OPERATOR'S MANUAL

MULTI-FUNCTION GPS CHART PLOTTER

SAFETY INSTRUCTIONS

Safety Instructions for the Operator

WARNING

Do not open the equipment.

Only qualified personnel should work inside the equipment.

Do not disassemble or modify the equipment.

Fire,electrical shock or serious injury can result.

Immediately turn off the power at the switchboard if the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire or electrical shock.Contact a **ONWA** agent for service.

Use the proper fuse.

Use of a wrong fuse can damage the equipment or cause fire.

Be sure the power supply is compatible with the equipment.

Incorrect power supply may cause the equipment to overheat.

The useable temperature range -5℃ to 55℃ for the display unit.

Use of the equipment out of those ranges may damage the equipment.

Safety Instructions for the Installer

WARNING

Do not open the cover unless totally familiar with electrical circuits and service manual.

Improper handling can result in electrical shock.

Turn off the power at the switchboard before beginning the installation.

Fire or electrical shock can result if the power is left on.

Be sure that the power supply is compatible with the voltage rating of the equipment.

Connection of an incorrect power supply can cause fire or equipment damage.

Use the proper fuse.

Use of a wrong fuse can damage the equipment or cause fire.

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FOREWORD

The MULTI-FUNCTION GPS PLOTTER are designed to be all-sealed and waterproof, can be rapid position-fixing and resistant to poor environment. The software is powerful by using the advanced processors, can be capable to display faster, and the design for operation is professional and reasonable, can be easy to use. The built-in Large-capacity map storage space provides intuitive and accurate indication to navigation. It's applicable to the navigation and position-fixing of various vessels at sea and rivers, as well as the hydrographic information collection, river management, etc. For the application for different types of the products please refer to the following:

FEATURES

- Easy to operate
- Ultra high brightness LCD, viewable under strong sunlight
- Compatible with 4 mapping system, C-MAP MAX, Navionics+, K-Chart2.0 and K-Chart3.0
- High speed CPU with fast map redraw speed
- High resolution LCD
- Built-in Class B+ AIS module(For 8A, 8X, 12A and 12X)
- Auto input baudrate scanning from 4800 up to 38400(NMEA0183)
- Selectable NMEA0183 output baudrate and sentences
- Support NMEA2000(N2K)
- Support ONENET(latest NMEA protocol)
- Free to use detail worldwide coverage KChart system
- IPX6 waterproof panel
- Compatible with optional external radar antenna
- Compatible with optional external fishfinder module

MAIN PERFORMANCE AND SPECIFICATIONS

Plotter

Waypoints/icons:	12000 user waypoints with name, symbol. 3 system waypoints: MOB, Start , Cursor 10 proximity waypoints
Routes:	Max 30 routes, up to 170 waypoints each
Tracks:	8000 points automatic track log; 10 saved tracks (up to 8000 track points each). Let you retrace your path in both directions
Drawing Marks:	1000
Drawing Lines:	2000
Drawing Placename:	1000
Color for drawing:	8
Alarms:	XTE, Anchor drag, arrival, speed, voltage, proximity waypoint, timer and AIS (CPA and TCPA) alarm
Palette:	Normal Daylight exposed to sunlight Night in dark environment NOAA paper chart color
Tides:	Built-in worldwide tide data
Position format:	LAT/LON
Basemap:	Worldwide
External Map:	Compatible K-Chart2.0, K-Chart3.0, C-MAP MAX and Navionics+
User data storage:	Internal backup of user settings or external SD card
Plot Intervals:	5sec to 60minutes or 0.01 to 10nm
Plotting scales:	0.001 to 700nm
Perspective View:	ON/OFF(for C-Map only)
Celestial:	Sunrise/Sunset Moonrise/Moonset

AIS

Max number of AIS targets:	700 AIS targets display
AIS target tracking:	10 Manually saved tracks(300 points each)
AIS alarm:	CPA and TCPA
AIS messaging:	AIS

GNSS receiver

Receiver :	50 parallel channel GNSS receiver continuously tracks and uses up to 50 satellites to compute and update your position
GNSS :	Support GPS, Beidou, GLONASS and Galileo (For 8, 8C, 12 and 12C) Support GPS and Beidou (For 8A, 8X, 12A and 12X)
Acquisition time :	Cold start : 29 seconds Hot start : 1 second
Update rate :	1 sec or 0.1 sec. selectable (For 8, 8C, 12C and 12C) 1 sec. (For 8A, 8X, 12A and 12X)
Accuracy :	Position : 3 meters (95%) without S/A Velocity : 0.1 meter/sec. without S/A
Dynamics :	Altitude : 18,000 meters Velocity : 515 meter/sec.
Datum :	WGS84 User define (For 8, 8C, 12 and 12C)
SBAS:	Supported (For all models)
QZSS:	Supported (For 8, 8C, 12 and 12C)

ClassB+ AIS module (For 8A 8X, 12A and 12X only)

Frequency :	156.026MHz ~ 162.025MHz
Technology :	SOTDMA
Channel Bandwidth :	25KHz
Modulation :	GMSK
Data Rate :	9,600bps
No. of Transmitter :	1
No. of Receiver :	2
AIS Channel 1 :	CH 87B (161.975MHz)
AIS Channel 2 :	CH88B (162.025 MHz)
TX Power Output :	>5 Watt (37dBm +/-1.5dB)
RX Sensitivity :	<-123dBm @20%PER
RX Message Format :	AIS Class A and B messages
Comply Standard :	IEC-62287 IEC-62287-2 Ed.2.0:2017

Fishfinder (For 8C, 8X, 12C and 12X only)

Echo Color : 16 colors (including background color)
According to echo intensity. The background color is selectable from blue, light blue, white and black

Basic Range

Meters	5	10	20	40	80	150	200	300	600	1000
Feet	15	30	60	120	200	400	600	1000	2000	3000
Fathoms	3	5	10	20	40	80	100	150	300	600

Range Shift : Up to 1000 meters (3000 feet, 600 fathoms)
Zoom Range : Times 2,3,4 and 6 ranges
Bottom Lock : 5/10 meters, 10/20 feet, 2/5 fathoms
Expansion Range
Auto Mode : Automatic adjustment of range and gain
Display Mode : High frequency (200K), Low frequency (50K), Dual (200K and 50K ½ display on each), Zoom (200K and 50K zoom) and A-scope Display, Marker Zoom, Bottom Zoom and Bottom-lock Expansion
Display Advance Speed : Lines/TX : Freeze, 1/8, ¼, ½, 1/1, 2/1, 4/1, 6/1, 8/1 and 10/1
TX Frequency : 50 and 200KHz (alternately transmit)
Power Output : Nominal 600W (up to 1KW by using high power transducer)

Pulse Length/TX Rate :

Display End Depth (m)	5	10	20	40	80	150	200	300	600	1000
Pulse Length 200K (μs)	120	220	320	520	920	1020	1020	1020	1020	1020
Pulse Length 50K (μs)	170	270	370	570	970	1070	1070	1070	1070	1070
TX Rate (pulse/min)	2000	1333	706	353	171	98	75	53	38	27
TX period (millisecond)	30	45	85	170	350	610	800	1120	1580	2200

Interference Rejecter : Rejects unwanted signals by comparing last and present echoes in strength
Alarm : Fish and Bottom alarms, Temperature alarm (sensor required)

Radar

Compatible with full ranges of radar antenna (radar antenna is supplied as an option)

Power Supply

10.5VDC to 30VDC

Current drain at 12V : 1.0A max. (for 8, 8A, 12 and 12A)
1.5A max. (for 8C, 8X, 12C and 12X)

GPS Interface (NMEA0183)

GPS Data : RS232 input/output, NMEA0183 V3.01 and V4.11
GPS Input Baudrate : Auto scan (4800, 9600, 19200 and 38400)
GPS Output Baudrate : Selectable among 4800, 9600, 19200 and 38400

AIS Interface (NMEA0183)

AIS Data : RS232 output, VDO, VDM, GGA, GSA, GSV and VTG
AIS Input Baudrate : 38400 from GPS input port (For 8, 8C, 12 and 12C only)

AIS Output Baudrate : 38400 (For 8A, 8X, 12A and 12X only)

Ethernet port

Support : radar, KM-router, KM-sonarN, ONENET

NMEA0183 Sentence supported

INPUT, auto scan baudrate
+ GGA, GLL, GSA, GSV, RMC, HDG, HDM, HDT
+ VTG, ZDA, MTW, VWR, VWT, MWD, VPW, VHW
+ TLL, TTM, VDO, VDM, GNS, MTA
+ RMA, DBT, DPT, MWV, BWC, XTE, ZDL, WPL, AAM, APB, BOD, RMB, DSC, MDA, RPM, XDR.

OUTPUT, Baudrate : Selectable 4800, 9600, 19200, 38400
+ GGA, GLL, RMC, GSA, GSV, AAM, APA, APB, BOD, BWC, BWR, DBT, DPT, HDT, MTW,
+ RMB, TLL, VTG, WPL, XTE, ZDA, ZTG, ZDL, MWD, VPW, VWR, VWT.

outputs for Autopilot: APA, APB, XTE, BOD

NMEA2000 and ONENET supported PGN

Description	PGN	CONTENT
GNSS	126992	System Time
	129026	COG & SOG, Rapid Update
	129540	GNSS Satellites in View
	129033	Local Time Offset
	129029	GNSS Position Data
	127250	Vessel Heading
	127258	Magnetic Variation
	129025	Position, Rapid Update PGN: 129025
	129539	GNSS DOPs
	129291	Set & Drift, Rapid Update
	129044	Datum
AIS	129810	AIS Class B “CS” Static Data Report, Part B
	129809	AIS Class B “CS” Static Data Report, Part A
	129798	AIS SAR Aircraft Position Report
	129793	AIS UTC and Date Report
	129040	AIS Class B Extended Position Report
	129039	AIS Class B Position Report
	129038	AIS Class A Position Report
	129041	AIS Aids to Navigation (AtoN) Report
	129802	AIS Safety Related Broadcast Message
	129801	AIS Addressed Safety Related Message
	129795	AIS Addressed Binary Message
	129797	AIS Binary Broadcast Message
ENGINE	127488	Engine Parameters, Rapid Update
	127489	Engine Parameters, Dynamic
	127493	Transmission Parameters, Dynamic
Sounder	128267	Water Depth
Navigation	127237	Heading/Track Control
	129284	Navigation Data
	129283	Cross Track Error
	127245	Rudder
	127251	Rate of Turn
	128259	Speed, Water Referenced
	128275	Distance Log
Environment	130306	Wind Data
	130310	Environmental Parameters – DEPRECATED
	130311	Environmental Parameters- DEPRECATED
	130312	Temperature – DEPRECATED

Physical

Size :	MR-8: 187mm(H) x 288mm(W) x 79mm(D)
	MR-12: 268mm(H) x 365mm(W) x 75mm(D)
Weight :	MR-8 : 2.1Kgs MR-12 : 2.9Kgs
	MR-8A : 2.5Kgs MR-12A : 3.0Kgs
	MR-8C : 2.1Kgs MR-12C : 2.9Kgs
	MR-8X : 2.5Kgs MR-12X : 3.0Kgs
Waterproofing :	Display unit : IPX6
	GPS antenna : IPX6
Temperature range :	Display unit : -15˚C to +55˚C
	GPS antenna : -25˚C to +70˚C

Equipment list :

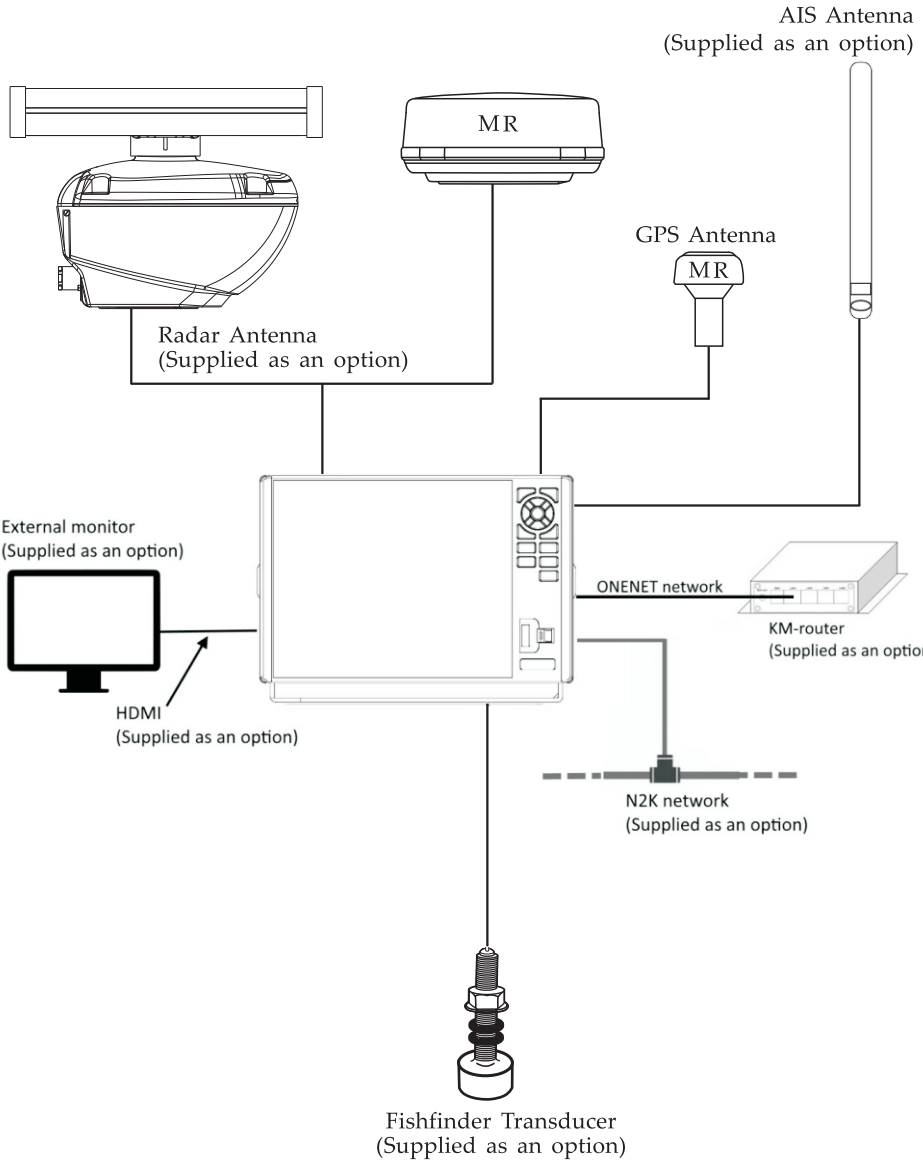
- Display unit
- GPS antenna with 10 meters cables
- Mounting brackets
- Quick start and installation manual
- Standard accessories pack (one power cable, 2 spare fuses, 2 mounting nuts, 4 desktop mounting screws, 4 panel mounting screws, one 8-pins data plug)

Options :

1) MR network radar antennas :	1007_N : 4KW
	4001_N : 6KW
	3002_N : 12.5KW
	5002_N : 25KW
2) MR router/WIFI :	KM-router
3) MR Fishfinder blackbox :	KM-sonarN
4) MR ultrasonic weather station:	KW-360 and KW-360_mini

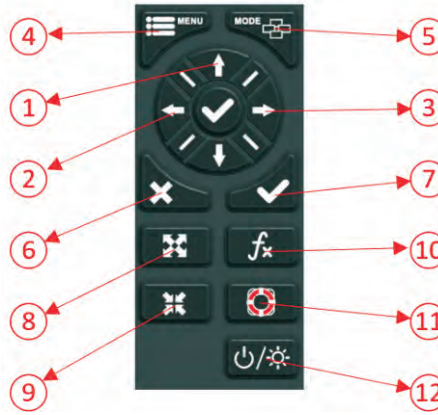
Option accessories :

1) Heading/GPS sensor :	KA-GC9A
2) Fishfinder transducer :	NBM40-50/200T through hull transducer (Plastic, 600W dual frequency with temperature sensor)
	NMM40-50/200T through hull transducer (Bronze, 600W dual frequency with temperature sensor)
	KTD-520 transom mount transducer (Plastic, 600W dual frequency with temperature sensor)


AIS Antenna
(Supplied as an option)
MR
GPS Antenna
MR
Radar Antenna
(Supplied as an option)
External monitor
(Supplied as an option)
ONENET network
KM-router
(Supplied as an option)
HDMI
(Supplied as an option)
N2K network
(Supplied as an option)
Fishfinder Transducer
(Supplied as an option)

1. OPERATION OVERVIEW

1.1 Keypad instruction



① Plotter and Radar function: Moving the cursor upward or to change the setting
Sounder function : Moving the VRM upward.

② Plotter and Radar function : Move cursor to the left
Sounder function :
Long press – Activate SHIFT range function
Short press – Activate the echoes history marker

③ Plotter and Radar function : Moving the cursor to the right
Sounder function :
Long press – Activate feeding rate selection for picture advance
Short press – Activate the echoes history marker

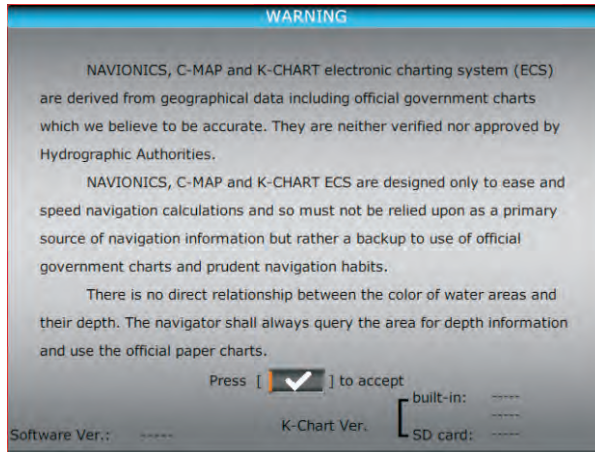
④ Press it once displays the menu of the current page, press it twice enters the main menu
Plotter function : Long press to turn track recording on/off
Radar overlay plotter function :
Press once – Plotter menu
Press twice – Radar menu
Press thrice – Main menu
Multi-windows function :
Short press – Display the menu of the screen that surrounds by orange border

⑤ Display the 16 screens selection window
Plotter function : Long press to change track color
Sounder function : Long press to activate sounder mode selection

⑥ Withdraw from an optional operation, or activate graphic mode selection
Short press – To activate graphic mode selection.
Multi-window function :
Short press – To switch between windows
Long press – To replace the function in orange border (Please study section1.7)
⑦ Confirms the input or data.
Plotter function :
Long press – Activate Drawing Mark option
Short press – Activate waypoint attribute edit window
Sounder function :
Long press – To switch from manual gain to auto gain and vice versa
Short press – To adjust gain level
Radar function:
Long press – Activate guardzone operation
Short press – Select tracking target when ARPA function is activated
⑧ Plotter, AIS and Radar function : Reduce the range
Sounder function :
Long press – To switch between Manual and Auto range function
Short press – Reduce the depth range
⑨ Plotter, AIS and Radar function : Increase the range
Sounder function :
Long press – To switch between Manual and Auto range function
Short press – Increase the depth range
⑩ Plotter function : Display other functions (GOTO, tide table, search etc.) menu
Sounder function : Provides signal level selection. Eliminate low intensity echoes (up to light-blue echoes).
Radar function :
Short press – To activate EBL and VRM operation
Long press – To cancel EBL and VRM display
⑪ Long press – Activate Man Overboard function
Short press – AIS detail list
⑫ Long press – Turn power ON/OFF
Short press – Adjust the screen brightness and keypad backlight dimmer

1.2 Turning ON and OFF Power

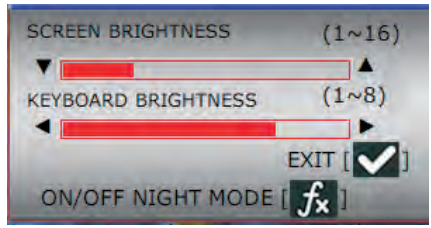
Turning on the power by press ⏻/☼ key, the unit beeps and displays the " MR " logo. Wait for the unit totally boot up to show the below warning page and press [✔] to enter working mode.



Turning off the power by press and hold ⏻/☼ until the screen goes off.

1.3 Adjusting Brilliance and Dimmer

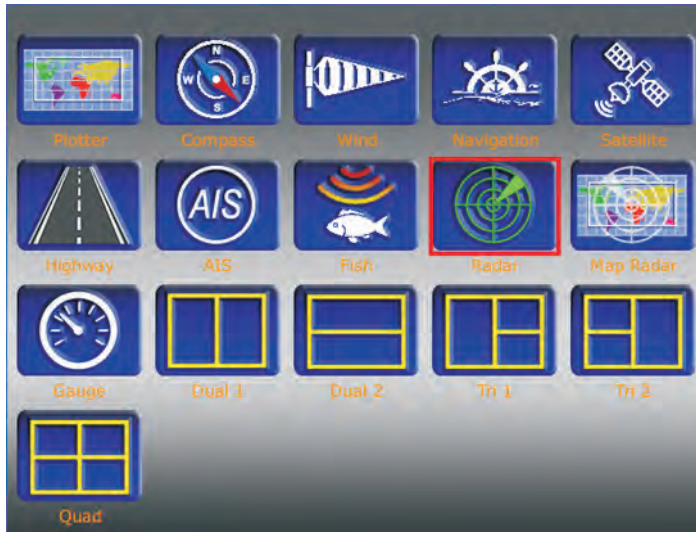
1. Short press the ⏻/☼ key. The adjusting window appears.



2. Press [▲] or [▼] to adjust LCD display brightness.
3. Press [▶] or [◀] to adjust keypad backlight.
4. Press the [✓] key to confirm and exit.

1.4 Selecting display modes

Press [MODE] or [✕]in any display mode an Icon selection window will appear as below.



You can use arrow keys to choose a display mode and press [✓] to enter that display mode.

Note : If some display modes cannot be selected (the Icon turns to grey color) please check SETUP menu whether this display mode is turned off.

