SWR 1

Radome 0.9 Feet

SWR 8

Radome 1.5 Feet

SWR 9

Radome 1.8 Feet

SWR 10

Open 3.5/4.5 Feet

User Manual

Caution

HIGH VOLTAGE WARNING

Dangerously high voltages are present within the RADAR scanner unit. There are no internal connections or adjustments necessary for installation. Only a qualified radar service technician should remove the cover. Technicians must exercise extreme care when working inside the unit. Always remove power before removing the cover. Some capacitors may take several minutes to discharge, even after switching off the radar. Before touching the magnetron or any high voltage components, ground them with a clip lead.

MICROWAVE RADIATION HAZARD

The microwave energy radiated by a radar antenna is harmful to humans, especially to one's eyes. Never look directly into an open waveguide or into the path of radiation from an enclosed antenna. Radar and other radio frequency radiation can upset cardiac pacemakers. If someone with a cardiac pacemaker suspects abnormal operation, immediately turn off the equipment and move the person away from the antenna. Turn off the radar whenever it is necessary to work on the antenna unit or on other equipment in the beam of the radar.

MAGNETRON PREHEATING

When starting your RADARpc for the first time or when restarting it after a two month or longer non-operating period, preheat the magnetron at least 30 minutes in standby mode.

Please read through this manual before the first operation. If you have any questions, please contact the Company's customer service or your local dealer.

About this User Manual

INTRODUCTION

The Radar consists of a scanner unit which illuminates targets with microwave energy and then collects the returns from those targets. The scanner unit includes the Radar antenna, transmitter, receiver and necessary electronics.
The scanner unit must be connected to a chart plotter equipped with software capable of displaying the radar functions (see the table below).

Any menu operation and functions activation in this User Manual is related to the following chart plotter models (see the following table). Whenever it is necessary, a note has been inserted for those models with differences.

CHART PLOTTER NAME	DESCRIPTION	SOFTWARE
MURENA	5.6" Sunlight Readable Color Display External Smart GPS Receiver	S3egSW7vc
MURENA iGPS	5.6" Sunlight Readable Color Display Internal GPS Receiver	S3igSW7vc
TIGERSHARK Plus	5.6" Gray Levels Display External Smart GPS Receiver	S3egSW7m
MILLENNIUM 7	5.6" Gray Levels Display Internal GPS Receiver	S3igSW7m
NAUTILUS iGPS Plus	5.6" Sunlight Readable Color Display External GPS Receiver	S3egSW7c
MILLENNIUM 7 Color	5.6" Sunlight Readable Color Display Internal GPS Receiver	S3igSW7c
BARRACUDA	7" Sunlight Readable Color Display External Smart GPS Receiver	S3egSW7wc
BARRACUDA iGPS	7" Sunlight Readable Color Display Internal GPS Receiver	S3igSW7wc
EXPLORER[3]	Controller for Color Display External Smart GPS Receiver	S3egSWctcj
BARRAMUNDI	11" Color Display External Smart GPS Receiver & Video Input	S3egSW11c
BARRAMUNDI Plus	11" Sunlight Readable Color Display External Smart GPS Receiver & Video Input	S3egSW11c
MARLIN	15" Color Display External Smart GPS Receiver & Video Input	S3egSW15c

Full functionality of the Radar is achieved when it is a part of an integrated system with a chart plotter connected to gyrocompass and GPS.
Please read carefully this User Manual to learn the operating features for your Radar. Refer to your chart plotter User Manual for all other operating instructions.

CONVENTIONS USED

Throughout this User Manual, the labelled keys are shown in capital letters enclosed in square brackets, for example [ENTER]; the software keys are shown in small capital letters enclosed in square brackets, for example [EDIT].
Menu operations are in bold characters listed by keys sequence with the menu names enclosed between inverted commas, for example **[MENU] + "ALARMS" + [ENTER]** means: press the [MENU] key, using the cursor key select the Alarms menu and then press [ENTER].

HOW THIS USER MANUAL IS ORGANIZED

- **CHAPTER 1: Radar Installation**
  Installation of the Radar and set up of the hardware configuration.
- **CHAPTER 2: Functions**
  Helps you understand how the chart plotter is connected to the Radar and how to operate.
- **CHAPTER 3: Radar Pages**
  Description of the available Radar pages, full and split pages.
- **CHAPTER 4: Technical Specifications**
  Technical specification and dimension of the Radar.
- **CHAPTER 5: Frequently Asked Questions**

The Analytical index is at the end of this User Manual.

IF YOU NEED ASSISTANCE

If your chart plotter does not operate properly, please refer to the chart plotter User Manual.

PACKING LIST *(TO BE CHECKED!!!!!!!!!!!!!!!!!)*

- Scanner Unit with cable
- Fasteners, stainless steel
- 4 Bolts, hex metric M8 x 25U (approx. 3/8 dia. x 1 in. long)
- 4 Flat washer
- 4 Lock washer
- 1 Radar Junction Box
- 1 Template, for locating mounting holes
- 2 Fuses, 5A (spare)

Optional

- Magnetic Heading Sensor
- Extended length cables, 15 or 20 meters

1. Radar Installation

This chapter provides instructions electrical connections of the Radar.

1.1 PRELIMINARY

The scanner unit must be located so that passengers and crew are not exposed to the direct radar beam. The scanner unit should be mounted on the centerline of your vessel in a location that has an unobstructed view forward and is as clear as possible the rest of the way around the unit. A location as high as practical to improve maximum range is desirable, keeping in mind that minimum range objects may be overlooked if mounted too high. Position the unit forward of large structure and exhaust stacks. Large structure or stacks cause blind spots. Contamination from engine exhaust on the scanner housing reduces radar performance.

Antennas for GPS, radio communication or other equipment should not be in the radar beam. Use non-metallic extension poles to move the active area of antennas above the radar beam.

In selecting a location, consider the suitability of the mounting surface. It must be flat and approximately level with the vessel's water line. The surface must support the weight of the scanner and have access to the under side for installation of the four mounting bolts.

NOTE *The recommended mounting surface thickness is 3/8 to 1/2 in. (9 mm to 13 mm). The scanner will be damaged if bolts penetrate more than 9/16 in. (15 mm). Also, consider the cable route from the scanner to the operator's location. Avoid routing the interconnecting cable through areas of possible damage from moving objects, machinery, and exposure to chemicals or high temperature.*

1.2 PREPARATION

Unpack your new Radar and check the contents against the packing list. Do not remove the cover from the unit. There are no connections or adjustments inside the unit that are needed for installation or operation. The cable must remain attached. For ease of handling, coil the cable and place it on top of the scanner. Then secure it with tape. Invert the scanner and make sure the four mounting holes are clear to accept bolts.

Working at higher elevations may become necessary while installing the scanner unit. Observe safety measures and take sufficient precaution to avoid personal injury or damage to the equipment.

1.3 PROCEDURE

- Prepare the mounting surface by making sure it is clean and flat.
- Use the template provided to mark the location of four mounting holes. Align the template squarely with the centerline of the vessel and with the arrow pointing forward.
- Drill four 3/8 in. (10 mm) diameter holes through the mounting surface.
- Check that each bolt (with lock washer and flat washer) protrude through the mounting surface at least 5/16 in. (8 mm) but less than 9/16 in.

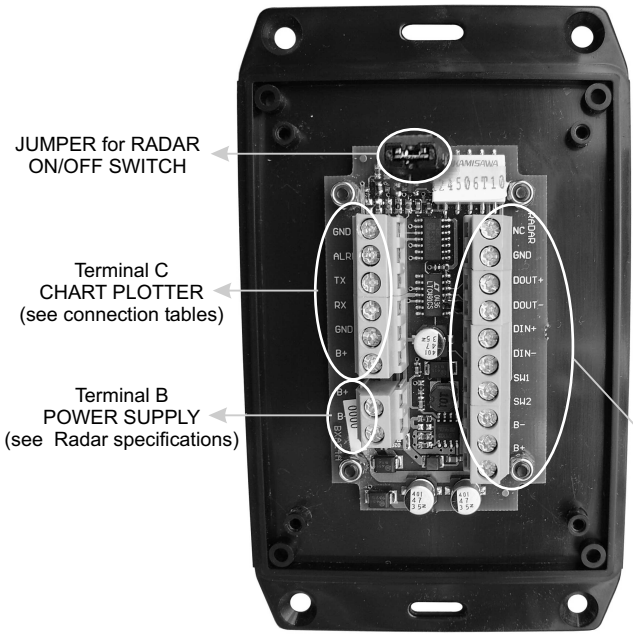
(15 mm). The scanner will be damaged if bolts protrude more than 9/16 in. (15 mm).

