

**FURUNO**

***MFDBB***  
***Multi Function Display***



**NAVnet<sup>®</sup>**  
**3D**



**FURUNO ELECTRIC CO., LTD.**

[www.furuno.co.jp](http://www.furuno.co.jp)

**OPERATOR'S MANUAL**

# Important Notices



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- The descriptions in this manual are intended for readers with a solid knowledge of English.
- No part of this manual may be copied or reproduced without written permission.
- If this manual is lost or worn, contact your dealer about replacement.
- The contents of this manual and equipment specifications are subject to change without notice.
- The example screens (or illustrations) shown in this manual may not match the screens you see on your display. The screen you see depends on your system configuration and equipment settings.
- Store this manual in a convenient place for future reference.
- FURUNO will assume no responsibility for the damage caused by improper use or modification of the equipment (including software) by an unauthorized agent or a third party.
- When it is time to discard this product it must be done according to local regulations for disposal of industrial waste. For disposal in the USA, refer to the Electronics Industries Alliance (<http://www.eiae.org/>).









# SAFETY INSTRUCTIONS






The operator of this equipment must read these safety instructions before attempting to operate the equipment.






 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

 Warning, Caution	 Prohibitive Action	 Mandatory Action
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 <b>WARNING</b>	
	The radar antenna emits electromagnetic radio frequency (RF) energy which can be harmful, particularly to your eyes. Never look directly into the antenna aperture from a close distance while the radar is in operation or expose yourself to the transmitting antenna at a close distance.  <i>(Radiation hazard figures TBA at later time.)</i>
	<b>Do not open the equipment.</b>  Only qualified personnel should work inside the equipment.

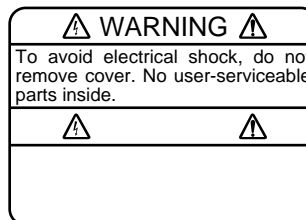
 <b>WARNING</b>	
	<b>Make sure no is near the antenna unit before turning on the radar.</b>  Serious injury or death can result if someone is struck by a rotating radar antenna.
	<b>Turn off the power immediately at the switchboard if water leaks into the equipment or the equipment is emitting smoke or fire.</b>  Continued use of the equipment can cause fire or electrical shock.

 <b>WARNING</b>	
	<p><b>Do not subject the units other than the antenna unit to rain or water splash.</b></p> <p>Fire or electrical shock can result if water gets inside the equipment.</p>
	<p><b>Do not disassemble or modify the equipment.</b></p> <p>Fire or electrical shock can result if the equipment is modified.</p>
	<p><b>Do not place liquid-filled containers on the top of the processor unit.</b></p> <p>Fire or electrical shock can result if a liquid spills into the processor unit.</p>
	<p><b>Do not operate the equipment with wet hands.</b></p> <p>Electrical shock can result.</p>

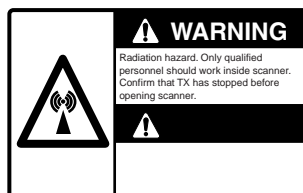
 <b>WARNING</b>	
	<p><b>No one navigation device should ever be solely relied upon for the navigation of the vessel.</b></p> <p>Always confirm position against all available aids to navigation, for safety of vessel and crew.</p>
	<p><b>A radar is useful as an anti-collision aid. However, it does not remove the requirement for maintaining a vigilant watch.</b></p> <p>Always maintain a vigilant watch while underway.</p>
	<p><b>Do not leave ropes or other objects in the vicinity of the antenna unit.</b></p> <p>Fire, electrical shock or injury can result if an object becomes entangled in the antenna unit.</p>
	<p><b>Use the correct fuse.</b></p> <p>Use of an incorrect fuse can cause fire or serious damage to the equipment.</p>

**Warning Labels**

Warning labels are attached to the equipment. Do not remove any label. If a label is missing or damaged, contact a FURUNO agent or dealer about replacement.