1.5 Selecting multi-windows modes

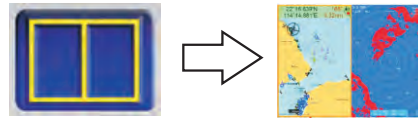
There are 5 combinations of multi-windows modes as shown below, they are Dual 1, Dual 2, Tri 1, Tri 2 and Quad :

Dual 1 Dual 2 Tri 1 Tri 2 Quad

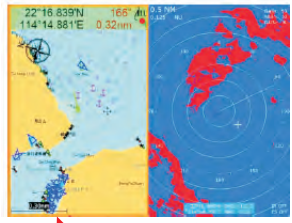
Once you selected one of the above multi-windows combinations you have to operate according to the following sections.

1.6 Menu operation of multi-window modes

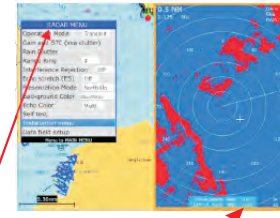
Here we take an example of Dual 1 combination : portrait split
Plotter mode is selected on left hand side window and radar mode is selected on right hand side window:



On Plotter + Radar split screen you can see an orange border as shown in below picture 1.6_1. Where this orange border surrounded all keys including [MENU] key are belonged to that part of screen.
If you want to change the orange border from plotter screen to radar screen you simple press [✕] key.



press [✕]



Picture 1.6_1

Orange border surrounds Plotter screen

Orange border jumps to surround Radar screen

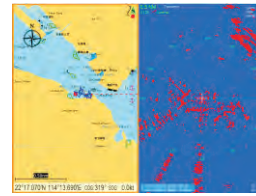
When press [MENU] key after the orange border jumps to surround radar screen the Radar menu is called out

After the orange border is jumped to surround Radar screen then all keys including [MENU] key are belonged to radar functions.

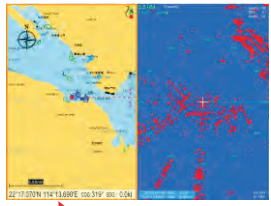
1.7 How to change the working mode in multi-windows

The user can set any combinations of 11 working modes as shown below :

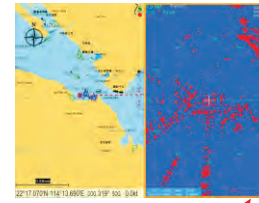
Here we take an example of Dual 1 combination : portrait split.



Now we will show how to change radar function to fishfinder function.
First of all you have to switch the orange border to the window you want to change the working mode by slight press [⊠] key.



press [⊠]



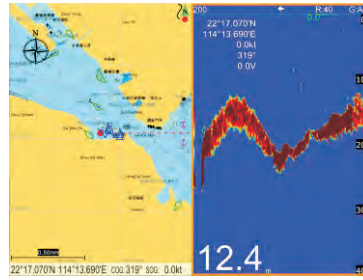
The orange border switch from plotter function to radar function

Then now you can long press [⊠] to call out the mode selection window, select the prefer working mode (example : fishfinder function) and press [☑] to confirm.

Long press [⊠]

Select the prefer working mode (surrounded by red border)

press [⊠]



2. PLOTTER DISPLAY OVERVIEW

2.1 Choosing the Zoom Display Range

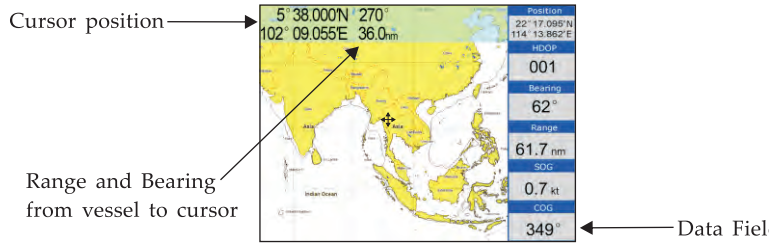
You may press ⊠ to Zoom In and ⊠ to Zoom Out as desired on the PLOTTER display.

2.2 Moving the Cursor

Press the cursor pad to move the cursor. The cursor moves in the direction of the pressed arrow. Whether up [▲], down [▼], left [◄], right [►] or diagonal [⊠].

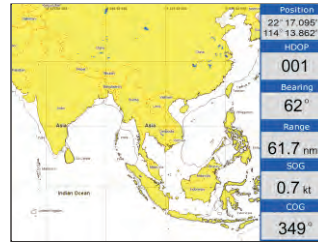
Cursor Position Turned On

Cursor position is displayed in latitude and longitude at the top left corner of the **PLOTTER** display when the cursor is on. The range and bearing from own ship to the cursor appears at the top left corner of the display too.



Cursor Position Turned Off

Press the [⊠] key to clear the cursor. Cursor position data will disappear when the cursor is off.



2.3 Panning the PLOTTER Display

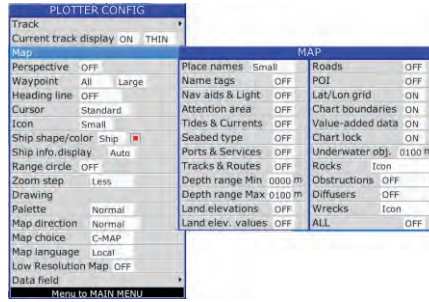
Using the cursor, pan left, right, up or down on your desired area. Place the cursor at the edge of the screen to start panning. The display shifts in the direction opposite to cursor pad operation.

2.4 Centering Own Ship's Position

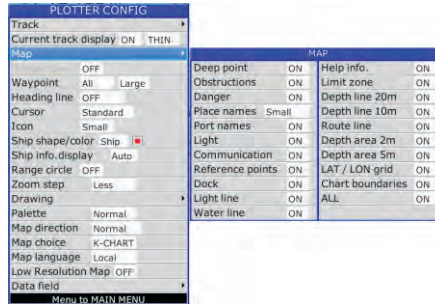
Press the [ ] key for centering own ship's position.

2.5 Map

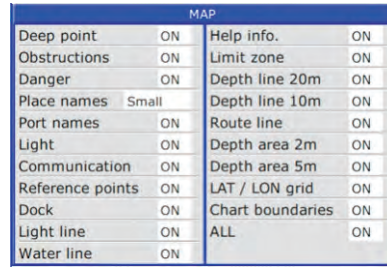
1. Press [MENU] key in **PLOTTER** screen.
2. Choose **Map** and then press [▶] key to select.
3. Choose the layer "**ON**" or "**OFF**" as desired and then press [ ] key to finish.



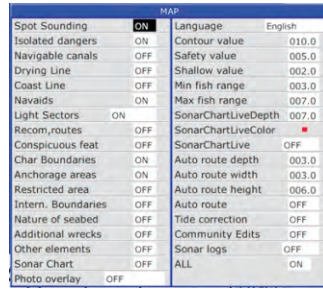
(K-Chart2.0)



(C-MAP)



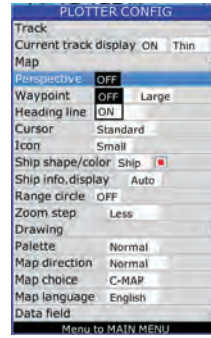
(K-Chart3.0)



(Navionics+)

2.6 Perspective View

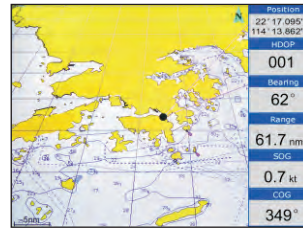
1. Press **[** MENU **]** key in **PLOTTER** screen.
2. Choose **Perspective** and then press **[** ✔ **]** key to select.



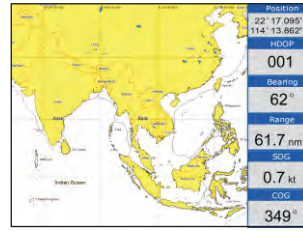
3. Choose "**ON**" or "**OFF**" as desired and then press **[** ✔ **]** key to finish.

Note: Perspective View only available on C-Map.

4. Choose the layer "**ON**" as desired and then press [✔] key to finish.

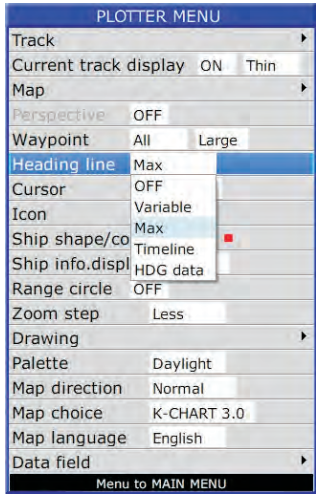


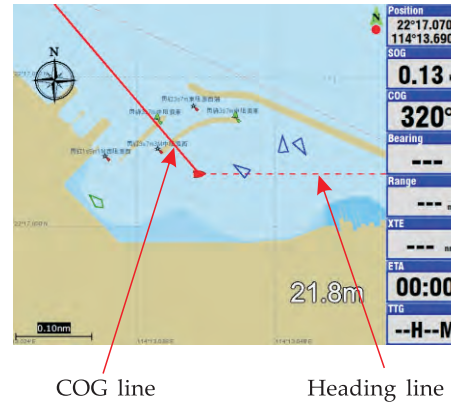
5. Choose the layer "**OFF**" as desired and then press [✔] key to finish.



2.7 Heading Line

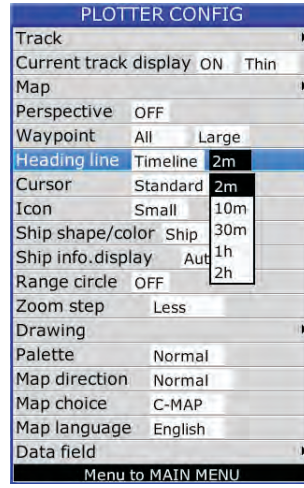
1. Press [MENU] key in **PLOTTER** screen.
2. Choose **Heading Line** and then press [☑] key to select.





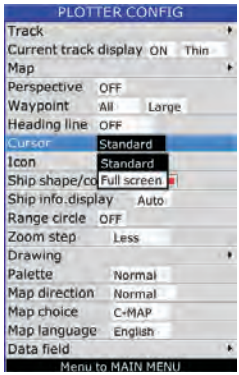
3. Choose "**Off**", "**Variable**", "**Max**", "**Timeline**" or "**HDG data**" as desired and then press [☑] key to finish.

4. Heading Line option: "COG Time Line" selection
   The length of heading line will vary according to the SOG to show the estimated point of destination after the set period. Example, if you set the COG Time Line to 10 minutes then the length of the heading line will point to the position that your boat will reach after 10 minutes.



2.8 Cursor

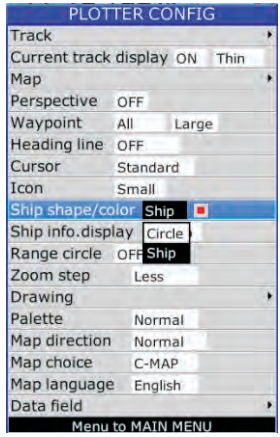
1. Press [MENU] key in **PLOTTER** screen.
2. Choose **Cursor** and then press [✔] key to select.



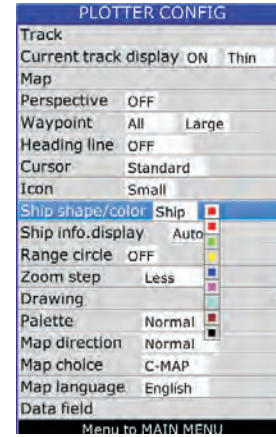
3. Choose "**Standard**" or "**Full Screen**" as desired and then press [✔] key to finish.

2.9 Ship shape/color

1. Press [MENU] key in **PLOTTER** screen.
2. Choose **Ship shape/color** and then press [✔] key to select.

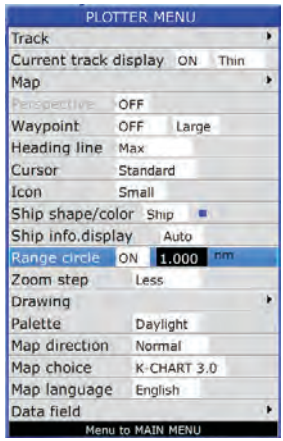


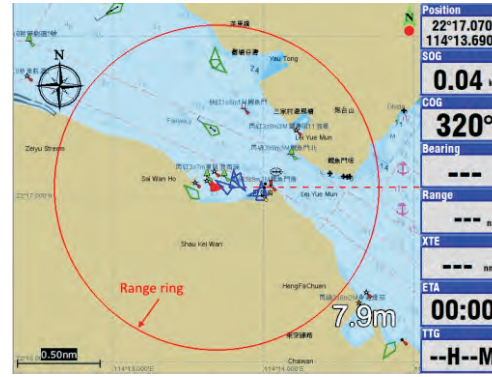
Press [▶] key and then press [✔] key.



2.10 Range Circle

1. Press [MENU] key in **PLOTTER** screen.
2. Choose **Range Circle** and then press [✔] key to select.

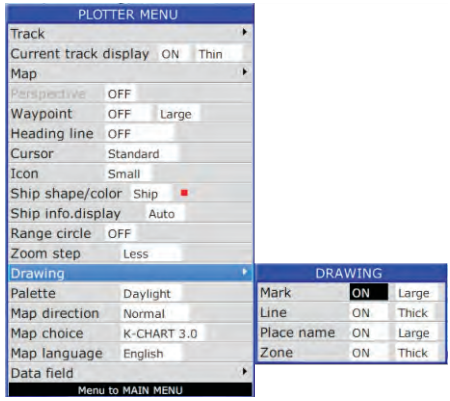


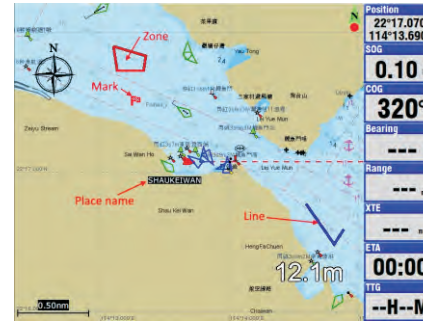


3. Choose "ON" (if you choose "ON", you need to input the radius of the circle manually), or "OFF" as desired and then press [✔] key to finish.

2.11 Drawing

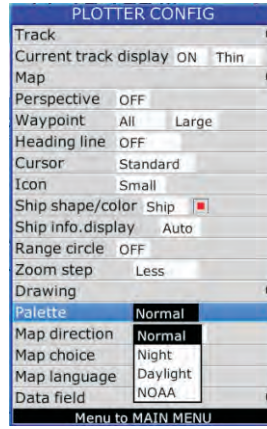
1. Press [MENU] key in **PLOTTER** screen.
2. Choose **Drawing** and then press [✔] key to select.
3. Choose "Mark", "Line", "Place name" and "Zone" as desired and then press [✔] key to finish.
4. User can change the size of the Drawings.



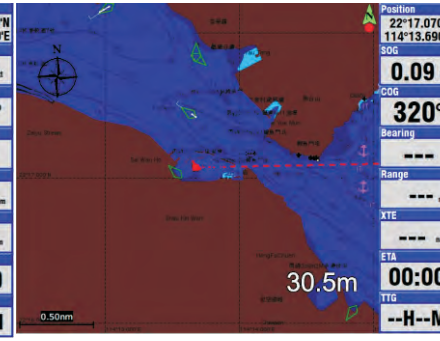


2.12 Palette

1. Press [MENU] key in **PLOTTER** screen.
2. Choose **Palette** and then press [✔] key to select.

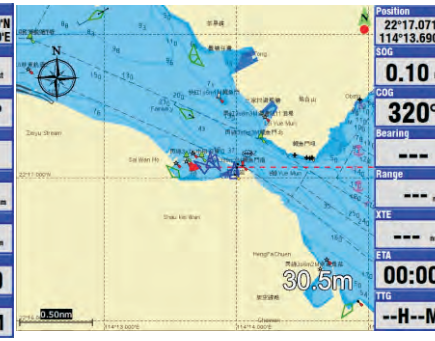


Normal



Night

Daylight

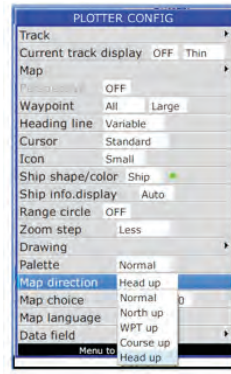


NOAA

3. Choose "Normal", "Daylight", "Night" or "NOAA" as desired and then press [✔] key to finish.

2.13 Map Direction

1. Press [MENU] key in **PLOTTER** screen.
2. Choose **Map Direction** and then press [✔] key to select.



3. Choose "Normal", "North Up", "WPT Up", "COURSE Up" or "Head up" as desired and then press [✔] key to finish.

Note :

Normal : It is similar to North up, map not move only own boat position move

North up : North is always on the top of the display, own boat not move only the map move

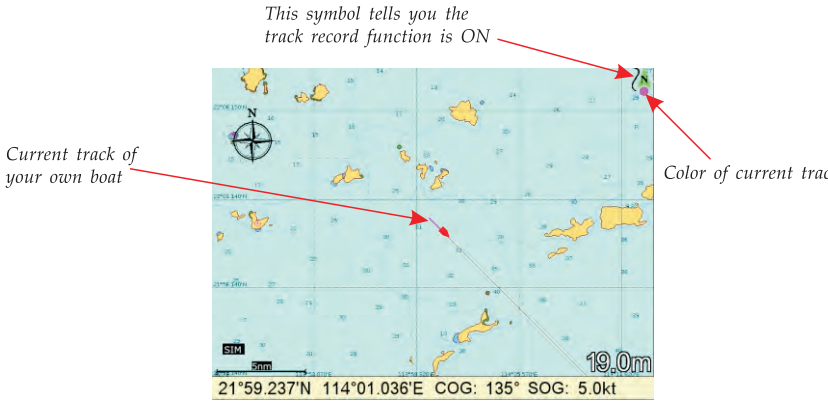
WPT up : Only available on GOTO mode when a waypoint is set as destination. The waypoint is always on the top of the display.

Course up : COG (Course over ground) is always on the top of the display

Head up : The heading of own boat is always on the top of the display. It requires an external heading signal input.

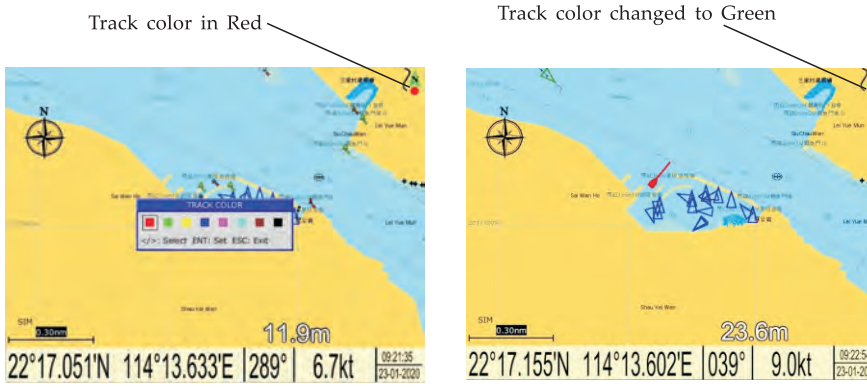
3. TRACK

In the following it teaches you how to manage the track of your own boat.



3.1 Change the color of current track

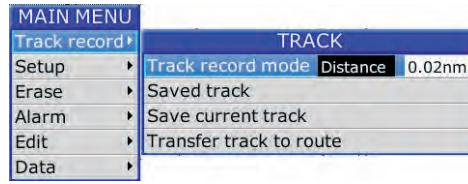
Press and hold [MODE] key on Plotter screen to change the color of current track of your own boat. Take an example : Change the track color from Red to Green.



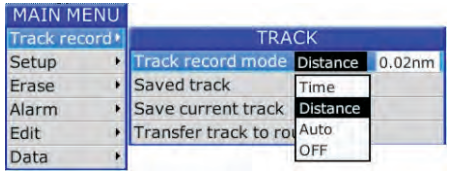
Press and hold [MODE] key until you see the track color box appear

3.2 Change plotting intervals of current track

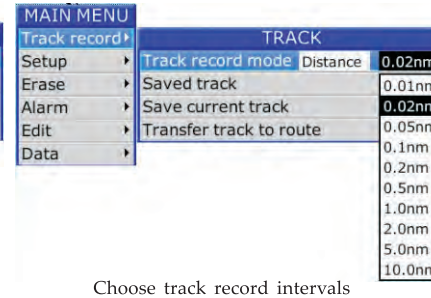
You can choose plotting intervals of the current track for your own boat as below:



Choose MAIN MENU->Track record->Track record mode



Choose the track record interval mode



Choose track record intervals

Track record mode :

-Time : Track is recorded and plotted at the time interval set

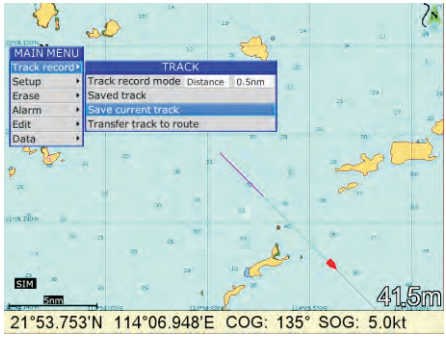
-Distance : Track is recorded and plotted at the distance interval set

-Auto : Plotting and recording interval changes with plotter display range selected

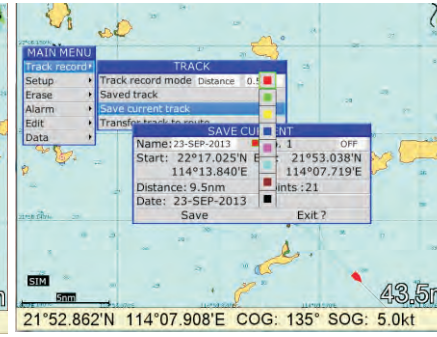
-OFF : Track is neither recorded or plotted

3.3 Save current track

You can save the current track of your own boat for future use.