- Apply sealant around each mounting hole.
- Place the Radar scanner unit on the mounting surface. Orient the scanner with the index mark on the housing facing forward (cable gland facing aft).
- Install and tighten four M8 x 25U (M8 x 1 in.) mounting bolts.
- Uncoil the scanner cable.
- Secure the cable near the scanner to support the weight of the cable and prevent strain on the watertight cable seal. If the cable is to pass through tubing or a bulkhead, protect the unfinished end. Do not use the unfinished wires or fabric braid to pull the cable. Attach a fish cord only to the cable jacket.
- Route the cable to the operator's location, securing it at appropriate points along the way. Make a drip loop and apply sealant at the entry point of an exterior bulkhead.

1.4 RADAR JUNCTION BOX CONNECTIONS

The cable from Radar scanner unit provides all power, data and control connections necessary for operation.

Referring to the diagram below, connect the color coded wires from the Radar cable to the designated place on Terminal strip A in Radar Junction Box as follows.



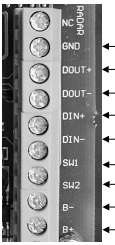
MOUNTING INSTRUCTIONS

1. Open the box unscrewing the 4 bottom screws.
2. Connect the Radar cable to the terminal A
3. Connect the Power supply to the terminal B
4. Connect the chart plotter cable to the terminal C
5. Set up the jumper for RADAR ON/OFF switch:
   - 5a. Mount to permanently power ON the Radar;
   - 5b. Connect to a switch to manually power on/off the Radar.
   - 5c. Remove to control the power ON/OFF via the chart plotter with the external alarm output signal.

Terminal A RADAR (see Radar cable label)

Fig. 1.4 - Junction Box

Terminal Strip A



RADAR CABLE	
WIRE COLOR	**FUNCTION**
BLACK	DATA GND
ORANGE	DATA OUT+
YELLOW	DATA OUT-
BROWN	DATA IN+
RED	DATA IN-
GREEN	POWER ON/OFF SWITCH 1
BLUE	POWER ON/OFF SWITCH 2
BLACK (large wire)	RADAR SUPPLY-
WHITE (large wire)	RADAR SUPPLY+

Fig. 1.4a - Terminal Strip

Terminal Strip B IS TO BE CONNECTED TO POWER SUPPLY (12 TO 24 VDC NOMINAL)
Do not omit the in-line fuse unless a dedicated and fused terminal is available. If so, install a 5 Amp fuse. If you are installing a MDS-10 open scanner Radar, it is important to also connect the Red (+) to positive power terminal, and Blue (-) to negative power terminal, as this provides power to scanner motor.
This terminal leads the power to the Scanner unit and to the chat plotter (*).

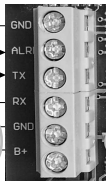
NOTE*(*)Only if the chart plotter power wires are connected to Terminal strip C, on B+ and GND terminals.*

12-24V POWER SUPPLY	
WIRE COLOR	**FUNCTION**
RED	POWER SUPPLY+
BLACK	POWER SUPPLY-

Fig. 1.4b - Terminal Strip B

Terminal Strip C
See connection tables to determine proper way to connect the chart plotter to Radar Junction Box.

POWER & I/O CABLE CONNECTION TO PORT 2		
PIN	**WIRE COLOR**	**FUNCTION**
1	BLACK	GND/COMMON
2	RED	POWER INPUT+ (10-35 Vdc)
3	WHITE	INPUT 1+
4	GREEN	INPUT 1-
5	GRAY	OUTPUT 2+
6	YELLOW	OUTPUT 1+
7	BROWN	INPUT 2+
8	BLUE	OUTPUT EXTERNAL ALARM+

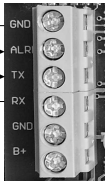


Connect to control the Radar ON/OFF via the chart plotter. Make sure that:
1) This signal is not used for any other operation (external alarm)
2) The jumper is removed on the junction box

Connect to power the chartplotter via the junction box

Fig. 1.4c - Connection to Port 2

AUX-IN I/O CABLE CONNECTION TO PORT 4		
PIN	**WIRE COLOR**	**FUNCTION**
1	BLACK	POWER OUTPUT-
2	RED	POWER OUTPUT+ (10-35 Vdc)
3	WHITE	INPUT 4+
4	GREEN	GND
5	GRAY	OUTPUT 5+
6	YELLOW	OUTPUT 4+
7	BROWN	INPUT 5+
8	BLUE	OUTPUT EXTERNAL ALARM+



Connect to control the Radar ON/OFF via the chart plotter. Make sure that:
1) This signal is not used for any other operation (external alarm)
2) The jumper is removed on the junction box

Fig. 1.4d - Connection to Port 4

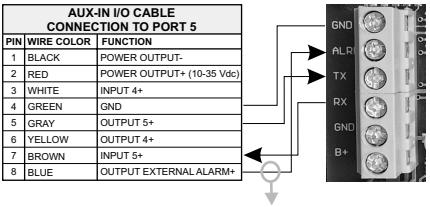


Fig. 1.4e - Connection to Port 5

1.4.1 JUMPER TO CONTROL RADAR ON/OFF OPERATION

RADAR POWERED ON ALL THE TIME
Leave jumper located at top of Radar Junction Box mounted. This will keep powered On at all times.

RADAR POWER ON/OFF CONTROLLED BY AN EXTERNAL SWITCH
The two remaining small leads, the Green wire and the Blue wire, connect to the On/Off control switch. The On/Off control switch does not switch the main power leads to the scanner unit, but it does provide a signal that controls DC power inside the scanner unit.

RADAR POWER ON/OFF CONTROLLED BY THE CHART PLOTTER SOFTWARE
Remove jumper. Connect the EXTERNAL ALARM signal of the chart plotter to TERMINAL Strip C, Terminal ALR (see connection tables).

1.4.2 ALTERNATIVE POWER CONNECTION

You can feed the Power supply to the Radar directly.

Power Connections
The LARGE WHITE wire and LARGE BLACK wire are for power connections and connect directly to a 12 to 24 VDC power bus.

- Connect the large black wire to the battery negative (—) terminal of the power panel.
- Connect the large white wire (with the in-line fuse) to the battery positive (+) terminal of the power panel (12 to 24 VDC nominal). Do not omit the in-line fuse unless a dedicated and fused terminal is available. If so, install a 5 Amp fuse. If you are installing a MDS-10 open scanner Radar, it is important to also connect the Red (+) to positive power terminal, and Blue (-) to negative power terminal, as this provides power to scanner motor.

This completes the installation of your Radar scanner unit.
Please proceed with setting up the data ports in your chart plotter, following the instructions below.

1.5 SOFTWARE CONFIGURATION

First you have to install the Radar. Refer to the following paragraphs to configure the chart plotter to operate with the Radar.

1.5.1 I/O Setup

Setting up the chart plotter I/O depends upon which port is used to connect the Radar. If you use the connecting cable supplied with the Radar, the Port2 is the default setting. In this case follow the procedure:

➤ **[MENU] + [MENU] + "ADVANCED" + [ENTER] + "Input/Output" + [ENTER] + "Port 2 Input" + [ENTER] + "RADAR" + [ENTER]**

1.5.2 Warming Up

It has to be noted that at start-up the Radar needs a variable time from 90 to 120 seconds to heat up the magnetron (microwave emitting tube). During this time it is not possible to turn on the transmission.
Radar pages are visible but with a small overlapping message window showing the time remaining to Warm Up completion:

"Radar Warming Up! xx seconds remaining!"

At completion of the Warm Up sequence the following message will be displyed:

"Radar Warming Up! Warm Up Completed!"

This window shall remain open for 2 seconds, then it will close automatically.
At this point the Radar is ready for operation. Trasmission is turned Off and "STAND BY" message is displayed at the center of the Radar page.

1.5.3 Transmission On

Turn On the transmission pressing:

➤ **[ENTER]**

NOTE *or following the procedure:*

➤ **[MENU] + "TRANSMISSION" + [ENTER] + "ON" + [ENTER]**

The Radar image is displayed on the screen.

1.5.4 Radar calibration

At first Radar installation it is recommended to perform Radar calibration.
To perform the calibration of the Radar follow the procedure:

➤ **[MENU] + "TUNING" + [ENTER]**

See the following table:

Heading Line	: An edit box allowing to set the Heading Line tuning in degrees and tens of degree is shown. The validity range is from -180.0° to 180.0°. The Heading Line adjustment is saved and it is sent to the Radar each time it is powered on.
Antenna Parking Position	: ONLY FOR MDS9/10 An edit box allowing to set it in degrees and tens of degree is shown. The validity range is from 0.0° to 359.9°. Such data is saved and it is sent to the Radar each time it is powered on.
Sector Transmission Off	: ONLY FOR MDS9/10 An edit box allowing to set the starting and ending angles in degrees and tens of degree is shown. The validity range is from 0.0° to 359.9°. Such data is saved and it is sent to the Radar each time it is powered on.
Transmission Trigger Dlay	: Starst the Transmission Trigger Delay procedure. See below.
Automatic Tune	: Starts the automatic tuning procedure.
Manual Tune	: Starts the manual tuning procedure.
Save Tuning to User Cartridge	: Saves the tuning data to user cartridge.
Add Tuning from User Cartridge	: Loads the tuning data from user cartridge.