Name: Warning Label 1  
 Type: 86-003-1011-1  
 Code No.: 100-236-231



Name: Warning Sticker  
 Type: 3-142-3201-0  
 Code No.: 100-266-890

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# Foreword

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## A Word to the Owner of the MFDBB

Congratulations on your choice of the MFDBB (Multi Function Display), an integral part of our new NavNet® 3D series of multi function displays. We are confident you will see why the FURUNO name has become synonymous with quality and reliability.

For over 50 years FURUNO Electric Company has enjoyed an enviable reputation for quality marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

This equipment is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless operated and maintained properly. Please carefully read and follow the recommended procedures for operation and maintenance.

Thank you for considering and purchasing FURUNO equipment.

## Features

The all new NavNet® 3D series of multi function displays combine radar, chart plotter, AIS receiver, etc. into an easy to use networked navigation system. A high quality “fog-less” color LCD presents navigation data, chart, radar echoes, etc. in vivid colors. (Use of a commercial monitor is also possible.) Chart plotter, radar, navigation data, etc. are instantly transferred between NavNet® 3D displays with our lightning fast NavNet® network. Expandability is virtually limitless with USB connection, and up to 10 NavNet devices may be connected.

### ***Chart plotter***

- Fast chart redraw
- Wide array of charts: C-MAP NT MAX/MAX2, Mapmedia, S52 layers
- 3D display of chart
- Waypoint and track data commonly shared via Ethernet.
- Large memory stores 12,000 track points, 2,000 waypoints and 200 routes.
- Route creation using current track