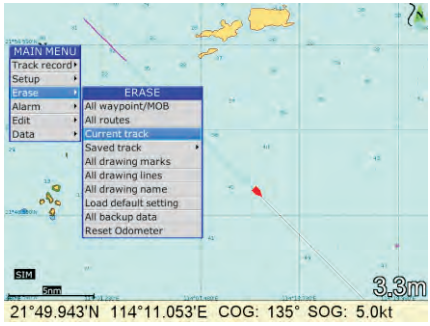


Choose MAIN MENU->Track record->Save current track

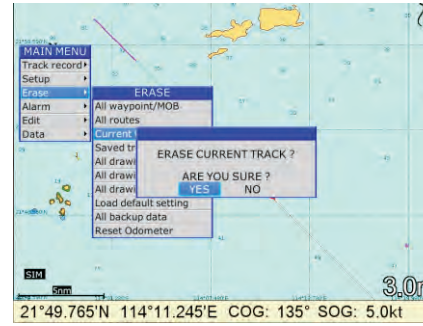


You can change the color and the name before save

3.4 Erase current track



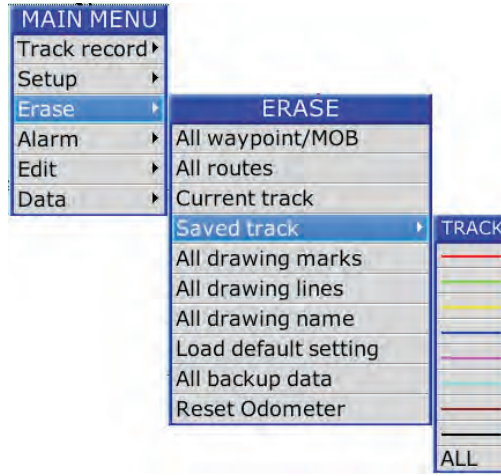
Choose MAIN MENU->Erase->Current track



To confirm erase or exit without erase

3.5 Erase saved track

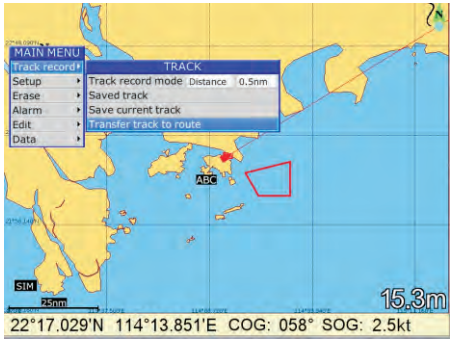
You can erase saved track by colors and erase all saved track.



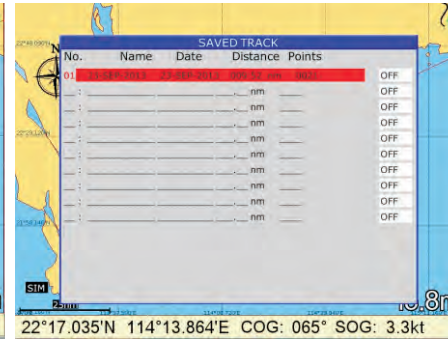
Choose MAIN MENU->Erase->Saved track

3.6 Transfer saved track to route

You can transfer the saved track of your own boat to a route for navigation purpose. You need to choose a starting point and a ending point of a saved track before transfer any part of the saved track into a route.



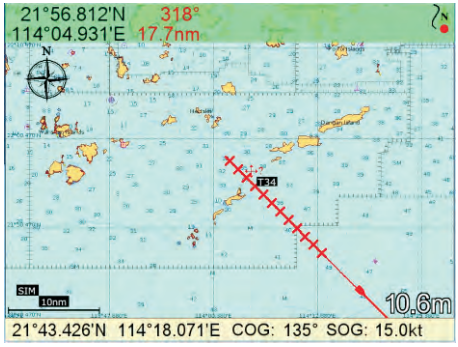
Choose MAIN MENU->Track record->Transfer track to route



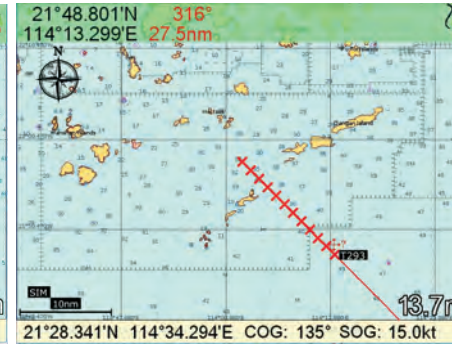
Choose a saved track from the list

After you choose a saved track from the list and press [✔] to confirm. The plotter screen will jump to the location of this saved track and the cursor will change to red color with a "?" beside the cursor then you can carry out selection of starting point. Note : In any screen if you choose "Transfer track to route" it will jump back to plotter screen automatically.

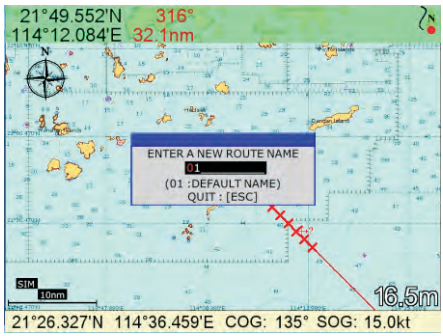
When you move the cursor close to the saved track you will see a number "TXXX" pop up beside the saved track. This number represent a saved track point in the saved track, smaller the number means earlier record.



Move the cursor to the starting point and press [✔]



Move the cursor to the ending point and press [✔] again



Enter the name of the new route and press [ENT] to confirm

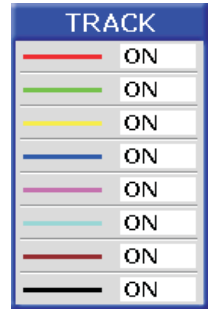
A new route is created

After finish of transferring you need to press [ ] to quit the "Transfer saved track to route" function.

Note : After it quit from "Transfer saved track to route" function the cursor will turns from RED color back to BLACK color.

3.7 Display saved track on the plotter screen

1. Press [MENU]key in **PLOTTER** screen.
2. Choose **Track** and then press **[►]** key to select.



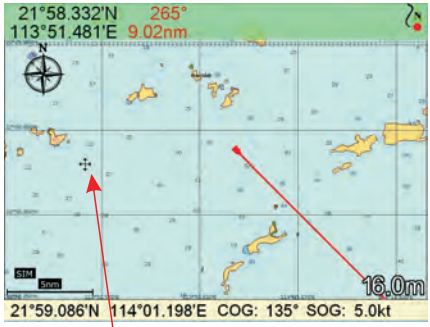
3. Choose the color and if you want to turn it "ON" or "OFF".
4. Press [MENU] key to finish.

4.1 Entering Waypoints

Waypoints can be entered on the **PLOTTER** display in three ways: by cursor position, at own ship's position, and from the waypoint edit.

Entering a waypoint with the cursor

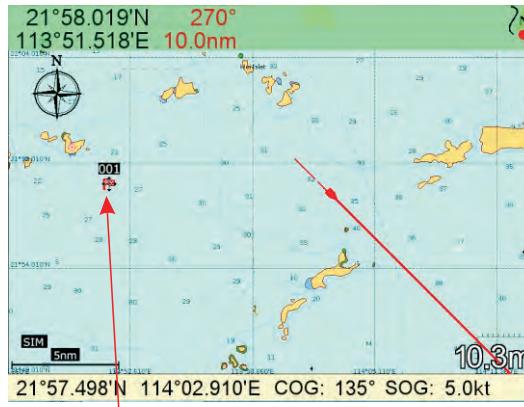
1. Use the cursor pad to place the cursor on the location desired for a waypoint.
2. Press the **[ ]** key. The following window appears.



Move the cursor to the location desired for a waypoint

Press [ ] , choose "SAVE" and press [ ] again

3. This window is where you can rename, edit LON and LAT, choose mark shape and color, and enter a comment.
4. Choose "**SAVE**" to finish.

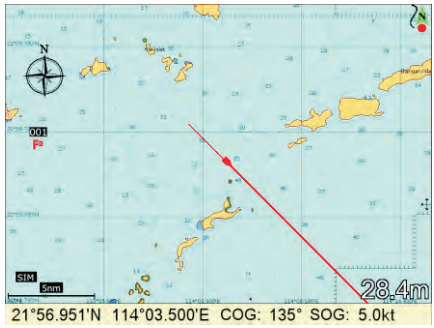


A waypoint is created on the cursor location

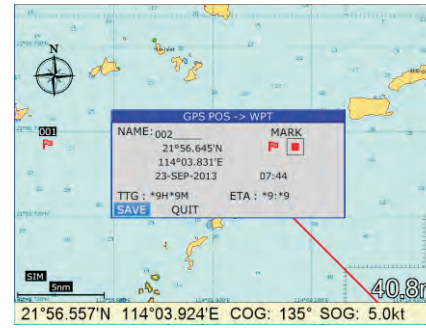
Entering a waypoint at own ship's position

1. Momentarily press [✔] key when no cursor is seen. The following window appears.

Note: if you see a cursor on the plotter screen you can press [✖] to make it disappear.

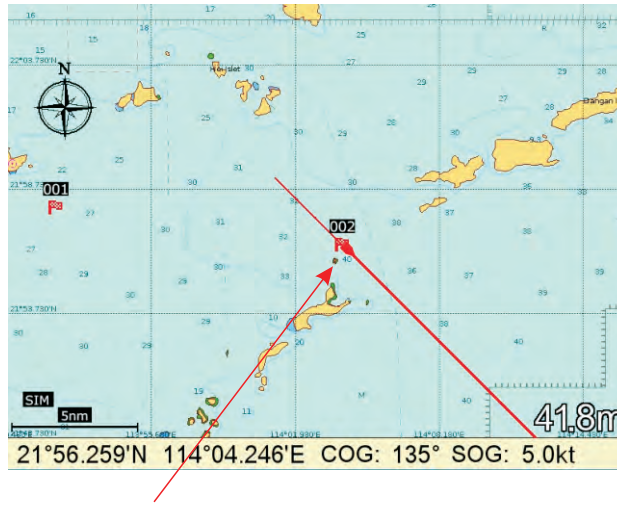


Make sure no cursor is seen on the plotter screen



Press [✔], choose "SAVE" and press [✔] again

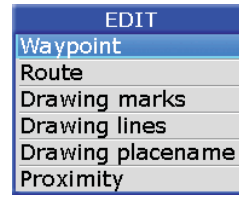
2. If you do not need to change anything, choose "SAVE" to finish.



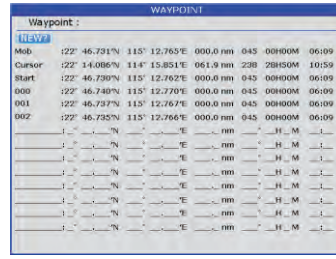
A waypoint is created on your own boat location

Entering a waypoint from the waypoint list

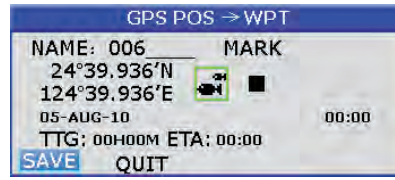
1. Press the [MENU] key twice to enter main menu.
2. Choose **Edit** and then press [▶] key to select.



3. Choose **Waypoint** and then press [☑] key.
   The following window will appear



4. Choose **NEW** then press [☑] key.
   The following window appears.



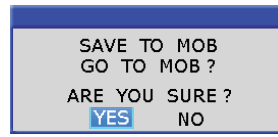
5. If you do not need to change anything, choose "SAVE" to finish.

4.2 Entering the MOB Mark

Only one MOB mark may be entered.

Each time the MOB mark is entered, the previous MOB mark and its position data are over-written.

1. Long press the [ ] key on any display mode.
   The following display appears.



2. To set MOB position as destination, press [▶] to choose "YES" and then press [☑] key. Choosing "NO" saves the position as a waypoint called "MOB".

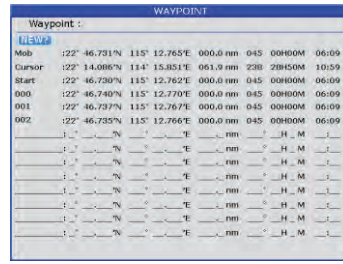
4.3 Displaying Waypoint Name

Please refer to section 2.6.5, PLOTTER CONFIG -> Waypoint.

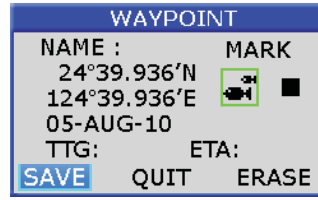
4.4 Operation on the Waypoint Editing

Waypoint position, waypoint name, mark shape, mark color and comment can be edited from the Waypoint Edit.

1. Press the [MENU] key twice to enter main menu.
2. Choose Edit and then press [▶] key to select.
3. Choose Waypoint and then press the [✔] key.
   The following window will appear.



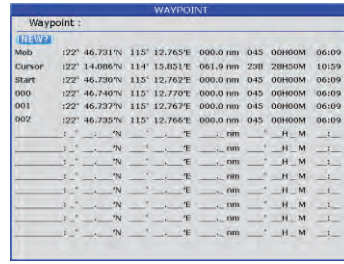
4. Choose waypoint to edit and then press the [✔] key.
   The following window will appear.



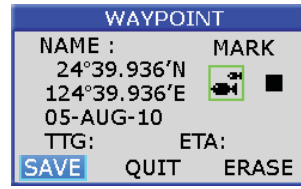
5. Choose the object you want to edit and then press the [✔] key to select.
6. Change name, position, mark shape, mark color, comment as desired.
7. Choose "SAVE" and then press [✔] key to finish.

4.5 Erasing Waypoints

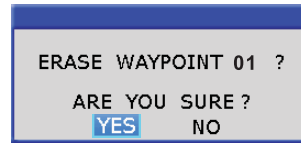
1. Press the [MENU] key twice to main menu.
2. Choose **Edit** and then press **[▶]** key to select.
3. Choose **Waypoint** and then press the **[✔]** key. The following window will appear.



4. Select a waypoint and press **[✔]** key.
5. The confirm window will appear. Choose "ERASE" and then press [✔] key.

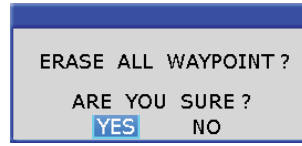


6. Choose "YES" and then press [✔] key to finish.



Erase All Waypoints

1. Press the **[MENU]** key twice to enter main menu.
2. Choose **Erase** and then press **[▶]** key to select.
3. Choose **All waypoint/MOB** and then press **[✔]** key.
   The confirming window will appear.

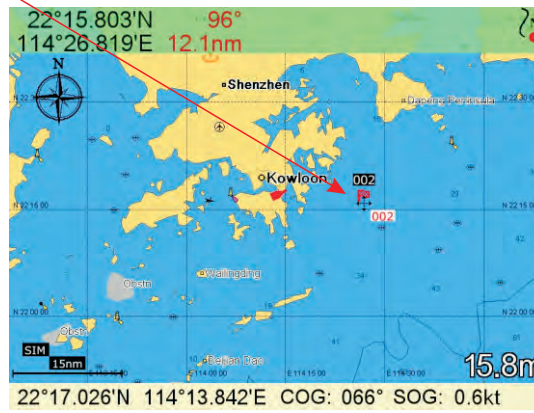


4. Choose "YES" and then press [✔] key to erase all waypoints.

4.6 Editing Waypoints on plotter screen

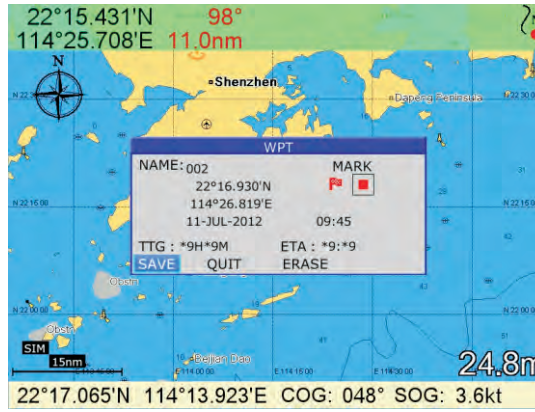
You can edit Waypoint on plotter screen.

1. Move the cursor close to a Waypoint you want to edit.



You will see a text box pop up with same name of the Waypoint you want to edit

2. Press [ ] to confirm, the confirm window will appear.

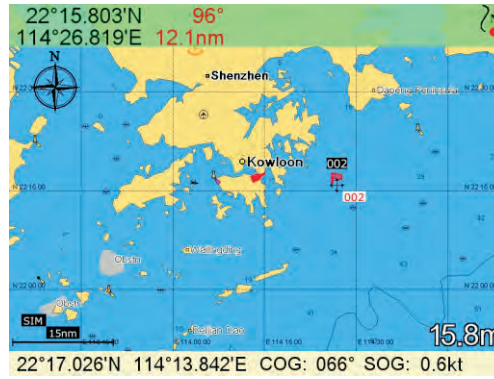


3. Choose the object you want to edit and then the [ ] key to select.
4. Change name, position, mark shape, mark color, comment as desired.
5. Choose "SAVE" and then press [ ] key to finish.

4.7 Erase Waypoints on plotter screen

You can erase Waypoint on plotter screen

1. Move the cursor close to the Waypoint you want to erase.



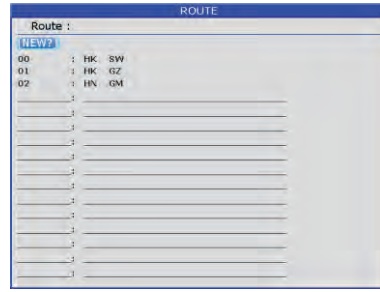
You will see a text box pop up with same name of the Waypoint you want to erase

2. Press [✔] to confirm, the confirm window will appear.

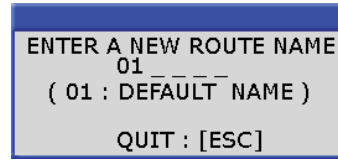
3. Choose "ERASE" and then press [✔] key to finish erase that Waypoint.

5.1 Creating Routes

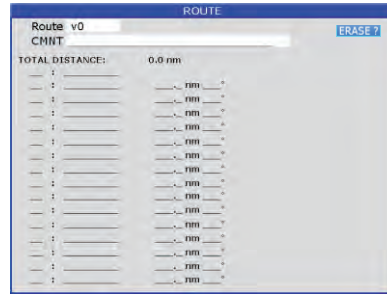
1. Press [MENU] key twice to enter main menu.
2. Choose **Edit** and then press **[▶]** key to select.
3. Choose **Route** and then press **[✔]** key.
   The following window will appear.



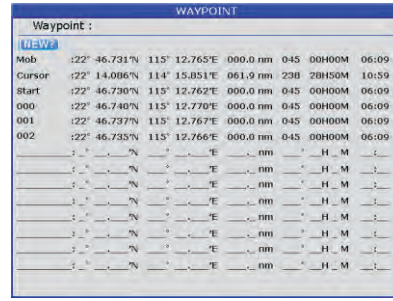
4. Choose "NEW" and then press [✔] key.
   The following window will appear.



5. Use [▲] or [▼] to enter the route name and then press [☑] key to finish.
   The following will appear.



6. Choose the location (e.g. 01) and then press [☑] key.
   A new window will open which will let you choose a waypoint.

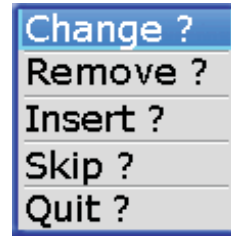


7. Choose the waypoint name that you want to include in the route and then press [☑] key (e.g., 001). You can also create a new waypoint if needed.
8. Repeat step 6 and 7 until the route is complete.

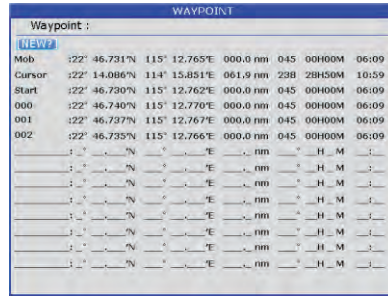
5.2 Editing Routes

Replacing waypoints in a route

1. Press the [MENU] key twice to enter main menu.
2. Choose **Edit** and then press [▶] key to select.
3. Choose **Route** and then press [✔] key to select.
4. Choose the route to edit and then press [✔] key.
5. Place the cursor on the waypoint to replace, press the [✔] key to show the route options.



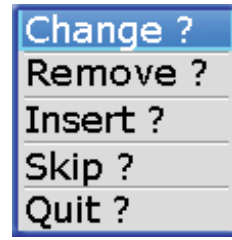
6. Choose "Change" and then press [✔] key.
   The waypoint select window will appear.



7. Choose the waypoint name that you want to include in the route and then press [✔] key.
8. Repeat step 5 to 8 until finish edit.

Permanently deleting a waypoint from a route

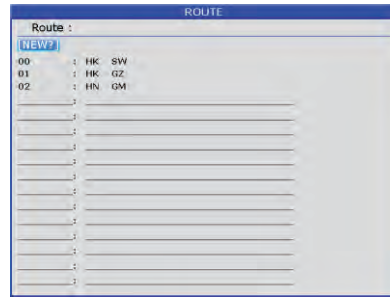
1. Press the [MENU] key twice to enter main menu.
2. Choose **Edit** and then press the [►] key to select.
3. Choose **Route** and then press [✓] key to select.
4. Choose the route desired and then press [✓] key to select.
5. Choose the waypoint you want to delete and then press [✓] key to show the route edit options.



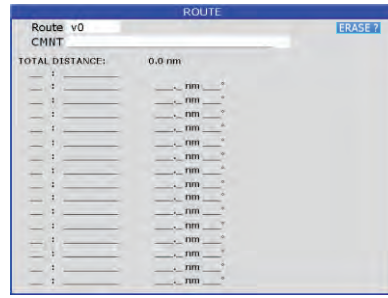
6. Choose "Remove" and then press [✓] key to finish.

