



INSTRUCTION MANUAL

MARINE RADAR

MR-1210RⅡ
(Radome type)

MR-1210TⅡ
(Open array type: 4 kW)

MR-1210TⅢ
(Open array type: 6 kW)



SYSTEM COMPONENTS

| MODEL NAME | DISPLAY UNIT | SCANNER UNIT |
|-------------|---------------------|---------------------------------|
| MR-1210RII | 12.1-inch Color LCD | EX-2714 (Radome type) |
| MR-1210TII | | EX-2780 (Open array type: 4 kW) |
| MR-1210TIII | | EX-2780 (Open array type: 6 kW) |

SUPPLIED ACCESSORIES

• 12.1-inch Color LCD display unit

| | Quantity |
|--|----------|
| ① Front cover | 1 |
| ② NMEA connector (PLT-167-P-R) | 1 |
| ③ NMEA connector (PLT-168-P-R) | 1 |
| ④ Spare fuse (FGB 15 A) | 1 |
| ⑤ Spare fuse (FGB 5 A: for over 24 V power supply) | 1 |
| ⑥ DC power cable | 1 |
| ⑦ Mounting bracket | 1 |
| ⑧ Mounting knob bolts | 2 |
| ⑨ Installation bolts (M6×30) | 5 |
| ⑩ Installation nuts (M6) | 5 |
| ⑪ Spring washers (M6) | 10 |
| ⑫ Flat washers (M6) | 10 |
| ⑬ Instruction manual | 1 |
| ⑭ Operating guide | 1 |
| ⑮ Display unit template | 1 |
| ⑯ EX-2714 template | 1 |
| ⑰ EX-2780 template | 1 |

• EX-2714 (Radome type unit)

| | Quantity |
|-------------------------------------|----------|
| ① System cable (15 m) | 1 |
| ② Installation bolts (M10×50) | 4 |
| ③ Installation bolts (M10×25) | 4 |
| ④ Installation nuts (M10) | 4 |
| ⑤ Flat washers (M10) | 4 |
| ⑥ Spring washers (M10) | 4 |

• EX-2780 (Open array type unit)

| | Quantity |
|-------------------------------------|----------|
| ① System cable (20 m) | 1 |
| ② Installation bolts (M10×40) | 4 |
| ③ Installation nuts (M10) | 4 |
| ④ Flat washers (M10) | 4 |
| ⑤ Spring washers (M10) | 4 |
| ⑥ Allen wrench | 1 |
| ⑦ Cap bolts (M8×18 mm) | 4 |
| ⑧ Belleville washers (8L) | 4 |
| ⑨ Sealing washers (T) | 4 |
| ⑩ Flat washers (M8) | 4 |
| ⑪ Flat washers (AW) | 4 |
| ⑫ Ferrite EMI filter | 1 |
| ⑬ Silicon sealant | 1 |

The MR-1210RII/MR-1210TII/MR-1210TIII are supplemental aids to navigation and are not intended to be a substitute for accurate and current nautical charts.

Thank you for choosing this Icom product. The **MR-1210RII**, **MR-1210TII**, and **MR-1210TIII** MARINE RADARS are designed and built with Icom's state of the art technology and craftsmanship. With proper care, this product should provide you with years of trouble-free operation.

IMPORTANT

READ THIS INSTRUCTION MANUAL CAREFULLY before attempting to operate the radar.

SAVE THIS INSTRUCTION MANUAL. This manual contains important safety and operating instructions for the MR-1210RII/MR-1210TII/MR-1210TIII.

FEATURES

The **MR-1210RII**, **MR-1210TII**, and **MR-1210TIII** MARINE RADARS are designed especially for fishing boats. It has powerful transmitting power, a 12.1-inch Color LCD display and many other advanced features.

EXPLICIT DEFINITIONS

| WORD | DEFINITION |
|-------------------|--|
| ⚠ DANGER! | Personal death, serious injury or an explosion may occur. |
| ⚠ WARNING! | Personal injury, fire hazard, or electric shock may occur. |
| CAUTION | Equipment damage may occur. |
| NOTE | If disregarded, inconvenience only. No risk of personal injury, fire, or electric shock. |

Icom is not responsible for the destruction, damage to, or performance of any Icom or non-Icom equipment, if the malfunction is because of:

- Force majeure, including, but not limited to, fires, earthquakes, storms, floods, lightning, other natural disasters, disturbances, riots, war, or radioactive contamination.
- The use of Icom marine radar with any equipment that is not manufactured or approved by Icom.

BE CAREFUL!

SART signals may not be detected and may not be displayed on the screen depending on the **SEA**, **RAIN** or **IR** settings.

Follow the settings as below to detect the SART signals on the screen.

- ① Select the screen range between 6 NM to 12 NM with **[+/-]**. (pp. 1, 16)
- ② Set the **[GAIN]** as high as possible. (pp. 2, 16)
- ③ Set the **[SEA]** to minimum. (pp. 2, 16)
- ④ Set the **[RAIN]** to minimum. (pp. 2, 16)
- ⑤ Turn OFF the Interference Rejection (IR) function. (p. 19)
- ⑥ Turn OFF the Echo Stretch function. (p. 19)

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PRECAUTIONS

For Display unit:

⚠ **WARNING! NEVER** let metal, wire or other objects contact the inside of the display unit, or make incorrect contact with connectors on the rear panel. This could cause an electric shock or damage the display unit.

⚠ **WARNING! NEVER** apply AC voltage to the DC connector of the display unit. This could cause a fire or damage the display unit.

⚠ **WARNING! NEVER** apply more than 42 V DC to the DC connector of the display unit. This could cause a fire or damage the display unit.

⚠ **WARNING! NEVER** touch or operate the display unit with wet hands. This could cause an electric shock or damage the display unit.

⚠ **WARNING! NEVER** open the display unit. There are no user adjustment points. This could cause an electric shock and incorrect reassembly may cause a fire hazard.

⚠ **WARNING! NEVER** operate the radar during a lightning storm. It may result in an electric shock, cause a fire or damage the display unit. Always disconnect the power source and scanner unit before a storm.

⚠ **WARNING! NEVER** reverse the DC power cable polarity. This could cause a fire or damage the display unit.

⚠ **WARNING! NEVER** remove the fuse holder on the DC power cable. Excessive current caused by a short could cause a fire or damage the display unit.

CAUTION: DO NOT use or place the display unit in areas with temperature below -15°C ($+5^{\circ}\text{F}$) or above $+55^{\circ}\text{C}$ ($+131^{\circ}\text{F}$).

CAUTION: DO NOT use harsh solvents such as Benzine or alcohol when cleaning the display unit, as they will damage the display unit surfaces.

CAUTION: DO NOT place the display unit in excessively dusty environments.

DO NOT place the display unit near heating equipment or in direct sunlight or where hot or cold air blows directly onto it.

DO NOT place the display unit in areas that could block air passage or put anything around the display unit. This will obstruct heat dissipation.

KEEP the display unit out of the reach of unauthorized persons.

KEEP the display unit away from heavy rain, and never immerse it in the water.

The display unit meets IPX4 requirements for splash resistance when the supplied connection cable, scanner unit are connected.

However, if it is dropped, splash resistance cannot be guaranteed because of possible damage to the case or the waterproof seals.

The LCD display may have cosmetic imperfections that is displayed as small dark or light spots. This is not a malfunction or defect, but a normal characteristic of LCD display.

For Scanner unit:

⚠ **DANGER: HIGH VOLTAGE! NEVER** open the scanner unit. The scanner unit contains high voltage that could be fatal. And there are no user adjustment points. All repairs and adjustments **MUST** be made by a qualified electronics technician at your Marine Navigation Dealer.

For qualified electronics technician only:

⚠ **DANGER: HIGH VOLTAGE!** High voltages of up to 3,500 volts are used in the scanner unit. Although prudent measures for safety have been adopted, sufficient care must be taken in the operation, maintenance and adjustment of the scanner unit. Electric shock of 1,000 volts or more may cause electrocution and death, even an electric shock of only 100 volts may be fatal.

⚠ **DANGER: HIGH VOLTAGE! DO NOT** turn OFF the radar's power and do not reach inside the scanner unit before you have:

- discharged the capacitors by disconnecting the system cable from the radar unit for 5 minutes.
- checked that no electric charges remain inside the device.

Also, it is recommended to wear dry insulated rubber gloves. **NEVER** use both hands simultaneously, keep one hand in your pocket.

⚠ **WARNING: RADIATION HAZARD!**

Radiation emitted from the scanner unit can be harmful, particularly to your eyes. To avoid harmful radiation, turn OFF the radar's power before working on the scanner unit.

DO NOT use or place the scanner unit in areas with temperature below -25°C (-13°F) or above $+70^{\circ}\text{C}$ ($+158^{\circ}\text{F}$).

NEVER immerse the scanner unit in the water.

The scanner unit meets IPX6* requirements for high-pressure water jet resistance.

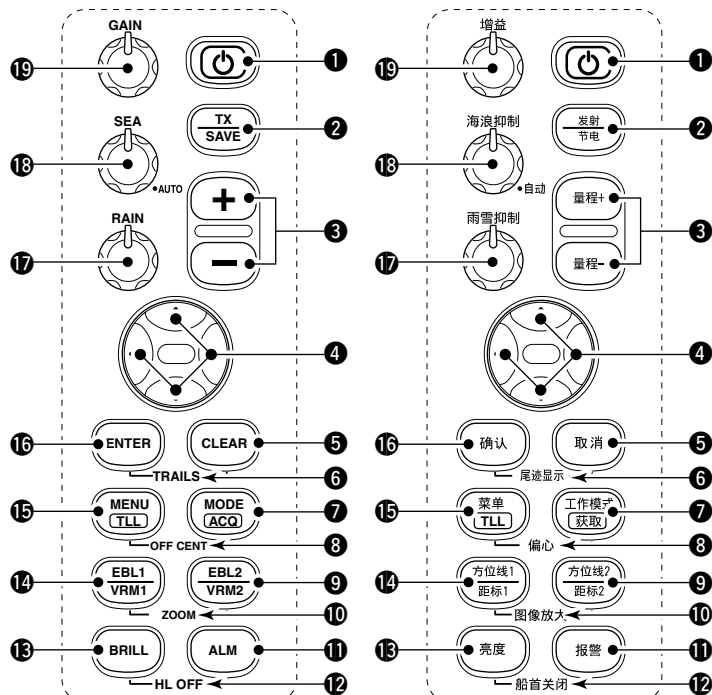
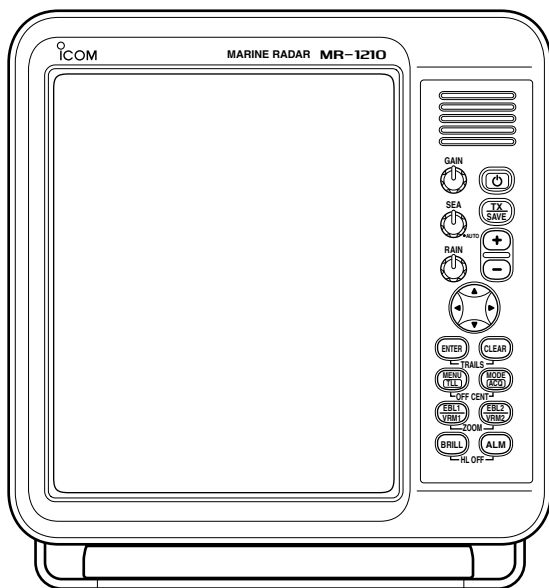
However, if the scanner unit is dropped, high-pressure water jet resistance cannot be guaranteed because of possible damage to the cases or the waterproof seals.

* Except for the cable connectors. They meet IPX4 requirements while connecting to the radar unit.

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Front panel



Control panel (English)

Control panel (Chinese)

1 POWER SWITCH [⏻] (p. 16)

Push to turn the radar power ON or OFF.

- The initial screen is displayed and a beep sounds after the power has been turned ON.
- The magnetron inside the scanner unit warms up for 90 seconds and the warm up time is counted down on the screen.

2 TRANSMIT/SAVE KEY [TX (SAVE)]/[发射(节电)]

- ➔ Push to toggle between the TX mode and the standby mode. (p. 16)
- ➔ Hold down for 1 second to turn ON the power save function. The radar for TX interval scan is fixed at 10 revolutions. (p. 22)
 - Select the save time in the System menu.

3 RANGE UP/ DOWN KEYS [+]/[-]/ [量程+]/[量程-] (p. 16)

[量程+]/[量程-] (p. 16)

Push [+] to increase the screen range.

Push [-] to decrease the screen range.

4 UP, DOWN, LEFT, RIGHT KEYS [▲] [▼] [◀] [▶]

- ➔ Sets the EBLs, VRMs, alarm area, ATA target, AIS target, and so on.
- ➔ In the Menu screen, push [◀] or [▶] to select the Menu group, or push [▲] or [▼] to select the menu items.
- ➔ In the normal operating mode, push a combination of the [▲]/[◀], [▲]/[▶], [▼]/[◀], or [▼]/[▶] to move the cross line cursor to the upper left, upper right, lower left, or lower right.

5 CLEAR KEY [CLEAR]/[取消]

- ➔ In the Menu screen, push to cancel the Submenu or Option selection mode. (p. 5)
- ➔ Hold down for 1 second to turn the activated AIS target into a sleeping target. (p. 38)
 - Hold down [ENTER]/[确认] for 1 second to change the sleeping AIS target to an activated target.
- ➔ Hold down for 1 second to release the ATA target or delete the TLL mark. (pp. 32, 52)

6 TRAILS KEY [TRAILS]/[尾迹显示] (p. 21)

- ➔ Simultaneously push [ENTER]/[确认] and [CLEAR]/[取消] to turn the trail function ON or OFF. This is useful for watching other vessel's tracks, and approximate relative speed.
 - The Trail settings can be changed in the Trail menu.
- ➔ Hold down [ENTER]/[确认] and [CLEAR]/[取消] for 1 second to erase the plotted echoes when the trail function is ON.

7 MODE•ACQUIRE TARGET KEY [MODE•ACQ]/[工作模式•获取]

- ➔ Push to select the Head-up (H-UP), Stabilized Head-up (SH-UP), Course-up (C-UP), North-up (N-UP) or True motion (TM) screens.
 - The North-up, Stabilized Head-Up, and Course-up screens can be selected only when a bearing data input is connected. (pp. 42, 63)
 - The TM screen requires bearing data or position data. (pp. 42, 63)
 - The TM screen is not selectable in the 32 NM or higher range.
- ➔ Hold down for 1 second to acquire an ATA target on the cursor. (p. 32)
 - Hold down [CLEAR]/[取消] for 1 second to release the ATA target.

- 8 OFF CENTER FUNCTION [OFF CENT]/[偏心] (p. 19)**
 Simultaneously push [MENU]/[菜单] and [MODE]/[工作模式] to turn the OFF CENTER function ON or OFF.
 • This function is usable in the 24 NM or less ranges.

9 EBL2 (VRM2) KEY [EBL2 (VRM2)]/

[方位线2(距标2)] (pp. 26–28)

- ➔ Push to display the EBL2 (Electronic Bearing Line 2) and the VRM2 (Variable Range Marker 2.)
 - Push [◀] or [▶] to adjust the EBL selector, or push [▲] or [▼] to adjust the VRM selector. Then push [ENTER]/[确认] to set the point.
 - The EBL2 bearing and the VRM2 distance are displayed in the lower right corner of the screen.
 - When the EBL1 and the VRM1 are displayed, the center of the VRM2 is displayed at the intersection point of the EBL1 and the VRM1.
- ➔ While holding down [EBL1(VRM1)]/[方位线1(距标1)], hold down [EBL2(VRM2)]/[方位线2(距标2)] for 1 second to turn the PI (Parallel Index) lines ON or OFF. (p.26)

10 ZOOM FUNCTION [ZOOM]/[图像放大] (p. 20)

Simultaneously push [EBL1(VRM1)]/[方位线1(距标1)] and [EBL2(VRM2)]/[方位线2(距标2)] to turn the ZOOM function ON or OFF. The ZOOM function enlarges the target to two times normal size.

- Move the cursor to the target, then turn ON the function.
- The zoomed area is displayed by the dotted square.

11 ALARM KEY [ALM]/[报警] (p. 29)

- ➔ Push [ALM]/[报警] to select the Alarm function, ALM1, ALM2, ALM1 & ALM2, or OFF.
- ➔ Hold down [ALM]/[报警] for 1 second to enter the alarm area setting mode.
 - Push [▲], [▼], [◀], or [▶] to move the cross cursor to the zone starting point, then hold down [ALM]/[报警] for 1 second. The starting ring of the zone is created. Then push [▲], [▼], [◀], or [▶] to fix the finish point, and then push [ALM]/[报警]. The desired alarm zone will automatically form.

12 HEADING LINE OFF FUNCTION [HL OFF]/

[船首关闭] (p. 16)

While holding down [BRILL]/[亮度] and [ALM]/[报警], the heading line is temporarily turned OFF.
 • The rings or other objects can also be turned OFF when the “HL OFF Mode” item in the System menu is set to “All.” (p. 11)

13 DISPLAY BRILLIANCE KEY [BRILL]/[亮度] (p. 17)

- ➔ Push to display the Brilliance/Color setting box.
 - The key backlight can be adjusted in this setting box.
 - The brightness of the symbols, characters and illuminations can be independently adjusted in the Color menu.
- ➔ Push to increase or decrease the brilliance of the picture on the display.
- ➔ Hold down for 1 second to select maximum brilliance.

14 EBL1 (VRM1) KEY [EBL1 (VRM1)]/

[方位线1(距标1)] (pp. 26–28)

- ➔ Push to display the EBL1 (Electronic Bearing Line 1) and the VRM1 (Variable Range Marker 1.)
 - Push [◀] or [▶] to adjust the EBL selector, or push [▲] or [▼] to adjust the VRM selector. Then push [ENTER]/[确认] to set the point.
 - The EBL1 bearing and the VRM1 distance are displayed in the lower left corner of the screen.
 - When the EBL1 and the VRM1 are displayed, the beginning of the EBL2 is displayed at the intersection point of the EBL1 and the VRM1.
- ➔ While holding down [EBL1(VRM1)]/[方位线1(距标1)], hold down [EBL2(VRM2)]/[方位线2(距标2)] for 1 second to turn the PI (Parallel Index) lines ON or OFF. (p.26)

15 MENU KEY [MENU•TLL]/[菜单•TLL]

- ➔ Push to enter or exit the Menu screen. (pp. 5–14)
 - Push [◀] or [▶] to select the Menu groups, or push [▲] or [▼] to select the items.
- ➔ Hold down for 1 second to output the position information where the cursor is placed, to the NMEA output terminals. (p. 52)
 - TLL output requires bearing data and position data.
 - The target mark can be displayed, depending on the setting in the “TLL Mode” item of the System menu. (p. 11)

16 ENTER KEY [ENTER]/[确认]

- ➔ Push to set the ATA, AIS, TLL, or WPT target to the selected mode. (pp. 23, 32, 37)
- ➔ In the Menu screen, push to enter the Submenu or Option selection mode, or push to save the setting. (p. 5)
- ➔ Hold down for 1 second to turn the sleeping AIS target into an activated target. (p. 38)
 - Hold down [CLEAR]/[取消] for 1 second to change the activated AIS target to a sleeping target.

17 RAIN CLUTTER CONTROL [RAIN]/[雨雪抑制] (p. 18)

Eliminates echoes from rain, snow, fog, and so on. Rotate the control fully counter clockwise to deactivate the RAIN function.

- The RAIN icon (☉) disappears.

18 SEA CLUTTER CONTROL [SEA]/[海浪抑制] (p. 18)

Eliminates echoes from waves in close range.

Reduces the receiver gain for close objects within a radius of approximately 8 nautical miles to eliminate sea clutter.

Rotate the control fully clockwise to activate the automatic SEA control function.

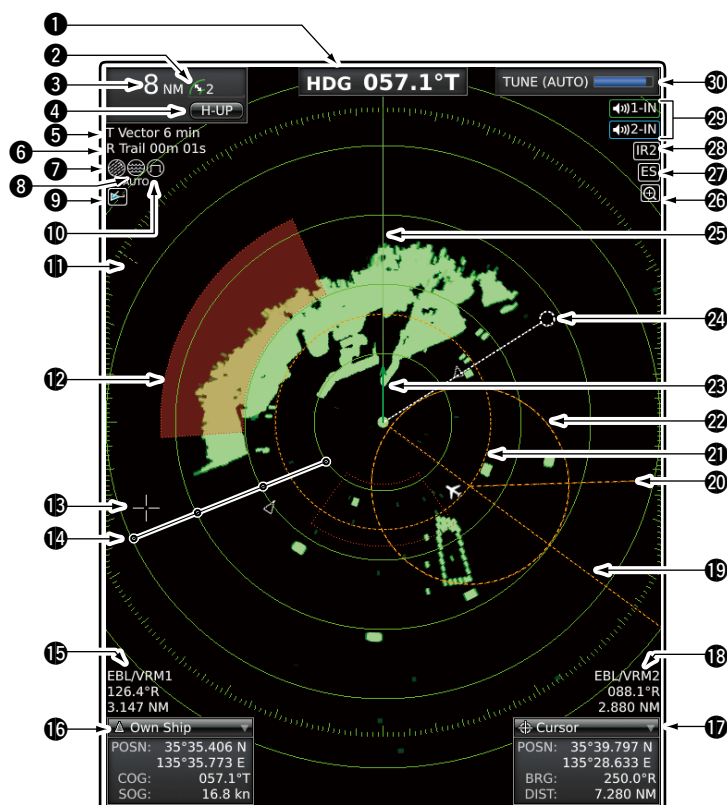
- The SEA icon (☉) is displayed in the upper left of the screen.
- “AUTO” is displayed below the SEA icon (☉) when the automatic control function is active.
- Under normal conditions set the SEA to minimum.
- Use this control with caution when the sea is rough.

19 GAIN CONTROL [GAIN]/[增益] (p. 16)

Adjusts the receiver amplifier gain.

- Clockwise rotation increases the gain.
- The increased gain may increase screen noise.

Screen



This Display example is set to Wide in the "PPI Area" item of the Display menu.

1 HEADING INDICATOR

Shows the heading readout.

- HDG: When the "Bearing Input" item in the Initial menu is set to "NMEA," "N+1," or "AUX."
- COG: When the "Bearing Input" item in the Initial menu is set to "GPS" or "GPS-L."
- The HDG readout indicates the bow of the vessel's heading in a clockwise direction from north.
- T: True Bearing, M: Magnetic bearing

2 FIXED RING RANGE READOUT (p. 25)

Shows the interval range of the fixed ring.

- This readout is displayed when the "Ring Brill" item in the Color menu is set to ON (1 to 3).

3 SCREEN RANGE READOUT (p. 25)

Shows the range of the displayed screen.

- Nautical miles (NM), kilometers (km), or miles (SM) can be selected as the distance unit in the Initial menu.

4 MODE INDICATOR

Head-up, Stabilized Head-up, Course-up, North-up and True motion screens are selectable.

- N-UP, SH-UP, and C-UP screens require external bearing data.
- The TM screen requires bearing data and position data.
- Move the cursor on the indicator, then push [ENTER]/[確認] to select the Head-up (H-UP), Stabilized Head-up (SH-UP), Course-up (C-UP), North-up (N-UP) or True motion (TM) screens.

5 VECTOR INDICATOR (p. 7)

Shows the ATA, AIS and Own vector type.

- T: True vector, R: Relative vector
- Shows the vector time. Select the vector time in the "Vector Time" item of the Target menu.

6 TRAILS INDICATOR (p. 21)

Shows the trail time.

- The echo remains, with gradation, during the trail time period on the screen. (Except for the trail time; ∞)
- Progressing time counter starts counting until the timer reaches the trail time.
- R: Relative trail

7 RAIN CONTROL ICON (p. 18)

Displayed when the RAIN function is used.

8 AUTO SEA ICON (p. 18)

Displayed when the SEA control function is used.

"AUTO" is displayed below this icon when the automatic SEA control function is used.

9 AIS ICON (p. 36)

Displayed when a valid VDM sentence is input from the [NMEA1] (AIS) port.

The indicator disappears if the AIS signal is not received for 6 minutes and 40 seconds.

10 LONG PULSE ICON (p. 20)

Displayed when the long pulse is used.

11 NORTH MARK

The north mark indicates the true north direction.

12 ALARM ZONE (p. 29)

Displays the alarm zone.

- Displayed when the alarm function is used.

13 CROSS LINE CURSOR

Used to measure the bearing and distance, setting the alarm zone, selecting the ATA/AIS targets, and so on.

- Push [▲], [▼], [◀], or [▶] one or more times to move the cursor.

14 FIXED RANGE RINGS (p. 25)

Displays the distance at fixed intervals from the own position. The interval distance is indicated by the ring range readout (2).

- These rings are displayed when the “Ring Brill” item in the Color menu is set to ON (1 to 3).

15 EBL/VRM1 READOUTS (pp. 26–28)

Displays the bearing of the EBL1 (Electronic Bearing Line) and the distance of the VRM1 (Variable Range Marker) when the EBL1 and the VRM1 are used.

- Nautical miles (NM), kilometers (km), or miles (SM) can be selected in the Initial menu as the distance unit.

16 OWN SHIP INFORMATION

- ➔ Displays your own ship's latitude and longitude when external NMEA data in 0183 format is connected.
 - To display the position, NMEA 0183 data is necessary.
- ➔ Displays the vessel's course and speed. (p. 23)
 - The speed unit in nautical miles (kn), kilometers (km/h), or miles (mph) can be selected as the speed unit in the Initial menu.

17 CURSOR INFORMATION

- ➔ Displays cursor latitude and longitude when external NMEA data in 0183 format is connected.
- ➔ Displays the bearing and distance to the cursor.
 - R: Relative bearing, T: True Bearing, M: Magnetic bearing.
 - To display the cursor bearing, bearing data and position data are required.

18 EBL/VRM2 READOUTS (pp. 26–28)

Displays the bearing of the EBL2 (Electronic Bearing Line) and the distance of the VRM2 (Variable Range Marker) when the EBL2 and the VRM2 are used.

- Nautical miles (NM), kilometers (km), or miles (SM) can be selected as the distance unit in the Initial menu.
- The PI indicator is displayed instead, when the PI (Parallel Index) lines function is ON. (p. 26)

19 EBL1 (pp. 26–28)**20 EBL2** (pp. 26–28)

Used to measure bearing.

When a target is selected, the EBL/VRM1 readouts (15) or the EBL/VRM2 readouts (18) display its bearing.

21 VRM1 (pp. 26–28)**22 VRM2** (pp. 26–28)

Used to measure distance.

When a target is selected, the EBL/VRM1 readouts (15) or the EBL/VRM2 readouts (18) display its distance.

23 OWN SHIP VECTOR INDICATOR (p. 6)

Displays the vector of your own ship.

24 WAYPOINT MARKER (p. 23)

Displays a waypoint that is received from navigation equipment.

- This marker is displayed when the “WPT Display” item in the Display menu is set to ON.
- To display the Waypoint marker, bearing data and NMEA data in 0183 format are necessary. (p. 63)

25 HEADING LINE (p. 16)

The heading line indicates the vessel bow direction.

26 ZOOM ICON (p. 20)

Displayed when the zoom function is used.

- Simultaneously push [EBL1(VRM1)]/[方位线1(距标1)] and [EBL2(VRM2)]/[方位线2(距标2)] to toggle the ZOOM function ON or OFF

27 ECHO STRETCH ICON (p. 19)

Displayed when the echo stretch function is used.

- This icon is displayed when the “Echo Stretch” item in the Video menu is set to ON.

28 IR ICON (p. 19)

Displayed when the IR (Interference Rejection) function is used.

- This icon is displayed when the “IR” item in the Video menu is set to ON (1 or 2).

29 ALARM ICONS (p. 29)

Displayed when the alarm function is used.

30 TUNING MODE INDICATOR (p. 16)

➔ Displays the tuning mode selection.

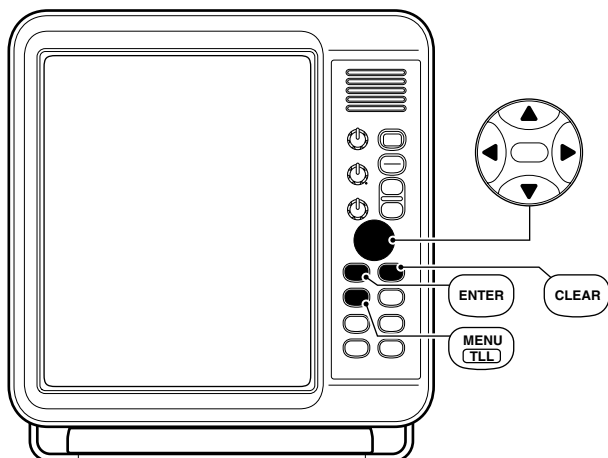
- “TUNE (AUTO)” is displayed when the “TUNE” item in the Video menu is set to “Auto” or “TUNE (MAN)” is displayed when the “TUNE” item is set “Manual.”

➔ Shows the receiver tuning level.

Information boxes (16 and 17):

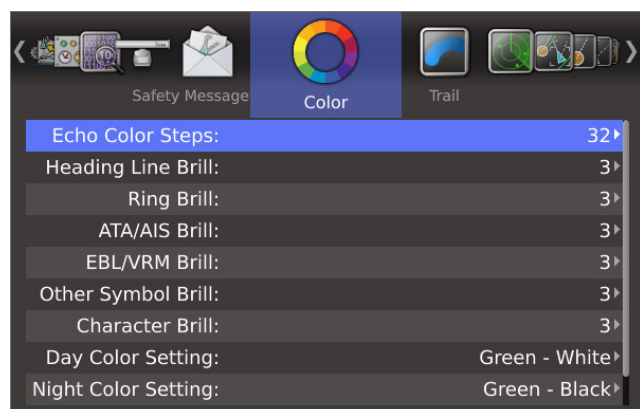
Move the cursor on the title bar, then push [ENTER]/[确认] to collapse or expand the information box.

■ Entering Menu screen



- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the menu.
 - You can select the “Color,” “Trail,” “Display,” “Target,” “ATA,” “AIS,” “Video,” “System,” “Initial,” “AIS List,” “AIS Own,” “Status,” “Port Monitor,” “Scanner Monitor,” or “Safety Message” menus.
- ③ Push [▲] or [▼] to select the item.
 - The selected item is highlighted.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to select an option.
- ⑥ Push [ENTER]/[确认] to save the setting and exit the option selection mode.
 - Push [CLEAR]/[取消] to cancel the setting and exit the mode, if desired.
- ⑦ Push [MENU]/[菜单] to exit the Menu screen.

■ Color menu



◇ Echo Color Steps

- 8: The gradation of an echo is displayed in 8 steps.
The 8 steps are 0, 1~3, 4~7, 8~11, 12~16, 17~21, 22~26, and 27~31.
- 32: The gradation of an echo is displayed in 32 steps.

◇ Heading Line Brill

Sets the Heading line brilliance to 1 (dark), 2 (normal), or 3 (bright).

