hours	
Monitor Unit			
Bezel & LCD assembly	Refer to the Operator's Manual for the Monitor Unit.		

Note: The magnetron is a consumable item. The effectiveness of your magnetron will decrease over time, causing lower-than-normal signal strength and loss of echoes. Magnetrons should be changed regularly. The table above shows the typical life-span of a magnetron used under normal conditions.

7.4 Trackball Maintenance

If the cursor skips or moves abnormally, clean the trackball using the procedure below.

1. Turn the retaining ring counterclockwise 45° to unlock it.
2. Remove the retaining ring and ball.
3. Clean the ball with a soft, lint-free cloth, then blow carefully into the ball-cage to dislodge dust and lint.
4. Look for a build-up of dirt on the metal rollers. If dirty, clean the rollers using a cotton swab moistened lightly with isopropyl-rubbing alcohol.
5. Make sure that fluff from the swab is not left on the rollers.
6. Replace the ball and retaining ring. Be sure the retaining ring is not inserted reversely.



7.5 Easy Troubleshooting

This section provides troubleshooting procedures that the user can follow to restore normal operation. If you cannot restore normal operation, do not attempt to check inside any unit. Any repair work is best left to a qualified technician.

Problem	Possible cause	Remedy
Key beep inaudible.	Key beep turned off.	Adjust key beep level in the [OPERATION] menu, referring to section 1.9.
Picture not updated or picture freeze. 30 seconds after the picture freezes, the buzzer sounds, the **ALARM ACK** (RCU-014) or **ALERT ACK** (RCU-031) key blinks and alarm signal is output.	Video freeze.	Turn the power off and on again to restore normal operation.
Power is ON but nothing appears on monitor.	Brilliance is too low.	Adjust the brilliance, referring to section 1.3.
Marks, indications and noise appear but no echo.	Tx high voltage protection circuit has activated.	Reset the power to restore normal operation.
Range changed but radar picture does not change.	Defective range key or video freeze up.	Adjust the range with the control unit, or the [RANGE] box several times. If that does not work try to turn the power off and on again to see if the problem might be video freeze up. If unsuccessful, replacement of keypad may be required.
Only two PI lines when six lines are wanted	Incorrect setting of PI line interval	Adjust PI line interval, referring to section 1.40.3. Also, the setting for number of PI lines to display may be inappropriate. Check the menu setting for number of PI lines, referring to section 1.40.2.
Range rings are not displayed	Range rings are turned off	Try turning on the range rings with [RANGE RING] in the [NAVTOOL] menu. If they do not appear, their brilliance may be too low. Adjust their brilliance in the [BRILL] menu.
Tracked target not tracked correctly	Poor definition of targets in sea clutter	Adjust A/C SEA and A/C RAIN referring to section 1.20 and section 1.21.
Tuning adjusted but poor sensitivity	Second trace echo rejector on or dirt on radiator face	• Disable the second trace echo rejector, referring to section 1.29. • Clean the radiator face.

7.6 Advanced-level Troubleshooting

This section describes how to cure hardware and software troubles that should be carried out by qualified service personnel.

Note 1: This radar equipment contains complex modules in which fault diagnosis and repair down to component level are not practicable by users.

Note 2: When replacement of the MAIN board is necessary, the previous settings can be transferred to new MAIN board as follows:

- **For IMO-types**, save your settings to a SD card, referring to section section 1.58. **For C-types**, save your settings to a USB Flash memory, referring to section section 1.60.
- After replacing the MAIN board, load the entire contents of the SD card to the radar, referring to section section 1.58 for the procedure.

Problem	Possible cause	Remedy
Cannot turn power on.	1) Blown fuse. 2) Mains voltage/polarity. 3) Power supply board (PWR1 and/or PWR2) inside the Processor unit.	1) Replace blown fuse. 2) Correct wiring and input voltage. 3) Replace the faulty power supply board.
Brilliance adjusted but no picture.	MAIN board - inside the Processor unit.	Replace MAIN board.
Antenna not rotating.	1) Antenna drive mechanism 2) MTR-DRV board	1) Replace antenna drive mechanism. 2) Replace the MTR-DRV board.
Data and marks not displayed in Transmit status	MAIN board - inside the Processor unit.	Replace MAIN board.
Adjust GAIN with A/C SEA set at minimum. Marks and indications appear but no noise or echo.	1) IF amplifier 2) Signal cable between antenna and processor unit	1) Replace IF amplifier. 2) Check continuity and isolation of coaxial cable. **Note:** Disconnect the plug and lugs at both ends of coaxial cable before checking it by ohmmeter.
Marks, indications and noise appear but no echo (transmission leak representing own ship position is absent)	1) TX high voltage protection circuit has activated. 2) Magnetron 3) MD board inside the antenna. 4) SPU board inside the antenna.	1) Reset power to restore normal operation. 2) Check magnetron current. Replace magnetron. 3) Replace MD board. 4) Replace SPU board.
Picture not updated or picture freeze-up	1) Rotary Encoder inside the antenna unit. 2) SPU board inside the antenna. 3) Video freeze-up	1) Check the connection of signal cables. 2) Replace SPU board. 3) Turn the radar off, then on.

Problem	Possible cause	Remedy
Incorrect orientation of picture	1) Rotary Encoder inside the antenna unit 2) SPU board inside the antenna unit. 3) MTR-DRV board inside the antenna unit.	If the message “NO HEADLINE SIGNAL” appears in orange letters inside the alert box, the heading signal is lost or interrupted. Check the heading line signal cable and board connections. If there is no problem with cables or connections, replace the faulty board.
Cannot operate radar from on-screen boxes	MAIN board - inside the Processor unit.	Replace MAIN board.
Radar is properly tuned but poor sensitivity	1) Deteriorated magnetron 2) Detuned MIC 3) Dirt on radiator face 4) Water ingress to the waveguide or other feeder line 5) Second trace echo rejection is ON	1) With the radar transmitting on 48 nm range, check magnetron current. If current is below normal, magnetron may be defective. Replace it. 2) Check MIC detecting current. If it is below normal value, MIC may have become detuned. MIC must be tuned. 3) Clean the radiator surface. 4) Remove water from the feeder line. 5) Disable the second-trace echo rejector referring to section 1.29.
Range changed but radar picture not changing	1) Defective range key 2) SPU board inside the antenna. 3) Video freeze up	1) Adjust the range with the control unit, or the [RANGE] box several times. If unsuccessful, replacement of keypad may be required. 2) Replace SPU board. 3) Turn off and on radar.
Interference rejector is inoperative (interference rejection level not displayed)	SPU board inside the antenna.	Replace SPU board.
Echo stretch is ineffective (neither ES1, ES2 nor ES3 is displayed)	SPU board inside the antenna.	Replace SPU board.
Range rings are not displayed	1) Adjust the brilliance of range rings on the BRILL menu to see if intensity is increased 2) MAIN board	1) Replace associated circuit board if unsuccessful. 2) Replace MAIN board.
Poor discrimination in range	Sea clutter control not functioning properly	Improper setting of A/C SEA. If A/C SEA is seen only at very close range, suspect inaccurate frequency of reference oscillator.
True motion orientation not working correctly	1) Incorrect menu setting 2) Speed entry incorrect 3) TM display inaccurate	1) Referring to section 1.30, select TM orientation mode. 2) Enter correct own ship speed referring to section 1.11. 3) Make sure that speed and compass inputs are accurate.
Target not tracked correctly	Poor definition of targets in sea clutter	Adjust A/C SEA and A/C RAIN referring to section 1.20 and section 1.21.
Buttons on trackball module operated but no response	Trackball module	Replace trackball module.

