

# SCALABLE INTEGRATED NAVIGATION SYSTEM MODEL 1933C



TRAINING CENTER YORKTOWN

JANUARY 2010

# SCALABLE INTEGRATED NAVIGATION SYSTEM (SINS)

## Model 1933C Job Aid

The FURUNO Model 1933C is an integrated navigation system. The system integrates radar, differential global positioning system (DGPS), a chart plotter, depth sounder, and a fluxgate compass. The system is commercially available from FURUNO Electric Company as the NavNet® system and is referred to by the USCG as the Scalable Integrated Navigation System (SINS). The SINS package is the standard navigation system onboard the USCG 25-ft RB-S, 41-ft UTB and the 47-ft MLB.

This job aid was prepared by Performance Systems Branch, Boat Forces Center, and BM "A" School staff at TRACEN Yorktown, VA. Special thanks go out to the Performance Technology Center for their pre-design analysis work.



*Performance Systems Branch  
Training Center Yorktown  
January 2010*

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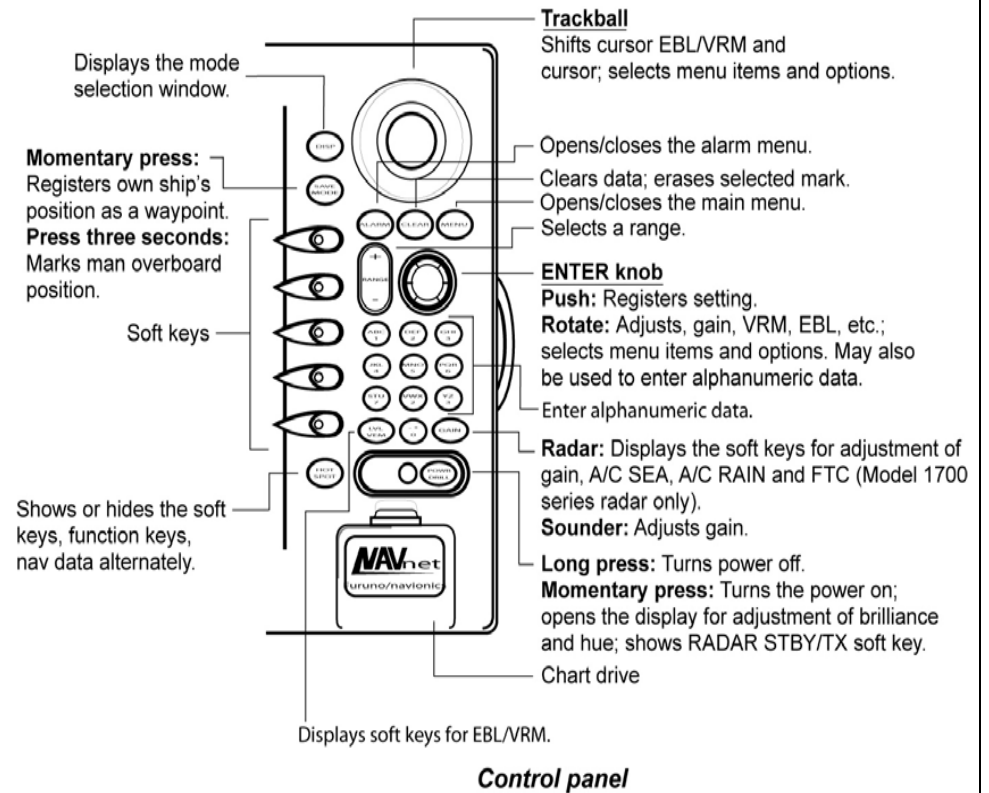
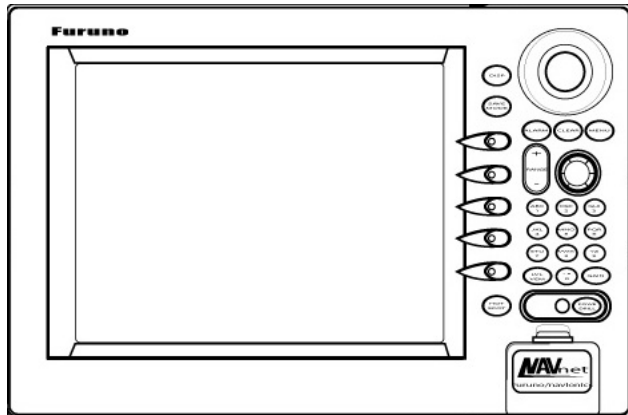
# SINS DISPLAY UNIT CONTROLS

## Overview

The radar, video plotter, depth sounder, and chart systems are operated with the controls of the display unit (figure 1) and the remote controller.

Ten keys are labeled, and they provide the function shown on their labels. The five soft keys provide various functions according to the current operating mode. The [ENTER] knob mainly functions to register selections on the menu and adjust the electronic bearing line (EBL), variable range marker (VRM), and gain.

The trackball's main function is to move the cursor across the screen. When you correctly execute an operation, the unit generates a beep. Invalid operation causes the unit to emit three beeps.



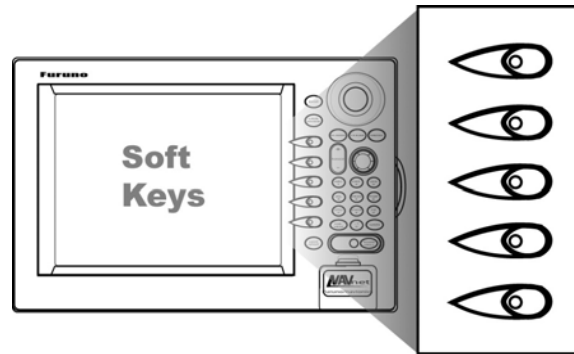
# SINS DISPLAY UNIT CONTROLS

## Soft Keys | Trackball

### Soft Keys:

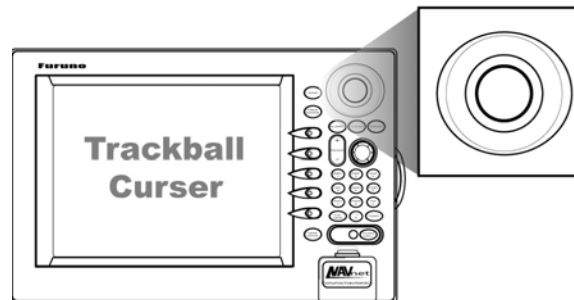
The function of the five soft keys (figure 2) changes according to the operation. Their labels for their current functions are shown on the screen to the left of the keys.

To hide or show the soft keys, press the [HIDE/SHOW] key. Each press of the key shows preset soft keys, user function keys, or turns off navigation information (at the top of the screen).



### Trackball:

The trackball functions to shift the cursor (figure 3), and is used for measurement of range and bearing to a location (radar) and latitude and longitude position (plotter). Roll the trackball to shift the cursor. The cursor moves in the direction of trackball rotation.



# OPERATIONAL SETUP

## Energizing the SINS

Each boat type has a different breaker panel configuration to energize the system's electrical circuit. Once the circuit is energized, complete the following steps:

- 1 Energize SINS unit on your vessel by energizing the DGPS Circuit Breakers on the vessel. A beep will sound and the unit will proceed automatically in its startup performance test check.

**Note:** DGPS GP-37 must be turned on first BEFORE the Furuno NavNet is turned on.

- 2 Press DGPS/Heading Sensor [POWER] key.

**Note:** A beep will sound and the unit will proceed automatically in its startup performance test check.

- 3 Press the [POWER/BRILL] key to turn the unit on.

**Note:** The first time you turn on the power (or any time the power is applied after a memory reset) you are asked if you want to start in the simulation mode which provides simulated operation of the equipment. Push the [ENTER] knob to start the simulation mode, or press the [CLEAR] key to start normal operation.

**Note:** A beep sounds and the equipment proceeds in the sequence shown below, displaying product information, startup test results, and the chart usage disclaimer. The startup test will check the internal ROM, RAM, internal battery and backup data functions for proper operation and display the results for each as OK or NG (No Good). If NG appears, an appropriate message appears on the screen. For any NG, try to press any key to go to the chart disclaimer screen, and then perform the diagnostic test. The magnetron takes from 1-2 minutes and 30 seconds (depending on radar model) to warm up before the radar can be operated. The time remaining to complete the warm up of the magnetron is counted down and displayed at the center of the display screen. You may press any key at the chart disclaimer screen to show the last-used display feature or wait several seconds to let the equipment do it for you.

- 4 Press Fathometer RD-30 [POWER] key.

**Note:** A beep will sound and unit will proceed automatically in its startup performance test check.



# OPERATIONAL SETUP

## Select Screen Display Mode

If you have an installed radar, navigator, network sounder, and external video source (video recorder, etc., an optional PIP board is required), six full-screen displays are available: plotter, radar, echo sounder, nav data, external video, and overlay. In addition to the full-screen display, you can divide the screen into halves or into thirds to show two or three sets of images on a combination display. The overlay screen options are radar plus plotter.

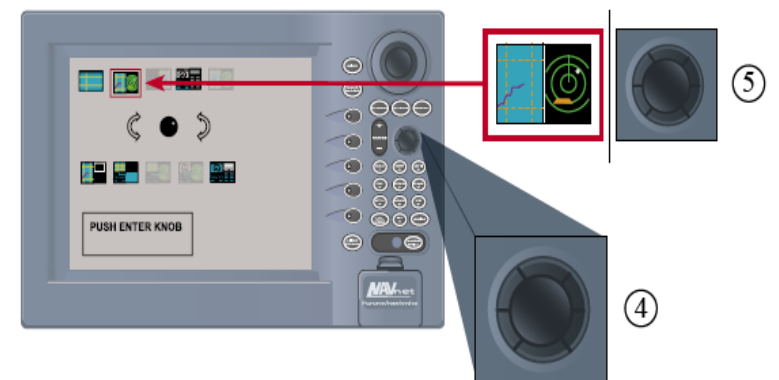
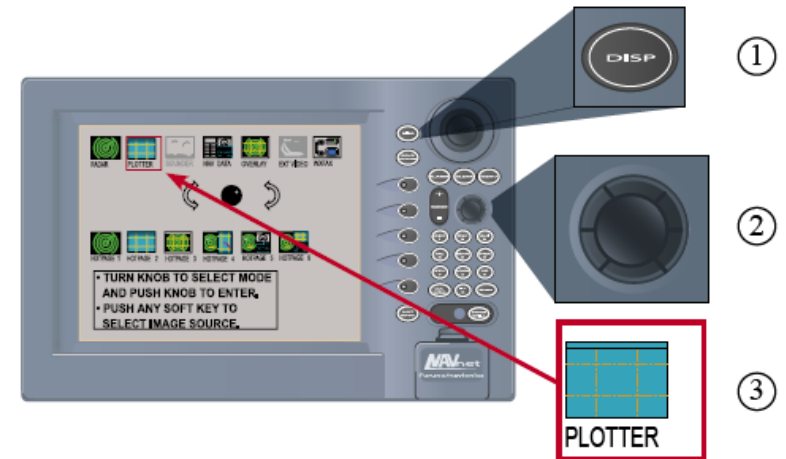
- 1 Press [DISP] key to show the display selection window. The icons of modes not available are marked with an "X."
- 2 Turn [ENTER] knob and push to select a basic display screen or hot page screen.
- 3 Select PLOTTER option using [ENTER] knob and press to set with chart plot on left.

**Note:** Unit should be in SPLIT screen with Chart Plot on left. This is important because when you hold the Man Overboard (MOB) key, the screen will enlarge with whatever is on the left side of the screen.

- 4 Turn the [ENTER] knob to select display desired.
- 5 Select SPLIT option using [ENTER] knob and press to set.

**Note:** Unit should be in SPLIT screen with Chart Plot on left. This is important because when you hold the Man Overboard (MOB) key, the screen will enlarge with whatever is on the left side of the screen.

- 6 Press the [ENTER] knob to finish.





# OPERATIONAL SETUP

## Adjust Display Brilliance and Panel Brilliance

1 Press [POWER/BRILL] key. A set of soft keys for adjustment of brilliance and hue appear.

2 Press the DISPLAY BRILL or PANEL BRILL soft keys as appropriate.

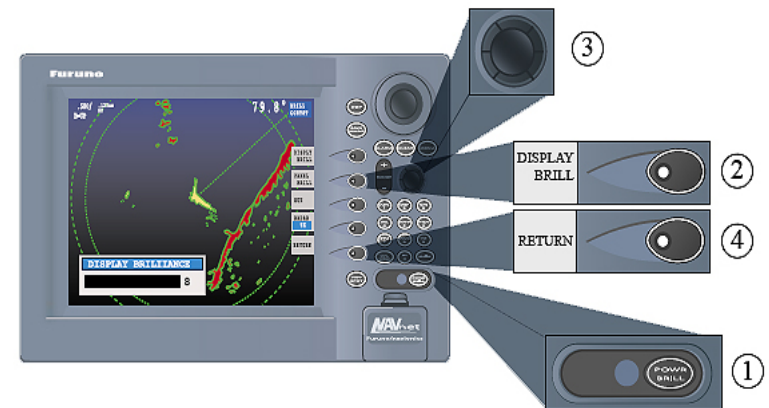
3 An adjustment window appears at the bottom of the screen. This window shows the name of the item selected for adjustment plus current brilliance level, by bar graph.

**Note:** This equipment does not have a contrast control.

4 Adjust brilliance using [ENTER] knob. Clockwise to raise the setting or counterclockwise to decrease it, and then press to set. You may also use the soft key pressed at step 2. Eight levels of display brilliance and panel brilliance are available.

**Note:** If the unit is turned off with minimum brilliance, the screen will be dark at the next power-up. Press the [POWER/BRILL] key consecutively to adjust the brilliance.