◇ Ring Brill*

- OFF: The fixed range rings are not displayed, and the scale is displayed in dark, the same as 1 (dark).
- 1 to 3: The circles and scale are displayed in 1 (dark), 2 (normal) or 3 (bright).

◇ ATA/AIS Brill*

Sets the Brilliance of the ATA or AIS symbols to 1 (dark), 2 (normal), or 3 (bright).

ATA: Automatic Tracking Aid

AIS: Automatic Identification System

◇ EBL/VRM Brill*

Sets the Brilliance of the EBL or VRM to 1 (dark), 2 (normal), or 3 (bright).

EBL: Electronic Bearing Lines

VRM: Variable Range Markers

◇ Other Symbol Brill*

Sets the Brilliance of other than above symbols to 1 (dark), 2 (normal), or 3 (bright).

This setting is not applied to an echo.

◇ Character Brill*

Sets the Brilliance of the character out of the scale to 1 (dark), 2 (normal), or 3 (bright).

* When the background color is set to White, 1 is bright and 3 is dark.

◇ Day Color Setting

Sets the display color for day time to Green-White, Yellow-White, Red-White, or Multi-White.

XX-White: The background color is fixed to white.

◇ Night Color Setting

Sets the display color for night time to Green-Black, Yellow-Black, Red-Black, or Multi-Black.

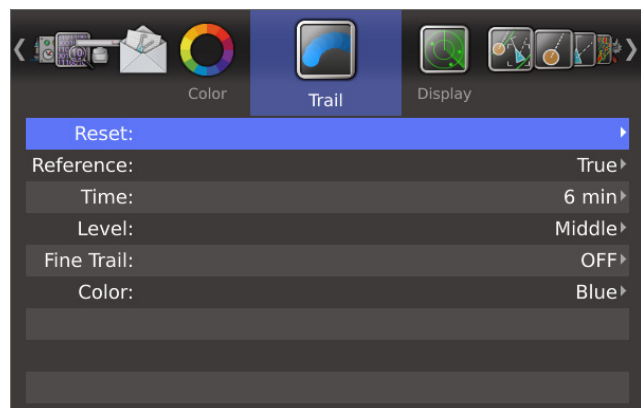
XX-Black: The background color is fixed to black.

◇ User Color Setting

Sets the display color for custom settings to Green, Yellow, Red, or Multi.

You can also select the background color from Black, Dark Blue, or White.

Trail menu



◇ Reset

- ① Push [ENTER]/[确认].
 - The dialog box “Sure?” is displayed.
- ② Push [ENTER]/[确认] again to clear the trail.

◇ Reference

Selects the reference of trail.

- True: Regardless of the movement of your vessel, the trail of other vessels displays a real movement over ground. Therefore, a stopped target's trail is not displayed. The true trail requires a heading signal and your own vessel's position information.
- Relative: The trail of other vessels is relative to your vessel. In this mode, other vessels' movement and your vessel's movement are combined, so Relative trail is valid if you want to look at the relative movement to avoid collisions. However, a stopped target's trail is also displayed. In that case, it is difficult to see in some places such as near Islands.

Regardless of this setting, the display acts as the True trail setting when the True motion (TM) screen is selected.

◇ Time

Selects the trail time from 30 seconds, 1 minute, 3 minutes, 6 minutes, 15 minutes, 30 minutes, or ∞.

◇ Level

Selects the level of the trail.

- Low: Leaves a trail between Low and High levels.
- Middle: Leaves a trail between Mid and High levels.
- High: Leaves a trail only at the High level.

◇ Fine Trail

Selects the thinness of the trail. The Fine trail function makes the trail thin.

- OFF: Normal trail.
- 1: Fine trail.
- 2: Extra fine trail.

◇ Color

Sets the trail color to between Blue, Yellow, Green, Red, Orange, and White.

Display menu



◇ Own Vector

- OFF: Does not display your own ship's vector.
- ON: Displays your own ship's vector.
 - Bearing data and ship speed data are required.

◇ PPI Area

Selects the PPI (Plan Position Indicator) area.

- Normal: The PPI area is inside the scale.
- Wide: The PPI area is the whole screen.

◇ Auto Hide Information

Sets whether or not to hide the outside of the scale, after 10 seconds without any operation.

This setting is effective only when the “PPI Area” item is set to “Wide.”

- OFF: Always displays the outside of the scale.
- ON: Hides the outside of the scale after 10 seconds has passed with no operation, and displays it again with any operation.

◇ WPT Display

Sets whether or not to display waypoints.

◇ Mark Display

Sets whether or not to display marks.

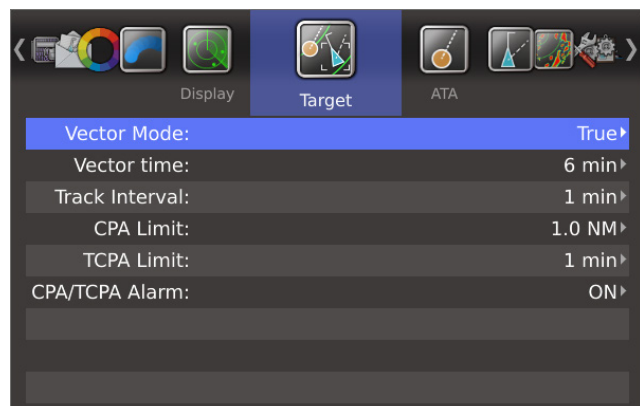
- OFF: The marks are not displayed.
- Symbol: The marks are displayed with icons.
- Symbol & No.: The marks are displayed with icons and numbers.

◇ Cursor Information

Selects the information in the Cursor box. The cursor box displays the information at the point of the cursor.

- Lat/Lon: Displays position information (latitude and longitude).
- TTG: Displays TTG (Time To Go) information (TTG, Bearing and Distance).

Target menu



◇ Vector Mode

- True: Selects the true vector mode.
- Relative: Selects the relative vector mode.

◇ Vector time

Sets the vector length (time) to 30 seconds, 1 minute, 3 minutes, 6 minutes, 15 minutes, or 30 minutes.

◇ Track Interval

The track data is updated at this specified tracking interval. Select the track interval from 15 seconds, 30 seconds, or between 1 and 15 minutes.

After 5 dots are displayed, the oldest dot disappears at the time when the next dot is displayed.

◇ CPA* Limit

Sets the CPA (Closest Point of Approach) limit to between 0.1 and 12.0 NM in 0.1 NM steps.

◇ TCPA* Limit

Sets the TCPA (Time to CPA) limit time to 30 seconds, between 1 and 6 minutes, or 12 minutes.

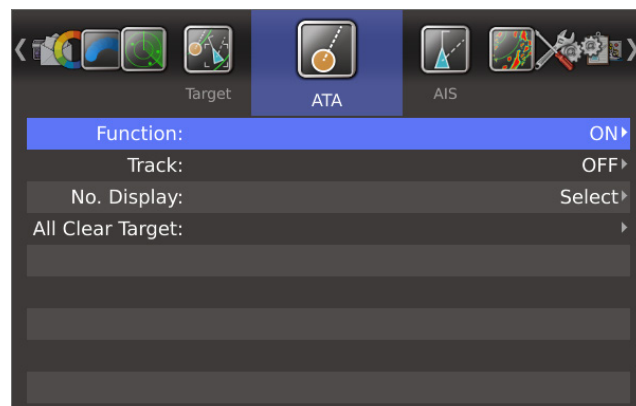
*CPA/TCPA: Closest Point of Approach and Time to Closest Point of Approach limits are set to give a warning when a target or targets enter those limits around your own vessel.

◇ CPA/TCPA Alarm

Sets whether or not to sound the CPA/TCPA alarm.

A CPA/TCPA alarm sounds when both the CPA and TCPA reach the limit.

ATA menu



◇ Function

- OFF: Turns OFF the ATA (Automatic Tracking Aid) function.
- ON: Turns ON the ATA function.

◇ Track

The plot displays the target's past positions as 5 dots, during each specified tracking interval.

You can specify the track interval in the "Track Interval" item of the Target menu.

- OFF: Turns OFF the Track display function.
- ON: Turns ON the Track display function.

◇ No. Display

Selects the target identification number type that is displayed at the right side of the mark.

- OFF: Does not display any mark number.
- Select: Displays only the selected mark number.
- All: Displays all mark numbers.

◇ All Clear Target

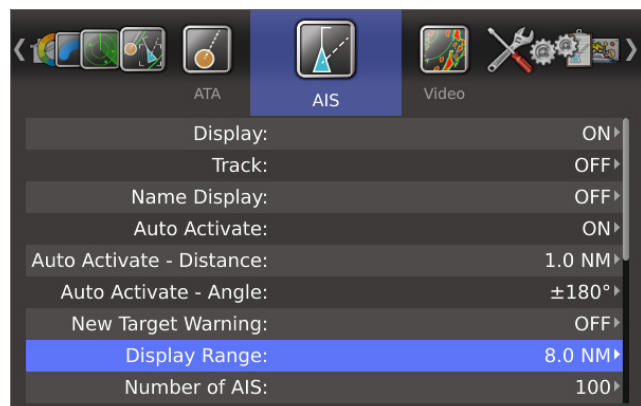
Releases all of the ATA targets at the same time.

① Push [ENTER]/[确认].

- The dialog box "Sure?" is displayed.

② Push [ENTER]/[确认] again to release all ATA targets.

■ AIS menu



◇ Display

- OFF: Turns OFF the AIS display.
- ON: Turns ON the AIS display.
 If an AIS target reaches the CPA and TCPA limits when "OFF" is selected, this setting is automatically turned ON.

◇ Track

The plot displays the AIS target's past positions as 5 dots, during each specified tracking interval. You can specify the track interval in the "Track Interval" item of the Target menu.

- OFF: Turn OFF the Track display function.
- ON: Turn ON the Track display function.

◇ Name Display

Selects the AIS target display type.

- OFF: Does not display any name or MMSI number of the target.
- Select: Displays the vessel name or MMSI number of the selected target.
- Active: Displays the vessel name or MMSI number of all active targets.

◇ Auto Activate

The Auto Activate function automatically turns the sleeping AIS target into an activated target when the AIS target is at the specified distance and angle. You can specify the distance and angle in the next two items.

- OFF: Turns OFF the Auto Activate function.
- ON: Turns ON the Auto Activate function.

◇ Auto Activate - Distance

Sets the distance to automatically turn the sleeping AIS target into an activated target.

- 0.1 to 10.0 NM: Select the distance from your vessel.

◇ Auto Activate - Angle

Sets the angle to automatically turn the sleeping AIS target into an activated target.

- 5 to 180°: Selects the angle with your vessel.

◇ New Target Warning

Sets whether or not to alert when the Auto Activate function automatically turns the sleeping AIS target into an activated target.

- OFF: Does not give a warning when the Auto Activate function activates the target.
- ON: Gives a warning when the Auto Activate function activates the target.

◇ Display Range

Sets the AIS targets display range to between 0.1 and 36.0 NM, or ∞.

- 0.1 to 36.0 NM: Selects the range from your vessel in 0.1 NM steps.
- ∞: Displays all range from your vessel.

◇ Number of AIS

Selects the maximum number of AIS targets that can be displayed on the screen to between 10 and 100 in 1 target steps.

◇ Slow Warn

The AIS unit calculated COG (Course Over Ground) data of a vessel that is at anchor or drifting is unreliable, and therefore the CPA (Closest Point of Approach) and TCPA (Time to CPA) data may not be correctly calculated. If a vessel is anchored in your alarm zone, the unreliable data can cause the collision alarm to sound many times, even if there is no real danger. To prevent this, when the anchored vessel's SOG (Speed Over Ground) is less than this set value, the Slow Warn function assumes that vessel's COG is fixed towards your vessel and an alarm will sound.

- OFF: Turns OFF the Slow Warn function.
- ON: Turns ON the Slow Warn function.

◇ Slow Warn Speed

- 0.1 to 5.0 kn: Selects the vessel's speed in 0.1 kn steps.

◇ Erase Lost Target

Erases all of the Lost targets at the same time.

When there is no lost targets, this setting is grayed out.

- ① Push [ENTER]/[确认].
 • The dialog box "Sure?" is displayed.
- ② Push [ENTER]/[确认] again to clear all of the Lost targets on the screen.

About "Lost Target": A vessel is regarded as a "Lost target" after a specified period of time has passed since the vessel last transmitted data, as described on the next page.

The "Lost target" icon disappears from the screen 6 minutes and 40 seconds after the vessel was regarded as a "Lost target."

■ AIS menu (Continued)

The criteria to become a Lost target**• Class A/B**

| Vessel type | | | Nominal re- porting interval Class A | Lost target maximum interval Class A | Nominal reporting interval Class B * ¹ | | Lost target maximum interval Class B * ¹ | |
|-------------|--|--|--|--|--|-------------------|--|-------------------|
| | | | | | CS * ² | SO * ³ | CS * ² | SO * ³ |
| 1 | Class A | Vessel is at anchor or moored and not moving faster than 3 knots | 3 min. | 18 min. | — | — | — | — |
| | Class B | Vessel is not moving faster than 2 knots | — | — | 3 min. | 3 min. | 18 min. | 18 min. |
| 2 | Vessel is at anchor or moored and moving faster than 3 knot | | 10 sec. | 60 sec. | N/A | | N/A | |
| 3 | Class A | Vessel is moving between 0 and 14 knots | 10 sec. | 60 sec. | — | — | — | — |
| | Class B | Vessel is moving between 2 and 14 knots | — | — | 30 sec. | 30 sec. | 180 sec. | 180 sec. |
| 4 | Class A | Vessel is moving between 0 and 14 knots while changing course | 3 1⁄3 sec. | 60 sec. | — | — | — | — |
| | Class B | Vessel is moving between 2 and 14 knots while changing course | — | — | 30 sec. | 30 sec. | 180 sec. | 180 sec. |
| 5 | Vessel is moving between 14 and 23 knots | | 6 sec. | 36 sec. | 30 sec. | 15 sec. | 180 sec. | 90 sec. |
| 6 | Vessel is moving between 14 and 23 knots while changing course | | 2 sec. | 36 sec. | 30 sec. | 15 sec. | 180 sec. | 90 sec. |
| 7 | Vessel is moving faster than 23 knots | | 2 sec. | 30 sec. | 30 sec. | 5 sec. | 180 sec. | 30 sec. |
| 8 | Vessel is moving faster than 23 knots while changing course | | 2 sec. | 30 sec. | 30 sec. | 5 sec. | 180 sec. | 30 sec. |

*¹ AIS Class B does not provide information about the navigation status, anchored or moored.*² CS: Carrier-sense, *³ SO: Self organized**• Others**

| Category | Nominal reporting interval | Lost target maximum interval |
|--------------|-------------------------------|---------------------------------|
| SAR | 10 sec. | 60 sec. |
| Base station | 10 sec. | 60 sec. |
| AtoN | 3 min. | 18 min. |

◇ Safety Message

Sets whether or not to display the message when the safety message is received.

- OFF: Turns OFF the Safety Message function.
- ON: Turns ON the Safety Message function.

◇ Favorite AIS

Sets whether or not to alert that the specified MMSI target gets into the specified range from your vessel.

- OFF: Turns OFF the Favorite AIS function.
- ON: Turns ON the Favorite AIS function.

◇ Favorite AIS Range

Sets the Favorite AIS display range to between 0.1 and 36.0 NM, or ∞.

- 0.1 to 36.0 NM: Selects the range from your vessel in 0.1 NM steps.
- ∞: Displays all range from your vessel.

◇ Favorite AIS Target1**◇ Favorite AIS Target2****◇ Favorite AIS Target3**

Enters the MMSI number of favorite targets.

■ Video menu



◇ TUNE

- Auto: Automatic tuning.
 - "TUNE (AUTO)" is displayed in the upper right corner of the screen.
- Manual: Manual tuning.
 - "TUNE (MAN)" is displayed in the upper right corner of the screen.

◇ Manual TUNE

When "Auto" is selected in the "TUNE" item, this setting is disabled.

- 1 Push [ENTER]/[确认] to enter the adjustment mode.
- 2 Push [◀] or [▶] to adjust the desired tuning level (256 levels).
- 3 Push [ENTER]/[确认] again to save and exit the adjustment mode.

◇ Dynamic Range

Selects the dynamic range of the PPI (Plan Position Indicator).

- Narrow: Narrow dynamic range. Even weak reflections are displayed as strong reflections.
- Middle: Mid dynamic range.
- Wide: Wide dynamic range. You can easily distinguish between weak reflections and strong reflections.

◇ IR

- OFF: Turns OFF the Interference Rejection function.
- 1 or 2 (ON): Turns ON the Interference Rejection function 1 (Low) or 2 (High).
 - "IR1" or "IR2" is displayed in the upper right corner of the screen.

◇ Echo Stretch

- OFF: Turns OFF the echo stretch function.
- ON: Turns ON the echo stretch function.
 - "ES" is displayed in the upper right corner of the screen.

◇ Pulse Width

- SP: Sets the pulse width to narrow.
- LP: Sets the pulse width to wide. "Ⓛ" is displayed in the upper left corner of the screen.

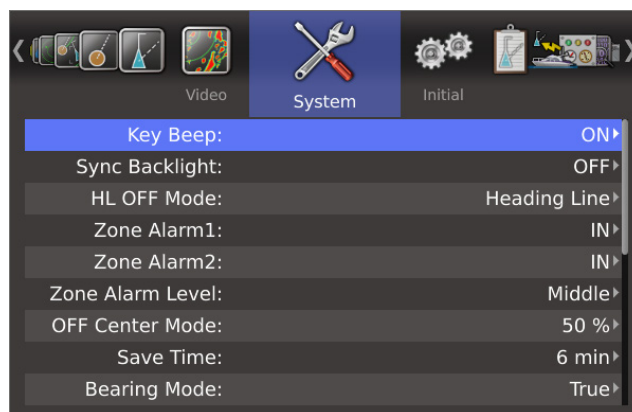
◇ SEA Curve

- The SEA knob can be used to fine tune the sea clutter of the display after one of four main levels are selected, depending on the sea conditions.

◇ Antenna Height

- Sets the antenna height from the surface of the sea. 5 m, 10 m, 15 m, 20 m, 30 m, 40 m, or 50 m is selectable.

■ System menu



◇ Key Beep

- OFF: Turns OFF* the beep tone.
 - ON: Turns ON the beep tone.
- * Except for the alarm function.

◇ Sync Backlight

Sets whether or not to synchronize the brilliance of the display and key backlight.

- OFF: Individually sets the brilliance of the display and key backlight. (16 levels each)
- ON: Synchronizes the brilliance of the key backlight to the display. (16 levels)

◇ HL OFF Mode

Selects the objects to hide temporarily in the Heading Line OFF mode (while [BRILL]/[亮度] and [ALM]/[报警] are simultaneously hold down).

- Heading Line: Turns OFF only the Heading line.
- All: Turns OFF the Heading line, Rings, and other objects.

■ System menu (Continued)

◇ **Zone Alarm1**◇ **Zone Alarm2**

Sets the Zone Alarm1 and Zone Alarm2 settings.

- IN: An alarm sounds when the target comes into the zone.
- OUT: An alarm sounds when the target goes out of the zone.

◇ **Zone Alarm Level**

Selects the target detection parameter of zone alarm 1 and 2.

Selectable parameters are Low, Middle and High.

◇ **OFF Center Mode**

Sets the OFF Center setting when the OFF Center function is ON.

- 25, 50, 75%: The center of the display area moves to the front of the bow, and the bow view increases.
- Cursor: The center of the display area shifts to the cursor, and the opposite view increases.

◇ **Save Time**

Selects the standby time during the save mode from 1 min, 6 min, 15 min or 30 min.

- The radar for a TX interval scan is fixed at 10 revolutions.

◇ **Bearing Mode**

Select the displayed bearing type, regardless of the bearing data format (NMEA, N+1, AUX, GPS, or GPS-L).

- True: Select the true North bearing.
- Magnetic: Select the magnetic North bearing.

◇ **Variation**

Selects the difference setting between true North and magnetic North.

- Auto: Automatically revises the magnetic variations. Until an effective variation is received, use 0° for difference between true North and magnetic North. After an effective variation is received, use the last data for the difference. The MR-1210 memorize the data until you turn OFF the power.
- Manual: Manually revises the magnetic variation. Use the manual setting for the difference between true North and magnetic North. Set the Manual Variation in the next item.

◇ **Manual Variation**

Manually sets the difference between true North and magnetic North. Selectable angles are 180.0°W (West) to 180°E (East).

This setting is used when "Variation" is set to "Manual."

◇ **Bearing Reference**

Sets the direction for the EBL (Electronic Bearing Line) or cursor.

- True: True or magnetic direction
- 360°R: Relative direction
- PT/SB: Bow direction

◇ **Speed Input**

Selects the speed input of the vessel from "SOG" or "Manual." If you select "Manual," enter data manually into the items below, "Manual Speed", "Manual SET", and "Manual Drift."

◇ **Manual Speed**

Sets your vessel's speed to between 0.1 and 40.0 kn. (0.2 ~ 74.0km/h, 0.1 ~ 46.0 mph)

◇ **Manual SET**

Sets the Tidal current direction to between 0 and 359.9°T (or M).

◇ **Manual Drift**

Sets the Tidal current speed to between 0 and 20.0 kn. (0 ~ 37.0 km/h, 0 ~ 23.0 mph)

◇ **TLL Mode**

- Output: Hold down [MENU]/[菜单] for 1 second to output the position information where the cursor is positioned, to the NMEA output terminals.
- Symbol: Hold down [MENU]/[菜单] for 1 second to mark on the screen where the cursor is positioned.
- Output & Symbol: Hold down [MENU]/[菜单] for 1 second to output the position information and mark on the screen where the cursor is positioned.

◇ **Transparency Menu**

Sets the transparency level of the Menu screen and Brilliance/Color dialog box to between 0% (Nontransparent) and 70% (Transparent).

◇ **Transparency Info.**

Sets the transparency level of the Information box, Own Ship information box, Cursor information box or Range/COG/Tune tag to between 0% (Nontransparent) and 70% (Transparent).

◇ **STBY Mode**

Sets the display information in the Standby mode to Normal or AIS.

◇ **Rev.**

Displays the revision number of the firmware.

■ Initial menu



◇ Distance Unit

Selects the distance unit from NM (nautical miles), km (kilometers), or SM (miles).

◇ Speed Unit

Selects the speed unit from kn (nautical miles), km/h (kilometers), or mph (miles).

◇ Date Display

Selects the Date format from “YYYY/MM/DD,” “MM/DD/YYYY,” or “DD/MM/YYYY.”
(YYYY: Year, MM: Month, DD: Day)

◇ Language

Selects the displayed language. (p. 53)

◇ Bearing Input

Sets the input source of the vessel's bow information.

- NMEA: NMEA0183 bearing data format.
- N+1: N+1 data format.
- AUX: Other format.
- GPS: Reads NMEA0183 COG format data as HDG format. (The course may not match with other HDG format and include errors.)
 - When a vessel's speed is less than 2 knots, the direction information is not displayed until the speed increases to more than 3 knots.
- GPS-L: Reads NMEA0183 COG format data as HDG format. (The course may not match with other HDG format and include errors.)
 - When a vessel's speed is less than 2 knots, the direction information is fixed. The display changes only when the vessel's speed increases to more than 3 knots.
 - This is in addition to the GPS option to display the cursor latitude and longitude when the vessel's speed is less than 3 knots.

NOTE: If this item is set to “GPS” or “GPS-L,” COG (Course Over the Ground) data is used as the bearing. However, if the vessel's speed is less than 3 knots, direction accuracy falls. Moreover, the position accuracy or the current actual course may vary, and therefore display an incorrect direction.

◇ TX Inhibit

Selects whether or not to use the TX inhibit.

◇ TX Inhibit Start

- 0 to 359°: Enters the start point of the TX inhibit area.

◇ TX Inhibit Angle

- 1 to 90°: Enters the TX inhibit area.

◇ Timing Adjust

Adjusts the sweep timing. (p. 54)

◇ Heading Adjust

Adjusts the bow compensation between -180° and $+180^\circ$. (p. 55)

◇ Antenna Rotation Speed

Sets the antenna rotation speed to Normal or Slow. (p. 54)

◇ Range Ring

Selects the type of range rings from Ring1 (normal) or Ring 2 (fine). (p. 25)

◇ Range

Sets the effective ranges. (p. 56)

- ① Push [ENTER]/[确认] to enter the selection mode.
- ② Push [▲] or [▼] to select a desired range.
- ③ Push [◀] to set the range OFF or push [▶] to set the range ON.
- ④ Push [ENTER]/[确认] to save the settings.

◇ Save Settings1

◇ Save Settings2

◇ Save Settings3

The settings can be saved. (p. 57)

- ① Push [ENTER]/[确认].
 - The dialog box “Sure?” is displayed.
- ② Push [ENTER]/[确认] again to save the settings.

◇ Load Settings1

◇ Load Settings2

◇ Load Settings3

The setting can be loaded. (p. 57)

- ① Push [ENTER]/[确认].
 - The dialog box “Sure?” is displayed.
- ② Push [ENTER]/[确认] again to load the settings.

■ Initial menu (Continued)

◇ **Setting Reset**

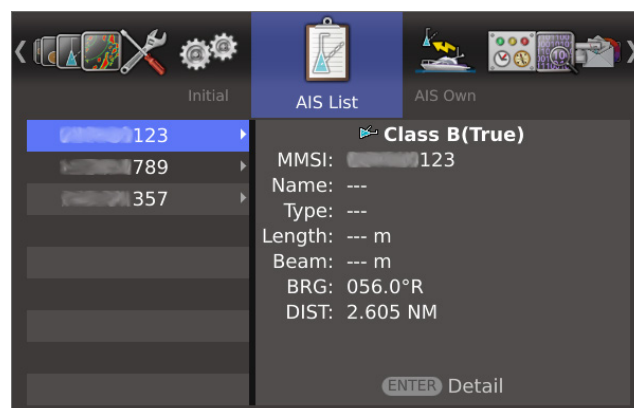
Resets the settings in the Menu screen other than the settings in the Initial menu. You can reset only in the Standby mode. (p. 58)

- ① Push [ENTER]/[确认].
 - The dialog box “Sure?” is displayed.
- ② Push [ENTER]/[确认] again to reset the settings.

◇ **Factory Reset**

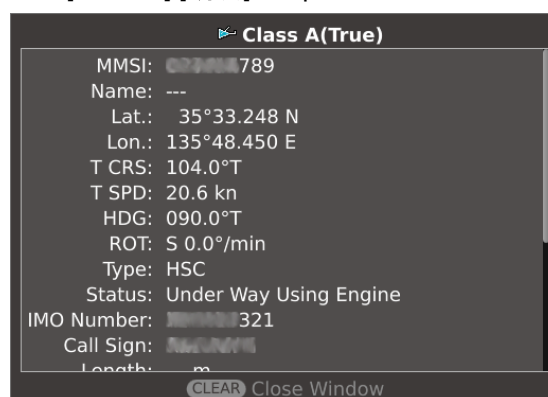
Resets the settings to the factory default. You can reset only in the Standby mode. (p. 58)

- ① Push [ENTER]/[确认].
 - The dialog box “Sure?” is displayed.
- ② Push [ENTER]/[确认] again to load the factory default.

■ **AIS List menu**

Displays AIS information.

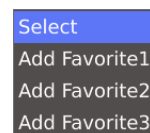
- ① Push [▲] or [▼] to select a desired AIS target.
- ② Push [ENTER]/[确认] to open the detail window.



- ③ Push [▲] or [▼] to scroll the window.
- ④ Push [CLEAR]/[取消] to close the window.

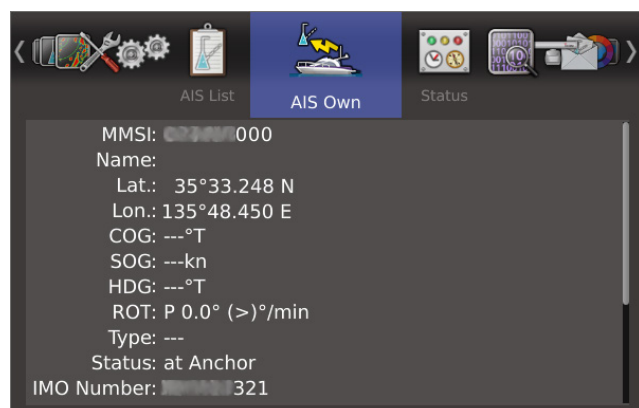
- When the AIS target is selected, set it to the “Selected AIS target” or register it to “Favorite AIS Target1, 2, or 3.”

- ① Hold down [ENTER]/[确认] for 1 second to open the Sub menu.



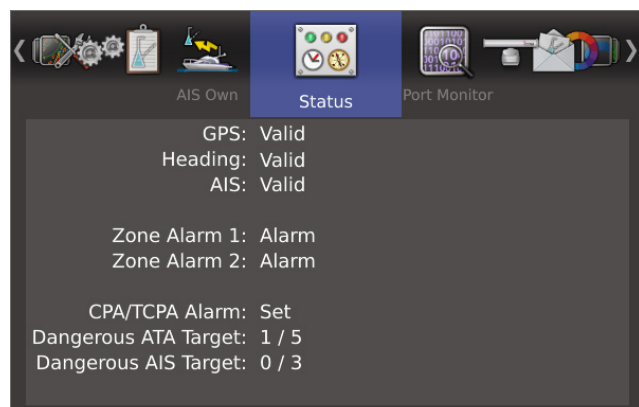
- ② Push [▲] or [▼] to select the option.
 - Select: Set to the Selected AIS Target.
 - Add Favorite1, 2, or 3: Register to the Favorite AIS.

■ AIS Own menu



Displays own AIS information.

■ Status menu



Displays the status of the GPS, Heading and AIS inputs, alarm settings, and CPA/TCPA alarm settings.

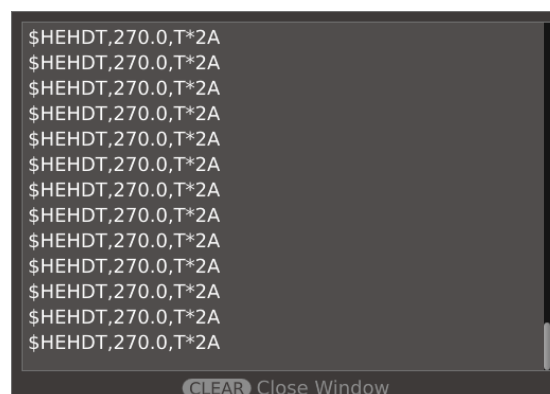
- The CPA/TCPA Alarm Set item indicates the number of dangerous targets in the total targets.

