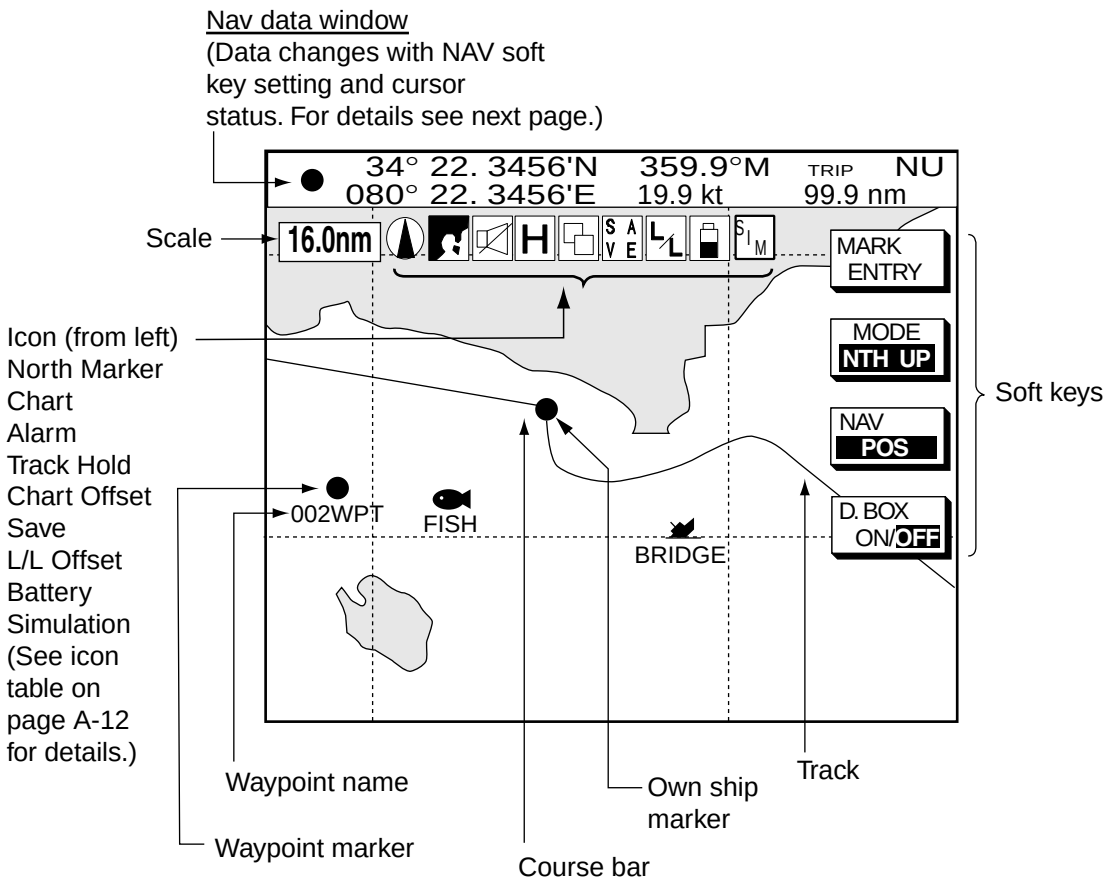
3. PLOTTER OPERATION

3.1 Plotter Displays

You may show the plotter display over the entire screen, in the overlay screen with the radar display, or in a combination screen.

3.1.1 Full-screen plotter display

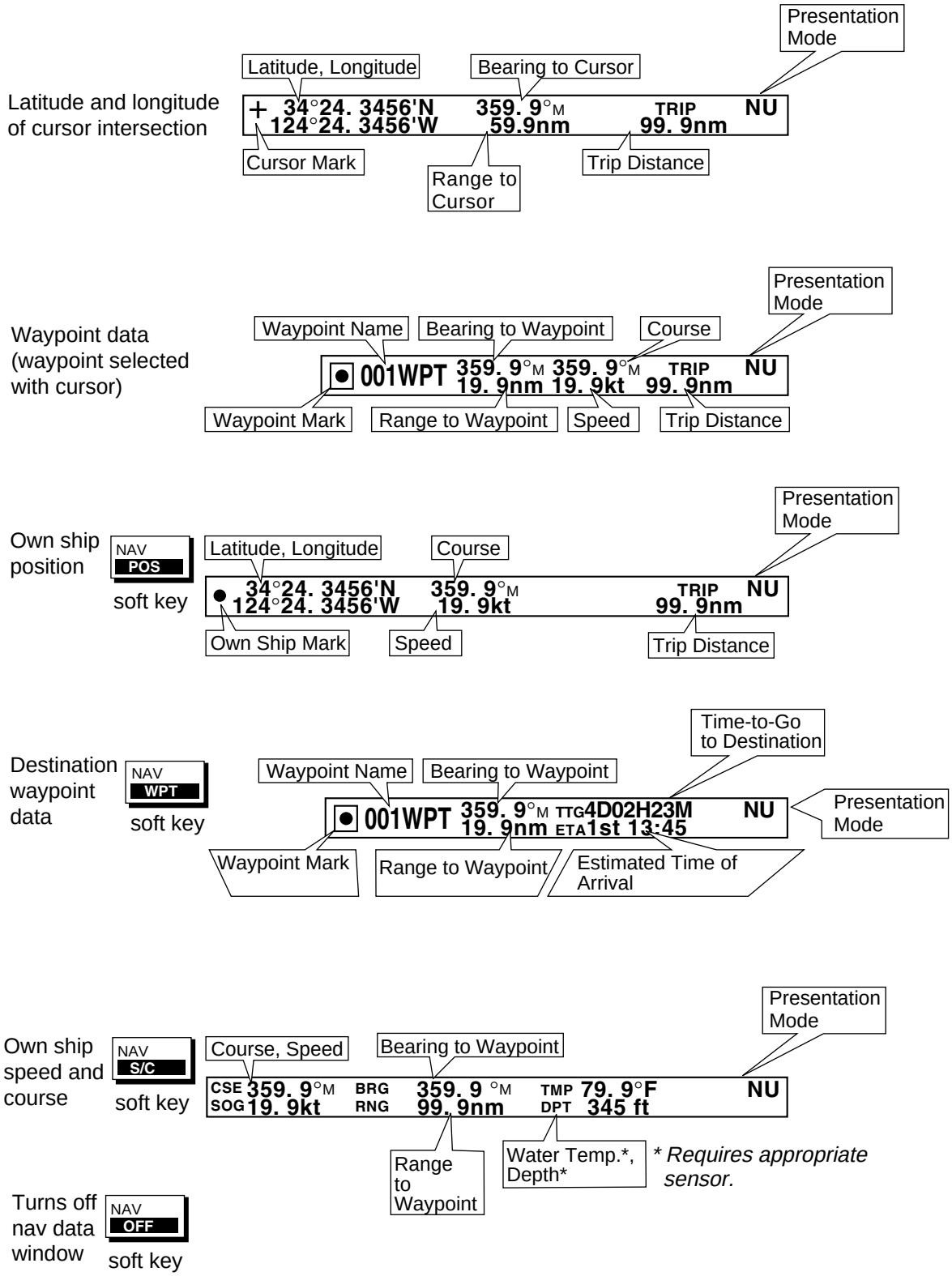


Full-screen plotter display

Note: : The own ship marker blinks when the unit loses the GPS signal. The message “No GPS fix!” appears approx. 90 seconds after the positioning error and is accompanied by the audio alarm. When the message “NO POSITION DATA” appears, a cable may be loosened.

Nav data window

The data shown in the nav data window depends on the status of the NAV soft key and the cursor.

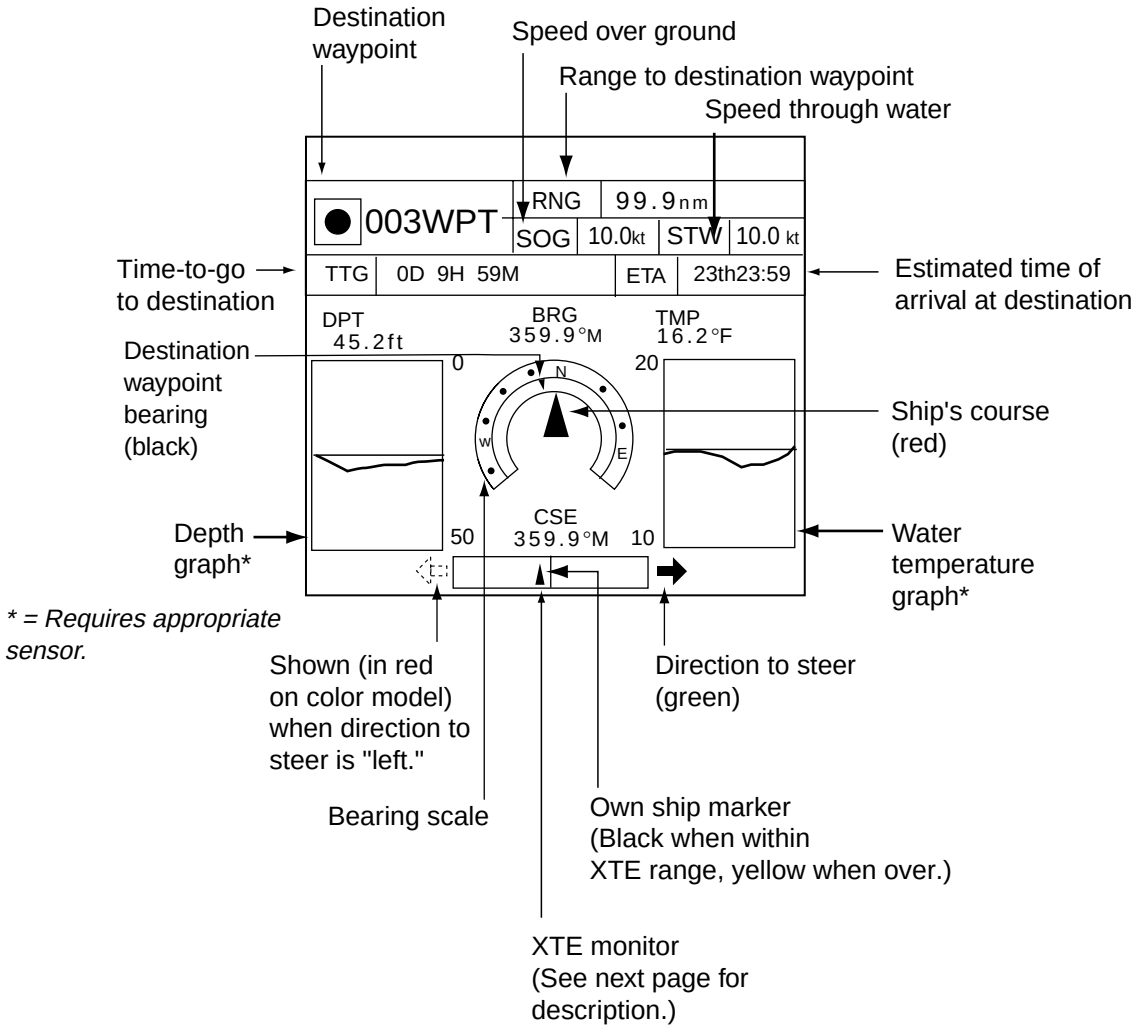


Contents of nav data window

3.1.2 Compass display

The compass display, shown in combination displays, provides steering information. The compass rose shows two triangles: the red triangle shows own ship's course and the black triangle, which moves with ship's course, shows the bearing to destination waypoint.

The water temperature and depth graphs, which require appropriate sensors, show the latest 10 minutes of water temperature and depth data. The range of the depth graph is 50 feet and it is automatically adjusted with depth.



Compass display

Reading the XTE (cross-track error) monitor

The XTE monitor, located below the compass rose, shows the distance you are off course and the direction to steer to return to course. The own ship marker moves according to direction and distance off course. It is shown in black when the amount of cross-track error is within the XTE monitor range and yellow when it is over. An arrow appears at the right or left side of the XTE monitor and it shows the direction to steer to return to intended course. It is shown in red when you should steer left, and green when you should steer right. In the example on the previous page you would steer right to return to course. To maintain course, steer the vessel so the own ship marker stays at the center of the XTE monitor.

Soft keys

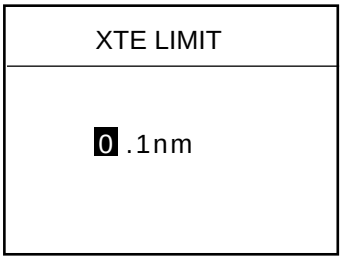
You can show the soft keys for the compass display by pressing the [HIDE/SHOW] key.

COMPSS CNTRL: On the radar/plotter/compass combination display you can switch control to the compass display by pressing the CNTRL soft key to select COMPSS.
EDIT XT-LMT: Sets the range for XTE monitor scale. See the procedure below for how to set.
RESET XTE: This soft key may be operated to restart navigation, when a destination is set. Press the EDIT XT-LMT soft key followed by the RESET XTE soft key. The following message is displayed.

```
RESTART NAVGATION TO
CURRENT WPT.
ARE YOU SURE?
YES ... PUSH ENTER KNOB
NO  ... PUSH CLEAR KEY
```

Setting the range for the XTE monitor

1. With the compass (or highway) display shown, press the EDIT XT-LMT soft key to display the following window.

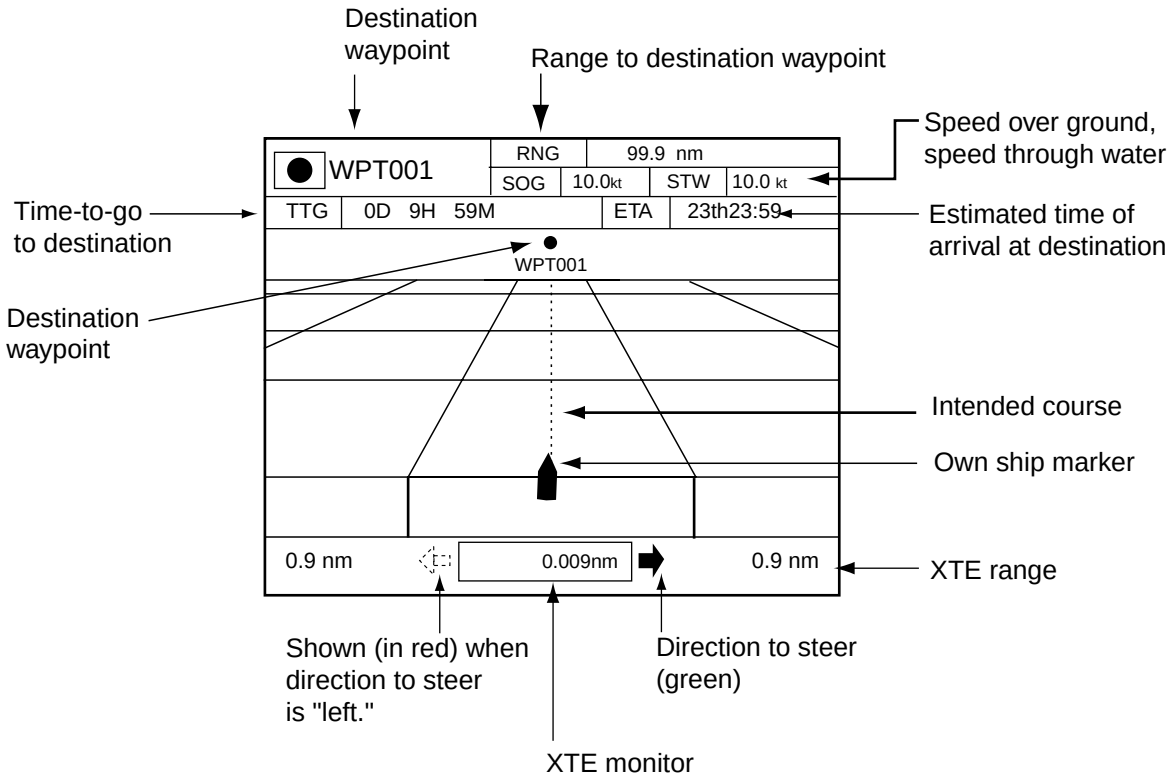


XTE range setting window

2. Use the trackball to select digit to change. Note that all digits may be cleared by pressing the [CLEAR] key.
3. Enter value with the alphanumeric keys.
4. Push the [ENTER] knob to set, or press the CANCEL soft key to cancel.

3.1.3 Highway display

The highway display, shown in combination displays, provides a graphic presentation of ship's track along intended course. It is useful for monitoring ship's progress toward a waypoint. The own ship marker shows the relation between ship and intended course. The XTE monitor shows the direction and amount your vessel is off course – the arrow shows the direction to steer to return to your course and the numeric the distance you are off course. Using the figure below as an example, you would steer right 0.009 nm to return to course. To maintain course, steer the vessel so the own ship marker stays aligned with the intended course line.



Highway display

Soft keys

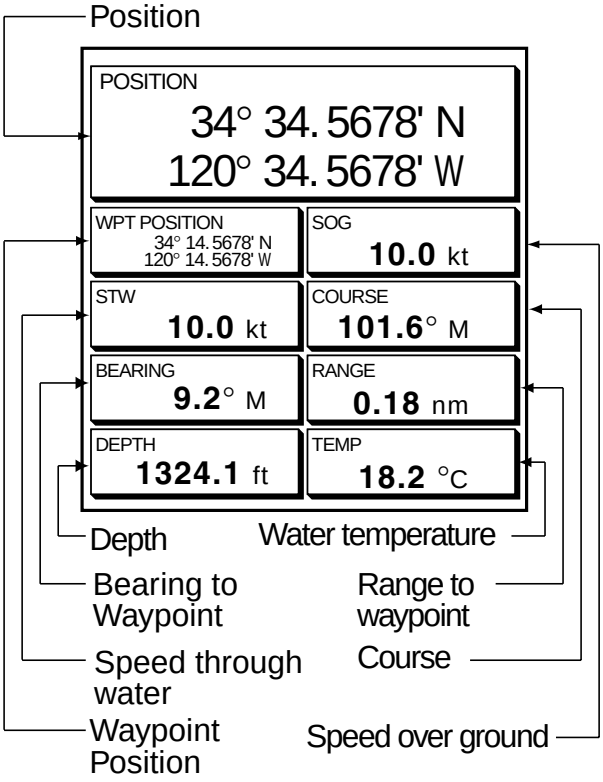
You can show the soft keys for the highway display by pressing the [HIDE/SHOW] key.

HIWAY CNTRL: On the radar/plotter/compass combination display you can switch control to the highway display by pressing the CNTRL soft key to show HIWAY.
EDIT XT-LMT: Sets the range for XTE monitor scale. See the procedure on the previous page for how to set.
RESET XTE: This soft key may be operated to restart navigation, when a destination is set. Press the EDIT XT-LMT soft key followed by the RESET XTE soft key. See the previous page for details.

3.1.4 Nav data display

The nav data display provides comprehensive navigation data, and it is shown in a three-screen combination display. The user may select what data to display and where to display it. For details see the paragraph “5.8 Nav Data Display Setup.”

Appropriate sensors are required. Bars (- -) appear when corresponding sensor is not connected.



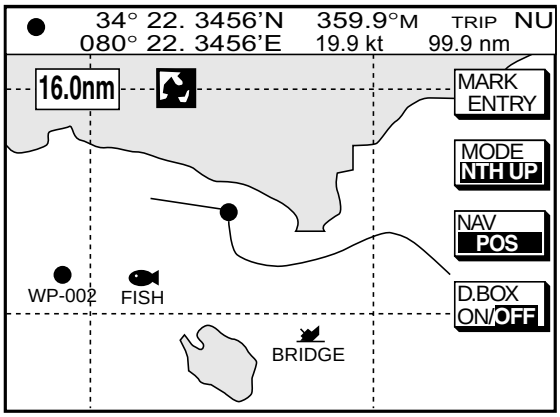
Nav data displays

3.2 Presentation Mode

Three types of presentation modes are provided for the plotter display: north-up, course-up and auto course-up. To change the presentation mode, press the [HIDE/SHOW] key followed by the MODE soft key. Each press of the key changes the presentation mode and presentation mode indication (top right-hand corner of the screen) cyclically in the sequence of North-up, Course-up and Auto course-up.

3.2.1 North-up

North (zero degree) is at the top of the display and own ship is shown with a filled circle. This mode is useful for long-range navigation.

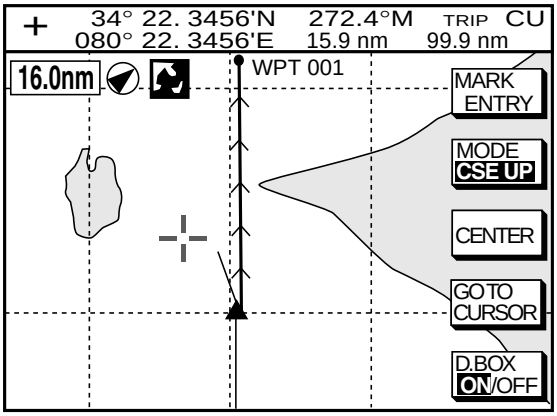


Plotter display, north-up mode

3.2.2 Course-up

The course-up mode is useful for monitoring ship's progress towards a waypoint. The destination is at the top of the screen when a destination is set. When no destination is set, the course or heading is at the top of the screen at the moment the course-up mode is selected. A filled triangle marks own ship's position.