5 Select the RETURN soft key to finish.



# OPERATIONAL SETUP

## Select the Hue

1 Press [POWER/BRILL] key momentarily.

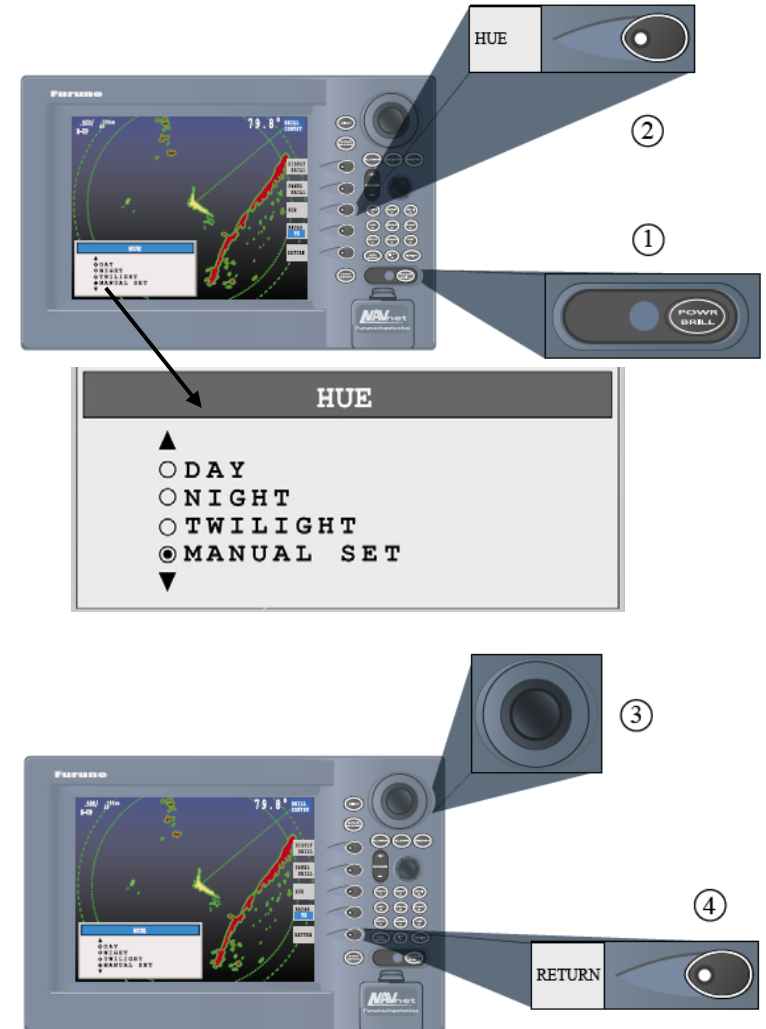
2 Press the HUE soft key to show the hue setting window.

**Note:** When using the overlay screen, the ownship track will be hidden if the radar background and ownship track are blue and the "MANUAL SET" hue setting is used. In this case, set HUE to other position and then return to "MANUAL" to show the ownship track in black.

3 Operate the trackball to select hue desired, referring to the table below. MANUAL SET follows the color settings on the CHART DETAILS menu for the plotter and the RADAR DISPLAY SETUP menu for the radar.

	Night	Day	Twilight
Characters	Red	Black	Green
Radar ring	Red	Green*	Green*
Radar echo	Orange	Red	Yellow
Background	Black	White	Blue
Landmass (plotter)	Light Yellow	Yellow	Light-Yellow

4 Select the RETURN soft key to finish.



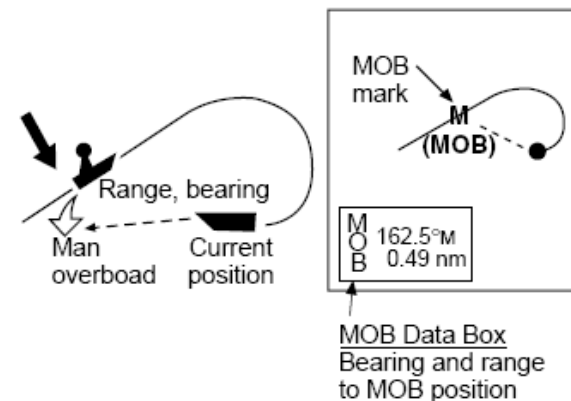
# OPERATIONAL SETUP

## Man Overboard Procedures

The MOB (Man Overboard) mark functions to mark man overboard position.

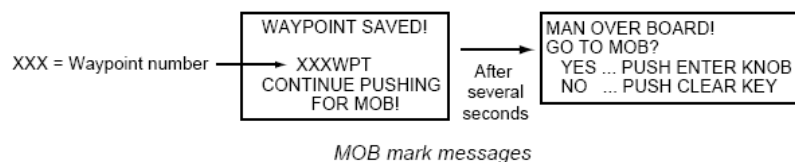
You can inscribe this mark from any mode, except while playing back data or conducting any test.

**Note:** This function requires position data.



- 1 Press and hold down the [SAVE/MOB] key for about 3 seconds when someone falls overboard.

**Note:** The display shows the waypoint number being saved (youngest empty waypoint number, 001-999) followed by the MOB confirmation window.



- 2 Press the [ENTER] knob to select the MOB position as the destination, or press the [CLEAR] key to only mark current ship's position as a waypoint.

**Note:** If you select the MOB position as destination or press [CLEAR] key to only mark current ship's position as a waypoint, a full-screen radar, plotter, or overlay appears depending on the left side of the display.



(cont.)

# OPERATIONAL SETUP

## Man Overboard Procedures (cont.)

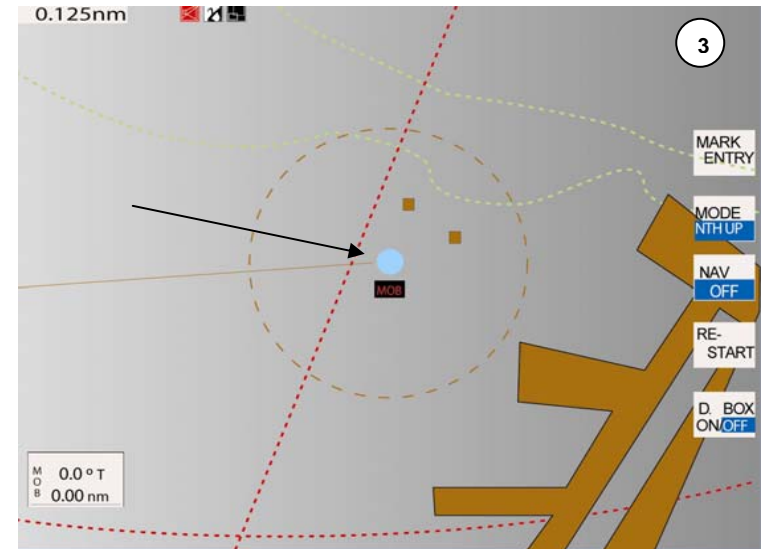
3

Range and bearing to the MOB position are shown in the MOB data box.

**Note:** When using 3-second MOB mode, display will shift to the device on the left side of the display (Plotter or Radar). The MOB mark "MOB" appears at the MOB position and a light-blue line runs between it and current position. This line shows the shortest course to the MOB position.

### To Erase a MOB Mark:

You must first erase its corresponding waypoint. Place the cursor on the MOB mark, then press the [CLEAR] key followed by pushing the [ENTER] knob to erase the waypoint. Then, repeat to erase the MOB mark.



## OPERATIONAL SETUP

### Anchor Watch Alarm

- 1 Press the [ALARM] key to open the alarm menu.

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  - 2 Use the trackball to select ANCHOR WATCH ALARM.

---

  - 3 Press the EDIT soft key to open the anchor alarm window: ANCHOR WATCH ALARM.

---

  - 4 Use the trackball to select ON. This will not show on the screen.

---

  - 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. This step is invisible.

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  - 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.



*Anchor watch alarm window*

# OPERATIONAL SETUP

## Select Data Boxes

- 1 Operate trackball and place cursor inside a data box you wish to move.
- 2 Press [ENTER] knob and the cursor enters the box and changes to a hand.
- 3 Press the knob again and the hand changes to a fist. The data box is now draggable.
- 4 Operate the trackball and drag the data box to its desired location.

### CAUTION

Data boxes can cover up information and should be used sparingly.  
If a data box is obscuring a desired object, you may temporarily erase the box by setting D. Box to OFF.

- 5 Press [ENTER] knob to set data box in place.



## OPERATIONAL SETUP

### Securing the SINS

- ① Press GPS Navigation [POWER] key until the screen goes dark.
- ② Press Radar/Display [POWER/BRILL] key until the screen goes dark.
- ③ Press Fathometer [POWER] key until the screen goes dark.  
**Note:** A 3-second countdown will be displayed on the screen.
- ④ Place hard cover over LCD screen.



# RADAR OPERATION

## Transmitting

- 1 Confirm that the network radar is plugged in.
- 2 Press the **[DISP]** key to select a radar display.
- 3 Press the **[POWER/BRILL]** key momentarily.
- 4 Press the **RADAR STBY** soft key to highlight **TX** on its label.
- 5 Press the **RETURN** soft key.

### **Standby Mode:**

When the radar picture is not required, but you want to keep it in a state of readiness, press the RADAR TX soft key to highlight STBY on its label.



# RADAR OPERATION

## Tuning the Radar

1 Press the [MENU] key to display the main menu.

2 Press the RADAR DISPLAY SETUP soft key.



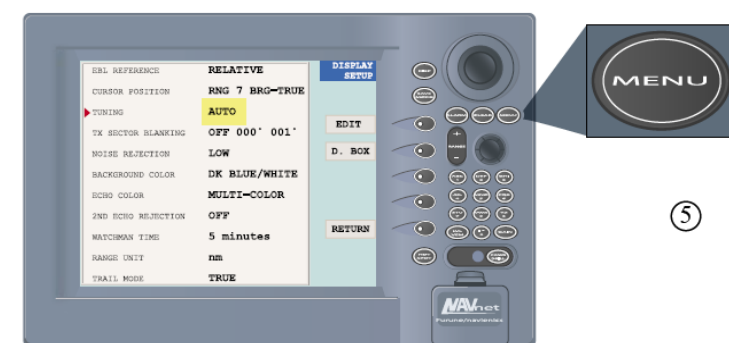
3 Select TUNING and then press the EDIT soft key.



4 Select AUTO (manual) setting.

**Note:** Radar should remain in AUTO Tune and NOT Manual.

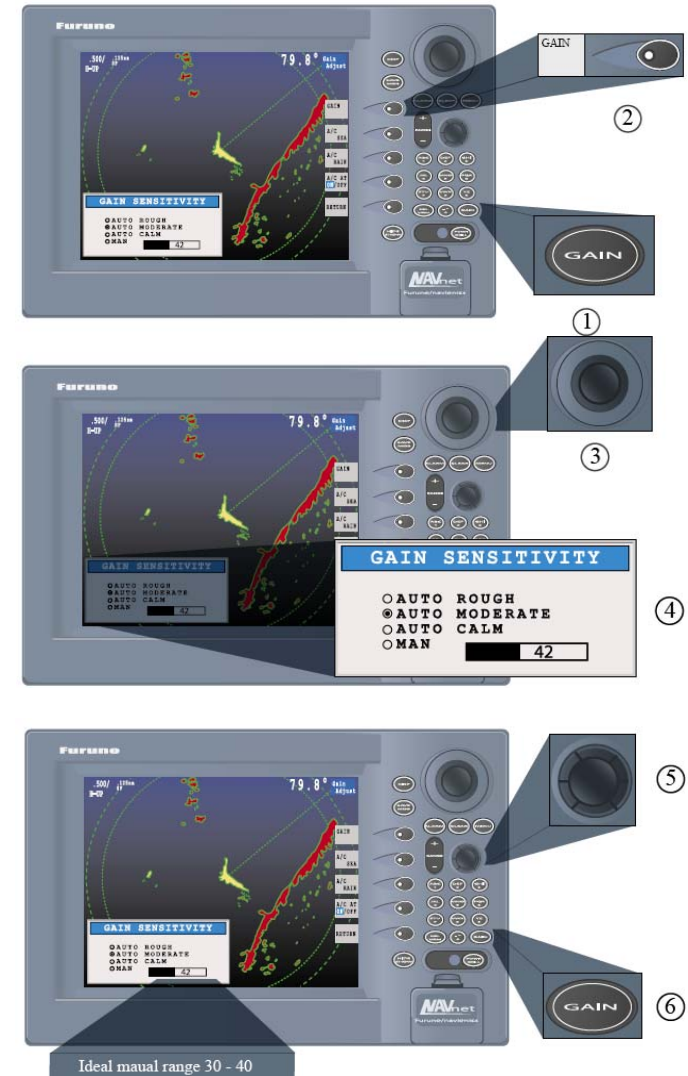
5 Press the [MENU] key to close menu.



# RADAR OPERATION

## Adjusting the Gain

- ① Depress [GAIN] key.
- ② Depress GAIN soft key to show the gain sensitivity setting window.
- ③ Use trackball to select Auto Rough, Auto Moderate, Auto Calm, or Manual, as appropriate.  
**Note:** For normal operation, recommend Auto-Set (Moderate). If Manual setting selected, go to 24-mile range and increase Gain until background speckle is seen on the farthest edge.
- ④ Select an Auto option according to the sea state.
- ⑤ For manual adjustments, rotate [ENTER] knob to adjust, while observing radar echo.  
**Note:** Use [ENTER] knob to manually adjust to the ideal manual range of between (30-40) and press return.
- ⑥ Press the [GAIN] key on the front panel or the RETURN soft key to finish.



# RADAR OPERATION

## Adjusting the Range

The range setting determines the size of the area (in nautical miles) that will appear on your display. In addition, the range setting will also automatically adjust the range ring interval so that accurate range measurements may be made while operating on any range setting. The range, range ring interval, and pulse length appear at the top left-hand corner of the display.

- 1 Press the [RANGE (+ or -)] key to change the range scale.

**Note:** Range and scale are used interchangeably.

- 2 Radar range/plotter display will require constant adjustment due to operational environment.



Range Scales (nm):

Range	0.125	0.25	0.5	0.75	1	1.5	2	3	4	6	8	12	16	24	36	48
Ring Interval	0.0625	0.125	0.125	0.25	0.25	0.5	0.5	1	1	2	2	3	4	6	12	12
No. of Rings	2	2	4	3	4	3	4	3	4	3	4	4	4	4	3	4

# RADAR OPERATION

## Radar Presentation Mode

1 If not displayed, press the [HIDE/SHOW] key to show the radar soft keys.

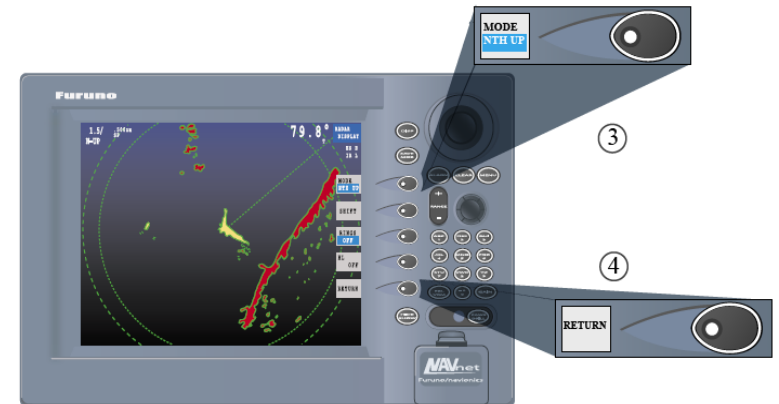
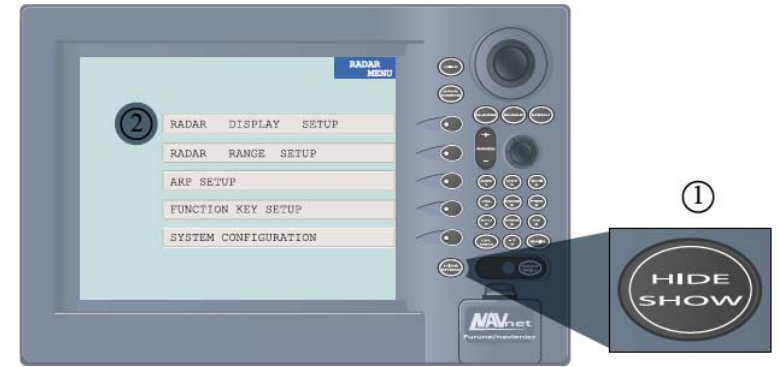
2 Press RADAR DISPLAY soft key to show the soft keys.