1.5.4.1 Heading Line

.....

1.5.4.2 Antenna Parking Position

.....

1.5.4.3 Sector Transmission Off

1.5.4.4 Trasmission Trigger Delay

Selecting the Trigger Delay tuning from the menu:

- Opens the following window:

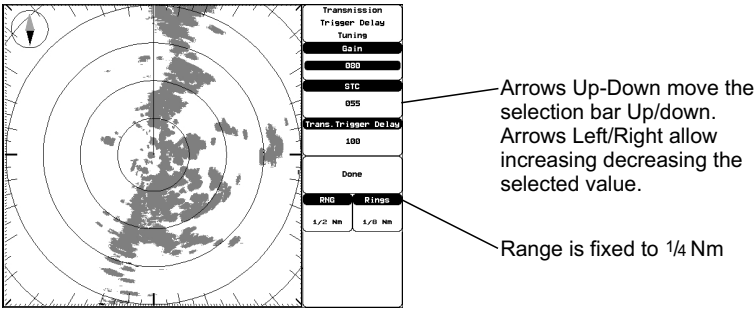
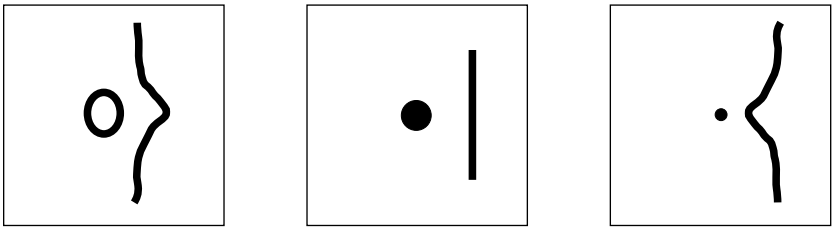


Fig. 1.5.4.1- Trasmission Trigger Delay tuning

Finaly tuning the transmission Trigger Dealy allows making accurate distance measurament. In practice, you need to align the start of teh sweep with the leading edge of the transmission pulse. Use the following procedure:

- Set up the Radar controls as follows before doing the following set ups. Set the GAIN to the best picture and adjust the STC until the TX pulse can be seen as a round point in the screen center.
- Adjust the transmission trigger delay to a point that the center looks as shown in the diagram (b) below and a target such as a bridge or a breakwater displays as a staright line on the screen.



a) Too long B) Correct c)Too short

Once the calibration has been performed, the calibration data is retained. However if a Clear RAM operation is performed it may be necessary to repeat the calibration.

IMPORTANT: Such tuning is already done by the factory and thus it is in general not necessary to do it unless some components of the Radar have been changed.

1.5.4.5 Automatic Tune

1.5.4.6 Manual Tune

1.5.4.7 Save Tuning to User Cartridge

1.5.4.8 Add Tuning from User Cartridge

2. Functions

2.1 BASIC

2.1.1 Cross Cursor

The Cross Cursor is a symbol that shows the cursor position on the screen. It is displayed when the Cursor Keys are pressed and it is moved around the screen using the Cursor Keys. It is automatically hidden when the Cross Cursor is not used for more than 5 seconds.
It is context-sensitive. The following table reports the list of objects and the labels that appear under the cursor:

- Center of Radar CTR
- EBL/VRM E/V
- Parallel Cursor ///
- Guard Zone GZ
- Ship Heading Marker HM

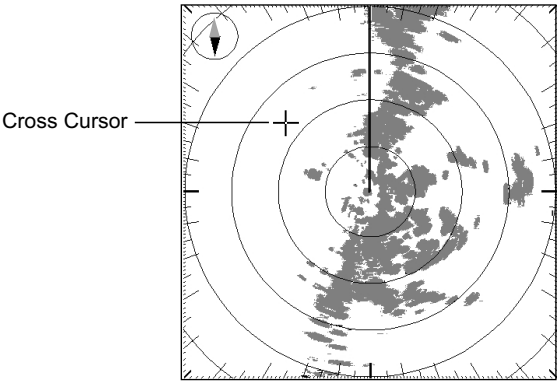


Fig. 2.1.1 - The Cross Cursor in the default Radar picture

2.1.2 Chart Overlay

AVAILABLE ONLY IN THE RADAR FULL PAGE

This function merges Radar and chart data into a single picture by drawing Radar targets over the cartography.
When in Chart Overlay mode, the chart inherits the Radar page setting, e.g. Orientation, True Motion mode.
To enable (On) or disable (Off) the Chart Overlay follow the procedure:

➢ **[MENU] + "CHART OVERLAY" + [ENTER]**

NOTE *Requires a heading and a position sensor connected to the chart plotter through an NMEA 0183 interface. The heading sensor can be either a gyrocompass or a fluxgate compass. The gyrocompass provides the best performance in all conditions.*

2.1.3 Range

Selects the Radar range among 1/8, 1/4, 1/2, 3/4, 1, 1 + 1/2, 2, 3, 4, 6, 8, 12, 16, 24, 36 and 48 Nm (the maximum range depends on the antenna used).

It is alternative to the Range selection in Radar page done using **[ZOOM IN]/ [ZOOM OUT]**.
To select the Radar Range value follow the procedure:

➢ **[MENU] + "RANGE" + [ENTER]**

2.1.4 Orientation

The Radar orientation option allows to choose the display mode, Head Up (HU), North Up (NU) or Track Up (TU), that refers to the top of the screen as it is relates to the direction of the boat.
The Radar directionmodes are described in the following table:

Head Up	: The Radar picture is displayed with the vessel's current heading upwards. As the heading changes the picture will rotate. It doesn't require heading information. It is the default value.
North Up	: The Radar picture is stabilized and displayed with north upwards. As heading changes, the ship's Heading Marker moves. Requires a heading sensor connected to the chart plotter.
Track Up	: The Radar picture is stabilized and displayed with the currently selected Course Leg upwards. As heading changes, the ship's heading marker moves. If you select a new course leg, the picture rotates to display the new course leg upwards. Requires a heading sensor connected to the chart plotter.

NOTE *Head Up cannot be selected in True Motion mode.*

To change the orientation mode follow the procedure:

➢ **[MENU] + "ORIENTATION" + [ENTER]**

2.1.5 Motion Mode

Allows choosing between two different presentation of targets and ship position over the Radar screen Relative Motion (RM) and True Motion (TM). See the following table:

True Motion	: In True Motion, fixed Radar targets maintain a constant position on the screen, whilst your own ship moves across the Radar image at the appropriate speed and heading. A map-like image is thus displayed, with all moving vessels traveling in true perspective to each other and to fixed landmasses. As your ship's position approaches the edge of the screen, the Radar center offset is automatically reset to reveal the area ahead of your ship.
Relative Motion	: In Relative Motion your own ship's position remains fixed on the Radar screen and all Radar targets move relative to your own ship. It is the default for the Radar display.

NOTE *True Motion is only available in North Up and Track Up modes (not in Head Up mode). Also True Motion requires a heading sensor and GPS position information.*

To change the Motion mode follow the procedure:

➢ **[MENU] + "MOTION MODE" + [ENTER]**

2.1.6 Echo Trails Settings

Selects an appropriate trail plotting interval to help determine the speed and course of a target vessel and help prevent collision with it. Selects Radar Trails among Continuous, 15 seconds, 30 seconds, 1 Minute,3 Minutes, 6 Minutes (or disables - Off).
To choose the Echo Trails follow the procedure:

➢ **[MENU] + "ECHO TRAILS" + [ENTER]**

2.1.7 Target Expansion

Allows the expand target size without affecting the range.
To enable (On) or disable (Off) the Target Expansion follow the procedure:

➢ **[MENU] + "TARGET EXPANSION" + [ENTER]**

2.2 SENSITIVITY

2.2.1 Interference Rejection

Reduces the interference caused by Radar signals from other Radar units. It is possible to turn Interference Rejection to Off, Level 1 (weak), Level 2 (middle), Level 3 (strong). The higher you set the Interference Rejection value the less interference you will receive.

To select the Interference Rejection value follow the procedure:

➢ **[MENU] + "SENSITIVITY" + [ENTER] + "INTERF RJECTION" + [ENTER]**

NOTE *The Sensitivity menu can be also opened by pressing:*
➢ **[ENTER]**
directly from the Radar page when the Cross Cursor is not placed over any features.

2.2.2 Gain Adjustment

Controls the Radar Gain. To see more details on the screen, increase the receiver sensitivity by selecting a higher gain percentage. If there is too much detail or if the screen is cluttered, lowering the sensitivity may increase the clarity of the display.

To select the Gain value follow the procedure:

➢ **[MENU] + "SENSITIVITY" + [ENTER] + "GAIN" + [ENTER]**

NOTE *The Sensitivity menu can be also opened by pressing:*
➢ **[ENTER]**
directly from the Radar page when the Cross Cursor is not placed over any features.