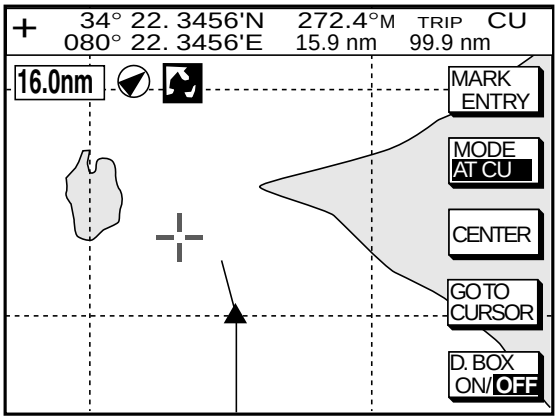
Note: The data sentences GGA and VTG must be output from the NavNet display unit connected to the GPS navigator in order to correctly orient the own ship marker in the course-up mode on other NavNet display units.



Plotter display, course-up mode, destination set

3.2.3 Auto course-up

The course is at the top of screen at the moment the auto course-up mode is selected. In this mode, the current course is kept at the top of the screen when the change is within 22.5 degrees. For example, if your vessel turns larger than 22.5 degrees to port or starboard, the chart display will rotate so that your course is pointing towards the top of the screen again. A filled triangle marks own ship's position.



Plotter display, auto course-up mode

3.3 Shifting the Display

The plotter display can be shifted as below.

1. Use the trackball to locate the cursor at a screen edge. The screen shifts in the direction opposite of cursor location.
2. To turn off the cursor, press the CENTER soft key. This also returns the own ship marker to the screen center.

3.4 Chart Scale

Chart scale (range) may be selected with the [RANGE -] or [RANGE +] key. The [-] key expands the chart range; the [+] key shrinks it. The available ranges are as below.

Charts scales

nm	0.125	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048
km	0.23	0.46	0.93	1.85	3.70	7.41	14.8	29.6	59.3	119	237	474	948	1896	3742
sm	0.144	0.29	0.58	1.15	2.30	4.60	9.21	18.4	36.8	73.7	147	295	589	1178	2356

Note: When the display is expanded or shrunk beyond the range of the chart card in use the message “NO CHART” appears, along with the appropriate chart icon. See the illustration on the next page for details.

3.5 Chart Cards

3.5.1 Chart card overview

Your system reads FURUNO and NavCharts™ (NAVIONICS) charts, or C-MAP charts, depending on the type of display unit you have.

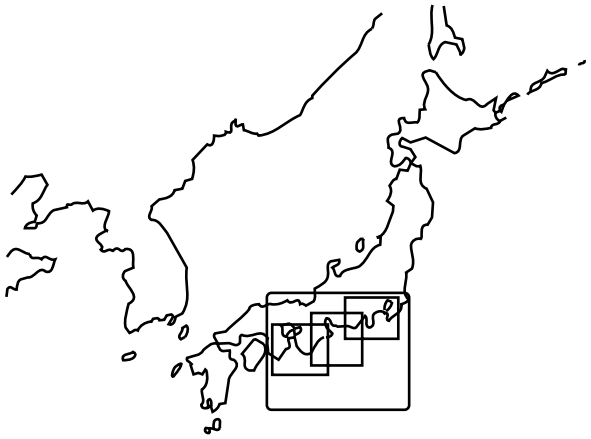
When you insert a suitable chart card in the slot and own ship is near any cartographic object, a chart appears. If a wrong card is inserted or a wrong chart scale is selected, landmasses will appear hollow. Chart icons appear at the top of the display to help you select a suitable chart scale. The table below shows the chart icons and their meanings.

Chart icons and their meanings

Icon	Meaning
	Proper card is not inserted or chart scale is too small. Operate the RANGE key to adjust chart scale.
	Chart scale is too large. Operate the RANGE key to adjust chart scale.
	Suitable chart scale is selected.

3.5.2 Indices and chart enlargement

When the [RANGE] key is operated, you will see several frames appear on the chart. These frames are called indices and they show you what parts of the chart can be enlarged in the current range.



Sample chart (Japan), showing indices

When a chart cannot be displayed

A chart will not be displayed in the following conditions:

- When the chart scale is too large or too small.
- When scrolling the chart outside the indices.

When this happens, select proper chart scale.

Note: Indices can be turned on or off. For further details see “Chart border line” on page 5-14 for FURUNO and NAVIONICS charts and page 5-16 for C-MAP charts.

3.5.3 FURUNO and NavCharts™ charts

Chart symbols

The table below shows FURUNO and NavCharts™ chart symbols and their meanings.

Chart symbols

Symbol	Description	Symbol	Description
	Summit		Position of Sounding
	Wreck		Obstruction
	Lighthouse		Fishing Reef
	Lighted Buoy		Platform
	Buoy		Anchorage
	Radio Station		

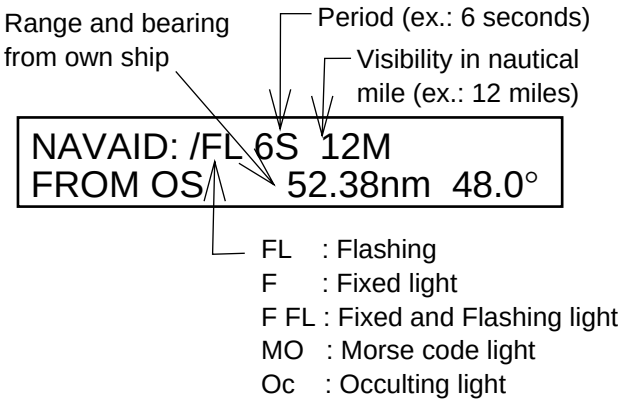
Data for aids to navigation

Selected FURUNO and NavCharts™ charts can show buoy and lighthouse data. Simply place the cursor on the lighthouse or buoy mark.

Place the cursor on
a lighthouse or buoy mark.

Lighthouse mark

Example of data displayed

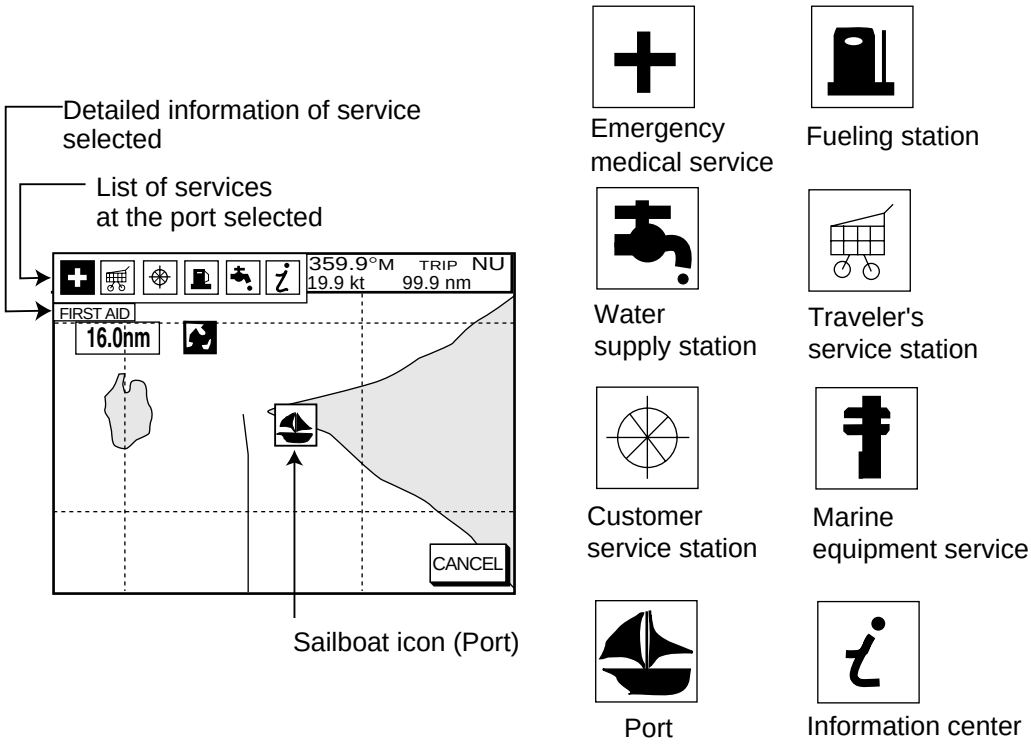


Example of buoy, lighthouse data

Port service icons (NavCharts™ only)

Selected NavCharts show services available at ports, with icons.

1. Use the trackball to place the cursor on the sailboat icon (denotes a port or harbor) desired.
2. Push the [ENTER] knob.
3. Roll the trackball horizontally to select icon desired at the top of the display. The services available appear directly below the icon selected.
4. Press the RETURN soft key to finish.



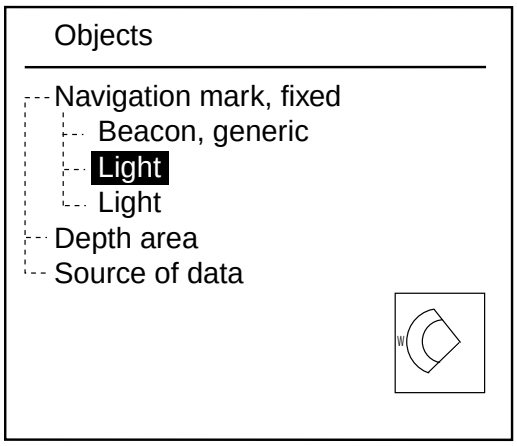
Plotter display, showing port service display

3.5.4 C-MAP charts

Cursor and data display

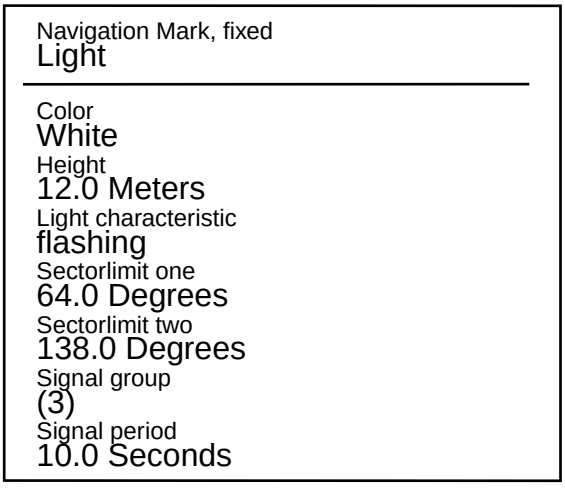
Besides its fundamental functions of providing position data, the cursor can also show information about caution area, depth area, source of data, etc. on C-MAP charts. In addition, you can display information about an icon by placing the cursor on it.

1. Press the trackball to turn the cursor on.
2. Use the trackball to place the cursor on the position desired.
3. Push the [ENTER] knob to open the Objects window.



Objects window

4. Use the trackball to select the item desired.
5. Push the [ENTER] knob to display details for object selected.



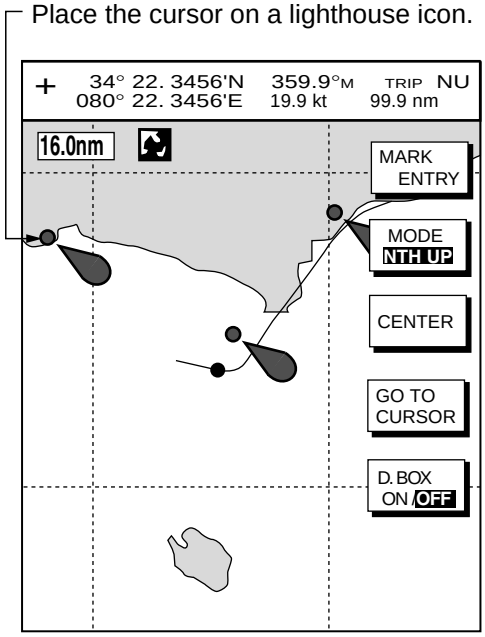
Example of caution area window

6. Press the RETURN soft key to close the window.
7. Press the RETURN soft key to finish.

Icon data

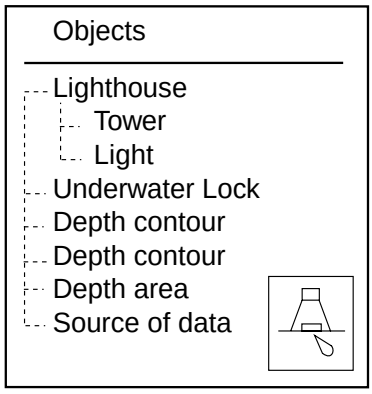
You may place the cursor on any icon to find information about the selected icon.

1. For example, place the cursor on a lighthouse icon.



Lighthouse icon

2. Push the [ENTER] knob to show data. For example, the following window appears for a lighthouse.



Object windows

3. Use the trackball to select the item desired.
4. Push the [ENTER] knob to display detailed information.

Navigation mark, fixed Light.
Color white Height 7. 00 Meters Light characteristic occulting XXXXXXXX XXXXXXXX

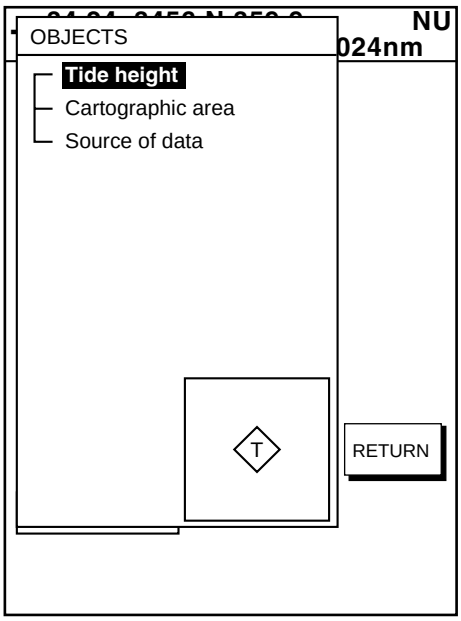
Sample lighthouse data

5. Press the RETURN soft key to finish.

Tide information

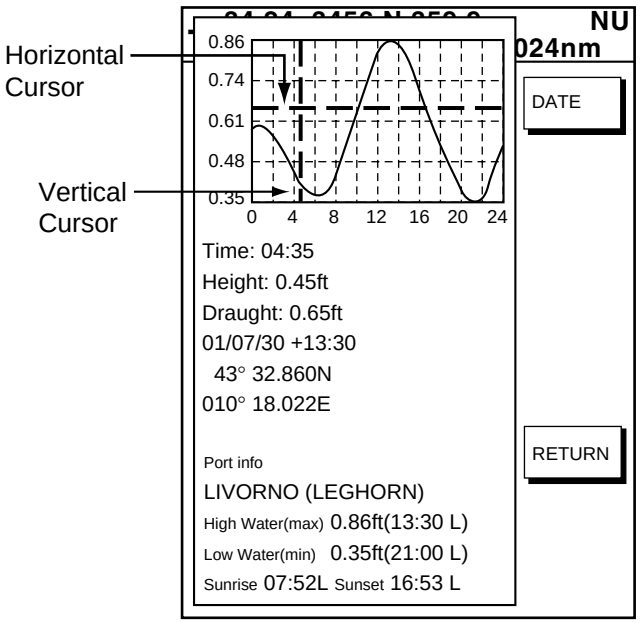
The C-MAP NT chart card provides for calculation of the tide heights for any date. Additionally it displays the times of sunrise and sunset.

1. Press the trackball to place the cursor on a Tide icon (T).
2. Push the [ENTER] knob to open the Objects window.



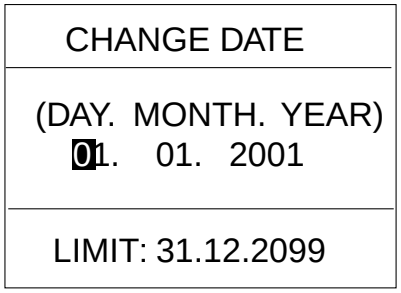
Objects window

3. Use the trackball to select Tide height.
4. Push the [ENTER] knob to open the TIDE window.



Tide window

5. Press the DATE soft key to open the DATE window.



Date window

6. Use the trackball to position the cursor where desired, then enter value with the alphanumeric keys. Repeat to enter complete date.
7. Push the [ENTER] knob to show the tidal graph for entered date.
8. Use the trackball to locate the vertical cursor on the hour desired.
9. Use the trackball to shift the level cursor to select draught.
10. See the time, height and draught indications below the tide graph for tide information.
11. Press the RETURN soft key to close the TIDE window.

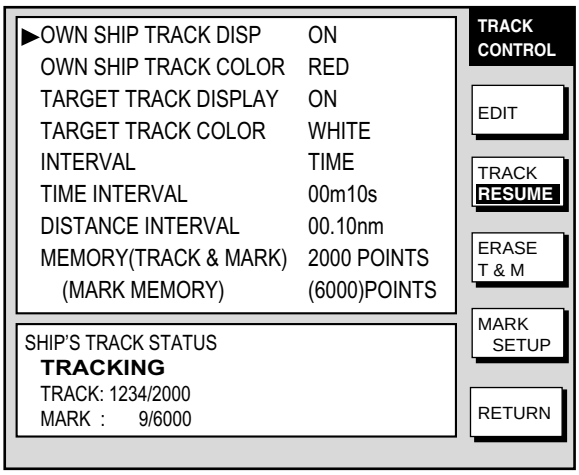
3.6 Working with Track

Your ship's track is plotted on the screen using navigation data fed from position-fixing equipment. This section shows you what you can do with track, from turning it on or off to changing its plotting interval. In the default setting, own ship's track is turned on and is displayed in red.

3.6.1 Displaying track

Own ship track

1. Press the [MENU] key followed by the CHART SETUP and TRACKS & MARKS CONTROL soft keys to open the TRACK CONTROL menu.



Track control menu

2. Use the trackball to select OWN SHIP TRACK DISP.
3. Press the EDIT soft key to show the track display window.
4. Use the trackball to select ON (default setting) or OFF as appropriate.
5. Press the ENTER soft key.
6. Press the [MENU] key to close the menu.

Note: The number of track and mark points used appears at the SHIP'S TRACK STATUS window on the TRACK CONTROL menu. Using the figure above as an example, 1234 points of track and 9 marks have been recorded.

Target track

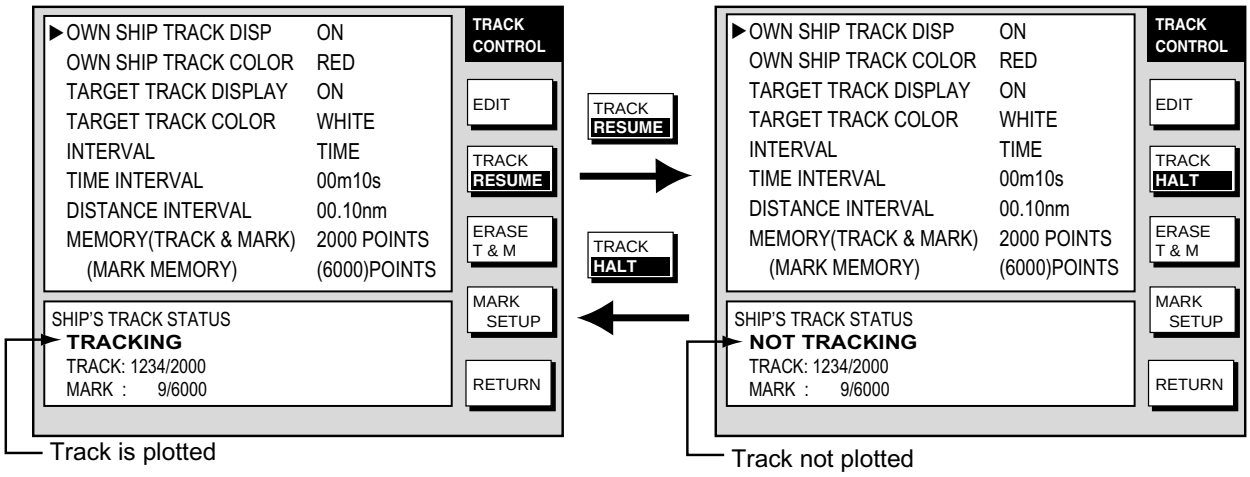
Target track, NMEA format TTM (Tracked Target Message) data sentence, may be turned on or off as desired. The default setting is ON.

1. Press the [MENU] key followed by the CHART SETUP and TRACKS & MARKS CONTROL soft keys to open the TRACK CONTROL menu.
2. Use the trackball to select TARGET TRACK DISPLAY.
3. Press the EDIT soft key to show the target track display window.
4. Use the trackball to select to ON (default setting) or OFF as appropriate.
5. Press the ENTER soft key.
6. Press the [MENU] key to close the menu.

3.6.2 Stopping, restarting plotting of own ship track

When your boat is at anchor or returning to port you probably won't need to record its track. You can stop recording the track, to conserve the track memory, as follows:

1. Press the [MENU] key followed by the CHART SETUP and TRACKS & MARKS CONTROL soft keys to open the TRACK CONTROL menu.



Track control menu

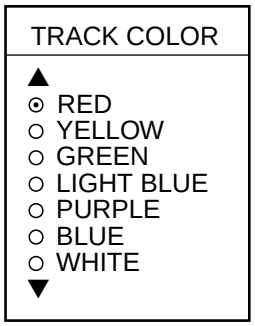
2. Press the TRACK RESUME soft key. The soft key now shows "TRACK HALT" and the indication "TRACKING" in the SHIP'S TRACK STATUS window changes to "NOT TRACKING." In addition, the icon "H" is displayed at the top of the plotter display and own ship marker becomes a hollow circle. To restart plotting the track, press the TRACK HALT soft key
3. Press the [MENU] key to close the menu.

3.6.3 Changing track color

Track can be displayed in red (default setting), yellow, green, light-blue, purple, blue and white. It can be useful to change track color on a regular basis to discriminate between previous day's track, etc.