3 Press the desired MODE soft key. Each pressing of the key changes the presentation mode and the presentation mode indication in the sequence of North-up, True Motion, Head-up, and Course-up.

Function	Indicator on display	Soft key label
North-up	N-UP	NTH UP
Head-up	H-UP	HD UP
Course-up	C-UP	CSE UP

**Note:** Heading data is required for modes other than head-up.

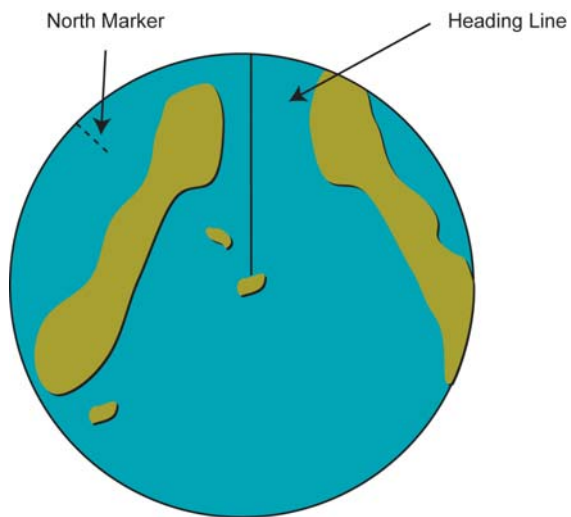
4 Press the RETURN soft key to finish. Note: When heading data is lost, the presentation mode automatically goes to Head-up; the heading indication at the screen top shows "- - .-□" and the audio alarm sounds. Press the [ALARM] key. "HEADING DATA MISSING" appears. Restore compass signal to show heading indication. Use the MODE soft key to select presentation mode if necessary. The audio alarm may be silenced with the [CLEAR] key.



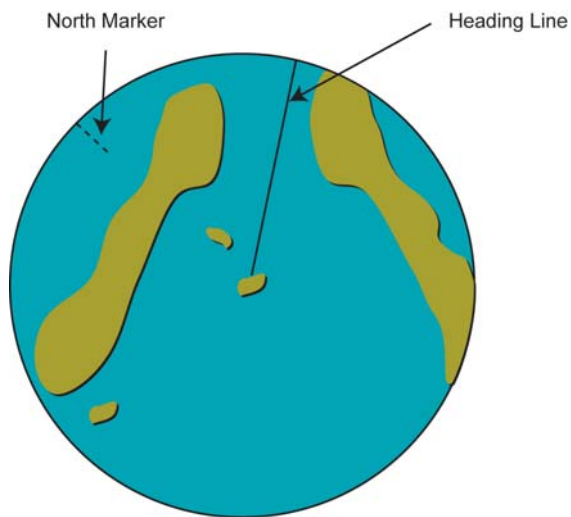
# RADAR OPERATION

## Radar Presentation Mode Figures

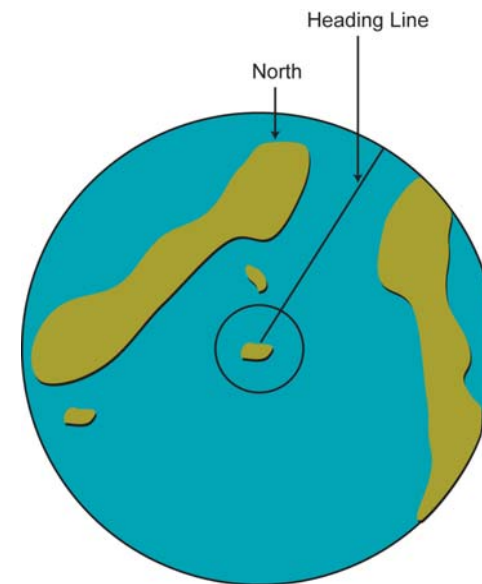
① Head-up Display



② Course-up Presentation Mode



③ North-up Presentation Mode

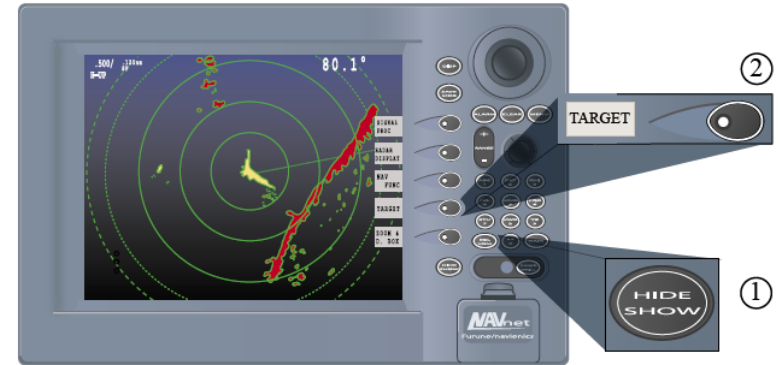


# RADAR OPERATION

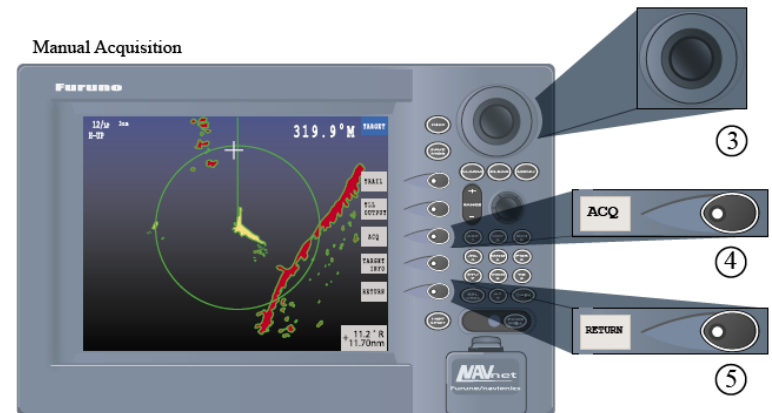
## Manually Acquire Target on Radar

- 1 If not already shown, press the [HIDE/SHOW] key to show the radar soft keys.
- 2 Press the TARGET soft key.
- 3 Operate trackball and place the cursor on the target to acquire.
- 4 Press the ACQ soft key.
- 5 Press the RETURN soft key to finish.

Manual Acquisition



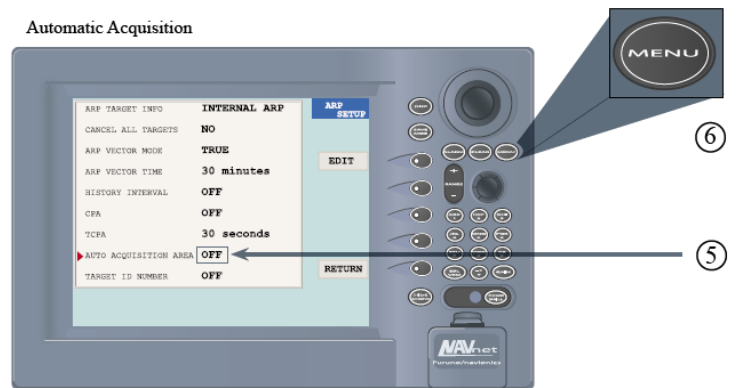
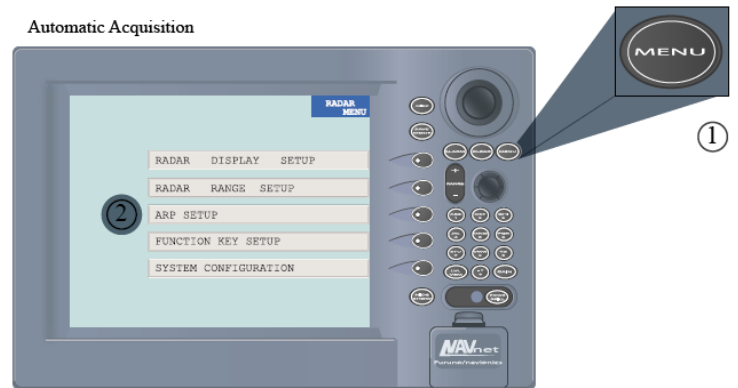
Manual Acquisition



# RADAR OPERATION

## Automatically Acquire Target on Radar

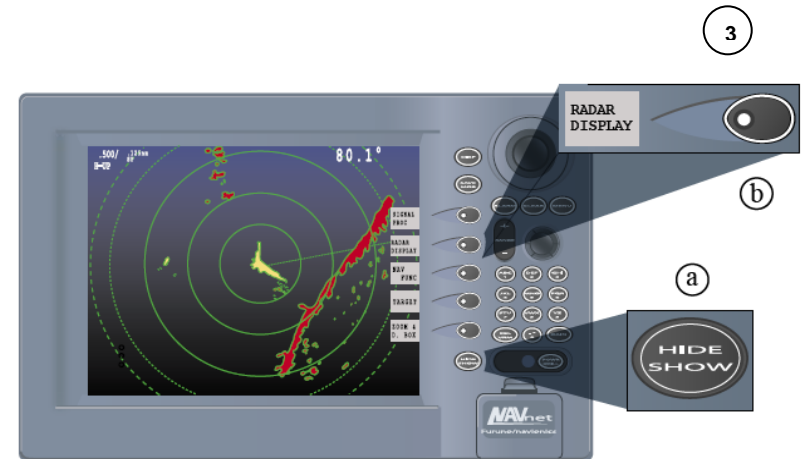
- 1 Press the [MENU] key to show the main menu.
- 2 Press the ARP SETUP soft key to show the ARP SETUP menu.
- 3 Operate the trackball to select AUTO ACQUISITION AREA.
- 4 Press the EDIT soft key to show the automatic acquisition area window.  
**Note:** An acquisition is an area of 2.0 to 2.5 miles in range and  $\pm 45^\circ$  on either side of the heading line in bearing appears.
- 5 Select On, then press the ENTER soft key.
- 6 Press the [MENU] key to close the menu.



# RADAR OPERATION

## Measure Range by Range Rings

- 1 The distance between each range ring is shown in NM in the top left corner next to the radar scale.
- 2 Check the range ring interval and judge the distance of the echo from the inner edge of the nearest ring.  
**Note:** There are three ways to measure the range to a radar target: by the range rings, by the cursor, and by the VRM (Variable Range Marker).
- 3 To turn the range rings on, do the following:
  - a. If not displayed, press the [HIDE/SHOW] key to show the radar soft keys.
  - b. Press the RADAR DISPLAY soft key.
  - c. Press the RINGS soft key to turn the rings on and select desired brilliance. The settings are Low, Medium, High, Off.
- 4 Press the RETURN soft key to finish

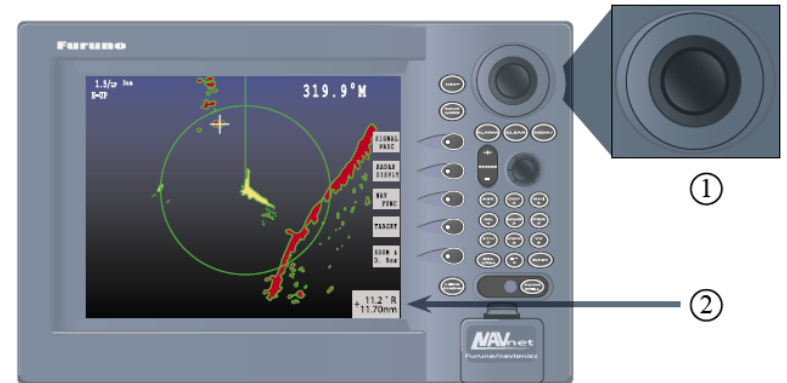




# RADAR OPERATION

## Measure Range by Cursor

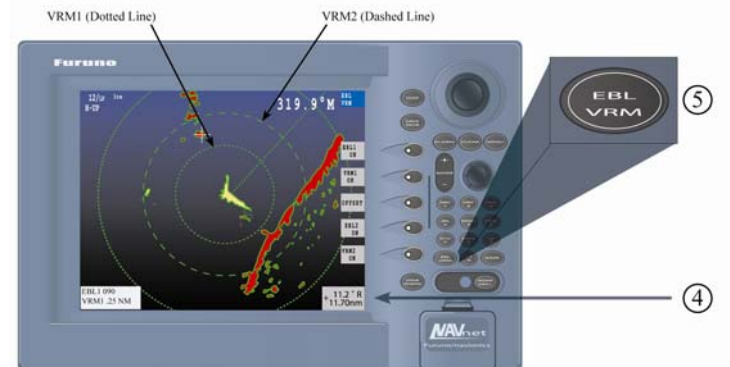
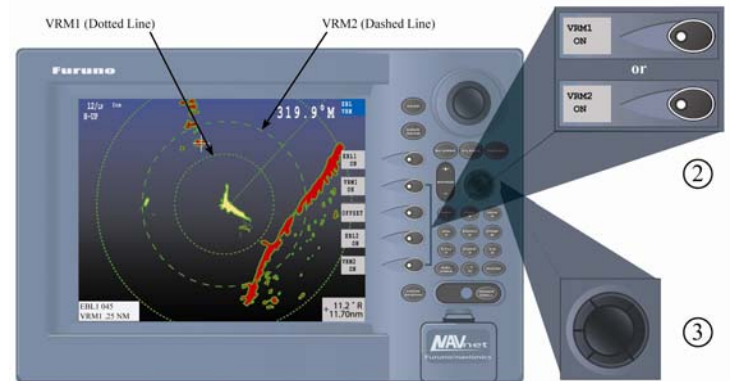
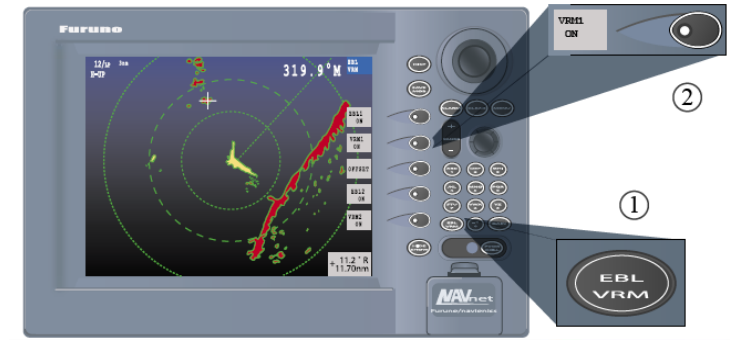
- 1 Operate the trackball to place the cursor intersection on the inside edge of the radar target.
- 2 The range to the target, as well as the bearing, appears to the right of "+" at the bottom of the display.