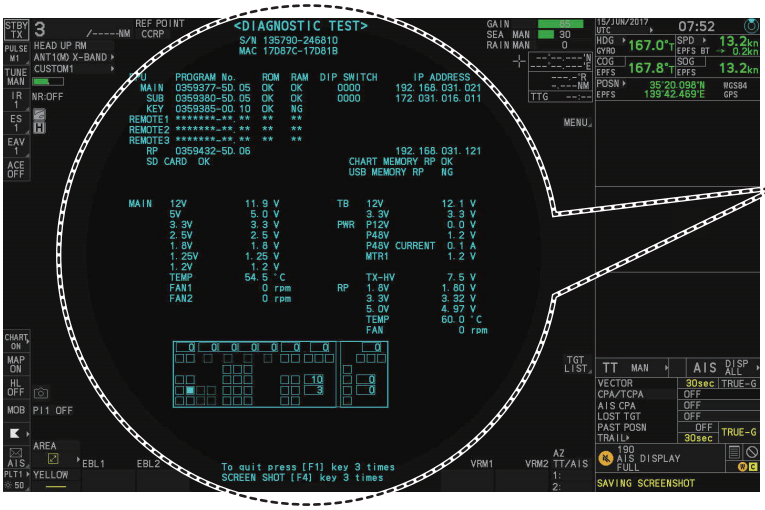
Problem	Possible cause	Remedy
Picture is not updated with each sweep.	Motor/gears	Check the motor and gears. Replace if worn.

7.7 Diagnostics

A diagnostic test program is provided to test major circuit boards in the control unit, processor unit and card I/F unit. Note that the normal radar picture is lost during this test.

Proceed as follows to execute the diagnostic test:

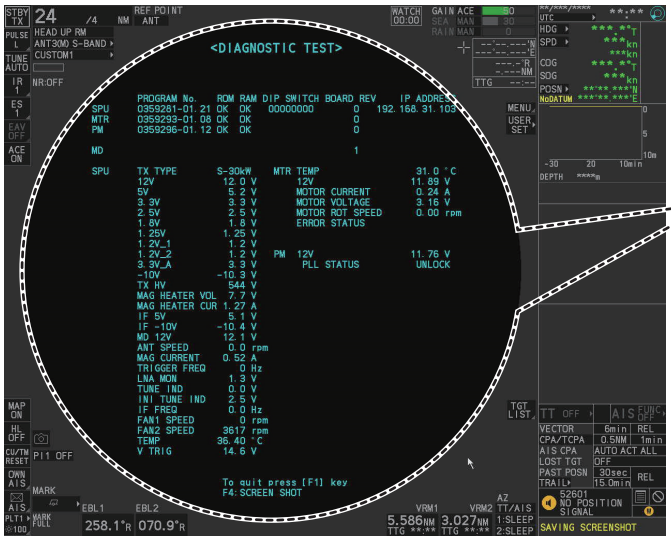
1. Open the [MAIN MENU].
2. Select [9 INITIAL SETTINGS].
3. Select [7 TESTS].
4. Select [2 DIAGNOSTIC TEST]. The system begins a diagnostic test.
   The Processor Unit is tested first and the test results appear after a few moments.



Processor Unit and Control Unit diagnostic test results appear here.

You can save a screenshot to a SD Card if there is a SC Card inserted into the Processor Unit. Press the **F4** key three times to save a screenshot.
A keyboard test is available at the bottom of the test results, also. Press each key on the control unit to highlight the corresponding area on-screen. Press the same key again to remove the highlight.

5. Press the **F1** key three times to show the results for antenna test.



Antenna diagnostic test results appear here.

You can save a screenshot to a SD Card if there is a SD Card inserted into the Processor Unit. Press the **F4** key three times to save a screenshot.

6. Press the **F1** key to close the test results and complete the test.

Diagnostic test results

The following table lists each test result along with the normal value range for each item.

"OK" appears for normal operation. If "NG" (No Good) appears, corresponding components may be defective.

Also, if a connected fan or PCB shows the check results as asterisks, it is an indication that the fan or PCB has failed, or is disconnected.

If there are any component which are suspected to be defective, or any test does not complete satisfactorily, consult your dealer for advice.

Tested item		Normal value or Description	
		Magnetron Radar	Solid State Radar
MAIN (Processor Unit) test			
[PROGRAM No.]		Shows the program version number.	
[ROM]		OK	
[RAM]		OK	
[DIP SWITCH]		Shows the DIP SWITCH settings.	
[IP ADDRESS]		Shows the IP address for the Processor Unit.	
[SD CARD]		OK	
[SD CARD RP]		(Not currently used)	
[HSC]		Shown only for systems with the optional High Speed Conversion kit.	
[RMS]		Shown only when Remote Maintenance Service is enabled.	
[MAIN]	[12V]	10.8 to 13.2 V	
	[5V]	4.7 to 5.3 V	
	[3.3V]	3.0 to 3.6 V	
	[2.5V]	2.3 to 2.7 V	
	[1.8V]	1.6 to 2.0 V	

(Continued on following page)

Tested item		Normal value or Description	
		Magnetron Radar	Solid State Radar
(Continued from previous page)			
[MAIN]	[1.25V]	1.13 to 1.38 V	
	[1.2V]	1.0 to 1.3 V	
	[TEMP]	-15 to +70°C	
	[FAN1]	3700 to 5700 rpm	
	[FAN2]	3700 to 5700 rpm	
	[FAN3]	• **X/S-Band radars with 24 rpm config**: Not shown • **S-Band radars with 42 rpm (HSC) config**: 3700 to 5700 rpm	
[TB]	[12V]	10.8 to 13.2 V	
	[3.3V]	3.0 to 3.6 V	
[PWR]	[P12V]	10.8 to 13.2 V	
	[P48V]	46 to 50 V	
	[P48 V CURRENT]	0 to 3 A	
	[MTR1]	45.1 to 51.3 V	
	[MTR2]	• **X/S-Band radars with 24 rpm config**: Not shown • **S-Band radars with 42 rpm (HSC) config**: 45.1 to 51.3 V	
	[TX HV]	500 to 570 V	
RP Board (For A/B-types with Radar Plotter functionality only)			
[PROGRAM No.]		Shows the program version number.	
[IP ADDRESS]		Shows the IP address of the RP board.	
[CHART MEMORY RP]		OK	
[USB MEMORY RP]		OK	
RP	[1.8V]	1.6 to 2.0 V	
	[3.3V]	3.0 to 3.6 V	
	[5.0V]	4.7 to 5.3 V	
	[TEMP]	-15 to +90°C	
	[FAN]	3700 to 5700 rpm	
SPU (Antenna)			
[PROGRAM No.]		Shows the program version number.	
[ROM]		OK	
[RAM]		OK	
[DIP SWITCH]		Shows the DIP SWITCH settings.	
[BOARD REV]		Shows the revision number for each PCB.	
[IP ADDRESS]		Shows the IP address for the Processor Unit.	
[SPU]	[TX TYPE]	X-12kW/X-25kW/S-30kW/S-50kW	S-Solid
	[12V]	• Other than FAR-2x58: 11.4 to 12.6 V • FAR-2x58: 12.2 to 13.2 V	
	[5V]	4.75 to 5.25 V	
	[3.3V]	3.18 to 3.42 V	
	[2.5V]	2.4 to 2.6 V	
	[1.8V]	1.71 to 1.89 V	
	[1.25V]	1.19 to 1.31 V	
	[1.2V_1]	1.14 to 1.26 V (not shown for FAR-2x58)	
	[1.2V_2]	1.14 to 1.26 V (not shown for FAR-2x58)	
	[1.2V]	1.15 to 1.25 V (shown only for FAR-2x58)	
	[3.3V_A]	3.18 to 3.42 V	
(Continued on following page)			