Own ship's track

1. Press the [MENU] key followed by the CHART SETUP and TRACKS & MARKS CONTROL soft keys to open the TRACK CONTROL menu.
2. Use the trackball to select OWN SHIP TRACK COLOR.
3. Press the EDIT soft key to display the track color window.



Own ship track color window

4. Use the trackball to select the color desired.
5. Press the ENTER soft key.
6. Press the [MENU] key to close the menu.

Target track

Like own ship's track, target tracks can be displayed in red, yellow, green, light-blue, purple, blue and white (default setting).

1. Press the [MENU] key followed by the CHART SETUP and TRACKS & MARKS CONTROL soft keys to open the TRACK CONTROL menu.
2. Use the trackball to select TARGET TRACK COLOR.
3. Press the EDIT soft key to display the track color window.
4. Use the trackball to select the color desired.
5. Press the ENTER soft key.
6. Press the [MENU] key to close the menu.

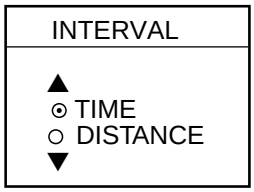
3.6.4 Track plotting method and interval for own ship track

In drawing the own ship track, first the ship's position fed from position-fixing equipment is stored into the unit's memory at an interval of time or distance. A shorter interval provides for better reconstruction of the track, but the storage time of the track is reduced. When the track memory becomes full, the oldest track is erased to make room for the latest.

Track plotting method

Track may be plotted by time or distance. The default setting is "time."

1. Press the [MENU] key followed by the CHART SETUP and TRACKS & MARKS CONTROL soft keys to open the TRACK CONTROL menu.
2. Use the trackball to select INTERVAL.
3. Press the EDIT soft key to display the plot window.

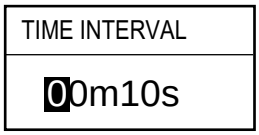


Interval window

4. Use the trackball to select TIME or DISTANCE as appropriate. Distance is useful for conserving track memory, since no track is recorded when the boat is stationary.
5. Press the ENTER soft key.
6. Press the [MENU] key to close the menu.

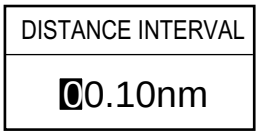
Track plotting interval

1. Press the [MENU] key followed by the CHART SETUP and TRACKS & MARKS CONTROL soft keys to open the TRACK CONTROL menu.
2. Use the trackball to select TIME INTERVAL or DISTANCE INTERVAL as appropriate.
3. Press the EDIT soft key to display the time or distance interval window, depending on what you selected at step 2.



Setting range: 0 min 1 sec (continuous) - 99 min 59 sec
Default setting: 10 sec

(When selecting TIME INTERVAL.)



Setting range: 0.01 nm (continuous) - 99.99 nm (km, sm)
Default setting: 0.1 nm

(When selecting DISTANCE INTERVAL.)

Interval windows

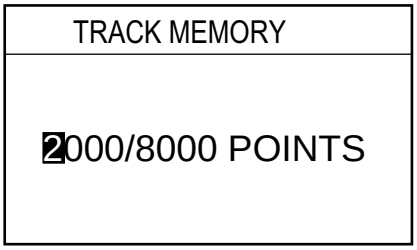
4. Use the trackball to select digit and enter value with the alphanumeric keys. The CLEAR soft key functions to clear an entire line of data.
5. Push the [ENTER] knob or ENTER soft key.
6. Press the [MENU] key to close the menu.

3.6.5 Changing own ship track/mark distribution setting

The equipment stores a total of 8000 points of track and marks. This amount may be distributed as desired, and the default setting is 2000 points of track and 6000 points for marks.

When you change the track memory setting, all tracks and marks in the memory are erased. If necessary save the data to a memory card. For further details see the paragraph “6.1.2 Saving data to a memory card.”

1. Press the [MENU] key followed by the CHART SETUP and TRACKS & MARKS CONTROL soft keys to open the TRACK CONTROL menu.
2. Use the trackball to select MEMORY (TRACK & MARK).
3. Press the EDIT soft key to display the track memory window.



Track memory window

4. Use the trackball to select digit and use the alphanumeric keys to enter value.
5. Push the ENTER soft key or the [ENTER] knob. You are asked if you are sure to change the track memory capacity.
6. Push the [ENTER] knob.
7. Press the [MENU] key to close the menu.

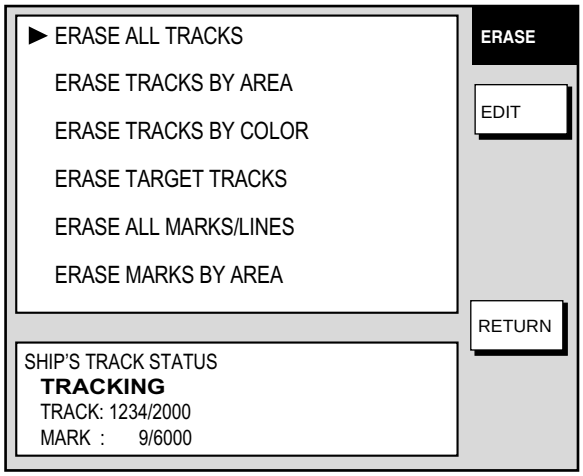
3.6.6 Erasing track

This paragraph shows you how to erase own ship's track and target tracks. You can erase ship's track three ways: collectively, by color and by area.

Erasing own ship track by area

You can erase own ship's track by area as below. This feature is not available when the overlay mode is in use.

1. Press the [MENU] key followed by the CHART SETUP, TRACKS & MARKS CONTROL and ERASE T & M soft keys to show the ERASE menu.



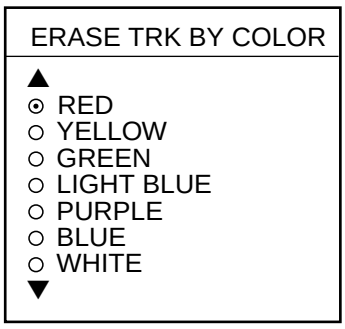
Erase menu

2. Use the trackball to select ERASE TRACKS BY AREA, then press the EDIT soft key. The menu is erased and the plotter display appears.
3. Use the trackball to place the cursor at the top left-hand corner of the area which you want to ease track from.
4. Press the START soft key or the [ENTER] knob.
5. Move the cursor to the bottom right-hand corner of the area which you want to ease track from.
6. Press the END soft key or the [ENTER] knob. You are asked if you are sure to delete the track.
7. Push the [ENTER] knob to delete the track selected.
8. Press the [MENU] key twice to close the menu.

Erasing own ship track by color

You may erase own ship's track by color as follows:

1. Press the [MENU] key followed by the CHART SETUP, TRACKS & MARKS CONTROL and ERASE T & M soft keys to show the ERASE menu.
2. Use the trackball to select ERASE TRACKS BY COLOR, then press the EDIT soft key.



Erase track by color window

3. Use the trackball to select the color you want to erase, then push the [ENTER] knob.
4. Push the [ENTER] knob to erase the track color selected.
5. Press the [MENU] key twice to close the menu.

Erasing all own ship track

1. Press the [MENU] key followed by the CHART SETUP, TRACKS & MARKS CONTROL and ERASE T & M soft keys to show the ERASE menu.
2. Use the trackball to select ERASE ALL TRACKS, then press the EDIT soft key.
3. Push the [ENTER] knob to erase all own ship track.
4. Press the [MENU] key twice to close the menu.

Erasing all target tracks

1. Press the [MENU] key followed by the CHART SETUP, TRACKS & MARKS CONTROL and ERASE T & M soft keys to show the ERASE menu.
2. Use the trackball to select ERASE TARGET TRACKS, then press the EDIT soft key.
3. Push the [ENTER] knob to erase all target tracks.
4. Press the [MENU] key twice to close the menu.

3.7 Marks, Lines

Marks are useful for denoting important points such as a good fishing spot. Marks can be inscribed in seven shapes and seven colors: Red, yellow, green, light-blue, purple, blue and white.

3.7.1 Entering a mark, line

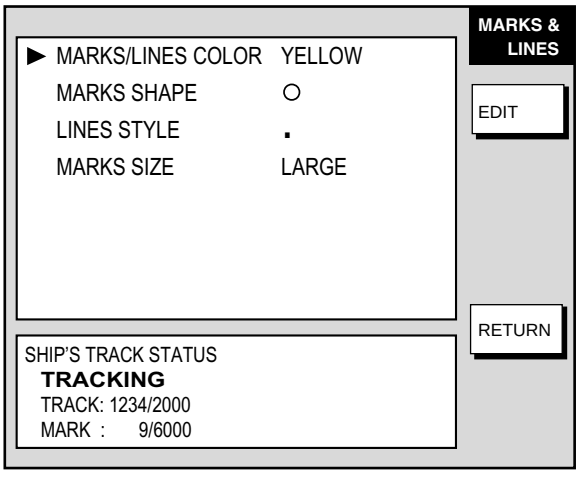
1. Place the cursor where you want a mark to appear.
2. Press the [SHOW/HIDE] key (if necessary) followed by the MARK ENTRY soft key.

The mark is inscribed in the size, color and shape selected on the mark & line menu. The default mark attributes are size, large; color, yellow, and shape, hollow circle (○).

3.7.2 Changing mark attributes

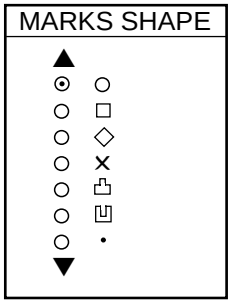
You can select the shape, size and color for marks on the MARKS & LINES menu.

1. Press the [MENU] key to show the menu.
2. Press the CHART SETUP, TRACKS & MARKS CONTROL and MARK SETUP soft keys to show the MARKS & LINES menu.



Marks & lines menu

3. Select MARKS/LINES COLOR, then press the EDIT soft key.
4. Use the trackball to choose color desired (default setting: yellow).
5. Press the ENTER soft key.
6. Select MARKS SHAPE, then press the EDIT soft key.



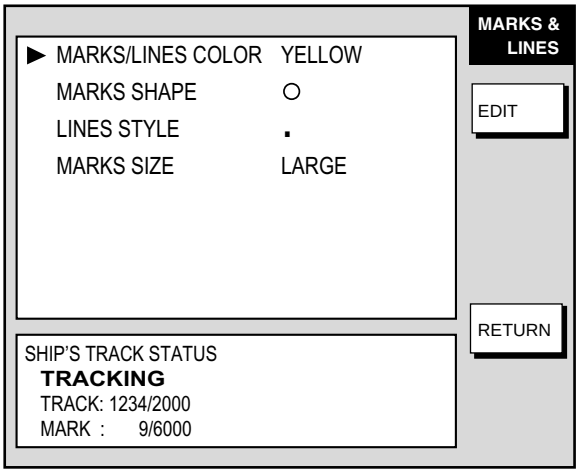
Marks shape window

7. Use the trackball to select mark shape desired, then press the ENTER soft key.
8. Select MARKS SIZE, then press the EDIT soft key.
9. Use the trackball to select LARGE (default setting) or SMALL as appropriate.
10. Press the ENTER soft key.
11. Press the [MENU] key twice to close the menu.

3.7.3 Selecting line type

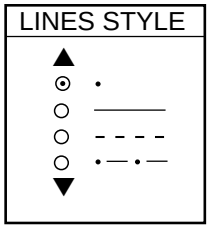
You may inscribe lines to denote good fishing spots, areas of special interest, etc. You can even construct simple charts.

1. Press the [MENU] key followed by the CHART SETUP, TRACKS & MARKS CONTROL and MARK SETUP soft keys to show the MARKS & LINES menu.



Marks & lines menu

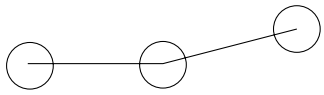
2. Select LINES STYLE, then press the EDIT soft key.



Lines style window

3. Use the trackball to select line style desired, then press the ENTER soft key.

   The line style “dot” disables line drawing. Edge of lines is determined by mark shape. For example, selecting the circle shape will join lines with a circle as below.



4. Press the [MENU] key twice to close the menu.

3.7.4 Erasing marks, lines

Erasing an individual mark

1. Operate the trackball to place the cursor on the mark you want to erase.
2. Press the [CLEAR] key to erase the mark.

Erasing an individual line

Place the cursor on an end of the line to erase, then press the [CLEAR] key. Placing the cursor at the intersecting point of two line segments will erase both line segments.

Erasing marks, lines by area

This feature is not available when the overlay mode is in use.

1. Press the [MENU] key followed by the CHART SETUP, TRACKS & MARKS CONTROL and ERASE T & M soft keys to show the ERASE menu.
2. Use the trackball to select ERASE MARKS BY AREA, then press the EDIT soft key. The menu is erased and the plotter display appears.
3. Use the trackball to place the cursor at the top left-hand corner of the area which you want to erase marks and lines from.
4. Press the START soft key or the [ENTER] knob.
5. Move the cursor to the bottom right-hand corner of the area which you want to erase marks and lines from.
6. Press the END soft key or the [ENTER] knob. You are asked if you are sure to delete the marks/lines selected. Press the [ENTER] knob to delete.
7. Press the [MENU] key twice to close the menu.

Erasing all marks, lines

You can erase all marks and lines collectively. Be absolutely sure you want to erase all marks and lines - erased marks and lines cannot be restored.

1. Press the [MENU] key followed by the CHART SETUP, TRACKS & MARKS CONTROL and ERASE T & M soft keys to show the ERASE menu.
2. Use the trackball to select ERASE ALL MARKS/LINES, then press the EDIT soft key.
3. Push the [ENTER] knob to erase all marks and lines.
4. Press the [MENU] key twice to close the menu.

3.8 Waypoints

In navigation terminology, a waypoint is a particular location on a voyage whether it be a starting, intermediate or destination point. A waypoint is the simplest piece of information your equipment requires to get you to a destination, in the shortest distance possible.

This unit has 999 waypoints into which you can enter position information. You may enter a waypoint five ways: at own ship position, at MOB position (see page 1-14 for details), by cursor, by range and bearing, and through the waypoint list (manual input of latitude and longitude).

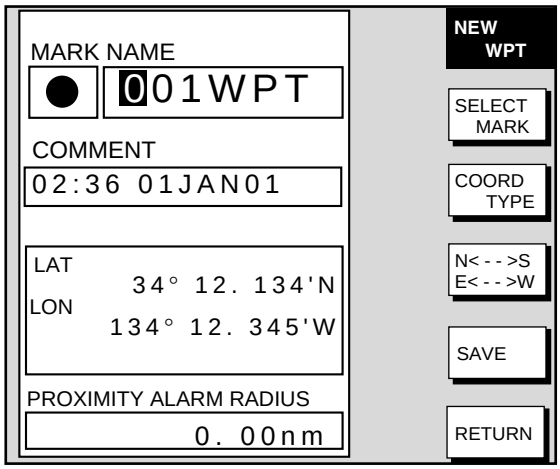
3.8.1 Entering waypoints

Entering a waypoint at own ship position

Press the [SAVE/MOB] key momentarily to store your position as a waypoint. This new waypoint is saved to the waypoint list, under the youngest empty waypoint number.

Entering a waypoint with the cursor

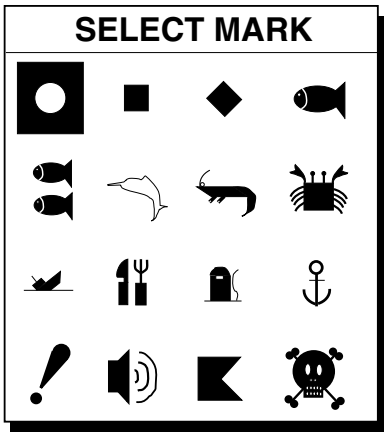
1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES, WAYPOINTS and WAYPOINT BY CURSOR soft keys. The plotter display appears.
3. Operate the trackball to place the cursor where you want to enter a waypoint.
4. Press the NEW WPT soft key. The waypoint window appears and it shows waypoint mark shape, waypoint name, comment (default: time and date), position of waypoint and proximity alarm radius.



Waypoint window

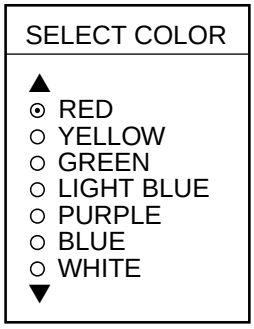
5. **If you do not need to change the waypoint data,** press the SAVE soft key to register the waypoint. The steps which follow show you how to change waypoint data.

6. Press the SELECT MARK soft key.
7. Press the MARK SHAPE soft key to open the mark shape selection window.



Waypoint mark shape selection window

8. Operate the trackball to select shape desired.
9. Press the ENTER soft key.
10. Press the SELECT MARK and MARK COLOR soft keys in that order to open the waypoint mark color selection window. Select the color desired, then press the ENTER soft key.



Waypoint mark color selection window

Note: You cannot change the shape and color of a waypoint when the proximity alarm radius for it is other than “zero.” To change shape or color, enter all zeroes as the proximity alarm radius.

11. You can change the name (6 characters), comment (13 characters), L/L position and the proximity alarm radius for a waypoint as follows:
    a) Use the trackball to select the NAME, COMMENT, position box or PROXIMITY ALARM RADIUS field. (“Proximity alarm radius” provides for audio and visual alarms when your boat nears a waypoint by the distance specified. The proximity alarm must be turned on in the ALARM menu to use this feature. For details see the paragraph “3.11.6 Proximity alarm.”)
    b) Use the trackball to select location.
    c) Enter appropriate alphanumeric character with the alphanumeric keys.
12. Press the SAVE soft key to register the waypoint.
13. Enter another waypoint, or press the [MENU] key to close the menu.

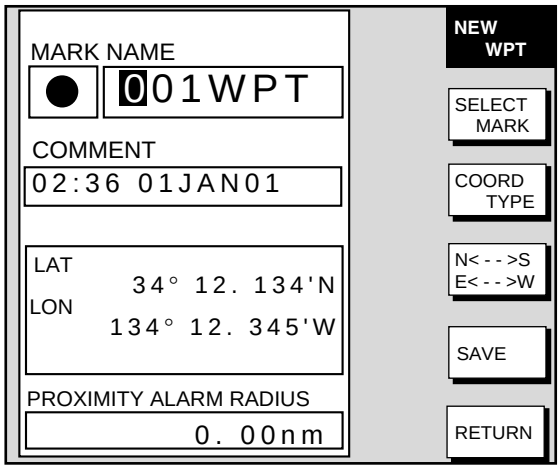
Entering a waypoint by range and bearing

This method is useful when you want to enter a waypoint using range and bearing to a target found on a radar.

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES, WAYPOINTS and WAYPOINT BY RNG & BRG soft keys.
3. A red “X” appears at own ship position, and it is the origin point for range and bearing. Operate the trackball to place the cursor on the location desired. Range and bearing from own ship to the cursor appear at the top of the display.

   Note: The origin point of range and bearing can be shifted to the location desired. Operate the trackball to select location, then press the START POINT soft key.

4. Press the NEW WPT soft key. The waypoint window appears and it shows mark shape, waypoint name, comment (default: date and time), position of waypoint and proximity alarm radius.



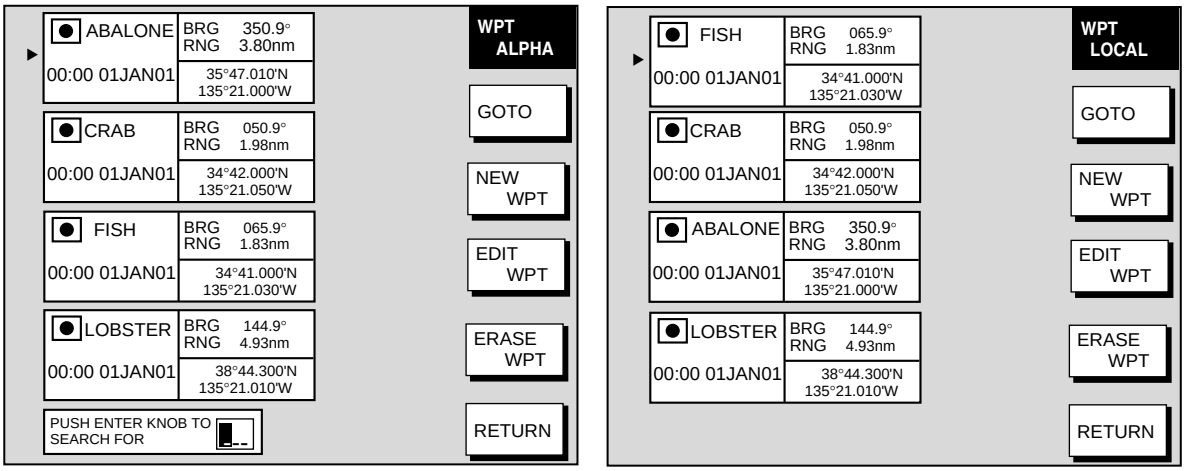
Waypoint window

5. If necessary, change waypoint data following the instructions from step 6 in “Entering a waypoint with the cursor” on page 3-29.
6. Press the SAVE soft key to register the waypoint.
7. Enter another waypoint as above, or press the [MENU] key to finish.

Entering a waypoint from the waypoint list

You can manually enter waypoint position from the waypoint list as follows:

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES and WAYPOINTS soft keys.
3. Press the LOCAL LIST (lists waypoints in order from nearest to furthest) or ALPHANUMERIC LIST (lists waypoints in ALPHANUMERIC order) soft key.