■ Port Monitor menu



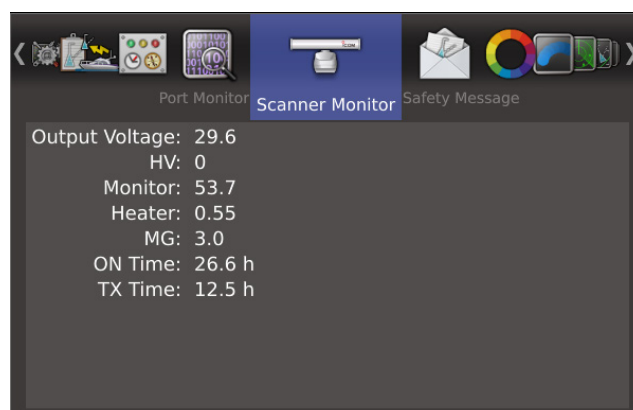
Displays status of the input/output ports.

- 1 Push [▲] or [▼] to select a desired port.
- 2 Push [ENTER]/[确认] to open the detail window.



- The display is automatically updated by new status.
- Push [ENTER]/[确认] to pause the display update. Push again to restart.
- Push [▲] or [▼] to scroll the window.
- 3 Push [CLEAR]/[取消] to close the window.

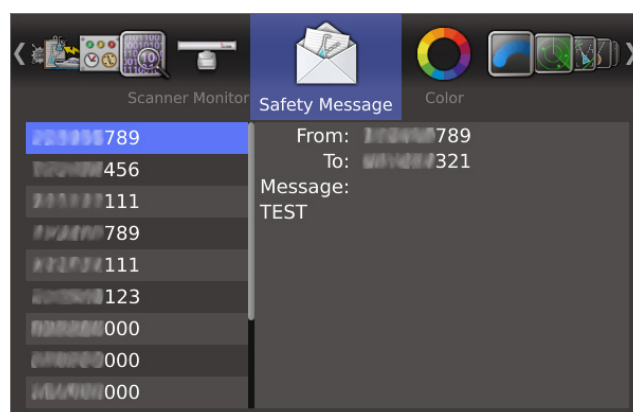
■ Scanner Monitor menu



Displays the scanner status.

- When the status is fail, the title and value change to red color.

■ Safety Message menu



Displays the AIS messages.

- ➡ Push [▲] or [▼] to select a desired AIS message.
 - The message is displayed to the right window.

■ Checking the installation

Before turning ON the power, be sure all the connections are complete. The checklist to the right may be helpful for necessary confirmation.

CAUTION: Connect the scanner unit before turning ON the power. Otherwise the magnetron inside the scanner unit might be damaged.

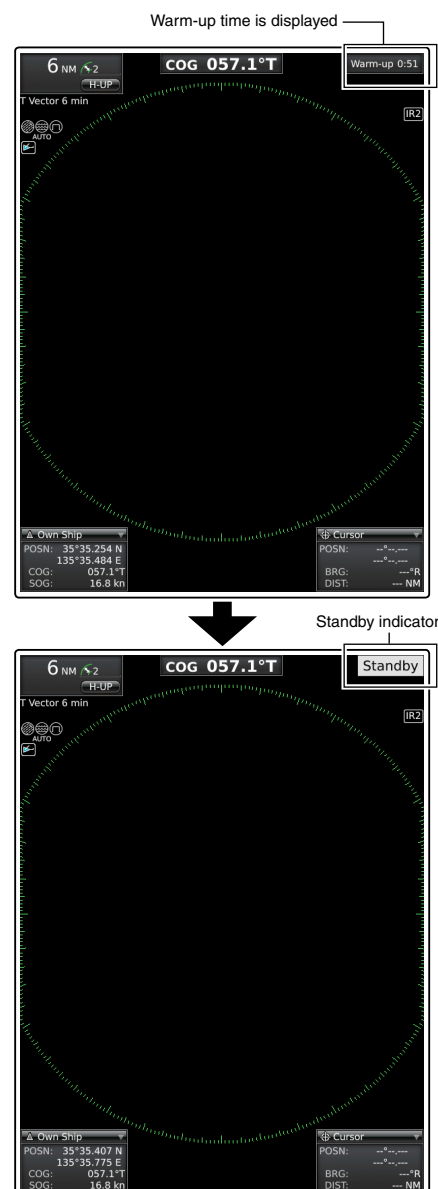
◇ Checklist

- ① The four bolts securing the scanner unit must be firmly tightened.
- ② Cabling must be securely attached to a mast or mounting material, and must not interfere with the rigging.
- ③ Be sure waterproofing procedures are completed on the system cable.
- ④ The power connections to the battery must be of the correct polarity.
- ⑤ Be sure that the plugs at the rear of the display unit have been connected correctly and securely.
(See page 42 for details.)

■ Turning power ON/OFF

- ① Push [] to turn ON the power.
 - The opening screen is displayed.
 - The initial screen is displayed and the magnetron warm up time is counted down on the screen.
 - The magnetron inside the scanner unit warms up for 90 seconds.
- ② When the countdown is completed, the Standby screen is displayed.
- ③ Push [TX (SAVE)]/[发射(节电)] to start scanning and select the Plan Position Indicator (PPI) screen.
 - Targets and heading markers are displayed.
 - The screen is displayed approximately 2 seconds after turning ON the power, when “Auto” is selected in the “TUNE” item of the Video menu.
- ④ Push [] to turn OFF the power.

At the first turning ON the radar or after executing Factory Reset, the Initial Setting screen (p. 58) is displayed before the opening screen is displayed.



■ Basic operation

- ① Turn ON the power.
- ② Push [TX (SAVE)]/[发射(节电)] on the Standby screen after the Warm-up is completed.
 - See “Turning power ON/OFF” on page 15.
- ③ Push [+]/[量程+] one or more times to select the maximum display range.
- ④ Rotate [GAIN]/[增益] to adjust the gain.
 - Clockwise rotation increases the gain.
 - The increased gain may increase screen noise.
 - Adjust the gain to the point where the screen noise just disappears.
- ⑤ Push [+]/[量程+] or [-]/[量程-] one or more times to select the desired display range.
 - The screen range readout shows the range of the screen.
- ⑥ Rotate [SEA]/[海浪抑制] to set the sensitivity time control to minimum.
- ⑦ Rotate [RAIN]/[雨雪抑制] to set the rain clutter control to minimum.
- ⑧ Push [MODE]/[工作模式] to select either the Head-up: H-UP, Stabilized head-up: SH-UP, Course-up: C-UP, North-up: N-UP or True Motion: TM screen. SH-UP, C-UP, N-UP or TM can be selected only when bearing or position data is provided. (See page 63 for details)

CAUTION: When the SEA setting is set to too high, close targets are blanked.

◇ Heading marker

The heading marker is a line that indicates your vessel's bow direction. (This marker will be displayed on the center of the screen when the Head-up screen: H-UP is selected.) You can hide the heading marker when the desired target is located under the heading marker.

- ➡ Simultaneously hold down [BRILL]/[亮度] and [ALM]/[报警] to hide the heading marker.

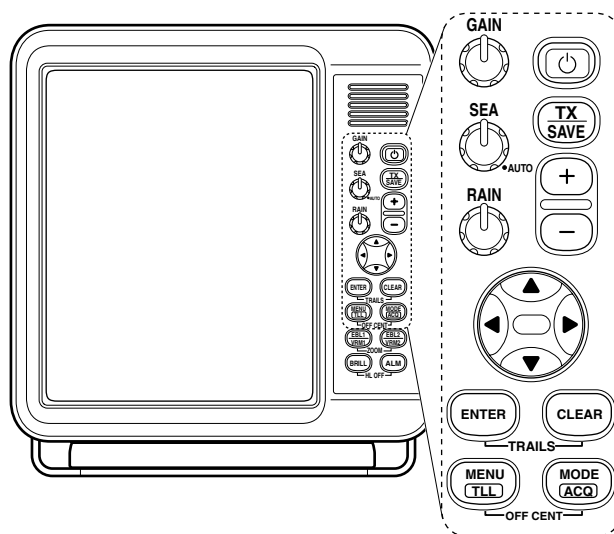
◇ Fixed range rings

The fixed range rings can be used for rough distance measurements. (p. 25)

The Brilliance of the fixed range rings can be adjusted or turned OFF.

(MENU > Color > Ring Brill)

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Color menu.
- ③ Push [▲] or [▼] to select the “Ring Brill” item.
 - The selected item is highlighted.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to select a desired Ring Brilliance 1, 2, 3 or OFF.
- ⑥ Push [ENTER]/[确认] to save the setting and exit the option selection mode.
 - Push [CLEAR]/[取消] to cancel the setting and exit the mode, if desired.



NOTE: Manual adjustment can be used. (See below for the Manual Tuning details.)

◇ Manual tuning

The receiver tuning can be manually adjusted.

(MENU > Video > Tune)

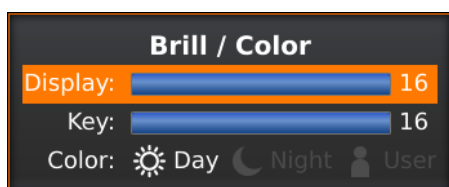
- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Video menu.
- ③ Push [▲] or [▼] to select the “TUNE” item.
 - The selected item is highlighted.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▼] to select “Manual,” then push [ENTER]/[确认].
 - “TUNE (MAN)” is displayed at the top of the screen.
- ⑥ Push [▼] to select the “Manual TUNE” item.
 - The selected item is highlighted.
- ⑦ Push [ENTER]/[确认] to enter the option selection mode.
 - If the “TUNE” item is set to “Auto,” the option selection mode cannot be entered.
- ⑧ Push [◀] or [▶] set the tuning level indicator to the maximum level. (p. 10)
- ⑨ Push [ENTER]/[确认].

■ Brilliance/Color adjustment

◇ Adjusting the Display Brilliance

The intensity of the screen can be adjusted. When you require continuous operation, but not constant viewing, a lower setting can increase the life of the LCD.

- ① Push [BRILL]/[亮度] to open the Brilliance/Color box.



- ② Push [◀] or [▶] to adjust a desired display brilliance.
 - If the other item is selected, push [▲] or [▼] to select the "Display" item.
- ③ Push [CLEAR]/[取消] to close the box.
 - The display automatically closes the box if you don't push any keys for 5 seconds.

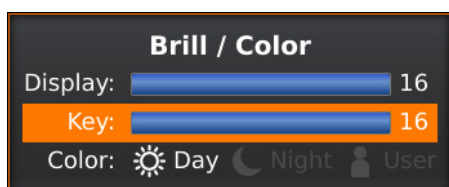
- ➡ Push [BRILL]/[亮度] to increase or decrease the display brilliance.
- ➡ Hold down [BRILL]/[亮度] for 1 second to select maximum brilliance.

NOTE: High intensity will shorten the life of the LCD display.

◇ Adjusting the Key backlight

The backlighting of the keys can be adjusted for convenient operation.

- ① Push [BRILL]/[亮度] to open the Brilliance/Color box.

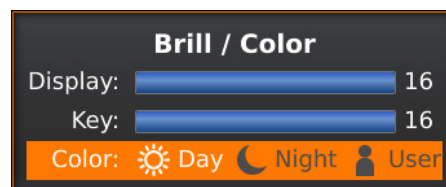


- ② Push [▼] one time to select the "Key" item.
- ③ Push [◀] or [▶] to adjust a desired Key illumination.
- ④ Push [CLEAR]/[取消] to close the box.
 - The display automatically closes the box if you don't push any keys for 5 seconds.

◇ Selecting the Display color

Three display colors can be memorized and selected between the Day, Night, and User settings.

- ① Push [BRILL]/[亮度] to open the Brilliance/Color box.



- ② Push [▼] two times to select the "Key" item.
- ③ Push [◀] or [▶] to set to a desired display color.
 - You can set the display color to the Day, Night, or User.
- ④ Push [CLEAR]/[取消] to close the box.
 - The display automatically closes the box if you don't push any keys for 5 seconds.

• Customizing the Display color

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Color menu.
- ③ Push [▲] or [▼] to select the "Day Color Setting," "Night Color Setting," or "User Color Setting" item.
 - The selected item is highlighted.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to a desired display color, then push [ENTER]/[确认].

The following are typical basic operation examples that may hinder radar reception (sea clutter, precipitation interference and echoes from other radar).

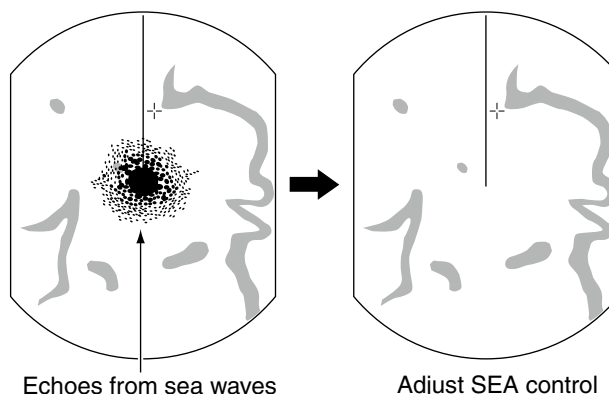
■ SEA function

This function serves to eliminate echoes from waves at close range. Reduce the receiver gain for close objects within a radius of approximately 8 NM to eliminate sea clutter.

- ➡ Rotate the [SEA]/[海浪抑制] control fully clockwise to activate the automatic control function.
 - The SEA icon (⊗) is displayed in the upper left corner of the screen.
 - "AUTO" is displayed below the SEA icon (⊗) when the automatic control function is active.

⚠ WARNING! The [SEA]/[海浪抑制] control reduces the receiver sensitivity of objects within approximately 8 NM. Therefore, caution and careful adjustment are necessary when using the [SEA]/[海浪抑制] control.

Small objects may not be displayed on the screen when strong echoes from rain or islands within 1 NM while the automatic SEA function is activated.

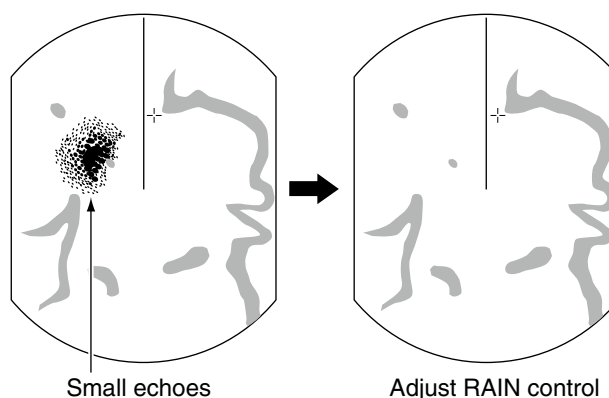


■ RAIN function

This function eliminates echoes from rain, snow, fog, and so on.

- ➡ Rotate the [RAIN]/[雨雪抑制] control fully counter-clockwise to deactivate the control function.
 - The RAIN icon (⊗) disappears.

⚠ NOTE: DO NOT reduce the echoes too much, otherwise you may miss weaker targets.



■ OFF CENTER function

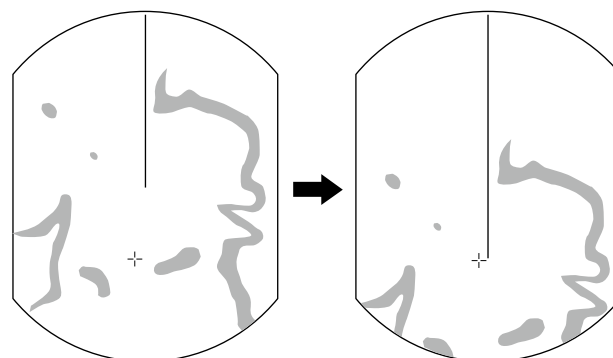
The scanning area can be shifted in a desired direction and can be partially enlarged. This is useful when the Head-up screen is selected, and you want to enlarge the bow direction display, or the center of the screen shifts in the direction of the intersection.

- This function is selectable in 24 NM or shorter ranges.
- This function is not selectable in the TM screen.

- ① Push [MENU]/[菜单] and [MODE]/[工作模式] simultaneously to shift the screen.
- ② Push [MENU]/[菜单] and [MODE]/[工作模式] simultaneously again to return to the normal screen.

The OFF center mode setting can be changed in the "OFF Center Mode" item of the System menu.

- 25%, 50%, 75%, and Cursor are selectable.



Normal screen

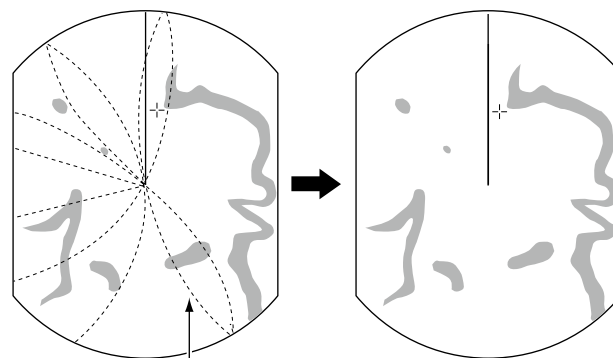
With OFF CENTER ON

■ IR function

Radar interference may appear when another vessel's radar is operating on the same frequency band in close proximity. The Interference Rejection (IR) function can eliminate this type of interference. (p. 10)

- ① Push [MENU]/[菜单] to enter the Menu screen.
 - ② Push [◀] or [▶] to select the Video menu.
 - ③ Push [▲] or [▼] to select the "IR" item.
 - ④ Push [ENTER]/[确认] to enter the option selection mode.
 - ⑤ Push [▲] or [▼] to select the IR function 1, 2, or OFF.
 - ⑥ Push [ENTER]/[确认] to save the setting.
 - ⑦ Push [MENU]/[菜单] to exit the Menu screen.
- "IR" is displayed in the upper right of the screen, when the function is activated.

(MENU > Video > IR)



Radar interference

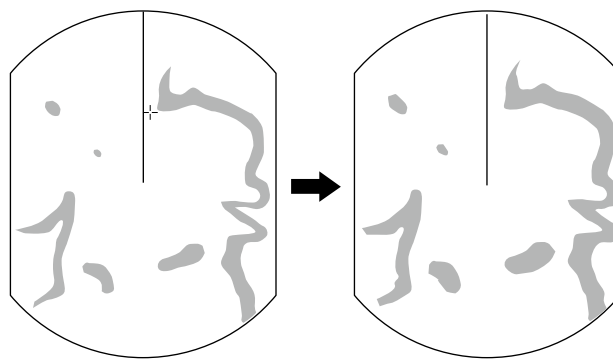
With IR function ON

■ Echo Stretch function

The blips can be magnified electronically for easier viewing of small targets.

- ① Push [MENU]/[菜单] to enter the Menu screen.
 - ② Push [◀] or [▶] to select the Video menu.
 - ③ Push [▲] or [▼] to select the "Echo Stretch" item.
 - ④ Push [ENTER]/[确认] to enter the option selection mode.
 - ⑤ Push [▲] or [▼] to select the Echo Stretch ON.
 - ⑥ Push [ENTER]/[确认] to save the setting.
 - ⑦ Push [MENU]/[菜单] to exit the Menu screen.
- "ES" is displayed in the upper right of the screen, when the function is activated.

(MENU > Video > Echo Stretch)



Normal screen

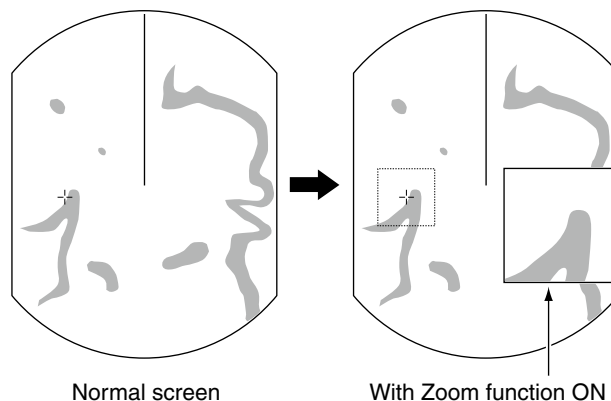
With Echo Stretch ON

NOTE: Turn OFF this function during normal operation.

■ Zoom function

The Zoom function expands the target to two times normal size.

- ① Push [▲], [▼], [◀], or [▶] to move the cursor to the desired target.
- ② Push [EBL1(VRM1)]/[方位线1(距标1)] and [EBL2(VRM2)]/[方位线2(距标2)] simultaneously to toggle between the Zoom function ON and OFF.
 - The ZOOM icon (⊕) is displayed in the upper right of the screen.



■ Long pulse function

To magnify the blips for easier viewing of small targets, the long pulse and echo stretch (p. 19) functions are usable. When the long pulse is used in the $\frac{3}{4}$ to 3 NM range, this function magnifies target echoes behind the target.

(MENU > Video > **Pulse Width**)

• Pulse selection

- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the Video menu.
- ② Push [▲] or [▼] to select the “Pulse Width” item.
- ③ Push [ENTER]/[确认] to enter the option selection mode.
- ④ Push [▲] or [▼] to select SP (Short Pulse) or LP (Long Pulse).
 - When “LP” is selected, “Ⓛ” is displayed in the upper left of the screen.
- ⑤ Push [ENTER]/[确认] to save the setting.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

NOTE: Selecting SP (Short Pulse) increases the target distance resolution. (p. 41)

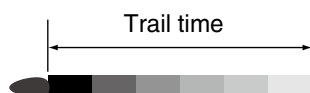
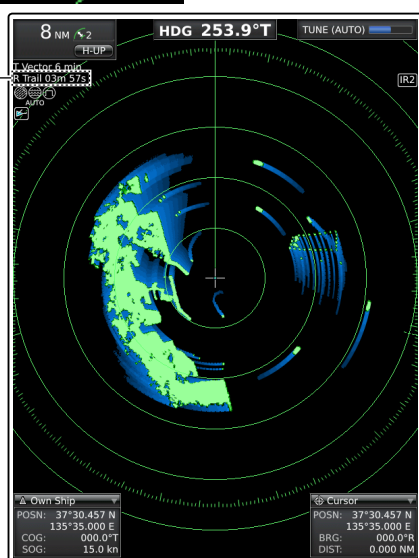
Trail function

The trail function memorizes echoes continuously or at constant intervals. This is useful for watching other vessels' tracks, approximate relative speed, and so on.

Using the Trail function

- ① Simultaneously push [ENTER]/[确认] and [CLEAR]/[取消] to turn ON the Trail function.
 - The trail icon and trail interval are displayed in the upper left of the screen.
 - Trail interval counter starts to count up to the trail time.
- ② All echoes higher than the specified level at the plotted time are memorized and displayed with a graduated intensity together with the current echoes.
 - Echoes are displayed with minimum intensity when "∞" is selected.
 - Hold down [ENTER]/[确认] and [CLEAR]/[取消] for 1 second to erase the plotted echoes.
- ③ Simultaneously push [ENTER]/[确认] and [CLEAR]/[取消] to cancel the Trail function and erase the plotted echoes.
 - The trail icon and trail interval disappear.

Trail indicator
R Trail 03m 57s ← Trail interval counter

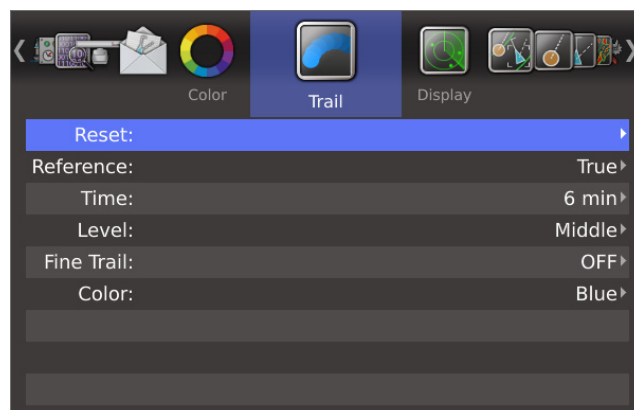


Customizing the trail settings

You can customize the trail settings in the Trail menu in the Menu screen.

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Trail menu.
- ③ Push [▲] or [▼] to select the item.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to select the option.
- ⑥ Push [ENTER]/[确认] to save the setting.
- ⑦ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > Trail >)



The selectable trail settings are as follows:
Refer to the "Menu screen" section for details on each item or option. (p. 6)

Reference:

Selects the reference of trails, True for real movement over ground, and Relative for relative movement to your vessel.

Time:

Selects the trail time from 30 seconds, 1 minute, 3 minutes, 6 minutes, 15 minutes, 30 minutes, or ∞.

Level:

Selects the level of trail from Low, Middle, or High.

Fine Trail:

The Fine trail function makes the trail thin. Selects the thinness of trails from OFF (normal), 1 (Fine), or 2 (Extra fine).

Color:

Sets the trail color to Blue, Yellow, Green, Red, Orange, or White.

■ Power save function

The power save function conserves the boat's battery power by pausing the transmission. The standby (pausing) times are selectable (rotation number is fixed to 10).

For example, when 1 minute is selected, the scanner rotates 10 revolutions; then stops for 1 minute, and then repeats this sequence while the power save function is activated.

◇ Setting the scanning standby time

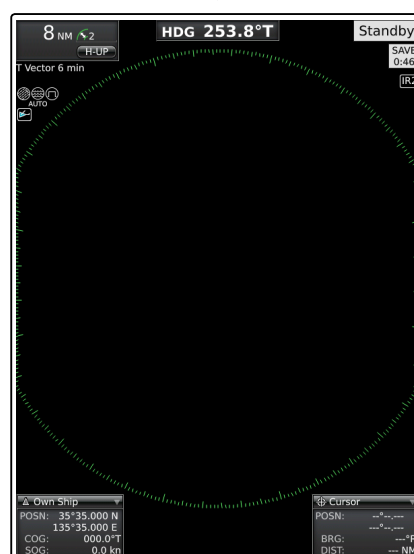
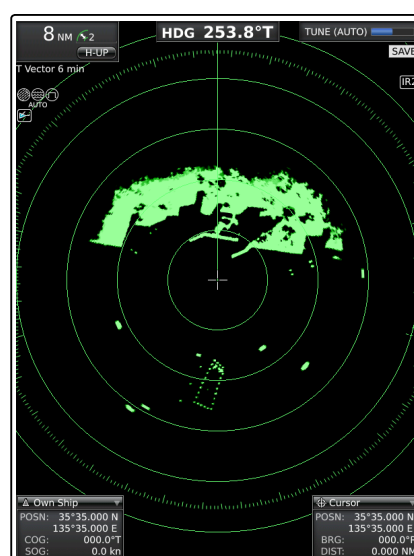
- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the System menu.
- ② Push [▲] or [▼] to select the "Save Time" item.
- ③ Push [ENTER]/[确认] to enter the option selection mode.
- ④ Push [▲] or [▼] to select the standby time.
 - 1, 6, 15, and 30 minutes are selectable.
- ⑤ Push [ENTER]/[确认] to save the setting.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

◇ Using the power save function

- ① Hold down [TX (SAVE)]/[发射(节电)] for 1 second to turn ON the power save function.
 - The save indicator is displayed in the upper right of the screen.
- ② After the scanning rotations are finished, transmission and rotation are suspended until the selected standby time elapses.
 - "SAVE" and standby time appear in the upper right of the screen and the standby time is counted down.
- ③ After the selected standby time elapses, transmission and rotation restart.
- ④ Push [TX (SAVE)]/[发射(节电)] to cancel the power save function.
 - The save indicator turns OFF.

NOTE: When you use the Power save function together with the Alarm function, the LCD display is turned OFF until an object enters the programmed alarm zone, therefore, more power saving is possible. (p. 29)

(MENU > System > Save Time)



SAVE
0:46

Countdown
the standby
time

Scan and Standby modes alternate

■ Ship speed indication

When the ship speed data in NMEA 0183 format is applied, the radar can display the ship speed.

- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the Initial menu.
- ② Push [▲] or [▼] to select the “Speed Unit” item.
- ③ Push [ENTER]/[确认] to enter the option selection mode.
- ④ Push [▲] or [▼] to select the desired speed unit.
 - knot (kn), kilometers/hour (km/h), or miles/hour (mph) are selectable.
- ⑤ Push [ENTER]/[确认] to save the setting.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > Initial > Speed Unit)

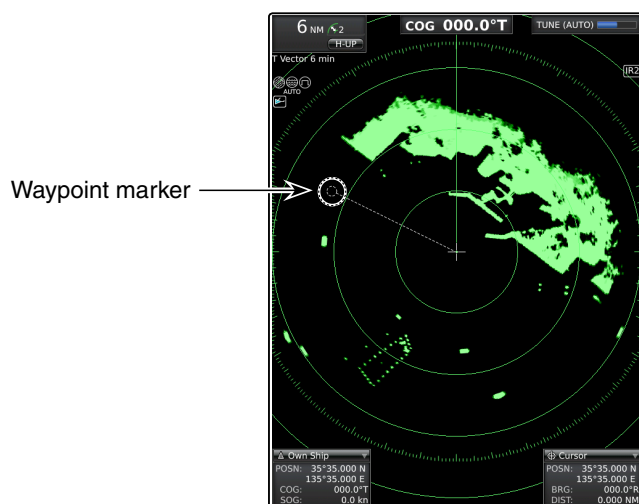


■ Waypoint indication

When waypoint data received from navigation equipment in NMEA 0183 format is applied, the radar can display the waypoint. To display the waypoint marker, bearing data and position data are necessary. (p. 63)

- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the Display menu.
- ② Push [▲] or [▼] to select the “WPT Display” item.
- ③ Push [ENTER]/[确认] to enter the option selection mode.
- ④ Push [▲] or [▼] to turn the setting ON or OFF.
- ⑤ Push [ENTER]/[确认] to save the setting.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

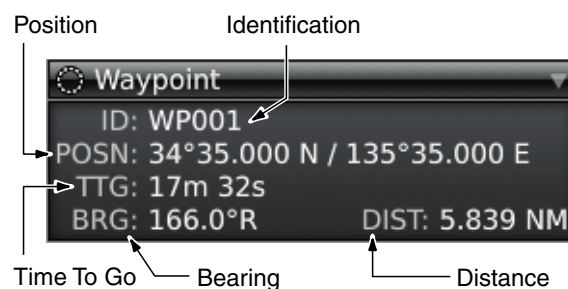
(MENU > Display > WPT Display)



◇ Waypoint information

- ① Push [◀], [▶], [▲], or [▼] to move the “+” cursor on the waypoint mark or line.
- ② Push [ENTER]/[确认] to display the information.
 - The target identification (ID), position (POSN), Time to go (TTG), bearing (BRG), and distance (DIST) are displayed.
 - To close the information box, move the cursor to the point where no dotted mark or line is displayed. Then push [ENTER]/[确认].

• Waypoint information box



Information box:

Move the cursor on the title bar, then push [ENTER]/[确认] to collapse or expand the information box.