Tested item		Normal value or Description	
		Magnetron Radar	Solid State Radar
(Continued from previous page)			
[SPU]	[-10V]	-10.5 to -9.5 V (not shown for FAR-2x58)	"not connect"
	[-12V]	-13.2 to -11 V (shown only for FAR-2x58)	
	[-5V]	-5.25 to -4.75 V (shown only for FAR-2x58)	
	[TX HV]	• Other than FAR-2x58: 500 to 560 V • FAR-2x58: TBD	"not connect"
	[MAG HEATER VOL]	• **X-Band, 12 kW**: 8.1 to 8.6 V or 6.8 to 7.3 V • **X-Band, 24 kW**: 7.0 to 7.5 V or 5.7 to 6.2 V • **S-Band**: 7.4 to 7.9 V or 6.3 to 6.8 V	"not connect"
	[MAG HEATER CUR]	• **X-Band**: 0.5 to 0.6 A • **S-Band**: 1.1 to 1.4 A	"not connect"
	[IF 5V]	4.75 to 5.25 V	"not connect"
	[IF -10V]	-10.5 to -9.5 V	"not connect"
	[MD 12V]	11.4 to 12.6 V	"not connect"
	[ANT SPEED]	• **24 rpm antennas**: 22 to 26 rpm • **42 rpm antennas**: 40 to 44 rpm	
	[MAG CURRENT]	• **X-Band**: 5.0 to 12.0 • **S-Band**: 6.0 to 10.0	"not connect"
	[TRIGGER FREQ]	Other than FAR-2x58: • **STBY**: 0 Hz • **[2ND ECHO REJ]=[OFF], TT range*= 24NM**: S1: 2640 to 3360 Hz, S2: 2640 to 3360 Hz, M1: 1320 to 1680 Hz, M2: 1060 to 1340 Hz, M3: 880 to 1120 Hz, L: 530 to 670 Hz • **[2ND ECHO REJ]=[OFF], TT range*= 32NM**: S1: 1940 to 2460 Hz, S2: 1940 to 2460 Hz, M1: 1320 to 1680 Hz, M2: 1060 to 1340 Hz, M3: 880 to 1120 Hz, L: 530-670 • **[2ND ECHO REJ]=[ON]**: S1: 2640 to 3360 Hz, S2: 2640 to 3360 Hz, M1: 440 to 560 Hz, M2: 440 to 560, M3: 440 to 560 Hz, L: 440 to 560 Hz FAR-2x58: • **STBY**: 0 Hz • **[2ND ECHO REJ]=[OFF]** S: 1425 to 2090 Hz, M: 825 to 1210 Hz, M: 450 to 660 Hz, L: 450 to 660 Hz • **[2ND ECHO REJ]=[OFF], TT range*= 48NM**: S: 825 to 1210 Hz, S2: 825 to 1210 Hz, M2: 450 to 660 Hz, L: 450 to 660 Hz • **[2ND ECHO REJ]=[ON]**: S: 1125 to 1650 Hz, M: 375 to 550 Hz, M2: 375 to 550 Hz, L: 375 to 550 Hz *: Maximum TT range is set at installation.	
	[LNA MON]	0.5 to 1.5 V	not connect
(Continued on following page)			

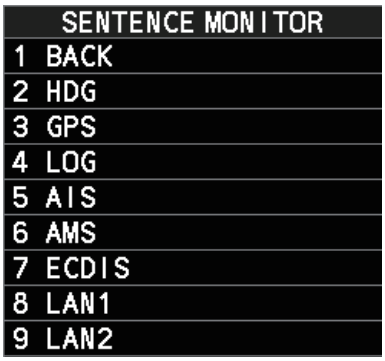
Tested item		Normal value or Description	
		Magnetron Radar	**Solid State Radar**
(Continued from previous page)			
[SPU]	[TUNE IND]	Other than FAR-2x58: 2.0 to 3.0 V FAR-2x58: • **Pulselength = [S]:** 1.0 to 2.0 V • **Pulselength = other than [S]:** 2.0 to 3.0 V	not connect
	[INI TUNE IND]	Other than FAR-2x58: 2.0 to 3.0 V FAR-2x58: • **Pulselength = [S]:** 1.0 to 2.0 V • **Pulselength = other than [S]:** 2.0 to 3.0 V	not connect
	[IF FREQ]	Other than FAR-2x58: • **Pulse length = [S1], [S2]**: 0.0 Hz • **Pulse length = [S1], [S2]**: 55.0 to 65.0 Hz FAR-2x58: • **Pulse length = [S], [M]**: 0.0 Hz • **Pulse length = [S], [M]**: 55.0 to 65.0 MHz	not connect
	[FAN1 SPEED]	Other than FAR-2x58: 3000 to 4000 rpm FAR-2x58: 2400 to 3900 rpm	not connect
	[FAN2 SPEED]	Other than FAR-2x58: 3000 to 4000 rpm FAR-2x58: 3700 to 00 rpm	not connect
	[TEMP]	Other than FAR-2x58: -40 to +70°C FAR-2x58: -15 to +85°C	
	[V TRIG]	10.0 to 18.0 V	not connect
[MTR]	[TEMP]	Other than FAR-2x58: **Ambient Temperature**: less than +20 °C FAR-2x58: -25 to +85°C	
	[12V]	9 to 15 V	
	[MOTOR CURRENT]	• **X-Band (Other than FAR-2x58), 24 rpm**: 0.8 A • **X-Band (Other than FAR-2x58), 42 rpm**: 1.2 A • **X-Band (FAR-2x58 only)**: 0.5 to 1.5 A • **S-Band, 24 rpm**: 1.3 A • **S-Band, 42 rpm**: 2 A	• **24 rpm**: 1.3 A • **42 rpm**: 2 A
	[MOTOR VOLTAGE]	43 to 53 Volts (33 to 53 volts for antenna units installed on the foremast.)	
(Continued on following page)			

Tested item		Normal value or Description	
		Magnetron Radar	Solid State Radar
(Continued from previous page)			
[MTR]	[MOTOR ROT SPEED]	Other than FAR-2x58: 0 (STBY)/24/36/42 FAR-2x58: TBD	
	[ERROR STATUS]	Blank indicates no errors. When an error is found, the relevant error code appears.	
[PM]	[12V]	9 to 15 Volts	
	[PLL STATUS]	Other than FAR-2x58: **For X-Band (with board revision number 1 or earlier) and S-Band (with board revision number 0):** UNLOCK **For X-Band (with board revision number 2 or later) and S-Band (with board revision number 1 or later):** • **PM activated**: LOCK • **PM inactive**: UNLOCK FAR-2x58: • **PM activated**: LOCK • **PM inactive**: UNLOCK	• **PM activated**: LOCK • **PM inactive**: UN-LOCK
[PSU]*	[TB 12V]	9 to 15 V	
	[TB -12V]	-15 to -9 V	
	[TB HEATER H]	9 to 15 V	
	[TB 5V]	4.5 to 5.5 V	
	[MONI TX HV]	760 to 820 V	
	[TB N5V]	-5.5 to -4.5 V	
*: Appears for FAR-2x58 only.			