Alphanumeric waypoint list Local waypoint list

Alphanumeric and local waypoint lists

4. Press the NEW WPT soft key to show the waypoint window (see the figure on the previous page). Own ship position is shown in the position box.
5. Select the position box and enter position desired.
6. If desired, change waypoint data following the instructions from step 6 in "Entering a waypoint with the cursor" on page 3-29.
7. Press the SAVE soft key to register the waypoint.
8. Press the [MENU] key to close the menu.

3.8.2 Editing waypoint data

Waypoint data may be edited from the waypoint list or directly from the plotter display.

Editing waypoint data from the waypoint list

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES and WAYPOINTS soft keys.
3. Press the LOCAL LIST or ALPHANUMERIC LIST soft key as appropriate.
4. Use the trackball to select the waypoint you want to edit.
5. Press the EDIT WPT soft key.
6. Edit data as appropriate.
7. Press the SAVE soft key.
8. Press the [MENU] key to close the menu.

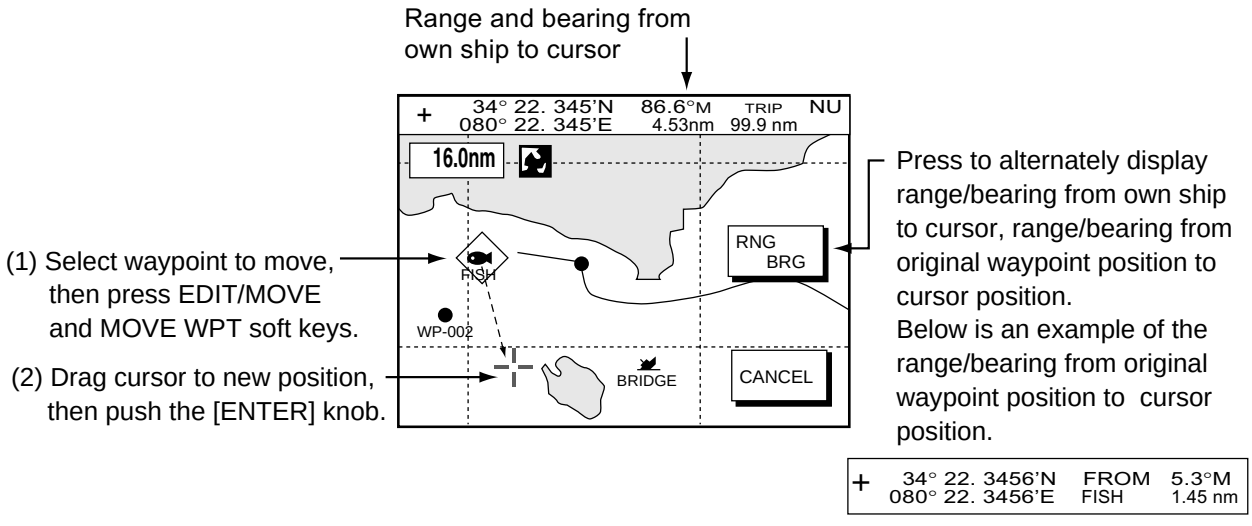
Editing a waypoint from the plotter display

You may edit waypoints from the plotter display as follows:

1. Press the [MENU] key followed by the WAYPOINTS/ROUTES and WAYPOINTS soft key to open the waypoint menu.
2. Press the WAYPOINT BY CURSOR soft key.
3. Operate the trackball to place the cursor on the waypoint which you want to change. A flashing diamond mark appears on the waypoint when it is correctly selected.
4. Press the EDIT/MOVE soft key. Three soft keys replace the EDIT/MOVE soft key:

   EDIT WPT: Edit from the waypoint entry window.
   MOVE WPT: Move waypoint to new position with the cursor.
   ERASE WPT: Erase waypoint. See paragraph 3.8.3.

5. Press the appropriate soft key. For the “EDIT WPT,” the waypoint entry window appears; edit data as appropriate. For “MOVE WPT,” do the following:
   a) Operate the trackball to place the cursor on the location desired for the waypoint. A line connects previous position and new position.
   b) Push the [ENTER] knob. The waypoint moves to the cursor position and its position is changed on the waypoint list. If the waypoint is set as destination or is part of a route, you are asked if you are sure to move the waypoint. In this case, push the [ENTER] knob to move the waypoint, or press the [CLEAR] key to cancel.
   c) Press the [MENU] key to finish.



Plotter display

3.8.3 Erasing waypoints

Erasing a waypoint directly from the plotter display

1. Operate the trackball to place the cursor on the waypoint you want to erase. A flashing diamond mark appears over the waypoint when the waypoint is correctly selected.
2. Press the [CLEAR] key. You are asked if you are sure to erase the waypoint.
3. Push the [ENTER] knob. The waypoint is erased from the plotter screen and the waypoint list.

Erasing a waypoint from the menu

1. Press the [MENU] key followed by the WAYPOINTS/ROUTES and WAYPOINTS soft key to open the waypoint menu.
2. Press the WAYPOINT BY CURSOR soft key.
3. Operate the trackball to place the cursor on the waypoint which you want to erase. A flashing diamond mark appears on the waypoint when it is correctly selected.
4. Press the EDIT/MOVE soft key followed by the ERASE WPT soft key. You are asked if you are sure to erase the waypoint.
5. Push the [ENTER] knob to erase the waypoint.
6. Press the [MENU] key to close the menu. The waypoint is erased from the plotter screen and the waypoint list.

Erasing a waypoint from the waypoint list

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES and WAYPOINTS soft keys.
3. Press the LOCAL LIST or ALPHANUMERIC LIST soft key.
4. Use the trackball to select the waypoint you want to erase.
5. Press the ERASE WPT soft key. You are asked if you are sure to erase the waypoint.
6. Push the [ENTER] knob. The waypoint is erased from both the waypoint list and the plotter screen (if it is currently displayed).
7. Press the [MENU] key to close the menu.

3.8.4 Changing waypoint mark size (FURUNO, NavCharts™)

You may change the size of all waypoint marks to small or large (default), or you may turn them off.

1. Press the [MENU] key to open the menu.
2. Press the CHART SETUP and CHART DETAILS soft keys.

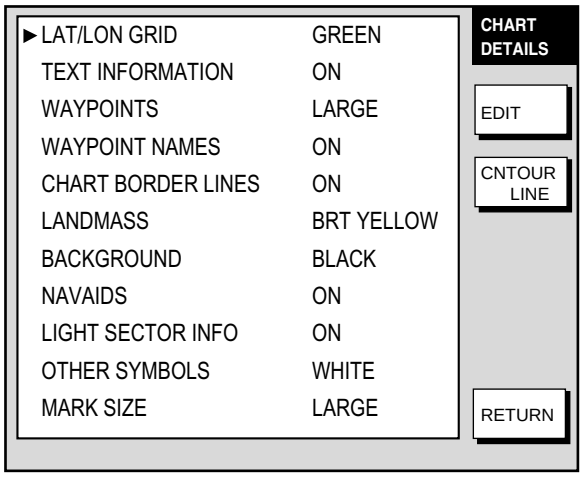


Chart details menu

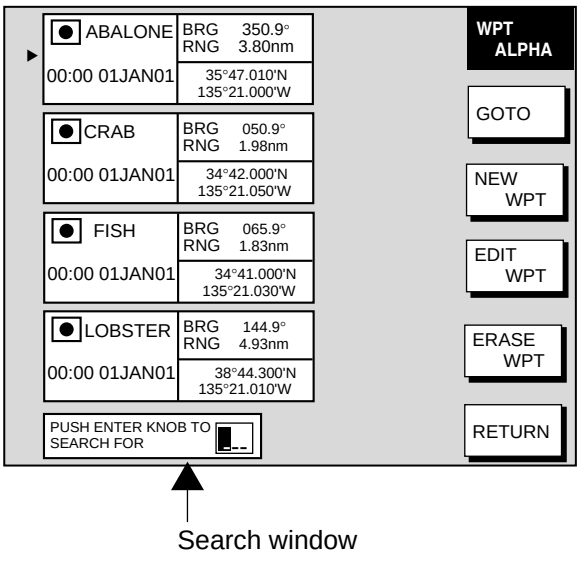
3. Use the trackball to select WAYPOINTS.
4. Press the EDIT soft key.
5. Use the trackball to select LARGE, SMALL or OFF.

   LARGE: Shows mark in actual shape.
   SMALL: Displays all waypoints with an “X” regardless of mark shape selected.
   OFF: Turns off all waypoints and their names. Waypoints currently used in navigation are shown regardless of this setting.
6. Press the ENTER soft key.
7. Press the [MENU] key to close the menu.

3.8.5 Searching waypoints

You can search for a waypoint through the alphanumeric waypoint list as follows:

1. Press the [MENU] key.
2. Press the WAYPOINTS/ROUTES, WAYPOINTS and ALPHANUMERIC LIST soft keys to show the alphanumeric list.



Alphanumeric list

3. Use the trackball and the alphanumeric keys to enter up to three alphanumeric characters in the search window. Then, the waypoint searched appears at the top of the screen.
4. Press the [MENU] key to close the menu.

3.9 Routes

Often a trip from one place to another involves several course changes, requiring a series of route points (waypoints) which you navigate to, one after another. The sequence of waypoints leading to the ultimate destination is called a route. Your unit can automatically advance to the next waypoint on a route, so you do not have to change the destination waypoint repeatedly.

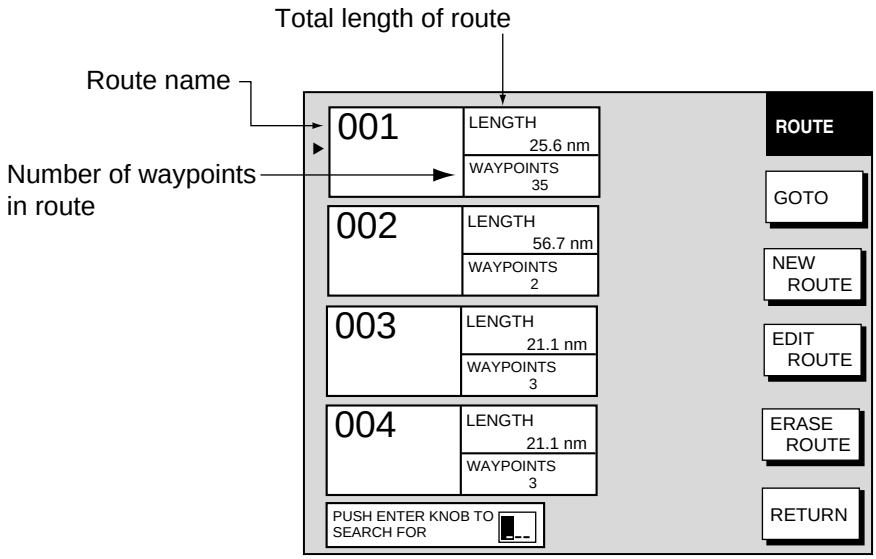
You can store up to 200 routes, and a route may have 35 waypoints.

3.9.1 Creating routes

Entering a route with existing waypoints

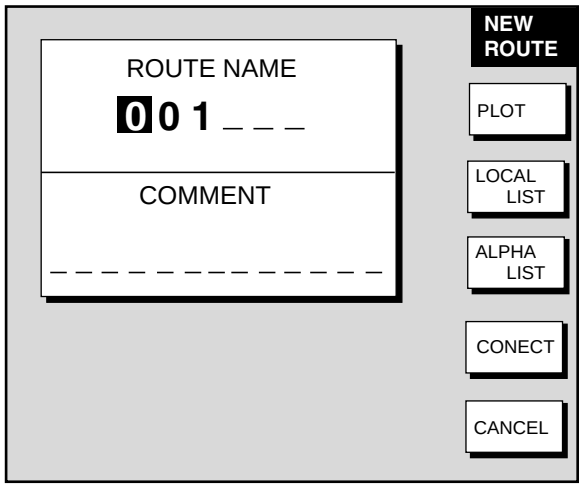
This method constructs routes by using existing waypoints.

1. Press the [MENU] key.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the ROUTES soft key to open the ROUTE menu. (No data will be shown if there are no routes entered.)



Route menu

4. Press the NEW ROUTE soft key to open the new route entry screen.



New route entry screen

5. If desired you can change the route name shown and/or add a comment. A route name may consist of six characters; comment, 13 characters.
6. Press the LOCAL LIST or ALPHA LIST soft key to open the waypoint list.
7. Use the trackball to select a waypoint, then press the ADD WPT soft key to add it to the route.
8. Repeat step 7 to complete the route.

   Note: To clear last-entered waypoint, press the ERASE LST WP soft key. Each press of this key deletes the last waypoint entered.

9. Press the SAVE soft key to register the route.
10. Press the [MENU] key to close the menu.

Entering a route with the cursor

This method allows you to construct a route directly from the plotter display, using existing waypoints or new positions. Any new position will be saved as a waypoint, under the youngest empty waypoint number.

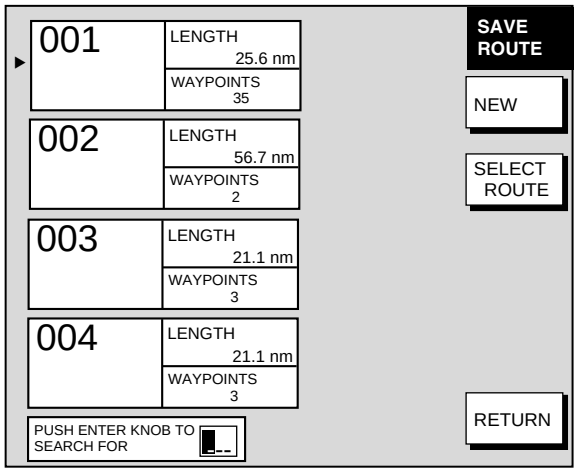
1. Follow steps 1-5 in “Entering a route from the route list” on the previous page.
2. Press the PLOT soft key to show the plotter display.
3. Operate the trackball to place the cursor on an existing waypoint (ADD WP soft key appears) or new location (ADD NEW WP soft key appears).
4. Press the ADD WP soft key (or ADD NEW WP soft key).
5. Repeat steps 3 and 4 to complete the route.
6. Push the [ENTER] knob to register the route.

Creating voyage-based routes

You can create routes based on your ship's track. The route can be created automatically by time or distance, or manually. This feature is useful when you wish to retrace previous track.

The "SAVE" icon (SAVE) appears at the top of the screen when a voyage-based route is being created.

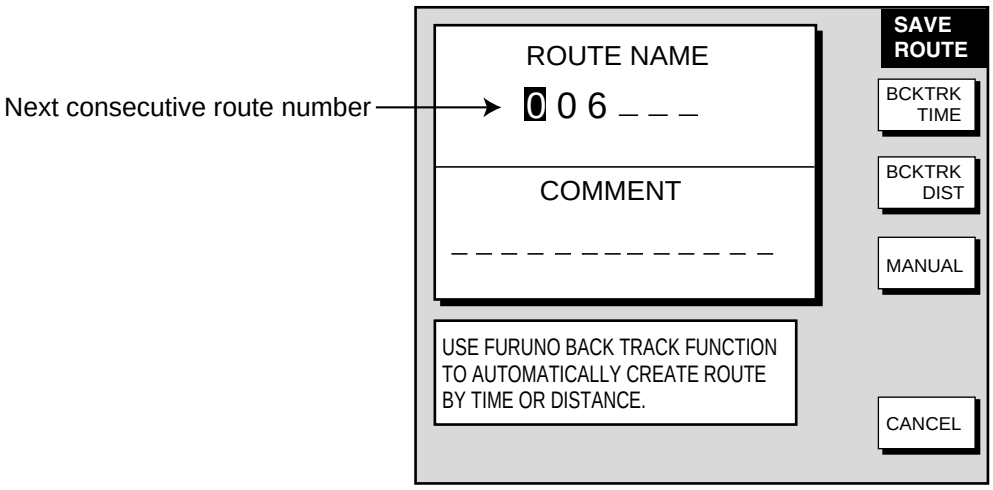
1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the CREATE VOYAGE-BASED ROUTE soft key.



Save route menu

4. Press the NEW soft key to show the new route window.

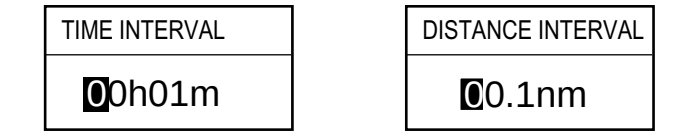
   Note: If you want to tack voyage-based points onto the end of an existing route, select the route with the trackball, then press the SELECT ROUTE soft key instead of the NEW soft key. Then, go to step 6.



Save route window

5. If required, you may change the route name and enter a comment.

6. Choose how to record points for your route, by time, by range or manual entry, by pressing BCKTRK TIME, BCKTRK RANGE or MANUAL soft key as appropriate. For manual entry, go to step 8. For BCKTRK TIME, BCKTRK DIST one of the following displays appears.



(When selecting BCKTRK TIME.) (When selecting BCKTRK DIST.)

Displays for entry of time, distance interval

7. Enter interval desired with the trackball and the alphanumeric keys. Press the START LOG and RETURN soft keys followed by the [MENU] key to close the menu. At this moment, a voyage-based route will be created.
8. **For manual entry of waypoints, do the following:**
   a) Press the [SAVE/MOB] key momentarily to enter a waypoint mark at own ship position. A new waypoint is created under the youngest empty waypoint number and added to the route. (At this time you may close the SAVE ROUTE screen by pressing the RETURN soft key followed by the [MENU] key.)
   b) Repeat step a) as necessary. 35 waypoints may be entered.

To stop recording waypoints and save the route

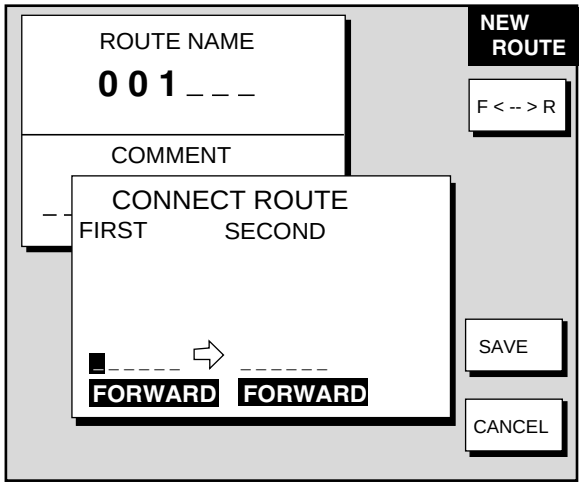
You can stop recording waypoints and save the route as shown in the procedure below. When 35 waypoints have been entered the message “Total 35 WPTS have been already registered in the route. Stop creating voyage-based route.” is displayed. In this case, automatically creating voyage-based route stops.

1. Press the [MENU] key followed by the WAYPOINTS/ROUTES and CREATE VOYAGE-BASED ROUTE soft keys.
2. Press the FINISH LOG soft key to stop recording waypoints and save the route.
3. Press the [MENU] key to close the menu.

3.9.2 Connecting routes

Two routes which you have created can be connected as follows to form a new route.

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the ROUTES soft key.
4. Press the NEW ROUTE soft key.
5. If desired enter route name and comment.
6. Press the CONECT soft key.
7. Use the trackball and the alphanumeric keys to enter the route name for the first route, beneath FIRST in the connect route window.



Connect route window

8. Press the F<– –>R soft key to select direction to follow the waypoints of the route, forward or reverse.
9. Enter the route name of the second route as you did for the first route.
10. Press the SAVE soft key.
11. Press the [MENU] key to close the menu.

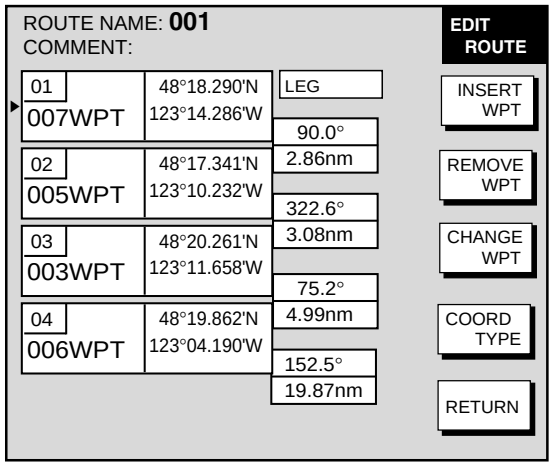
Note: The maximum number of waypoints in a route is 35. If this number is exceeded an error message appears. In this case, delete waypoints in one or both routes so the total number of waypoints does not exceed 35.

3.9.3 Inserting waypoints

Waypoints can be inserted in a route as follows:

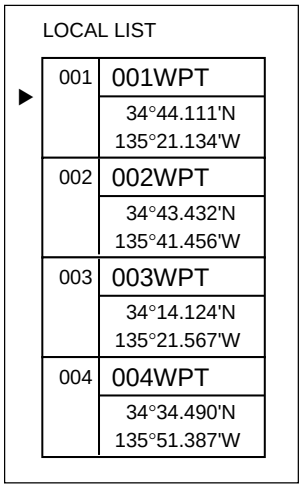
Inserting a waypoint from the route list

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the ROUTES soft key.
4. Use the trackball to select a route.
5. Press the EDIT ROUTE soft key. The route name screen appears.
6. Press the LOCAL LIST soft key.



Edit route menu

7. Use the trackball to place the cursor at the location where you want to insert a waypoint.
8. Press the INSERT WPT or CHANGE WPT soft key as appropriate. The local waypoint list appears.



Waypoint list for editing a route (local list)

9. Use the trackball to select the waypoint you want to insert. (You can switch between the local list and alphanumeric list by using the LOCAL LIST and ALPHA LIST soft keys.)
10. Press the SELECT WPT or CHANGE WPT soft key, whichever is displayed.
11. Press the [MENU] key to close the menu.