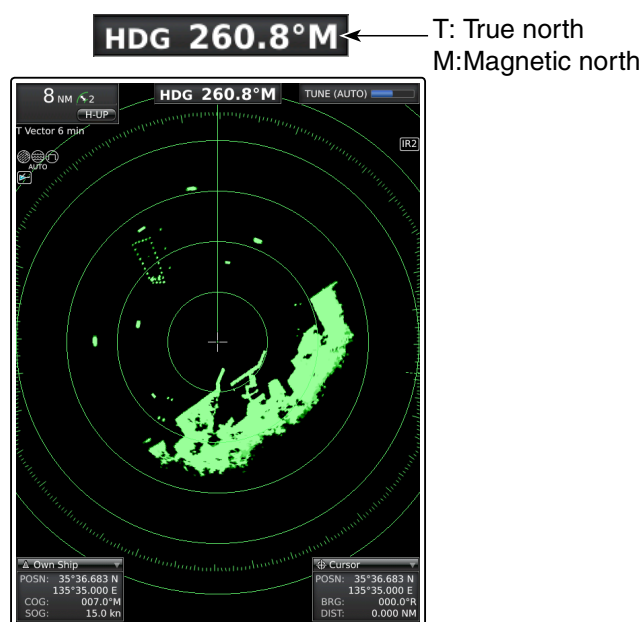
■ Bearing setting

The radar bearing interface accepts NMEA, N+1, AUX, or COG data format and the bearing can use a magnetic or true north type. When a true north type bearing is used, the variation from magnetic north can be adjusted on 0.1° steps.

◇ Setting the bearing type

- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the System menu.
- ② Push [▲] or [▼] to select the “Bearing Mode” item.
- ③ Push [ENTER]/[确认] to enter the option selection mode.
- ④ Push [▲] or [▼] to select the Bearing mode.
 - True and Magnetic north type are selectable.
 - All displayed bearing readouts show the selected bearing type.
- ⑤ Push [ENTER]/[确认] to save the setting.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

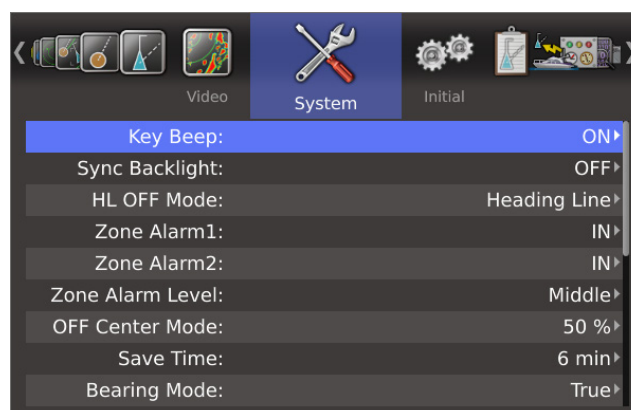
(MENU > System > Bearing Mode)



◇ Setting the magnetic variation

- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the System menu.
- ② Push [▲] or [▼] to select the “Variation” item.
- ③ Push [ENTER]/[确认] to enter the option selection mode.
- ④ Push [▲] or [▼] to select the bearing variation.
 - “Auto”* and “Manual” are selectable.
- ⑤ Push [ENTER]/[确认] to save the setting.
- ⑥ When the “Manual” option is selected in step ④, push [▼] to select the “Manual Variation,” then push [ENTER]/[确认].
- ⑦ Push [▲] or [▼] to set the bearing variation.
- ⑧ Push [ENTER]/[确认] to save the setting.
- ⑨ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > System > Variation)



*NOTE:

- NMEA data is required for the Auto variation. **NEVER** select “Auto” without NMEA data or incorrect variation data may be entered.
- Until an effective variation is received, use 0° for difference between true North and magnetic North. After an effective variation is received, use the last data for the difference. The MR-1210 memorize the data until you turn OFF the power.

Distance measurement

Various way to measure the distance are provided with this radar.

- The distance unit, nautical miles (NM), kilometers (kn), or miles (SM) is selected in the Initial menu of the Menu screen (p. 12).

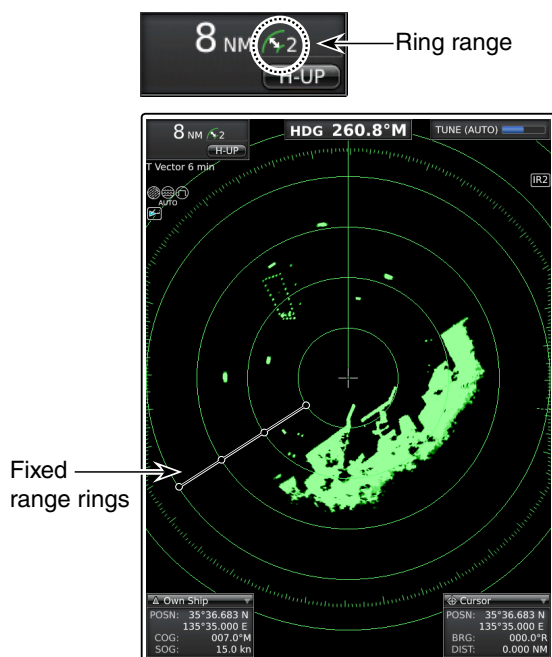
| TYPE | DESCRIPTION |
|--------------------------------|---|
| Fixed range rings (RING) | Displays fixed rings. Suitable for rough estimations from your own vessel to any target. Selectable from two types of range rings. |
| Parallel index lines (PI) | Displays six parallel index lines. Suitable for rough estimations from your own vessel to any target. |
| Variable range marker 1 (VRM1) | Displays a variable range marker and activated by [▲] or [▼] for the range marker selector. Suitable for accurate measurements from your own vessel to a target. |
| Variable range marker 2 (VRM2) | Normally functions the same as VRM1. When the VRM1 and EBL1 selects a target, the center of VRM2 is displayed at the intersection point. Suitable for accurate measurements from target to target. |

◇ Setting the Fixed range rings brilliance

(MENU > Color > Ring Brill)

- Push [MENU]/[菜单], and then push [◀] or [▶] to select the Color menu.
- Push [▲] or [▼] to select the “Ring Brill” item.
- Push [ENTER]/[确认] to enter the option selection mode.
- Push [▲] or [▼] to select the desired brilliance (1 to 3) to turn ON the Ring function and display the fixed rings.
 - 1 to 3 and OFF are selectable.
 - The ring range is fixed depending on the screen range. (See the tables below.)
- Push [ENTER]/[确认] to save the setting.
- Push [MENU]/[菜单] to exit the Menu screen.

/// To clear the fixed rings, select “OFF” in step ③ above.



◇ Selecting the range ring type

(MENU > Initial > Range Ring)

- Push [MENU]/[菜单], and then push [◀] or [▶] to select the Initial menu.
- Push [▲] or [▼] to select the “Range Ring” item.
- Push [ENTER]/[确认] to enter the option selection mode.
- Push [▲] or [▼] to select the type of the fixed range rings Ring1 or Ring2.
 - The ring range is fixed depending on the screen range. (See the tables below.)
- Push [ENTER]/[确认] to save the setting.
- Push [MENU]/[菜单] to exit the Menu screen.

• Fixed rings in each screen range

| Range (NM) | Ring range (NM) | | Number of rings | | Range (km) | Ring range (km) | | Number of rings | |
|------------|-----------------|-------|-----------------|-------|------------|-----------------|-------|-----------------|-------|
| | Ring1 | Ring2 | Ring1 | Ring2 | | Ring1 | Ring2 | Ring1 | Ring2 |
| 1/8 | 0.0625 | | 2 | | 1/4 | 0.125 | | 2 | |
| 1/4 | 0.125 | | 2 | | 1/2 | 0.125 | 0.25 | 4 | 2 |
| 1/2 | 0.125 | | 4 | | 3/4 | 0.25 | | 3 | |
| 3/4 | 0.25 | | 3 | | 1 | 0.25 | | 4 | |
| 1 | 0.25 | | 4 | | 1.5 | 0.5 | 0.25 | 3 | 6 |
| 1.5 | 0.5 | 0.25 | 3 | 6 | 2 | 0.5 | | 4 | |
| 2 | 0.5 | | 4 | | 3 | 1 | 0.5 | 3 | 6 |
| 3 | 1 | 0.5 | 3 | 6 | 4 | 1 | | 4 | |
| 4 | 1 | | 4 | | 6 | 2 | 1 | 3 | 6 |
| 6 | 2 | 1 | 3 | 6 | 8 | 2 | | 4 | |
| 8 | 2 | | 4 | | 12 | 3 | | 4 | |
| 12 | 3 | 2 | 4 | 6 | 16 | 4 | | 4 | |
| 16 | 4 | | 4 | | 24 | 6 | | 4 | |
| 24 | 6 | 4 | 4 | 6 | 32 | 8 | | 4 | |
| 32 | 8 | | 4 | | 36 | 12 | | 3 | |
| 36 | 12 | | 3 | | 48 | 12 | | 4 | |
| 48*1 | 12 | | 4 | | 64*1 | 16 | | 4 | |
| 64*1 | 16 | | 4 | | 72*1 | 18 | | 4 | |
| 72*2 | 18 | | 4 | | 96*2 | 24 | | 4 | |

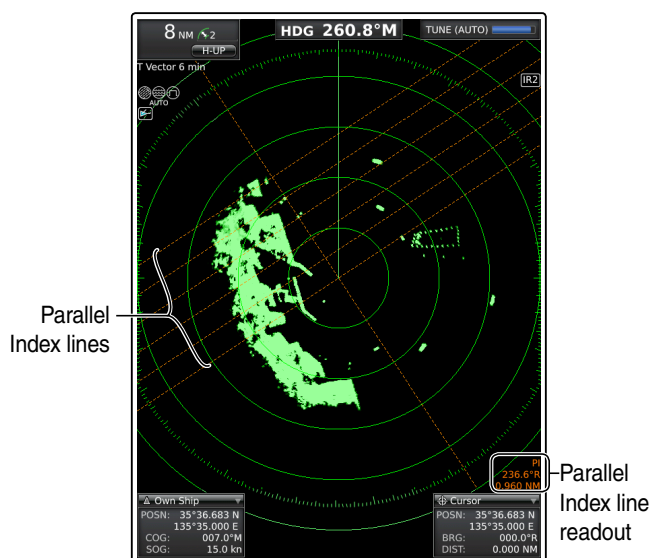
*1 Available for MR-1210TII and MR-1210TIII only.

*2 Available for MR-1210TIII only.

NOTE: When the screen is shifted, the number of rings may differ.

◇ Using the Parallel index lines

- ① Simultaneously hold down [EBL1(VRM1)]/[方位线1(距标1)] and [EBL2(VRM2)]/[方位线2(距标2)] for 1 second to display the Parallel index lines.
 - The crossed lines are displayed.
- ② Push [▲] or [▼] to increase or decrease the range of lines, and [◀] or [▶] to rotate the lines.
 - The direction of the parallel index lines and the range of lines are displayed on the lower right of the screen.
- ③ Push [ENTER]/[确认] to set lines.
- ④ Simultaneously hold down [EBL1(VRM1)]/[方位线1(距标1)] and [EBL2(VRM2)]/[方位线2(距标2)] for 1 second to clear the parallel index lines.



◇ Using the variable range marker

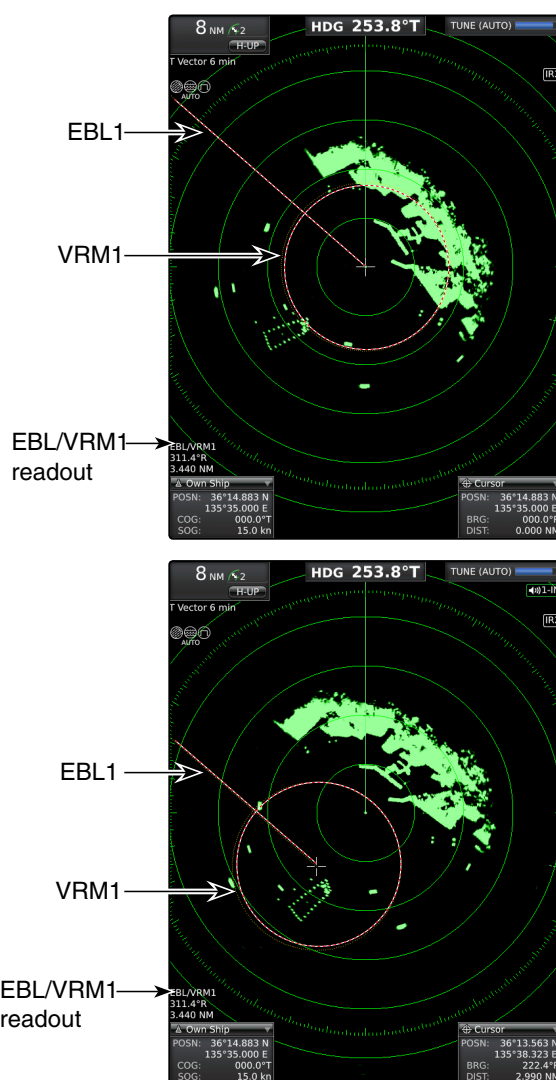
- ① Push [EBL1 (VRM1)]/[方位线1(距标1)] to display the VRM1 and EBL1; then push [▲] or [▼] to set the marker.
 - The range between the vessel and the target is indicated in the EBL/VRM1 readout
- ② Push [ENTER]/[确认] to set the EBL/VRM1 setting.
- ③ Push [EBL2 (VRM2)]/[方位线2(距标2)] to display the VRM2 and EBL2; then push [▲] or [▼] to set the marker.
 - The range between the vessel and the target is indicated in the EBL/VRM2 readout.
 - When VRM1 and EBL1 are displayed, the center of VRM2 appears at the intersection point of VRM1 and EBL1.
- ④ Push [ENTER]/[确认] to set the EBL/VRM2 setting.
- ⑤ Push [EBL1 (VRM1)]/[方位线1(距标1)] to clear the EBL1 and VRM1.
- ⑥ Push [EBL2 (VRM2)]/[方位线2(距标2)] to clear the EBL2 and VRM2.

■ Bearing and Distance measurement

This radar has two Electronic Bearing Lines (EBL) to indicate the target direction from your ship or a target.

◆ Using both the EBL and VRM

- ① Push [▲], [▼], [◀], or [▶] to move the cursor onto the desired target.
- ② Push [EBL1 (VRM1)]/[方位线1(距标1)] to display the EBL1 and VRM1.
 - Push [◀] or [▶] to rotate the Electronic Bearing Line.
 - Push [▲] or [▼] to increase or decrease the Variable Range Marker's ring size.
 - The EBL/VRM1 readout indicates the target bearing and distance.
 - The EBL readouts indicate the target bearing. The indication may differ, depending on the setting in the "Bearing Reference" item of the System menu (p. 12).
 - 0 to 360°R: Relative direction, when "360°R" is selected in the "Bearing Reference" item.
 - P/S 0 to 180°: Bow direction, when "PT/SB" is selected in the "Bearing Reference" item.
 - 0 to 360°T*: True or magnetic bearing, when selecting "True" in the "Bearing Reference" item.
- ③ Push [ENTER]/[确认] to set the EBL/VRM1 setting.
- ④ Push [▲], [▼], [◀], or [▶] to move the cursor onto the desired target.
- ⑤ Hold down [EBL1 (VRM1)]/[方位线1(距标1)] for 1 second to move the EBL1 and VRM1 to the cursor.
 - Hold down [EBL1 (VRM1)]/[方位线1(距标1)] for 1 second again to move the EBL1 and VRM1 to the original place.
- ⑥ Push [EBL1 (VRM1)]/[方位线1(距标1)] to clear the EBL1 and VRM1.
 - The cursor remains on the display.

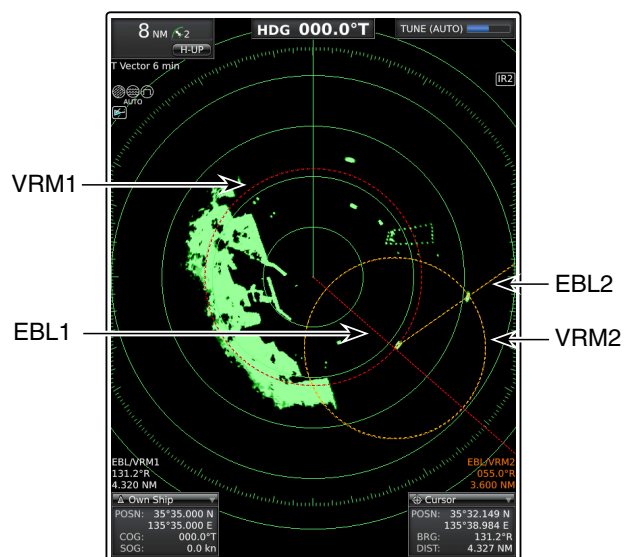


■ Advanced measurements

Using both Electronic Bearing Lines (EBL) and both Variable Range Markers (VRM), the following advanced measurements can be made.

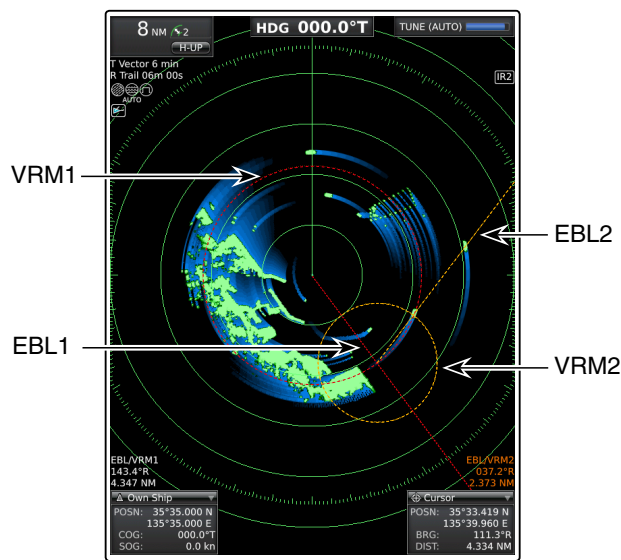
◆ Measuring the distance and direction between two targets

- ① Push [▲], [▼], [◀], or [▶] to move the cursor onto the desired target.
- ② Push [EBL1 (VRM1)]/[方位线1(距标1)] to display the EBL1 and VRM1.
 - Push [◀] or [▶] to rotate the Electronic Bearing Line.
 - Push [▲] or [▼] to increase or decrease the Variable Range Marker ring size.
- ③ Push [ENTER]/[确认] to set the VRM/EBL1 setting.
- ④ Push [EBL2 (VRM2)]/[方位线2(距标2)] to display the EBL2 and VRM2.
 - The intersection of the EBL1 and VRM1 becomes the center of the EBL2 and VRM2.
- ⑤ Push [▲], [▼], [◀], or [▶] to move the cursor onto the other target.
 - Push [◀] or [▶] to rotate the Electronic Bearing Line.
 - Push [▲] or [▼] to increase or decrease the Variable Range Marker ring size.
- ⑥ The VRM2 readout displays the distance between the two targets. The EBL2 readout displays the direction from one target to the other.



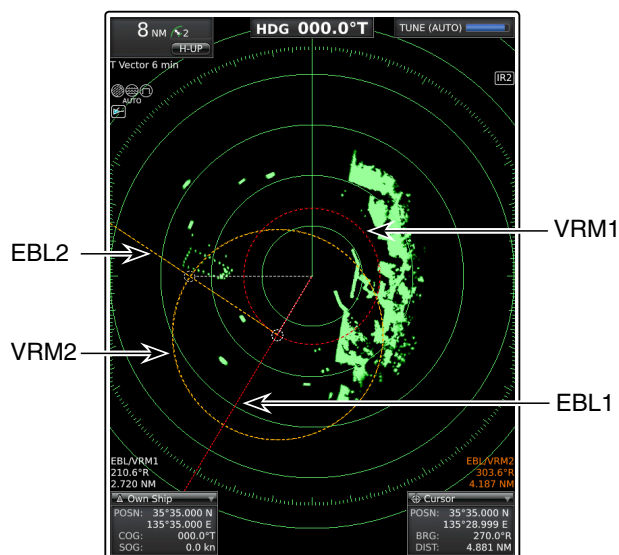
◆ Measuring the relative speed and course of a target

- ① Simultaneously push [ENTER]/[确认] and [CLEAR]/[取消] to turn ON the Trail function, and then the trail extends until it reaches to the preset trail time. (pp. 6, 21)
 - The trail icon and trail interval are displayed in the upper left of the screen.
- ② Push [EBL1 (VRM1)]/[方位线1(距标1)] to display the EBL1 and VRM1, and then set the VRM1 and EBL1 to a previously plotted target.
 - Push [◀] or [▶] to rotate the Electronic Bearing Line.
 - Push [▲] or [▼] to increase or decrease the Variable Range Marker ring size.
- ③ Push [ENTER]/[确认] to set the VRM1/EBL1 setting.
- ④ Push [EBL2 (VRM2)]/[方位线2(距标2)] to display the EBL2 and VRM2, and then set the VRM2 and EBL2 to the current plotted position of the same target.
 - The intersection of the EBL1 and VRM1 becomes the center of the EBL2 and VRM2.
- ⑤ The VRM2 is a measure of target movement that can be converted into relative target speed.
 - For example, when a 6 minute trail time is selected, multiplying the distance by ten gives the relative average speed of the target.
 - If your vessel is stationary during the plotting time, the converted speed and direction become absolute.
 - The converted speed unit is knots, kilometers or miles, depending on the Distance Unit in the Initial menu.
- ⑥ The EBL2 displays the course direction of the target.



◆ Measuring the distance and course from a waypoint

- ① Display a waypoint as described on page 23.
- ② Push [EBL1 (VRM1)]/[方位线1(距标1)] to display the EBL1 and VRM1, and then set the VRM1 and EBL1 to the waypoint.
 - Push [◀] or [▶] to rotate the Electronic Bearing Line.
 - Push [▲] or [▼] to increase or decrease the Variable Range Marker ring size.
- ③ Push [ENTER]/[确认] to set the VRM1/EBL1 setting.
- ④ Push [EBL2 (VRM2)]/[方位线2(距标2)] to display the EBL2 and VRM2, and then set the VRM2 and EBL2 to a target point.
 - (Example: Set to the next waypoint.)
 - The intersection of the EBL1 and VRM1 becomes the center of the EBL2 and VRM2.
- ⑤ The VRM2 displays the distance to the target from the first waypoint.
 - The distance unit can be selected as nautical miles (NM), kilometers (km) or Sea miles (SM) in the Initial menu.
- ⑥ The EBL2 readout displays the direction to the target from the first waypoint.



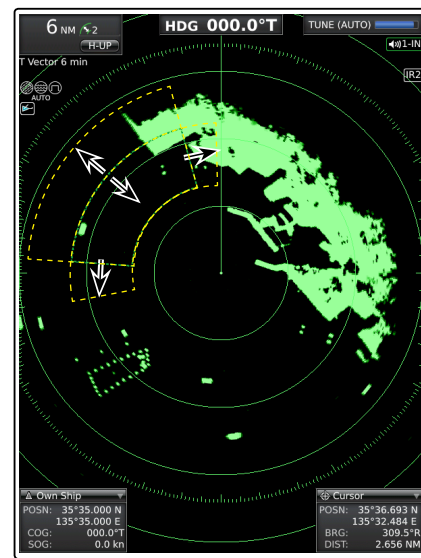
The unit has an alarm function to protect your vessel from collisions. If other vessels, islands or other obstructions come into the preset alarm zone, the function alerts you with an alarm. You can set the desired range and bearing for up to two alarm zones. While the alarm function is activated, the power save function turns OFF the LCD screen until an alarm is given, to conserve the power.

■ Setting Alarm zone

◇ Setting and using the alarm function

- ① Push [+]/[量程+] or [-]/[量程-] to select a desired range.
- ② Push [◀], [▶], [▲], or [▼] to set the cursor to the starting point of the alarm zone.
- ③ Push [ALM]/[报警] several times to turn ON the desired functions, Alarm 1 or Alarm 2.
 - “◀▶)” and the preset alarm zone(s) is displayed. (Fig. 1)
- ③ Hold down [ALM]/[报警] for 1 second to enter the alarm zone setting.
 - The starting zone is displayed on the screen. (Fig. 1)
- ④ Push [◀] or [▶] to adjust an angle and push [▲] or [▼] to set the distance of the alarm zone.
 - The selected alarm zone is displayed.
- ⑤ Push [ALM]/[报警] to set the alarm zone and activate the alarm function.
 - “◀▶)” is displayed on the upper right of the screen.
 - The selected alarm zone remains.
- ⑥ If a target comes into or goes out of the alarm zone, an alarm sounds.
 - Push [CLEAR]/[取消] to stop the alarm, or push [ALM]/[报警] to cancel the alarm signal and function.
- ⑦ To deactivate the alarm function, push [ALM]/[报警] several times.
 - “◀✕)” and alarm zone disappear.
- ⑧ To activate the alarm function again with the same programmed zone, push [ALM]/[报警].
 - “◀▶)” and the preset alarm zone are displayed. (Fig. 2)

If “◀✕)” is displayed, the alarm function is invalid. In that case, push [+]/[量程+] until the alarm icon returns to “◀▶)”.



← Alarm icon is displayed

Push [◀], [▶], [▲] or [▼], then Push [ALM]/[报警]

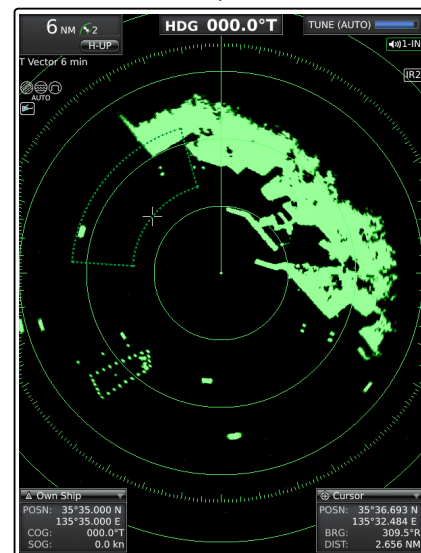


Fig. 2

◇ Entering the power save mode

- ➡ To activate the power save function, hold down [TX (SAVE)]/[发射(节电)] for 1 second while the Alarm function is ON.
 - The power save function is activated and the display turns OFF.
 - When a target comes into the alarm zone, an alarm sounds, the display turns ON and the power save mode is cancelled.

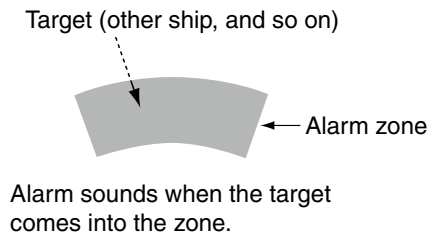
■ Setting Zone alarm type

A zone alarm sounds when the target comes into the zone, or when the target goes out of the zone. (p. 11)

- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the System menu.
- ② Push [▲] or [▼] to select the “Zone Alarm1” or “Zone Alarm2” item.
- ③ Push [ENTER]/[确认] to enter the option selection mode.
- ④ Push [▲] or [▼] to select IN or OUT.
 - IN: Alarm sounds when the target comes into the zone.
 - OUT: Alarm sounds when the target goes out of the zone.
- ⑤ Push [ENTER]/[确认] to save the setting.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > System > **Zone Alarm1**)

(MENU > System > **Zone Alarm2**)



■ ATA (Automatic Tracking Aid)

By automatically tracking the target chosen with the cursor key, the closest point of approach (CPA) and the time to closest point of approach (TCPA) limit of your vessel and a target are calculated.

ATA function is designed to sound an alarm when the CPA and TCPA fall below a set value (the approach watch area).

Only targets in the 0.25 to 16 NM range that are displayed with a high luminosity (strong return signal) can be selected as ATA targets.

- A maximum of 10 targets can be plotted on the screen.
- Plot positions are identified by an approved symbol mark (p. 33) and associated plot number.
- The target and vector line will move across the screen at the rate and direction defined by the calculated true or relative course and speed.
- The vector line is displayed on the target.

■ The ATA function ON or OFF

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the ATA menu.
- ③ Push [▲] or [▼] to select the "Function" item.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to select "ON" or "OFF" to turn the ATA function ON or OFF.
- ⑥ Push [ENTER]/[确认] to save the setting.
- ⑦ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > ATA > **Function**)



■ ATA settings

Set the menu items before using the ATA function.

- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the ATA menu.
- ② Push [▲] or [▼] to select the item.
- ③ Push [ENTER]/[确认] to enter the option selection mode.
- ④ Push [▲] or [▼] to select an option.
- ⑤ Push [ENTER]/[确认] to save the setting.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > **ATA** >)



◇ Track

The plot displays the target's past positions as 5 dots, during each specified tracking interval.

You can specify the track interval in the "Track Interval" item of the Target menu.

- OFF: Turns OFF the Track display function.
- ON: Turns ON the Track display function.

◇ No. Display

Selects the target identification number type that is displayed at the right side of the mark.

- OFF: Does not display any mark number.
- Select: Displays only the selected mark number.
- All: Displays all mark numbers.

■ Related settings

◇ Target menu

You can change the target settings for ATA operation. The settings of the Target menu are commonly used for the ATA and AIS operations. See page 7 for the Target menu details.

These are the Target menu items and their default settings.

- Vector Mode: True
- Vector Time: 6 min
- Track Interval: 1 min
- CPA* Limit: 1.0 NM
- TCPA* Limit: 1 min
- CPA/TCPA Alarm: ON

*CPA/TCPA: Closest Point of Approach and Time to Closest Point of Approach limits are set to give a warning when a target or targets enter those limits around your own vessel.

■ ATA operation

◇ Operation

Select a target on the screen that you want to track.

○ Turn ON the ATA function and set its settings. (p. 31)

① Push [▲], [▼], [◀] or [▶] to move the “+” cursor onto a desired target.

② Hold down [MODE•ACQ]/[工作模式•获取] for 1 second to set the target for tracking.

- A dotted circle symbol is displayed on the cursor.
- After 20 seconds progressing time has passed, the dotted vector is displayed on the target.
- After 1 minute progressing time has passed, it changes to a solid circle with a dotted vector line, and tracking operation starts.

➡ When the target disappears, red crosses blink on the target, and then the mark disappears after 1 minute.

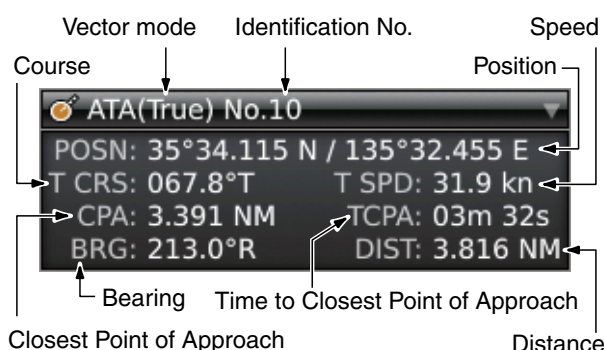
➡ When a target advances within the CPA and TCPA limits, the mark changes its color to red, blinks, and sounds an alarm. To cancel the alarm, push any key.

➡ To cancel the target setting, move the cursor onto the target, then hold down [CLEAR]/[取消] for 1 second.

➡ To select the target that displays information, set the cursor to the target, and then push [ENTER]/[确认].

- The corners of a square are displayed on the selected target.
- The target identification number, position (POSN), course (CRS), speed (SPD), CPA, TCPA, bearing (BRG), and distance (DIST) are displayed.

• ATA information box



Information box:

Move the cursor on the title bar, then push [ENTER]/[确认] to collapse or expand the information box.

■ ATA operation (Continued)

◇ All Clear Target

Releases all of the ATA targets at the same time.

- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the ATA menu.
- ② Push [▲] or [▼] to select the “All Clear Target” item.
- ③ Push [ENTER]/[确认].
 - The dialog box “Sure?” is displayed.
- ④ Push [ENTER]/[确认] again to release all ATA targets.
 - The “All Clear Target” item is grayed out.
- ⑤ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > ATA > All Clear Target)



■ Plotting marks

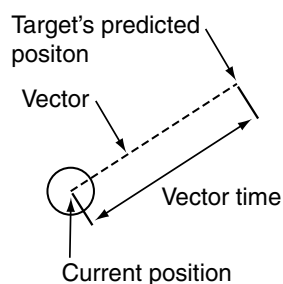
There are 5 kinds of plotting marks.

| Mark | Description |
|------|---|
| | Selected, uncalculated mark. |
| | Selected, calculated mark. |
| | Normal, calculated mark. |
| | CPA/TCPA alarm mark. The target is close to within a minimum range and time. • Alarm sounds and red colored mark blinks. Push any key to cancel the alarm. |
| | Indicates the tracking of a target disappears. • Alarm sounds and red crosses blink. Push any key to cancel the alarm. |

■ Course and speed vector

The vector indicates the target's predicted, true or relative course and speed.

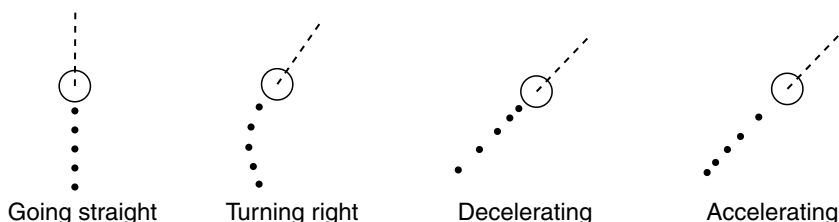
- The vector time may change, depending on the setting in the “Vector Time” item of the Target menu (p. 7).
- The tip of the vector shows the target's predicted position after the time selected in the “Vector Time” item of the Target menu (p. 7).



■ Plots (ATA)

The plot displays the target's past positions as 5 dots, during each specified tracking interval.

- The target track interval may change, depending on the setting in the “Track Interval” item of the Target menu (p. 7)



■ AIS (Automatic Identification System)

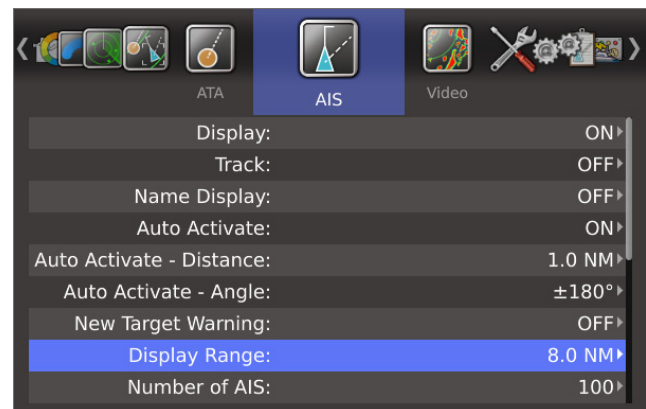
AIS is an acronym for “Automatic Identification System.”

An AIS transponder is a short range data radio unit, used primarily for collision-risk management and navigation safety. It automatically transmits and receives vessel information such as the vessel name, MMSI code, vessel type, position data, speed, course, destination and more. Information is exchanged among the vessels and/or base stations on the VHF maritime mobile band. The information helps to identify other nearby vessels or stations by displaying the received data on the radar screen.

■ The AIS Display ON or OFF

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the AIS menu.
- ③ Push [▲] or [▼] to select the “Display” item.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to select “ON” or “OFF” to turn the AIS display ON or OFF.
- ⑥ Push [ENTER]/[确认] to save the setting.
- ⑦ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > AIS > Display)

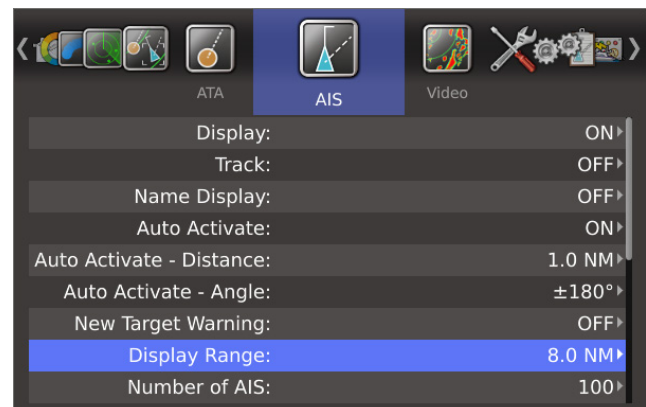


■ AIS settings

Sets the menu items before using the AIS function.

- ① Push [MENU]/[菜单], and then push [◀] or [▶] to select the AIS menu.
- ② Push [▲] or [▼] to select the item.
- ③ Push [ENTER]/[确认] to enter the option selection mode.
- ④ Push [▲] or [▼] to select an option.
- ⑤ Push [ENTER]/[确认] to save the setting.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > AIS >)



◇ Track

The plot displays the AIS target's past positions as 5 dots, during each specified tracking interval. You can set the track interval in the “Track Interval” item in the Target menu.

- OFF: Turns OFF the Track display function.
- ON: Turns ON the Track display function.

◇ Name Display

Selects the AIS target display type.

- OFF: Does not display any name or number of the target.
- Select: Displays the vessel name of the selected target.
- Active: Displays all active target numbers.

◇ Auto Activate

The Auto Activate function automatically turns the sleeping AIS target into an activated target when the AIS target is at the specified distance or angle.

You can specify the distance or angle in the next two items.

- OFF: Turns OFF the Auto Activate function.
- ON: Turns ON the Auto Activate function.

◇ Auto Activate - Distance

Sets the distance to automatically turn the sleeping AIS target into an activated target.

- 0.1 to 10.0 NM: Select the distance from your vessel.

■ AIS Setting (Continued)

◇ Auto Activate - Angle

Sets the angle to automatically turn the sleeping AIS target into an activated target.

- 5 to 180°: Selects the angle from your vessel.

◇ New Target Warning

Sets whether or not to alert when the Auto Activate function automatically turns the sleeping AIS target into an activated target.

- OFF: Does not give a warning when the Auto Activate function activates the target.
- ON: Gives a warning when the Auto Activate function activates the target.

◇ Number of AIS

Selects the maximum number of AIS targets that can be displayed on the screen to between 10 and 100 in 1 target steps.

◇ Slow Warn

The AIS unit calculated COG (Course Over Ground) data of a vessel that is at anchor or drifting is unreliable, and therefore the CPA (Closest Point of Approach) and TCPA (Time to CPA) data may not be correctly calculated. If a vessel is anchored in your alarm zone, the unreliable data can cause the collision alarm to sound many times, even if there is no real danger. To prevent this, when the anchored vessel's SOG (Speed Over Ground) is less than this set value, the Slow Warn function assumes that vessel's COG is fixed towards your vessel and an alarm will sound.

- OFF: Turns OFF the Slow Warn function.
- ON: Turns ON the Slow Warn function.

◇ Slow Warn Speed

- 0.1 to 5.0 kn: Selects the vessel's speed in 0.1 kn steps.

◇ Erase Lost Target

Erases all of the Lost targets at the same time.

When there is no lost target, this setting grays out.

① Push [ENTER]/[确认].

- The dialog box "Sure?" is displayed.

② Push [ENTER]/[确认] again to clear all of the Lost targets on the screen.

About "Lost Target": A vessel is regarded as a "Lost target" after a specified period of time has passed since the vessel last transmitted data, as described on page 9.

The "Lost target" icon disappears from the screen 6 minutes and 40 seconds after the vessel was regarded as a "Lost target."

◇ Safety Message

Sets whether or not to display the message when the safety message is received.

- OFF: Turns OFF the Safety Message function.
- ON: Turns ON the Safety Message function.

◇ Favorite AIS

Sets whether or not to alert that the specified MMSI target gets into the specified range from your vessel, or not.

- OFF: Turns OFF the Favorite AIS function.
- ON: Turns ON the Favorite AIS function.

◇ Favorite AIS Range

Sets the Favorite AIS display range to between 0.1 and 36.0 NM.

- 0.1 to 36.0 NM: Selects the range from your vessel in 0.1 NM steps.

◇ Favorite AIS Target1

◇ Favorite AIS Target2

◇ Favorite AIS Target3

Enters the MMSI number of favorite targets.

■ Related settings

◇ Target menu

You can change the target settings for AIS operation. The settings of the Target menu are commonly used for the ATA and AIS operations. See page 7 for the Target menu details.

These are the Target menu items and their default settings.







- Vector Mode: True
- Vector Time: 6 min
- Track Interval: 1 min
- CPA* Limit: 1.0 NM
- TCPA* Limit: 1 min
- CPA/TCPA Alarm: ON

*CPA/TCPA: Closest Point of Approach and Time to Closest Point of Approach limits are set to give a warning when a target or targets enter those limits around your own vessel.

■ Description of the AIS display

◆ AIS target

The AIS targets are displayed with the icons described below.

| Icon | Description |
|---|--|
|  | Vessel The tip of the target triangle automatically points in the direction it's heading. |
|  | Base Station |
|  | Search and Rescue (SAR) |
|  | Aids to Navigation (AtoN) |
|  | Virtual Aids to Navigation (Virtual AtoN) |
|  | Search and Rescue Transponder (SART), MAN OVERBOARD (MOB), or Emergency Position Indicate Radio Beacon (EPIRB) |

◆ Selected AIS target

The corners of a square are displayed when a target is selected. The information of the selected AIS target is displayed in the AIS box.

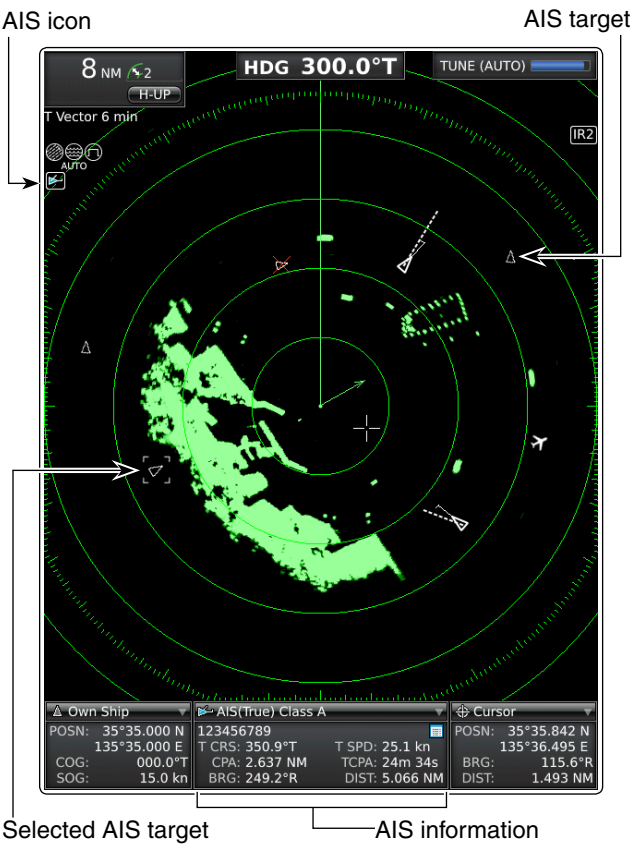
◆ AIS icon

Displayed when a valid VDM sentence is input from the [NMEA1] (AIS) port.
The indicator disappears if the AIS signal is not received for 6 minutes.

◆ Your vessel icon

Your vessel icon is displayed in the center of the stand-by screen when a valid VDM sentence is input from the [NMEA1] (AIS) port.

- The icon is displayed when “AIS” is selected in the “STBY Mode” item of the System menu (p. 12).



If more than the specified AIS signals are received, “△ AIS Data is Full” is displayed.
The number of AIS signals are specified in the “Number of AIS” item of the AIS menu.

■ AIS operation

◇ Operation


Select a target whose information you want to display on the screen.

- Turn ON the AIS display and set its settings. (pp. 34, 35)

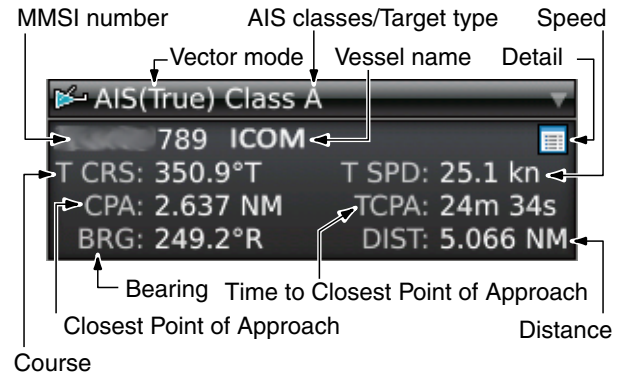
① Push [▲], [▼], [◀] or [▶] to move the “+” cursor onto a desired target.

② Push [ENTER]/[确认] to select the target.

- The corners of a square is displayed on the selected target.
- The target information is displayed in the AIS information box.
 - AIS Class, MMSI number, Vessel name, Course (CRS), Speed (SPD), CPA, TCPA, bearing (BRG), and distance (DIST) are displayed.

- If several targets are overlapped on the screen, push [ENTER]/[确认] to sequentially select a target.
- When the sleeping target is selected, hold down [ENTER]/[确认] for 1 second to manually change the selected target to activated.
- When the activated target is selected, hold down [CLEAR]/[取消] for 1 second to change the selected target to sleeping.
- When the target disappears, red crosses blink on the target, and then the mark disappears after 6 minutes and 40 seconds.
- When a target advances within the CPA and TCPA limits, mark changes its color to red, blinks, and sounds an alarm. To cancel the alarm, push any key.
- When the cursor onto the “” (detail) icon, push [ENTER]/[确认] to open the Detail window.
 - Push [▲], [▼] to scroll the window.
 - Push [CLEAR]/[取消] to close the window.

• AIS information box




Information box:

Move the cursor on the title bar, then push [ENTER]/[确认] to collapse or expand the information box.

■
 Status of the vessel icon


There are 5 kinds of target vessel status.

Sleeping target:

- 


The AIS signal has been updated (received), but the distance from your vessel is far, or you set it as 'sleeping.' The target is displayed as just a triangle without a heading or vector line.

Activated target:

- 


The target is displayed with the heading line, SOG (Speed Over Ground), COG (Course Over Ground) vector and ROT (Rate of Turn).

Dangerous target:

- 


Even if the target's status is sleeping or activated, when it enters your CPA and TCPA limit settings, the target is displayed with a thick line and changes its color to red.

Selected target:

- 

The target information is displayed in the AIS information box.

Lost target*:

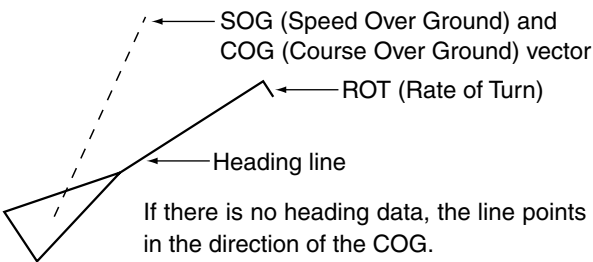
- 

When the AIS signal has not been updated (received) for a specific time period, the target triangle is marked with a red cross.

If the AIS signal has still not been updated (received) for 6 minutes and 40 seconds, the target icon disappears.

*A vessel is regarded as a "Lost target" after a specified period of time has passed since the vessel last transmitted data. (p. 9)

• Activated target

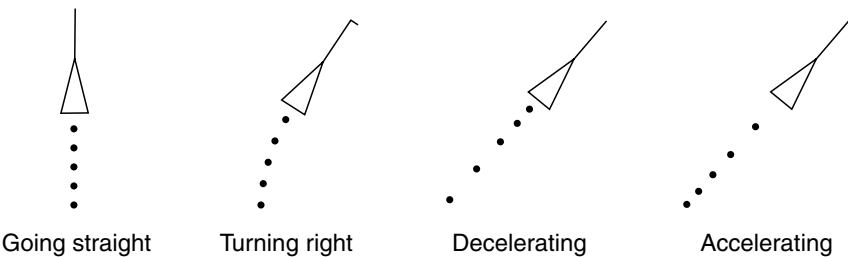


- ➡ When the sleeping target is selected, hold down [ENTER]/[确认] for 1 second to manually change the selected target to activated.
- ➡ When the activated target is selected, hold down [CLEAR]/[取消] for 1 second to change the selected target to sleeping.

■
 Plots (AIS)

The plot displays the activated target, SAR, SART, MOB, or EPIRB's past positions as 5 dots, during each specified tracking interval.

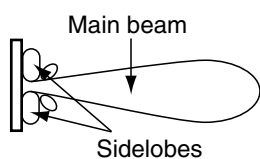
- The target track may change, depending on the setting in the "Track Interval" item of the Target menu. (p. 7)



Radar uses a form of electromagnetic radiation that can be reflected off a large vessel, bridge, or other metal objects that are in proximity. Because of this property, unwanted reflections off some objects may cause false echoes to appear on the screen where in fact no actual targets exist. Operators should be familiar with the effect of this phenomena. In some cases, echoes can be reduced.

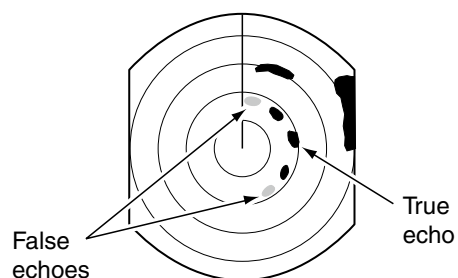
■ Sidelobe echoes

Radiation can escape on each side of the beam inside the sidelobes. If a target reflects this radiation, it will be displayed on the screen as an echo.



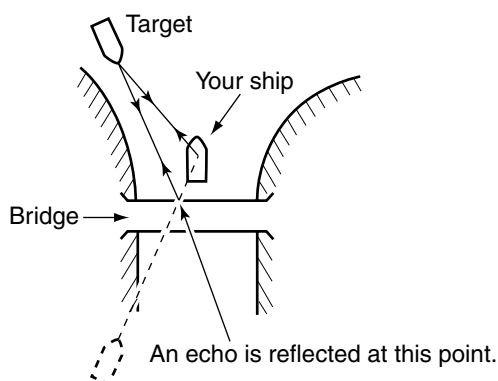
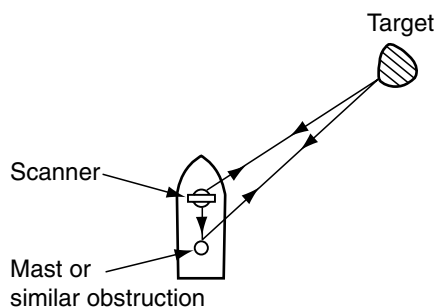
Sidelobe echoes usually occur at short ranges and as a result of large (strongly reflective) targets. They can be reduced with proper adjustment of the [SEA]/[海浪抑制] control.

See page 18 for details of the [SEA]/[海浪抑制] control.

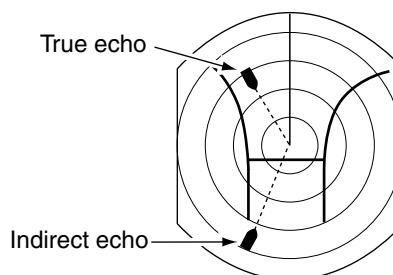
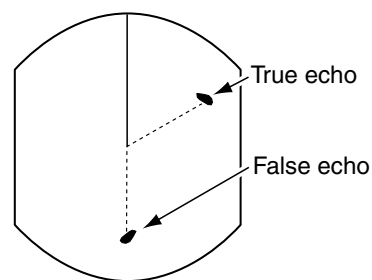


■ Indirect echoes

Indirect echoes may be returned from either a passing vessel, or returned from a reflecting surface, such as a mast on your own vessel.

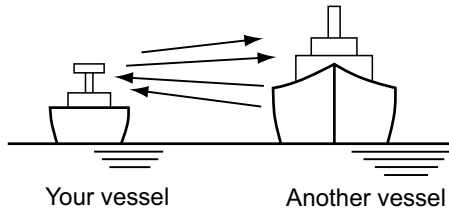


An indirect echo from a reflective surface will appear on a different bearing from the direct (true) echo, but the distance will be approximately the same for both.



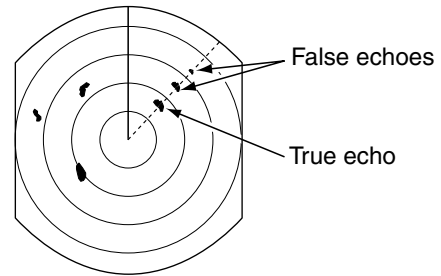
■ Multiple echoes

Multiple echoes may appear when a short-range and strong echo is received from a vessel, bridge, or breakwater.



Multiple echoes will appear beyond the target's true echo point on the same bearing of a large target. They can be reduced with proper adjustment of the [SEA]/[海浪抑制] control.

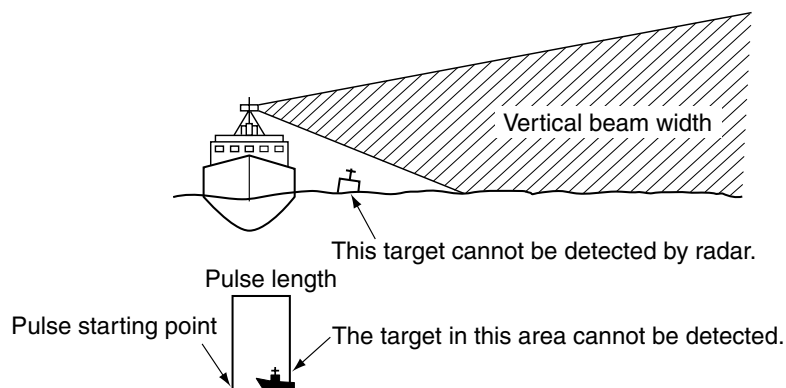
See page 18 for the [SEA]/[海浪抑制] control.



■ Minimum range

Detection at short range is very important. Minimum range is determined primarily by transmitter pulse length, vertical beam width and height of the scanner unit. The shorter the transmission time, the quicker the return echoes can be received and their distance measured.

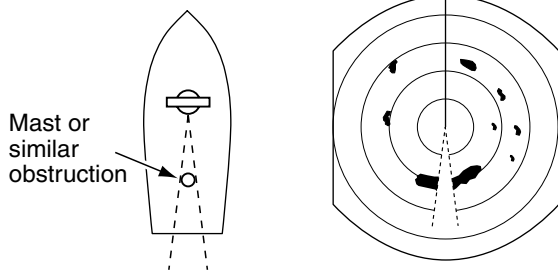
The ability to see targets very close to the vessel is decreased if the scanner is mounted too high off the water, because the bottom of the vertical beam of the scanner overshoots nearby targets.



Blind and Shadow sectors

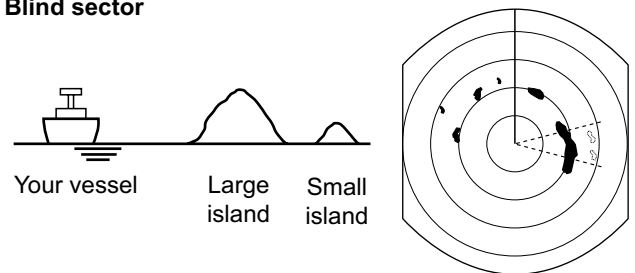
Blind or Shadow sectors may exist because of obstructions such as masts, derricks or other metal objects. An obstruction may throw either a complete or partial shadow as shown in the diagram below. If a target is in a shadow sector, target echoes may not appear on the screen.

Shadow sector



When tall and massive targets such as a large island are located at close range also shadowed without producing any echoes. This phenomenon is called blind sector. It is very important to know the bearings and widths of all shadow sectors caused by your own vessel's obstructions.

Blind sector



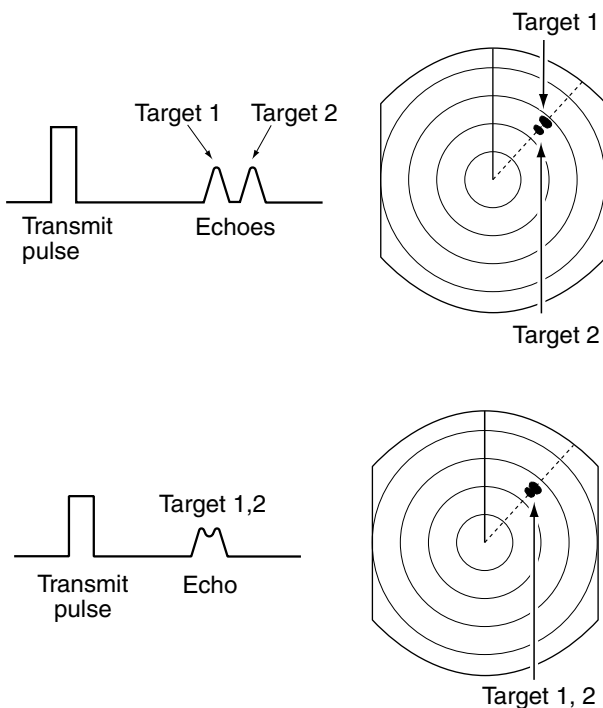
Target resolution

Target resolution is determined by the horizontal beam width and transmit pulse width. Sometimes it is difficult to detect two targets that are separated by short distances or that are in the same direction.

Distance resolution

When two targets are separated by more than the pulse width, they appear as two echoes.

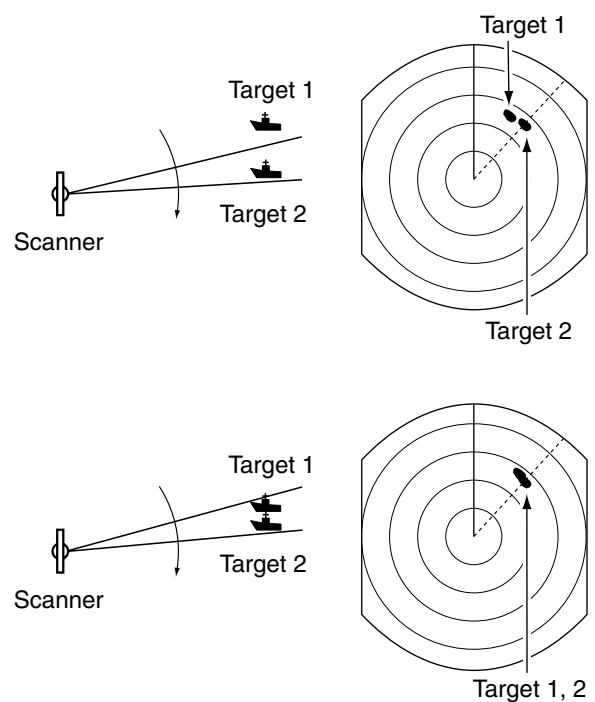
When two targets are not separated by more than the pulse width, they appear as 1 echo.



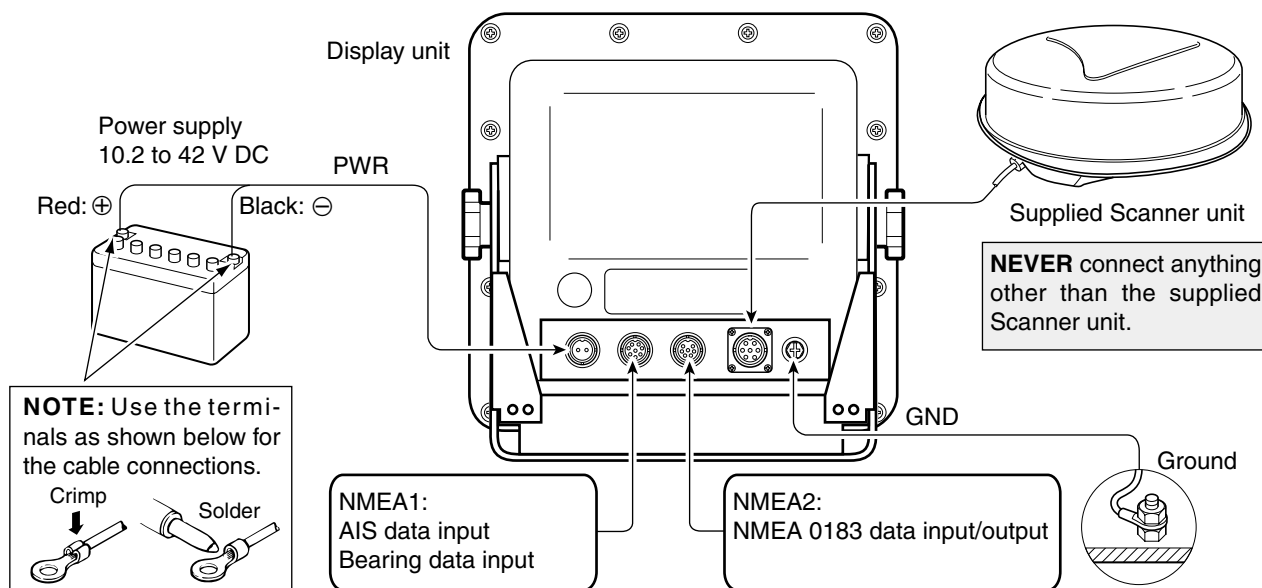
Direction resolution

When two targets are separated by more than the horizontal beam width, they appear as two echoes.

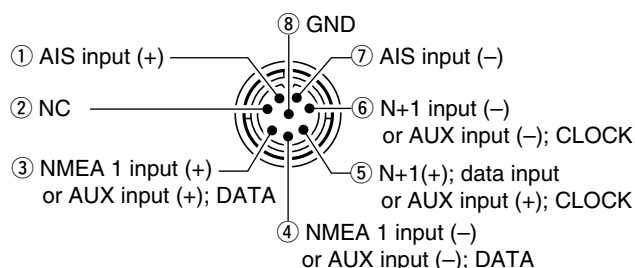
When two targets are not separated by more than the horizontal beam width, they appear as one echo.



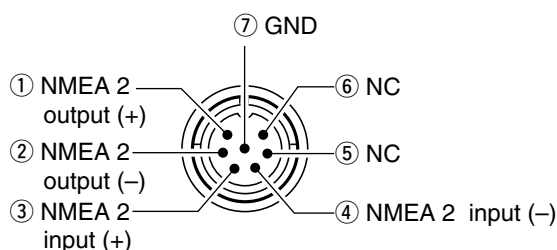
■ Connecting the units



NMEA1 connection (Rear panel view)



NMEA2 connection (Rear panel view)



NMEA 1/2 inputs/NMEA 2 output: 4800 bps, AIS input: IEC61162-2 38400 bps

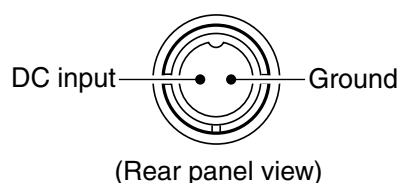
■ Power source requirement

◇ DC power source

The display unit is designed for connection to any power source if the voltage is 10.2–42 V DC, so that a 12, 24, or 32 V DC battery can be used without a DC-DC converter, or any internal modifications.