2.2.3 STC (Sensitivity Time Constant) Adjustment

Reduces the effects of the sea clutter that can adversely affect displayed targets.

To select the STC value follow the procedure:

➢ **[MENU] + "SENSITIVITY" + [ENTER] + "STC" + [ENTER]**

NOTE *The Sensitivity menu can be also opened by pressing:*
➢ **[ENTER]**
directly from the Radar page when the Cross Cursor is not placed over any features.

2.2.4 FTC (Fast Time Constant) Adjustment

Reduces the effects of rain, snow, fog and cloud that can adversely affect displayed targets.

To select the FTC value follow the procedure:

➢ **[MENU] + "SENSITIVITY" + [ENTER] + "FTC" + [ENTER]**

NOTE *The Sensitivity menu can be also opened by pressing:*
➢ **[ENTER]**
directly from the Radar page when the Cross Cursor is not placed over any features.

2.2.5 MBS (Main Bang Suppression) Adjustment

AVAILABLE ONLY FOR SWR 9/10

The MBS adjustment is indispensable for getting clear near center spot image. In general, you must adjust MBS and STC and Gain to obtain desired Radar image.

To select the MBS value follow the procedure:

➢ **[MENU] + "SENSITIVITY" + [ENTER] + "MBS" + [ENTER]**

NOTE *The Sensitivity menu can be also opened by pressing:*
➢ **[ENTER]**
directly from the Radar page when the Cross Cursor is not placed over any features.

2.3 RADAR FEATURES

2.3.1 Cursor Window

The content of the Cursor Window depends on cursor location.
It shows detailed information on the cursor Lon/Lat, the cursor bearing and range, the center of the screen, EBL/VRM, Guard Zone, Heading Marker and Parallel Cursor. It is hidden when the cursor is hidden.
To turn On or Off the Cursor Window follow the procedure:

➤ **[MENU] + "RADAR FEATURES" + [ENTER] + "CURSOR WINDOW" + [ENTER]**

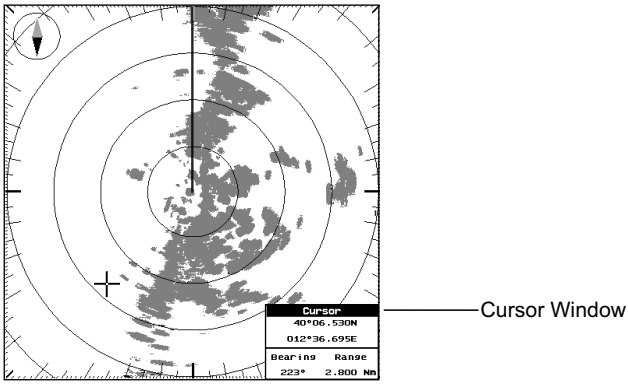


Fig. 2.3.1- The Cursor Window

2.3.2 Heading Marker

The Heading Marker (HM) is the line from the own vessel's position to the edge of the picture at the vessel's current heading with respect to the North indicated by the compass.

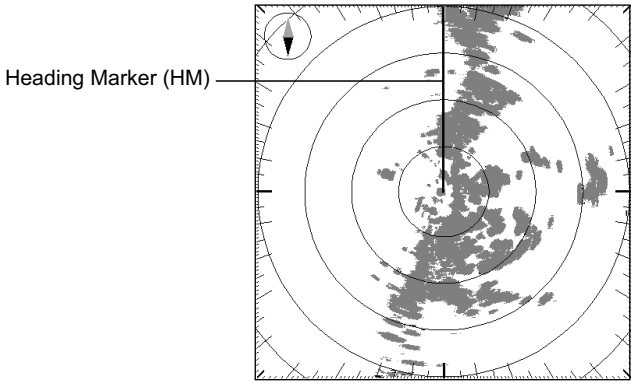


Fig. 2.3.2- The Heading Marker

The Heading Marker is updated each time the Radar image is updated. It can temporarily be hidden to check for small targets under it by positioning the Cross Cursor over it and pressing **[CLEAR]**.

To turn On or Off the display of the Heading Marker follow the procedure:

➢ **[MENU] + "RADAR FEATURES" + [ENTER] + "HEADING MARKER" + [ENTER]**

2.3.3 Degree Scale

The Degree Scale is the graduated scale located on the most external visible range ring edge of the Radar page, with major ticks at 0, 10, 20, …, 350 degrees and minor ticks at 5, 15, 25, …, 355 degrees.

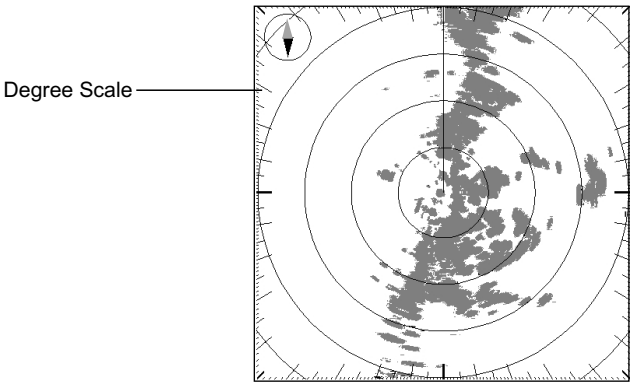


Fig. 2.3.3- The Degree Scale

To hide (Off) or unhide (On) the display of the Degree Scale follow the procedure:

➢ **[MENU] + "RADAR FEATURES" + [ENTER] + "DEGREE SCALE" + [ENTER]**

2.3.4 Range Rings

The Range Rings are concentric rings centered on the ship position, equally spaced.

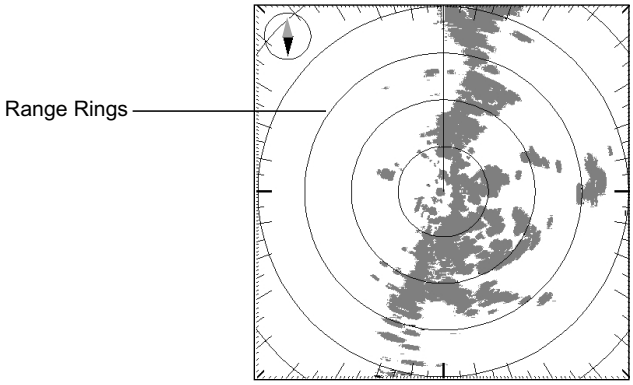


Fig. 2.3.4- The Range Rings

They are used to give an immediate idea of the range of targets from the ship. Their number and spacing are adjusted automatically accordingly with the Range Scale. The indication of the Range Rings interval is indicated in the Status Bar (see Par. 3.2.1).

To turn On or Off the display of the Range Rings follow the procedure:

➢ **[MENU] + "RADAR FEATURES" + [ENTER] + "RANGE RINGS" + [ENTER]**

2.3.5 Compass Rose

The Compass Rose is an icon used to identify four main directions: North, South, East and West. It is North oriented.

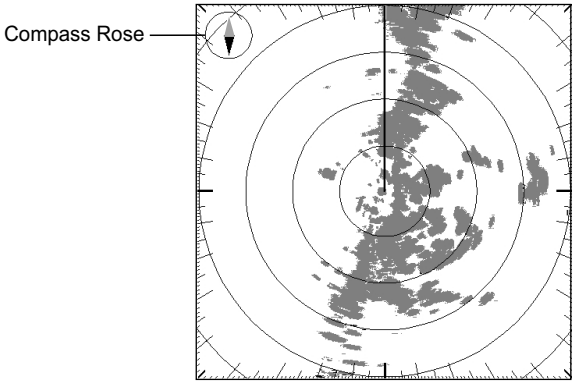


Fig. 2.3.5- The Compass Rose in the default Radar picture

NOTE *Requires a heading and position sensor connected to the chart plotter*

To hide (Off) or unhide (On) the display of the Compass Rose follow the procedure:

➤ **[MENU] + "RADAR FEATURES" + [ENTER] + "COMPASS ROSE" + [ENTER]**

2.3.6 EBL & VRM

Electronic Bearing Lines (EBL) and Variable Range Marker (VRM) are used to measure the range (distance) and the bearing between two points. A standard VRM is displayed by default as a circle with its center located on your vessel's position, and EBL is displayed as a line from the vessel's position to the edge of the Radar picture display.

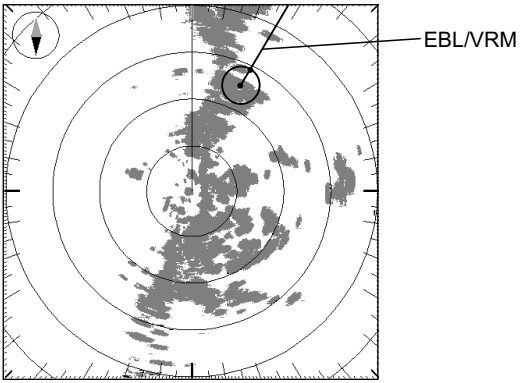


Fig. 2.3.6 - EBL & VRM display

2.3.6.1 Handling of EBL/VRM

Positioning the Cross Cursor on the EBL/VRM causes message "E/V" under the

cursor. It is possible to allow to MOVE, HOOK and HIDE it.