Inserting a waypoint from the plotter display

Inserting a waypoint before first waypoint or after last waypoint in a route

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the ROUTES soft key.
4. Use the trackball to select a route.
5. Press the EDIT ROUTE soft key.
6. Press the PLOT soft key to show the plotter screen.
7. Operate the trackball to place the cursor on the first (or last) waypoint of the route. A flashing diamond appears over the waypoint when it is correctly selected.
8. Press the ADD TO START soft key or the ADD TO END soft key depending on the waypoint you selected at step 7.
9. Operate the trackball to place the cursor on an existing waypoint (ADD WPT soft key appears) or new location (ADD NEW WP soft key appears).
10. Press the ADD WPT soft key (ADD NEW WP soft key).
11. Press the [MENU] key to close the menu.

Inserting a waypoint in an intermediate location on a route

1. Follow steps 1 through 6 in “Inserting a waypoint before the first or last waypoint in a route.”
2. Operate the trackball to place the cursor on a line connecting waypoints. The SPLIT LEG soft key appears and the line flashes when it is correctly selected.
3. Press the SPLIT LEG soft key.
4. Move the cursor to a new location or select an existing waypoint, in which case the INSERT WPT soft key replaces the INSERT NEW WP soft key.
5. Press the INSERT WPT soft key (INSERT NEW WP soft key).
6. Press the [MENU] key to close the menu.

3.9.4 Removing waypoints from a route

Removing a waypoint from the route list

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the ROUTES soft key.
4. Select a route.
5. Press the EDIT ROUTE and LOCAL LIST soft keys.
6. Select the waypoint you want to remove.
7. Press the REMOVE WPT soft key.
8. Press the [MENU] key to close the menu.

Removing a waypoint from the plotter display

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the ROUTES soft key.
4. Select a route.
5. Press the EDIT ROUTE soft key.
6. Press the PLOT soft key to show the plot screen.
7. Operate the trackball to place the cursor on the waypoint you want to remove from the route.
8. Press the REMOVE WPT soft key. The route is redrawn, eliminating the waypoint removed.
9. Press the [MENU] key to close the menu.

3.9.5 Erasing routes

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the ROUTES soft key.
4. Use the trackball to select a route.
5. Press the ERASE ROUTE soft key. You are asked if you are sure to erase the route.
6. Push the [ENTER] knob to erase the route, or the [CLEAR] key to escape.
7. Press the [MENU] key to close the menu.

3.10 Navigation

This section shows you how to get to a desired destination by “quick points,” waypoints, port services and routes.

Note: Reciprocal setting and canceling of destination is available by outputting the data sentence ZDA from the NavNet unit connected to the navigator.

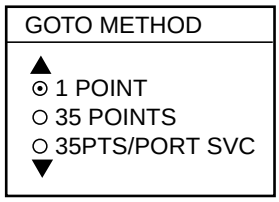
3.10.1 Navigating to a “quick point”

The “quick point” feature allows you to navigate to point(s) without retaining the data indefinitely in your unit’s memory.

Selecting quick point entry method

You need to tell your unit how to set the quick point: 1 POINT, 35 POINTS (up to 35 points) or 35PTS/PORT SVC. (For how to navigate to points/port services see “3.10.2 Navigating to ports, port services” on page 3-45.)

1. Press the [MENU] key.
2. Press the PLOTTER SETUP soft key.
3. Use the trackball to select SET GOTO METHOD, then press the EDIT soft key.



Go to method window

4. Use the trackball to select a method.
5. Press the ENTER soft key.
6. Press the [MENU] key to close the menu.

Navigating to a single quick point

1. Place the cursor on an existing waypoint (GOTO WPT soft key appears) or a new location (GOTO CURSOR soft key appears).
2. Select “1 POINT” following the procedure in the above paragraph.
3. Depending on the selection you made at step 1, press the GOTO CURSOR or GOTO WPT soft key.

A solid light-blue line with arrows connects between own ship and destination, which is marked as “<QP01>” for cursor-selected location or waypoint name in case of waypoint. This line shows the shortest course to the destination. Arrows on the line show the direction to follow to get to the quick point. Range and bearing from own ship to the destination appear at the top of screen. The quick point location is saved to the waypoint list as waypoint “QP01.”

Navigating to multiple quick points

1. Select “35 POINTS” following the procedure in “Selecting quick point entry method” on the previous page.
2. Press the GOTO soft key.
3. Place the cursor on an existing waypoint (SELECT WPT soft key appears) or a new location (ADD QP soft key appears).
4. Depending on the action taken at step 3, press the SELECT WPT or ADD QP soft key. “QP<01>” appears at the cursor location if a quick point is selected. To erase last-entered quick point (waypoint), press the ERASE LST QP (ERASE LST WP) soft key.
5. Repeat steps 3 and 4 to complete the route.
6. Push the [ENTER] knob to finish.

A solid light-blue line with arrows connects between own ship and the first point and all other points are connected with a green dashed line with arrows. Arrows on the line show the direction to follow to get to your destination. Quick points are numbered in sequential order from QP<01> and are saved to the waypoint list. Range and bearing from own ship to the first destination appear at the top of screen. The quick points are saved as a route, under the name “Q>RTE” (Quick Route).

3.10.2 Navigating to waypoints

Selecting a waypoint from the plotter display

1. Operate the trackball to select a waypoint.
2. Press the GOTO WPT soft key.

Note: GOTO method should be selected to “1 POINT” on the PLOTTER SETUP menu.

Selecting a waypoint from the waypoint list

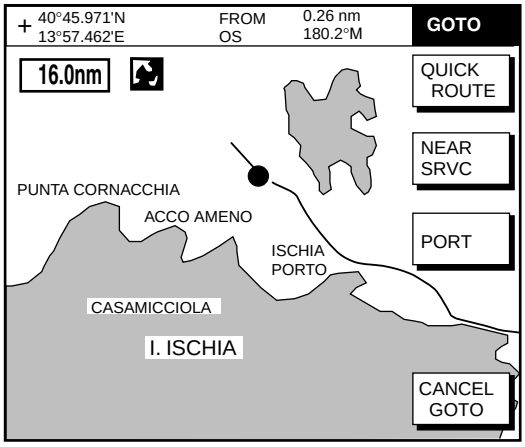
1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the WAYPOINTS soft key to open the waypoint menu.
4. Press the LOCAL LIST or ALPHANUMERIC LIST soft key as desired.
5. Use the trackball to select a waypoint.
6. Press the GOTO soft key, and the plotter display appears.

For either of the above methods, a solid light-blue line with arrows runs between waypoint selected and own ship’s position. Arrows on the line show the direction to follow to get to the waypoint. Waypoint data appears at the top of screen.

3.10.3 Navigating to ports, port services (NavCharts™ only)

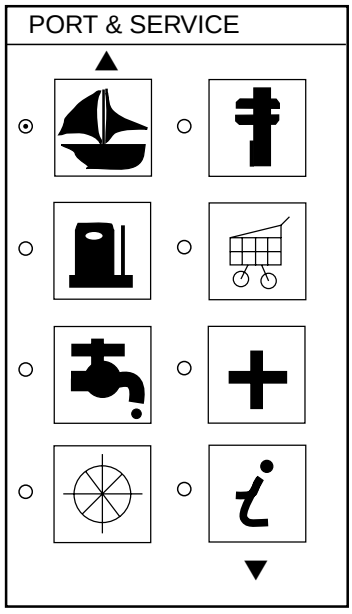
NavCharts™ have a port service list which shows services available at ports or harbors. (See page 3-13.) You can use the list to set your destination as follows:

1. Select “35 PTS/PORT SVC” following the procedure in “Selecting quick point entry method” on page 3-44.
2. Place the cursor on the location desired, then press the GOTO soft key. Soft key titles change as in the figure below.

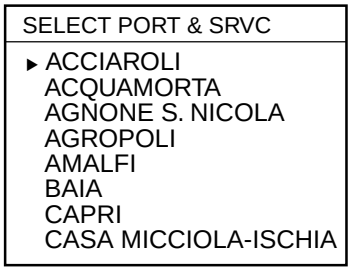


Plotter display

3. Press the PORT or NEAR SRVC soft key depending on objective. PORT shows a list of ports in your area. NEAR SRVC displays the port service list.



Port services

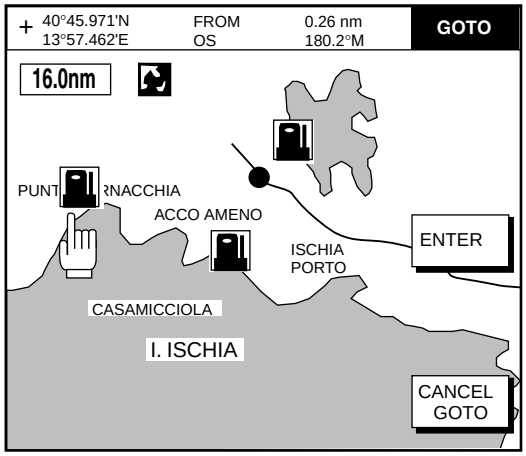


Port list (Italy)

Port services and sample port list

4. **If you selected PORT at step 3,** use the trackball to select a port, then press the ENTER soft key. Make a route using the soft keys, then push the [ENTER] knob. (If you want to go directly to that port, simply press the ADD QP soft key followed by the [ENTER] knob.)

   If you selected NEAR SRVC at step 3, select service mark desired with the trackball and then push the ENTER soft key or the [ENTER] knob. Then, the display shows the locations of those services nearest you. (The figure below shows the location of filling stations in an area in southern Italy.) Use the trackball to place the “hand cursor” on the port service icon desired, then press the ENTER soft key. Make a route using the soft keys, then push the [ENTER] knob. (If you want to go directly to location selected, simply press the ADD QP soft key followed by pushing the [ENTER] knob.)

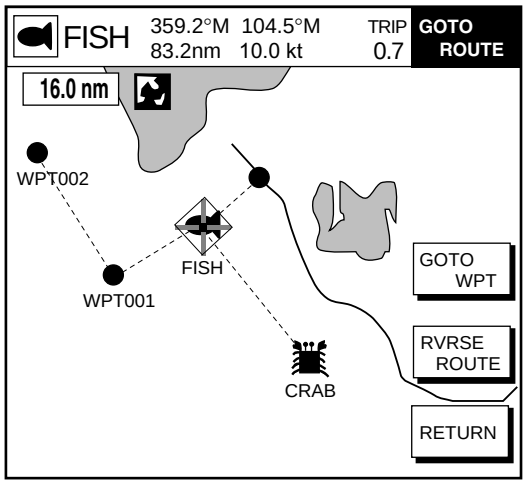


Sample filling station locations (southern Italy)

3.10.4 Following a route

Selecting the route to follow

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the ROUTES soft key to open the route list.
4. Select a route.
5. Press the GOTO soft key to show the plotter display. The cursor is on the waypoint nearest own ship.



Plotter display, route selected as destination

6. Operate the trackball to place the cursor on the waypoint or leg in the route from where to start navigating the route.
7. Press the GOTO WPT or FOLLOW LEG soft key, depending on the action taken at step 6.

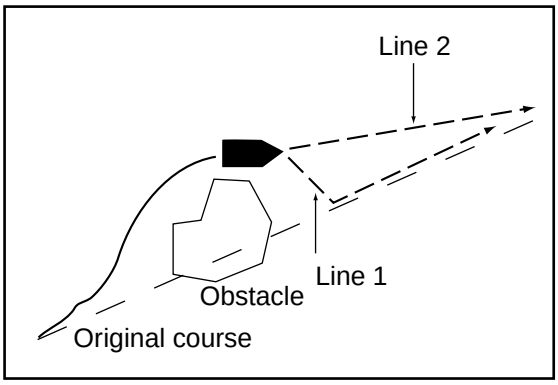
A solid light-blue line runs between own ship and first waypoint. Green dashed lines connect all other waypoints. The arrows on the lines show the direction to traverse the route.

Navigating waypoints in reverse order

Press the RVRSE ROUTE soft key followed by the [ENTER] knob to navigate waypoints in reverse order. The arrows on the route line point in the direction selected.

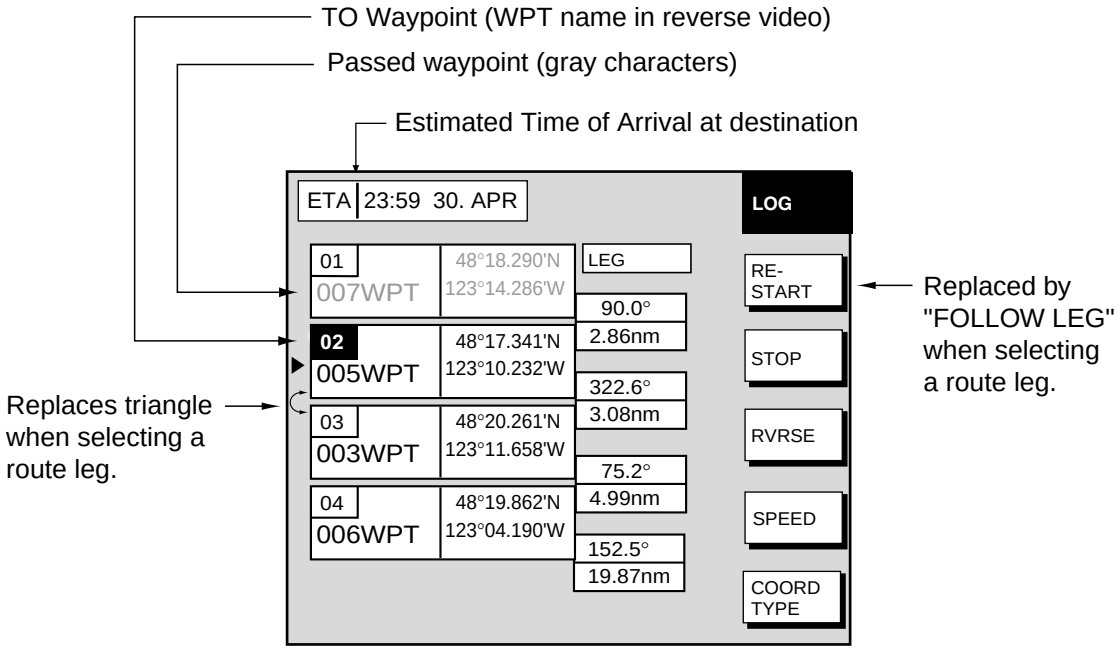
Restarting navigation

When you steer to avoid an obstacle or the vessel drifts, you may go off your intended course, as in Line 1 in the figure below. Also, if you don't need to return to the original course, you can go directly to the next waypoint, as in Line 2 in the figure below. In these cases, use the restart navigation function to restart navigation.



Example of when to restart navigation

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the LOG soft key.



Log display

4. Use the trackball to select a waypoint or a route leg. When a route leg is selected the single arrow cursor is replaced by double arrows.
5. Press the RESTART soft key or FOLLOW LEG soft key in case of route leg.

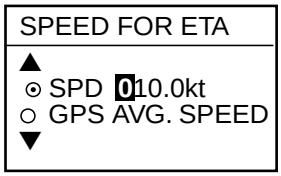
   Note: Navigation may be restarted from the plotter display, with the RESTART key, when a single quick point (QP<01>) is selected for navigation.

6. Press the [MENU] key to close the menu.

Setting speed for ETA calculation

Speed, which may be input manually or automatically, is required to calculate ETA (Estimated Time of Arrival) to a destination.

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the LOG soft key.
4. Press the SPEED soft key.



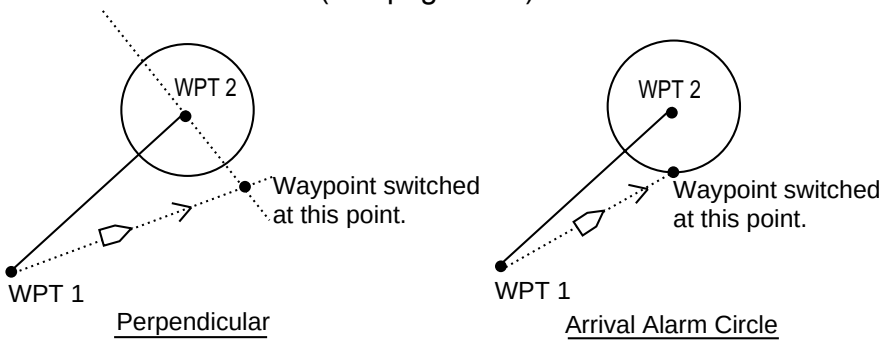
Select speed for ETA window

5. Enter speed manually in the SPD field, or use GPS speed data (if applicable) by selecting GPS AVG. SPEED.
6. Press the ENTER soft key or the [ENTER] knob to register your selection.
7. Press the [MENU] key to close the menu.

Switching waypoints

When you arrive to a waypoint on a route, you can switch to the next waypoint by one of the three methods below.

PERPENDICULAR: Automatically switches the destination waypoint when the boat comes passes an imaginary perpendicular line passing through the center of the destination waypoint.
ARRVL ALM CRCL: Destination waypoint is automatically switched when the boat comes within the arrival alarm range. For how to set the arrival alarm, see the paragraph 3.11.2 Arrival alarm.
MANUAL: The destination waypoint may be manually switched by using the RESTART soft key (see page 3-49). This function is operative when “1 POINT” is selected as the GOTO method (see page 3-44).



Automatic waypoint switching methods

To select waypoint switching method do the following:

1. Press the [MENU] key.
2. Press the PLOTTER SETUP soft key.
3. Use the trackball to select WAYPOINT SWITCHING.
4. Press the EDIT soft key to show the waypoint switching window.
5. Use the trackball to select appropriate waypoint switching method; PERPENDICULAR, ARRVL ALM CRCL (default setting), or MANUAL.
6. Press the ENTER soft key.
7. Press the [MENU] key to close the menu.

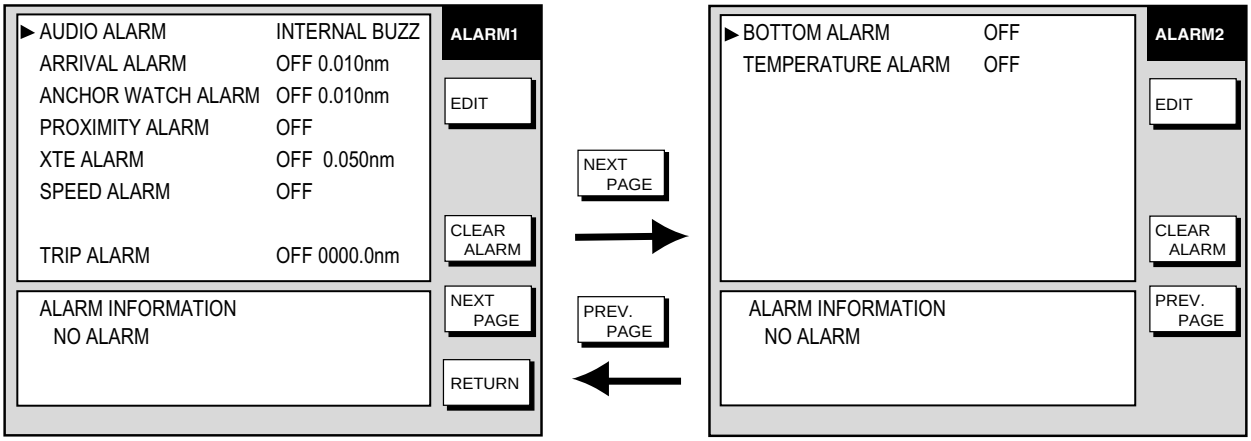
3.10.5 Canceling route navigation

1. Press the [MENU] key to open the menu.
2. Press the WAYPOINTS/ROUTES soft key.
3. Press the LOG soft key.
4. Press the STOP soft key.
5. Push the [ENTER] knob.
6. Press the RELEASE soft key.
7. Push the [ENTER] knob.

3.11 Alarms

The plotter section has eight conditions which generate both audio and visual alarms: arrival alarm, anchor watch alarm, XTE (Cross Track Error) alarm, proximity alarm, speed alarm, trip alarm, water temperature alarm and bottom alarm. (The bottom and water temperature alarms, which require depth and water temperature data, may also be set on the sounder alarm menu. For these alarms see Chapter 4.)

You may set up the plotter alarms on the ALARM menu, which may be displayed by pressing the [ALARM] key.

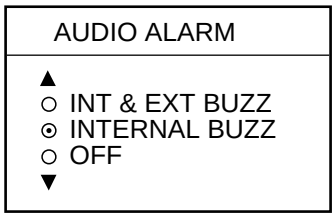


Plotter alarm menu

3.11.1 Audio alarm on/off

Audio and visual alarms are released whenever an alarm setting is violated. You can enable or disable the audio alarm as follows:

1. Press the [ALARM] key to show the alarm menu.
2. Use the trackball to select AUDIO ALARM.
3. Press the EDIT soft key to show the audio alarm window.

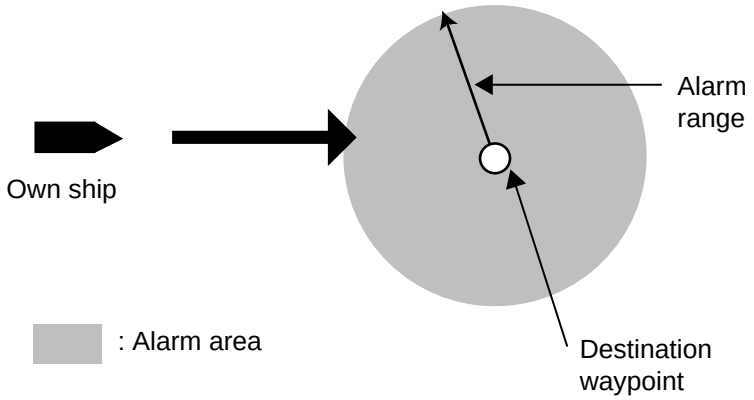


Audio alarm window

4. Use the trackball to select INT & EXT BUZZ (Internal + External alarm), INTERNAL BUZZ (Internal alarm) or OFF as appropriate. This turns on or off the audio alarm globally for all alarms, including radar.
5. Press the ENTER soft key.
6. Press the [ALARM] key to finish.