• DC power cable connection

Connect the supplied DC power cable as shown in the diagram.



CAUTION: Incorrect cable connection will damage the display unit.

■ Ground connection

To prevent electrical shocks and other problems, ground the display unit through the [GND] terminal. For best results, connect a heavy gauge wire or strap to the nearest grounding point on the boat. The distance between the [GND] terminal and the ground point should be as short as possible.

■ Installing the display unit

◆ Location

Select a place for installation that meets the following important conditions:

- The display unit should be placed near the wheel in the cabin so that an operator may easily view the radar screen while facing the bow.
- To minimize interference, **KEEP** the unit **AT LEAST THE COMPASS SAFE DISTANCE** stated in the serial number label on the rear panel away from the compass and navigation receiver.
- Select a position where there is no danger of salt or fresh water spray or immersion.
- Select a location where it is easy to perform maintenance or adjustment after installation.
- Select a location that can support the weight of the display unit.
- **DO NOT** select areas subject to extreme heat, cold, vibrations or direct sunlight.

• Display unit Mounting Bracket

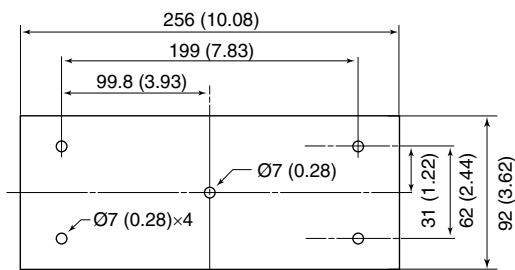


Fig. 1

◆ Mounting

The mounting bracket supplied with the display unit allows “dashboard” or “overhead” mounting.

- ① Hold the mounting bracket up to the selected location and mark pilot holes for the five installation holes using the template.
 - The template is provided on page 64.
- ② Drill five holes, 7 mm (0.28 in.) in diameter as shown in the diagram. (Fig. 1)
- ③ Install the bracket using the knob bolts, bolts, nuts or washers with the supplied accessories. (Fig. 2)
- ④ Adjust the display unit to an adequate view angle.

• Mounting Bracket installation

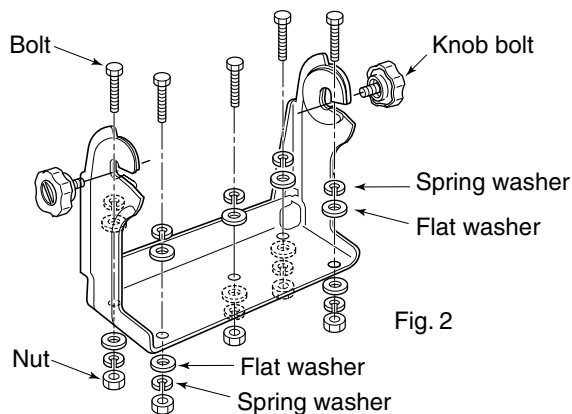
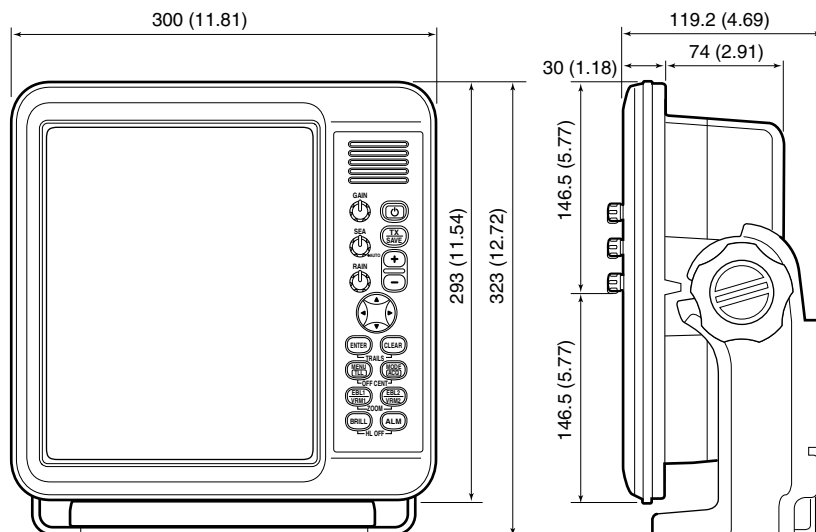
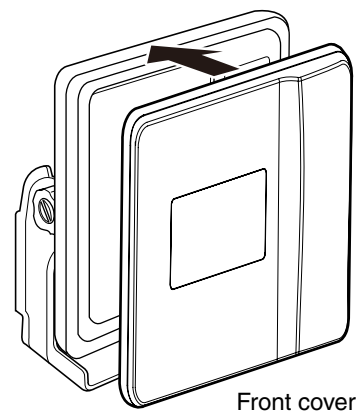


Fig. 2

• Display unit



• Front cover attachment



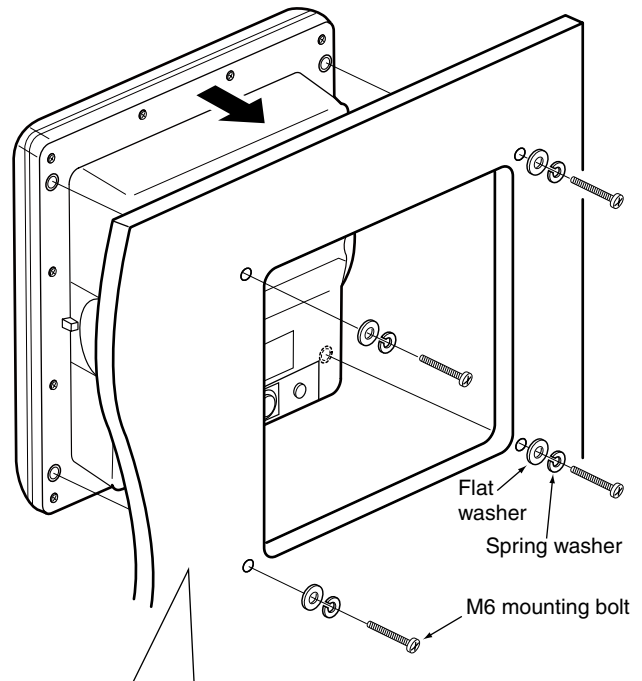
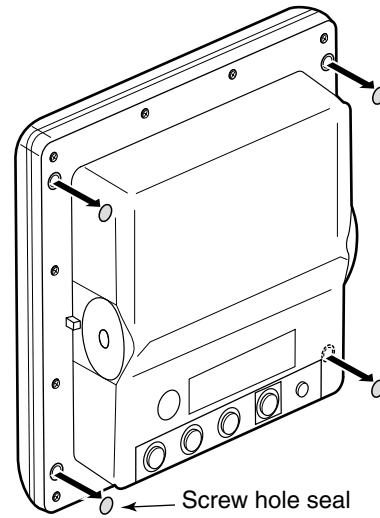
◆ Wall Mounting

The display unit can be mounted to a flat surface, such as an instrument panel, using the M6 mounting bolts. The screw hole depth is 14.5 mm (0.57 inches).

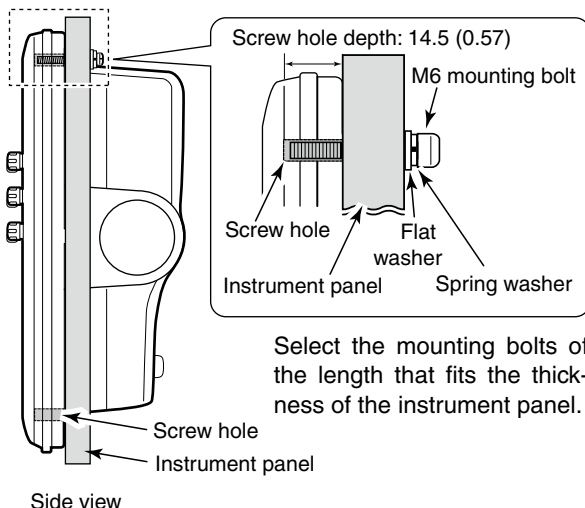
- ① Remove the four screw hole seals from the four corners of the display unit.
 - The template is supplied with the display unit.

BE CAREFUL! NEVER use your finger nail to remove the seal. Otherwise, you may injure your nail.

- ② Carefully cut a hole in the instrument panel, or wherever you plan to mount the display unit.
- ③ Drill four holes for the mounting screw.
- ④ Slide the display unit through the hole.
- ⑤ Attach the four corners of the display unit using the flat washers, spring washers, and M6 mounting bolts.

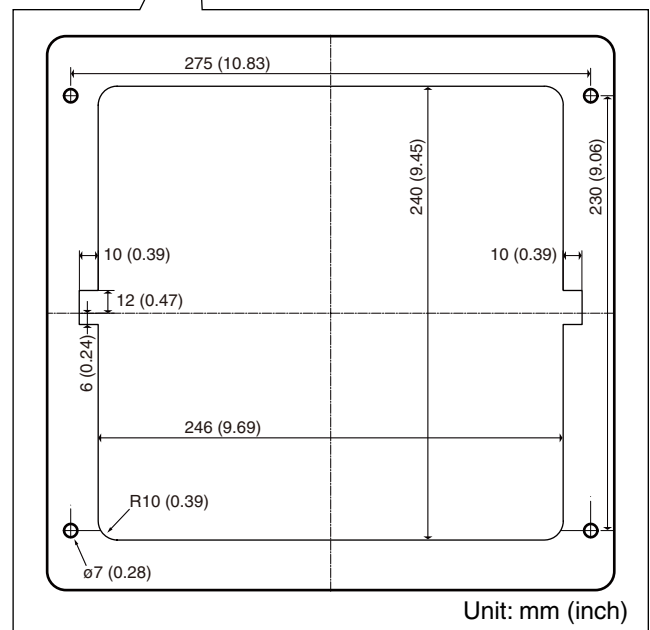


• M6 Mounting bolt



Side view

Unit: mm (inch)



Unit: mm (inch)

■ Mounting the EX-2714 scanner unit

◆ Location

The scanner unit is designed for high-pressure water jet resistance (except for the cable connectors). Select a place for installation that meets the following important conditions.

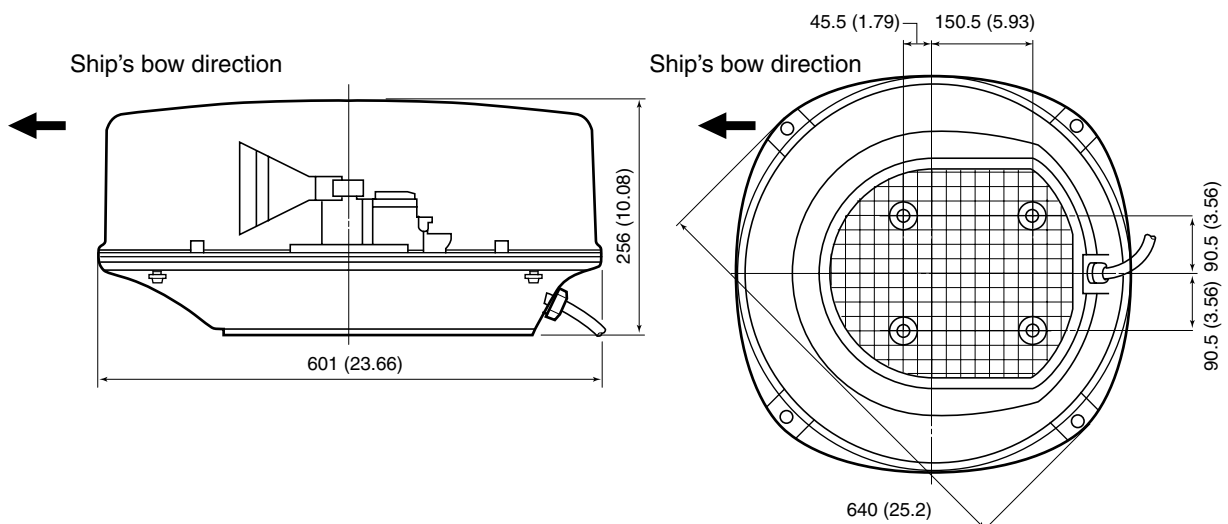
- The scanner unit must be near the boat's center line and have a good view in every direction. Be sure there are no objects in the surrounding area that will interfere with the scanning beam.
- Keep the scanner unit away from any exhaust pipes. Exhaust gas can damage the unit.
- When the boat is equipped with a Radio Directional Finder (RDF) system, keep the scanner unit at least 2 m (6.6 ft) away from any RDF antenna.
 - Radiation from the scanner unit can affect the measurement data of RDF equipment.
- The unit should be placed as high as possible on the boat to obtain best performance with maximum range.
- If you install two or more radar in one boat, install one above, and the other(s) below.
- The mounting surface must be parallel with the boat's waterline.
- If the height is insufficient to install the scanner unit, build a special frame for installation.

◆ Mounting

⚠ WARNING! BE SURE [Ⓢ] is OFF whenever you are working with the scanner unit.

- ① Drill four holes, 12 mm (0.47 in) in diameter using the template supplied with the display unit.
- ② If the mounting surface or platform is metal, apply a sealing compound around the holes to prevent corrosion and water infusion.
- ③ Attach the scanner unit to the selected position with the supplied bolts (M10×50 mm or M10×25 mm; depending on your installation needs), flat and spring washers.

⚡ **CAUTION: SECURE** the four bolts firmly.



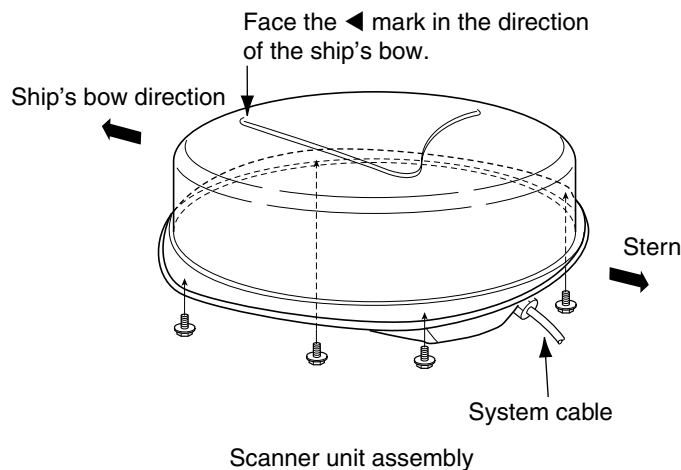
Unit: mm (in.)

■ Wiring the EX-2714 system cable

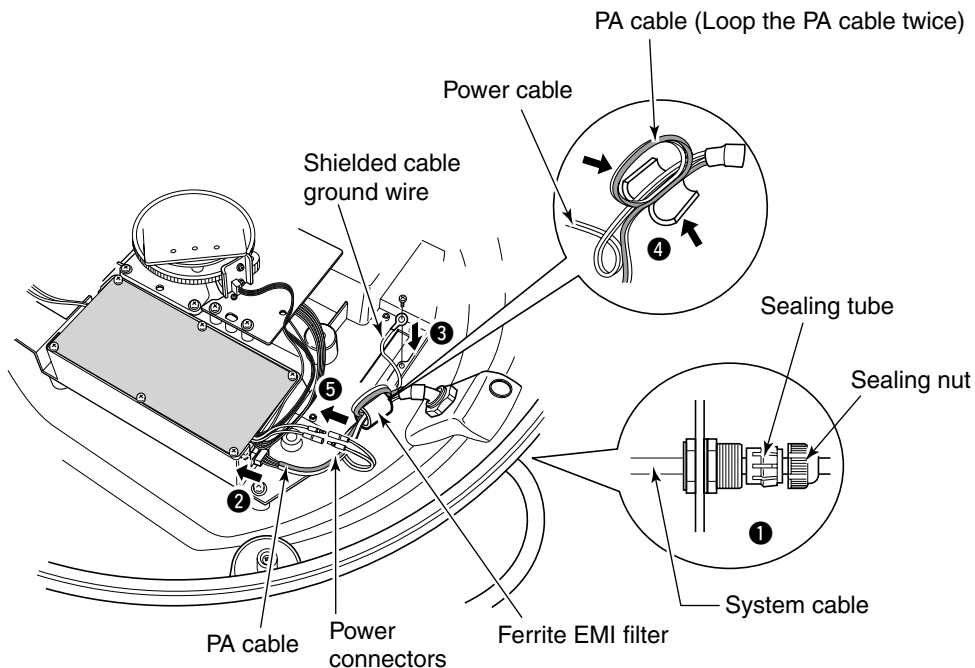
CAUTION: NEVER cut the supplied system cable.

- ① Using a hex head wrench*, loosen the four bolts on the bottom of the scanner unit, and open the unit.
* A Phillips head or flat head screwdriver is also usable.
- ② Loosen the sealing nut on the scanner unit and pass the system cable through the sealing nut and sealing tube. (①)
- ③ Insert the black and white PA cable connector into the PA unit connector J1. (②)
- ④ Connect the shielded cable ground wire to the ground plate with the screw. (③)
- ⑤ Clamp the system cable with the ferrite EMI filter attached near the sealing connector. Be sure to clamp it tightly. (④)
- ⑥ Connect the power cable (black and red) to the power connector. (⑤)
- ⑦ Tighten the sealing nut, then replace the radome cover over the scanner unit.
DO NOT stretch the system cable too much, otherwise a miss contact of the connector may occur.
- ⑧ Tighten the four bolts on the bottom of the scanner unit. (Use a torque wrench until the scale on the wrench reads 5.0 N•m; 3.69 lbf•ft.)
• The four projections around the circumference of the radome cover show the positions of the bolt receptacles.

• Scanner unit assembly (cover removed)



• Connect the system cable



■ Mounting the EX-2780 scanner unit

◆ Location

The scanner unit is designed for high-pressure water jet resistance (except for the cable connectors). Select a place for installation that meets the following important conditions.

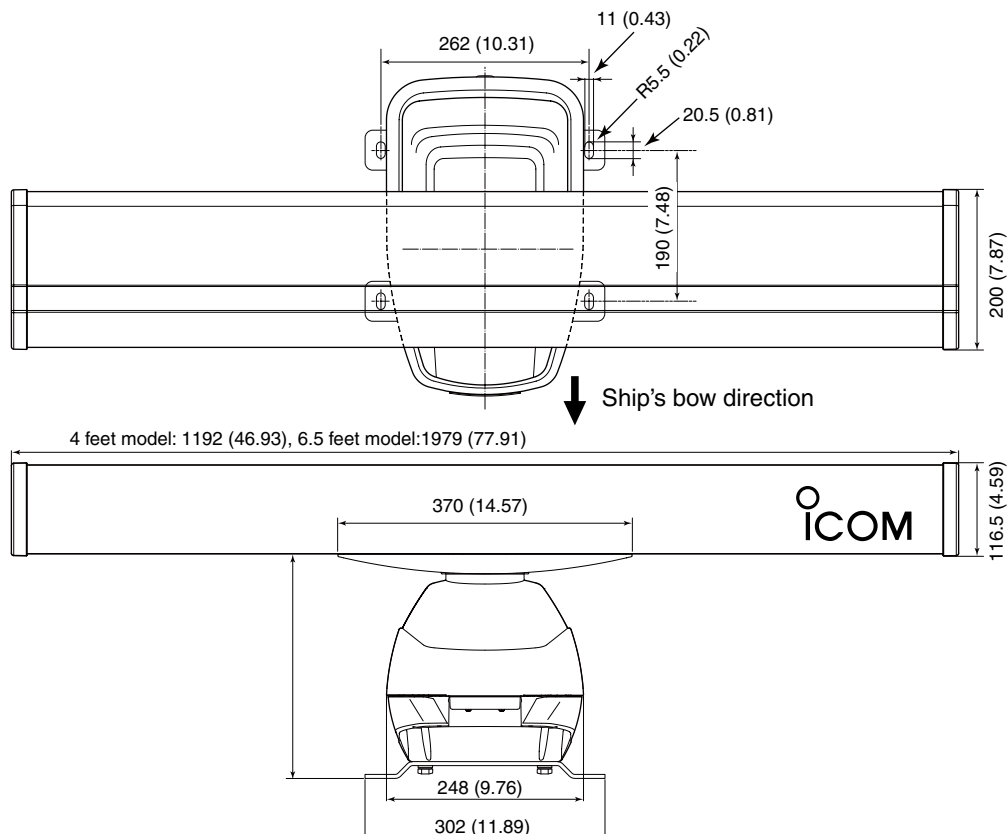
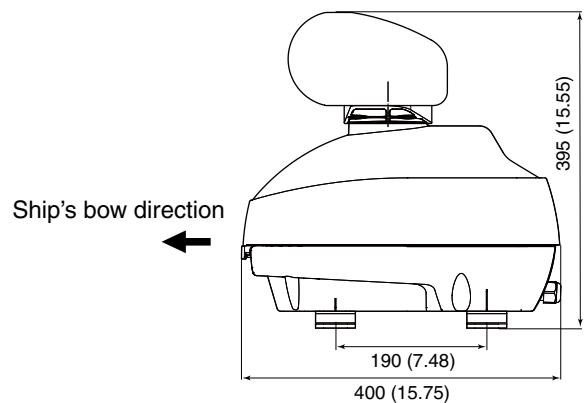
- The scanner unit must be near the boat's center line and have a good view in every direction. Be sure there are no objects in the surrounding area that will interfere with the scanning beam.
- Keep the scanner unit away from any exhaust pipes. Exhaust gas can damage the unit.
- When the boat is equipped with a Radio Directional Finder (RDF) system, keep the scanner unit at least 2 m (6.6 ft) away from any RDF antenna.
 - Radiation from the scanner unit can affect the measurement data of RDF equipment.
- The unit should be placed as high as possible on the boat to obtain best performance with maximum range.
- If you install two or more radar in one boat, install one above, and the other(s) below.
- The mounting surface must be parallel with the boat's waterline.
- If the height is insufficient to install the scanner unit, build a special frame for installation.

◆ Mounting

⚠ WARNING! BE SURE [Ⓢ] is OFF whenever you are working with the scanner unit.

- ① Drill four holes, 12 mm (0.47 in) in diameter using the template supplied with the display unit.
- ② If the mounting surface or platform is metal, apply sealing compound around the holes to prevent corrosion and water infusion.
- ③ Attach the scanner unit to the selected position with the supplied bolts (M10×40 mm), flat and spring washers.

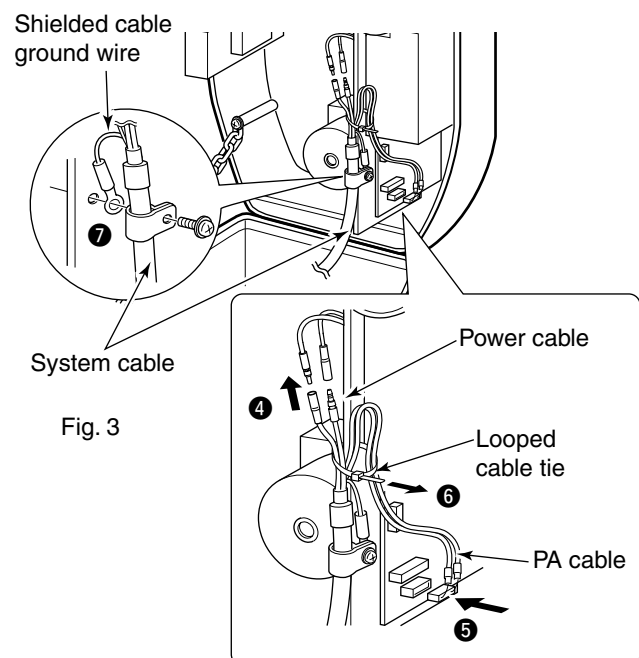
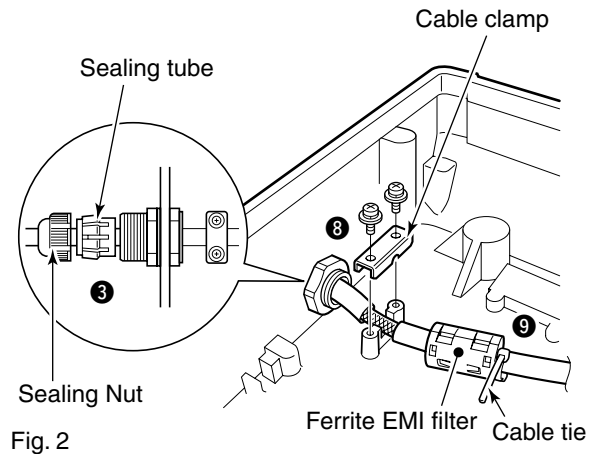
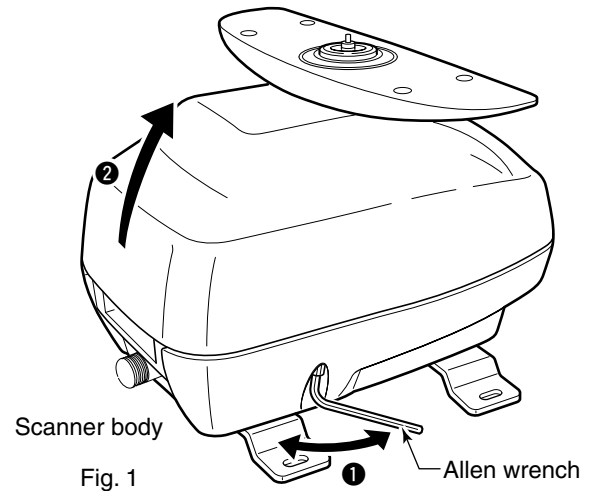
⚡ **CAUTION: SECURE** the four bolts firmly.



■ Wiring the EX-2780 system cable

CAUTION: NEVER cut the supplied system cable.

- ① Loosen the four bolts on the bottom of the scanner unit body using the supplied allen wrench (①), and open the top cover. (②)
- ② Loosen the sealing nut on the scanner unit and pass the system cable through the sealing nut and sealing tube. (③)
- ③ Connect the power cable (black and red) connector to the power unit connector through the looped cable tie. (④)
- ④ Insert the PA cable (black and white) connector into the PA unit connector. Be sure to follow the diagram below carefully. (⑤)
 - Secure the looped PA cable with the looped cable tie. (⑥)
- ⑤ Connect the shielded cable ground wire to the chassis with the screw, as shown in the diagram. (⑦)
- ⑥ Clamp the system cable with the cable clamp metal fitting using a screw near the sealing connector. (⑧)
 - Be sure to clamp it tightly.
- ⑦ Clamp the system cable with the ferrite EMI filter attached near the sealing connector. (⑨)
 - Be sure to clamp it tightly.
 - Secure the ferrite EMI filter with cable tie.
- ⑧ Tighten the sealing-nut, then close the top cover.
- DO NOT** stretch the system cable too much, otherwise a miss contact of the connector may occur.
- ⑨ Tighten the four bolts on the bottom of the scanner body. (Use a torque wrench to 9.8 N•m; 7.23 lbf•ft.)

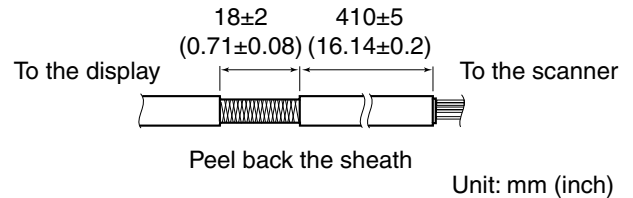


■ Attaching the EX-2780 scanner unit

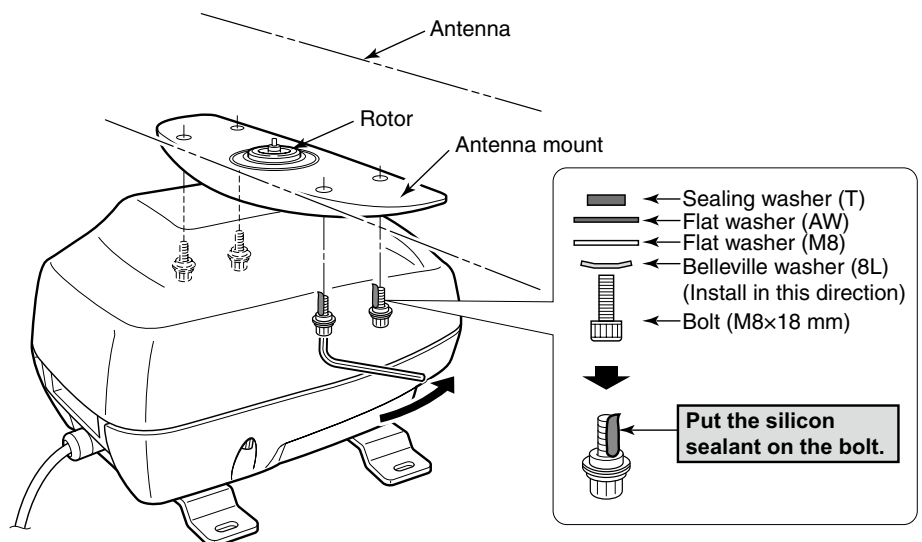
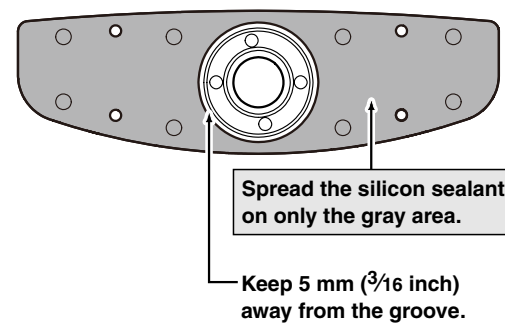
- ① Put the scanner unit on the stay.
 - ② Attach the antenna rotor with the supplied bolts (M8×18 mm), flat and Belleville washers and a sealing washer.
- Be sure to install the Belleville washer in the direction shown below.

NOTE: When using the optional system cable.
 Peel back the outer sheath of the system cable when using the optional **OPC-2340** system cable.

BE CAREFUL! DO NOT cut the inner shield wire when peeling back the outer sheath.



- ① Spread the supplied silicon sealant onto the top of the antenna mount.
- ② Carefully place the antenna onto the mount so that the rotor ring and pin go into the hole in the antenna. If necessary, move the antenna slightly back and forth on the mount to align the bold holes. The antenna will drop slightly into place.
- ③ Slide the flat and Belleville washers and a sealing washer onto the supplied bolt (M8 x 18 mm), and then put the silicon sealant on the bolt. (4 bolts)
 - Be sure to install the Belleville washer in the direction, shown below.
- ④ Insert and tighten the 4 bolts using the wrench.
- ⑤ Wipe off any excess silicon sealant.



■ Installing the UX-234 Video output unit

When an optional UX-234 is installed, the MR-1210 can be connected to an external display or a PC monitor with a D-sub 15-pin connector (DE-15).

- The monitor resolution of 800 × 600 pixels or higher is required.