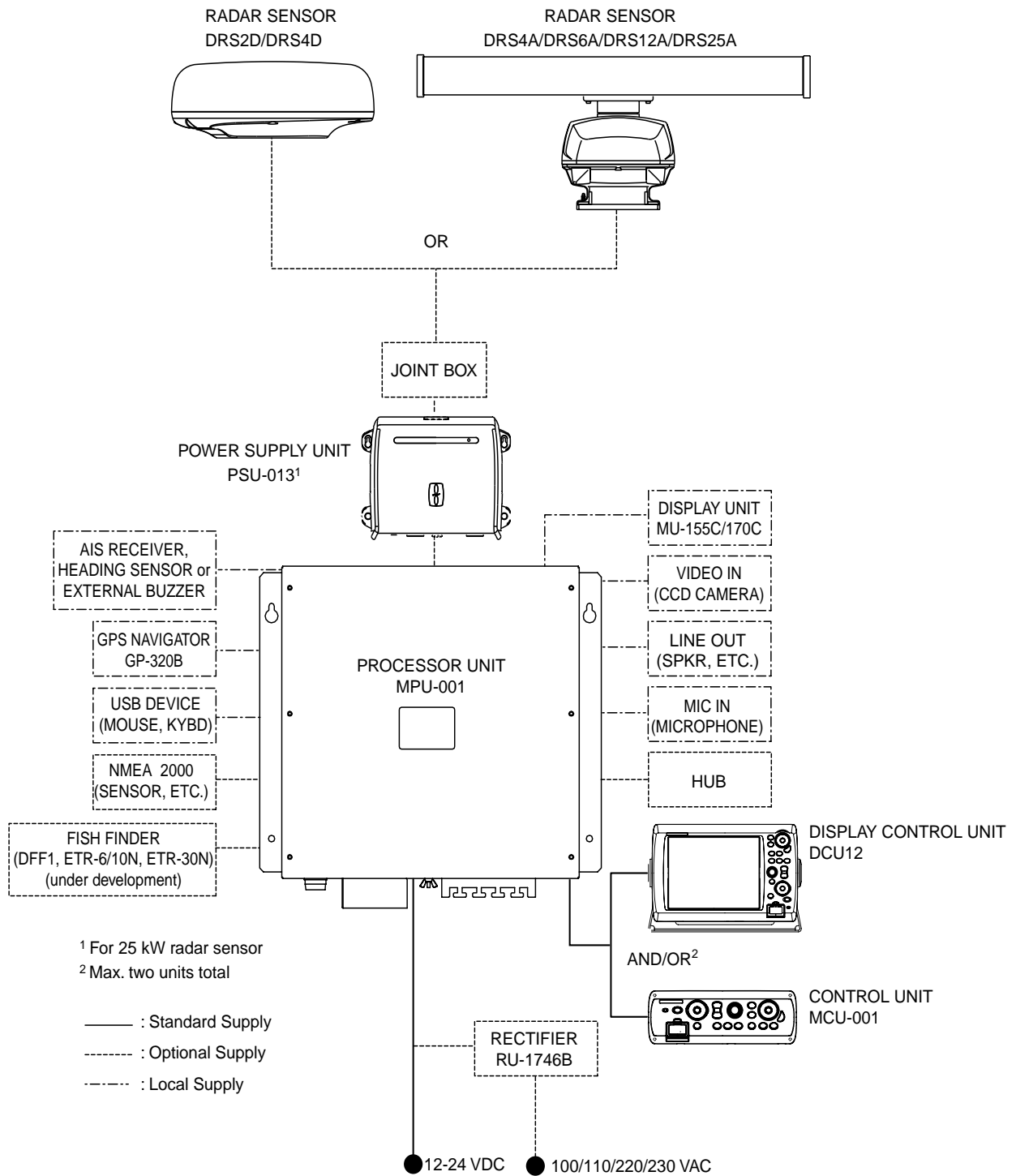
### ***Radar sensor (option)***

- Radar echoes presented in color or monochrome.
- Automatic control of sea clutter, tuning, and gain for ease of operation.
- Guard zone watches for targets within a specific area.

***Other***

- Unique ROTOkeys (soft keys) provide quick access to functions of the active mode.
- AIS Receiver FA-30 (option) receives AIS data (name of vessel, position, course, speed, etc.) from other vessels and shore stations and navigational aids and displays this data.
- Optional Automatic Radar Plotter (ARP) tracks movement of targets.
- USB port connects USB devices (mouse, keyboard, etc.), for virtually limitless expandability.
- Various instrument displays with connection of applicable sensors: Steering, Engine, Weather, Wind, Tide, Multimedia. (To be developed)
- Weather information display (option) available with connection of 3D display of chart receiver or MaxSea's chopper interface.
- Sensor data commonly shared with all units connected via Ethernet.
- IP camera connectable to monitor onboard activity.
- NMEA 2000® interface for connection of VHF receiver, GPS receiver, NAVPilot, Weather Station, FI-30 (instrument series), Motion Sensor, etc.
- Plug and play with USB devices.
- Audio and video playback with entertainment function.
- NavData boxes show navigation data on every mode
- 100 Megabit per second transfer rate.

# System Configuration



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# Chapter 1: Operational Overview

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This chapter provides the information necessary to get you started using your multi function display, from how to turn it on and off to how to read the main displays.

This manual shows dedicated keys in bold face upper case letter; for example, **DISP**. All other labelled items such as ROTOkeys are shown in body text font.

## 1.1 Operating Controls

This multi function display comes with either the Control Unit (MCU-001) or Display Control Unit (DCU12). (Alternatively necessary software is incorporated in a PC.) Their controls are identical except for the POWER switch; on the DCU12 it also functions to adjust display brilliance.

Discrete keys whose key labels have two text labels separated by an underline carry two functions. The top label is the main function and the bottom label, the secondary function. You access those functions with a short push and long push, respectively.

You operate the chart plotter, radar, etc. with a combination of

- Twelve discrete keys
- Cursorpad
- Scrollingpad
- ROTOkey
- Menus, where you select options
- Pop-up menus, where you select options
- Lists, where you can edit items

When you operate a key a single beep sounds to confirm correct operation. For invalid operation three beeps sound. If you do not need the key beep you may turn it off, in the General menu.



## Control Description

The controls of your unit are shown in the figure below. Controls are backlit for easy viewing in nighttime use.