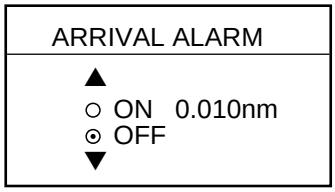
3.11.2 Arrival alarm

The arrival alarm informs you that your boat is approaching a destination waypoint. The area that defines an arrival zone is that of a circle which you approach from the outside of the circle. The alarm will be released if your boat enters the circle. When the arrival alarm is active a red dashed circle marks the arrival alarm area. Note that the arrival alarm and anchor watch alarm can be turned on together.



How the arrival alarm works

1. Press the [ALARM] key to open the alarm menu.
2. Use the trackball to select ARRIVAL ALARM.
3. Press the EDIT soft key to show the arrival alarm window.

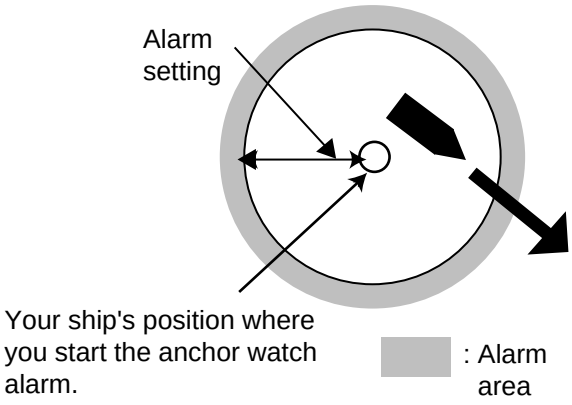


Arrival alarm window

4. Use the trackball to select ON.
5. Use the trackball and the alphanumeric keys to enter alarm setting: Operate the trackball to select digit; use the alphanumeric keys to enter value. The available arrival alarm setting is 0.001 to 9.999 miles.
6. Press the ENTER soft key or push the [ENTER] knob to register setting.
7. Press the [ALARM] key to finish.

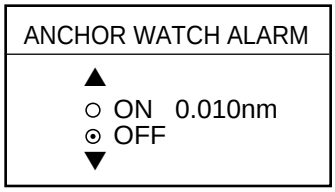
3.11.3 Anchor watch alarm

The anchor watch alarm informs you that your boat is moving when it should be at rest. When the anchor watch is active, a red dashed circle with an “X” at its center marks the anchor watch area.



How the anchor watch alarm works

1. Press the [ALARM] key to open the alarm menu.
2. Use the trackball to select ANCHOR WATCH ALARM.
3. Press the EDIT soft key to open the anchor alarm window.



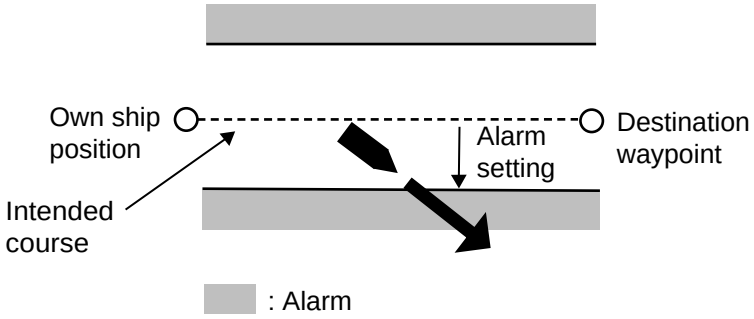
Anchor watch alarm window

4. Use the trackball to select ON.
5. Use the trackball and the alphanumeric keys to enter alarm setting: Operate the trackball to select digit; use the alphanumeric keys to enter value. The available anchor watch setting is 0.001 to 9.999 miles.
6. Press the ENTER soft key or push the [ENTER] knob to register setting.
7. Press the [ALARM] key to finish.

Note: If the arrival alarm range is changed, turn off the anchor watch alarm and then turn it on again to give priority to the anchor watch alarm.

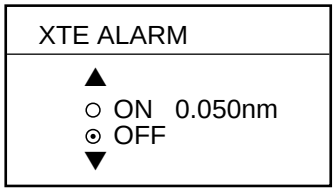
3.11.4 XTE (Cross-Track Error) alarm

The XTE alarm warns you when your boat is off its intended course. When the XTE alarm is active two red dashed lines mark the XTE alarm area.



How the XTE alarm works

1. Press the [ALARM] key to open the alarm menu.
2. Use the trackball to select XTE ALARM.
3. Press the EDIT soft key to open the XTE alarm window.



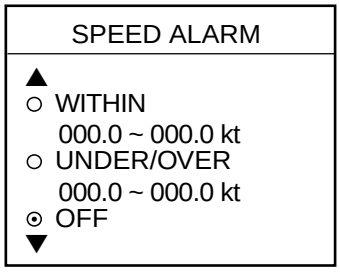
XTE alarm window

4. Use the trackball and the alphanumeric keys to enter alarm setting: Operate the trackball to select digit; use the alphanumeric keys to enter value. The available XTE alarm setting is 0.001 to 9.999 miles.
5. Press the ENTER soft key or push the [ENTER] knob to register setting.
6. Press the [ALARM] key to finish.

3.11.5 Speed alarm

The speed alarm warns when your boat's speed is within or under/over the speed range set.

1. Press the [ALARM] key to open the alarm menu.
2. Use the trackball to select SPEED ALARM.
3. Press the EDIT soft key to display the speed alarm window.

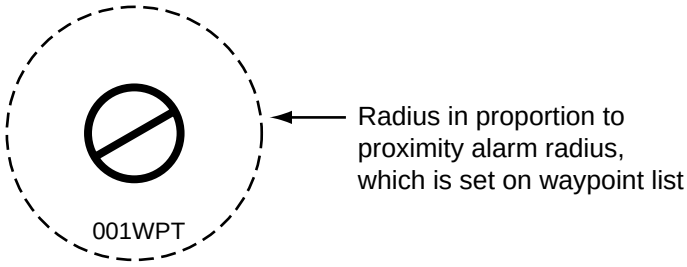


Speed alarm window

4. Use the trackball to select WITHIN, UNDER/OVER, or OFF as appropriate
5. For WITHIN and UNDER/OVER use the trackball and the alphanumeric keys to enter alarm range: Operate the trackball to select digit; use the alphanumeric keys to enter value.
6. Press the ENTER soft key or push the [ENTER] knob to register setting.
7. Press the [ALARM] key to finish.

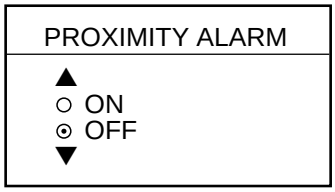
3.11.6 Proximity alarm

The proximity alarm alerts you when own ship nears a waypoint, which is marked with the proximity mark, by the proximity alarm radius set for that waypoint on the waypoint list. When own ship is within a waypoint's proximity alarm radius, the alarm sounds. The proximity mark remains on the screen until the waypoint is erased.



Proximity mark

1. Press the [ALARM] key to open the alarm menu.
2. Use the trackball to select PROXIMITY ALARM.
3. Press the EDIT soft key to show the proximity alarm window.



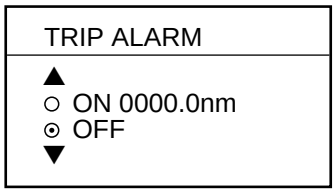
Proximity alarm window

4. Use the trackball to select ON or OFF as appropriate, then press the ENTER soft key.
5. Press the [ALARM] key to finish.

3.11.7 Trip alarm

The trip alarm informs you when you have traveled a certain distance.

1. Press the [ALARM] key to open the alarm menu.
2. Use the trackball to select TRIP ALARM.
3. Press the EDIT soft key to show the trip alarm window.



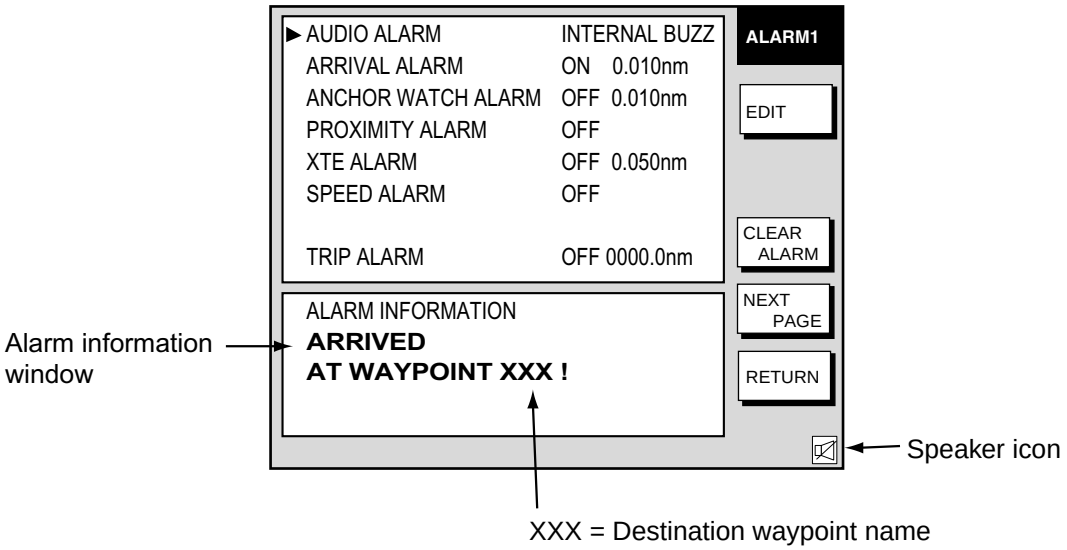
Trip alarm window

4. Select ON.
5. Use the trackball and the alphanumeric keys to enter alarm setting: Operate the trackball to select digit; use the alphanumeric keys to enter value.
6. Press the ENTER soft key or push the [ENTER] knob to register setting.
7. Press the [ALARM] key to finish.

3.11.8 Alarm information

When an alarm setting has been violated, the buzzer sounds and the speaker icon appears and is red. Press the [CLEAR] key to silence the alarm. You can see which alarm has been violated on the ALARM menu. In the example below the arrival alarm has been violated.

1. Press the [ALARM] key. The name of the offending alarm appears in the alarm information window.



Plotter alarm menu, page 1

2. Press the CLEAR ALARM soft key to acknowledge the alarm (and silence the buzzer if it was not done with the [CLEAR] key). The color of the speaker icon changes from red to background color. The icon remains on the screen until the cause of the alarm is eliminated or the alarm is disabled. If more than one alarm has been violated the message CONTINUE appears at the bottom of the alarm information window. In this case, press the NEXT INFO soft key to see which other alarms have been violated.
3. Press the [ALARM] key to finish.

Note: The alarm icon is red when an alarm setting is violated, and changes to background color when the [CLEAR] key or CLEAR ALARM soft key is pressed. The color does not change regardless of how many other alarms are violated.

Alarm messages

The table below shows the plotter alarm messages and their meanings.

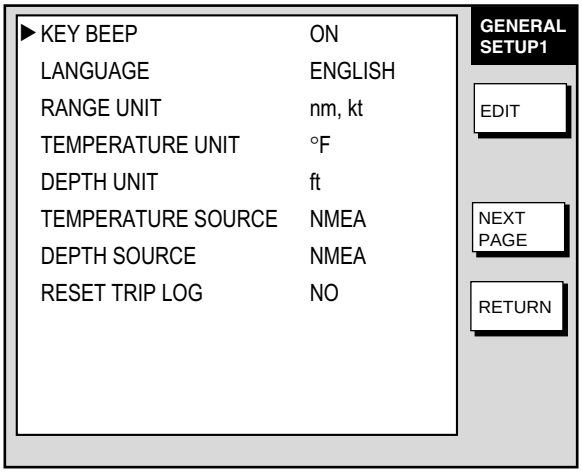
Plotter alarm messages and their meanings

Message	Meaning
ARRIVED AT WAYPOINT XXX! (XXX = waypoint name)	Arrival alarm violated.
ENTERED INTO AVOIDANCE AREA!	Proximity alarm violated.
EXCEEDED ANCHOR WATCH LIMIT!	Anchor watch alarm violated.
EXCEEDED XTE LIMIT!	XTE alarm violated.
SPEED ALARM!	Speed alarm violated.
TEMPERATURE ALARM!	Water temperature alarm violated.
TRIP ALARM! MILEAGE EXCEEDED	Trip alarm violated.

3.12 Resetting Trip Distance

Trip distance is shown on the navigation data display. You can reset the trip distance to zero as follows:

1. Press the [MENU] key.
2. Press the SYSTEM CONFIGURATION and GENERAL SETUP soft keys in that order to show the GENERAL SETUP menu.



General setup menu, page 1

3. Use the trackball to select RESET TRIP LOG, then press the EDIT soft key.
4. Use the trackball to select YES, then press the ENTER soft key.
5. Press the [MENU] key to close the menu.

4. VIDEO SOUNDER OPERATION

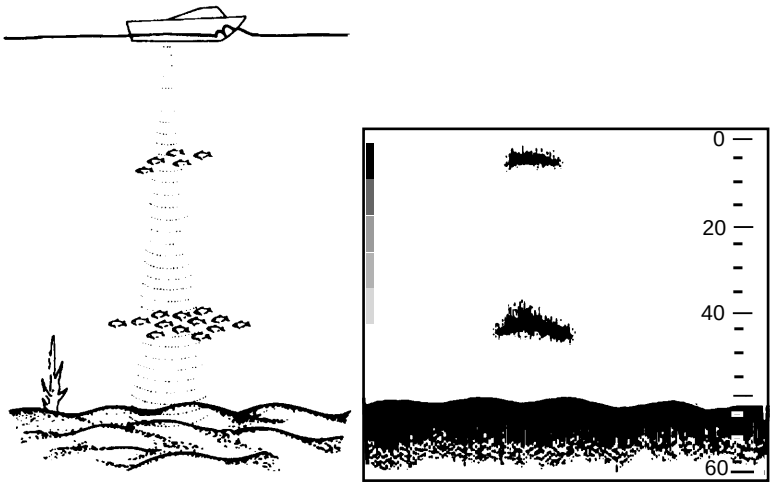
With connection of the optional Network Sounder ETR-6/10N you can show video sounder images on the display.

4.1 Principle of Operation

The video sounder determines the distance between its transducer and underwater objects such as fish, lake bottom or seabed and displays the results on screen. It does this by utilizing the fact that an ultrasonic wave transmitted through water travels at a nearly constant speed of 4800 feet (1500 meters) per second. When a sound wave strikes an underwater object such as fish or sea bottom, part of the sound wave is reflected back toward the source (transducer). Thus by calculating the time difference between the transmission of a sound wave and the reception of the reflected sound wave, the depth to the object can be determined.

The entire process begins in the network sounder. Transmitter power is sent to the transducer as a short pulse of electrical energy. The electrical signal produced by the transmitter is converted into an ultrasonic signal by the transducer and transmitted into the water. Any returning signals from intervening objects (such as a fish school) are received by the transducer and converted into an electrical signal. The signals are then amplified in the amplifier section, and finally, displayed on screen.

The picture displayed is made up of a series of vertical scan lines, one for each transmission. Each line represents a snapshot of what has occurred beneath the boat. A series of snapshots are accumulated side by side across the screen, and the resulting contours of the bottom and fish between the bottom and surface are displayed.



Underwater conditions and video sounder display

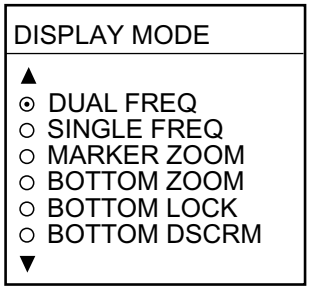
4.2 Sounder Displays

4.2.1 Selecting a sounder display

There are seven display modes from which to choose: dual frequency, single frequency, marker zoom, bottom zoom, bottom lock, bottom discrimination, and A-scope.

To select a display;

1. Press the [DISP] key and then select sounder display desired.
2. If not already displayed, press the [HIDE/SHOW] soft key to show the sounder soft keys.
3. Press the DISPLY MODE soft key to show the display mode window.



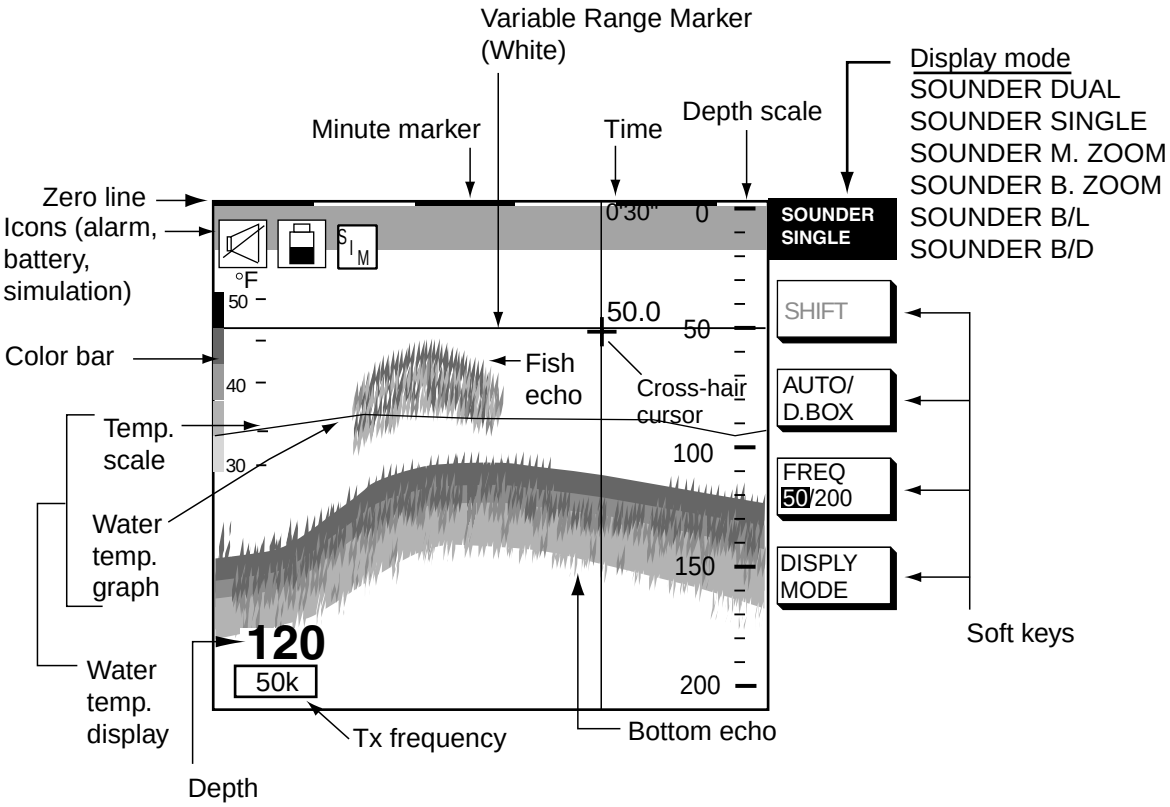
Display mode window

4. Use the trackball or the [ENTER] knob to select a display.
5. Press the RETURN soft key to close the window.

Note: On menus which show the RETURN soft key you may use it or the ENTER knob to register setting and close the window.

4.2.2 Description of sounder displays

Single-frequency display



Indications on the single frequency display

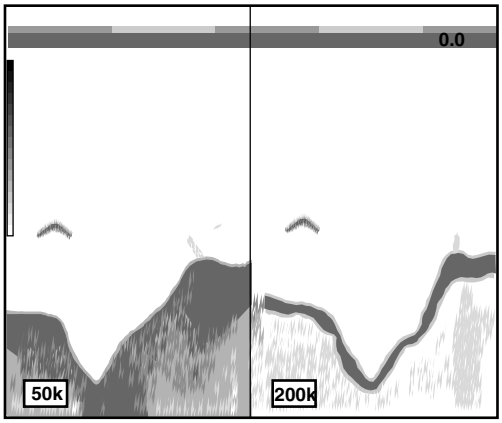
Note: The water temperature display requires an appropriate water temperature sensor. It can be turned on or off with TEMPERATURE GRAPH on the SOUNDER MENU.

Selecting transmission frequency

The single frequency display shows either the 50 kHz picture or 200 kHz picture. To select transmission frequency, press the FREQ 50/200 soft key. “50” or “200” is highlighted on its key label with each press of the key.

Dual-frequency display

The dual-frequency display provides both 50 kHz and 200 kHz pictures. This display is useful for comparing the same picture with two different sounding frequencies.



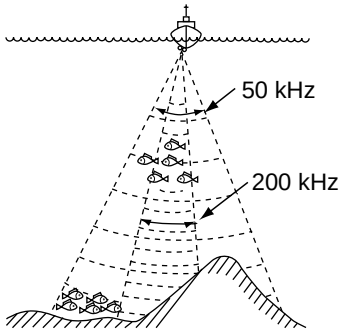
Dual-frequency display

50 kHz picture

The sounder uses ultrasonic pulses to detect bottom conditions. The lower the frequency of the pulse, the wider the detection area. Therefore, the 50 kHz frequency is useful for general detection and judging bottom condition.