- **[MOVE]:** Allows moving EBL/VRM from the own ship's position to any location of the Radar page. Pressing **[ENTER]** once more confirms the new position; pressing **[CLEAR]** resets the original position.
- **[HOOK]:** hooks the EBL/VRM cross point allowing changing bearing and range using the Cursor Keys. Pressing [ENTER] once more confirms the new range and bearing, pressing [CLEAR] resets the original range and bearing values.
- **[EDIT]:** opens an edit window allowing editing the following parameters: the Lat/Lon position of EBL/VRM center, the range and bearing of EBL/VRM center from the center of the screen, and the range and bearing of the EBL/VRM.
- **[HIDE]:** hides the EBL/VRM.

It is allowed to place on Radar screen up to 2 EBL/VRM's. To turn EBL/VRM On or Off or to select 1 EBL/VRM, 2 EBL/VRM or both (1+2) EBL/VRM, follow the procedure:

➤ **[MENU] + "RADAR FEATURES" + [ENTER] + "EBL/VRM" + [ENTER]**

2.3.7 Parallel Cursor

It's a set of parallel lines with first line passing through the own ship's position and next lines being placed equally spaced and extending from the own ship's position towards one direction.

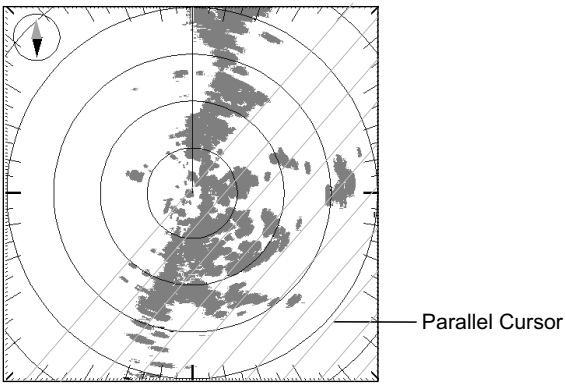


Fig. 2.3.7 - Parallel Cursor display

The user can change the angle of the lines and the range between lines. It is used to measure the bearing of other boats, navigate at a fixed distance from the coast, measure the distance between two points.
The display of the Parallel Cursor can be turned On or Off following the procedure:

➤ **[MENU] + "RADAR FEATURES" + [ENTER] + "PARALLEL CURSOR" + [ENTER]**

2.3.8 Center Offset

Allows to move the Radar center in any location of the screen.

2.3.8.1 Handling of center offset

If the Radar is in Relative Motion mode, positioning the Cross Cursor on the center of the Radar image, allows editing the Center Offset ("CTR" message is

shown under the cursor position).The soft keys are automatically displayed:

- **[MOVE]:** hooks the Radar image center allowing the user, using the Cursor Keys, to move it at any location on the Radar screen. At this point pressing [ENTER] confirms the new position of the center, pressing [CLEAR] reset the position of the Radar image at 0,0.
- **[EDIT OFFSET]:** opens an edit window where it is possible to edit the X Offset and Y Offset position in pixel at which the center of the screen is positioned.
- **[CENTER SCREEN]:** resets screen offset position to 0,0.

NOTE *In True Motion mode the user cannot change the screen center position.*

To set the Center Offset follow the procedure:

➤ **[MENU] + "RADAR FEATURES" + [ENTER] + "CENTER OFFSET" + [ENTER]**

2.4 CHART FEATURES

2.4.1 Chart Overlay Display Mode

AVAILABLE ONLY IN THE RADAR FULL PAGE.

Selects which cartographic objets are to be displayed when Chart Overlay function is active in Radar Full page.

The following chart presets shall be available:

- **Minimum**: only the coast lines and elevation objects, no area fill.
- **Low**: includes also area fills, important city names, Nav-Aids & Lights and underwater object icons.
- **Medium**: includes "Low" settings plus Ports & Services and Auto Chart Boundaries.
- **Full**: Full cartographic representation.
- **As Cartography page**: inherits settings from the current cartography setting.
- **Custom**: Custom chart representation.

To select the desired Chart Overlay Display Mode follow the procedure:

➤ **[MENU] + "CHART FEATURES" + [ENTER] + "CHART OVERLAY DISPLAY MODE" + [ENTER]**

2.4.2 Chart Synchronization

AVAILABLE ONLY IN THE RADAR CHART SPLIT PAGE

When Chart Synchronization is enabled, the chart display is syncronized to the Radar display. This function is enabled when Home mode is active (e.g. by pressing **[CLEAR]** from the chart screen). An alert window showing the message "Radar - Chart Synchronization mode On" is displayed.

To enable (On) or disable (Off) the Chart Synchronization follow the procedure:

➤ **[MENU] + "CHART FEATURES" + [ENTER] + "CHART SYNCHRONIZATION" + [ENTER]**

2.4.3 Cursor Echo

AVAILABLE ONLY IN THE RADAR CHART SPLIT PAGE

This function allows to correlate targets on the Radar display with objects in the chart.

Moving the Radar cursor on Radar display will cause moving another cursor over the chart. The cursor over the chart shall be positioned over the same lat/lon of

the cursor over the Radar.
When the Cursor Echo function is enabled, the Radar cursor in the chart display is always shown even if the cursor in the Radar display is hidden.

To enable (On) or disable (Off) the Cursor Echo follow the procedure:

➤ **[MENU] + "CHART FEATURES" + [ENTER] + "CURSOR ECHO" + [ENTER]**

2.4.4 Color Palette

Selects the Color Palette.
It is possible to set Green over Black, Orange over Black, Green over White, Blue over White:

➤ **[MENU] + "CHART FEATURES" + [ENTER] + "COLOR PALETTE" + [ENTER]**

2.5 GUARD ZONES

Your Radar allows a function to help you avoid a collision. It is possible to set an alarm to trigger when a target is within a specified zone, the Guard Zone.
It is allowed to display up to 2 Guard Zones, Sector or Circular.

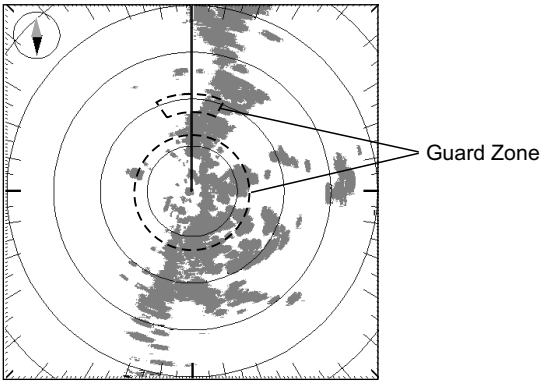


Fig. 2.5 - Guard Zone display

When a Guard Zone is active, the Guard Alarm sounds when a target enters its area.

NOTE *A Guard Zone only operates when the whole zone is displayed on the screen. In addition, a Guard Zone is inactive for 10 seconds after it is placed or re-sized, to avoid inappropriate alarms during positioning.*

2.5.1 Handling of Guard Zone

Positioning the Cross Cursor over a Guard Zone, causes the message "GZ" to be displayed under the cursor. It is possible to allow to HOOK or HIDE the Guard Zone.

- **[HOOK]:** allows changing Guard Zone range by moving up/down Cursor Keys.
- **[HIDE]:** hides the Guard Zone.

2.5.2 Guard Zone Sensitivity

It defines a limit (selectable from 0 to 100) under which echoes cause an alarm condition, when detected inside a Guard Zone.

Guard Zone Sensitivity default is 50.
The value 100 is the most sensitive (the system is always on, every detected echo cause an alarm condition) and the value 000 is the least sensitive (equal to switching the alarm off).

To turn the alarm On or Off follow the procedure:

- **[MENU] + "GUARD ZONES" + [ENTER] + "GUARD ZONE" + [ENTER]**

3. Radar Pages

This section will assist you to select the desired Radar page.

NOTE *The Radar display page is available only if the Radar is connected and powered On, and the Radar is in Transmit mode (see Chapter 1).*

3.1 PAGES SELECTION

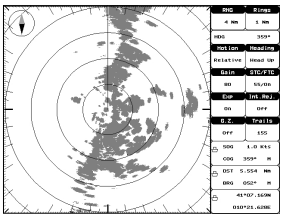
The Page Selection menu allows you to change the Radar page displayed. To access this menu:

➤ **[MENU] + "PAGE" + [ENTER] + "RADAR" + [ENTER]**

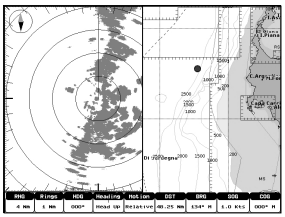
NOTE *On 10.4 Model:* ➤ **[DATA] + "RADAR" + [ENTER]**
On 12.1 Model: ➤ **[PAGE] + "RADAR" + [ENTER]**

The menu now shows four selections related to the Radar: **Radar Full page**, **Radar Split Chart page**, **Radar Split Fish Finder page**, **Radar Split Highway page**, **Radar Combo Page** (Radar, Chart, Fish Finder, Highway). Move the cursor to select the desired item and then press **[ENTER]**.