# RADAR OPERATION

## Measure Range by VRM

- 1 Press [EBL/VRM] key to display the EBL/VRM soft keys.
- 2 Press the VRM1 ON (dotted ring VRM) or VRM2 ON (dashed ring VRM) soft key to select the desired VRM.  
**Note:** The selected VRM's indication, at the bottom of the screen, is highlighted.
- 3 Rotate the [ENTER] knob then place the VRM on the inside edge of a radar target.
- 4 Read the VRM indication to find range to the target.
- 5 You may hide the EBL/VRM soft keys by pressing the [EBL/VRM] key.

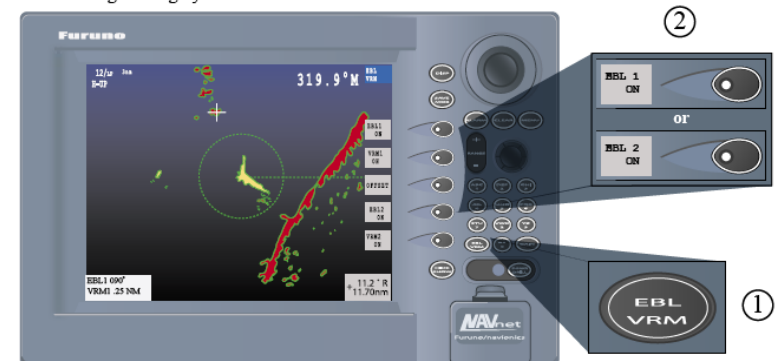


# RADAR OPERATION

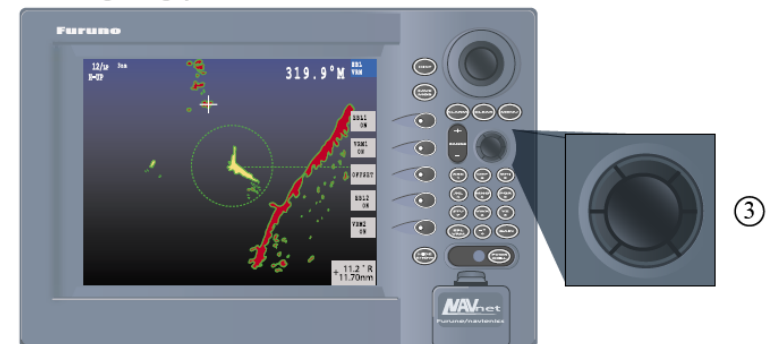
## Measure Bearing

- 1 Press [EBL/VRM] key.
- 2 Press the EBL1 ON (dotted line EBL) or EBL2 ON (dashed line EBL) soft key to select the desired EBL.
- 3 Rotate the [ENTER] knob to bisect the radar target with EBL.
- 4 Read the EBL indication to find the bearing to the target.
- 5 You may hide the EBL/VRM soft keys by pressing the [EBL/VRM] key.  
**Note:** The bearing to a target may be shown relative to own ship's heading (Relative), or True bearing (requires heading data).
- 6 To remove each box, press CLEAR for each box to be removed.

Measuring bearing by EBL



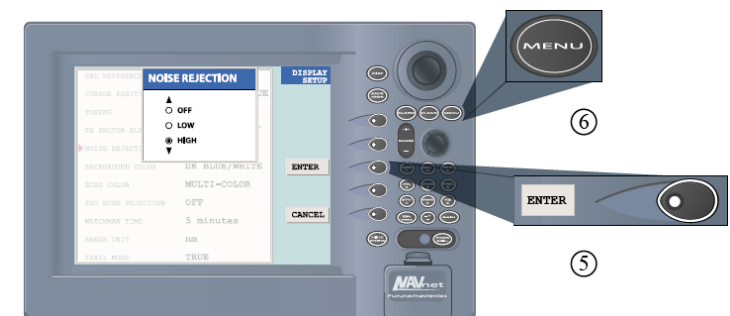
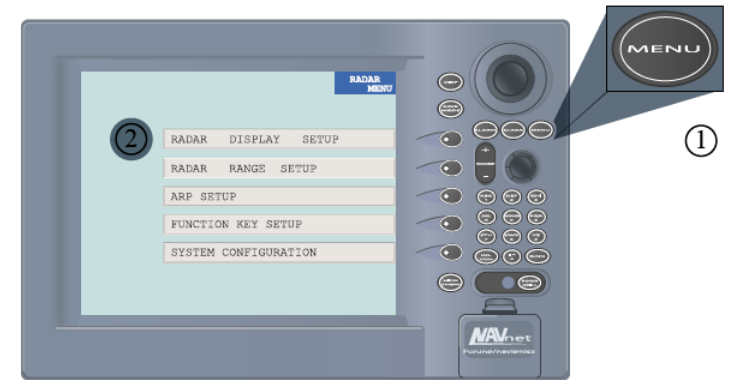
Measuring bearing by EBL



# RADAR OPERATION

## Reducing Noise Interference

- 1 Press the [MENU] key to open the menu.
- 2 Press the RADAR DISPLAY SETUP soft key.
- 3 Select NOISE REJECTION, then press the EDIT soft key.
- 4 Select OFF, LOW, or HIGH, as appropriate.
- 5 Press the ENTER soft key.
- 6 Press the [MENU] key to close the menu.



# RADAR OPERATION

## Rejecting Radar Interference

1 If not displayed, press the [HIDE/SHOW] key to show the radar soft keys.

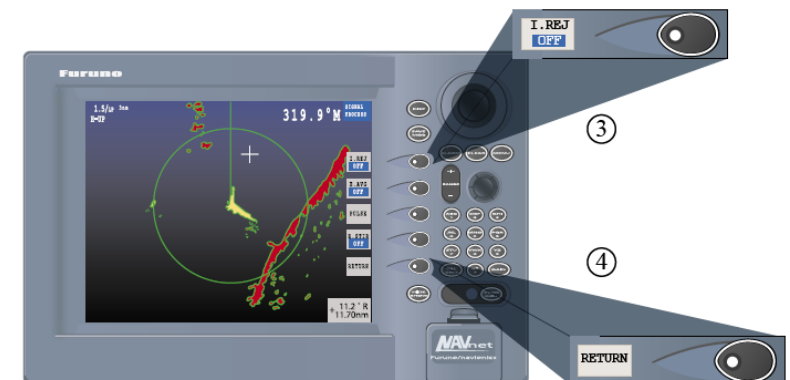
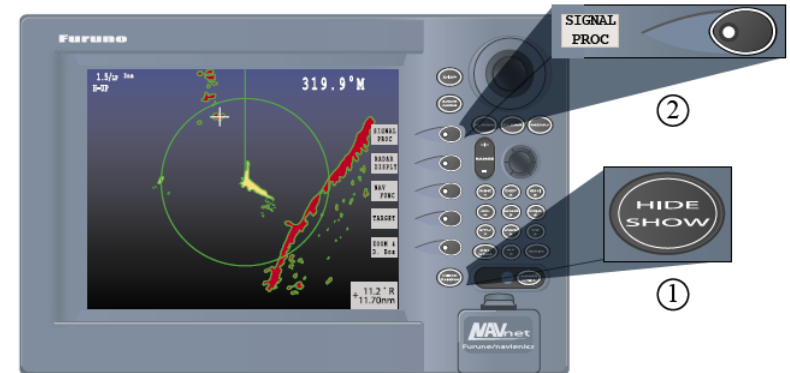
2 Press SIGNAL PROC soft key.

3 Press the I. REJ soft key successively to choose the interference rejection level desired, LOW, MED, HIGH, or OFF.

**Note:** For optimal operation, the following set-up is recommended:

- (1) REJ = Low
- (2) AVG = Off
- (3) STR = Low

4 Press the RETURN soft key to finish.



# RADAR OPERATION

## Zoom in on Target

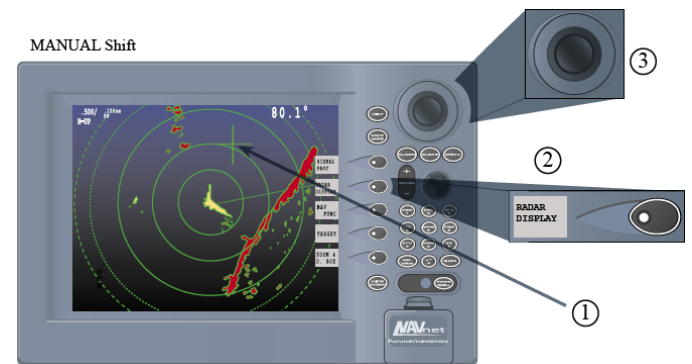
- 1 If not displayed, press the [HIDE/SHOW] key to show the radar soft keys.
- 2 Use the trackball to set the cursor where you want to zoom.  
**Note:** SINS must be in full radar screen view to enable zoom.
- 3 Press the ZOOM & D. BOX soft key to show ZOOM & D. BOX soft keys.
- 4 Press the Zoom ON/OFF soft key to select ON. A solid circle, called the "zoom circle," appears on the display.
- 5 To release the cursor, press the CURSOR FLOAT soft key.
- 6 To relocate the zoom circle, select location with the trackball, then press the CURSOR LOCK key.
- 7 To quit the zoom function, press the ZOOM ON/OFF soft key to select OFF.



# RADAR OPERATION

## Manually Shift Picture

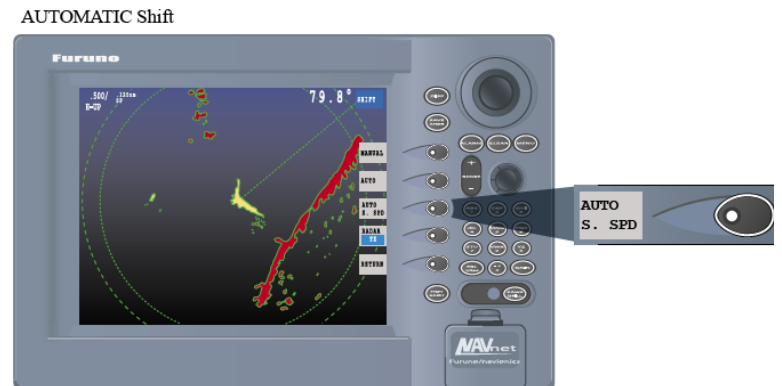
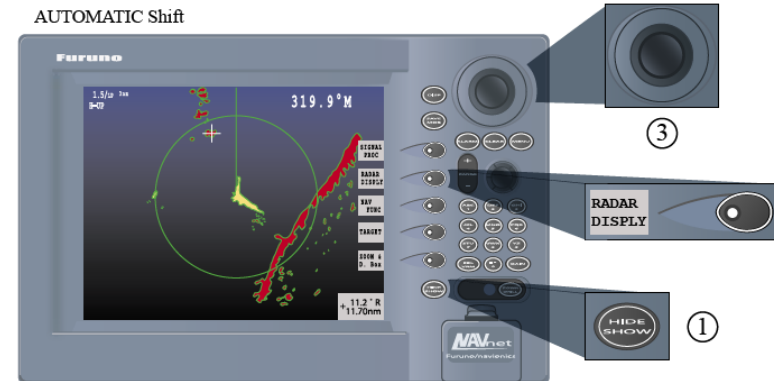
- 1 Locate the cursor anywhere within the effective radius of the display.
- 2 Press RADAR DISPLAY soft key.
- 3 Operate trackball to move cursor to shift position. The cursor will shift towards the cursor crosshairs.
- 4 Press the SHIFT soft key.
- 5 Press the MANUAL soft key.
- 6 Press OFF to clear screen.



# RADAR OPERATION

## Automatic Shift Picture

- 1 If not displayed, press the [HIDE/SHOW] key to show the radar soft keys.
- 2 Press RADAR DISPLAY soft key.
- 3 Operate trackball to move cursor to shift position.
- 4 Press the AUTO S. SPD soft key to display the auto ship speed setting window.

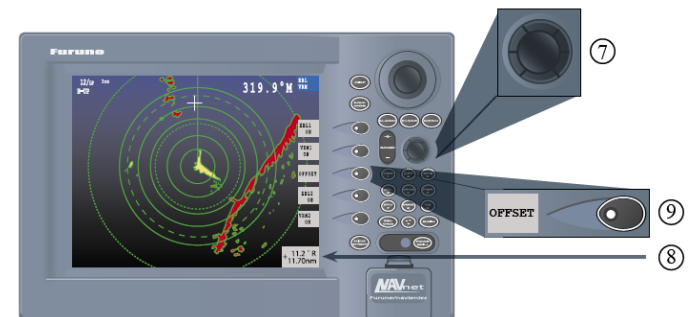
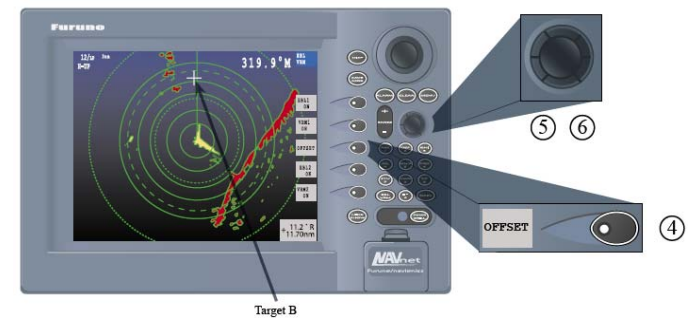
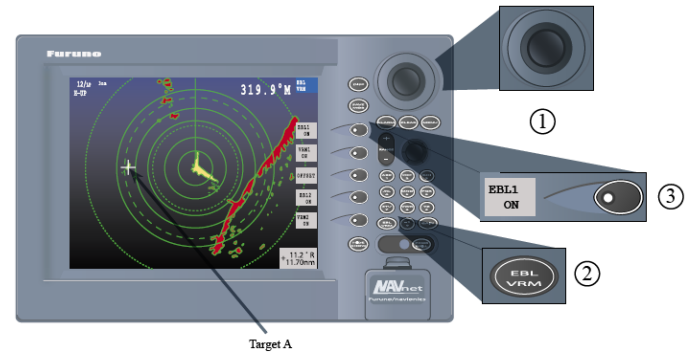




# RADAR OPERATION

## Measure Range and Bearings between Two Targets

- 1 Operate the trackball to place the cursor on the target "A."
- 2 Press the [EBL/VRM] key to show the EBL/VRM soft keys.
- 3 Press the EBL1 ON soft key to turn on the EBL1.
- 4 Press the OFFSET soft key. The origin of the EBL1 moves to the cursor position which is marked with an "X."
- Note:** VRM placed on target "B."
- 5 Rotate the [ENTER] knob so the EBL bisects the target "B."
- 6 Push the [ENTER] knob, then press the VRM1 ON soft key.
- 7 Rotate the [ENTER] knob to place the VRM1 on the inner edge of the target "B."
- 8 Look at the indications for VRM1 and EBL1 to find the range and bearing between the two targets.
- 9 To cancel the OFFSET EBL, press the OFFSET soft key.
- 10 Pushing the CLR button will turn off the EBL/VRM.