⚠ WARNING! BE SURE to disconnect the power cable from the display unit, when you are installing the optional unit.

- ① Remove the cable hole seal to the left of the display unit's serial number label. (Fig. 1)

BE CAREFUL! NEVER use your finger nail to remove the seal. Otherwise, you may injure your nail.

- ② Remove the 12 screws from the display unit's rear panel. (Fig. 1)
- ③ Slowly open the rear case and disconnect the four connectors from the display's main board. (Fig. 1)

CAUTION: DO NOT pull the cables when opening the rear case. This could damage the cables and/or display unit.

- One connector is lock type. Hold the release on connector head to disconnect the connector.

- ④ Pass the video output cable through the hole, then screw in and tighten the sealing tube. (Fig. 2)
- ⑤ Connect the video output cable connector to the UX-234's connector. (Fig. 3)

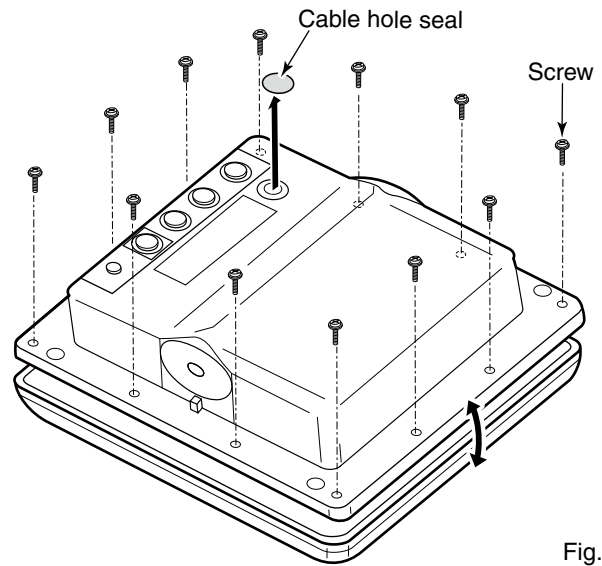


Fig. 1

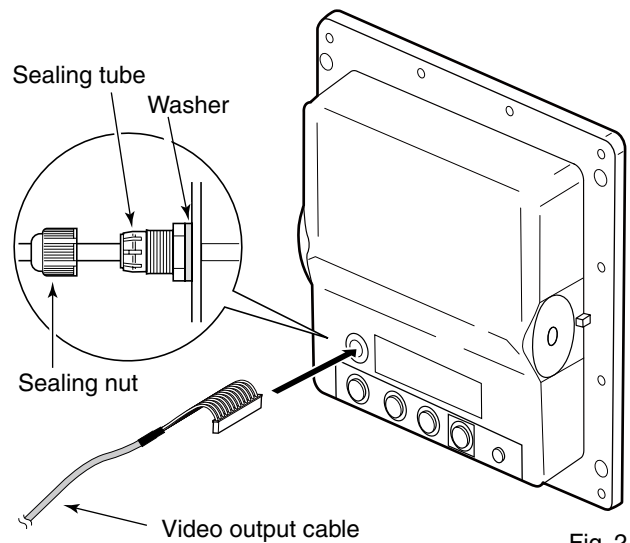


Fig. 2

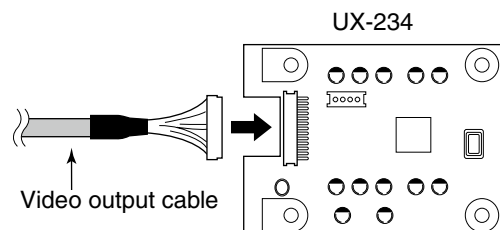


Fig. 3

■ Installing the UX-234 Video output unit (Continued)

- ⑥ Install the UX-234 on the display's main board using the four screws supplied with the UX-234. (Fig. 4)
 - Before tightening the screws, be sure to connect the UX-234's connector to the display unit's connector.
- ⑦ Secure the cable to the UX-234 with a cable tie. (Fig. 5)
- ⑧ Clamp the cable with the ferrite EMI filter attached near the UX-234. (Fig. 5)
 - Be sure to clamp it tightly.
- ⑨ Reconnect the four connectors to the display's main board.
- ⑩ Replace the gasket, rear case, and screws their original position.
 - Make sure the gasket is properly seated.
- ⚠ **CAUTION: DO NOT** pinch the cables when closing the rear case. This could damage the cables.
- ⑪ Adjust the video output cable length and then tighten the sealing nut. (Fig. 6)

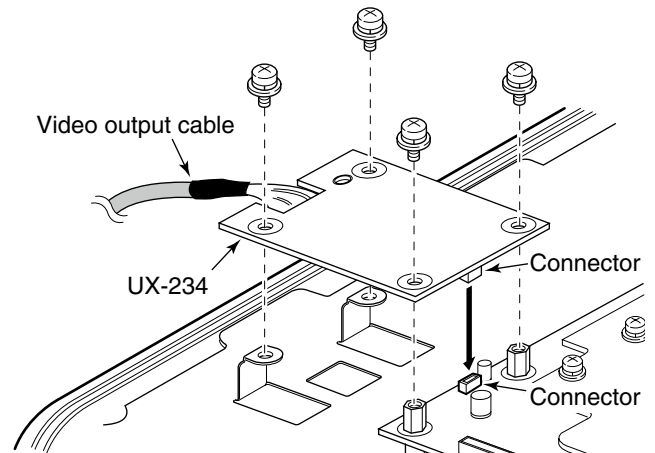


Fig. 4

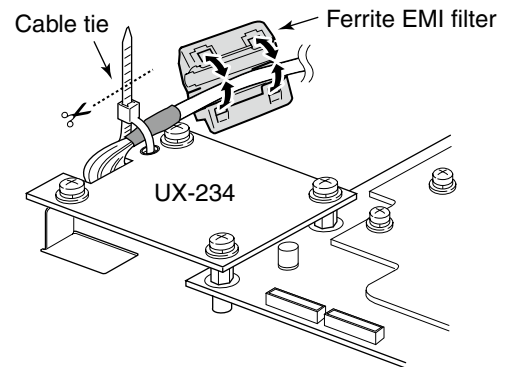


Fig. 5

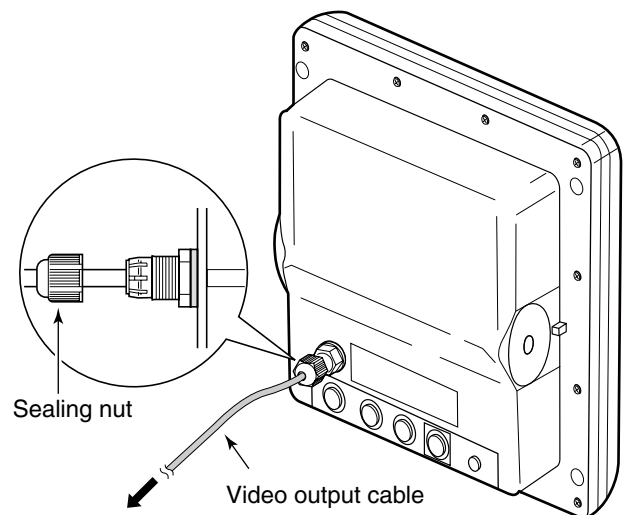


Fig. 6

■ TLL function

The TLL (Target Latitude and Longitude) function marks the target on the display or outputs its data to an external unit.

◇ TLL setting

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the System menu.
- ③ Push [▲] or [▼] to select the "TLL Mode" item.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to select an option.
 - "Output," "Symbol," and "Output & Symbol" are selectable.
- ⑥ Push [ENTER]/[确认] to save the setting.
- ⑦ Push [MENU]/[菜单] to exit the Menu screen.

◇ Operation

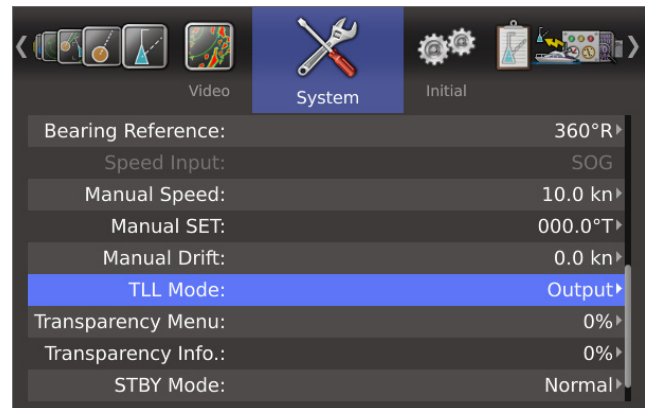
Select a target on the screen that you want to mark.

- ① Push [▲], [▼], [◀] or [▶] to move the "+" cursor onto a desired place.
 - ② Hold down [MENU•TLL]/[菜单•TLL] for 1 second to mark the point.
 - When the "Output" or "Output & Symbol" is selected in the "TLL Mode" of the System menu, outputs the position information from the NMEA output terminal.
 - When the "Symbol" or "Output & Symbol" option is selected in the "TLL Mode" of the System menu, displays the target mark.
 - ③ Repeat steps ① and ② until you complete marking places.
- ➡ Hold down [CLEAR]/[取消] for 1 second to delete the selected mark.

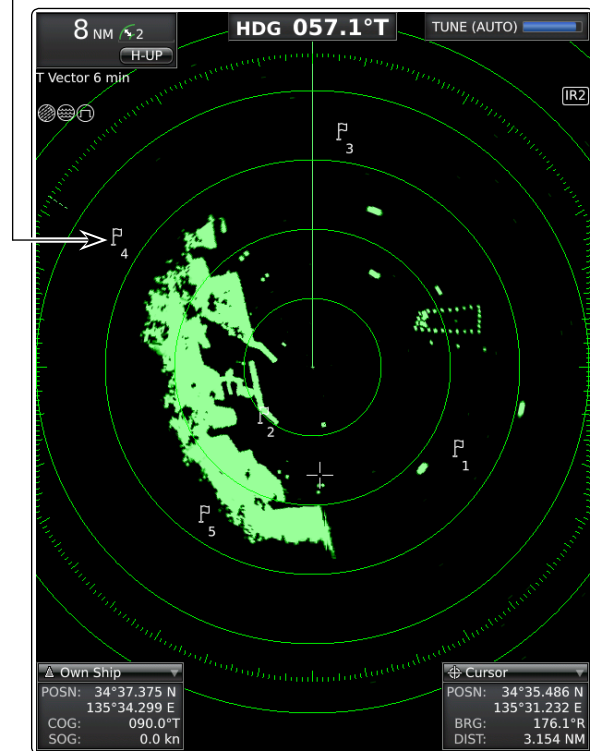
◇ TLL mark information

- ① Push [◀], [▶], [▲], or [▼] to move the "+" cursor on to the mark.
- ② Push [ENTER]/[确认] to display the information.
 - The target identification number, position (POSN), bearing (BRG), distance (DIST), Time to go (TTG), and day/time (Day/Time) are displayed.
 - To close the information box, move the cursor to the point where no mark is displayed. Then push [ENTER]/[确认].

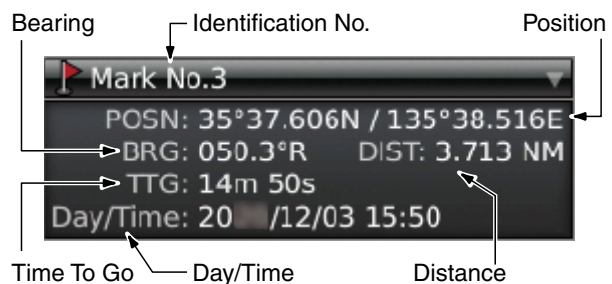
(MENU > System > TLL Mode)



TLL Mark



• TLL mark information box



Information box:

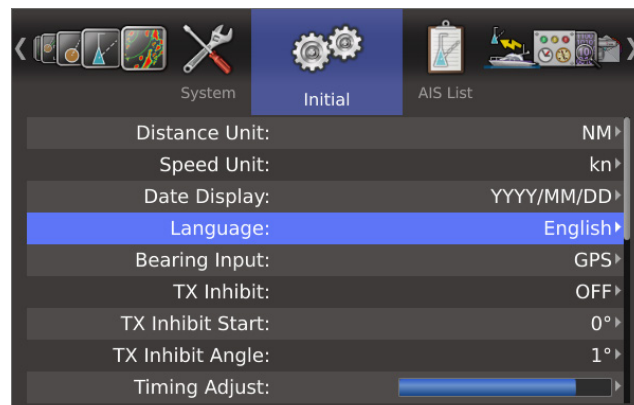
Move the cursor on the title bar, then push [ENTER]/[确认] to collapse or expand the information box.

■ Select the language

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Initial menu.
- ③ Push [▲] or [▼] to select the “Language” item.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to select the display language, “English” or the other*.
- ⑥ Push [ENTER]/[确认] to save the setting.
- ⑦ Push [MENU]/[菜单] to exit the Menu screen.

* The selectable languages differ, depending on the display unit's version.

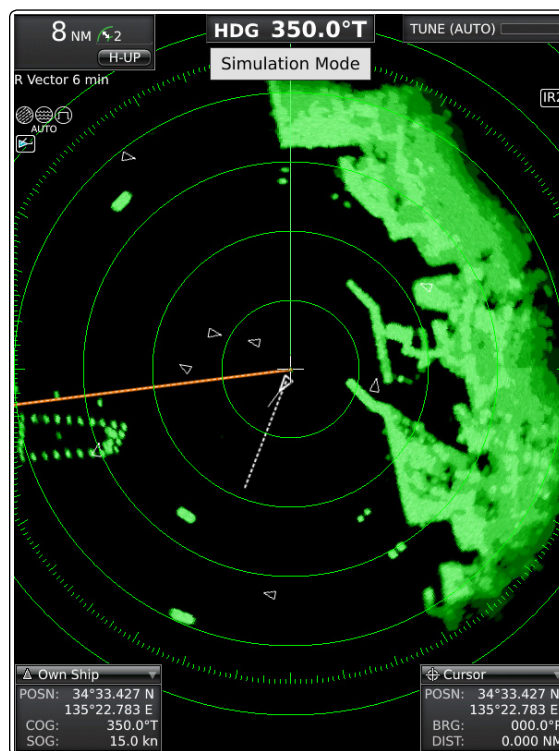
(MENU > Initial > Language)



■ Simulation screen

The MR-1210 has a simulation screen capability.

- ① While holding down [BRILL]/[亮度], push [⏻] to turn ON the power.
 - The opening screen is displayed.
- ② After the opening screen disappears, the standby screen is displayed.
- ③ Push [TX (SAVE)]/[发射(节电)] to display the simulation screen.
 - On the simulation screen, “Simulation Mode” is displayed.
- ④ To return to normal operating mode, turn OFF the power, then ON again.

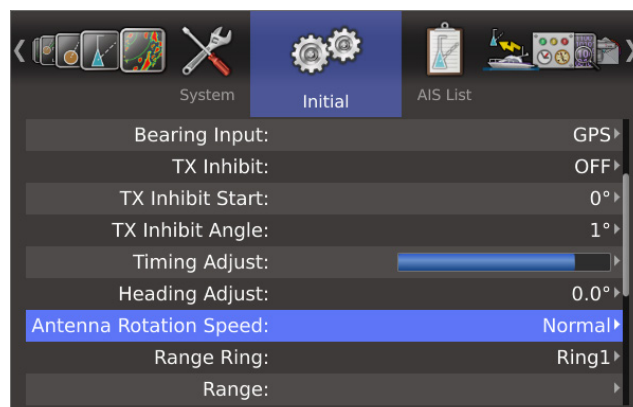


■ Antenna rotation speed

The antenna rotation speed can be selected between Normal (36 rpm) and Slow (24 rpm) in the 1/2, 1/4 or 1/8 range.

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Initial menu.
- ③ Push [▲] or [▼] to select the “Antenna Rotation Speed” item.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to select “Normal” or “Slow” to toggle the antenna rotation speed.
- ⑥ Push [ENTER]/[确认] to save the setting.
- ⑦ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > Initial > **Antenna Rotation Speed**)

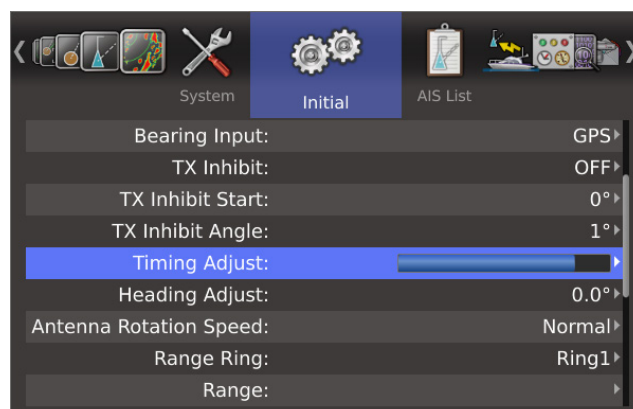


■ Timing adjustment

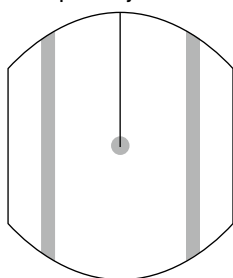
The system cable length affects the sweep timing. When the cable length adjustment is not correct, a straight target is shown as a curved echo. Thus, a cable length adjustment is necessary.

- ① Position your boat near a straight target such as breakwater, wharf, and so on.
- ② Push [–]/[量程–] one or more times to select 1/8 or 1/4 NM range.
- ③ Push [TX (SAVE)]/[发射(节电)] to display the target on the screen.
- ④ Push [MENU]/[菜单] to enter the Menu screen.
- ⑤ Push [◀] or [▶] to select the Initial menu.
- ⑥ Push [▲] or [▼] to select the “Timing Adjust” item.
- ⑦ Push [ENTER]/[确认] to enter the option selection mode.
- ⑧ Push [◀] or [▶] to adjust the echo until it becomes straight. (See below.)
- ⑨ Push [ENTER]/[确认] to save the setting.
- ⑩ Push [MENU]/[菜单] to exit the Menu screen.

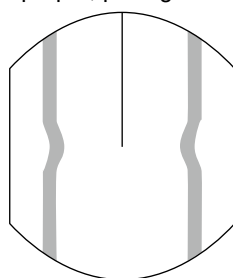
(MENU > Initial > **Timing Adjust**)



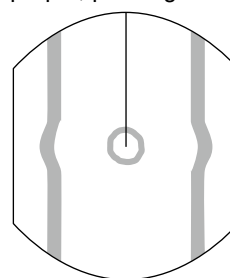
Proper adjustment



Improper, pulling inward



Improper, pushing outward

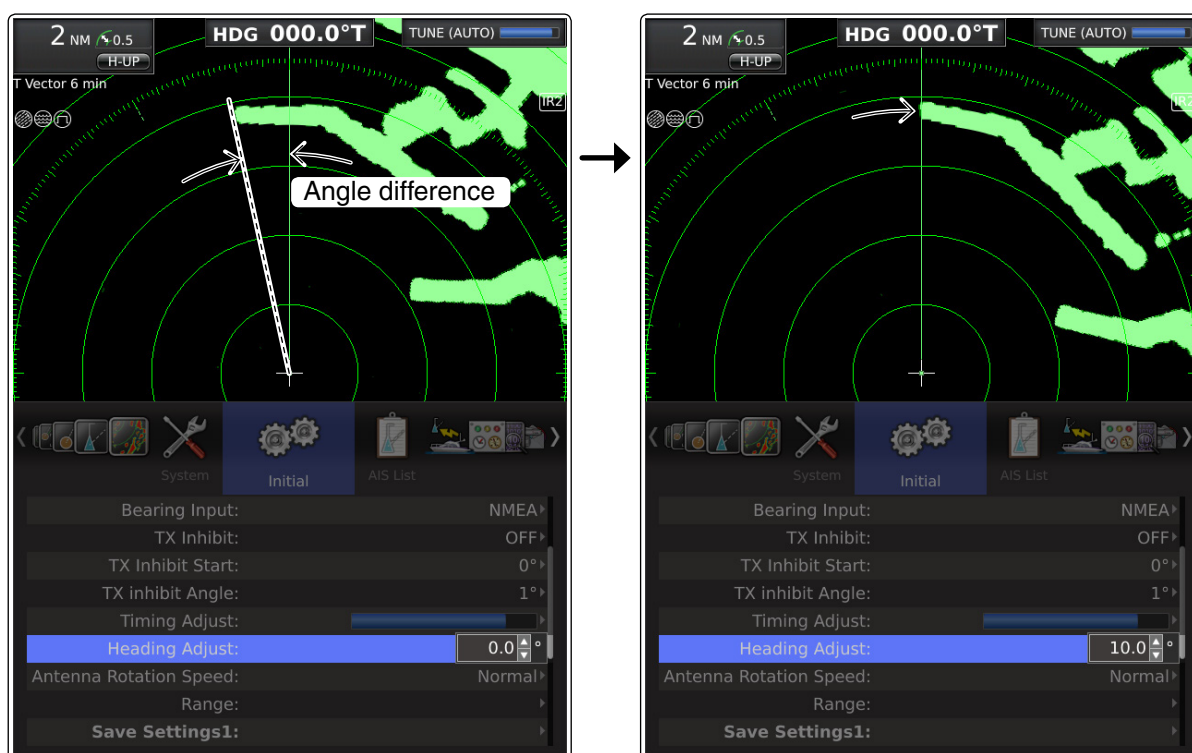
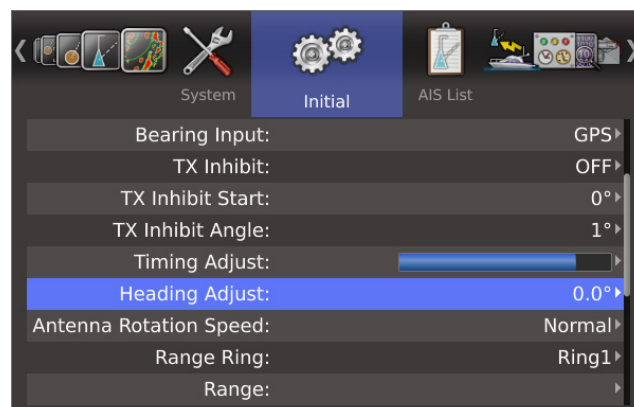


■ Heading adjustment

If the heading marker line differs from the exact bow direction, correct the heading marker line as follows. This function may be helpful when the scanner has not been mounted exactly in the line with the bow.

- ① Line up the bow of the boat with an identifiable target.
- ② Push [TX (SAVE)]/[发射(节电)] to display the target on the screen.
- ③ Push [MENU]/[菜单] to enter the Menu screen.
- ④ Push [◀] or [▶] to select the Initial menu.
- ⑤ Push [▲] or [▼] to select the “Heading Adjust” item.
- ⑥ Push [ENTER]/[确认] to enter the option selection mode.
- ⑦ Push [▲] or [▼] to adjust the heading until the target matches the heading marker. (The difference can be readout on the menu screen)
- ⑧ Push [ENTER]/[确认] to save the setting.
- ⑨ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > Initial > Heading Adjust)



Push [▲] or [▼] to adjust the heading

■ Range selection

You can customize the selectable range.

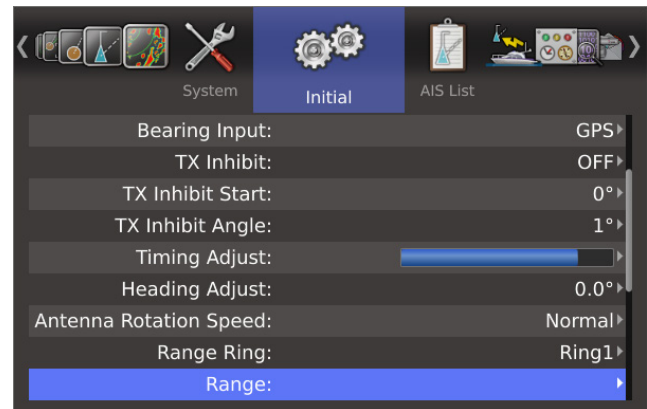
- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Initial menu.
- ③ Push [▲] or [▼] to select the “Range” item.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
- ⑤ Push [▲] or [▼] to select the range that you want to change the setting.
- ⑥ Push [◀] to set the range OFF, or push [▶] to set it ON.
- ⑦ Repeat steps ⑤ and ⑥ until you complete the range selection.
- ⑧ Push [ENTER]/[确认] to save the setting.
 - Do not push [CLEAR]/[取消] that exists the range selection screen without saving the settings.
- ⑨ Push [MENU]/[菜单] to exit the Menu screen.

Selectable ranges: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 36, 48^{*1}, 64^{*2}, 72^{*2} (NM)

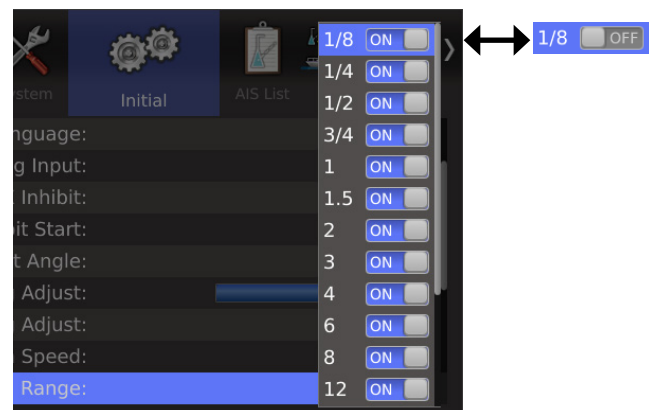
^{*1} 48 NM range is selectable in the MR-1210TII and the MR-1210TIII.

^{*2} 64 and 72 NM ranges are selectable in only the MR-1210TIII.

(MENU > Initial > **Range**)



• Option selection mode



■ Saving and loading settings

The MR-1210 can save three different settings for different operators or different situations, and immediately change from one to another.

The save or load settings are the settings of the items in the Color, Trail, Display, Target, ATA, AIS, Video, and System menus.

- “Save settings” and “Load settings” are selectable only in the Standby mode.

◆ Saving settings

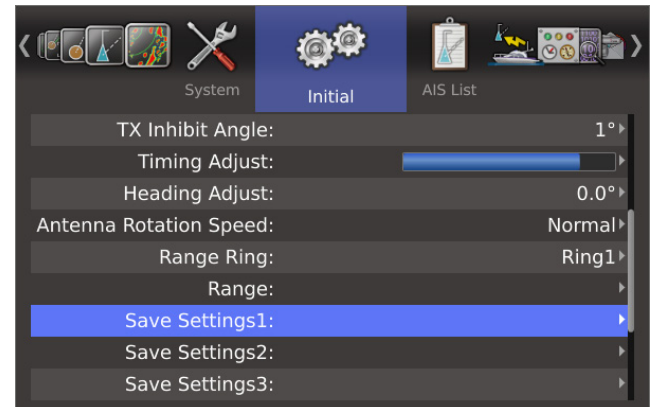
- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Initial menu.
- ③ Push [▲] or [▼] to select either the “Save Settings1,” “Save Settings2,” or “Save Settings3” item.
 - The setting item displayed in bold face has already been saved.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
 - The confirmation “Sure?” is displayed.
- ⑤ Push [ENTER]/[确认] to save the settings.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

◆ Loading settings

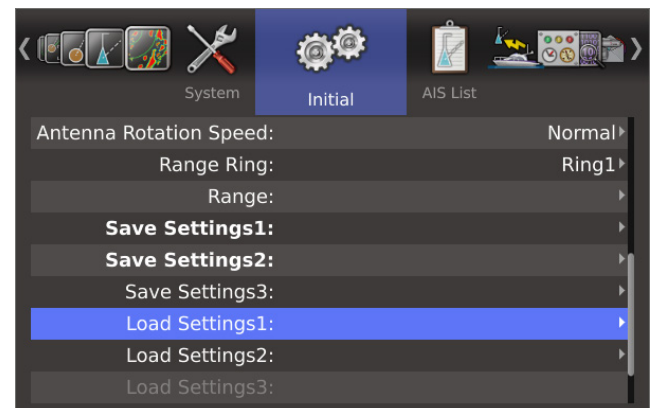
After the setting is saved, you can recall it.

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Initial menu.
- ③ Push [▲] or [▼] to select either the “Load Settings1,” “Load Settings2,” or “Load Settings3” item that you want to recall.
 - The load item is grayed out when the settings have not been saved.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
 - The confirmation “Sure?” is displayed.
- ⑤ Push [ENTER]/[确认] to save the settings.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > Initial > **Save Setting1, 2, or 3**)



(MENU > Initial > **Load Setting1, 2, or 3**)



■ Resetting

The MR-1210 has two reset types. One is 'Setting Reset' and the other is 'Factory Reset.'

'Setting Reset' resets all settings other than the settings in the Initial menu.

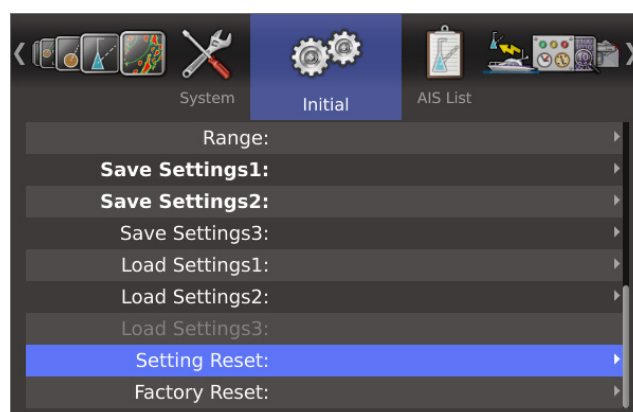
'Factory Reset' resets all settings including the settings in the Initial menu.

- Resetting is made on the Standby mode.

◇ Setting Reset

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Initial menu.
- ③ Push [▲] or [▼] to select the "Setting Reset" item.
 - The Reset items gray out if the TX mode is selected. Push [TX (SAVE)]/[发射(节电)] in this case.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
 - The confirmation "Sure?" is displayed.
- ⑤ Push [ENTER]/[确认] to reset the settings.
- ⑥ Push [MENU]/[菜单] to exit the Menu screen.

(MENU > Initial > **Setting Reset**)



◇ Factory Reset

- ① Push [MENU]/[菜单] to enter the Menu screen.
- ② Push [◀] or [▶] to select the Initial menu.
- ③ Push [▲] or [▼] to select the "Factory Reset" item.
 - The Reset items are grayed out if the TX mode is selected. Push [TX (SAVE)]/[发射(节电)] in this case.
- ④ Push [ENTER]/[确认] to enter the option selection mode.
 - The confirmation "Sure?" is displayed.
- ⑤ Push [ENTER]/[确认] to reset the settings.
 - After resetting, the display unit automatically restarts and displays the Initial screen.
- ⑥ Push [▲] or [▼] to select language.
 - Selectable language differs, depending on the display unit's version.
- ⑦ Push [ENTER]/[确认] to display the Standby screen.