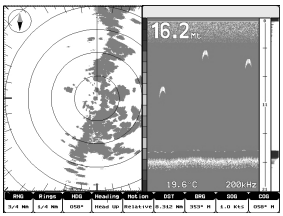
The Radar Full page



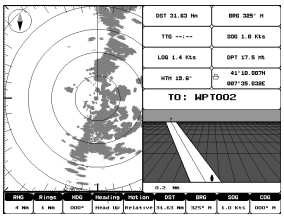
Radar Split Chart page



Radar Split Fish Finder page



Radar Split Data page



Radar Combo page

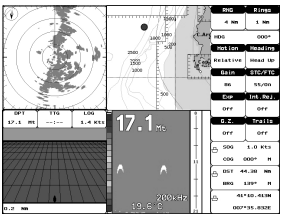


Fig. 3.1 - Available Radar pages

3.1.1 Selection by Soft Key

The default soft keys configuration can be customized. When the Radar is connected, any soft key can be assigned any of the Radar pages.
Pressing and holding down any of the four soft key shows a pop-up window on the top of the soft key pressed that contains all possible data pages assignable to the soft key pressed. Move the cursor key up/down to place the selector on the desired item; move the cursor key to the right or press **[ENTER]** to set the selected item; move the cursor key to the left or press **[CLEAR]** to close the pop-up window. In the picture below, the four soft keys are customized to select four among the five available Radar page:

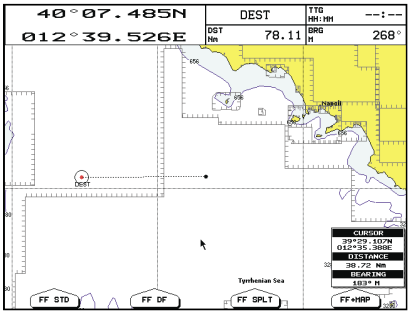


Fig. 3.1.1 - Radar page selection by Soft Key ---------- TO UPDATE-------

Press **[FULL]** to show the Full page, **[RADAR+CHART]** to show the Radar Split Chart page, **[RADAR+FF]** to show the Radar Split Fish Finder page, **[RADAR +DATA]** to show the Radar Split Data page and **[RADAR 4]** to show the Radar/ Chart/Fish Finder/Highway page.

3.2 STATUS BAR

It is a group of up to 15 data boxes. You select which data is displayed in the boxes during system set up.
The default data box are shown in the following figure:

1. RNG (Radar Range) and Range rings interval
2. Current Heading
3. Motion Mode and Heading Mode indication
4. Gain and STC/FTC indication
5. Expansion and Interference Rejection
6. Guard Zone alarms and Trails
7. Ship Speed Over Ground and Course Over Ground
8. Ship Distance and Bearing from destination
9. Ship Lat/Lon
10. Cursor Window

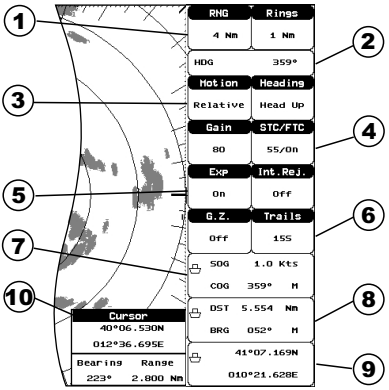


Fig.3.2 - The Default Status Bar

3.3 MENU HANDLING ON FULL PAGES

When in Radar Full page pressing **[MENU]** once opens the Radar Setup menu. pressing **[MENU]** twice opens the Main menu.

3.4 SELECTION OF THE "ACTIVE" VIEW IN SPLIT/ COMBO PAGES

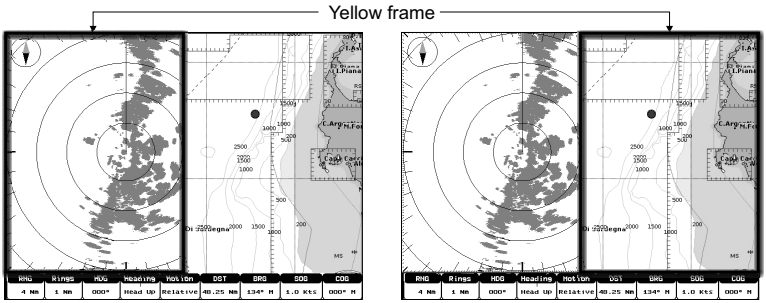


Fig. 3.4- Selection of active View

When in Split/Combo pages, the active view is highlighted by a focus (Yellow frame). The Radar commands are related to that focused view to move the focus press **[MENU]** twice.

4. Technical Specifications

This chapter provides specifications of the several types of Radar.

4.1 SWR 1

Antenna unit

Power supply		: 10.8 to 31.2 VDC
Power consumption		: 30W or less
Preheat times		: 90 sec
Aerial		: Radome 0.9 Feet
Peak power output		: 2kW
Trasmitting frequency		: 9445+/-30MHz
Beam width (degree)	Horizontal	: 7°
	Vertical	: 25°
Sidelobes Within +/-10°		: <=-20dB
Rotation		: 30rpm
Pulse Length (msec)/PRF (Hz)	S	: 0.1/2200
	M, M1	: 0.3/1100
	L, M2	: 0.8/550
IF center frequency		: 60MHz (Linear amplifier)
IF bandwidth	S	: 6MHz
	M, M1	: 6MHz
	L, M2	: 3MHz
Noise figure		: 10dB nominal
Operating Temperature		: -25° ~ +55°
Operation in wind (relative)		: 100 knots
Water Resistence		: IPX6 (IEC60529)
Preheat times output (by 5 sec step)		: 85 sec to 5 sec

Dimensions and Mounting

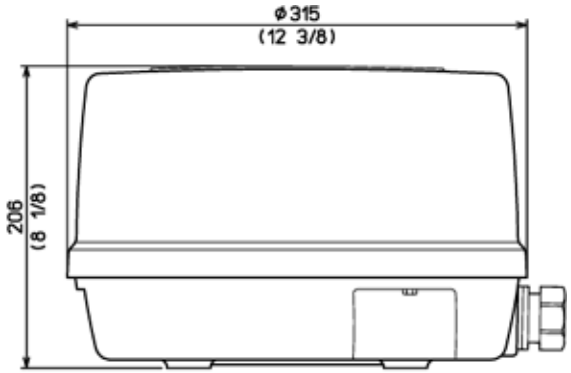
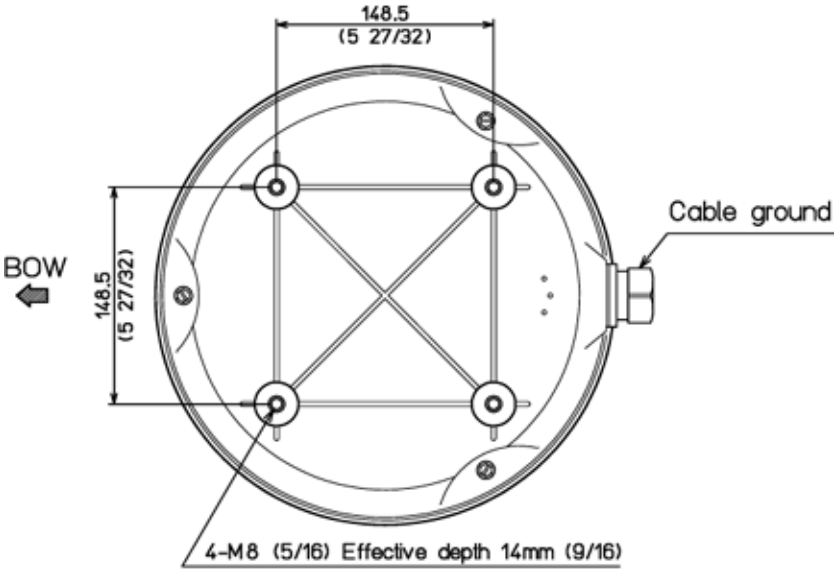


Fig. 4.1 - Radar SWR 1 (I)



Weight: 4.5 kg (10 lb) without cable
Weight: 5.5 kg (12.5 lb) 10m cable included

Fig. 4.1a - Radar SWR 1 (II)