7.8 Sentence Monitor

You can check which sentences input to the radar.

1. Open the [MAIN MENU].
2. Select [9 INITIAL SETTINGS].
3. Select [7 TESTS].
4. Select [3 SENTENCE MONITOR].
5. Select the item you want to check.
   All sentences input to the radar for the selected item appear on the screen.
   Press the **F3** key to save the sentence information to the SD Card.
   Press the **F4** key to save a screenshot to the SC Card.
   Note: If a SD Card is not connected to the Processor Unit, you cannot save sentence information or screenshots.
6. Press the **F1** key to close the sentence information.
7. Repeat steps 5 and 6 to view other sentence information as required.
8. Close the menu.



7.9 Fallback Arrangements

If the top priority sensor (for example EPFS1) cannot be used, this equipment automatically uses the second priority sensor (for example, EPFS2) when multiple sensors (EPFS1 and EPFS2 for example) are installed. When there is no fallback sensor available, each function is limited as follows:

Sensor	Function limitations
Heading sensor	• The [HDG] indication reads "***.*°" • The orientation mode is automatically set to [HEAD-UP]. • TT, AIS, radar map and echo averaging are disabled.
Speed sensor	When [LOG(WT)] is selected: • The sensor used is automatically switched in the following priority order: EPFS(BT) > LOG(BT). • The SPD indication reads "***.* kn" when both EPFS(BT) and LOG(BT) cannot be used.
	When [LOG(BT)] is selected: • The sensor used is automatically switched in the following priority order: EPFS(BT) > LOG(WT). • The SPD indication reads "***.* kn" when both EPFS(BT) and LOG(WT) cannot be used.
	When [EPFS(BT)] is selected: • The sensor used is automatically switched in the following priority order: LOG(BT) > LOG(WT). • The SPD indication reads "***.* kn" when both LOG(BT) and LOG(WT) cannot be used.
COG/SOG sensor	• When the EPFS sensor cannot be used, the values of COG and SOG are calculated from HDG and LOG(BT). • Additionally when the heading sensor cannot be used, the values of SOG is calculated from LOG(BT). The COG indication reads "***.*°".
Position sensor	• The POSN indication reads all asterisks. • AIS and radar map are disabled.