*Display Control Unit (DCU12)*





*Control unit (MCU-001)*

### Control description

No.	Label	Function	Key on PC or control on mouse
1	POWER	<b>Momentary press:</b> Turn on the power; adjust key dimmer when equipment is active. On the DCU12 it additionally functions to adjust display brilliance. <b>Long press:</b> Turn the power on/off	F13
2	Card drive	Card drive for chart cards and memory cards.	None

Control description

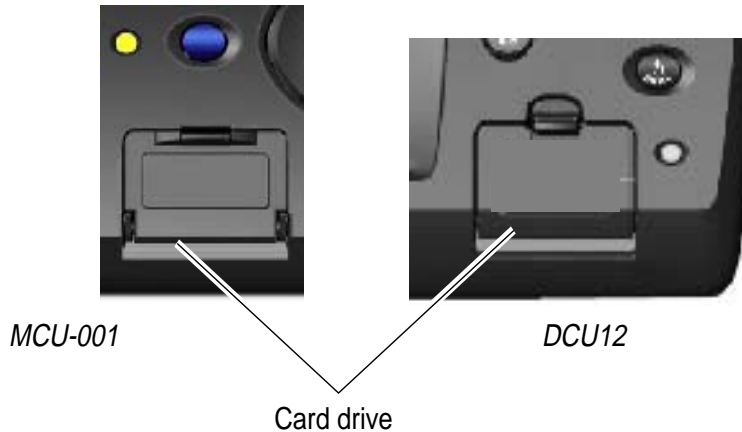
No.	Label	Function	Key on PC or control on mouse
3	SAVE/MOB	<b>SAVE(short push):</b> Save current position as waypoint. <b>MOB(long push):</b> Save current position as MOB.	F2
4	CTRL key	Switch active display.	F6
5	Rotary Knob	<ul style="list-style-type: none"> <li>• Rotate to; <ul style="list-style-type: none"> <li>- display ROTOkeys</li> <li>- select setting</li> <li>- select option</li> </ul> </li> <li>• Push to; <ul style="list-style-type: none"> <li>- display ROTOkeys</li> </ul> </li> </ul> short push to show "basic" ROTOkeys; long push to show ROTOkey quantity selected on the menu. <ul style="list-style-type: none"> <li>• - confirm selection</li> </ul>	Scrollwheel. Spin or push to display ROTOkeys or select option; push to confirm selection.
6	DISP	Select display.	F3
7	CANCEL key	Cancel last entry (undo); silence audio alarm.	Esc
8	POINTS/ROUTE	<b>POINTS(short push):</b> Save current position as waypoint. <b>ROUTE(long push):</b> Open route building tool.	F9
9	GOTO/LIST	<b>GOTO(short push):</b> Save current position as waypoint. <b>LIST(long push):</b> Open route building tool.	F8
10	Cursorpad	<ul style="list-style-type: none"> <li>• <b>Pad:</b> Shift cursor.</li> <li>• : Like the "click" button on a PC mouse. Hereafter referred to as "<b>left-button key</b>".</li> </ul>	<ul style="list-style-type: none"> <li>• Drag mouse.</li> <li>• Left mouse button.</li> </ul>
11	 ((Right-button key)	Show/erase pop-up menu. Hereafter referred to as " <b>right-button key</b> ".	Right mouse button
12	DATA/VOL	<b>DATA(short push):</b> Show/hide NavData. <b>VOL(long push):</b> Change audio level.	F7
13	MENU	Open/close menu.	F4
14	GAIN/TX	<b>GAIN(short push):</b> Adjust radar gain. <b>TX(long push):</b> Toggle between standby and transmit for radar.	F5
15	RANGE OUT, RANGE IN	Choose range on chart and radar.	F10: RANGE OUT F11: RANGE IN
16	Scrollingpad	<ul style="list-style-type: none"> <li>• <b>Pad:</b> Scroll chart; offcenter radar picture.</li> <li>• <b>SHIP/3D button:</b> Momentary push to center vessel; long push to alternately enable and display the 3D display.</li> </ul>	<ul style="list-style-type: none"> <li>• Left and right mouse buttons.</li> <li>• F12</li> </ul>
17	Power lamp	Lights in green when power is on	–

## 1.2 Inserting, Removing a Chart Card

Before turning on the power, insert the chart card for your area in the card drive. Your multi function display can read C-MAP NT MAX/MAX2, Mapmedia and S52 cards.