200 kHz picture

The higher the frequency of the ultrasonic pulse the better the resolution. Therefore, the 200 kHz frequency is ideal for detailed observation of fish school.

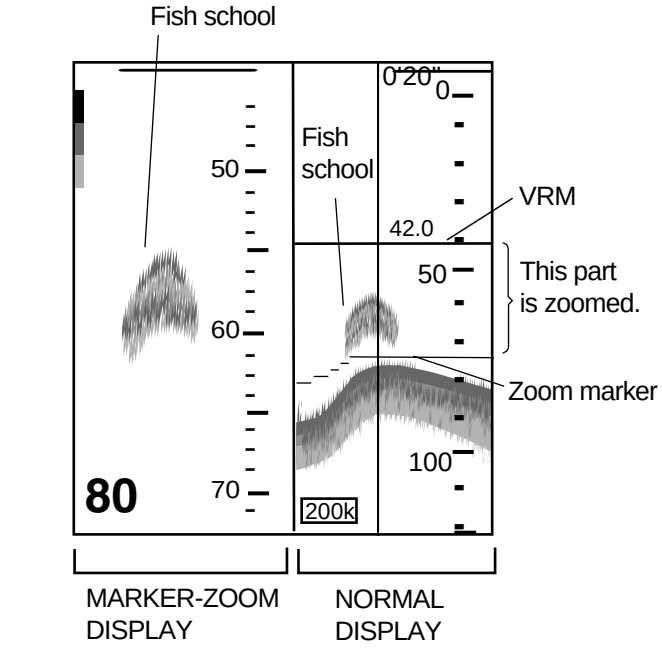


Sounding area and transmission frequency

Marker-zoom display

The marker-zoom display expands a selected area of the normal sounder picture to full vertical size of the screen on the left-half window. You may specify the portion to expand by operating the VRM (Variable Range Marker), which you can shift with the [ENTER] knob. The area between the VRM and zoom marker is expanded. The length of the segment is equal to one division of the depth scale.

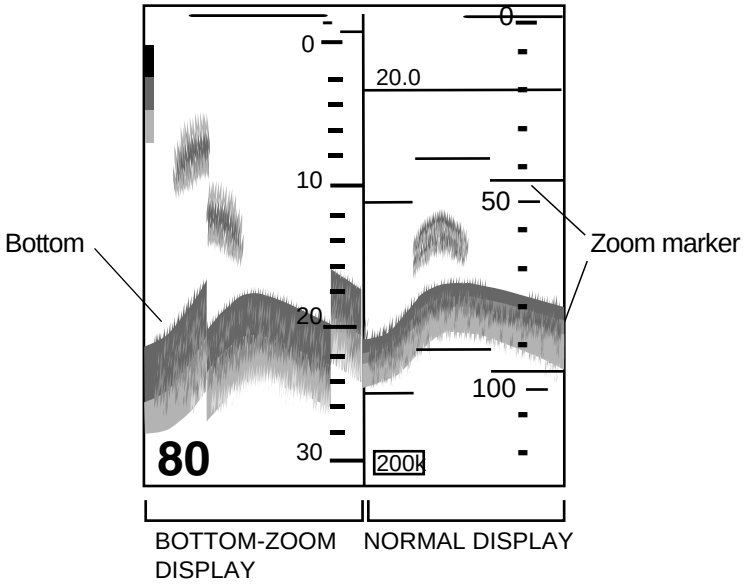
Note: The VRM is set independently from other displays in case of multiple displays.



Marker-zoom display plus normal sounder display

Bottom-zoom display

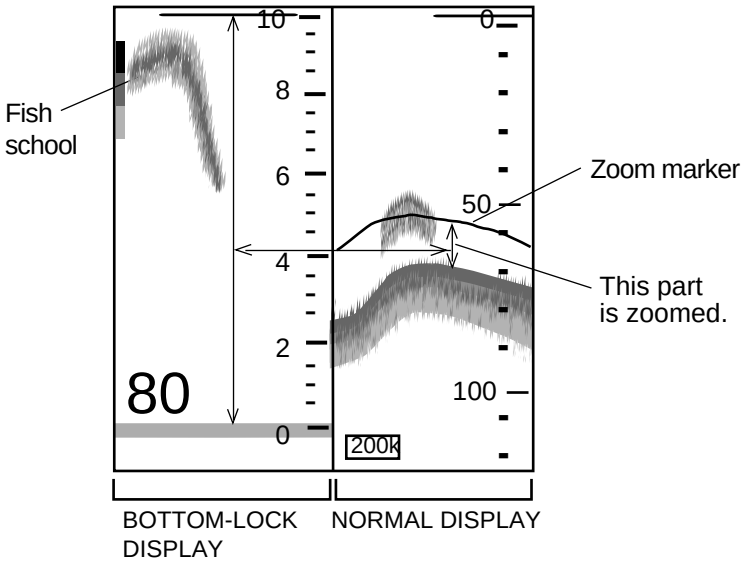
The bottom-zoom display expands bottom and bottom fish echoes by the zoom range selected on the SOUNDER RANGE SETUP menu (see paragraph 5.9.3), and is useful for determining bottom hardness. A bottom displayed with a short echo tail usually means it is a soft, sandy bottom. A long echo tail means a hard bottom.



Bottom-zoom display plus normal sounder display

Bottom-lock display

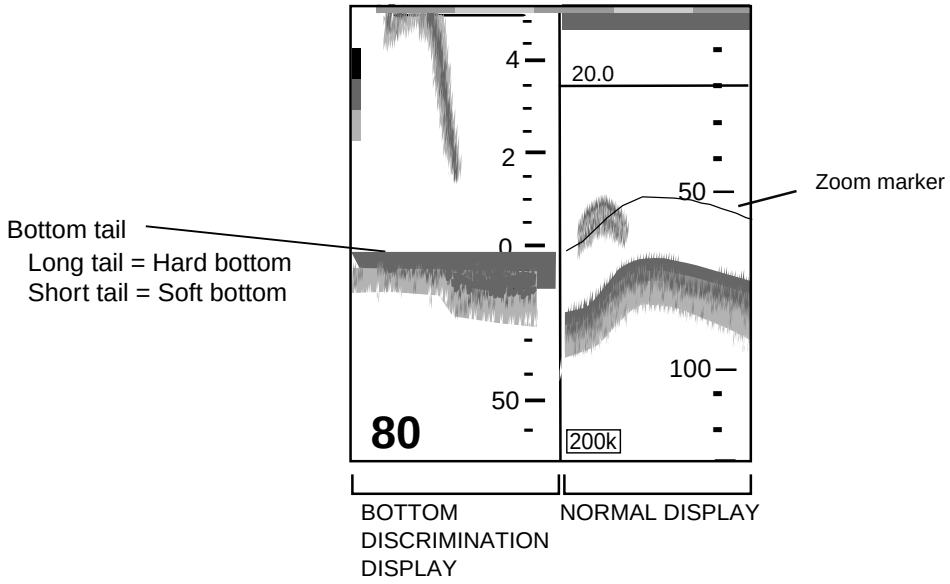
The bottom-lock display provides a compressed normal picture on the right half of the screen and a 10 or 20 feet (3 or 6 meter) wide layer in contact with the bottom is expanded onto the left half of the screen. This mode is useful for discriminating bottom fish from the bottom echo. You may select the bottom lock range from the SOUNDER RANGE SETUP menu. For details, see paragraph 5.9.3.



Bottom-lock display plus normal sounder display

Bottom discrimination display

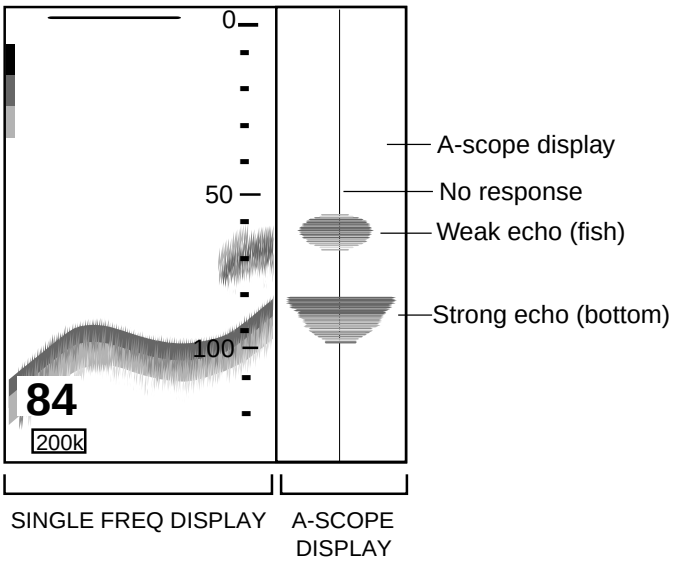
The bottom discrimination mode displays the bottom echo to help you determine bottom hardness. A bottom displayed with a short echo tail usually means it is a soft, sandy bottom. A long echo tail means a hard bottom.



Bottom discrimination display

A-scope display (display only)

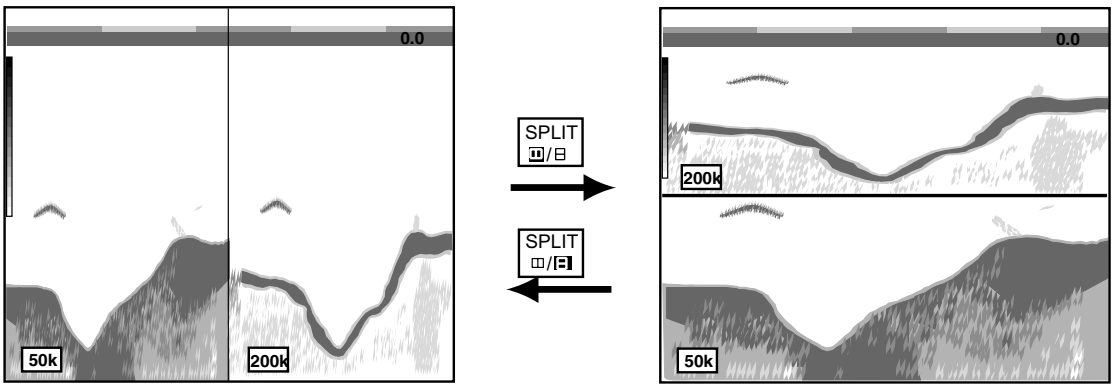
The A-scope display, available in all modes, shows echoes at each transmission with amplitudes and tone proportional to their intensities, on the right 1/10 of the screen. It is useful for estimating fish species and bottom composition. To turn on the A-scope display, press the DISPLAY MODE soft key, select display mode desired, then press the A-SCPE soft key to show “ON” on its label. For modes other than SINGLE FREQ the screen must be split horizontally to show the A-scope display.



A-scope display

4.2.3 Selecting screen split method in combination displays

On combination sounder displays you can split the screen vertically or horizontally, using the SPLIT soft key as below.



How to use the SPLIT soft key (example: dual frequency display)

4.3 Automatic Sounder Operation

Automatic sounder operation is useful when you are preoccupied with other tasks and do not have the time to adjust the display.

4.3.1 How the automatic sounder works

The automatic sounder function automatically selects the proper gain, range scale and clutter suppression level according to the depth. It works as follows:

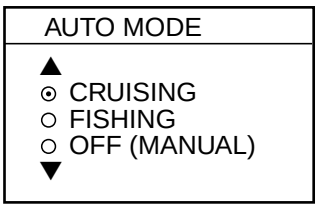
- The range changes automatically to locate the bottom on the lower half of the screen. The range jumps to one step shallower range when the bottom echoes reach a half way point of the full scale from the top and to one step deeper range when they come to the lower edge of the scale.
- The gain is automatically adjusted to display the bottom echo in reddish brown (default color arrangement).
- Clutter, which suppresses low level noise, is automatically adjusted.

4.3.2 Types of automatic sounder modes

Two types of automatic sounder modes are available: CRUISING and FISHING. CRUISING is for tracking the bottom, and FISHING is for searching fish schools. CRUISING uses a higher clutter rejection setting than FISHING therefore it is not recommended for fish detection - weak fish echoes may be erased by the clutter suppression circuit.

4.3.3 How to enable automatic sounder operation

1. If not displayed, press the [HIDE/SHOW] key to show the sounder soft keys.
2. Press the AUTO/D. BOX soft key.



Mode/frequency window

3. Use the trackball or the [ENTER] knob to select CRUISING or FISHING as appropriate.
4. Press the RETURN soft key.

4.4 Manual Sounder Operation

Manual operation is useful for observing fish schools and bottom using a fixed gain setting.

The gain, range and range shift functions used together give you the means to select the depth you can see on the screen. The basic range can be thought of as providing a “window” into the water column and range shifting as moving the “window” to the desired depth.

4.4.1 Selecting the manual mode

1. If not displayed, press the [HIDE/SHOW] key to show the sounder soft keys.
2. Press the AUTO/D. BOX soft key to show the mode/frequency window.
3. Select OFF (MANUAL).
4. Press the RETURN soft key.

4.4.2 Selecting display range

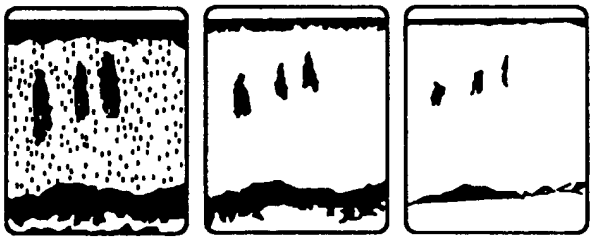
Press the [RANGE +] or [RANGE -] key to select a range. The default ranges in feet, meters, fathoms and passi/braza are as below. Note that the range cannot be changed in the automatic sounder mode.

Default sounder ranges

Range 1	Range 2	Range 3	Range 4	Range 5	Range 6	Range 7	Range 8
15 ft	30 ft	60 ft	120 ft	200 ft	400 ft	1000 ft	4000 ft
5 m	10 m	20 m	40 m	80 m	150 m	300 m	1200 m
3 fa	5 fa	10 fa	20 fa	40 fa	80 fa	150 fa	650 fa
3 P/B	5 P/B	10 P/B	30 P/B	50 P/B	100 P/B	200 P/B	700 P/B

4.4.3 Adjusting the gain

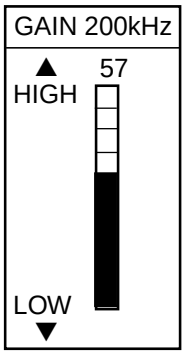
Normally, set the gain to the point where excessive noise does not appear on the screen. Use a higher gain setting for greater depths and a lower setting for shallow waters.



Gain too high Gain proper Gain too low

Examples of proper and improper gain

Press the [GAIN] key to show the gain window, and adjust the [ENTER] knob or trackball. Current level is shown on the bar, and the setting range is 0-100(%). Press the RETURN soft key to finish.



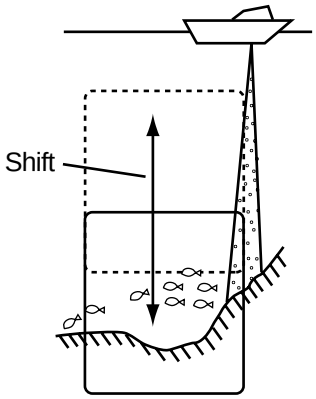
Gain window

Note 1: On the dual-frequency display, the gain can be independently set for 50 kHz and 200 kHz. Use the FREQ 50/200 soft key to select the frequency for which to adjust gain.

Note 2: Gain cannot be adjusted in the automatic sounder mode. The message "SOUNDER GAIN CANNOT BE CHANGED IN AUTO MODE" is displayed when you attempt to do so.

4.4.4 Shifting the range

The basic range may be shifted up or down as desired by pressing the SHIFT soft key followed by adjusting the [ENTER] knob. Press the RETURN soft key to finish.

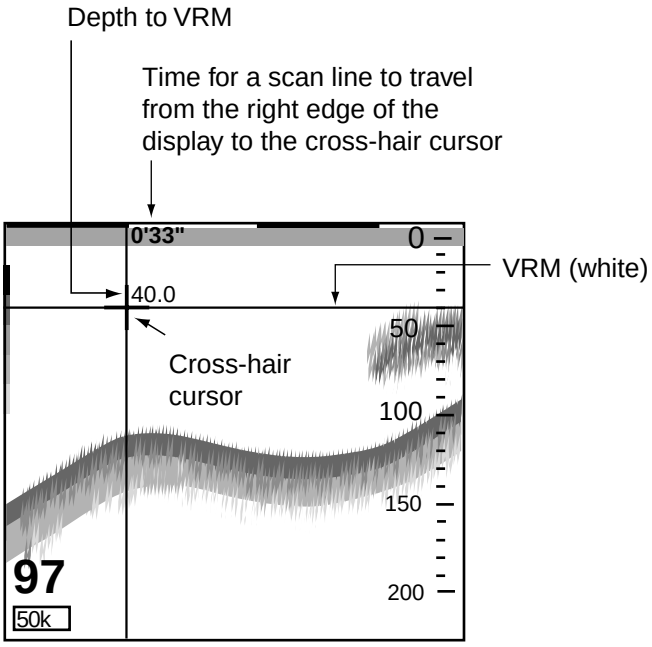


Shift concept

4.5 Measuring Depth, Time

The VRM measures the depth and the cross-hair cursor, time.

1. Rotate the [ENTER] knob to shift the VRM; counterclockwise to shift it downward, clockwise to shift it upward. You may also use the trackball to shift the VRM.
2. Roll the trackball horizontally to adjust the cross-hair cursor to measure time.

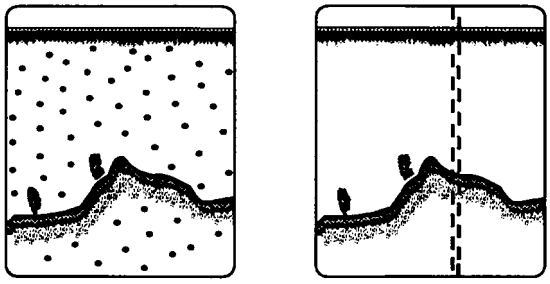


How to measure depth and time

Note: If, when the range setting is over 1000 ft (m, fa, p/b), the VRM indication and depth scale may overlap one another, shift the cross-hair cursor slightly to show them completely. Further, when the display is shifted, the depth scale may obscure the time indication.

4.6 Reducing Interference

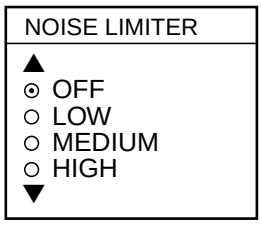
Interference from other acoustic equipment operating nearby or other electronic equipment on your boat may show itself on the display as shown below.



Types of interference

To reduce interference, do the following:

1. Press the [MENU] key.
2. Press the SOUNDER MENU soft key.
3. Select NOISE LIMITER, then press the EDIT soft key to show the noise limiter window.



Noise limiter window

4. Use the trackball to select the degree of suppression desired (LOW, MEDIUM, HIGH), or turn the noise limiter off.
5. Press the RETURN soft key followed by the [MENU] key to close the menu.

Turn the noise limiter circuit off when no interference exists, otherwise weak echoes may be missed.

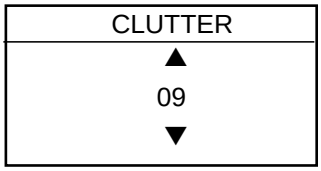
4.7 Reducing Low Level Noise

Light-blue dots may appear over most of the screen. This is mainly due to sediment in the water, or noise. This noise can be suppressed by adjusting CLUTTER on the SOUNDER SETUP menu.

Appearance of clutter

When the automatic sounder mode is used, clutter is automatically adjusted. To reduce low level noise in manual sounder operation do the following:

1. Press the [MENU] key.
2. Press the SOUNDER MENU soft key.
3. Select CLUTTER, then press the EDIT soft key to show the clutter window.



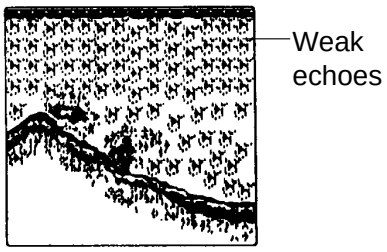
Clutter window

4. Adjust the trackball upward or downward to select clutter rejection level desired; 0 (OFF) through 16. The higher the number the higher the degree of suppression. Note that the clutter suppressor may erase weak echoes. Therefore, turn off the clutter when its use is not required.
5. Press the RETURN soft key followed by the [MENU] key to close the menu.

Note: Unlike the signal level feature, clutter does not erase echoes. However, if you do not wish to change the relation between weak and strong echoes, use signal level instead.

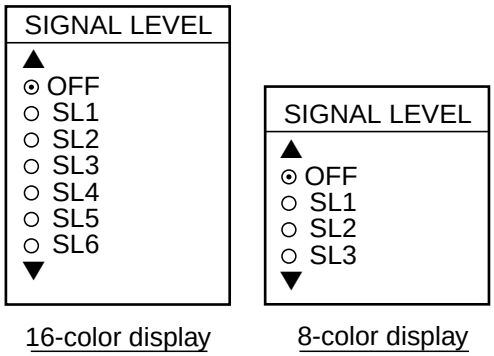
4.8 Erasing Weak Echoes

Sediments in the water or reflections from plankton may be painted on the display in green or light blue. These weak echoes may be erased as below.



Appearance of weak echoes

1. Press the [MENU] key.
2. Press the SOUNDER MENU soft key.
3. Select SIGNAL LEVEL, and press the EDIT soft key to show the signal level window.