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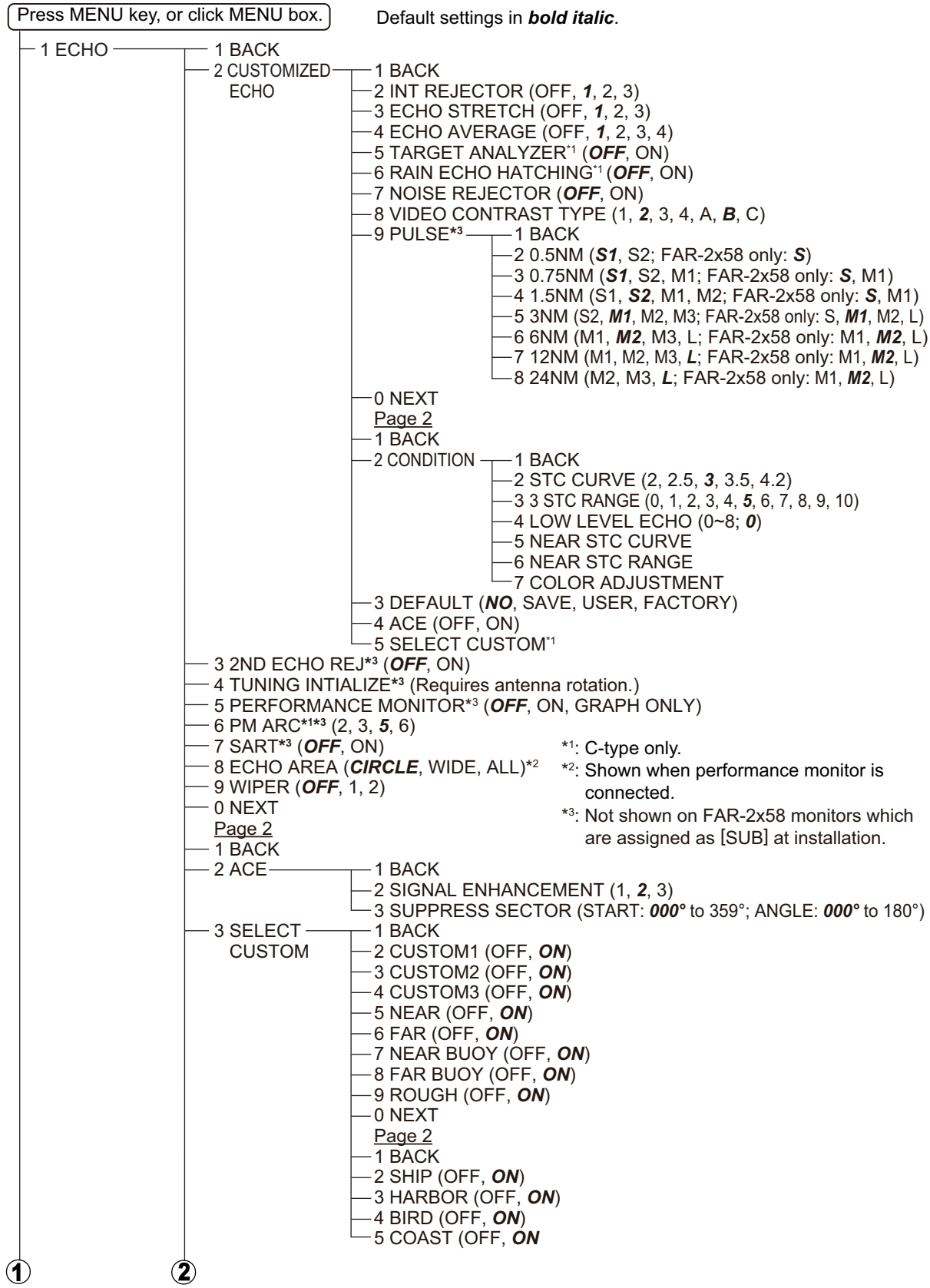
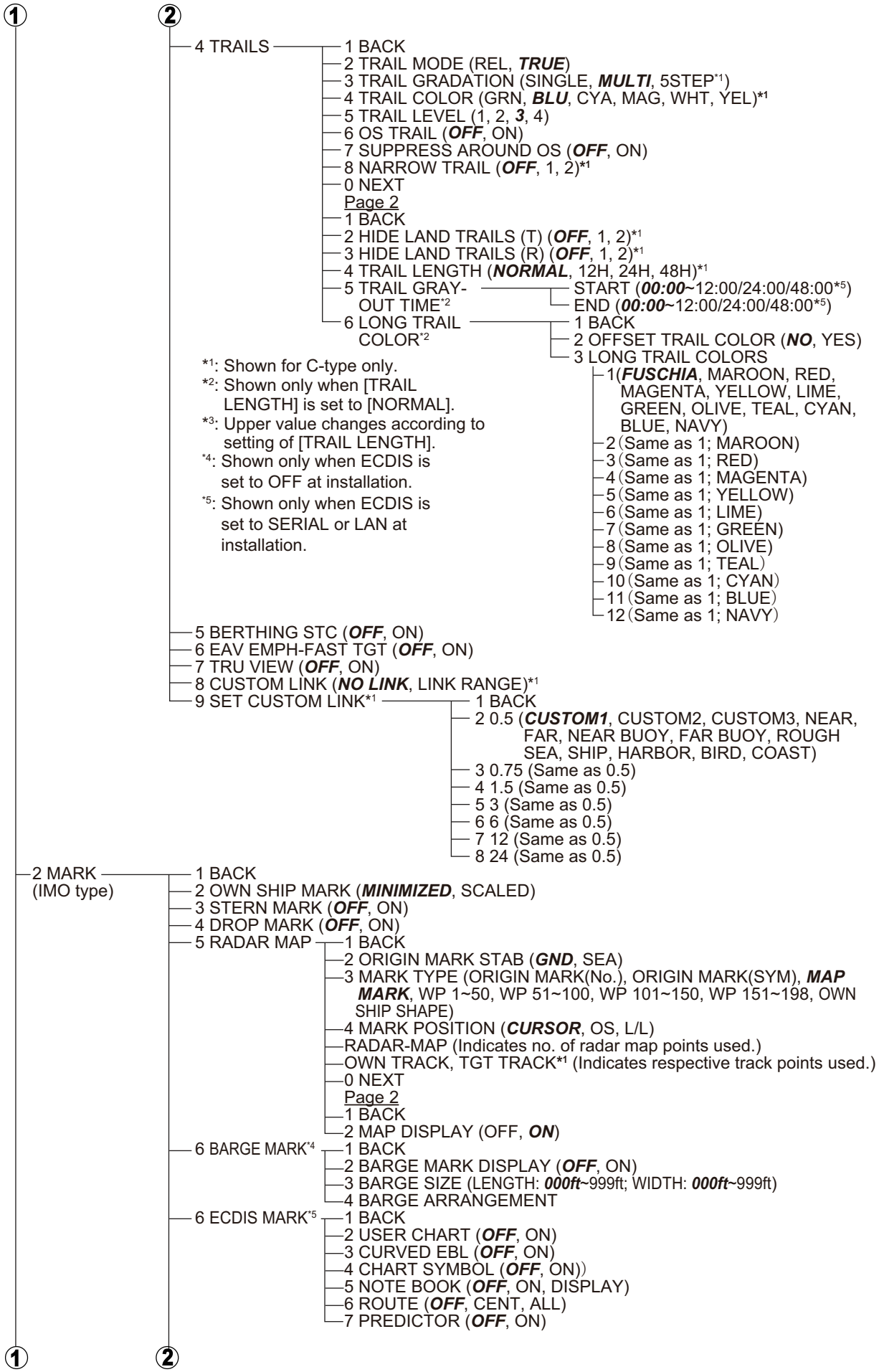
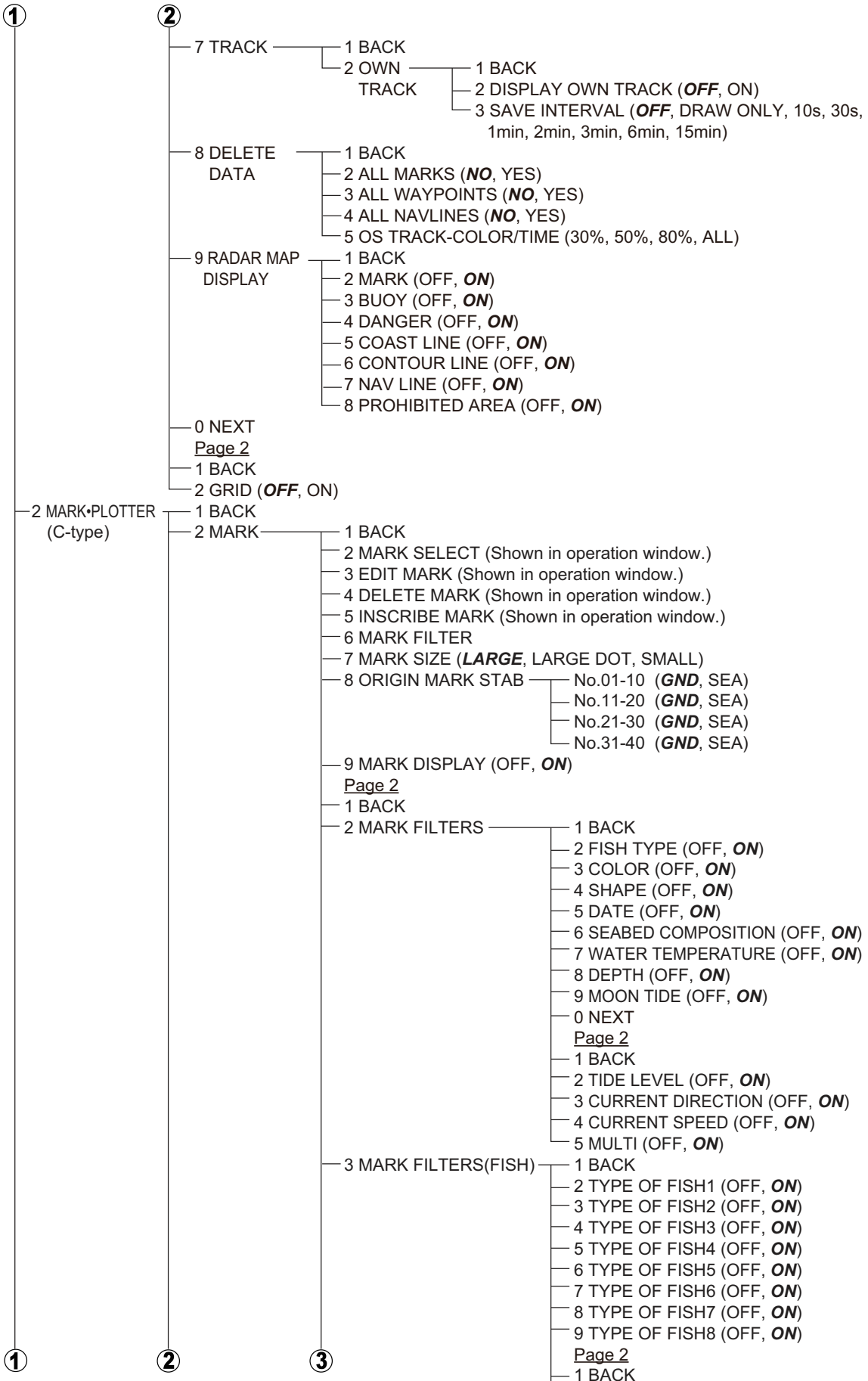
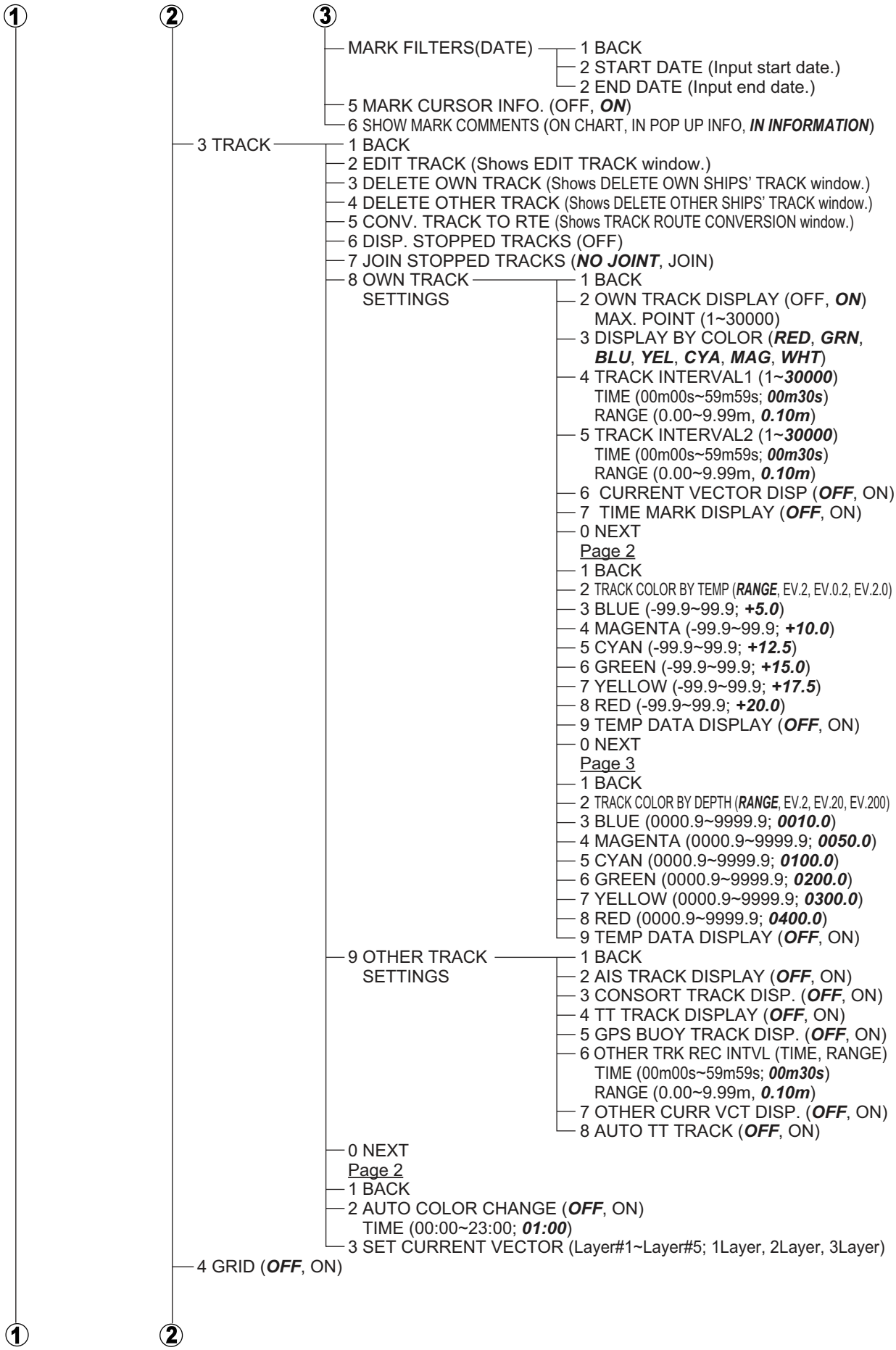
APPENDIX 1 MENU TREE