5.3 Erasing Routes

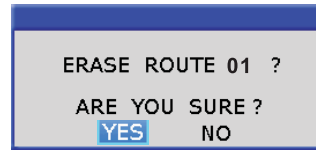
1. Press the [MENU] key twice to enter main menu.
2. Choose **Edit** and then press [►] key to select.
3. Choose **Route** and then press the [✓] key. The following window will appear.



4. Select a route then press [✓] key.
5. The confirm window will appear. Choose "**ERASE**" and then press [✓] key.

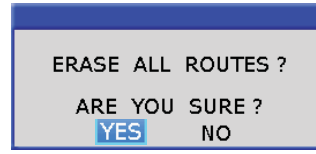


6. Choose "YES" and then press [✓] key to finish.



Erase All Routes

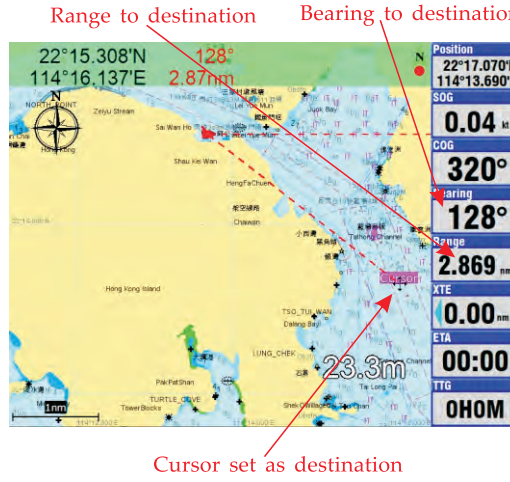
1. Press the [MENU] key twice to enter main menu.
2. Choose **Erase** and then press [▶] key to select.
3. Choose **All routes** and then press [✓] key.
   The confirming window will appear.



4. Choose "YES" and then press [✓] key to erase all routes.

6.1 Setting Destination by Cursor

1. Press [ƒx] key to display the **FUNCTION** window.
2. Choose **Goto cursor** and then press [✔] key to select.
3. The cursor appears with "?".

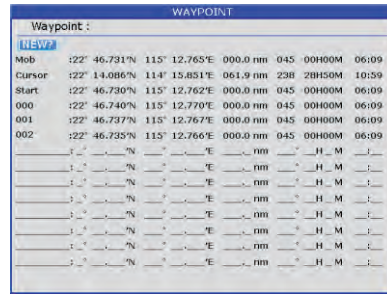


4. Use the cursor pad to place the cursor on the location desired for destination.
5. Press the [✔] key to mark destination.

6.2 Setting Destination by Waypoint (WPT)

1. Press the [fx] key to display the **FUNCTION** window.

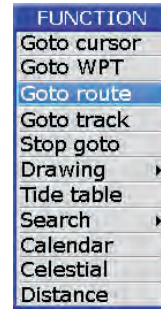
2. Choose **Goto WPT** and then press [✓] key to select.
3. The **WAYPOINT** list appears.



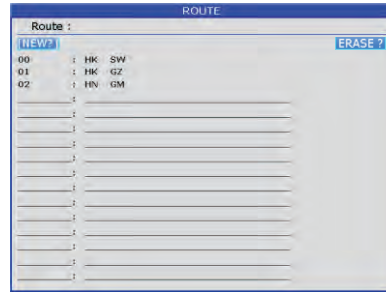
4. Choose a waypoint and then press [✓] key to finish.

6.3 Setting Route as Destination

1. Press the [fx] key to display the **FUNCTION** window.
2. Select Goto route and then press [✓] key to select.

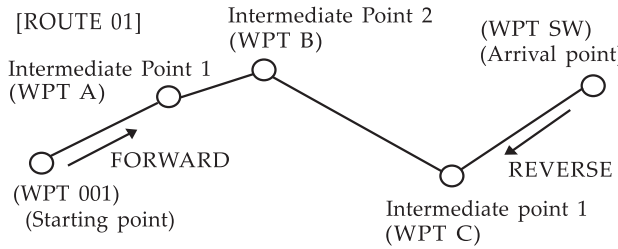


3. The **ROUTE** list appears.



4. Choose a route and then press [☑] key. The following window appears.

5. Choose "Forward" or "Reverse" in order to traverse the waypoints in the route, and then press [☑] key to finish.



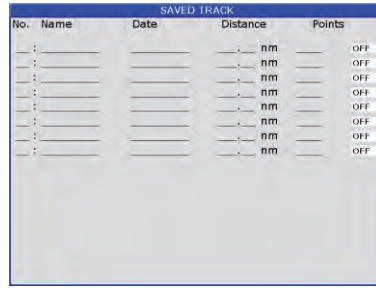
Meaning of forward and reverse

6.4 Setting Track Data as Destination

Track Data can be used for navigation.

1. Press the [ ] key to display the **FUNCTION** window.
2. Choose **Goto track** and then press the [ ] key to select.

3. The **SAVED TRACK** window will appear.



4. Choose the track that you want to set as destination, and then press [ ] key.

5. Choose Forward or Reverese to start Goto track navigation.

Once a Goto track has been activated, the track will divide it into segments. Up to 200 temporary waypoints are created (named T1,T2, T3, etc. and END) to mark the most significant features of the track, duplicating your exact path as closely as possible. To get the most out of the Goto track feature, remember the following tips:

- Always clear the track log at the point that you want to go back to.
- There must be at least two track log points stored in memory to create a track route.
- If the receiver is turned off or satellite coverage is lost during your trip, it will draw a straight line between any point where coverage was lost and where it resumed.
- If your track's changes in distance and direction are too complex, 200 waypoints may not mark your path accurately.

The receiver then assigns the 200 waypoints to the most significant points of your track, and simplifies segments with fewer changes in direction.

6.5 Canceling Destination

You can cancel a destination as follows.

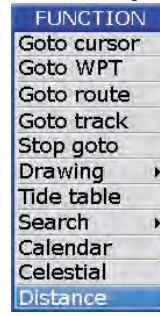
1. Press the [ ] key to display the FUNCTION window.

2. Choose Stop goto and press [ ] key to finish.

6.6 Distance

Measure the distance of several points and save it as a route.

1. Press [ƒx] key in **PLOTTER** screen to display **FUNCTION** window.



2. Select "**Distance**" and press [✔] key to activate the distance measurement function.

Note:

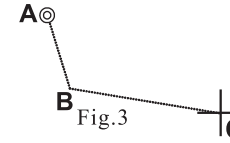


Fig.3

a) LON/LAT is the position of the cursor (point C)

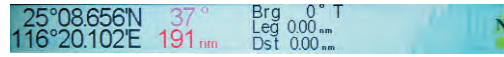
b) BRG is the bearing of cursor to the last point (point B)

c) LEG is the distance of cursor to the last point (point B)

d) DST is the total distance from the cursor to the starting point (AB + BC)

e) M is Magnetic North, T is True North

3. Move the cursor to the starting point (A) and press [✔] to set up starting point. Now all BRG, LEG and DST are display 0.



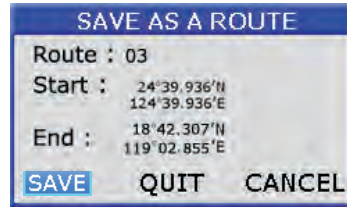
4. Move the cursor to the next point (B). Now the BRG and LEG display the Bearing and Distance from point A to point B, DST=0.

5. Press [✔] key, now DST= distance from point A to point B is shown, while BRG and LEG turns to 0.

6. Move the cursor to the next point (C). Now the BRG and LEG displays the Bearing and Distance from point B to point C. DIST displays the total distance from point A to point B.

7. Press [✔] key, now DIST = distance of point AB + distance of point BC is shown, while BRG and LEG turns to 0.

8. Repeat steps 3, 4 and 5 to measure the distance of several points.
9. Press [✖] key during the step 3, 4 or 5, the following menu will pop out.



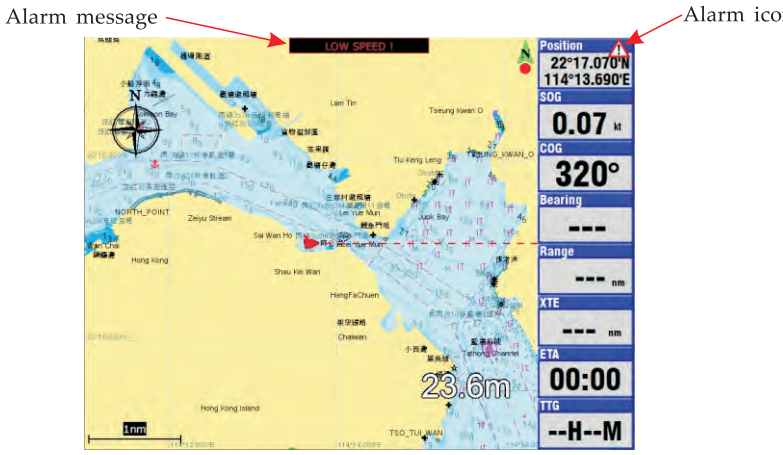
10. You can select :
    A) "SAVE" to save the measurement as a route.
    B) "QUIT" to quit the distance measurement function without saving.
    C) "CANCEL" to continue the distance measurement.

7. ALARM

There are six alarm conditions which generates both audio and visual alarms: **Arrival alarm**, **Anchor drag alarm**, **XTE (Cross-Track Error) alarm**, **Speed alarm**, **Voltage alarm** and **Timer alarm**.

When the alarm setting is violated, the buzzer sounds and the name of the offending alarm and the alarm icon appears on the display.

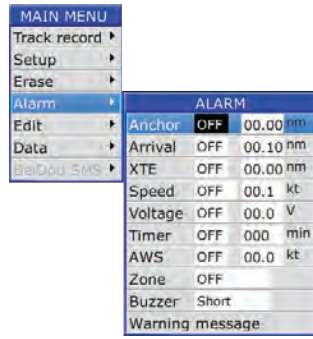
You can silence the buzzer and remove the alarm name indication by pressing any key. The alarm icon remains on the screen until the reason for the alarm is cleared.



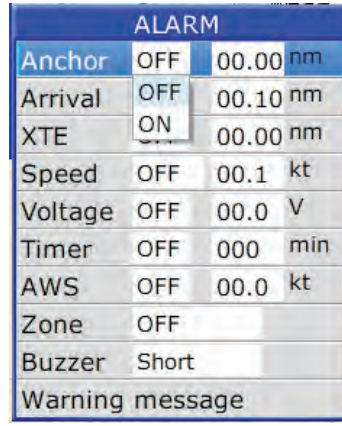
7.1 Anchor Drag Alarm

Anchor Drag Alarm informs you that own ship is moving when it should be at rest and when the ship moves out a certain set range.

1. Press **[** MENU **]** key twice to enter main menu.
2. Choose **Alarm** and then press **[►]** key to display **ALARM** menu.



3. Choose Anchor and then press [✓] key. The alarm options appear.

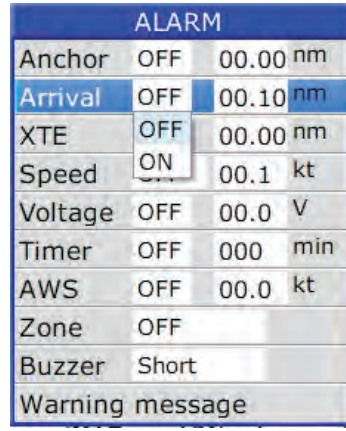


4. Press [▶] key to select the alarm value and then press [✓] key to setup the value.
5. Choose "ON" and then press [✓] key to enable the alarm.

7.2 Arrival Alarm

Arrival Alarm informs you that own ship is approaching your set destination.

1. Press **[** MENU **]** key to enter main menu.
2. Choose **Alarm** and then press **[▶]** key to display **ALARM** menu.
3. Choose **Arrival** and then press **[✓]** key. The alarm options appear.

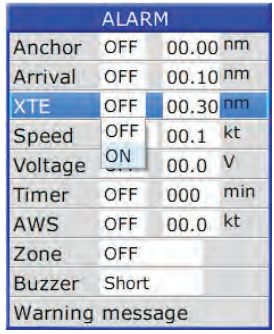


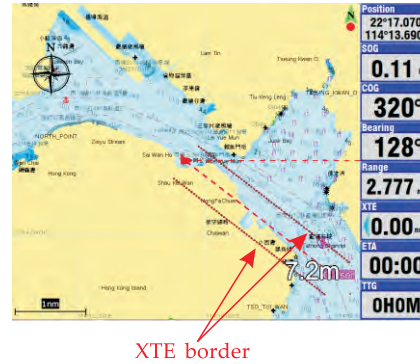
4. Press [▶] key to select the alarm value and then press [✓] key to setup the value.
5. Choose "ON" and then press [✓] key to enable the alarm.

7.3 XTE (Cross-Track Error) Alarm

XTE (Cross-Track Error) Alarm warns you when own ship is off its intended course.

1. Press [MENU] key twice to enter main menu.
2. Choose **Alarm** and then press [▶] key to display **ALARM** menu.
3. Choose **XTE** and then press [✓] key. The alarm options appear.



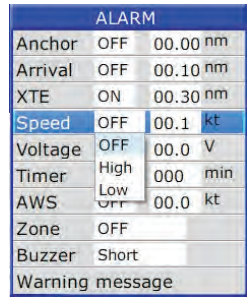


4. Press [▶] key to select the alarm value and then press [✓] key to setup the value.
5. Choose "ON" and then press [✓] key to enable the alarm.
6. XTE alarm will only activate in GOTO function, two XTE border appear parallel to bearing line to destination with XTE alarm set value distance.

7.4 Speed Alarm

Speed Alarm provides visual and aural alerts when the ship's speed is higher or lower than the alarm range set.

1. Press [MENU] key twice to enter main menu.
2. Choose **Alarm** and then press [▶] key to display **ALARM** menu.
3. Choose **Speed** and then press [✓] key. The alarm options appear.

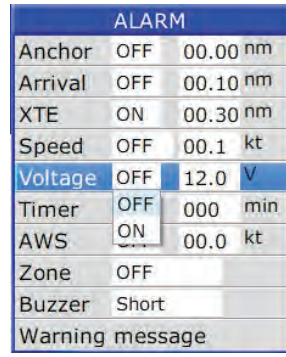


4. Press [▶] key to select the alarm value and then press [✓] key to setup the value.
5. Choose "ON" and then press [✓] key to enable the alarm.

7.5 Voltage Alarm

Voltage Alarm warns you when the input voltage in the unit is higher than the set value.

1. Press [MENU] key to enter main menu.
2. Choose Alarm and then press [▶] key to display ALARM menu.
3. Choose Voltage and then press [✓] key. The alarm options appear.

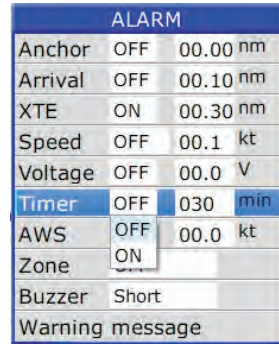


4. Press [▶] key to select the alarm value and then press [✓] key to setup the value.
5. Choose "ON" and then press [✓] key to enable the alarm.

7.6 Timer Alarm

Timer Alarm provides audio and visual alarms when the time set has expired.

1. Press [MENU] key to enter main menu.
2. Choose **Alarm** and then press **[▶]** key to display **ALARM** menu.
3. Choose **Timer** and then press **[✓]** key. The alarm options appear.

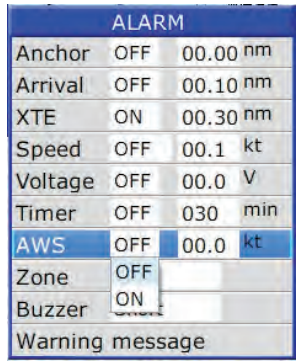


4. Press [▶] key to select the alarm value and then press [✓] key to setup the value.
5. Choose "ON" and then press [✓] key to enable the alarm.

7.7 AWS Alarm

When there is an anemometer is connected, you can set AWS alarm to warn you when wind speed is higher than the set value.

1. Press [MENU] key to enter menu.
2. Choose Alarm and then press [▶] key to display ALARM menu.
3. Choose AWS and then press [✔] key, the alarm options appear.

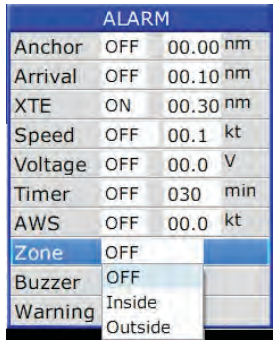


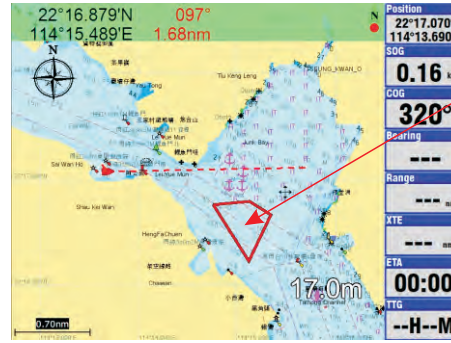
4. Press [▶] key to select the alarm value and then press [✔] key to setup the value.
5. Choose "ON" and then press [✔] key to enable the alarm.

7.8 Zone Alarm

When a zone or zones is drawn on plotter screen, you can set Zone alarm to warn you when the boat is going in or leaving a zone or zones.

1. Press [Menu] key to enter menu.
2. Choose Alarm and then press [▶] key to display ALARM menu.
3. Choose Zone and then press [✔] key, the alarm options appear.





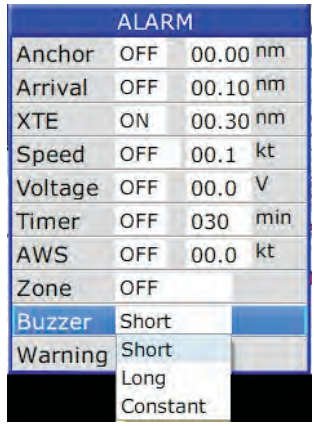
Drawing zone

4. Choose "Inside" or "Outside" and then press [✔] key to enable the alarm.

7.9 Buzzer Type Selection

The buzzer sounds whenever an alarm setting is violated.

1. Press the [MENU] key twice to enter main menu.
2. Choose Alarm and then press [▶] key to select.
3. Choose Buzzer and then press [▶] key to select.
4. Choose buzzer type desired and then press [✔] key to finish.



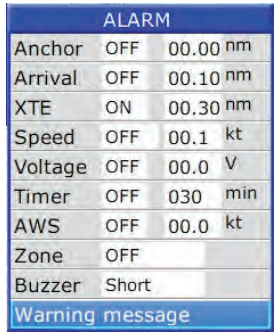
Short: Two short beeps

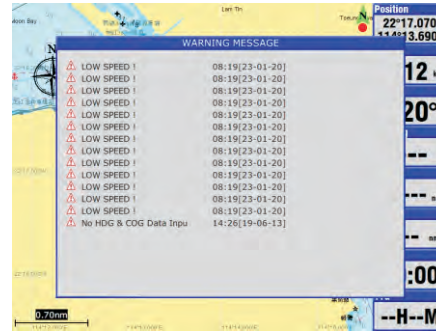
Long: Three long beeps

Constant: Continuous beeps

8.0 Warning Message

When an alarm is triggered, it will store in Warning message page with type of alarm, time and date.



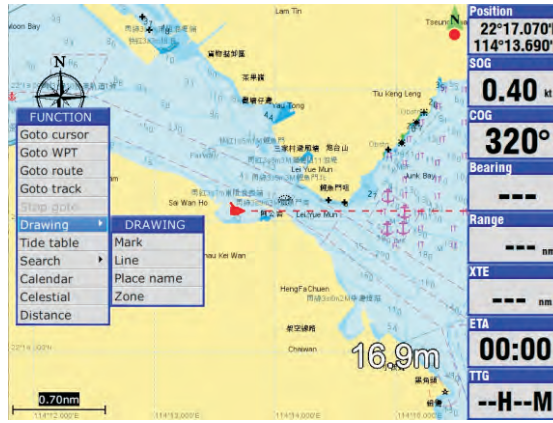


Disabling the alarm

1. Press any key to disable the buzzer of any alarm.
2. The Alarm Icon will not disappear until the reason for the alarm is cleared.

8. DRAWING FUNCTION

You can draw marks, lines and place names on the plotter screen. Press [ƒx] key and choose "DRAWING" on the function menu.



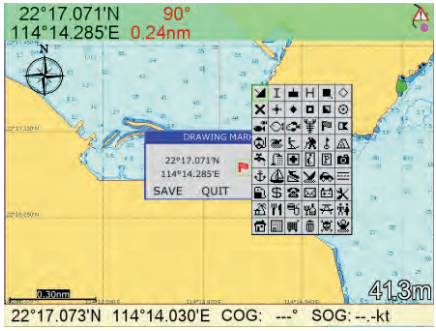
8.1 Drawing Marks

Choose FUNCTION menu->Drawing->Mark

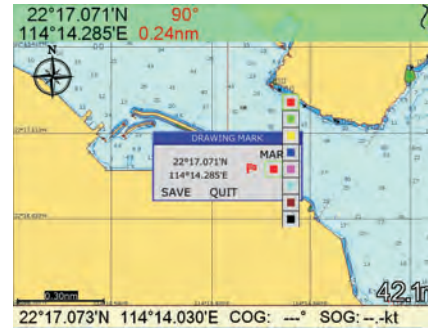
Note : You can also press and hold [✓] key on Plotter screen to enable drawing mark function.