### Inserting a Chart Card

1. Open the card drive lid at the lower left side of Control Unit MCU-001, or the lower right side of the Display Control Unit DCU12.



2. Insert chart card label side up in one of the slots. It will go in only if oriented and inserted correctly.
3. Close the lid. You will hear a click when the lid is correctly closed.

### Removing a Chart Card

1. Open the card drive lid.
2. Push in the card. The card will pop half way out. Pull out the card.
3. Close the lid. You will hear a click when the lid is correctly closed.

### Precautions with Chart Cards

- Do not remove a card while the chart is being drawn. This can cause the equipment to freeze.
- Do not insert or remove a card while the power is on. This can cause the equipment to freeze.
- Keep the lid closed at all times to keep foreign material and water out of the card drive.
- Remove, insert and store the card with care. Rough handling can damage the card and destroy its contents.

## 1.3 Turning the Power On/Off

Press the power switch to turn the power on. To turn the power off, press and hold down the switch until the screen goes blank.

Shortly after the power is applied the lamp below the power switch lights (in green) and the start-up screen appears. Then, the application program no. for the MPU-001 (Processor Unit) and the application and boot program nos. for the MCU-001 and/or DCU12 are shown.

## 1.4 Adjusting Display Brilliance, Key Dimmer

The brilliance of the DCU12's display can be adjusted, with the **POWER/BRILL** key.

1. Push the **POWER/BRILL** key to display the LCD brilliance and key dimmer adjustment window.
2. Rotate the Rotary Knob to select the item you wish to adjust and push the Rotary Knob.
3. Rotate the Rotary Knob to adjust item selected; clockwise rotation to raise brilliance(dimmer) or counterclockwise to lower brilliance(dimmer). Eight levels of brilliance and dimmer are available.
4. Push the Rotary Knob to confirm setting.

## 1.5 Selecting a Display

Use the **DISP** key and ROTOkey to select a display. The displays available depend on the equipment you have in your NavNet system. In a later chapter you will learn how to customize the display selection to suit your needs and system configuration.

1. Press the **DISP** key to show the display selection window. (The labels in the illustration below do not appear on the actual display.)



*Display selection window*

2. Rotate the Rotary Knob to place the display desired inside the on-screen display unit.
3. Push the Rotary Knob to confirm selection.

### Switching Active Display in Combination Displays

Use the **CTRL** key to switch active display in combination displays. Each time the key is operated the active display is switched and the active display is circumscribed with a yellow square.