4.2 SWR 8

Antenna unit

Power supply		: 10.8 to 41.6 VDC
Power consumption		: 30W or less
Preheat times		: 90 sec
Aerial		: Radome 1.5 Feet
Peak power output		: 2kW
Trasmitting frequency		: 9445+/-30MHz
Beam width (degree)	Horizontal	: 4.7°
	Vertical	: 25°
Sidelobes Within +/-10°		: <=-20dB
Rotation		: 30rpm
Pulse Length (msec)/PRF (Hz)	S	: 0.1/2200
	M, M1	: 0.3/1100
	L, M2	: 0.8/550
IF center frequency		: 60MHz (Linear amplifier)
IF bandwidth	S	: 6MHz
	M, M1	: 6MHz
	L, M2	: 3MHz
Noise figure		: 10dB nominal
Operating Temperature		: -25° ~ +55°
Operation in wind (relative)		: 100 knots
Water Resistence		: IPX6 (IEC60529)
Preheat times output (by 5 sec step)		: 85 sec to 5 sec

Dimensions and Mounting

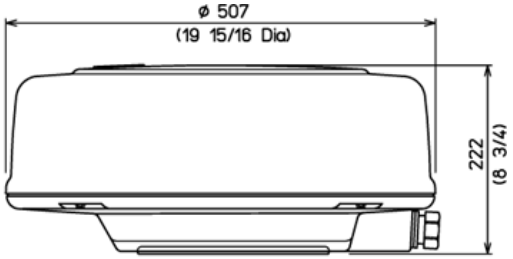
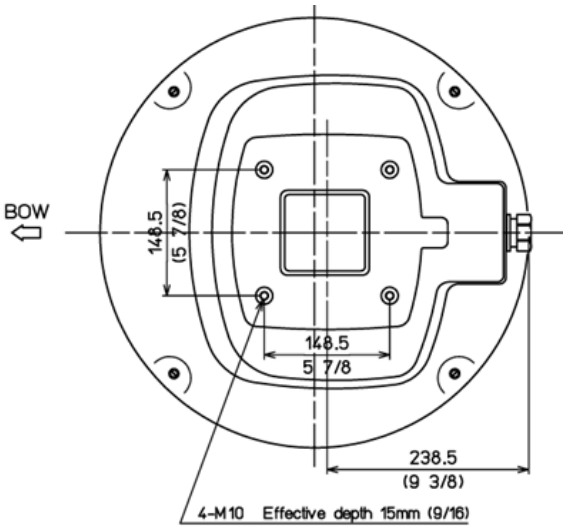


Fig. 4.2 - Radar SWR 8 (I)



Weight: 8.1 kg (18.0 lb) 10m cable included
Weight: 6.8 kg (15.0 lb) without cable

Fig. 4.2a - Radar SWR 8 (II)

4.3 SWR 9

Antenna unit

Power supply		: 10.8 to 41.6 VDC
Power consumption		: 45W or less
Preheat times		: 120 sec
Aerial		: Radome 1.8 Feet
Peak power output		: 4kW
Trasmitting frequency		: 9410+/-30MHz
Beam width (degree)	Horizontal	: 4.0°
	Vertical	: 25°
Sidelobes Within +/-10°		: <=-20dB
Rotation		: 24rpm
Pulse Length (msec)/PRF (Hz)	S	: 0.1/2000
	M, M1	: 0.25/2000
	L, M2	: 0.5/1000

	L, L1	: 1.0/500
IF center frequency		: 60MHz (Linear amplifier)
IF bandwidth	S	: 6MHz
	M, M1	: 6MHz
	L, M2	: 3MHz
	L, L1	: 3MHz
Noise figure		: 6.0dB or less
Operating Temperature		: -25° ~ +55°
Operation in wind (relative)		: 100 knots
Water Resistence		: IPX6 (IEC60529)
Preheat times output (by 5 sec step)		: 115 sec to 5 sec

Dimensions and Mounting

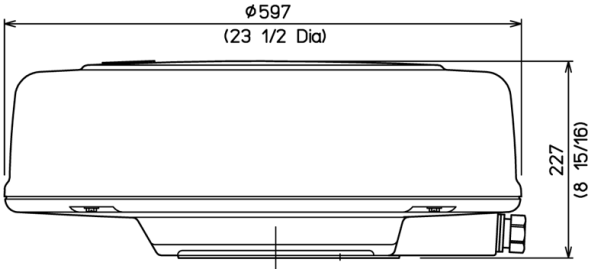
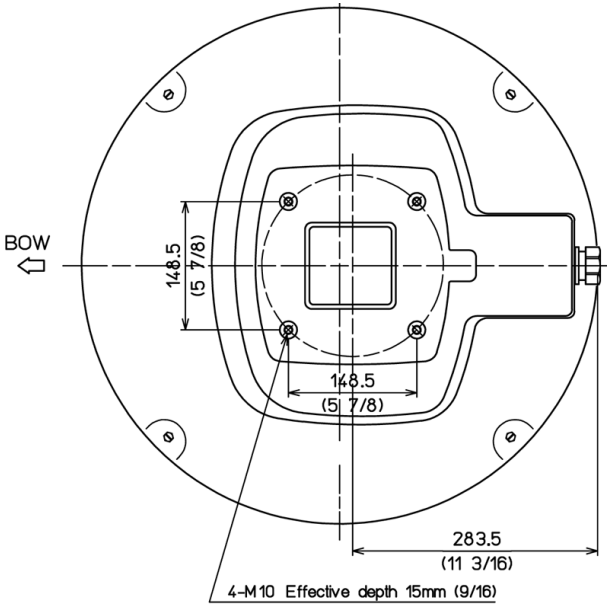


Fig. 4.3 - Radar SWR 9 (I)



Weight: 9.7 kg (21.5lb) 10m cable included
Weight: 8.4 kg (19.0lb) without cable

Fig. 4.3a - Radar SWR 9 (II)

4.4 SWR 10

Antenna unit

Power supply		: 10.8 to 41.6 VDC
Power consumption		: 80W or less
Preheat times		: 120 sec
Aerial		: Open 3.5 o3 4.5 Feet
Peak power output		: 4kW
Trasmitting frequency		: 9410+/-30MHz
Beam width (degree)	Horizontal	: 2.4° or 1.7°
	Vertical	: 25°
Sidelobes	Within +/-10°	: <=-23dB
	Outside +/-10°	: <=-32dB
Rotation		: 24rpm
Pulse Length (㎳ec)/PRF (Hz)	S	: 0.06/4000
	M, M1	: 0.15/2000
	L, M2	: 0.4/1000
	L, L1	: 1.0/500
IF center frequency		: 60MHz (Linear amplifier)
IF bandwidth	S	: 20MHz
	M, M1	: 20MHz
	L, M2	: 5MHz
	L, L1	: 5MHz
Noise figure		: 5.0dB or less
Operating Temperature		: -25° ~ +55°
Operation in wind (relative)		: 70 knots
Water Resistence		: IPX6 (IEC60529)
Preheat times output (by 5 sec step)		: 115 sec to 5 sec

Dimensions and Mounting

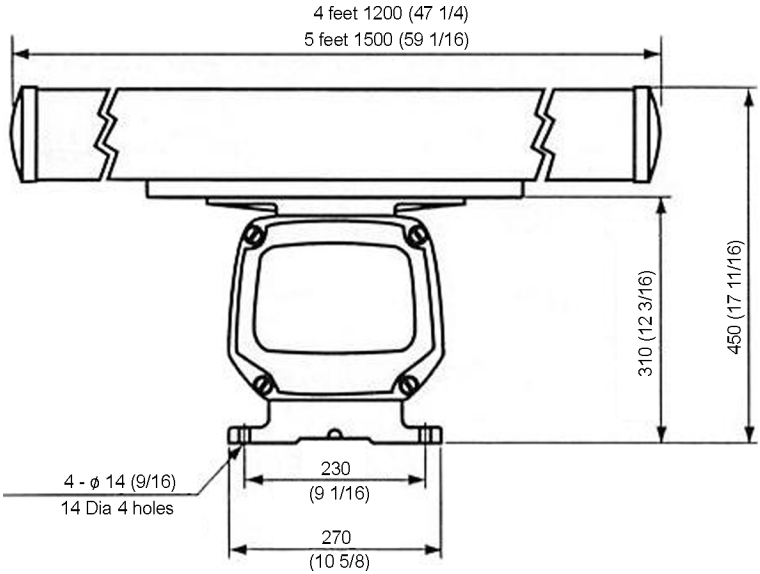
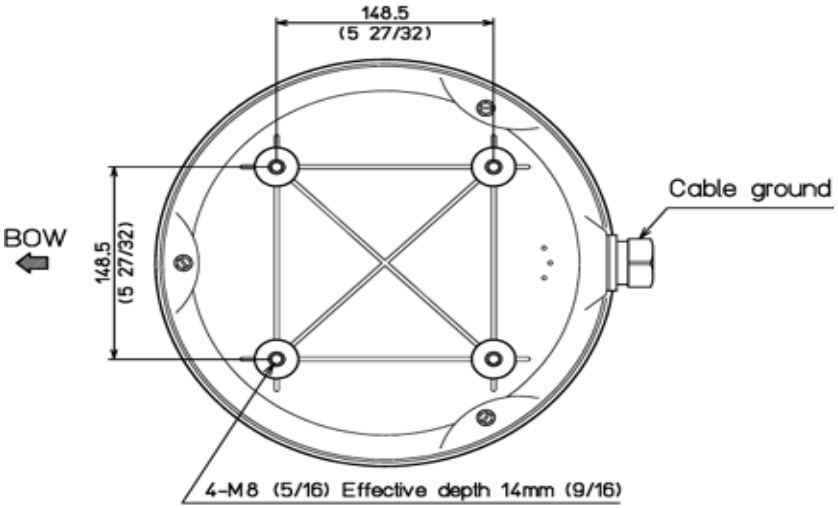


Fig. 4.4 - Radar SWR 10 (I)



Weight: 4.5 kg (10 lb) without cable
Weight: 5.5 kg (12.5 lb) 10m cable included

Fig. 4.4a - Radar SWR 10 (II)

5. Frequently Asked Questions

5.1 I connected the Radar but the chart plotter doesn't show any Radar page, why?

You probably didn't setup properly the I/O port to communicate with the Radar. Go into the I/O menu:

➤ **[MENU] + [MENU] + "ADVANCED" + [ENTER] + "Input/Output" + [ENTER]**

and setup the I/O port to which you have connecter your Radar to support it.