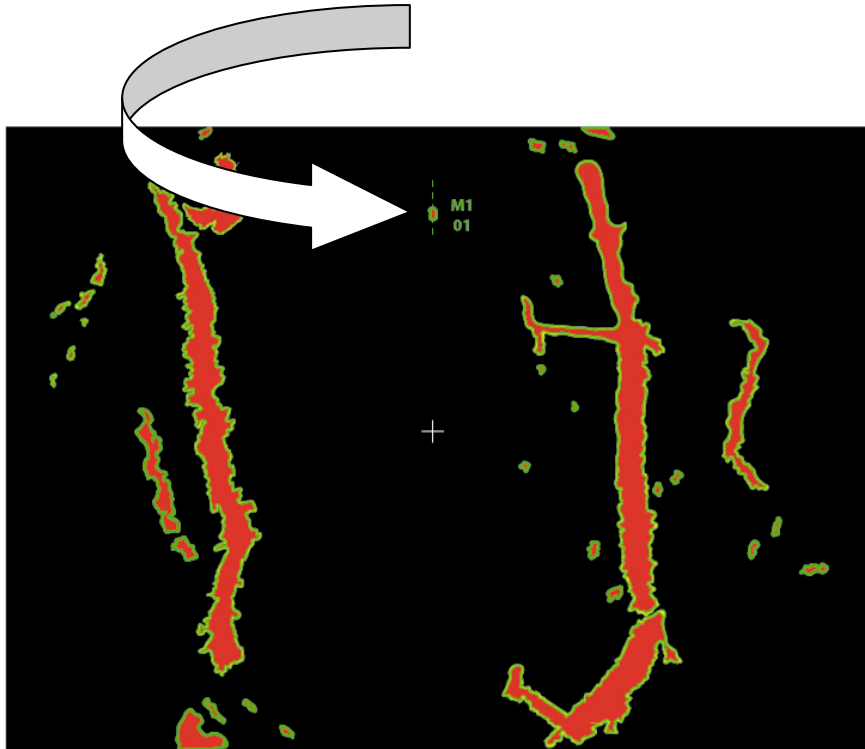


# RADAR OPERATION

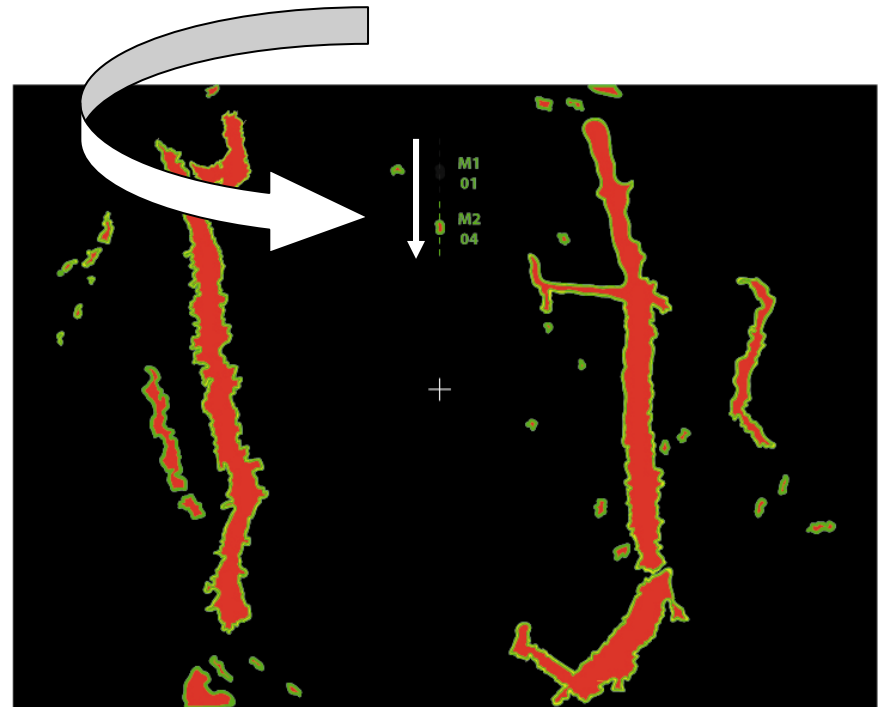
## Head-on Situation Radar Display

In the following screen captures from a SINS Radar display, we will show a vessel progression on the radar scope for determining a **head-on** situation. Your position is the white cross in the middle of the screen. You are on a course of 000°T. You are underway but maintaining station (drifting). You are in a head-on situation with the other vessel. The white arrow represents the relative motion line (RML) line for the vessels. The white arrow showing the RML will not be indicated on the radar scope. (cont.)

- ① Contact first acquired. Mark as "M1" and put the time in minutes you acquire it. With the first mark, you cannot tell if this is an overtaking situation by you, or a Head-On situation.



- ② Three minutes later, acquire the contact again and Mark as "M2" and put time in minutes acquired. The first mark can still be faintly seen. The first and second mark will give you a rough idea of the RML of the contact.



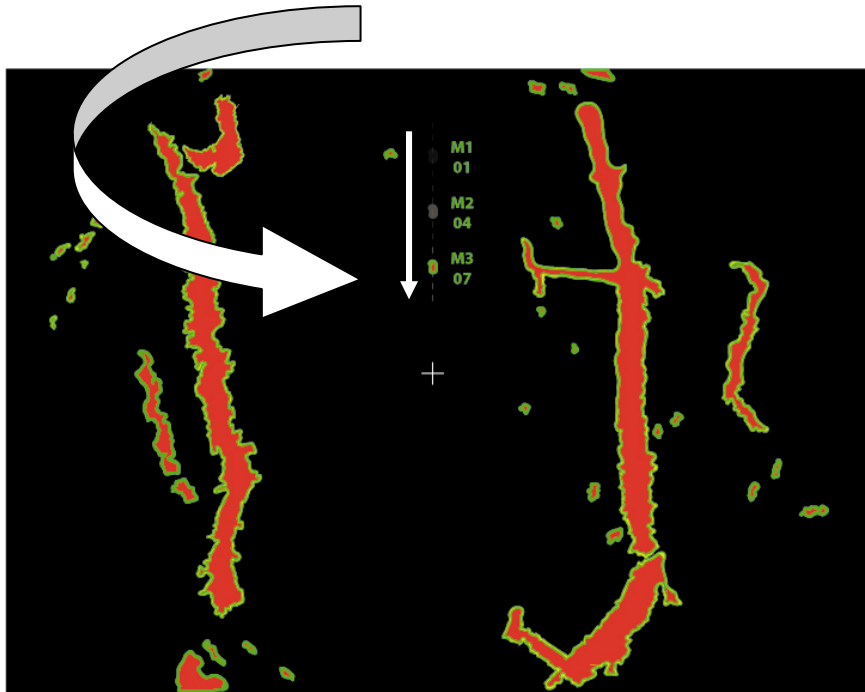
# RADAR OPERATION

## Head-on Situation Radar Display (cont.)

In the following screen captures from a SINS Radar display, we will show a vessel progression on the radar scope for determining a **head-on** situation. Your position is the white cross in the middle of the screen. You are on a course of 000°T. You are underway but maintaining station (drifting). You are in a head-on situation with the other vessel. The white arrow represents the relative motion line (RML) line for the vessels. The white arrow showing the RML will not be indicated on the radar scope. (4 images total)

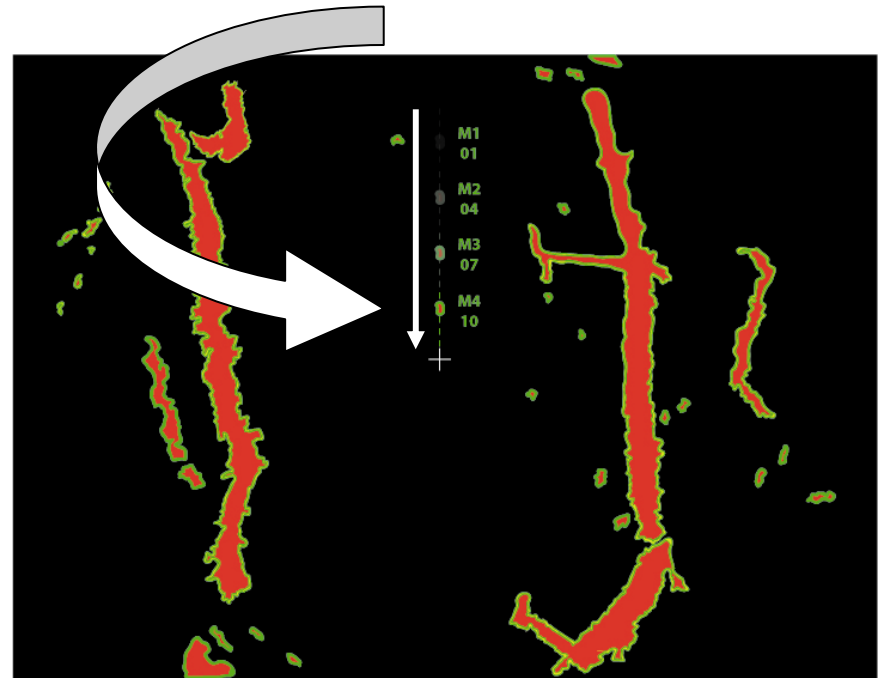
3

Three minutes later, acquire the contact again and Mark as "M3" and put time in minutes acquired. The first and second mark can still be faintly seen. The first, second, and third mark will give you a better idea of the RML of the contact. This RML indicates a contact that is in a head-on situation with your vessel.



4

Three minutes later, acquire the contact again and Mark as "M4" and put time in minutes acquired. The first, second, and third mark can still be faintly seen. The RML from M1 to M4 will give you a very good idea of the RML of the contact. This RML indicates a contact that is meeting your vessel head-on. This is also a constant bearing decreasing range (CBDR) situation. Speed and course changes will have to be made to avoid collision.



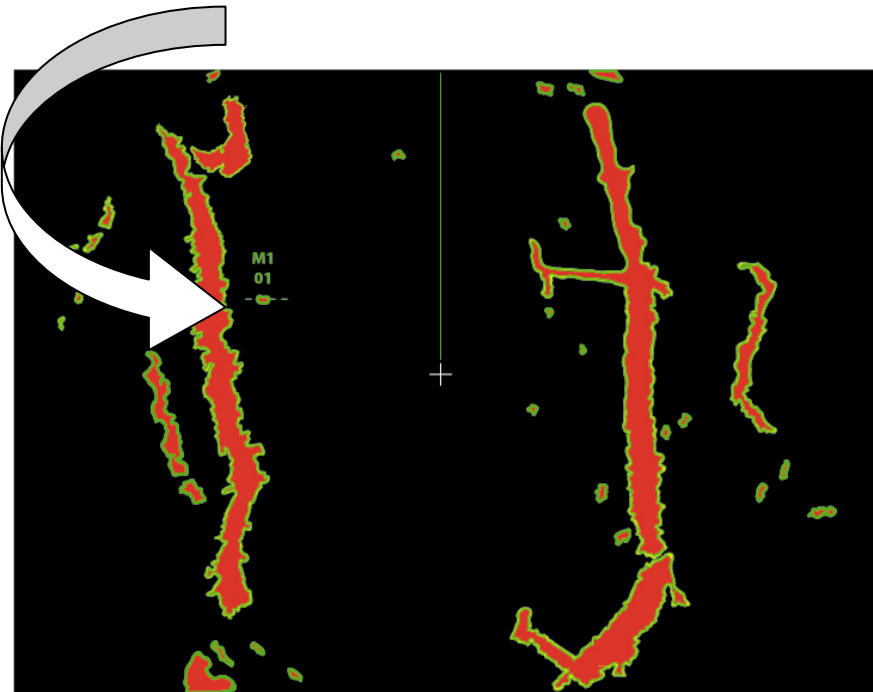
# RADAR OPERATION

## Crossing Situation Radar Display

In the following screen capture from a SINS Radar display, we will show a vessel progression on the radar scope for determining a **crossing** situation. You are on a course of 000°T. You are underway but maintaining station (drifting). You are in a crossing situation with the other vessel. The white arrow represents the relative motion line (RML) line for the vessels. The white arrow will not be indicated on the radar scope. (cont.)

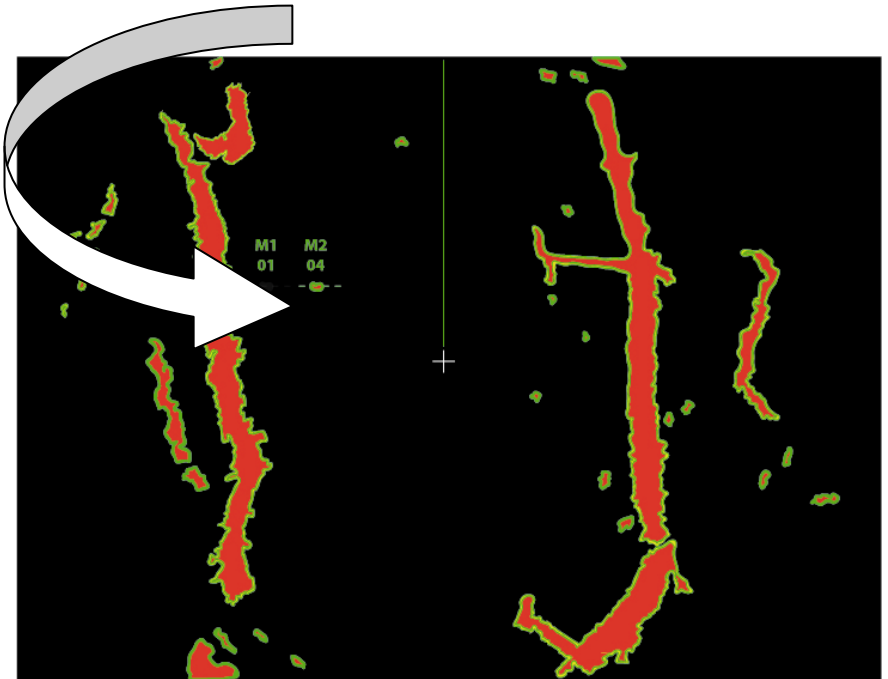
1

Contact first acquired. Mark as "M1" and put time in minutes acquired. With the first mark, you cannot tell what type of situation is unfolding.