A "?" symbol will appear beside the cursor and the cursor will turn to red color

Move the cursor to the position you want to put the mark then press [✓], a DRAWING MARK window will appear as shown

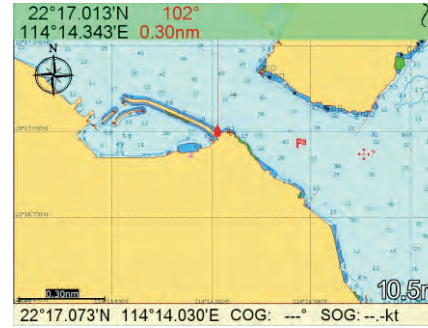


Choose the desire symbol for the drawing mark

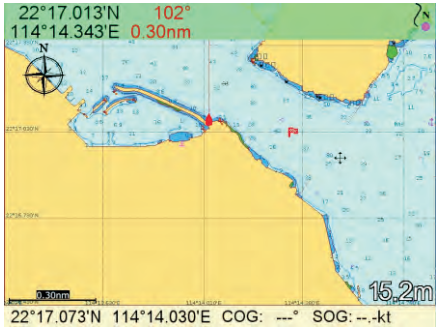


Choose the desire color for the drawing mark

Choose [SAVE] to save the drawing mark or choose [QUIT] to exit without save the drawing mark



If you choose [SAVE] then you can see a drawing mark appear on the plotter screen with the symbol and the color you choose



Press [ ] after finish drawing mark to quit this function and the cursor will turn back to black color

8.2 Drawing line

Choose FUNCTION MENU->Drawing->Line

A "?" symbol will appear beside the cursor and the cursor will turn to red color

Move the cursor to a starting point of the line you want to draw and press [✔] then move the cursor to the second point and press [✔] again

Continue to move the cursor and press [✔] to draw any shape any you like

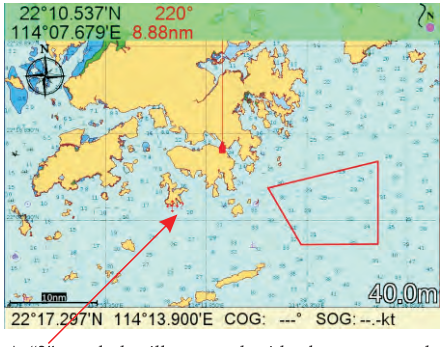
Press [✘] after you finish drawing lines, a DRAWING LINE window will appear as shown

Choose [SAVE] to save the drawing mark or choose [QUIT] to exit without save the drawing lines

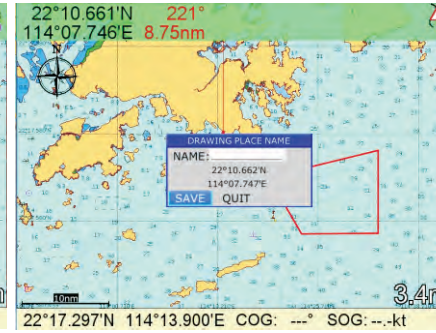
If you choose [SAVE] the cursor will turn back to black color

8.3 Drawing place name

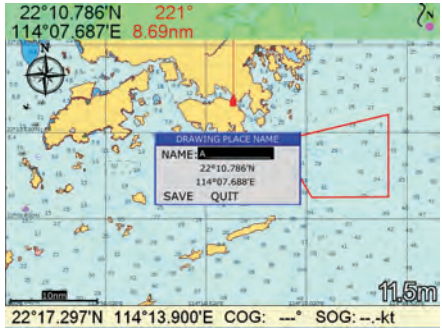
Choose FUNCTION MENU->Drawing->Place name



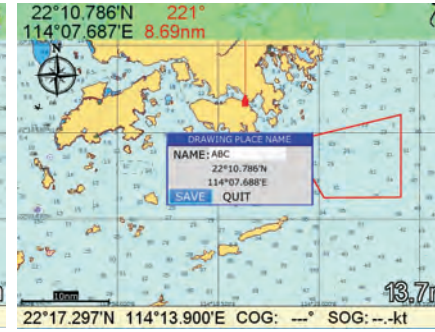
A "?" symbol will appear beside the cursor and the cursor will turn to red color



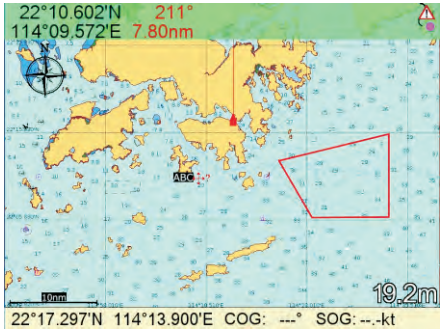
Move the cursor to the position you want to put the place name then press [✔], a DRAWING PLACE NAME window will appear as shown



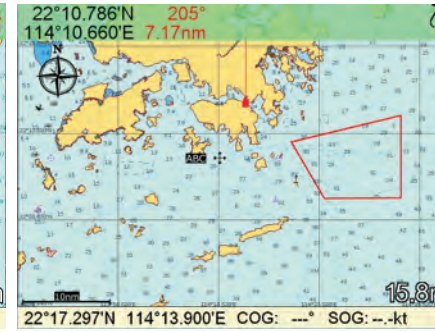
Move the cursor to the NAME and press [✔] (the column will turn to black color from white) then start to enter the place name by the direction arrow keys



After finish entering place name press [✔] and choose [SAVE to save the drawing place name or choose [QUIT] to exit without save the drawing place name



If you choose [SAVE] then you will see place name appear on the plotter screen



Press [✘] after you finish drawing place name the cursor will turn back to black color

8.4 Drawing zone

Choose FUNCTION MENU->Drawing->Zone

A "?" symbol will appear beside the cursor and the cursor will turn to red color

Move the cursor to a starting point of the zone you want to draw and press [✔] then move the cursor to a second point and press [✔] again

Continue to move the cursor and press [✔] to draw any shape you like

Press [✖] after you finish drawing a zone, a DRAWING ZONE window will appear as shown

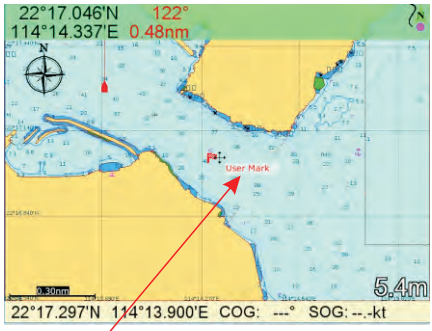
Select the color of the zone then choose [SAVE] to save the drawing zone or choose [QUIT] to exit without save the drawing zone

If you choose SAVE the cursor will turn back to black color

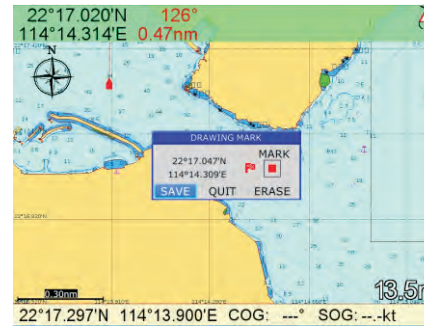
8.5 Erase or edit drawings

After drawing marks, lines or place name on the plotter screen you can erase or edit the drawings as describe below.

8.5.1 Erase or edit drawing mark

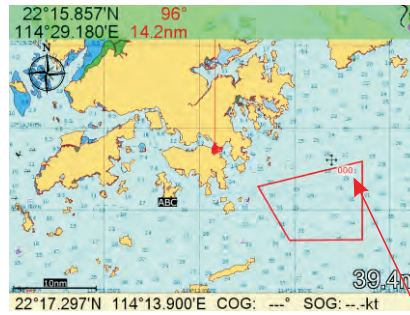


Move the cursor close to the mark you want to erase or edit, you will see a pop up text box "User Mark"

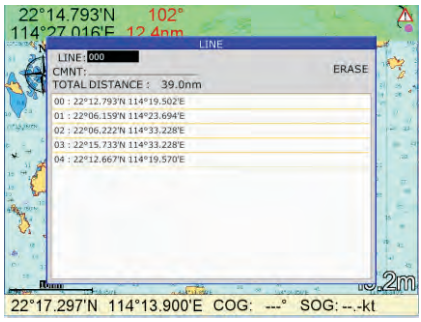


Press [✓] to erase or edit the selected mark

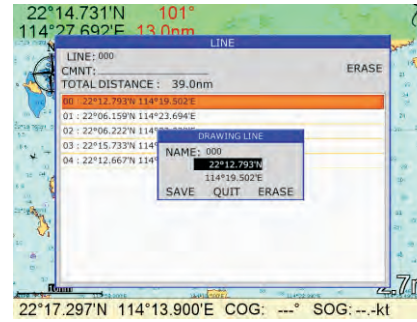
8.5.2 Erase or edit drawing line



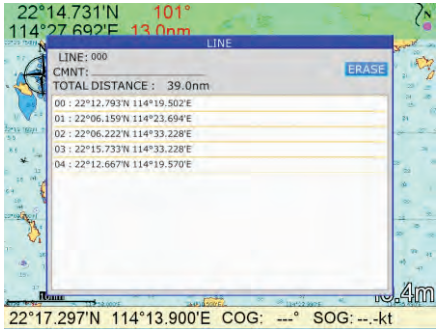
Move the cursor close to the lines you want to erase or edit, you will see a pop up text box of line's name e.g. "000"



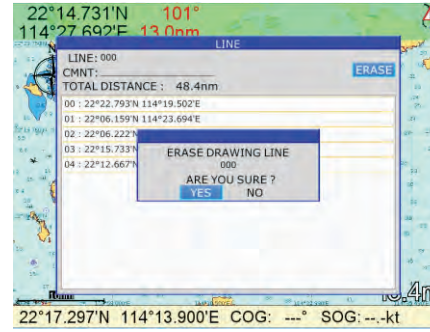
Press [✓] to erase or edit the selected lines



Move the cursor to any point of the lines and press [✓] to change the location or erase this point from the lines



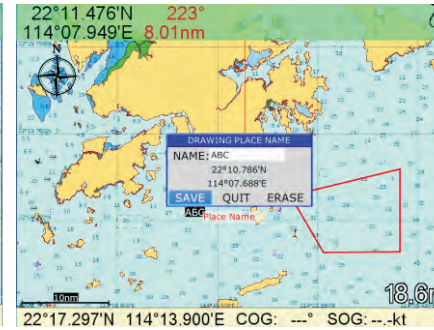
Or you can move the cursor to "ERASE" as shown to erase all points and lines



After you choose "ERASE" you need to confirm

8.4.3 Erase or edit drawing place name

Move the cursor close to the place name you want to edit or erase, you will see a pop up text box " Place Name"

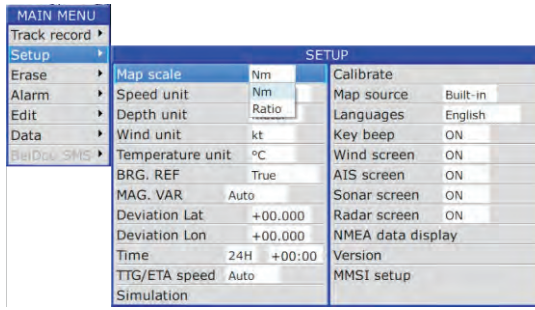


Press [✔] to erase or edit the selected place name

9.1 Map Scale

You can change the map scale display format.

1. Press [MENU] key twice to enter main menu.
2. Choose **Setup** and then press **[▶]** key to select.



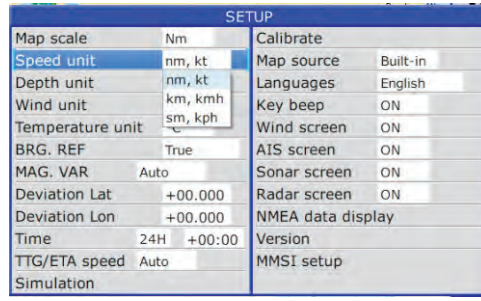
3. Choose Map scale and then press [☑] key to select.
4. Choose "Miles" or "Ratio" as desired and then press [☑] key to finish.

9.2 Unit of Measurement

Speed Unit

Distance/speed can be displayed in nautical miles/knots, kilometers/kilometers per hour, or statute miles/kilometers per hour.

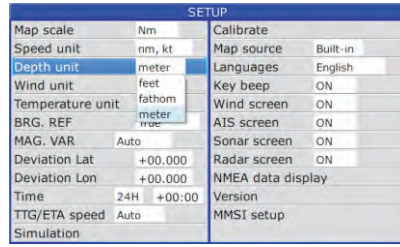
1. Press [MENU] key twice to enter main menu.
2. Choose **Setup** and then press **[▶]** key to select.
3. Choose **Speed unit** and then press **[☑]** key to select.



4. Choose "nm, kt", "km, kmh" or "sm, kph" as desired and then press [☑] key to finish.

Depth Unit

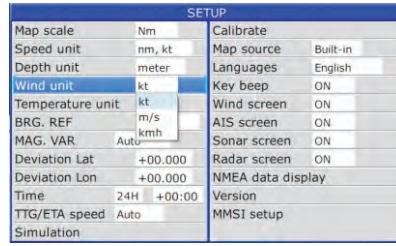
1. Press [MENU] key twice to enter main menu.
2. Choose **Setup** and then press **[►]** key to select.
3. Choose **Depth unit** and then press **[✓]** key to select.



4. Choose "feet", "fathom" or "meter" as desired and then press [✓] key to finish.

Wind Unit

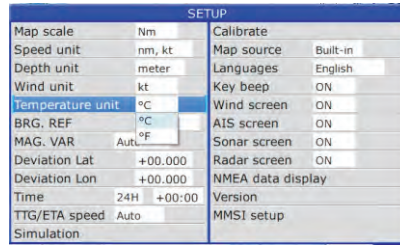
1.Press [MENU] key twice to enter main menu.
2.Choose Setup and then press [►] key to select.
3.Choose Wind unit and then press [✓] to select.



4. Choose “kt”, “m/s” or “kmh” as desired and then press [✓] key to finish.

Temperature Unit

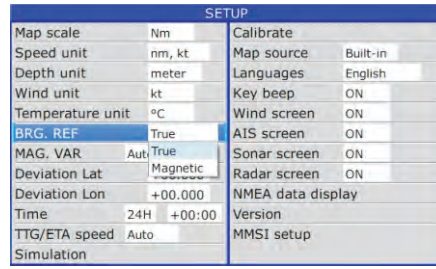
1. Press [MENU] key twice to enter main menu.
2. Choose Setup and then press [►] key to select.
3. Choose Temperature unit and then press [✓] to select.
4. Choose “˚C” or “˚F” as desired and then press [✓] to finish.



9.3 Bearing Reference

Ship's course and bearing to a waypoint may be displayed in true or magnetic bearing. Magnetic bearing is true bearing plus (or minus) earth's magnetic deviation. Use the bearing reference in accordance with the compass interfaced: magnetic for magnetic compass, true for gyrocompass.

1. Press [MENU] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose BRG. REF. and then press [✔] key to select.



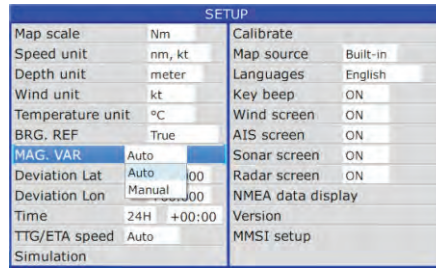
4. Choose "True" or "Magnetic" as desired and then press [✔] key to finish.

9.4 Magnetic Variation

The location of the magnetic North Pole is different from the geographical North Pole. This causes a difference between the true and magnetic north direction. This difference is called magnetic variation, and varies with respect to the observation point on earth.

Your unit is pre-programmed with all the earth's magnetic variation. However, you may want to enter variation manually to refine accuracy. Set **BRG. REF** on the **PLOTTER** screen to "Magnetic" to use magnetic variation.

1. Press **[** MENU **]** key twice to enter main menu.
2. Choose **Setup** and then press **[▶]** key to select.
3. Choose MAG. VAR. and then press [✔] key to select.

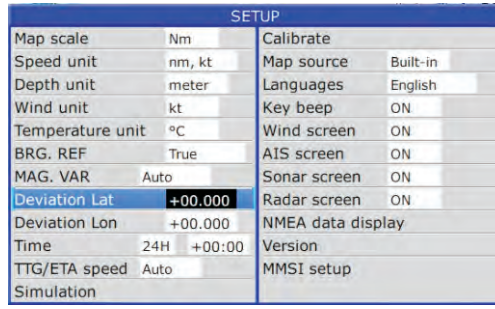


4. Choose "Auto" or "Manual" (if you choose "Manual", you need to input the value manually) as desired and then press [✔] key to finish.

9.5 Deviation

You can input the deviation of the ship or map manually to correct the position error from GPS error or map error.

1. Press [MENU] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose **Deviation** and then press [✔] key to select.



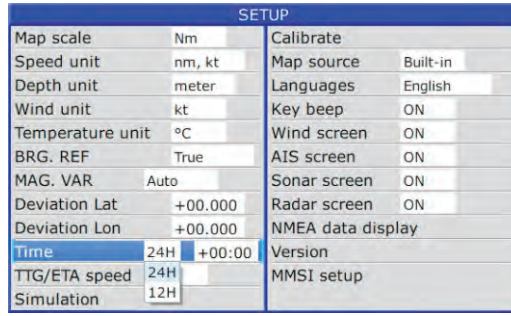
4. Input the value as desired and then press [✔] to finish. To disable deviation, input "0" into the value.

9.6 Time

GPS uses UTC time. If you would rather use local time, enter the Time difference (range: -13:30 to +13:30) between it and UTC time.

You may display the time in 12 or 24 hour format.

1. Press [MENU] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose **Time** and then press [▶] key to select.

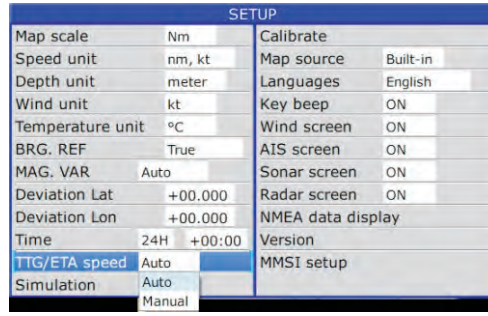


4. Input the time difference as desired. Choose "24H" or "12H" as desired and then press [✔] key to finish.

9.7 TTG/ETA speed

To calculate time-to-go and estimated time of arrival, enter your speed as below.

1. Press the [MENU] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose **TTG/ETA speed** and then press [✔] key select.



4. Choose "**Auto**" for automatic speed input (GPS calculated speed), or "**Manual**" for manual input.

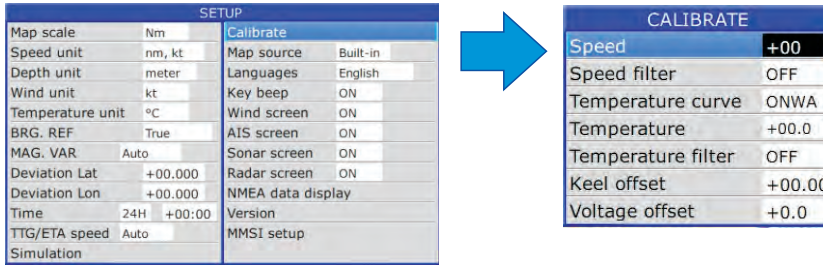
9.8 Calibrate

To calibrate Speed, Temperature, Keel offset and Voltage offset :

9.8.1 Speed

Speed : to adjust the speed when there is a paddle wheel input

Speed filter : to apply filter to unable speed input.



9.8.2 Temperature

Temperature curve : To select the temperature curve between sensor and Airmar sensor

Temperature : To adjust the temperature accuracy.

Temperature filter : To apply filter to sudden change of temperature

9.8.3 Keel offset

To enter the depth from water surface to transducer

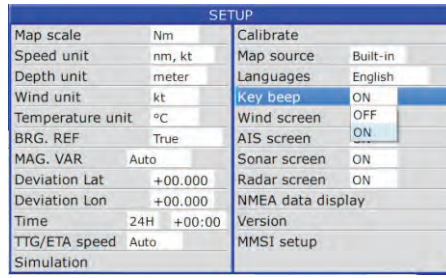
9.8.4 Voltage offset

To adjust the difference between the display voltage and actual power supply voltage.

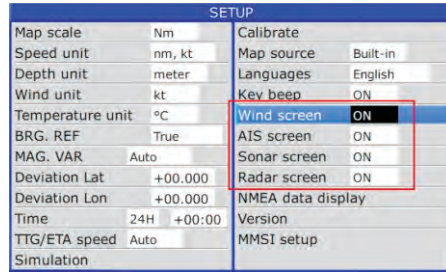
9.9 Key beep

you can set the key sound

1. Press the [MENU] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose **Key beep** and then press [✔] key select.
4. Choose "OFF" or "ON" and then press [✔] key to finish.

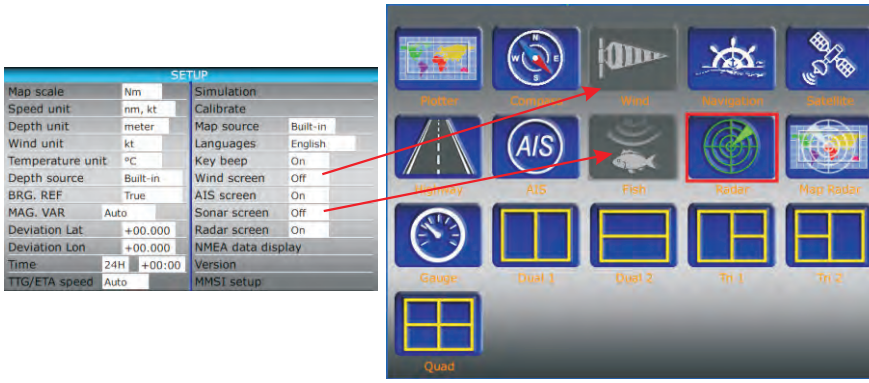


Option screens



1. Press the [MENU] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose **Wind screen** and then press [✔] key select.
4. Choose ON and then press [✔] key to finish.

Note : If you turn OFF one or more screens you will find that in MODE selections the related screens will turn to grey and no selection is allowed.
In case you want to use those screen or screens again you need to turn it or them ON in Setup menu.