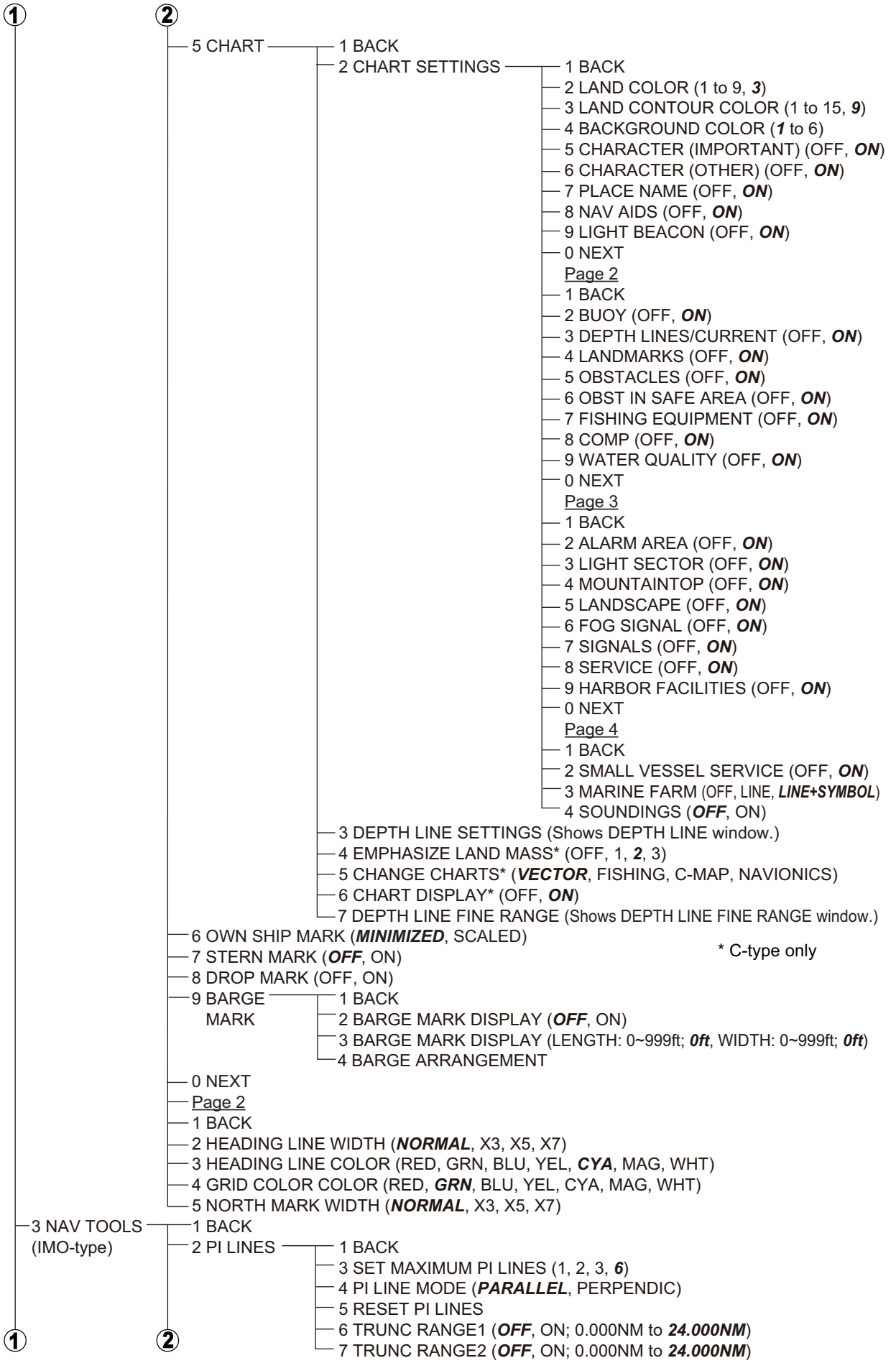


*1: C-type only.
*2: Shown when performance monitor is connected.
*3: Not shown on FAR-2x58 monitors which are assigned as [SUB] at installation.