2

Three minutes later, acquire the contact again and Mark as "M2" and put time in minutes acquired. The first mark can still be faintly seen. The first and second mark will give you a rough idea of the RML of the contact.



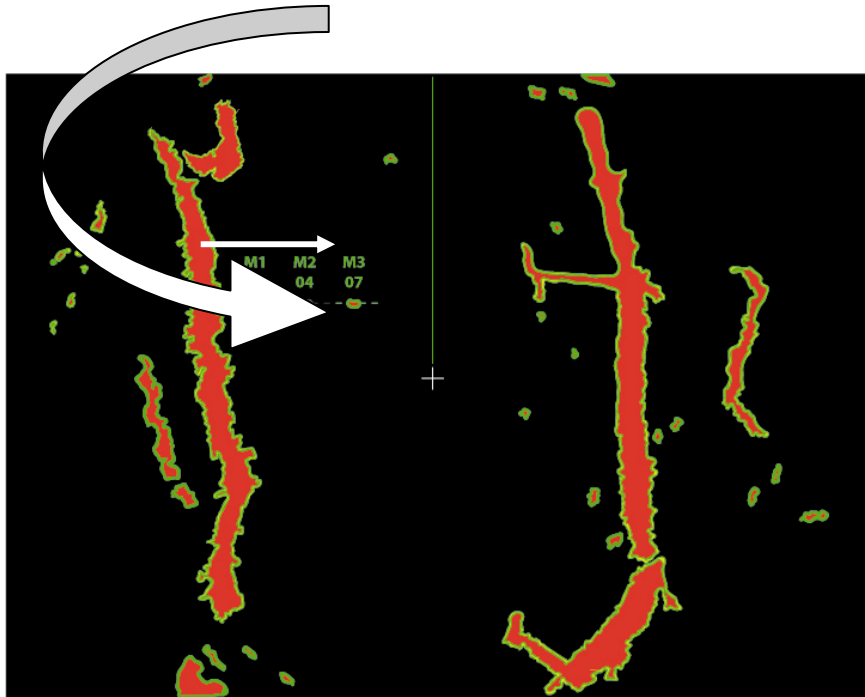
# RADAR OPERATION

## Crossing Situation Radar Display (cont.)

In the following screen capture from a SINS Radar display, we will show a vessel progression on the radar scope for determining a **crossing** situation. You are on a course of 000°T. You are underway but maintaining station (drifting). You are in a crossing situation with the other vessel. The white arrow represents the relative motion line (RML) line for the vessels. The white arrow will not be indicated on the radar scope. (4 images total)

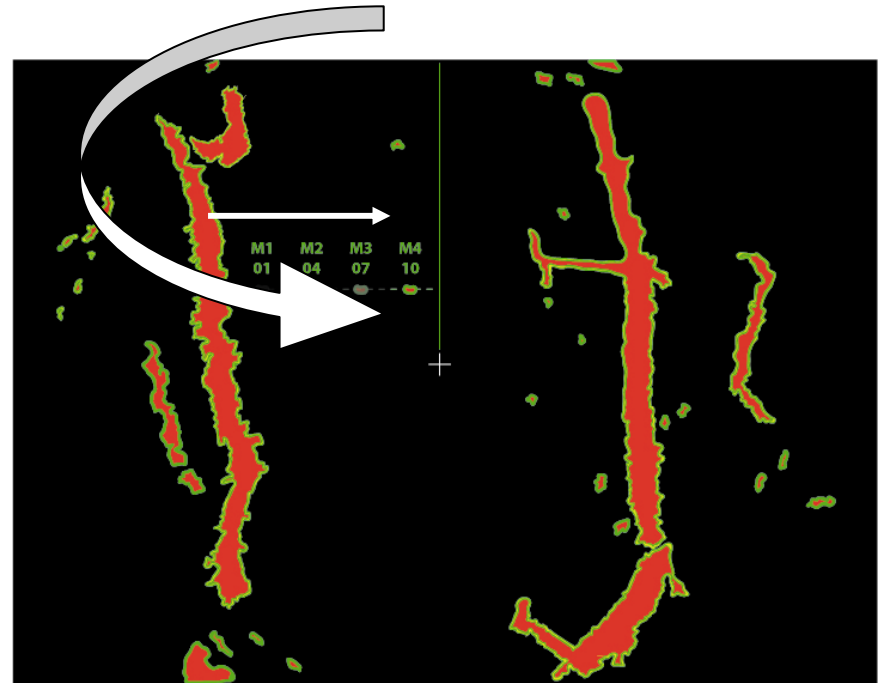
3

Three minutes later, acquire the contact again and Mark as "M3" and put time in minutes acquired. The first and second mark can still be faintly seen. The first, second, and third mark will give you a better idea of the RML of the contact. This RML indicates a contact that is in crossing situation.



4

Three minutes later, acquire the contact again and Mark as "M4" and put time in minutes acquired. The first, second, and third mark can still be faintly seen. The RML from M1 to M4 will give you a very good idea of the RML of the contact. This RML indicates a contact that is in a crossing situation. It is crossing well ahead of you and as long as you continue to drift there is low risk of collision.



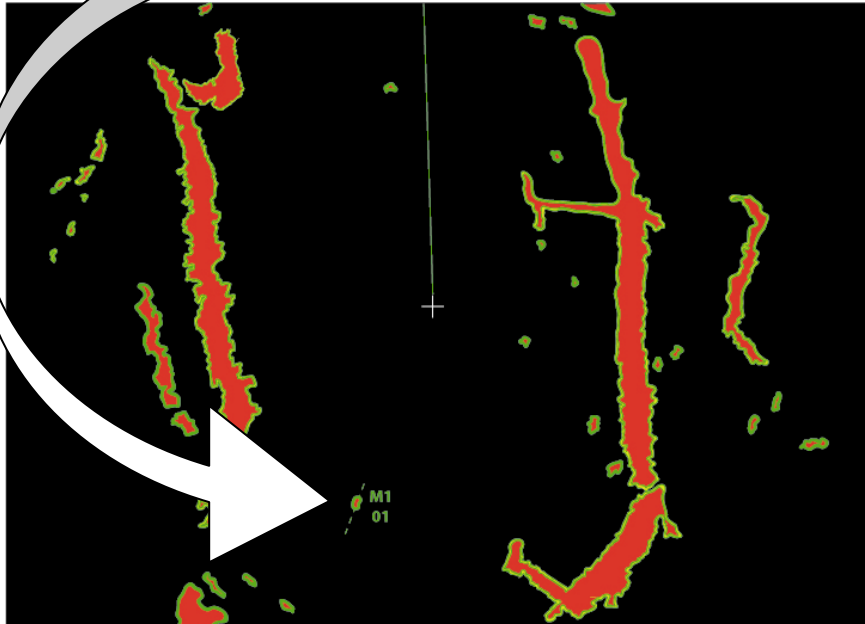
# RADAR OPERATION

## Overtaking Situation Radar Display

In the following screen captures from a SINS Radar display, we will show another vessel's progression on the radar scope for determining an **overtaking** situation. You are on a course of 000°T. You are underway, but maintaining station (drifting). You are being overtaken by the other vessel. The white arrow represents the RML line for the vessel. This white arrow is for training purposes and will not be indicated on the radar scope. (cont.)

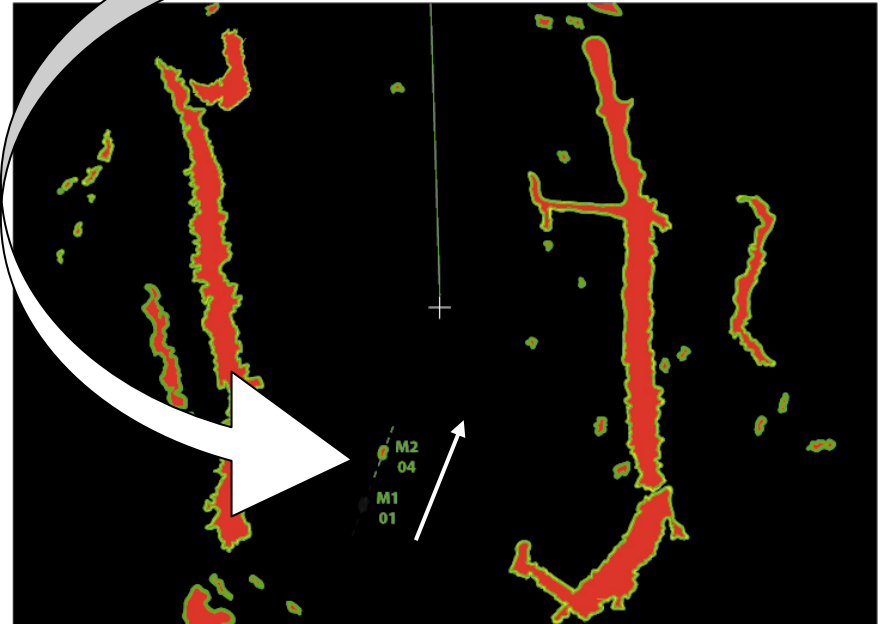
1

Contact first acquired. Mark as "M1" and put time in minutes acquired.



2

Three minutes later, acquire the contact again and Mark as "M2" and put time in minutes acquired. The first mark can still be faintly seen. The first and second mark will give you a rough idea of the RML of the contact.



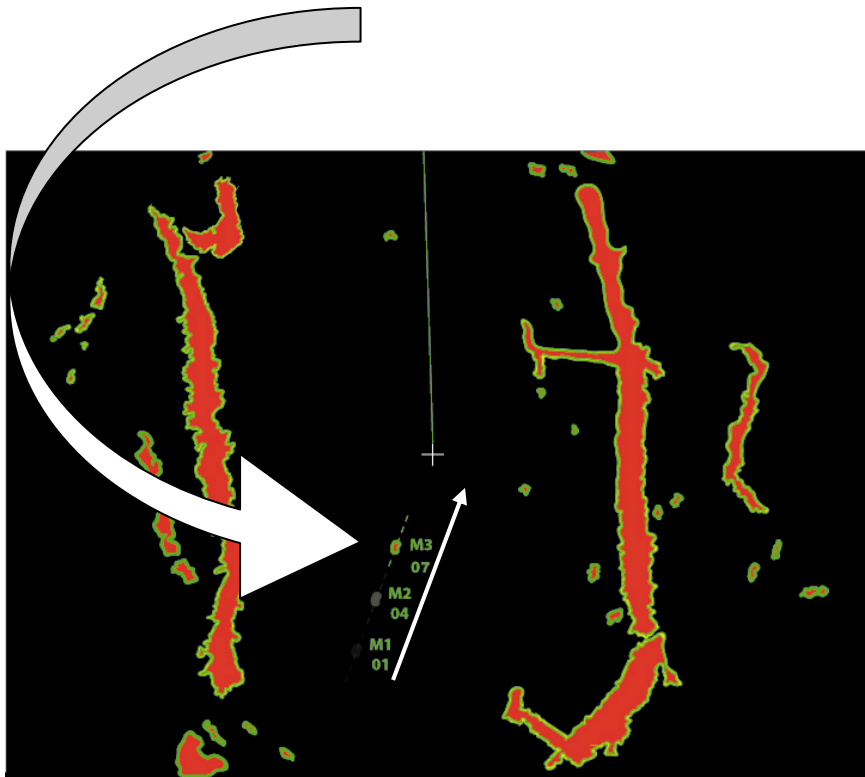
# RADAR OPERATION

## Overtaking Situation Radar Display (cont.)

In the following screen captures from a SINS Radar display, we will show another vessel's progression on the radar scope for determining an **overtaking** situation. You are on a course of 000°T. You are underway, but maintaining station (drifting). You are being overtaken by the other vessel. The white arrow represents the RML line for the vessel. This white arrow is for training purposes and will not be indicated on the radar scope. (4 images total)

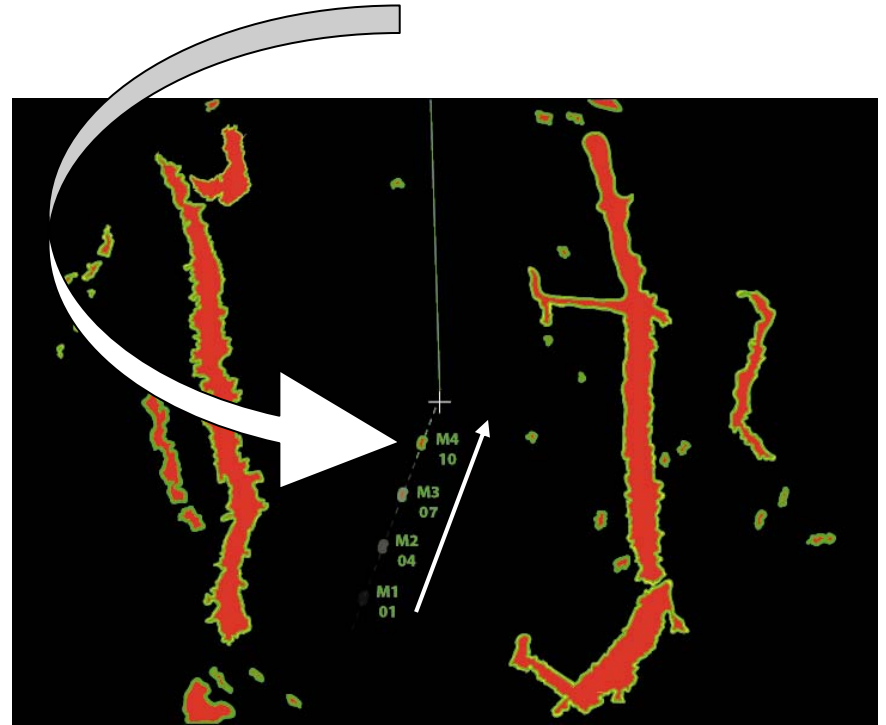
3

Three minutes later, acquire the contact again and Mark as "M3" and put time in minutes acquired. The first and second mark can still be faintly seen. The first, second, and third mark will give you a better idea of the RML of the contact. This RML indicates a contact that is overtaking your vessel.