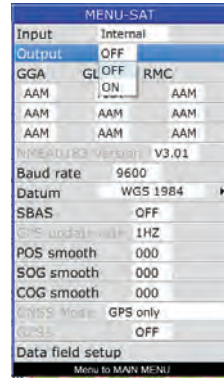


9.10 GPS setting

9.10.1 Choosing GPS output data

The unit's default is using an internal GPS module for position fixing. On the other hand, you can use external GPS data for position fixing.

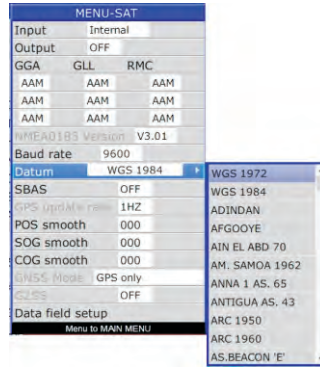
1. Press **[** MENU **]** key on the **SATELLITE** screen.
2. Choose **Output** and then press **[** ✔ **]** key to select.



3. Choose "ON" or "OFF" as desired and then press [✔] key.
4. Press [▶] key to select your desired output data, press [✔] key to finish.

9.10.2 Datum setting

1. Press [MENU] on the **SATELLITE** screen.
2. Choose **Datum** and press [✓] key to select.

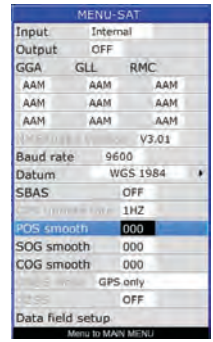


3. Choose your desired datum and press [✓] key to confirm.

9.10.3 Smoothing

You can setup position smoothing, speed smoothing and course smoothing.

1. Press [MENU] key on the **SATELLITE** screen.



2. Choose **POS** smooth to enter position smoothing data.
3. Choose **SOG** smooth to enter speed smoothing data.
4. Choose **COG** smooth to enter course smoothing data.

Note : For slow vessel such as fishing boat the following smoothing settings are recommended :
POS smooth : 10
SOG smooth : 06
COG smooth : 10

9.10.4 GNSS settings

Global Navigation Satellite System (GNSS) refers to a constellation of satellites providing signals from space that transmit positioning and timing data to GNSS receivers. The receivers then use this data to determine location.

Onwa charplotters are using GNSS module integrated with 4 global navigation systems, GPS, Beidou, GLONASS and Galileo.

The below items are only able to change in
the GNSS module is inside the Class B+ AIS module.

In Class B+ AIS module also use the same GNSS module and programmed the below settings as default :

1. Datum : WGS-1984
2. SBAS : ON
3. GPS update rate : 1Hz
4. GNSS mode : GPS + Beidou

9.10.4.1 SBAS

SBAS uses GNSS measurements taken by accurately located reference stations deployed across an entire continent. All measured GNSS errors are transferred to a central computing centre, where differential corrections and integrity messages are calculated. These calculations are then broadcast over the covered area using geostationary satellites that serve as an augmentation, or overlay, to the original GNSS message.

You can turn on SBAS to increase the accuracy of your position fixed.

9.10.4.2 GPS update rate

When using Onwa chartplotter on a speed boat you might want to increase the update rate of your position when you are riding your boat in high speed.

You can change GPS update rate to 10Hz to increase the position update rate by 10 times.

9.10.4.3 GNSS Mode

On some circumstance you might want to use different global navigation system (default is GPS + Beidou).

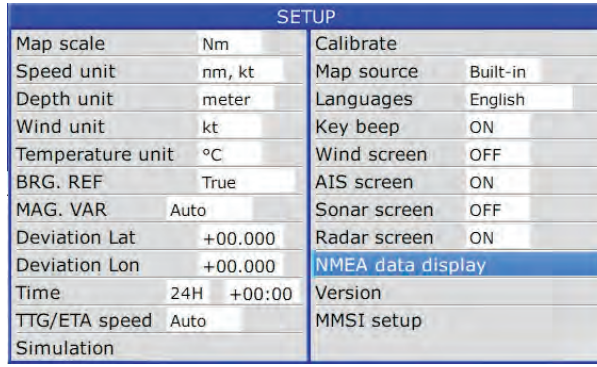
You can choose the below combination of global navigation systems:

One global navigation system : GPS only, Beidou only, GLONASS only or Galilio only

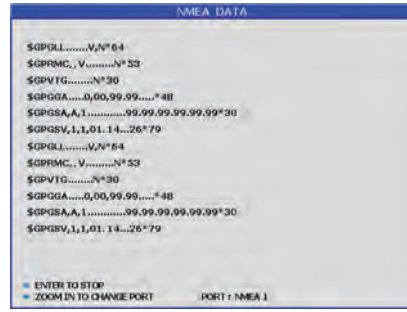
Two global navigation systems : GPS + Beidou, GPS + GLONASS, GPS + Galileo, Beidou + GLONASS, Beidou + Galileo, GLONASS + Galileo.

9.11 NMEA data display

1. Press [MENU] key twice to enter main menu.
2. Choose **Setup** and then press [▶] key to select.
3. Choose **NMEA** data display and then press [✔] key.



4. NMEA data display is used during the installation to check whether the NMEA input and output data to and from other equipment onboard is normal. Press [✖] key to switch between the input and output ports. Press [✔] key to stop scrolling of NMEA data and press [✔] key again to restart NMEA data scrolling. Press [✖] key to quit the NMEA data display.



9.12 Version

1.Press [MENU] key twice to enter main menu.

2.Choose Setup and then press [▶] key to select.

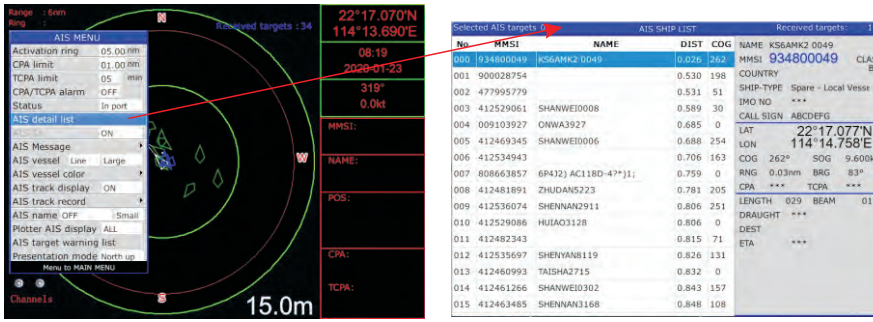
3.Choose Version and then press [✔] key.

10. THE AIS FUNCTION

This chapter is for AIS functions of 8A, 8X, 12A and 12X or you already connected AIS input to 8, 8C, 12 and 12C.

10.1 Vessels list

1. Press [MENU] on the **AIS** screen.

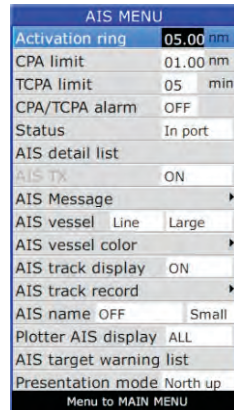


2. Choose AIS detail list and then press [✓] key. The AIS SHIP LIST window will appear.

Note : slightly press [ ] key in any screens can also call out AIS Vessel list.

10.2 The collision alarm

1. Press [MENU] on the AIS screen.

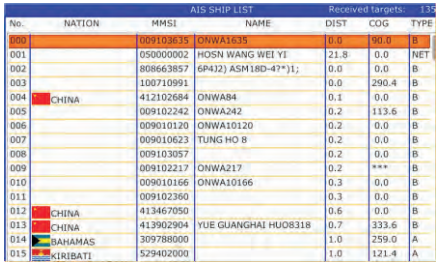


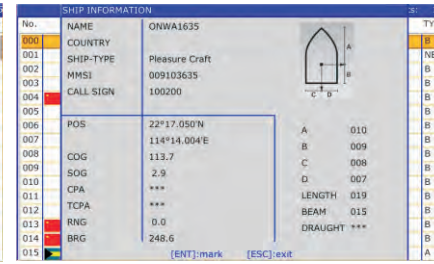
2. Select CPA Limit or TCPA Limit then press [✓] key to enter a value.
3. Select CPA Alarm or TCPA Alarm then press [✓] key to choose "ON" or "OFF".

10.3 ship's information

There are two ways to display " Shi Infp"

1. Enter the "**Vessels list**", and press the [MENU] key, and then select the "**Ship Info**" to check all the information of your own ship.
2. Move the cursor to select your AIS Vessel on the chart screen and press the [✔] key.





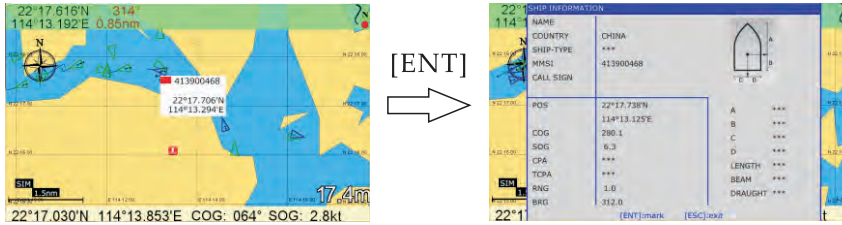
10.4 Chart Screen

Users can check all AIS vessels being received in real-time on the chart screen, as well as the specific position and track of your own ship on the charts.

The track length of AIS vessels depends on the equipment memory space, generally not less than 20 track points.

10.5 View AIS vessels' information on Plotter and AIS screen

There are two ways to view AIS vessels' information: one is to move the cursor to select AIS vessel on the Plotter screen and AIS screen, and press the [✔] key. The other is to select the AIS vessel from the AIS vessels list, and press the [✔] key.

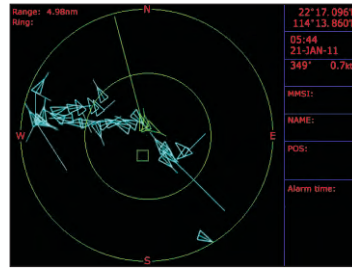


10.6 Check all AIS ships within the scope of Radar (AIS screen)

Displays all AIS ships within the current scope of the Radar. The current location of the own ship is at the center of the map, appearing as a white hollow triangle, and the vertex angle of the triangle stands for the current direction of your own ship. The blue hollow triangle stands for the vessels of CLASS B. The green hollow triangle stands for CLASS A vessels. The green hollow square stands for BASE STATION. Circle stands for no direction.

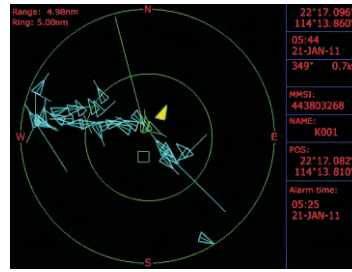
The collision alarm setting and the current scope of radar can be displayed on the upper left corner of the Radar, and the scope can be adjusted by pressing the [⛶] key and [⛶] key.

The message display frame on the upper right corner of the Radar displays the following information: the own ship's position, the current time, the current speed/direction of the own ship.



10.7 Emergency alarm

The information of the emergency alarm received is displayed on the bottom right corner. The emergency alarm is always available and can not be deleted, if the emergency alarm information is not read, after exiting the alarm menu, the "emergency alarm" window will pop up a little later. The warning ship displayed on the Radar will be yellow and flashing.

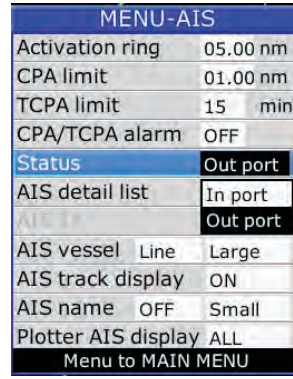


The relevant data (including the time, place, the relevant ship's information, etc.) will also be saved by the display terminals. It can be the basis of analysis in the event of any accident.

10.8 Entry/Departure setting

The Entry/Departure setting is for the temporary shut down or restart of the collision alarm. When entering the port, the collision alarm will be temporarily closed. When leaving the port, the collision alarm will be opened.

1. Press the **[** MENU **]** key at the **AIS** screen.
2. Choose **Status** then press **[** ✔ **]** key to select.
3. Select "**In Port**" or "**Out Port**" as desired and press **[** ✔ **]** key to finish.



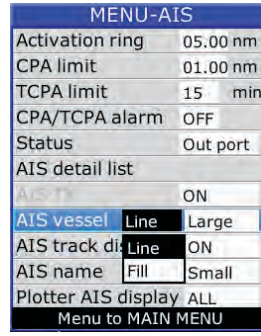
Note :

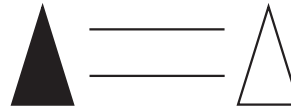
- In port : only visual alarm when collision alarm is triggered.

- Out port : both visual and audio alarm when collision alarm is triggered.

10.9 AIS Vessel

1. User can define the AIS vessel display as either "**Fill**" or "**Line**".
2. User can also selkect the size of the AIS Icon to either “Small”, “Medium” or “Large”.

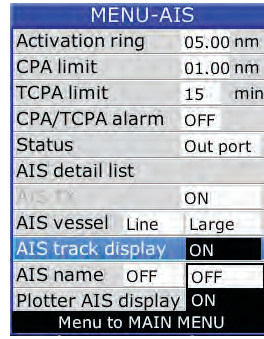




Fill Line

10.10 AIS track display

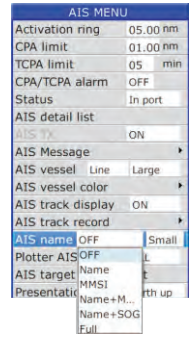
User can enable or disable the display of AIS track on plotter screen.

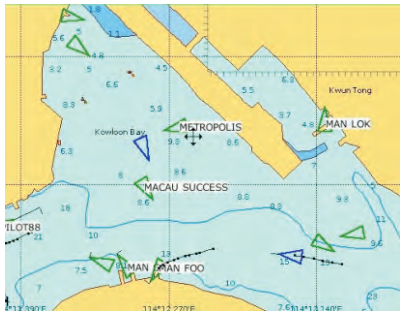


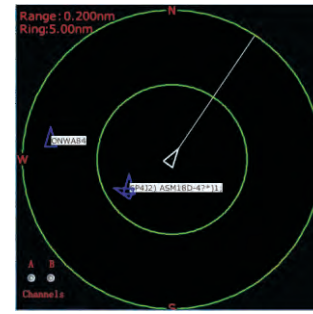
10.11 AIS name

1. User can turn on the name of AIS targets on Plotter and AIS screen.

2. User can also adjust the size of AIS target names.



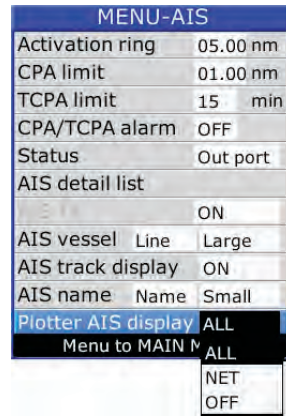




10.12 Plotter AIS display

User can choose to turn ON or OFF AIS targets display on Plotter screen.

Note: User can also choose to display "NET" which is the AIS buoy on the Plotter screen.

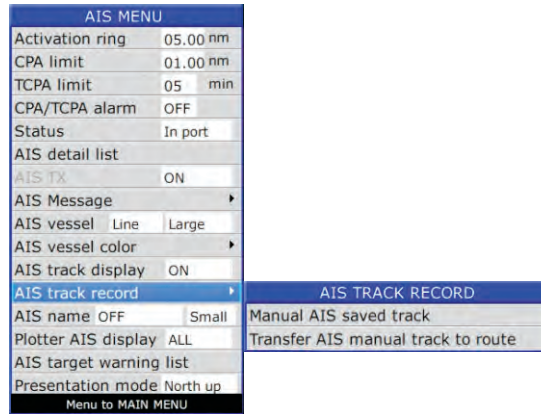


10.13 AIS track recording

There are two ways to record the AIS track :

1) Automatic AIS track record

When each time you power on the unit, the AIS targets track record within 0.5NM range of your own boat will be saved automatically in “AIS track record” as shown below.



The maximum number of Auto AIS saved track is 1,000 and if over the 1,000 records the earliest records will be replaced by the latest records.

2) Manual AIS track record

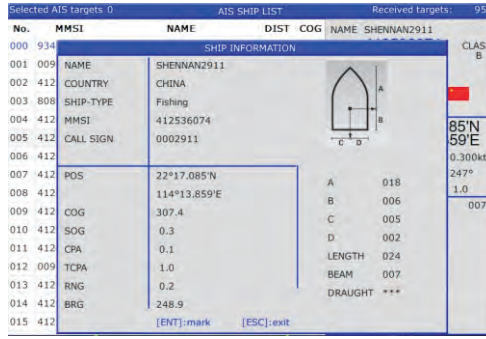
Under some circumstance you might want to save the track record of an AIS target. You can mark and save the track record of an AIS target on below screens :

- Plotter screen
- AIS screen
- Radar overlay Plotter screen
- AIS detail list

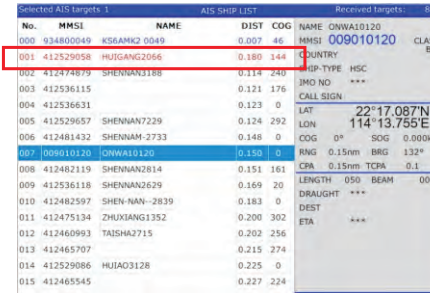
The maximum number of Manual AIS saved record is 10 so if the records are full you need to delete some Manual AIS saved record before you can save a new one.

10.13.1 How to do AIS track recording

In chapter 10.5 it already mentioned how to view the detail information of an AIS target. In the information box shown below there are a “Mark” function, when you press [☑] then this AIS target is marked and its track is recording.



Once the AIS target is marked you can see a [ ] surrounds that AIS target and you can also see the marked AIS target or targets on the top of the AIS detail list in red color.



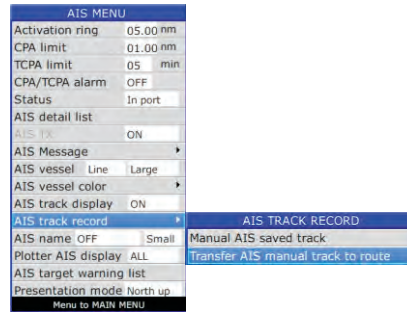
On the right top corner of Plotter and AIS screen it will show how many AIS targets are marked.

10.13.2 How to transfer saved AIS track record to a route

Under some circumstance you might want to turn a saved AIS track record into a route for navigation purpose.

You just need simply select “Transfer AIS manual track to route” in order to transfer the saved AIS track record into a route.

The operation is same as “Transfer saved track to route” in Chapter 3.6.



10.14 AIS message

This function is only available for 8A, 8X, 12A and 12X (built-in Class B+ AIS module).

You can exchange message with AIS plotter only but not only limited to 8A, 8X, 12A and 12X.

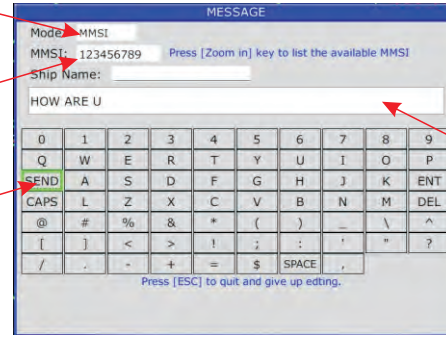
10.14.1 How to compose a message

On AIS screen press [MENU]->AIS Message->Compose, appear the below message box :

1.MMSI or Broadcast

2. Enter MMSI or press [Zoom in] to select MMSI in the list

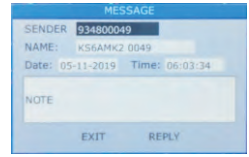
4. Select "SEND" after finish compose the message



3. Compose the message

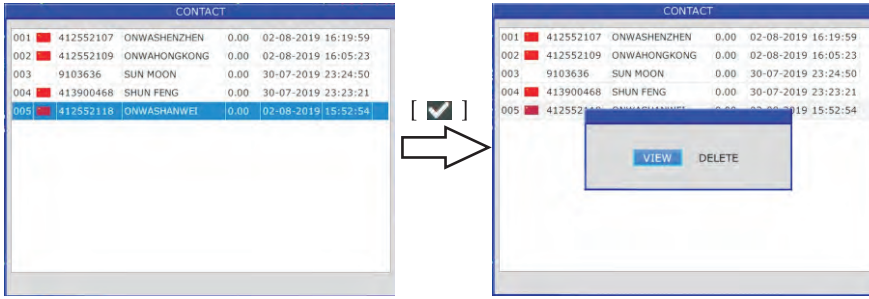
10.14.2 How to check message

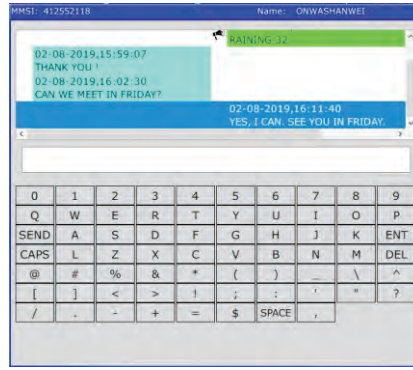
When a message is received a message box will pop up on the screen, this message will not disappear until you acknowledge by choosing "EXIT" or "REPLY".



If you want to check the history message you can switch to AIS screen the press [MENU]->AIS message->Contact.

Select the AIS target and press [☑] key, a "VIEW" or "DELETE" appear then select "VIEW" to read the conversation with that AIS target.





You can now check the conversation or compose a message.

10.15 AIS vessel color

The color of AIS targets can be configured depends on first 3 or first 5 digits of MMSI.

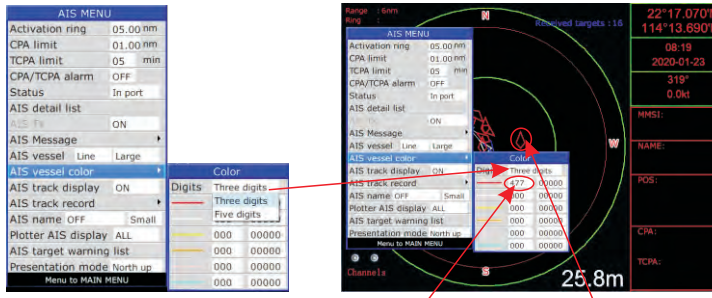
1.Press [MENU] key at the AIS screen.