5.2 How can I turn Radar power On/Off

Radar power On/Off can be either directly controlled from the chart plotter or by an external switch depending on how you have set up your chart plotter. In case the power is managed by the chart plotter you can turn power On by pressing [MENU] when in the Radar Page. Otherwise you have to turn power On by acting on the external switch.

5.3 How should I setup the chart plotter to control the Radar power On/Off?

Please refer to Par. 1.1 for cabling schematic.
Enter the [specific for the plotter family] menu and [perform operation specific for each plotter family].

5.4 What is the preheating?

Each time you power On the Radar you must allow 90 to 120 seconds (depending on the Radar model) to warm up the Radar. Operating the Radar before this time could cause damage to it. For this reason the chart plotter doesn't allow operating the Radar until the preheating is complete.

5.5 Some time the preheating takes less than 90 seconds, is this normal?

Yes it is. It means that the Radar was already powered on at the time you turned On the chart plotter so the preheating started before.

5.6 What should I do at first Radar installation ?

At first installation its necessary to:
1) properly set up the Radar calibration
2) set up the I/O to detect the Radar

5.7 What is the Radar calibration?

Radar calibration is a set of options that allows to properly set the Radar to work on your boat.
You can set up the Heading correction, to compensate of orientation errors due to the installation, the Radar trigger delay to properly adjust the Radar beam as to correctly measure ranges, and finally the sensitivity of the Radar to maximise the Radar sensitivity.

5.8 When and how should I adjust the Radar heading?

At first installation you should correct the Radar heading as to ensure that it is

perfectly aligned with your bow.

5.9 When and how should I adjust the Radar Trigger delay?

At first installation. It is required to ensure the Radar is capable to perfectly measure ranges and avoid distorsions. Please follow the procedure described at Par. 1.2.4.1.

5.10 When should I do the Radar tuning?

Radar tuning is generally not necessary since it is already tuned at the factory. However in the long run or in case some components are replaced it could be necessary to perform tuning to achieve the maximum sensitivity.

5.11 Should I use the Manual or Auto Tuning?

We strongly suggest to use the Auto Tuning that generally is capable to give optimal results.

5.12 How should I do the Manual tuning?

Follow procedure at Par. 1.2.4.

5.13 How can I turn Radar Transmission On/Off?

From the Radar page to turn transmission On you have simply to press [ENTER].

5.14 I can't turn Chart Overlay On, why?

To turn Chart Overlay On you must have both a GPS and a heading sensor connected to the chart plotter. If the chart plotter doesn't detect such devices it will automatically disable the Chart Overlay option.

5.15 I can't set the North Up or Course Up navigation mode, why?

To turn On the North Up or Course Up navigation modes you must have both a GPS and a heading sensor connected to the chart plotter. If the chart plotter doesn't detect such devices it will automatically disable such option.

5.16 I can't set up the True Motion mode, why?

To turn On the True Motion mode you must have both a GPS and a heading sensor connected to the chart plotter. If the chart plotter doesn't detect such devices it will automatically disable such option.

5.17 Why do I need a Heading Sensor and a GPS to use all Radar functionalities?

Because the Radar need to know the current position of the boat and its current heading.

5.18 What are the functions that require a GPS or a Heading Sensor?

Function	Heading	GPS FIX
North Up Radar orientation	Y	N
Track Up Radar orientation	Y	N
True Motion mode	Y	Y
Chart Overlay	Y	Y
Radar/Chart Synchronization	Y	Y
Cursor Echo	Y	Y

Waypoints/Marks	Y	Y
Lat/Lon Grid	Y	Y
Cartography Objects Info	Y	Y
Cartography Objects Display	Y	Y
Head Up Mode	N	N
Relative Motion mode	N	N

5.19 Is it better a gyrocompass or a flux gate compass?

The gyrocompass it is a better choice because it is faster but it is much more expensive. The flux gate compass is slower but it is much cheaper. Using a flux-gate you have to expect to see delays in the rotation of the chart when in Chart Overlay mode.

5.20 How can I be advised of potential dangers for the navigation?

Using the Guard Zone alarms.

5.21 What are Guard Zones?

Guard Zones are zones defined by the user that causes an audible and visual alarm to be triggered when a target exeeding a certain density enters into it. The density of the target that may trigger the alarm is regulated by mean of the Guard Zone sensitivity. There are of two types of Guard Zones: Circular or Sectorial. Their are fixed with respect to the the ship position and heading but their range and orientation (only for sector type) are user defined.

5.22 How should I set the Guard Zone sensitivity?

Guard Zone sensitivity must be regulated accordingly to the current Gain of the Radar. The higher the sensitivity the smaller the target that may trigger the alarm. In general if you regulated your Radar to obtain a clean picture you can set the Guard Zone sensitivity very high to detect even the smaller targets. In case in the Radar picture is present clutter due to the higher gain set, you'll have to reduce the Guard Zone sensitivity to avoid triggering false alarms. In general a way to set the maximum sensitivity for a Guard Zone is to start increasing the sensitivity until an alarm is triggered and then reduce the sensitivity until the alarm stops.

5.23 What is the STC, and how should I operate it?

STC is the Sensitivity Time Constant. It is used to reduce the sensitivity and thus the clutter in the ranger closer to the Radar. Operate the STC as to reduce the echoes coming from the closer ranges to an acceptable range.

5.24 What is the FTC and how should I operate it?

FTC is the Fast Time Constant. It is used to reduce the echoes coming from large objects that can hide other small objects. It is also called the rain control since it is capable to reduce the effects of the rain on the display.

5.25 What is the MBS?

The MBS is the Main Bang Suppression. It is used to suppress the stronger echoes caused by Radar transmission in the receiver. It like the STC but its operates in a shorter range.

Declaration of Conformity

(As required by Article 6.3 of Directive 1999/5/EC-RTTE Directive)

Declares under his sole responsibility that the produced Marine Radar System manufactured by

Koden Electronics Co., Ltd.
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Uenohara-Machi, Kitatsuru-Gun
Yamanashi-Ken
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Telephone +81 554 20 5865 **Telefax +81 554 20 5880**

Intended for Worldwide use as a Radar Sensor for use aboard non-SOLAS vessels and identified by the type number RADARpc (MDS-1) to which this declaration refers has been tested to the essential radio test suites required by the notified body and is in conformity with the standards

EN60945

and

IEC 60936-1 Annex D

and complies with the essential requirements of Directive 1999/5/EC

Conformity procedure under Annex IV of 1999/5/EC (Technical Construction file) has been

QinetiQ (0191) Fort Cumberland Road, Eastney, Portsmouth, England.

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QA Manager.
Koden Electronics Co., Ltd.
25 Dec. 2003

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Intended for Worldwide use as a Radar Sensor for use aboard non-SOLAS vessels and identified by the type number MDS-8 to which this declaration refers has been tested to the essential radio test suites required by the notified body and is in conformity with the standards

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and complies with the essential requirements of Directive 1999/5/EC

Conformity procedure under Annex IV of 1999/5/EC (Technical Construction file) has been undertaken by
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QA Manager.
Koden Electronics Co., Ltd.
01 Feb. 2005

CE 0191

SWR 8 is the Seiwa name for RADARpc (MDS-8)

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Intended for Worldwide use as a Radar Sensor for use aboard non-SOLAS vessels and identified by the type number MDS – 9 to which this declaration refers has been tested to the essential radio test suites required by the notified body and is in conformity with the standards

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01 Feb. 2005

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Intended for Worldwide use as a Radar Sensor for use aboard non-SOLAS vessels and identified by the type number MDS-10 to which this declaration refers has been tested to the essential radio test suites required by the notified body and is in conformity with the standards

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and complies with the essential requirements of Directive 1999/5/EC

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