4

Three minutes later, acquire the contact again and Mark as "M4" and put time in minutes acquired. The first, second, and third mark can still be faintly seen. The RML from M1 to M4 will give you a very good idea of the RML of the contact. This RML indicates a contact that is overtaking your vessel. This is also a constant bearing decreasing range (CBDR) situation. The other vessel must stay clear of you.



# PLOTTER OPERATION

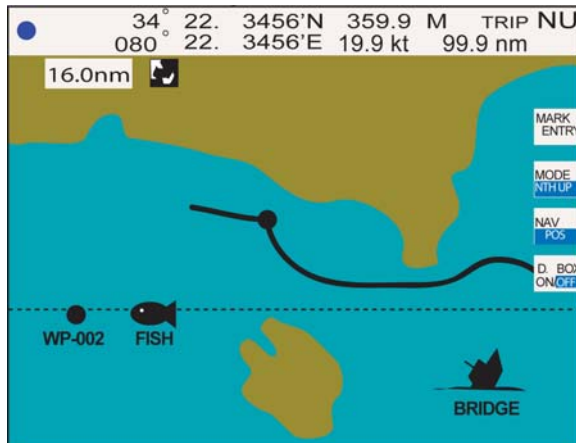
## Presentation Modes

Three types of presentation modes are provided for the **plotter display**: north-up, course-up, and auto course-up.

- 1 To change the presentation mode, press the [HIDE/SHOW] key followed by the MODE soft key.
- 2 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.

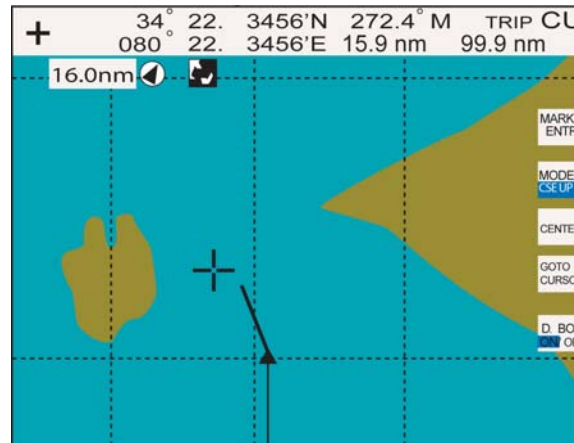
### North-up

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



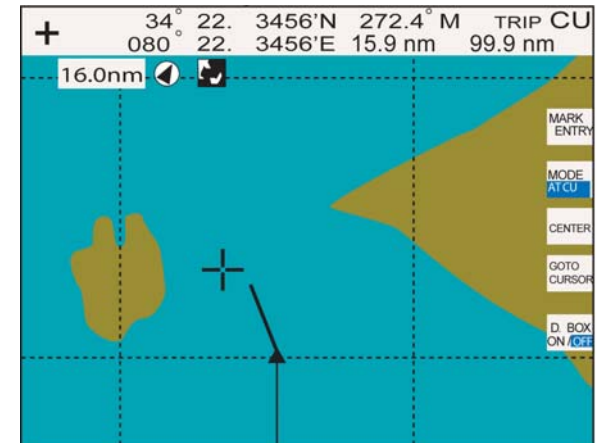
### Course-up

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 ownship's position.



### 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 ownship's position.





# PLOTTER OPERATION

## Shifting the Display | Chart Scale | Waypoints

### Shifting the Display:

- 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 ownship marker to the screen center.

### 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:

nm	0.125	0.25	0.5	1	2	4	8	16	32	64	128	256	512	1024	2048
----	-------	------	-----	---	---	---	---	----	----	----	-----	-----	-----	------	------

**Note:** When the display is expanded or shrunk beyond the range of the chart card, the message "NO CHART" appears, along with the appropriate chart icon.

### Waypoints:

In navigation terminology, a waypoint is a particular location on a voyage whether it is 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, by cursor, by range and bearing, and through the waypoint list (manual input of latitude and longitude).

#### Entering a Waypoint at Ownship Position:

Press the [SAVE/MOB] key momentarily to store your position.

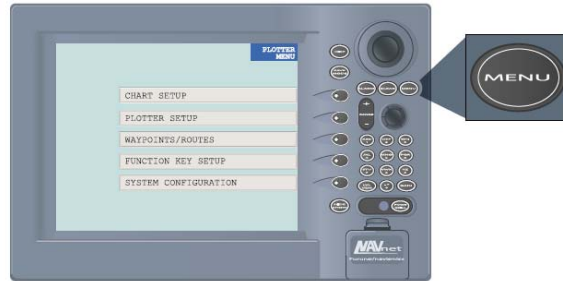
**Note:** While in radar mode, current position will be saved as a waypoint.



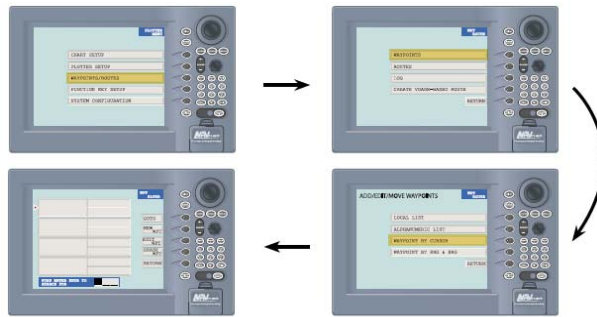
# PLOTTER OPERATION

## Entering a Waypoint by Cursor

- 1 Press the [MENU] key to open the menu.



- 2 Press the WAYPOINTS/ROUTES, WAYPOINTS, and WAYPOINT BY CURSOR soft keys.



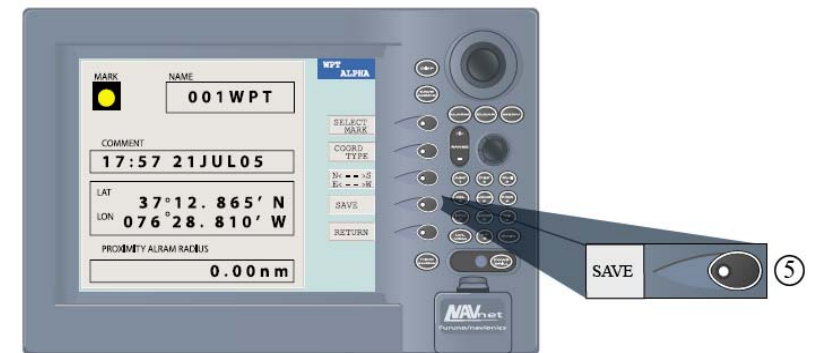
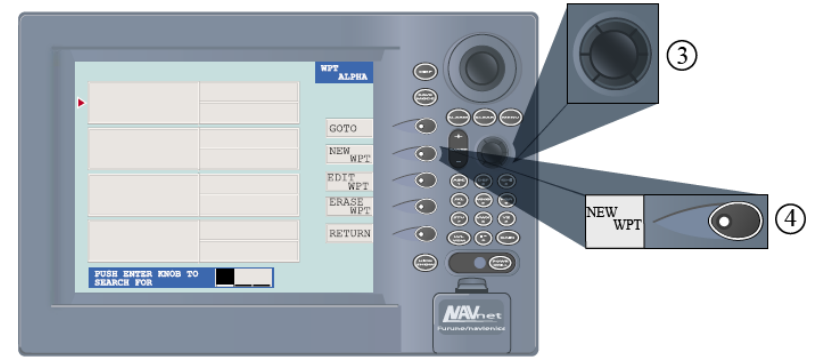
The plotter display appears.

- 3 Operate the trackball to place the cursor where you want to enter a waypoint.

- 4 Press the NEW WPT soft key.

- 5 The waypoint window appears and it shows waypoint mark shape, waypoint name, comment (default: time and date), and position of waypoint and proximity alarm radius.

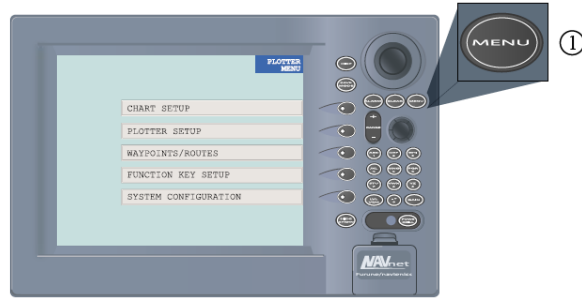
- 6 Press the SAVE soft key (if you do not need to change the waypoint data) to register the waypoint.



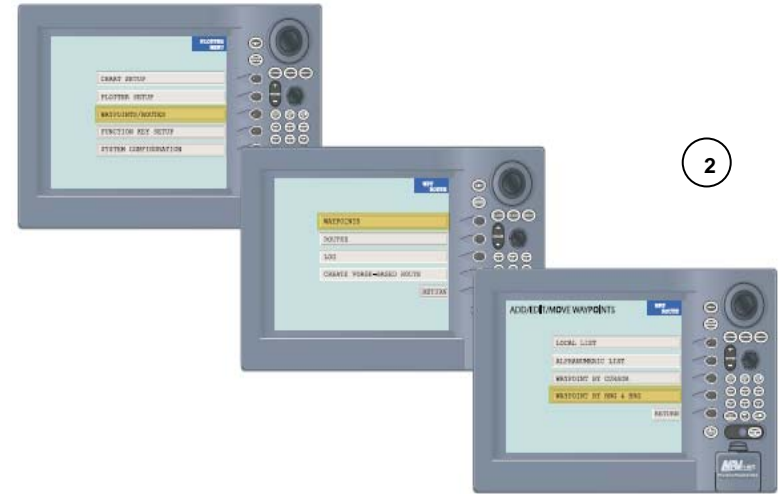
# PLOTTER OPERATION

## Entering a Waypoint by Range and Bearing

- 1 Press the [MENU] key to open the menu.



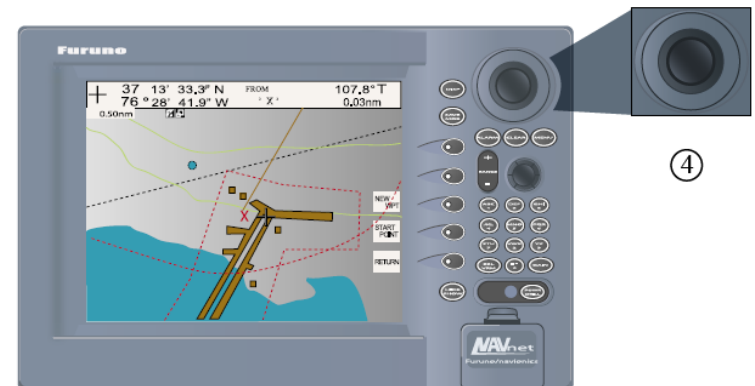
- 2 Press the WAYPOINTS/ROUTES, WAYPOINTS, and WAYPOINT BY RNG & BRG soft keys.



- 3 A red blinking X appears at ownship position, and it is the origin point for range and bearing.

- 4 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.

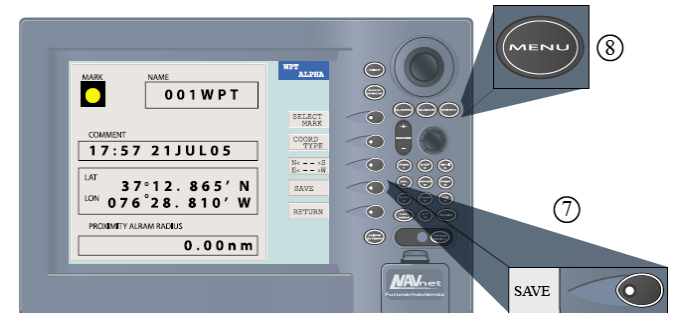
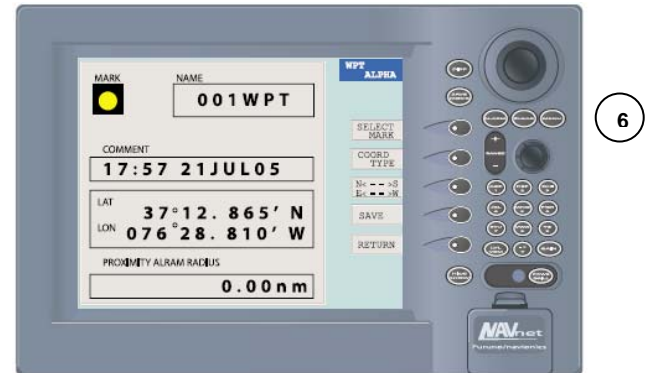


(cont.)

# PLOTTER OPERATION

## Entering a Waypoint by Range and Bearing (cont.)

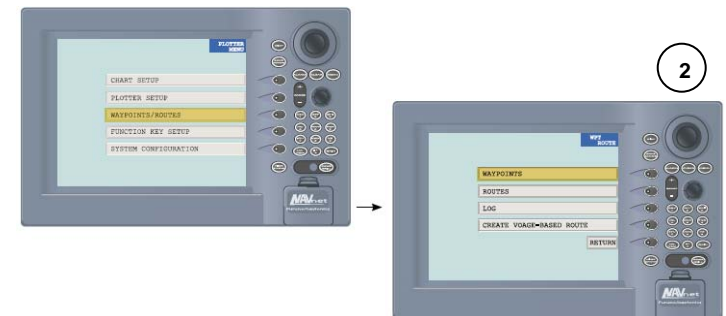
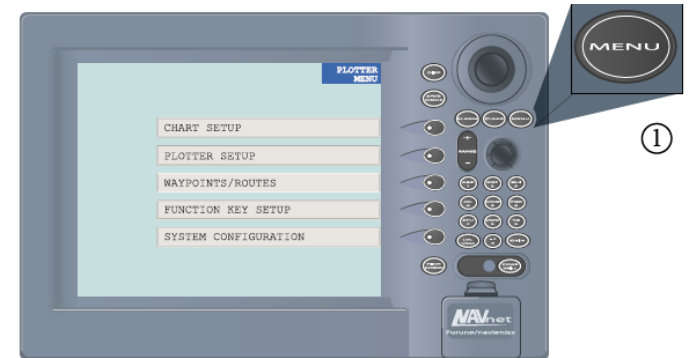
- 5 Press the NEW WPT soft key. The waypoint window appears and it shows mark shape, waypoint name, comment (default: date and time), position of waypoint, and proximity alarm radius.
- 6 If necessary, change waypoint data following the instructions from step 6 in "Entering a waypoint with the cursor" located on page 3-29 in the Furuno operator's manual.
- 7 Press the SAVE soft key to register the waypoint.
- 8 Enter another waypoint as above, or press the [MENU] key to finish.