(MENU > Initial > **Factory Reset**)



11 ERROR MESSAGE

■ Error message list

| Message | Condition |
|--|--|
| Check Scanner Connection* ¹ | The system cable may not be properly connected. |
| Communication error (Scanner) | The data from the Scanner unit can be received, but it is incorrect data. This is possibly a bad cable or bad connection, or a malfunction from other equipment noise. |
| Trigger Signal Fail* ² | If the Trigger signal is interrupted for more than 15 seconds while in the TX mode, an alarm sounds. |
| SHM Signal Fail* ³ | If the SHM signal is interrupted for more than 15 seconds while in the TX mode, an alarm sounds. |
| Heading Data is not available. * ² | The Azimuth signal is interrupted. An alarm sounds within 5 seconds and the display reverts to H-UP mode in approximately 1 minute. |
| Position Data is not available. * ² | If the position signal is interrupted for more than 15 seconds, an alarm sounds. |

*¹ Turn OFF the power, then check the system cable connections.

*² Push any key to cancel the error message and beep tone. Turn OFF the power, then check the external data cable connection.

*³ An electricity failure may occur. Turn OFF the power, then consult your dealer or service person.

■ AIS error message list

An error message is displayed when a system error is received from the AIS unit.
See the AIS unit instructions for details.

(Some examples)

| Message contents |
|---------------------------------|
| AIS: TX MALFUNCTION |
| AIS: ANTENNA VSWR EXCEEDS LIMIT |
| AIS: RX CHANNEL 1 MALFUNCTION |
| AIS: RX CHANNEL 2 MALFUNCTION |
| AIS: RX CHANNEL 70 MALFUNCTION |
| AIS: GENERAL FAILURE |
| AIS: MKD CONNECTION LOST |
| AIS: EXTERNAL EPFS LOST |
| AIS: NO SENSOR POSITION IN USE |
| AIS: NO VALID SOG INFORMATION |
| AIS: NO VALID COG INFORMATION |
| AIS: HEADING LOST/INVALID |
| AIS: NO VALID ROT INFORMATION |

Only the first 29 digits of the error message are displayed. If the message is longer than 30 digits, “...” is displayed after the 29th digit.

Continued, reliable operation of the radar depends on how you care for it. The simple maintenance tips that follow can help you save time and money, and avoid premature equipment failure.

■ Periodic maintenance

⚠ **WARNING! BE SURE** [⏻] is **OFF** before performing any maintenance.

- ① Keep the equipment as clean as possible.
 - Use a soft cloth to remove dirt, dust and water.
- ② Check all hardware for loose screws, bolts, and so on.
- ③ Check cables and terminal connections.

■ Scanner unit maintenance

⚠ **WARNING! BE SURE** [⏻] is **OFF** whenever you are working with the scanner unit.

◇ Cleaning

- ① Wipe the surface of the scanner with a clean soft cloth.
 - **DO NOT** use harsh solvents such as benzine or alcohol.
- ② Check that there is no dirt or caked-on salt.
 - A heavy deposit of dirt or caked-on salt on the painted surface of the upper scanner unit will cause a considerable drop in radar performance.
- ③ Check for cracks or deterioration of the rubber packing and replace it if necessary.

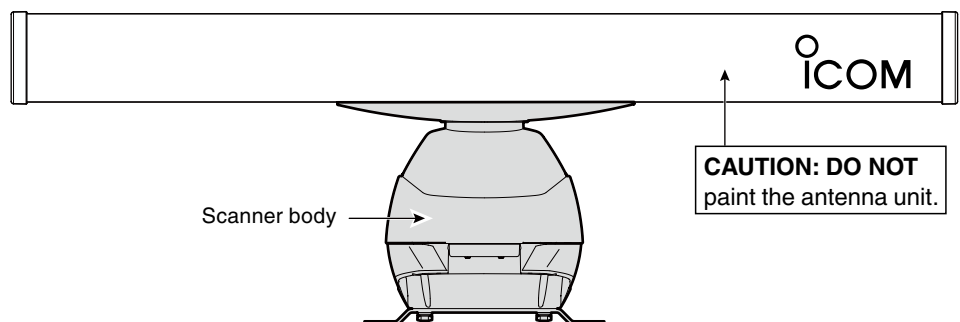
◇ Mounting

Check the mounting bolts of the scanner unit and tighten if necessary.

◇ Painting (for the Open array types)

To prevent a corrosion, paint the surface of the scanner body and the base once a year or more.

DO NOT paint the antenna unit. Otherwise, the loss of the antenna sensitivity or a crack will cause.



■ Display unit maintenance

⚠ **WARNING! BE SURE** the power is **OFF** before working on the radar.

◇ Cleaning

Dirt on the LCD will, in time, leave a film of contaminants that tend to dim the picture.

- ① Wipe the surface of the display unit with a clean soft cloth.
 - **DO NOT** use harsh solvents such as benzine or alcohol.
- ② If the picture is still dim, clean the LCD screen.

13 SPECIFICATIONS

■ General

- Minimum range: 25 m; 82 ft (when measurement range is $\frac{1}{8}$ NM)
- Maximum range: 36 NM (MR-1210RII; when measurement range is 36 NM)
48 NM (MR-1210TII; when measurement range is 48 NM)
72 NM (MR-1210TIII; when measurement range is 72 NM)
- Measurement range: $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 32, 36, 48*¹, 64*², 72*² (NM) *¹only MR-1210TII/TIII, *²MR-1210TIII
- Preheat time: 90 seconds
- Connection length between display and scanner unit: 15 m; 49.2 ft (MR-1210RII),
20 m; 65.6 ft (MR-1210TII/TIII, optional for MR-1210RII),
30 m; 98.4 ft (optional)

■ Display unit

- LCD display: 12.1-inch TFT Color LCD display
- Pixels: 600×800 dot
- LCD mounting: Vertical
- Input: NMEA 0183 format (for navigation receiver),
N+1 format (fluxgate compass sensor),
AUX,
IEC61162-2 format (for AIS unit)
- Output: NMEA 0183 format
- Power supply requirement: 10.2 to 42 V DC
- Power consumption (at zero wind velocity): Approximately 60 W (MR-1210RII)
Approximately 70 W (MR-1210TII #11,12)
Approximately 80 W (MR-1210TII #16,17, MR-1210TIII #21, 22)
Approximately 90 W (MR-1210TIII #31, 32)
- Usable temperature range: -15°C to +55°C; +5°F to 131°F
- Dimensions (Mounting bracket is included): 300 (W)×323 (H)×119.2 (D) mm,
(Projections are not included) 11.8 (W)×12.7 (H)×4.7 (D) in
- Weight (Mounting bracket is included): Approximately 4.6 kg; 10.1 lb

■ Scanner unit

◇ EX-2714 (Radome)

- Type: 60 cm (2 ft.) Slotted Waveguide Array, enclosed in a radome.
- Rotation speed (typical): 24 rpm, 36 rpm
- Beam width (typical): Horizontal beam 4°
Vertical beam 22°
- Side lobe (typical): -22 dB
- Polarization: Horizontal
- Transmission frequency: 9410 MHz ±30 MHz P0N
- Peak output power: 4 kW
- Pulse width: 80 ns/2160 Hz, 80 ns/1440 Hz, 250 ns/1440 Hz,
350 ns/1440 Hz, 900 ns/720 Hz
- Mixer and Local Oscillator: Microwave Integrated Circuit
- Transmitting Tube: Magnetron MAF1421B
- Modulator: FET switching
- Duplexer: Circulator
- Tuning system: Automatic/manual selectable
- Intermediate frequency: 60 MHz
- IF Band width: 10 MHz, 3 MHz
- Dimensions: 640 (W)×256 (H)×640 (D) mm,
25.2 (W)×10.1 (H)×25.2 (D) in
- Usable temperature range: -25°C to +70°C; -13°F to 158°F
- Relative Humidity: Less than 95% at 40°C (+104°F)
- Weight: Approximately 8 kg; 17.5 lb (without cable)

◇ EX-2780 (Open array)

● 4 feet model

- Type: 120 cm (4 ft.) Slotted Waveguide Array
- Rotation speed (typical): 22 rpm (MR-1210TIII only), 24 rpm, 36 rpm
- Beam width (typical):
 - Horizontal beam 2°
 - Vertical beam 23°
- Side lobe (typical): -24 dB
- Polarization: Horizontal
- Transmission frequency: 9410 MHz \pm 30 MHz P0N
- Peak output power: 4 kW (MR-1210TII), 6 kW (MR-1210TIII)
- Pulse width: 80 ns/2160 Hz, 80 ns/1440 Hz, 250 ns/1440 Hz, 350 ns/1440 Hz, 900 ns/720 Hz, 900 ns/660 Hz*
*only MR-1210TIII
- Mixer and Local Oscillator: Microwave Integrated Circuit
- Transmitting Tube:
 - Magnetron MAF1421B (MR-1210TII)
 - MAF1422B (MR-1210TIII)
- Modulator: FET switching
- Duplexer: Circulator
- Tuning system: Automatic/manual selectable
- Intermediate frequency: 60 MHz
- IF Band width: 10 MHz, 3 MHz
- Diameter of rotation/height: 1217/395 mm; 48/16 in
- Usable temperature range: -25°C to +70°C; -13°F to 158°F
- Relative Humidity: Less than 95% at 40°C (+104°F)
- Weight: Approximately 18 kg; 39.7 lb (without cable)

● 6.5 feet model

- Type: 200 cm (6.5 ft.) Slotted Waveguide Array
- Rotation speed (typical): 22 rpm (MR-1210TIII only), 24 rpm, 36 rpm
- Beam width (typical):
 - Horizontal beam 1.2°
 - Vertical beam 23°
- Side lobe (typical): -27 dB
- Polarization: Horizontal
- Transmission frequency: 9410 MHz \pm 30 MHz P0N
- Peak output power: 4 kW (MR-1210TII), 6 kW (MR-1210TIII)
- Pulse width: 80 ns/2160 Hz, 80 ns/1440 Hz, 250 ns/1440 Hz, 350 ns/1440 Hz, 900 ns/720 Hz, 900 ns/660 Hz*
*only MR-1210TIII
- Mixer and Local Oscillator: Microwave Integrated Circuit
- Transmitting Tube:
 - Magnetron MAF1421B (MR-1210TII)
 - MAF1422B (MR-1210TIII)
- Modulator: FET switching
- Duplexer: Circulator
- Tuning system: Automatic/manual selectable
- Intermediate frequency: 60 MHz
- IF Band width: 10 MHz, 3 MHz
- Diameter of rotation/height: 1995/395 mm; 79/16 in
- Usable temperature range: -25°C to +70°C; -13°F to 158°F
- Relative Humidity: Less than 95% at 40°C (+104°F)
- Weight: Approximately 20 kg; 44.1 lb (without cable)

■ Options

- **OPC-2339 SYSTEM CABLE** (for only MR-1210RII)
Allows you to install the display unit and scanner up to 20 m (65.6 ft) apart.

- **OPC-2340 SYSTEM CABLE**
Allows you to install the display unit and scanner up to 30 m (98.4 ft) apart.

- **UX-234 VIDEO OUTPUT UNIT**

Allows you to connect an external display or a PC monitor with a D-sub 15-pin connector (DE-15).

14 EXTERNAL DATA LIST

The following external bearing, speed, position and waypoint data is (are) required, when you use the radar functions.

| | | EXTERNAL DATA INPUT | | | | | | |
|--|---------|-------------------------------|----------------|----------------------------|---|-------------------------------|------------------------------|----------------|
| | | [NMEA1]*1 connector | | | [NMEA2]*1 connector | | | |
| | | "THS," "HDG," "HDM," "HDT" | | "VDM", "ALR" "VDO"*2 | "RMC," "GGA," "GLL," "GNS," "VTG," "WPL," "BWC," "BWR" | | | |
| | | N+1, AUX | | | | | | |
| FUNCTION | DISPLAY | BEARING | VARI- ATION | AIS | SPEED | POSITION | WAYPOINT | VARI- ATION |
| HEAD UP | H-UP | — | — | — | — | — | — | — |
| STABILIZED HEAD UP | SH-UP | Required | — | — | — | — | — | — |
| COURSE UP | C-UP | Required | — | — | — | — | — | — |
| NORTH UP | N-UP | Required | — | — | — | — | — | — |
| TRUE MOTION | TM | Required | — | — | — | "RMC," "GGA," "GLL," or "GNS" | — | — |
| SPEED DISPLAY | SOG | — | — | — | "RMC" or "VTG" | — | — | — |
| HEADING BEARING | HDG | Required | — | — | — | — | — | — |
| WAYPOINT | WPT | Required | — | — | — | "RMC," "GGA," "GLL," or "GNS" | "WPL," "BWC," or "BWR" | — |
| OWN VECTOR | — | Required | — | — | "RMC" or "VTG" | — | — | — |
| ATA | ATA | Required | — | — | "RMC" or "VTG" | — | — | — |
| Cursor/Waypoint Estimated Time of Arrival | — | — | — | — | "RMC" or "VTG" | — | — | — |
| MAGNETIC VARIATION (AUTO) *4 | — | — | "HDG" | — | — | — | — | "RMC" |
| TLL | — | Required | — | — | — | "RMC," "GGA," "GLL," or "GNS" | — | — |
| AIS (Display only) | AIS | Required | — | "VDM" | — | "RMC," "GGA," "GLL," or "GNS" | — | — |
| AIS (CPA/TCPA Alarm) | AIS | Required | — | "VDM" | "RMC" or "VTG" | "RMC," "GGA," "GLL," or "GNS" | — | — |
| AIS (OWN) | MENU | — | — | "VDO" | — | — | — | — |
| Alarm status*3 | — | — | — | "ALR" | — | — | — | — |

| | | EXTERNAL DATA OUTPUT | | | | | | |
|--|--|----------------------|---|---|--|--|--|--|
| | | — | | | [NMEA2]*1 connector | | | |
| | | — | — | — | "RMC," "GGA," "GLL," "VTG," "TTM," "TLL," "RSD," "OSD" | | | |

*1 [NMEA1] and [NMEA2] connectors: See page 28.

*2 AIS input also receives "RMC," "GGA," "GLL," "VTG," and "GNS" sentences.

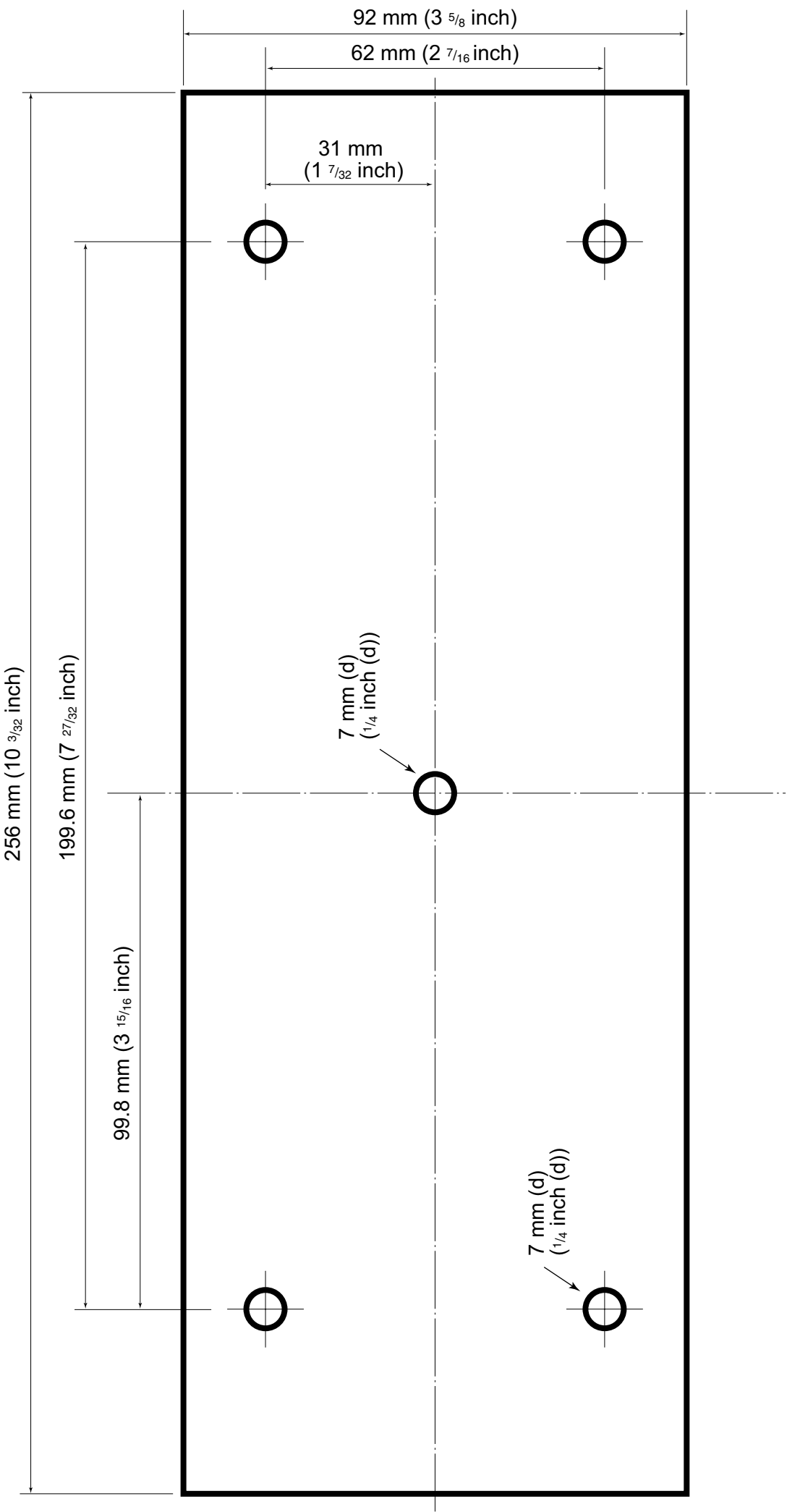
If the NMEA2 input does not receive these, the sentences from the AIS input are used.

*3 The system error is displayed from the AIS unit.

*4 Either an "HDG" to [NMEA1] connector or an "RMC" to [NMEA2] connector is required.

- "THS," "HDG," "HDM," "HDT," "RMC," "GGA," "GLL," "GNS," "VTG," "WPL," "BWC," "BWR," "TTM," "TLL," "RSD," and "OSD" are sentences of NMEA0183.
- If the "Bearing Input" item in the Initial menu is set to "GPS" or "GPS-L," "RMC" of [NMEA2] connector or COG (Course Over the Ground) of "VTG" a bow it receives as a direction, even if there is no direction information (compass etc.) in [NMEA1] connector, the screen display of the North rise etc. is possible.
However, direction accuracy falls when the speed of a vessel is set to 2 knots or less, or when exceeding 3 knots a bow it does not receive as direction data. Moreover, the influence of measurement position accuracy or a current an actual bow it may differ from a direction.

Display mounting bracket template



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To receive the source code, please send your inquire to the Icom Support Center.

There will be a nominal charge for shipping and handling.

Icom Support Center

1-6-19 Kamikuratsukuri, Hirano-ku, Osaka 547-0004, Japan

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@defgroup IPU MXC Image Processing Unit (IPU) Driver

@file arch-mxc/ipu.h

@brief This file contains the IPU driver API declarations.

@ingroup IPU

■ About "zlib"

ZLIB DATA COMPRESSION LIBRARY

zlib 1.2.7 is a general purpose data compression library. All the code is thread safe. The data format used by the zlib library is de-

scribed by RFCs (Request for Comments) 1950 to 1952 in the files <http://tools.ietf.org/html/rfc1950> (zlib format), [rfc1951](http://tools.ietf.org/html/rfc1951) (deflate format) and [rfc1952](http://tools.ietf.org/html/rfc1952) (gzip format).

All functions of the compression library are documented in the file `zlib.h` (volunteer to write man pages welcome, contact zlib@gzip.org). A usage example of the library is given in the file `test/example.c` which also tests that the library is working correctly. Another example is given in the file `test/minigzip.c`. The compression library itself is composed of all source files in the root directory.

To compile all files and run the test program, follow the instructions given at the top of `Makefile.in`. In short `./configure; make test`, and if that goes well, `make install` should work for most flavors of Unix. For Windows, use one of the special makefiles in `win32/` or `contrib/vstudio/`. For VMS, use `make_vms.com`.

Questions about zlib should be sent to [<zlib@gzip.org>](mailto:zlib@gzip.org), or to Gilles Vollant [<info@winimage.com>](mailto:info@winimage.com) for the Windows DLL version. The zlib home page is <http://zlib.net/>. Before reporting a problem, please check this site to verify that you have the latest version of zlib; otherwise get the latest version and check whether the problem still exists or not.

PLEASE read the zlib FAQ http://zlib.net/zlib_faq.html before asking for help.

Mark Nelson [<markn@ieee.org>](mailto:markn@ieee.org) wrote an article about zlib for the Jan. 1997 issue of Dr. Dobbs's Journal; a copy of the article is available at <http://marknelson.us/1997/01/01/zlib-engine/>.

The changes made in version 1.2.7 are documented in the file `ChangeLog`.

Unsupported third party contributions are provided in directory `contrib/`.

zlib is available in Java using the `java.util.zip` package, documented at <http://java.sun.com/developer/technicalArticles/Programming/compression/>.

A Perl interface to zlib written by Paul Marquess [<pmqs@cpan.org>](mailto:pmqs@cpan.org) is available at CPAN (Comprehensive Perl Archive Network) sites, including <http://search.cpan.org/~pmqs/IO-Compress-Zlib/>.

A Python interface to zlib written by A.M. Kuchling [<amk@amk.ca>](mailto:amk@amk.ca) is available in Python 1.5 and later versions, see <http://docs.python.org/library/zlib.html>.

zlib is built into tcl: <http://wiki.tcl.tk/4610>.

An experimental package to read and write files in .zip format, written on top of zlib by Gilles Vollant [<info@winimage.com>](mailto:info@winimage.com), is available in the `contrib/minizip` directory of zlib.

Notes for some targets:

- For Windows DLL versions, please see `win32/DLL_FAQ.txt`
- For 64-bit Irix, `deflate.c` must be compiled without any optimization. With `-O`, one `libpng` test fails. The test works in 32 bit mode (with the `-n32` compiler flag). The compiler bug has been reported to SGI.
- zlib doesn't work with gcc 2.6.3 on a DEC 3000/300LX under OSF/1 2.1 it works when compiled with cc.
- On Digital Unix 4.0D (formerly OSF/1) on AlphaServer, the `cc` option `-std1` is necessary to get `gzprintf` working correctly. This is done by `configure`.
- zlib doesn't work on HP-UX 9.05 with some versions of `/bin/cc`. It works with other compilers. Use `"make test"` to check your compiler.
- `gzdopen` is not supported on RISCOS or BEOS.
- For PalmOs, see <http://palmzlib.sourceforge.net/>

Acknowledgments:

The deflate format used by zlib was defined by Phil Katz. The deflate and zlib specifications were written by L. Peter Deutsch. Thanks to all the people who reported problems and suggested various improvements in zlib; they are too numerous to cite here.

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Written by David Howells (dhowells@redhat.com)

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■ About "iana-etc"

ABOUT

The iana-etc package installs services(5) and protocols(5) using data from the Internet Assigned Numbers Authority <<http://www.iana.org/>>. In future, other such files may be added.

Included are snapshots of the data from the IANA, scripts to transform that data into the needed formats, and scripts to fetch the latest data.

Maintainer: Seth W. Klein <sk@sethwwklein.net>

Home Page: <http://www.sethwwklein.net/projects/iana-etc/>

Bug reports and patches are welcome.

PORT ALIASES

Please report any additional port aliases that you need. The port-aliases file contains the current list. To minimize cruft, it includes only aliases for which there has been reported need.

If you need an alias that isn't included, you may see the error:

```
getaddrinfo: Servname not supported for ai_socktype
```

Some useful things for finding out what alias is needed:

```
* strace from <http://www.wi.leidenuniv.nl/~wichert/strace/>
* grep -r 'getaddrinfo' in the appropriate source tree
```

The various RFCs and such usually list the number for an alias but it may be faster to just check the FreeBSD services file at <<http://www.freebsd.org/cgi/cvsweb.cgi/src/etc/services>>.

Bug reports and patches are welcome at the maintainer address listed above.

DEPENDENCIES

GNU Awk 3.1.0 or Later

Numerous GNU Awk extensions are used. Awk was chosen over Perl for its smaller size and more flexible installation process both of which are important in a bootstrap environment.

Version 3.1.0 or later is required for support of the third argument to match(). The workaround to support older versions would be less readable and slower so I'd rather not include it without good reason.

Like GNU Awk before 3.1.0, Mawk doesn't support three argument match() and so is not supported. It also doesn't support network extensions.

Make

Testing is only done with GNU Make but incompatibilities with other make implementations are bugs. Please send patches.

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Section 5. Term and Termination

- 5.1 This Agreement will remain in effect unless terminated as provided herein.
- 5.2 You may terminate this Agreement immediately upon written notice to Freescale at the address provided below.
- 5.3 Either party may terminate this Agreement if the other party is in default of any of the terms and conditions of this Agreement, and termination is effective if the defaulting party fails to correct such default within 30 days after written notice thereof by the non-defaulting party to the defaulting party at the address below.
- 5.4 Notwithstanding the foregoing, Freescale may terminate this Agreement immediately upon written notice if you:
- (a) breach any of your confidentiality obligations or the license restrictions under this Agreement;
 - (b) become bankrupt or insolvent, or file a petition therefore;
 - (c) make an assignment for the benefit of its creditors;
 - (d) enter proceedings for winding up or dissolution;
 - (e) are dissolved; or
 - (f) are nationalized or is subject to the expropriation of all or substantially all of its business or assets.
- 5.5 Upon termination of this Agreement, all licenses granted under Section 2 will expire, except that any licenses extended to end-users pursuant to Sections 2.2 (c), 2.2 (d) and 2.3 (b) which have been granted prior to such termination will survive.
- 5.6 After termination of this Agreement by either party and upon Freescale's written request, you will, at your discretion, return to the Freescale any confidential information including any and all copies thereof or furnish to Freescale at the address below, a statement certifying, with respect to the Licensed Software delivered hereunder that the original and all copies, except for archival copies to be used solely for dispute resolution purposes, in whole or in part, in any form, of the Licensed Software have been destroyed.
- 5.7 Notwithstanding the termination of this Agreement for any reason, the terms of Sections 1, 2.5 - 2.12, 3, 4, 5.6, 5.7, 7 and 8 will survive.

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Section 8. General Provisions

- 8.1 Amendments and Waivers.
No amendment of any provision of this Agreement will be valid unless stated in writing and signed by authorized representatives of each of the parties. No waiver by any party of any default, misrepresentation or covenant herein, whether intentional or not, will be deemed to extend any prior or subsequent default, misrepresentation, or covenant hereunder or affect in any way any rights arising by virtue of any prior or subsequent occurrence.
- 8.2 Choice of Law.
This Agreement will be governed by, construed, and enforced in accordance with the laws of the State of Texas.
- 8.3 Confidential Information.
You will treat the Licensed Software as confidential information and you agree to retain the Licensed Software in confidence perpetually with respect to Licensed Software in source code form (human readable), or for a period of five (5) years from the date of termination of this Agreement, with respect to all other parts of the Licensed Software. During this period you may not disclose any part of the Licensed Software to others than employees or contractors who have a need to know of the Licensed Software and who have executed written agreements obligating them to protect such Licensed Software. You agree to use the same degree of care, but no less than a reasonable degree of care, with the Licensed Software as you do with your own confidential information. You may disclose Licensed Software to the extent required by a court or under operation of law or order provided that you notify Freescale of such requirement prior to disclosure, that you only disclose information required, and that you allow Freescale the opportunity to object to such court or other legal body requiring such disclosure.
- 8.4 Counterparts.
This Agreement may be executed in one or more original counterparts, all of which together will constitute one agreement, and facsimile signatures will have the same effect as original signatures.
- 8.5 Entire Agreement.
This Agreement, including its attachments, constitutes the entire agreement between the parties regarding the subject

matter hereof, and supersedes all prior communications, negotiations, understandings, agreements or representations, either written or oral, by or among the parties regarding such subject matter.

- 8.6 Limitation of Liability.
EXCLUDING LIABILITY FOR A BREACH OF SECTION 8.3 (CONFIDENTIALITY), BREACHES OF THE LICENSE GRANTS IN SECTION 2, OR CLAIMS UNDER SECTION 7, IN NO EVENT WILL EITHER PARTY BE LIABLE, WHETHER IN CONTRACT, TORT, OR OTHERWISE, FOR ANY INCIDENTAL, SPECIAL, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES, INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, OR LOST PROFITS, SAVINGS, OR REVENUES, TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW. FREESCALE'S TOTAL LIABILITY FOR ANY AND ALL COSTS, DAMAGES, CLAIMS, OR LOSSES WHATSOEVER ARISING OUT OF OR IN CONNECTION WITH THIS AGREEMENT OR PRODUCT(S) SUPPLIED UNDER THIS AGREEMENT IS LIMITED TO THE AGGREGATE AMOUNT PAID BY YOU TO FREESCALE IN CONNECTION WITH THE LICENSED SOFTWARE TO WHICH LOSSES OR DAMAGES ARE CLAIMED.

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Freescale Semiconductor, Inc.
6501 William Cannon Drive, West
Austin, Texas 78735
ATTN: General Manager, Multimedia Applications Division

With a copy to:
Freescale Semiconductor, Inc.
6501 William Cannon West OE62
Austin, Texas 78735
ATTN: Law Director, Multimedia Applications Division

You: The address provided at registration will be used.

Either party may change its notice information upon notice to the other party.

- 8.8 Relationship of the Parties.
The parties are independent contractors. Nothing in this Agreement will be construed to create any partnership, joint venture, or similar relationship. Neither party is authorized to bind the other to any obligations with third parties.
- 8.9 Severability.
If any provision of this Agreement is held for any reason to be invalid or unenforceable the remaining provisions of this Agreement will be unimpaired and, unless a modification or replacement of the invalid or unenforceable provision is further held to deprive a party of a material benefit, in which case the Agreement will immediately terminate, the invalid or unenforceable provision will be replaced with a provision that is valid and enforceable and that comes closest to the parties' intention underlying the invalid or unenforceable provision.
- 8.10 Succession and Assignment.
This Agreement will be binding upon and inure to the benefit of the parties and their permitted successors and assigns. Neither party may assign this Agreement, or any part of this Agreement, without the prior written approval of the other party, which approval will not be unreasonably withheld or delayed.
- 8.11 Unauthorized Use.
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8.13 International Sale of Goods.

The United Nations Convention on Contracts for the International Sale of Goods will not apply to this document.

8.14 Audit.

You will maintain accurate and up-to-date records pertaining to this Agreement and will grant Freescale or its authorized agent access to and copies of such records and information as requested by Freescale that pertain to your obligations under this Agreement. Such access will be granted upon reasonable advance written notice, and be conducted during normal business hours with minimal impact to your business operations, and subject to confidentiality restrictions. You will maintain such records for a period of at least three (3) years from the date of termination of this Agreement. You must make prompt adjustment to compensate for any errors and/or omissions disclosed by such examination or audit.

APPENDIX A

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