2.Choose AIS vessel color then press [▶] key to select.

3.Select “Digits” either “Three digits” or “Five digits” as desired and press [✔] to finish.

4.Enter first 3 digits or first 5 digits of MMSI on the color you want to display

Example if you want to display AIS targets of all Hong Kong vessels (477xxxxxx) in red color, you can enter 477 as shown below :



477xxxxxx= Hong Kong vessels

10.16 AIS target warning list

You can put specify MMSI in the warning list and warn you when those MMSI in the warning list enter the set range

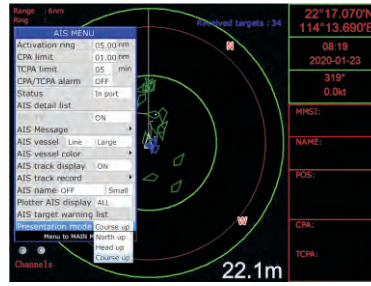
1. Press [MENU] key at the AIS screen.
2. Choose AIS target warning list then press [✓] key to select.

3. Select “Alarm range” and enter MMSI you want to watch

10.17 Presentation mode

You can select different presentation mode, North up, Head up (heading sensor input require) and Course up

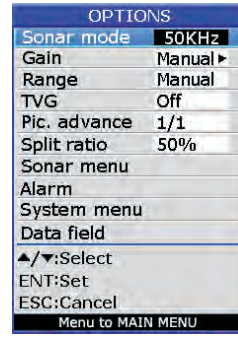
1. Press [MENU] key at the AIS screen.
2. Choose Presentation mode then press [✓] key to select.
3. Select either “North up” , “Head up” or “Course up” as desired and press [✓] to finish.

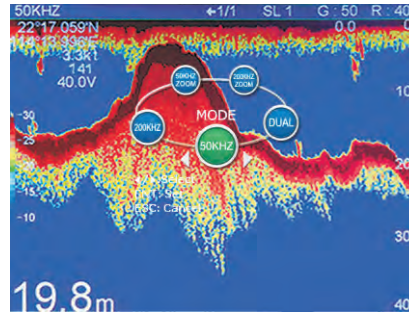


11. THE FISHFINDER FUNCTION

11.1 Sounder Mode

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Sonar mode** and then press [✔] key or press and hold [MODE] key in the **SOUNDER** screen. The following window will appear.

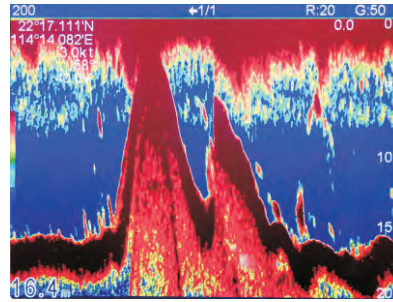




MODE	Function
200KHz	Provides the high frequency (200KHz)normal picture on the full screen.
50KHz	Displays the low frequency (50KHz)normal picture on the full screen.
DUAL	Displays the normal display for high frequency (200KHz) on the right half and low frequency (50KHz) on the left half.
200KHz ZOOM	Shows the normal display of the high frequency (200KHz) on the right half and its zoom display on the left half.
50KHz ZOOM	Provides the normal display of the low frequency (50KHz)on the right half and its zoom display on the left half.

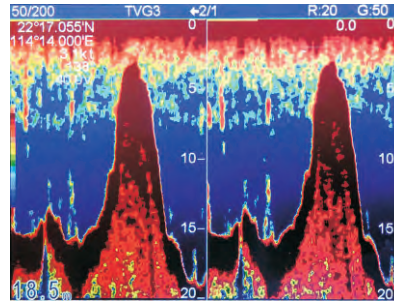
200KHz, 50KHz (high frequency, low frequency) mode

The sounder uses ultrasonic pulses to detect bottom conditions. The lower the frequency of the pulse the wider the detection area. Therefore, the 50KHz frequency is useful for general detection and judging bottom conditions, while the 200KHz frequency is useful for detailed observation of fish schools.



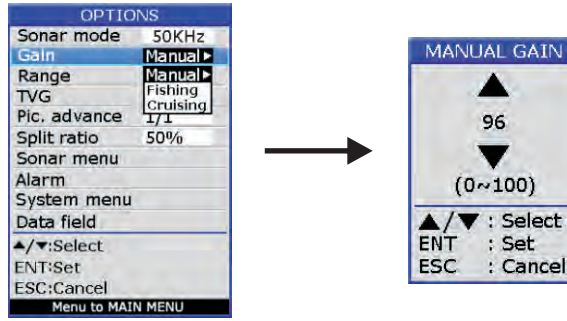
DUAL frequency mode

This mode provides the 50KHz picture on the left-half of the screen and the 200KHz on the right half, and is useful for detecting fish schools which have different reflection characteristics with frequency. For example, a school of tiny fish like minnow returns stronger echoes on a high frequency compared to a low frequency.



11.2 Gain

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Gain** and then press [✓] key, or press [✓] key in the **SOUNDER** screen to adjust gain manually. The following window will appear.



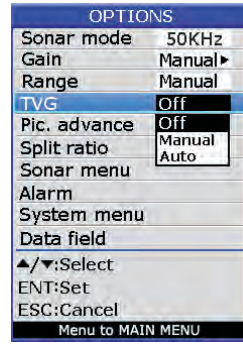
3. Choose Manual, Fishing or Cruising as desired and then press the [✓] key, or press and hold [✓] key in SOUNDER screen. **AUTO 1** (fishing) mode is activated which is for ground fishing with automated gain adjustments.
   Press [✓] key again to activate the **AUTO 2** (cruising) mode with automatic gain adjustments for cruising. Press and hold [✓] key to return to manual gain mode.

11.3 Range

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Range** and then press [✓] key to select.
3. Choose "**Manual**" or "**Auto**" and then press the [✓] key or when in the **SOUNDER** screen, press and hold [⤢] or [⤡] to change to Manual or Auto.
4. If you choose Manual, press the [✕] key to return to **SOUNDER** screen.
   Press [⤢] or [⤡] to increase or decrease in the depth range.

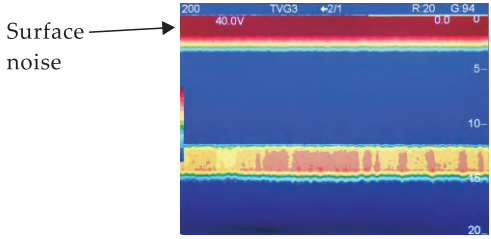
11.4 TVG

1. Press **[** MENU **]** key in **SOUNDER** screen.
2. Choose **TVG** and then press **[✔]** key. The following window will appear.

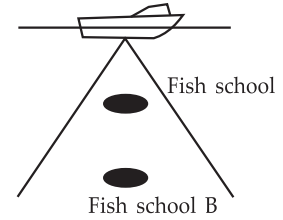


3. Choose "**Off**" or "**Manual**" as desired then press **[✔]** key.

The TVG compensates for propagation loss of sound, so that the echoes from the same fish school size are displayed in the same color. Normally, set it between "0" and "5". Avoid excessive TVG; weak echoes may not be displayed. The TVG is also useful for reducing surface noise.



Appearance of surface noise



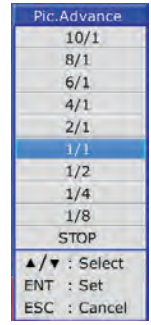
How TVG compensates for propagation loss of sound

Note: Surface noise appearing in the range of 0 to 40 m can be reduced by the Clutter function.

11.5 Picture advance

The picture advance speed determines how quickly the vertical scan lines run across the screen.

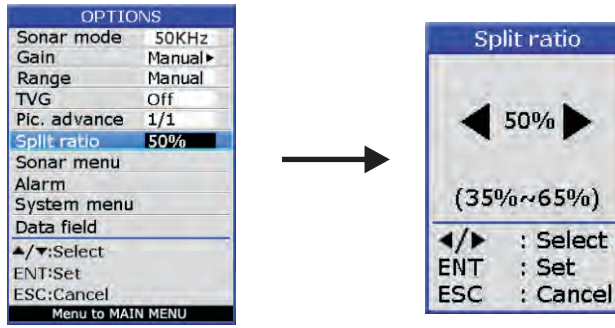
1. Press **[** MENU **]** key in **SOUNDER** screen.
2. Choose **Pic. advance** and then press **[✓]** key or press and hold **[▶]** key in **SOUNDER** screen. The following window will appear.



3. Press the **[▲]** or **[▼]** key to select speed: 10/1(FAST), 8/1, 6/1, 4/1, 2/1, 1/1, 1/2, 1/4, 1/8(SLOW) or STOP advance .

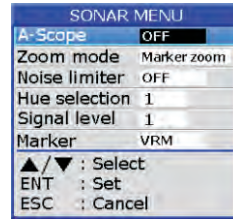
11.6 Split ratio

1. When in **PLOTTER+SOUNDER** screen and the **SOUNDER** screen is ≧50%, press **[** MENU **]** key.
2. Choose **Split ratio** and then press **[✓]** key to setup split ratio, or press and hold **[** MODE **]** key in the **PLOTTER+SOUNDER** screen. The following window will appear.



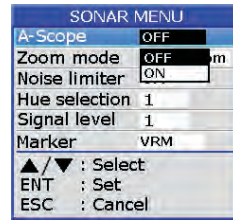
11.7 Sonar Menu

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press [✓] key. The following window will appear.

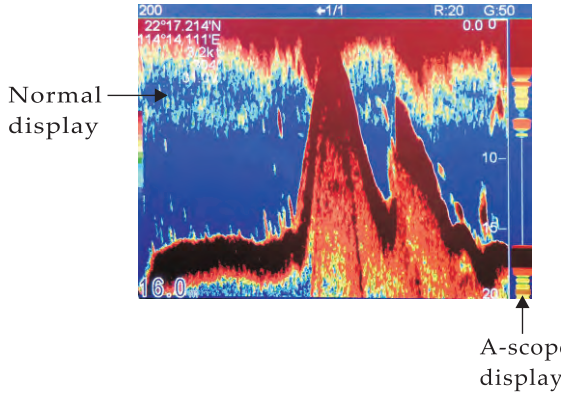


11.7.1 A-Scope

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press [✓] key to select.
3. Choose **A-Scope** and then press [✓] key. The following window will appear.
4. Press the [▲] or [▼] key to enable or disable the A-Scope.

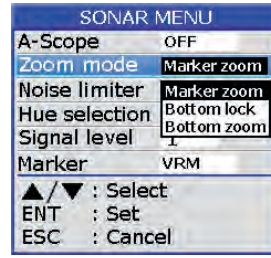


This display shows echoes at each transmission with amplitudes and tone proportional to their intensities, on the right 1/4 of the screen. It is useful for estimating the kind of fish school and bottom composition.

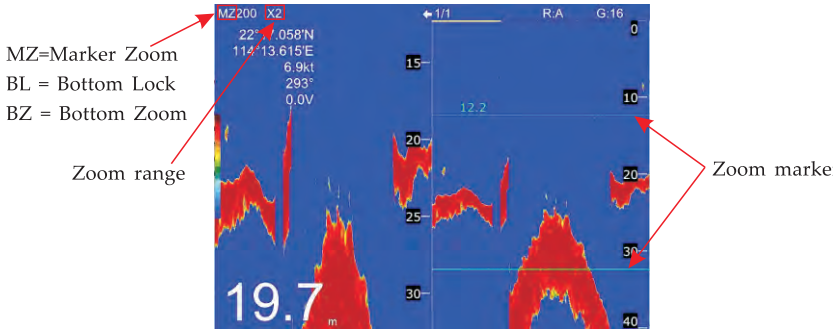


11.7.2 Zoom modes

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press [✔] key to select.
3. Choose **Zoom mode** and then press [✔] key. The following window will appear.

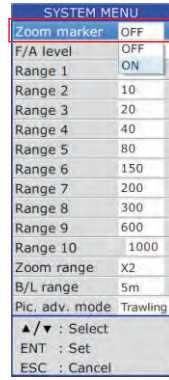


4. Choose "**Marker Zoom**", "**Bottom lock**" or "**Bottom zoom**" as desired then press [✔] key to finish.



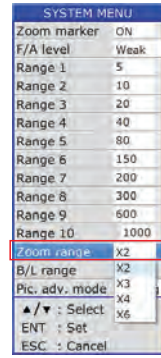
11.7.2.1 How to display zoom marker

If you want Zoom marker appear on zoom modes of sounder screen you need to turn on the Zoom marker in the SOUNDER MENU-> SYSTEM MENU.



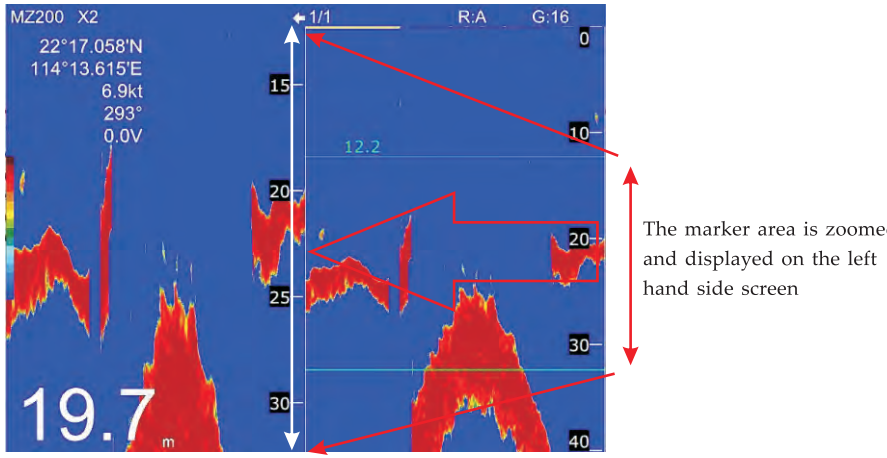
11.7.2.2 How to change the zoom range

You can choose to zoom the selected range to X2, X3, X4 and X6 in the SOUNDER MENU-> Zoom range.



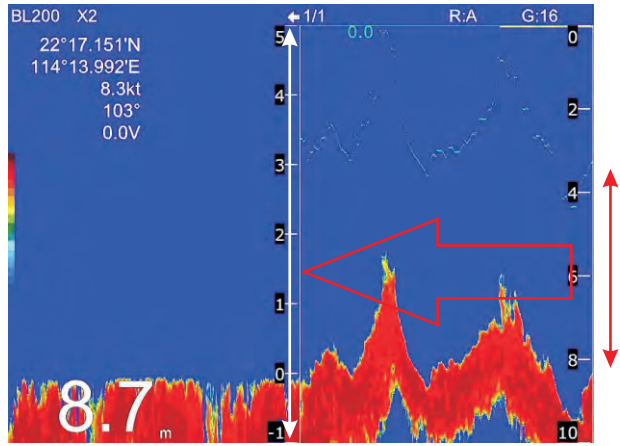
11.7.2.3 MARKER ZOOM

This mode expands selected area of the normal picture to full vertical size of the screen on the left-half window. You may specify the portion to expand with the VRM (Variable Range Marker), which you can shift with [▲] or [▼] key. The area between the VRM and the zoom range marker is expanded. The length of the segment is equal to one division of the depth scale.



11.7.2.4 BOTTOM LOCK

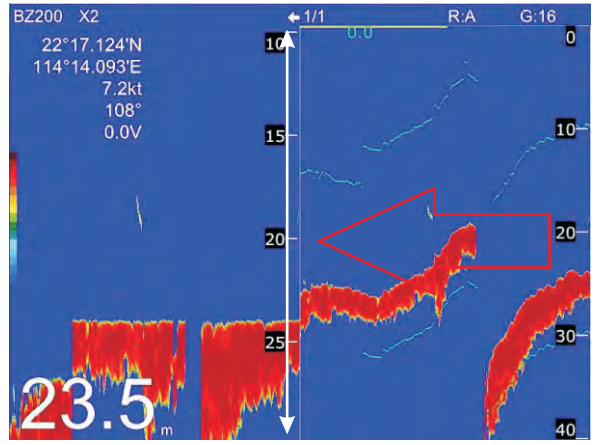
This zoom mode locks the sea bottom depth and zoom the area above the bottom to display on left hand side screen.



11.7.2.5 BOTTOM ZOOM

This zoom mode locks the sea bottom zoom the area including the sea bottom to display on left hand side screen.

It is useful for determining bottom hardness. A bottom displayed with a short echo tail usually means it is a soft, sandy bottom. A long tail means a hard bottom.



11.7.3 Noise limiter

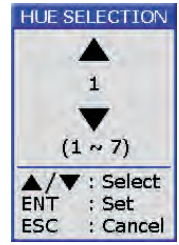
Light-blue dots may appear over most of the screen. This is mainly due to unclean water or noise. This noise can be suppressed by adjusting Clutter on the menu.

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press [✓] key to select.
3. Choose **Noise limiter** and then press [✓] key. The following window will appear.

4. Choose "Off" , "Low" , "Medium" or "High" as desired and then press [✓] key to finish.

11.7.4 Hue Selection

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press [✓] key to select.
3. Choose **Hue Selection** and then press [✓] key. The following window will appear.

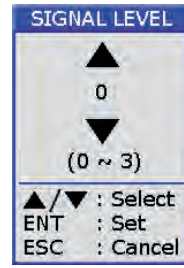


Hue Ho.	Background color	Echo color
1	Blue	7 colors, bottom reddish-brown
2	Blue	6 colors, bottom red
3	Black	7 colors, bottom reddish-brown
4	Black	6 colors, bottom red
5	White	7 colors, bottom reddish-brown
6	White	6 colors, bottom red
7	Black	Monochrome yellow, 8 intensities

4. Press the [▲] or [▼] key to select the background and press [✓] key to finish.

11.7.5 Signal level

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press [✓] key to select.
3. Choose **Signal level** and then press [✓] key. The following window will appear.

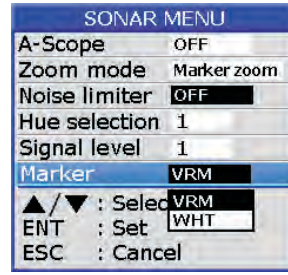


4. Press the [▲] or [▼] key to select the signal level and press [✓] key to finish.

Short cut : it can also changes the signal level by press [fx] key on Sounder screen.

11.7.6 Marker

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Sonar menu** and then press [✓] key to select.
3. Choose **Marker** and then press [✓] key. The following window will appear.

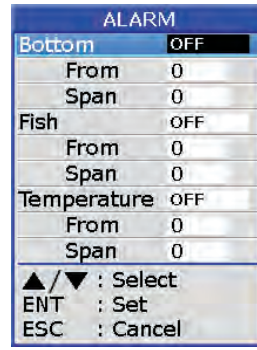


4. Choose "VRM" or "WHT" as desired and then press [✓] key to finish.

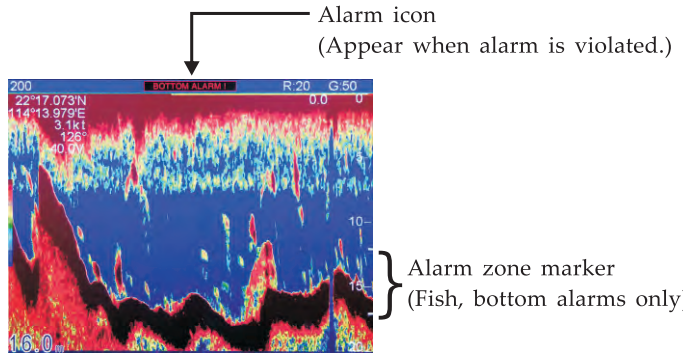
The white marker functions to display a particular echo color in white. For example, you may want to display the bottom echo (reddish-brown) in white to discriminate fish echoes near the bottom. Note that the bottom must be displayed in reddish-brown for the white marker to function.

11.8 Alarm

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **ALARM** and then press [✓] key. The following window will appear.



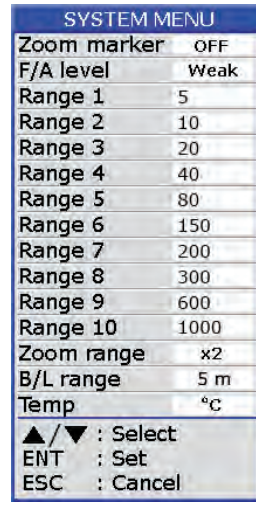
3. Press [▲] or [▼] key to select an alarm.
4. Press [✓] key to select "OFF", "ON", "IN" or "OUT". (For the water temperature alarm, select "IN" to get the alarm when the water temperature is within the alarm zone range, or "OUT" to get the alarm when the water temperature is higher than the alarm zone range.)
5. Choose From then press [✓] key to adjust alarm starting depth. Press [▲] or [▼] to adjust value.
6. Choose Span then press [✓] key to adjust alarm range. Press [▲] or [▼] to adjust value.



7. To deactivate an alarm, select "OFF" at step 4 in the above procedure.

11.9 System Menu

1. Press [MENU] key in **SOUNDER** screen.
2. Choose **System menu** and then press [✔] key. The following window will appear.

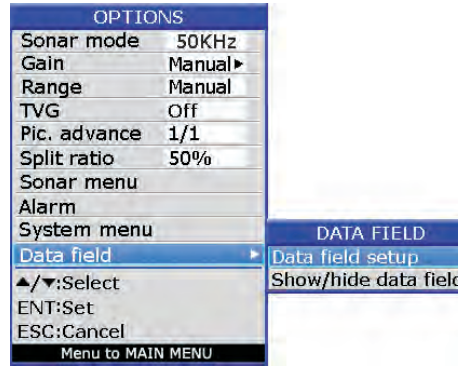


RANGE 1- 10: Activates or deactivates specific range scales. Default ranges are 5, 10, 20, 40, 80, 150, 200, 300, 600, and 1000 (meters). Setting area is 2m to 800m.