# PLOTTER OPERATION

## Entering a Waypoint into 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 (lists waypoints in order from newest to oldest) or ALPHANUMERIC LIST (lists waypoints in ALPHANUMERIC order) soft key.

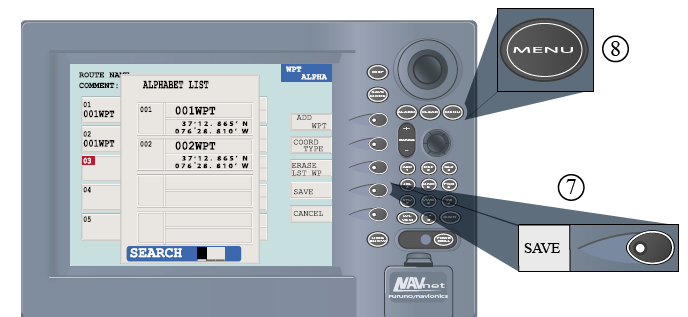
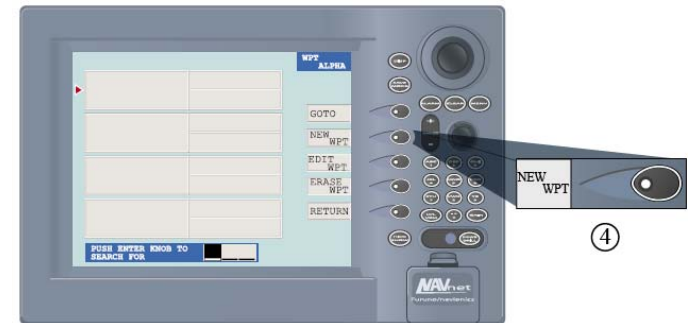


(cont.)

# PLOTTER OPERATION

## Entering a Waypoint into the Waypoint List (cont.)

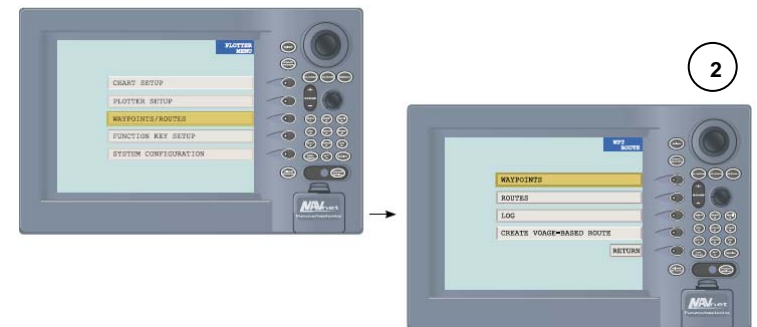
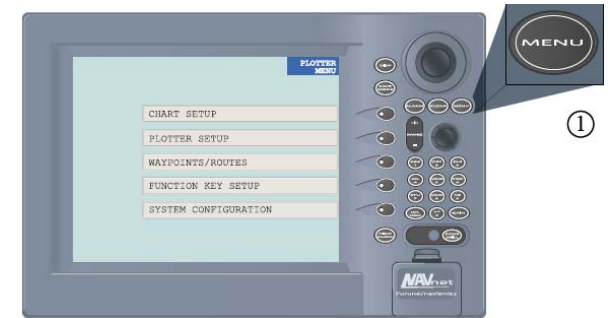
- 4 Press the NEW WPT soft key to show the waypoint window (see the figure on the previous page). Ownship position is shown in the position box.
- 5 Select the position box and enter position desired.
- 6 If necessary, change waypoint data following the instructions from step 6 in "Entering a waypoint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



# PLOTTER OPERATION

## Editing a Waypoint in the Waypoint List

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



(cont.)

# PLOTTER OPERATION

## Editing a Waypoint in the Waypoint List (cont.)

4 Use the trackball to select the waypoint you want to Edit.

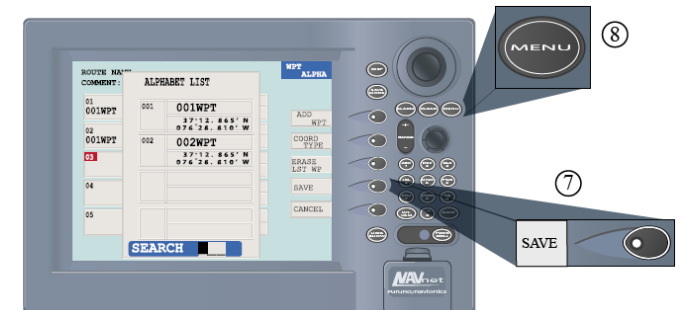
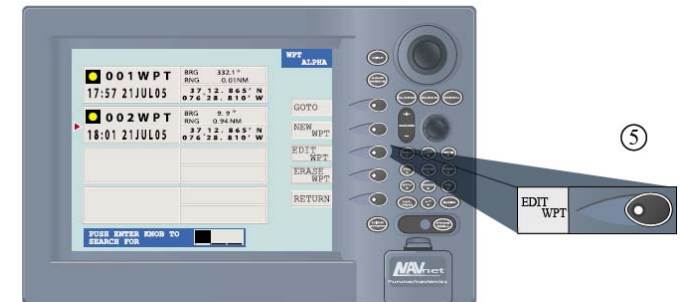
5 Press the EDIT WPT soft key.

6 Edit data as appropriate. You can change the name (six characters), comment (13 characters), L/L position, and the proximity alarm radius for a waypoint as follows:

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.)

7 Press the SAVE soft key.

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





# PLOTTER OPERATION

## Setting Plotter Alarms

- 1 Press [ALARM] key.

---

- 2 Operate the trackball to select AUDIO ALARM.

---

- 3 Press the EDIT soft key to show the audio alarm window.

---

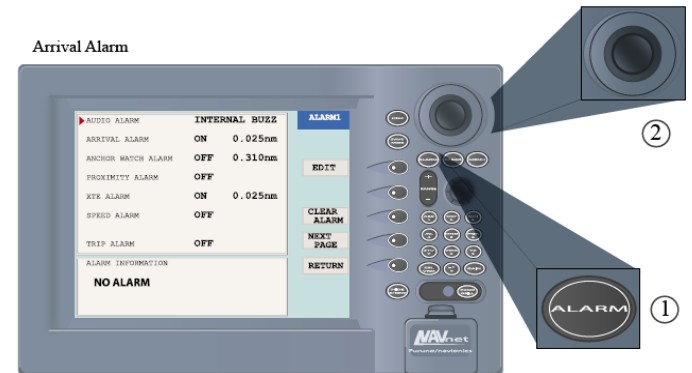
- 4 Operate the trackball to select type of alarm and alphanumeric keys to enter alarm setting.  
  
**Note:** Operate the trackball to select digits and use the alphanumeric keys to enter value.

---

- 5 Press the ENTER soft key or press the [ENTER] knob to register setting.

---

- 6 Press the [ALARM] key to finish.

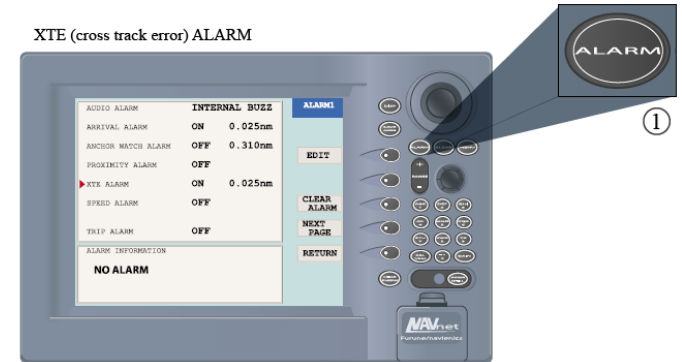


# PLOTTER OPERATION

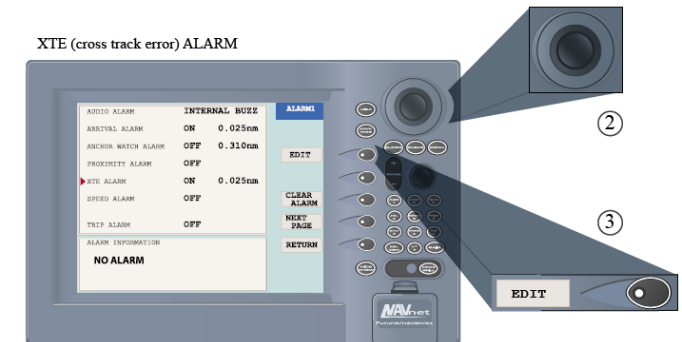
## Setting the Cross Track Error Alarm

- 1 Press the [ALARM] key to open the alarm menu.  
**Note:** Operate the trackball to select digits and use the alphanumeric keys to enter value.
- 2 Operate the trackball to select XTE ALARM.
- 3 Press the EDIT soft key to open the XTE ALARM window.
- 4 Press the ENTER soft key or push the [ENTER] knob to register setting.
- 5 Press the [ALARM] key to finish.

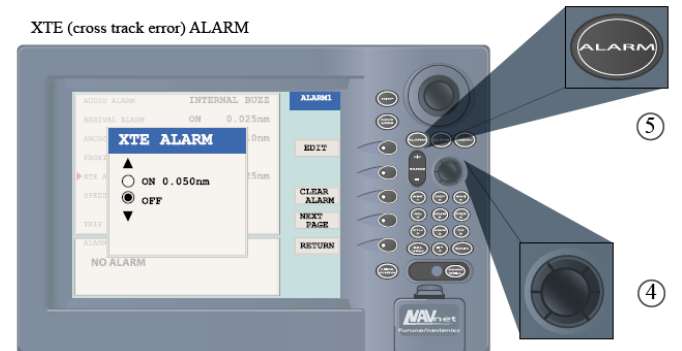
XTE (cross track error) ALARM



XTE (cross track error) ALARM



XTE (cross track error) ALARM

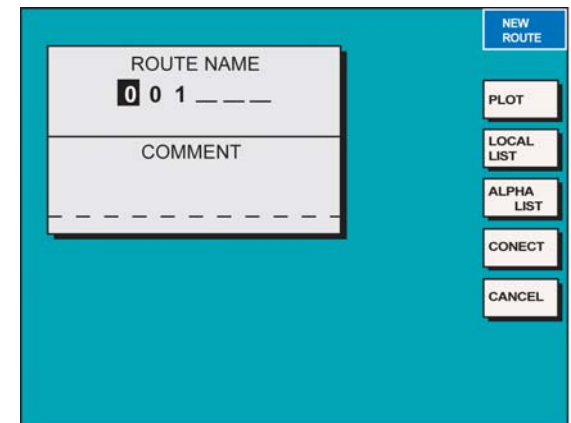
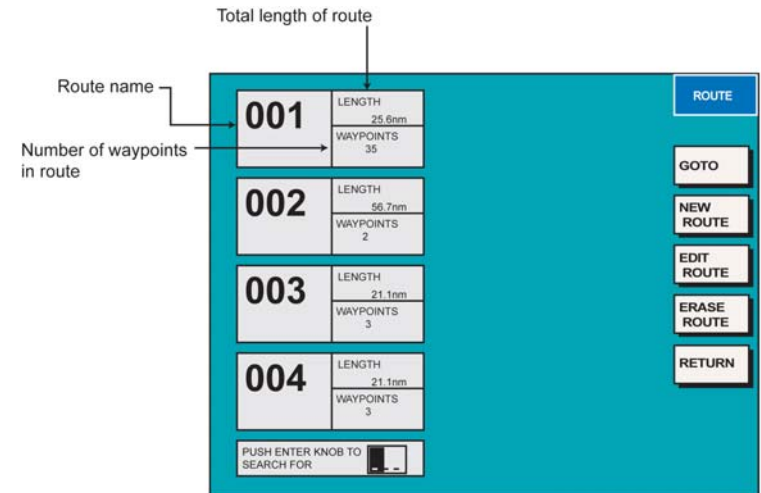


# ROUTES

## Creating Routes

Often a trip 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. Up to 200 routes can be stored; a route may have 35 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.)
- 4 Press the NEW ROUTE soft key to open the 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.



# ROUTES

## 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.  

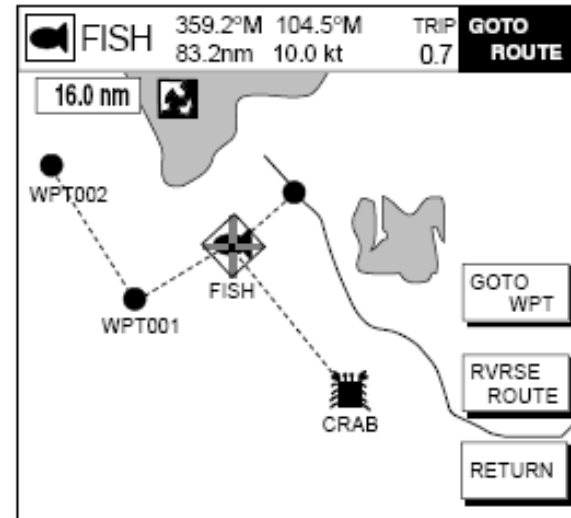
---
- 4 Select a route.  

---
- 5 Press the GOTO soft key to show the plotter display. The cursor is on the waypoint nearest own ship.  

---
- 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.

**Note:** 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.



*Plotter display, route selected as destination*

## ROUTES

### Entering a Waypoint with the Cursor

- 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.

## ROUTES

### 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.

## ROUTES

### 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 will appear: 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.

## ROUTES

### Erasing Routes

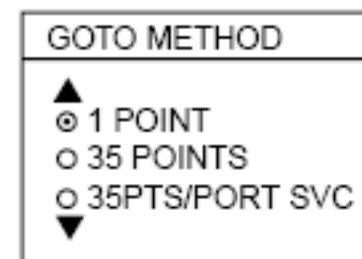
- 1 Press the [MENU] key to open the menu.
- 2 Press the WAYPOINTS/ROUTES soft key.
- 3 Press the ROUTES soft key.
- 4 Use the trackball to select a route.
- 5 Press the ERASE ROUTE soft key. You are asked if you are sure you want to erase the route.
- 6 Push the [ENTER] knob to erase the route, or the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

## ROUTES

### 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. You need to tell your unit how to set the quick point: 1 POINT, 35 POINTS (up to 35 points) or 35PTS/PORT SVC.

- 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.
- 4 Use the trackball to select a method.
- 5 Press the **ENTER** soft key.



*Go to method window*

## ROUTES

### 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.

**Note:** 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.