Signal level window

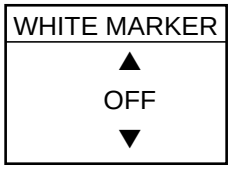
4. Use the trackball to select level of erasure or OFF as appropriate. The higher the number the stronger the echo that will be erased.
5. Press the RETURN soft key followed by the [MENU] key to close the menu.

Note: Unlike “clutter,” signal level erases echoes. Therefore, if you do not wish to erase echoes, use clutter instead.

4.9 White Marker

The white marker functions to display a particular echo color in white. For example, you may want to display the bottom echo in white to discriminate fish echoes near the bottom. Note that the bottom must be displayed in reddish-brown (default color arrangement) for the white marker to function.

1. Press the [MENU] key.
2. Press the SOUNDER MENU soft key.
3. Select WHITE MARKER, then press the EDIT soft key to open the white marker window.



White marker window

4. Use the trackball to select the color to display in white. As you use the trackball, the number in the white marker window changes, the white marker on the echo strength bar shifts and the selected echo color is displayed in white.

Color bar (16 color) when white marker function is active

5. Press the RETURN soft key followed by the [MENU] key to close the menu.

To turn the white marker function off, display “OFF” in the white marker window.

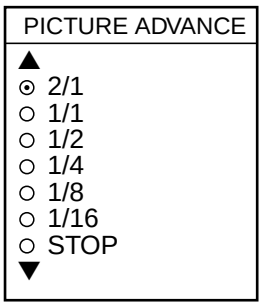
4.10 Picture Advance Speed

The picture advance speed determines how quickly the vertical scan lines run across the screen. When selecting a picture advance speed, keep in mind that a fast advance speed will expand the size of the fish school horizontally on the screen and a slow advance speed will contract it.

The advancement speed may be set independent of or synchronized with ship's speed.

4.10.1 Advancement independent of ship's speed

1. Press the [MENU] key.
2. Press the SOUNDER MENU soft key.
3. Select PICTURE ADVANCE, and press the EDIT soft key to open the picture advance window.



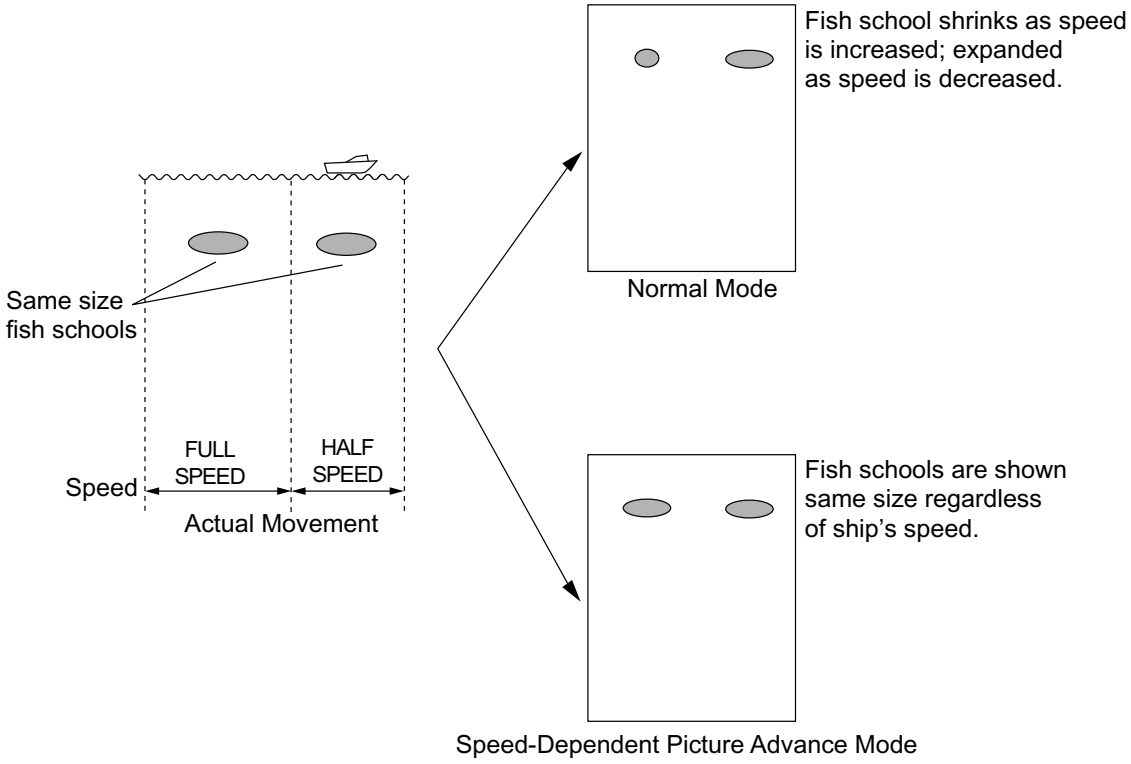
Picture advance window

4. Use the trackball to select speed desired. The fractions in the window denote the number of scan lines produced per transmission. For example, 1/8 means one scan line is produced every eight transmissions. STOP freezes the display and it is convenient for observing an echo.
5. Press the RETURN soft key followed by the [MENU] key to close the menu.

Note: When using the plotter/sounder combination display, advancement of the sounder picture may be temporarily interrupted while the plotter display is being shifted or its display range is being changed.

4.10.2 Advancement synchronized with ship's speed

With speed data provided by a speed-measuring device, picture advance speed may be automatically synchronized with ship's speed. As shown in the figure below the horizontal scale of the display is not influenced with the speed-dependent picture advance mode active, thus it permits judgment of fish school size and abundance at any speed. With the advancement synchronized with ship's speed the picture advance speed setting (on the previous page) is ignored.



How the speed-dependent picture advance mode works

Activating/deactivating the speed-dependent picture advance mode

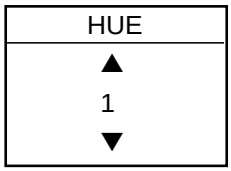
1. Press the [MENU] key followed by the SOUNDER MENU soft key.
2. Select SPD SENSING PIC ADV.
3. Press the EDIT soft key to open the setting window.
4. Use the trackball to select ON or OFF (default setting) as appropriate.
5. Press the ENTER soft key followed by the [MENU] key to close the menu.

Note: Use the same speed data sentence (STG or STW) throughout the network for smooth advancement of the sounder picture. See the paragraph 6.5 for how to output data through the network.

4.11 Display Colors

You can select the number of colors and background color to display as follows:

1. Press the [MENU] key.
2. Press the SOUNDER MENU soft key.
3. Select HUE, then press the EDIT soft key to show the hue window.



Hue window

4. Use the trackball to select hue number, referring to the table below. (You can see the result of your selection on the display.)

Hue no. and background and echo colors

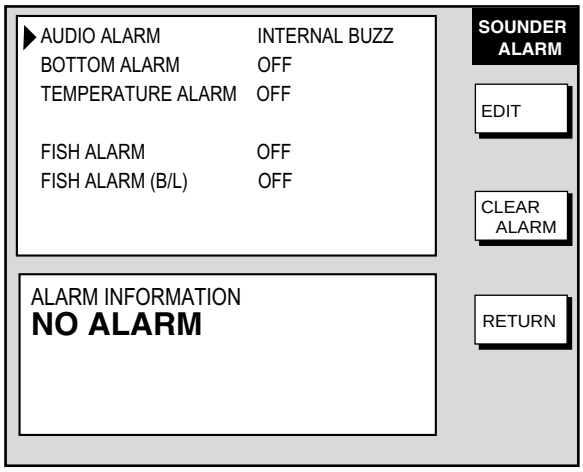
Hue No.	Echo Color	Background Color
1	16 color	Blue
2	8 color	Blue
3	16 color	Dark blue
4	8 color	Dark blue
5	16 color	White
6	8 color	White
7	16 color	Black
8	8 color	Black
9	Monochrome yellow, eight intensities	

5. Press the RETURN soft key followed by the [MENU] key to close the menu.

4.12 Alarms

The sounder section has five conditions which generate audio and visual alarms: bottom alarm, fish alarm (bottom lock), fish alarm (normal) and water temperature alarm (temperature sensor required).

You may set up the sounder alarms on the ALARM menu, which may be displayed by pressing the [ALARM] key.

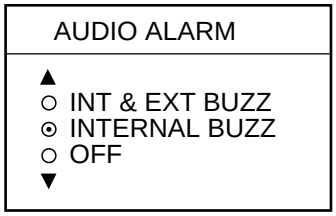


Sounder alarm menu

4.12.1 Audio alarm on/off

The audio alarm sounds whenever an alarm setting is violated. You can enable or disable the audio alarm as follows:

1. Press the [ALARM] key to show the ALARM menu.
2. Use the trackball to select ALARM AUDIO.
3. Press the EDIT soft key to show the audio alarm window.



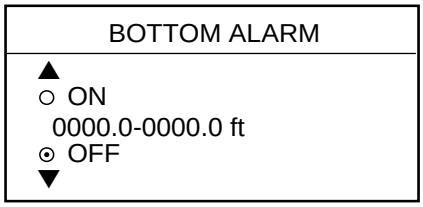
Alarm audio window

4. Use the trackball to select INT & EXT BUZZ (Internal + External alarm), INTERNAL BUZZ (Internal alarm) or OFF. External buzzer required to select “INT+EXT BUZZ.” OFF globally turns the audio alarm on or off for all modes, including radar.
5. Press the ENTER soft key.
6. Press the [ALARM] key to close the menu.

4.12.2 Bottom alarm

The bottom alarm sounds when the bottom echo is within the alarm range set. To activate the bottom alarm, the depth must be displayed. Note that the bottom alarm is turned on or off reciprocally with the bottom alarm on the plotter alarm menu.

1. Press the [ALARM] key to show the ALARM menu.
2. Use the trackball to select BOTTOM ALARM.
3. Press the EDIT soft key to show the bottom alarm window.



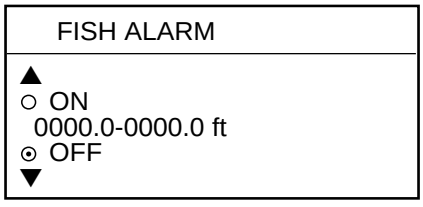
Bottom alarm window

4. Use the trackball to select ON or OFF as appropriate. For ON, enter alarm range with the trackball and numeric keys: Adjust the trackball to select digit; hit appropriate numeric key to enter value.
5. Press the ENTER soft key or push the [ENTER] knob to register setting.
6. Press the [ALARM] key to close the menu.

4.12.3 Fish alarm

The fish alarm sounds when a fish echo is within the preset alarm range. Note that the sensitivity of the fish alarm can be set on the SOUNDER SYSTEM SETUP menu.

1. Press the [ALARM] key to show the ALARM menu.
2. Use the trackball to select FISH ALARM.
3. Press the EDIT soft key to show the fish alarm window.



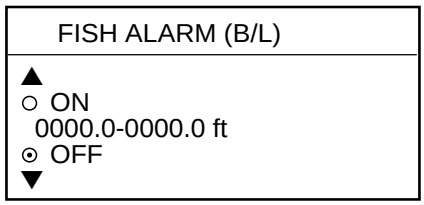
Fish alarm window

4. Use the trackball to select ON or OFF as appropriate. For ON, use the trackball and numeric keys to enter range: Adjust the trackball to select digit; hit the appropriate numeric key to enter value.
5. Press the ENTER soft key or push the [ENTER] knob to register setting.
6. Press the [ALARM] key to close the menu.

4.12.4 Fish alarm (B/L)

The bottom-lock fish alarm sounds when a fish echo is within a predetermined distance from the bottom. Note that the sensitivity of the fish alarm can be set on the SOUNDER SYSTEM SETUP menu.

1. Press the [ALARM] key to show the ALARM menu.
2. Use the trackball to select FISH ALARM (B/L).
3. Press the EDIT soft key to show the fish alarm (B/L) window.



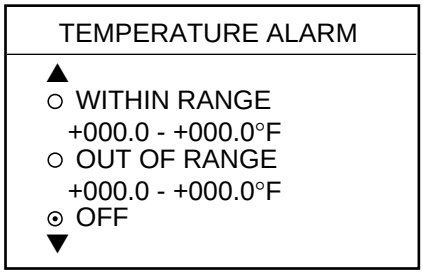
Fish alarm (B/L) window

4. Use the trackball to select ON or OFF as appropriate. For ON, use the trackball and numeric keys to enter range: Adjust the trackball to select digit; hit appropriate numeric key to enter value.
5. Press the ENTER soft key or push the [ENTER] knob to register setting.
6. Press the [ALARM] key to close the menu.

4.12.5 Water temperature alarm

There are two types of water temperature alarms: WITHIN RANGE and OUT OF RANGE. The WITHIN RANGE alarm sounds when the water temperature is within the range set, and the OUT OF RANGE alarm sounds when the water temperature is higher or lower than the range set. Note that the water temperature alarm is turned on or off reciprocally with the water temperature alarm on the plotter menu.

1. Press the [ALARM] key to show the ALARM menu.
2. Use the trackball to select TEMPERATURE ALARM.
3. Press the EDIT soft key to show the temperature alarm window.



Water temperature alarm window

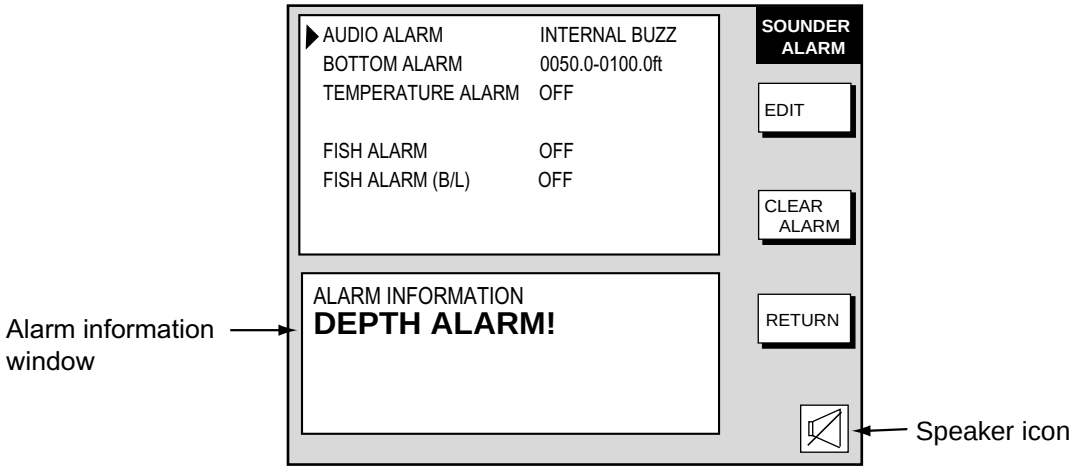
4. Use the trackball to select WITHIN RANGE, OUT OF RANGE or OFF as numeric key to enter alarm range: Adjust the trackball to select digit; hit appropriate numeric key to enter value. To switch between plus and minus and vice versa use the +< - ->- soft key.
5. Press the ENTER soft key or push the [ENTER] knob to register setting.
6. Press the [ALARM] key to close the menu.

4.12.6 When an alarm setting is violated...

When an alarm setting has been violated the buzzer sounds and the speaker icon appears in red. Press the [CLEAR] key to silence the alarm. At this time the color of the speaker icon changes from red to background color. You can see which alarm has been violated on the alarm menu display. In the example below the bottom alarm has been violated.

To see which alarm(s) has been violated:

1. Press the [ALARM] key. The name of the offending alarm is shown in the ALARM INFORMATION window.



Sounder alarm menu

2. Press the CLEAR ALARM soft key to acknowledge the alarm (and silence the buzzer if it has not already been done with the [CLEAR] key). The color of the speaker icon changes from red to background color. The icon remains on the screen until the reason for the alarm is eliminated or the alarm is disabled. If more than one alarm has been violated, the message CONTINUE appears at the bottom of the alarm information window. In this case, press the NEXT INFO soft key to see which other alarms have been violated.

   Note: The alarm icon is red when an alarm setting is violated, and changes to background color when the [CLEAR] key or CLEAR ALARM soft key is pressed. The color remains the same regardless of how many times another alarm is violated.

3. Press the [ALARM] key to close the menu.

Alarm messages

The table below shows the sounder alarm messages and their meanings.

Sounder alarm messages and their meanings

Message	Meaning
DEPTH ALARM!	Bottom alarm violated.
FISH ALARM!	Fish alarm violated.
TEMPERATURE ALARM!	Water temperature alarm violated.

4.13 Water Temperature Graph

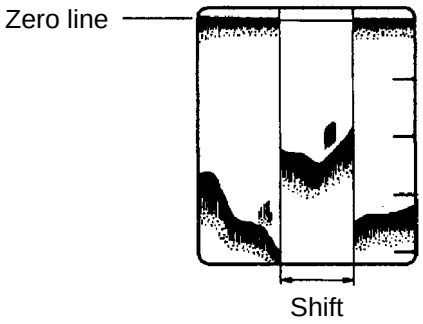
The water temperature graph (appropriate sensor required) plots water temperature on the sounder display. (See the figure on page 4-3.) It can be turned on or off as below.

1. Press the [MENU] key to open the menu.
2. Press the SOUNDER MENU soft key.
3. Select TEMPERATURE GRAPH and press the EDIT soft key.
4. Select OFF (default setting) or ON as appropriate.
5. Press the ENTER soft key.
6. Press the [MENU] key to close the menu.

4.14 Interpreting the Sounder Display

4.14.1 Zero line

The zero line (sometimes referred to as the transmission line) represents the transducer's position, and moves off the screen when a deep phased range is used.



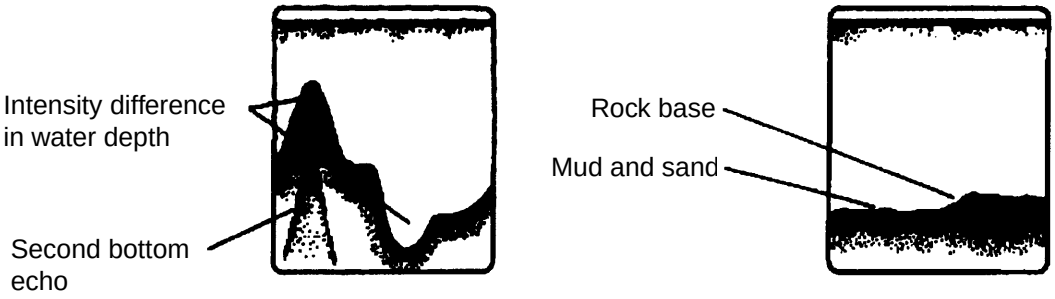
Zero line

4.14.2 Bottom echo

Echoes from the bottom are normally the strongest and are displayed in reddish-brown, but the color and width will vary with bottom composition, water depth, frequency, sensitivity, etc.

In a comparatively shallow depth, a high gain setting will cause a second or sometimes a third or a fourth echo to be displayed at the same interval between them below the first echo trace. This is because the echo travels between the bottom and the surface twice or more in shallow depths.

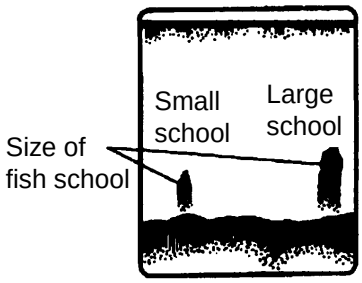
The color of the bottom echo can be used to help determine the density of the bottom materials (soft or hard). The harder the bottom, the wider the trace. If the gain is set to show only a single bottom echo on mud, a rocky bottom will show a second or third bottom return. The range should be chosen so the first and second bottom echoes are displayed when bottom hardness is being determined.



Bottom echoes

4.14.3 Fish school echoes

Fish school echoes will generally be plotted between the zero line and the bottom. Usually the fish school/fish echo is weaker than the bottom echo because its reflection property is much smaller compared to the bottom. The size of the fish school can be ascertained from the density of the display.

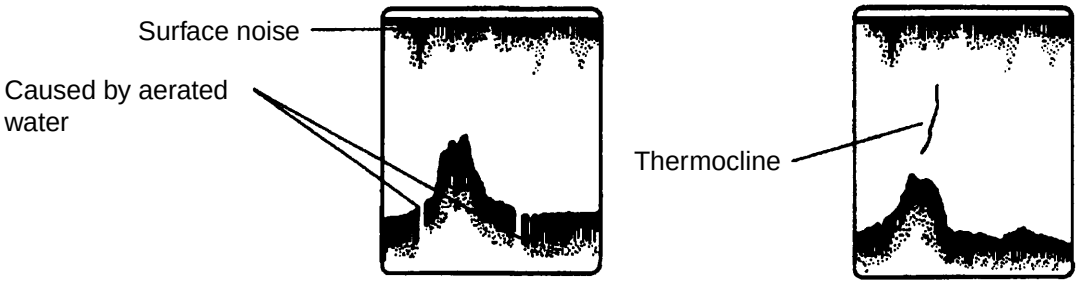


Fish school echoes

4.14.4 Surface noise/Aeration

When the waters are rough or the boat passes over a wake, surface noise may appear near the zero line. As surface turbulence is acoustically equivalent to running into a brick wall, the bottom echo will be displayed intermittently. Similar noise sometimes appears when a water temperature difference (thermocline) exists. Different species of fish tend to prefer different temperature zones, so the thermocline may be useful to help identify target fish. 200 kHz tends to show shallow thermoclines better than 50 kHz.

In rough waters the display is occasionally interrupted due to below-the-ship air bubbles obstructing the sound path. This also occurs when the boat makes a quick turn or reverses movement. Lowering the picture advance speed may reduce the interruption. However, reconsideration of the transducer installation may be necessary if the interruption occurs frequently.



Surface noise/aeration