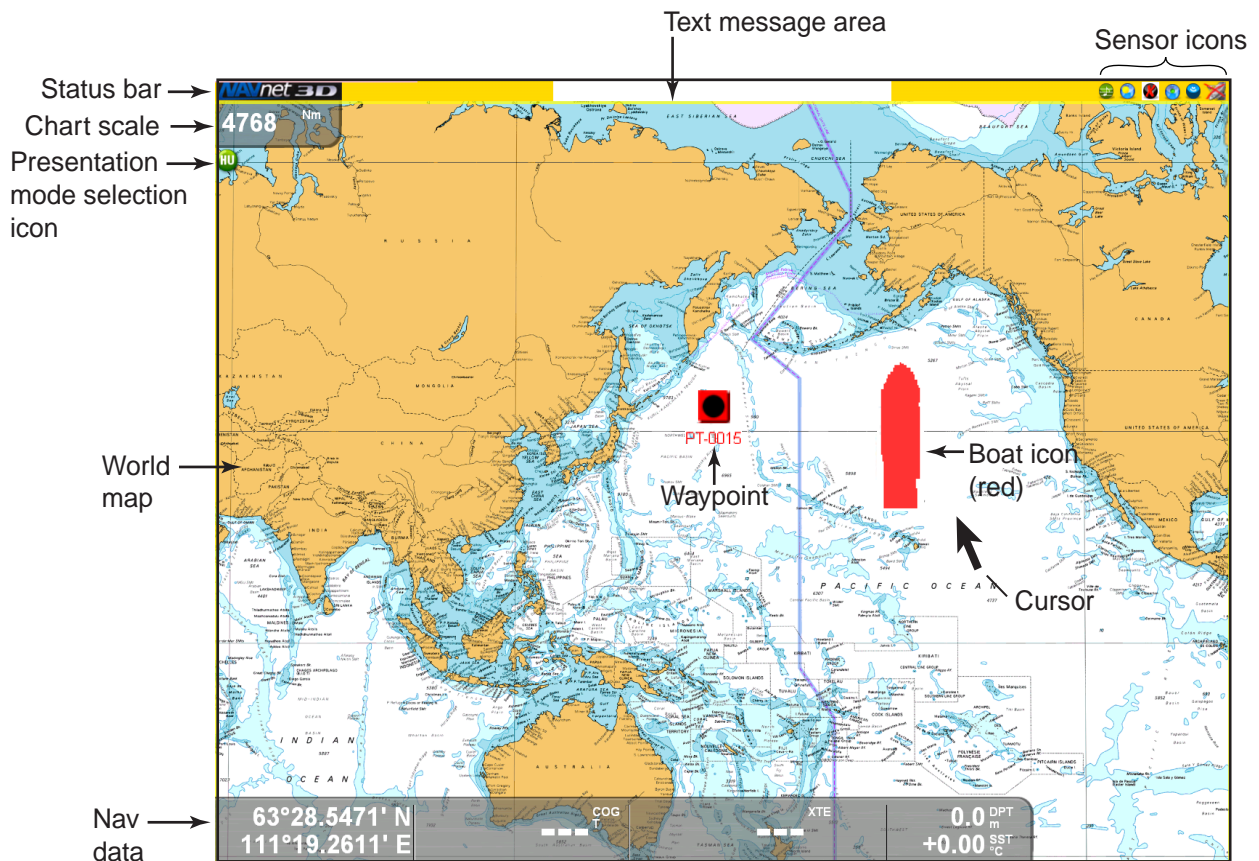
## 1.6 Chart Plotter Display Overview

The chart plotter display provides a miniature world map. Detailed chart information is available when a chart card is inserted. The plotter section has facilities for waypoint entry and route construction and planning. A typical chart plotter display is shown in the illustration below.

The chartplotter uses position information fed from position-fixing equipment such as GPS or DGPS. With position data available, your boat's position is marked on screen with a boat icon, the configuration of which can be selected from the menu. If no heading or course data is available, your boat is shown as a hollow circle (flashing).

Waypoints and routes you have entered are shown on the display, and they can easily be moved, deleted and edited from a pop-up menu.

In addition to waypoint and route processing, the chart plotter also provides information to nearest port, displays your boat's track, measures distances and bearings, marks man overboard (MOB) position, process various alarms, follow simple and complex routes, etc.