①
②
4 TRAILS
1 BACK
2 TRAIL MODE (REL, ***TRUE***)
3 TRAIL GRADATION (SINGLE, ***MULTI***, 5STEP*1)
4 TRAIL COLOR (GRN, ***BLU***, CYA, MAG, WHT, YEL)*1
5 TRAIL LEVEL (1, 2, ***3***, 4)
6 OS TRAIL (***OFF***, ON)
7 SUPPRESS AROUND OS (***OFF***, ON)
8 NARROW TRAIL (***OFF***, 1, 2)*1
0 NEXT
Page 2
1 BACK
2 HIDE LAND TRAILS (T) (***OFF***, 1, 2)*1
3 HIDE LAND TRAILS (R) (***OFF***, 1, 2)*1
4 TRAIL LENGTH (***NORMAL***, 12H, 24H, 48H)*1
5 TRAIL GRAY-OUT TIME*2
START (***00:00***~12:00/24:00/48:00*5)
END (***00:00***~12:00/24:00/48:00*5)
6 LONG TRAIL COLOR*2
1 BACK
2 OFFSET TRAIL COLOR (***NO***, YES)
3 LONG TRAIL COLORS
1(***FUSCHIA***, MAROON, RED, MAGENTA, YELLOW, LIME, GREEN, OLIVE, TEAL, CYAN, BLUE, NAVY)
2 (Same as 1; MAROON)
3 (Same as 1; RED)
4 (Same as 1; MAGENTA)
5 (Same as 1; YELLOW)
6 (Same as 1; LIME)
7 (Same as 1; GREEN)
8 (Same as 1; OLIVE)
9 (Same as 1; TEAL)
10 (Same as 1; CYAN)
11 (Same as 1; BLUE)
12 (Same as 1; NAVY)
*1: Shown for C-type only.
*2: Shown only when [TRAIL LENGTH] is set to [NORMAL].
*3: Upper value changes according to setting of [TRAIL LENGTH].
*4: Shown only when ECDIS is set to OFF at installation.
*5: Shown only when ECDIS is set to SERIAL or LAN at installation.
5 BERTHING STC (***OFF***, ON)
6 EAV EMPH-FAST TGT (***OFF***, ON)
7 TRU VIEW (***OFF***, ON)
8 CUSTOM LINK (***NO LINK***, LINK RANGE)*1
9 SET CUSTOM LINK*1
1 BACK
2 0.5 (***CUSTOM1***, CUSTOM2, CUSTOM3, NEAR, FAR, NEAR BUOY, FAR BUOY, ROUGH SEA, SHIP, HARBOR, BIRD, COAST)
3 0.75 (Same as 0.5)
4 1.5 (Same as 0.5)
5 3 (Same as 0.5)
6 6 (Same as 0.5)
7 12 (Same as 0.5)
8 24 (Same as 0.5)
2 MARK (IMO type)
1 BACK
2 OWN SHIP MARK (***MINIMIZED***, SCALED)
3 STERN MARK (***OFF***, ON)
4 DROP MARK (***OFF***, ON)
5 RADAR MAP
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, WP 101~150, WP 151~198, OWN SHIP SHAPE)
4 MARK POSITION (***CURSOR***, OS, L/L)
RADAR-MAP (Indicates no. of radar map points used.)
OWN TRACK, TGT TRACK*1 (Indicates respective track points used.)
0 NEXT
Page 2
1 BACK
2 MAP DISPLAY (OFF, ***ON***)
6 BARGE MARK*4
1 BACK
2 BARGE MARK DISPLAY (***OFF***, ON)
3 BARGE SIZE (LENGTH: ***000ft***~999ft; WIDTH: ***000ft***~999ft)
4 BARGE ARRANGEMENT
6 ECDIS MARK*5
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)
①
②


①
②
7 TRACK
1 BACK
2 OWN TRACK
1 BACK
2 DISPLAY OWN TRACK (OFF, ON)
3 SAVE INTERVAL (OFF, DRAW ONLY, 10s, 30s, 1min, 2min, 3min, 6min, 15min)
8 DELETE DATA
1 BACK
2 ALL MARKS (NO, YES)
3 ALL WAYPOINTS (NO, YES)
4 ALL NAVLINES (NO, YES)
5 OS TRACK-COLOR/TIME (30%, 50%, 80%, ALL)
9 RADAR MAP DISPLAY
1 BACK
2 MARK (OFF, ON)
3 BUOY (OFF, ON)
4 DANGER (OFF, ON)
5 COAST LINE (OFF, ON)
6 CONTOUR LINE (OFF, ON)
7 NAV LINE (OFF, ON)
8 PROHIBITED AREA (OFF, ON)
0 NEXT
Page 2
1 BACK
2 GRID (OFF, ON)
2 MARK•PLOTTER (C-type)
1 BACK
2 MARK
1 BACK
2 MARK SELECT (Shown in operation window.)
3 EDIT MARK (Shown in operation window.)
4 DELETE MARK (Shown in operation window.)
5 INSCRIBE MARK (Shown in operation window.)
6 MARK FILTER
7 MARK SIZE (LARGE, LARGE DOT, SMALL)
8 ORIGIN MARK STAB
No.01-10 (GND, SEA)
No.11-20 (GND, SEA)
No.21-30 (GND, SEA)
No.31-40 (GND, SEA)
9 MARK DISPLAY (OFF, ON)
Page 2
1 BACK
2 MARK FILTERS
1 BACK
2 FISH TYPE (OFF, ON)
3 COLOR (OFF, ON)
4 SHAPE (OFF, ON)
5 DATE (OFF, ON)
6 SEABED COMPOSITION (OFF, ON)
7 WATER TEMPERATURE (OFF, ON)
8 DEPTH (OFF, ON)
9 MOON TIDE (OFF, ON)
0 NEXT
Page 2
1 BACK
2 TIDE LEVEL (OFF, ON)
3 CURRENT DIRECTION (OFF, ON)
4 CURRENT SPEED (OFF, ON)
5 MULTI (OFF, ON)
3 MARK FILTERS(FISH)
1 BACK
2 TYPE OF FISH1 (OFF, ON)
3 TYPE OF FISH2 (OFF, ON)
4 TYPE OF FISH3 (OFF, ON)
5 TYPE OF FISH4 (OFF, ON)
6 TYPE OF FISH5 (OFF, ON)
7 TYPE OF FISH6 (OFF, ON)
8 TYPE OF FISH7 (OFF, ON)
9 TYPE OF FISH8 (OFF, ON)
Page 2
1 BACK
2 TYPE OF FISH9 (OFF, ON)
3 TYPE OF FISH10 (OFF, ON)
①
②
③