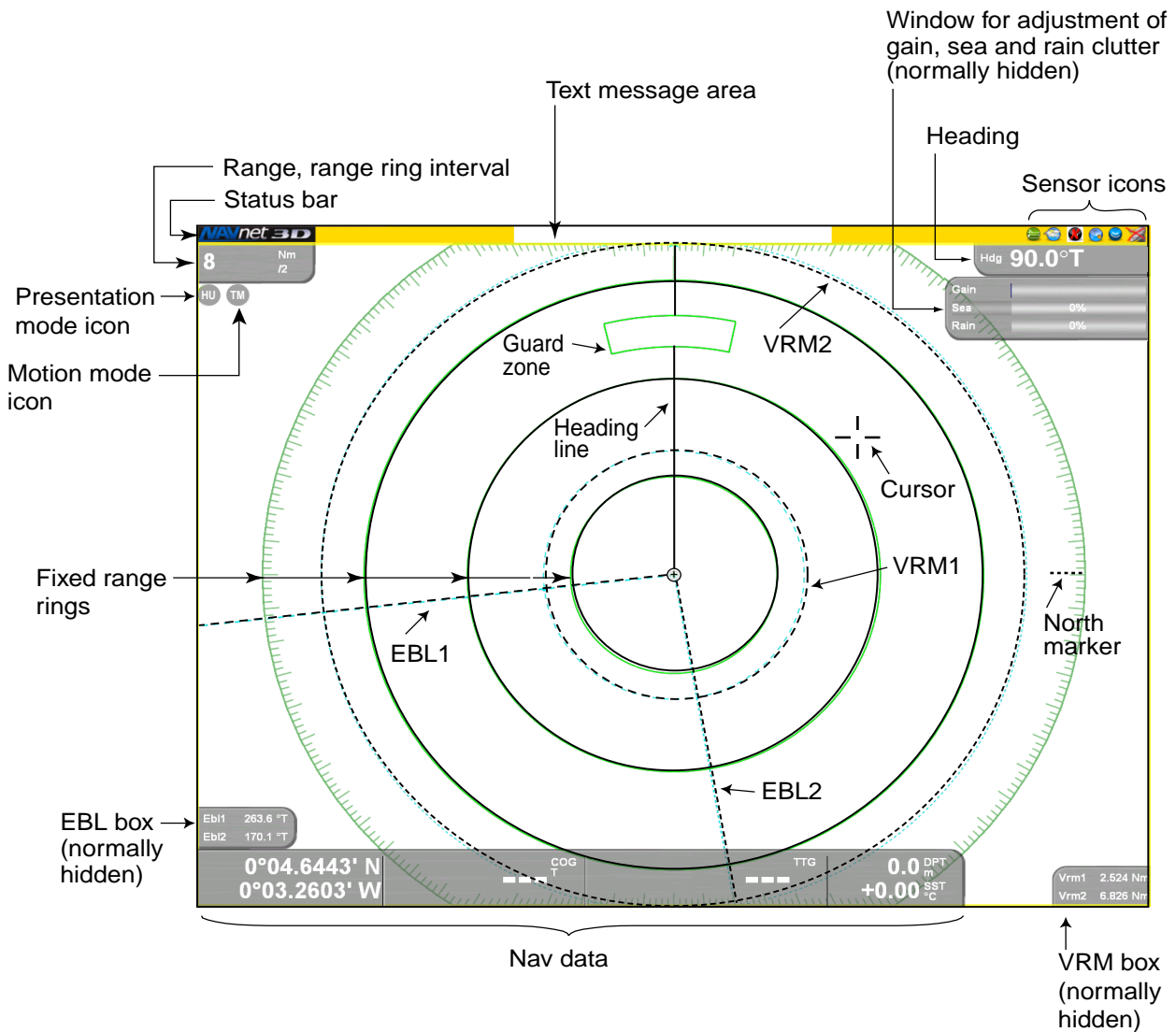


# 1.7 Radar Display Overview

A radar system operates in the ultra-high-frequency (UHF) or microwave part of the radio-frequency (RF) spectrum, and is used to detect the position and movement of objects. Objects are shown on the radar display at their measured distances and bearings, in intensities according to echo strength.

The radar display is available in head-up, course-up and north-up modes and orientation in true and relative motion. Relative motion shows other ships movement relative to own ship, True motion shows own ship and other moving objects moving in accordance with their true courses and speed.

Dual VRMs are provided to measure the range to objects, and dual EBLs to measure the bearing to targets. A guard zone can be created to be alerted to targets in a specific area. The trail of targets can be shown in afterglow to monitor their movement.



## 1.8 Common Operations

### Moving the Cursor

The cursor is the pointer you see on your display. Its main functions are

- Find a position on the display
- Select an item; for example, waypoint on the chart plotter

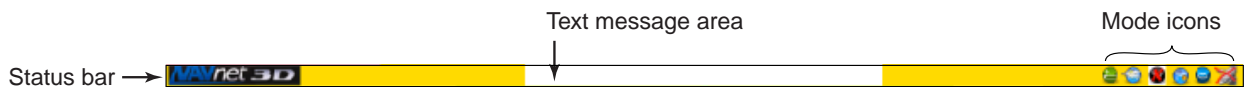
To move the cursor, press on any of the four arrows on the Cursorpad to move the cursor in the direction indicated on the arrow pressed. You may also move the cursor diagonally by pressing and holding down on any two locations together on the pad. The current cursor position is shown in the cursor position box at the bottom of the screen, if it is displayed.









*Cursor position box*

### Status Bar

The status bar is the yellow horizontal bar at the top of the display. It provides operating information with text messages and sensor status with icons. Text (operational help, alarm alert, etc.) runs across the text message area from right to left, tickertape style. When an alarm is violated, the bar turns red and the name of the offending alarm appears in the text message area.



The mode icons at the far right hand side show active and inactive sensors. An icon is animated if the corresponding sensor is active. An inactive sensor (or no data) has a red "X" through it.

Icon	Sensor	Icon	Sensor
	Multimedia		GPS
	Weather		Fish Finder (under development)
	Compass		Radar



## ROTOkeys

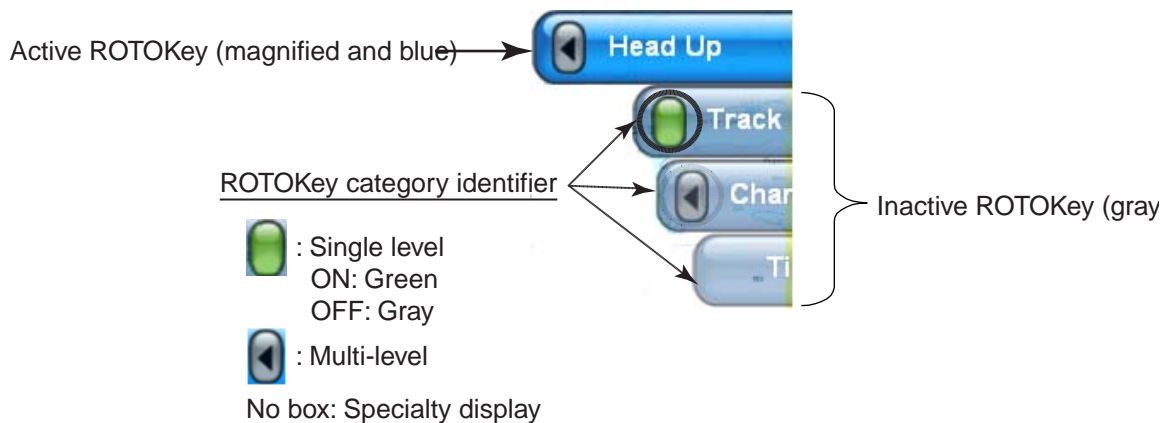
The ROTOkeys are like "soft keys"; they change according to active display. The ROTOkeys are hidden until you elect to display them. To display the ROTOkeys, simply rotate or push the Rotary Knob, and they appear at the right edge of the screen. By long-pushing the Rotary Knob you can display a greater quantity of ROTOkeys. In the default set up a short push shows the "basic" set and a long push shows the "standard" set. A "full" set and "custom" set are also available.

The ROTOkeys are auto-hiding, and are erased from the screen if not operated within about six seconds. They can also be manually hid by using the **CANCEL** key.

There are three categories of ROTOkeys: Single level, multi-level and specialty display.

### To select a ROTOkey for adjustment do the following:

1. Rotate or push the Rotary Knob to show the ROTOkeys. (Long-push the knob to show the "standard" keys. These keys can also be activated when the "basic" keys are shown.) In the example below, a few of the basic ROTOkeys for the chart plotter are shown.



### *Basic ROTOkeys for chart plotter*

2. Rotate the Rotary Knob to select the ROTOkey you wish to use.  
As you step through the ROTOkey selections, the active ROTOkey is magnified and blue and inactive ones are grey.
3. Do one of the following depending on category of ROTOkey.
  - Single level:** Push the Rotary Knob to color the status indicator (left of the ROTOkey label) green to turn on the respective item, or gray to turn it off.
  - Multi-level:** Push the Rotary Knob, rotate it to select desired ROTOkey and push it to confirm selection.
  - Specialty display:** Push the Rotary Knob to show the display whose name appears on the ROTOkey label.