①
②
③
MARK FILTERS(DATE)
1 BACK
2 START DATE (Input start date.)
2 END DATE (Input end date.)
5 MARK CURSOR INFO. (OFF, ON)
6 SHOW MARK COMMENTS (ON CHART, IN POP UP INFO, IN INFORMATION)
3 TRACK
1 BACK
2 EDIT TRACK (Shows EDIT TRACK window.)
3 DELETE OWN TRACK (Shows DELETE OWN SHIPS' TRACK window.)
4 DELETE OTHER TRACK (Shows DELETE OTHER SHIPS' TRACK window.)
5 CONV. TRACK TO RTE (Shows TRACK ROUTE CONVERSION window.)
6 DISP. STOPPED TRACKS (OFF)
7 JOIN STOPPED TRACKS (NO JOINT, JOIN)
8 OWN TRACK SETTINGS
1 BACK
2 OWN TRACK DISPLAY (OFF, ON)
MAX. POINT (1~30000)
3 DISPLAY BY COLOR (RED, GRN, BLU, YEL, CYA, MAG, WHT)
4 TRACK INTERVAL1 (1~30000)
TIME (00m00s~59m59s; 00m30s)
RANGE (0.00~9.99m, 0.10m)
5 TRACK INTERVAL2 (1~30000)
TIME (00m00s~59m59s; 00m30s)
RANGE (0.00~9.99m, 0.10m)
6 CURRENT VECTOR DISP (OFF, ON)
7 TIME MARK DISPLAY (OFF, ON)
0 NEXT
Page 2
1 BACK
2 TRACK COLOR BY TEMP (RANGE, EV.2, EV.0.2, EV.2.0)
3 BLUE (-99.9~99.9; +5.0)
4 MAGENTA (-99.9~99.9; +10.0)
5 CYAN (-99.9~99.9; +12.5)
6 GREEN (-99.9~99.9; +15.0)
7 YELLOW (-99.9~99.9; +17.5)
8 RED (-99.9~99.9; +20.0)
9 TEMP DATA DISPLAY (OFF, ON)
0 NEXT
Page 3
1 BACK
2 TRACK COLOR BY DEPTH (RANGE, EV.2, EV.20, EV.200)
3 BLUE (0000.9~9999.9; 0010.0)
4 MAGENTA (0000.9~9999.9; 0050.0)
5 CYAN (0000.9~9999.9; 0100.0)
6 GREEN (0000.9~9999.9; 0200.0)
7 YELLOW (0000.9~9999.9; 0300.0)
8 RED (0000.9~9999.9; 0400.0)
9 TEMP DATA DISPLAY (OFF, ON)
9 OTHER TRACK SETTINGS
1 BACK
2 AIS TRACK DISPLAY (OFF, ON)
3 CONSORT TRACK DISP. (OFF, ON)
4 TT TRACK DISPLAY (OFF, ON)
5 GPS BUOY TRACK DISP. (OFF, ON)
6 OTHER TRK REC INTVL (TIME, RANGE)
TIME (00m00s~59m59s; 00m30s)
RANGE (0.00~9.99m, 0.10m)
7 OTHER CURR VCT DISP. (OFF, ON)
8 AUTO TT TRACK (OFF, ON)
0 NEXT
Page 2
1 BACK
2 AUTO COLOR CHANGE (OFF, ON)
TIME (00:00~23:00; 01:00)
3 SET CURRENT VECTOR (Layer#1~Layer#5; 1Layer, 2Layer, 3Layer)
4 GRID (OFF, ON)
①
②


①
②
5 CHART
1 BACK
2 CHART SETTINGS
1 BACK
2 LAND COLOR (1 to 9, 3)
3 LAND CONTOUR COLOR (1 to 15, 9)
4 BACKGROUND COLOR (1 to 6)
5 CHARACTER (IMPORTANT) (OFF, ON)
6 CHARACTER (OTHER) (OFF, ON)
7 PLACE NAME (OFF, ON)
8 NAV AIDS (OFF, ON)
9 LIGHT BEACON (OFF, ON)
0 NEXT
Page 2
1 BACK
2 BUOY (OFF, ON)
3 DEPTH LINES/CURRENT (OFF, ON)
4 LANDMARKS (OFF, ON)
5 OBSTACLES (OFF, ON)
6 OBST IN SAFE AREA (OFF, ON)
7 FISHING EQUIPMENT (OFF, ON)
8 COMP (OFF, ON)
9 WATER QUALITY (OFF, ON)
0 NEXT
Page 3
1 BACK
2 ALARM AREA (OFF, ON)
3 LIGHT SECTOR (OFF, ON)
4 MOUNTAINTOP (OFF, ON)
5 LANDSCAPE (OFF, ON)
6 FOG SIGNAL (OFF, ON)
7 SIGNALS (OFF, ON)
8 SERVICE (OFF, ON)
9 HARBOR FACILITIES (OFF, ON)
0 NEXT
Page 4
1 BACK
2 SMALL VESSEL SERVICE (OFF, ON)
3 MARINE FARM (OFF, LINE, LINE+SYMBOL)
4 SOUNDINGS (OFF, ON)
3 DEPTH LINE SETTINGS (Shows DEPTH LINE window.)
4 EMPHASIZE LAND MASS* (OFF, 1, 2, 3)
5 CHANGE CHARTS* (VECTOR, FISHING, C-MAP, NAVIONICS)
6 CHART DISPLAY* (OFF, ON)
7 DEPTH LINE FINE RANGE (Shows DEPTH LINE FINE RANGE window.)
6 OWN SHIP MARK (MINIMIZED, SCALED)
7 STERN MARK (OFF, ON)
8 DROP MARK (OFF, ON)
9 BARGE MARK
1 BACK
2 BARGE MARK DISPLAY (OFF, ON)
3 BARGE MARK DISPLAY (LENGTH: 0~999ft; 0ft, WIDTH: 0~999ft; 0ft)
4 BARGE ARRANGEMENT
0 NEXT
Page 2
1 BACK
2 HEADING LINE WIDTH (NORMAL, X3, X5, X7)
3 HEADING LINE COLOR (RED, GRN, BLU, YEL, CYA, MAG, WHT)
4 GRID COLOR COLOR (RED, GRN, BLU, YEL, CYA, MAG, WHT)
5 NORTH MARK WIDTH (NORMAL, X3, X5, X7)
* C-type only
3 NAV TOOLS (IMO-type)
1 BACK
2 PI LINES
1 BACK
3 SET MAXIMUM PI LINES (1, 2, 3, 6)
4 PI LINE MODE (PARALLEL, PERPENDIC)
5 RESET PI LINES
6 TRUNC RANGE1 (OFF, ON; 0.000NM to 24.000NM)
7 TRUNC RANGE2 (OFF, ON; 0.000NM to 24.000NM)
①
②