Note: Ranges must be set in numerical order. For example, if range 1 is 5 m and range 3 is 20m, range 2 should be between 6 and 19 m.

11.10 Data field

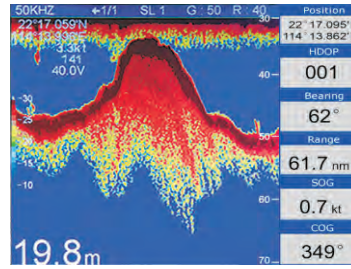
1. Press [MENU] key in **SOUNDER** screen.
2. Choose **Data field** and then press [✓] key. The following window will appear.



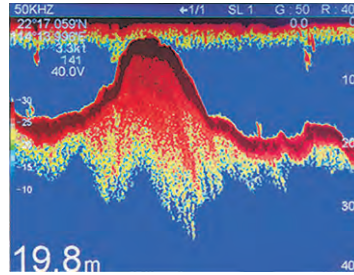
3. Data field setup

The Data Field will appear on the right-side of the screen. The black area is the data area of which may be changed.

- Press [✓] key and a data table will appear.
- Press the [◀], [▶], [▼] or [▲] key to select the one you want to display on the data field, then press [✓] to finish.



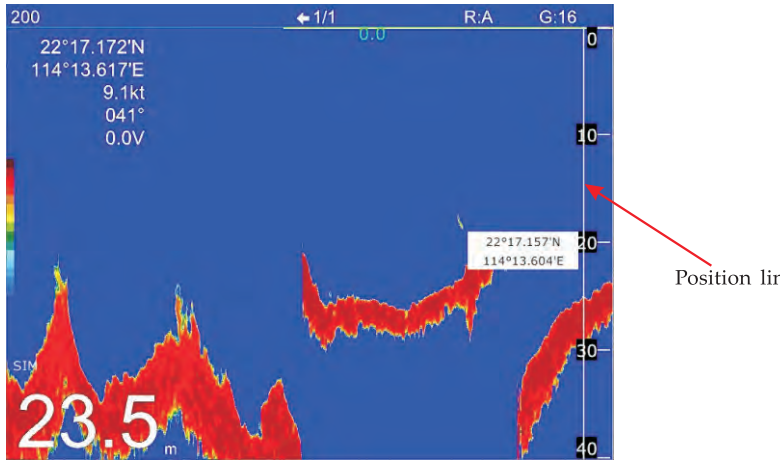
4. User can **Show/hide data field** as desired.



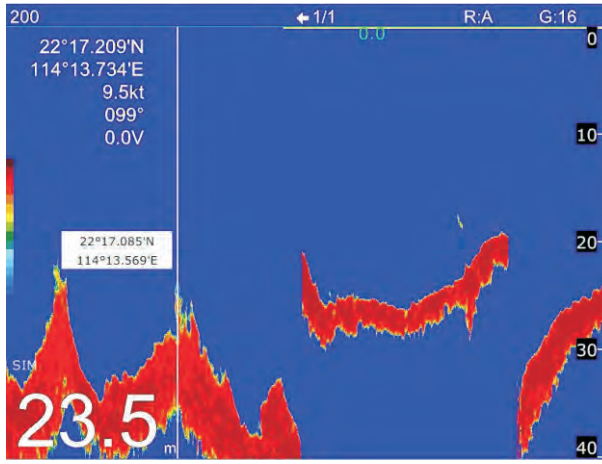
11.11 To save the position of a history echo into waypoint memory

Sometimes you might want to save a fishing ground or a wreck location into a waypoint memory.

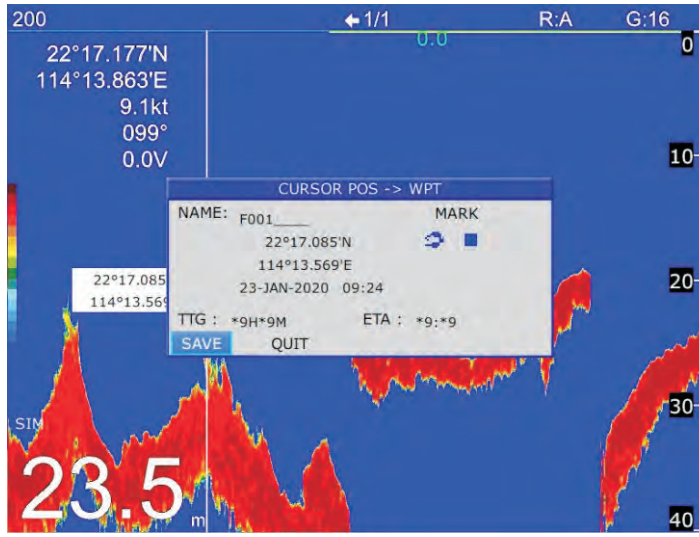
1. When you want to save the location of a history echo you just require to slightly press [►] arrow key then you will see a position vertical line appear as shown below :



2. After the Position line appears you can use Left and Right arrow keys to move the position line to the desire location that you want to save.



3. After the position line reach a desire location you can press [✔] key then a message box will pop up as shown below. You can save it into waypoint memory after you edit the options.

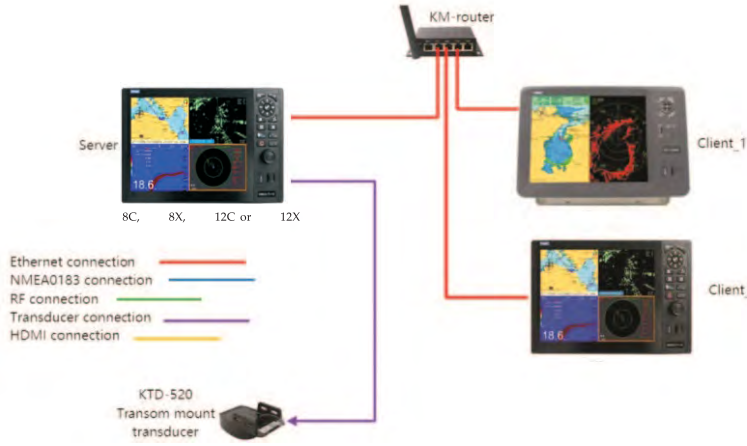


4. When you finish you can press [✖] to quit this function.

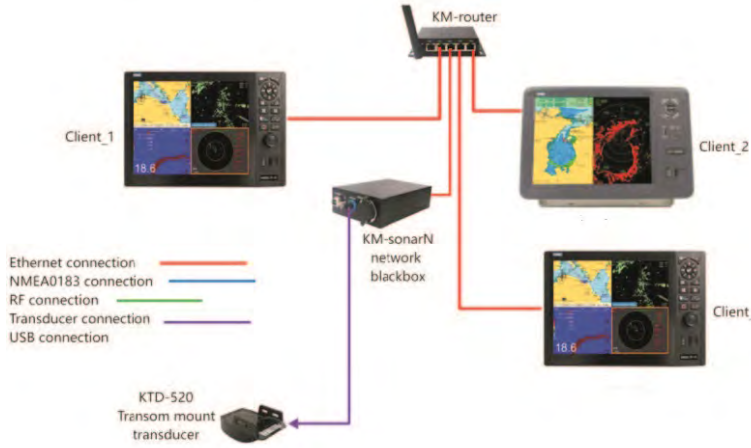
11.12 Sonar share

8C, 8X, 12C, 12X or 8 (or 8A, 12 and 12A) with KM-sonar connected can share the sonar image series in the same network as shown below :

Scenario 1,

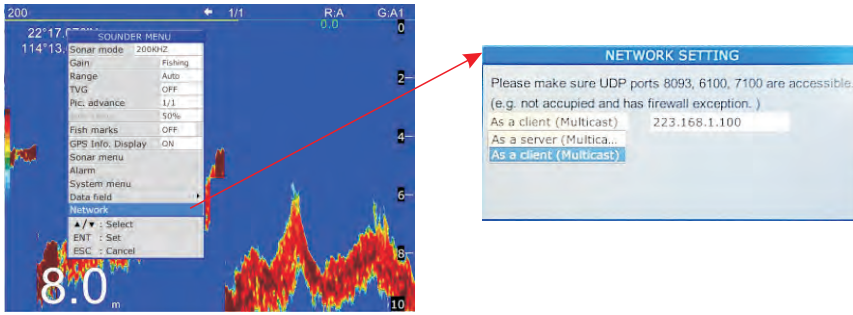


Scenario 2,



Any unit in the network with fishfinder function can be set as server or client :

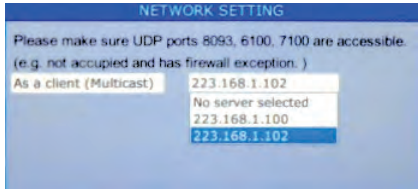
1. Press [MENU] key in SOUNDER screen
2. Choose Network and press [✔] key



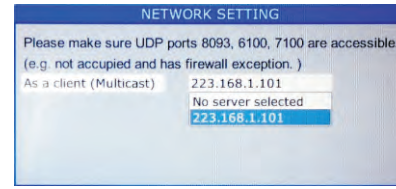
3. Select “As a client” or “As a server” in different scenarios

11.12.1 Set “As a client”

Make sure there at least one server in the network before set “As a client” otherwise the fishfinder function is unavailable.



Two servers in the network



One server in the network

11.12.2 Set “As a server”

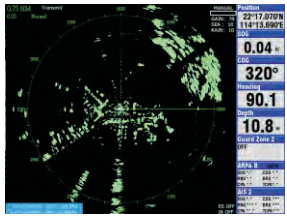
Make sure the unit built-in fishfinder (8C, 8X, 12C or 12X),
otherwise it could not be set “As a server”.

Note :
After sonar share is established, the below controls sync among servers and clients:
1. Fishfinder mode
2. Auto and manual range
Example : any unit in the network (server or client) change fishfinder mode to 50KHz, all units in the network will also switch to 50KHz mode.

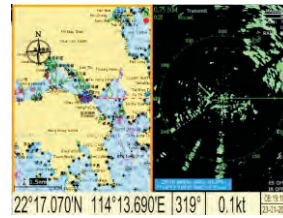
The below controls are adjusted independently of every unit :
1. Auto and manual gain
2. TVG
3. Zoom mode
Example : any unit in the network (server or client) change gain from manual to auto, all other units in the network would not sync the change.

12. THE RADAR FUNCTION

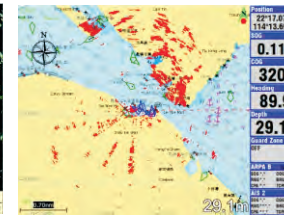
There are 3 screen related to radar function :



Radar screen



Radar + plotter screen



Radar overlay screen

Before we start to use radar function you need to confirm a radar antenna is properly installed and connected to the plotter.
In case you see this message on the left top corner of your radar screen then either no radar antenna is installed or the radar antenna is not properly connected, please consult the dealer if you want to make the radar function works properly.

12.1 Introduction of radar

12.1.1 What is Radar ?

The word radar is an abbreviation from Radio Detection And Ranging. Applies to electronic equipment designed for detecting and tracking objects (targets) at considerable distances. The main purpose of a marine radar is to provide bearing and distance of ships and land targets in vicinity from own boat for collision avoidance and navigation at sea.

12.1.2 How Radar determines Range

Radar determines the distance to a target by calculating the time difference between the transmission of a radar signal and the reception of the reflected echo. It is known fact that radar waves travel at a nearly constant speed of 162,000 nautical miles per second. Therefore the time required for a transmitted signal to travel to a target and return as an echo to the source is a measure of the distance to the target. Note that the echo makes a complete round trip, but only half the time travel is needed to determine the one-way distance to the target. The radar automatically takes this into account when making the range calculation.

12.1.3 How Radar determines Bearing

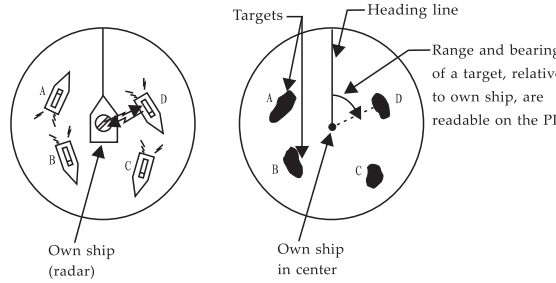
The bearing to a target found by the radar is determined by the direction in which the radar antenna is pointing when it emits and electronics pulse and then receives a returning echo. Each time the antenna rotates pulses are transmitted in full 360 degree, each pulse at a slightly different bearing from the previous one. Therefore if one knows the direction in which the signal is sent out, one knows the direction from which the echo return.

12.1.4 Radar wave speed and antenna rotation speed

Note that the speed of a radar wave out to the target and back again as echo is extremely fast compare to the speed of rotation of the antenna. By the time radar echoes have returned to the antenna, the amount of the antenna rotation after initial transmitting of the radar pulse is extremely small.

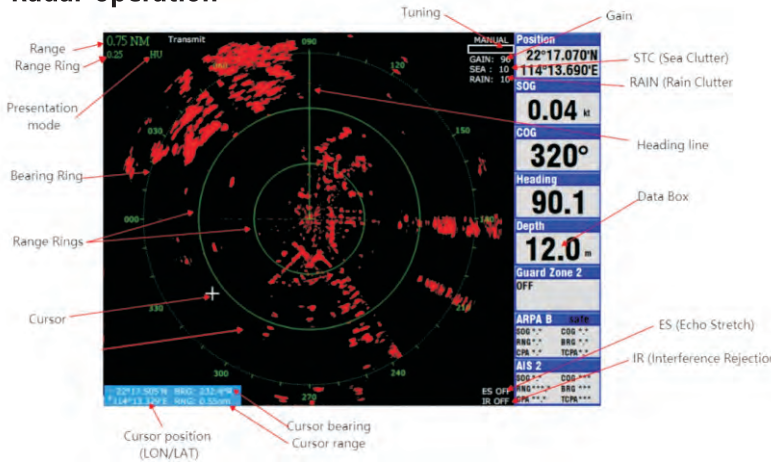
12.1.5 The Radar display

The range and the bearing of a target is displayed on what is called a Plan Position Indicator (PPI). This display is essentially a polar diagram, with the transmitting ship's position at the center. Images of target echoes are received and displayed at their relative bearings and distance from the PPI center.



(A) Bird's eye view of situation (B) Radar picture of (A)

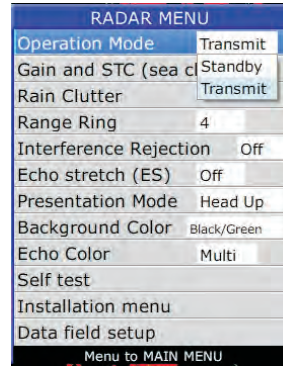
12.2 Radar operation



12.2.1 Transmit and Standby

When you want to use radar function the first thing you need to do is to turn the radar from standby to transmit.

There are no echoes on radar screen when the radar is on standby mode. It needs to select Transmit on the radar menu as shown :



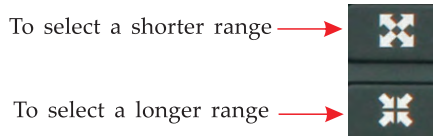
Standby mode　　Transmit mode

12.2.2 Selecting the Range

The range selected automatically determines the range ring intervals, the number of the range rings, pulse length and pulse repetition rate, for optimal detection capability in short to long ranges. The range and range ring intervals appear at the top left-hand corner of the display.

To select a range

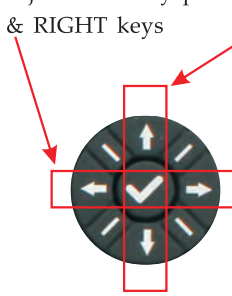
- When navigating in or around a crowded harbor, select a short range to watch for possible collision situations.
- If you select a lower range while on open water, increase the range occasionally to watch for vessels that may be heading your way.

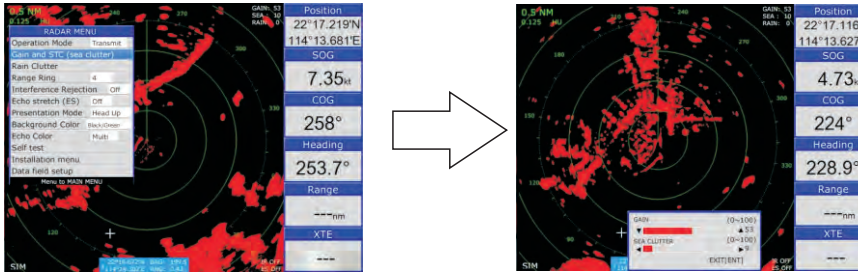


12.2.2 Gain and STC

If you want the radar works properly with clear echoes then you need to correctly adjust the Gain and STC settings.

Select “Gain and STC” from the radar menu, a GAIN and SEA CLUTTER adjustment box will pop up as shown below. You can adjust GAIN by press UP & DOWN arrow keys, adjust SEA CLUTTER by press LEFT & RIGHT keys





12.2.2.1 Adjusting GAIN

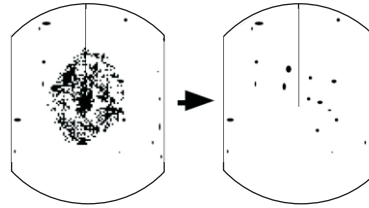
The GAIN control adjusts the echoes strength, it works precisely in the same manner as the volume control of a radio. The proper setting is such that the background noise is just visible on the screen. If you set too low then the weak echoes may be missed. On the other hand excessive GAIN yields too much background noise, strong targets may be missed because of the poor contrast between desired echoes and the background noise on the display. To set a proper GAIN is to adjust GAIN on long range (suggest on 12NM range) so the background noise is just visible on the screen.

12.2.2.2 Adjusting SEA CLUTTER (STC)

Echoes from sea waves can be troublesome, covering the central part of the display with random signals known as " sea clutter". The higher the sea waves and the higher the radar antenna above water the further sea clutters will extend. Sea clutters appear on the display may cover the small echoes near your boat so you need to set proper STC on short range (below 1.5NM).

The proper setting of sea clutter should be such that the clutter is broken up into small dots and small targets become distinguishable. If the control is set too low then targets will be hidden in the clutter, while if it is set too high then both sea clutter and small targets will be disappeared from the display. In most cases adjust the sea clutter until clutter has disappeared on leeward, but a little is still visible on windward.

1. Confirm that GAIN is properly adjusted then transmit on short range (under 1.5NM)
2. Adjust SEA CLUTTER so small targets are distinguishable but some clutter remains on the display.



Sea clutters displayed on the center

sea clutter adjusted sea clutter suppressed.

Tip for adjusting SEA CLUTTER

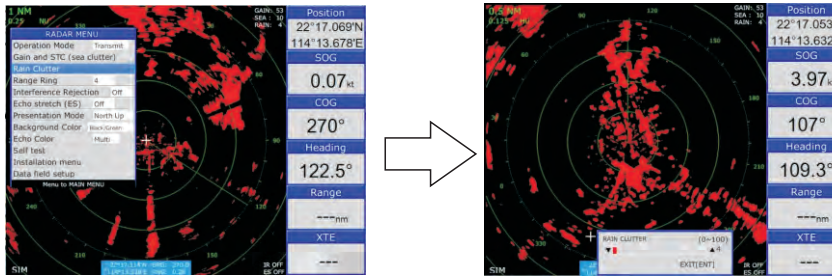
A common mistake is over-adjusted so all the clutter is removed. As an example setup for maximum SEA CLUTTER you will see how the center of the display becomes no echoes, we called it dark zone. This dark zone can be dangerous (targets may be missed), especially if the GAIN is not properly adjusted. Always leave a little clutter visible on the center of the display to be sure weak echoes will not be suppressed. If there no clutter visible on the center of the display, adjust lower SEA CLUTTER value to get little clutter.

12.2.3 Adjusting RAIN CLUTTER

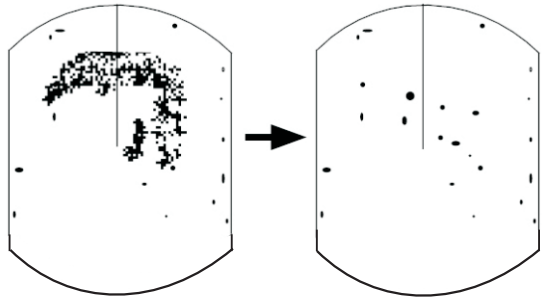
The radar antenna is designed to detect surface targets. However this design will also detect rain clutter (rain, snow, hail etc.) which will cover the wanted targets. Therefore it needs to adjust RAIN CLUTTER to remove rain clutter.

Select Rain Clutter from radar menu and press **[✔]** key, a RAIN CLUTTER adjustment box will appear as shown.

You can adjust RAIN CLUTTER by pressing UP & DOWN arrow keys.



When rain clutter masks echoes, by adjusting RAIN CLUTTER splits up these unwanted echoes into a speckled pattern to make recognition of solid targets easier.



Appearance of rain clutter

RAIN clutter adjusted
rain clutter is suppressed

Noted : In addition to reduce clutter the RAIN CLUTTER can be used in fine weather to clarify the picture when navigating in confined waters to eliminate unwanted second echoes from strong targets.

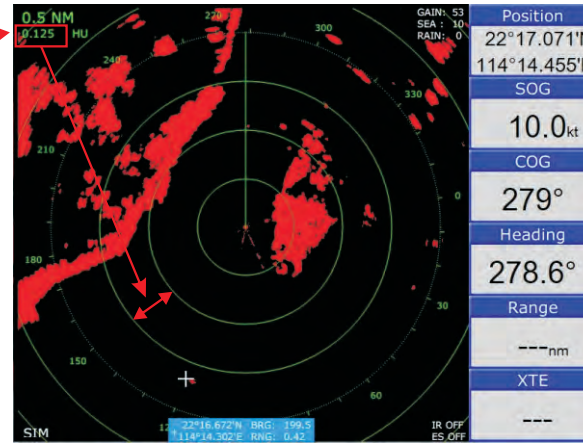
12.2.4 Range Ring

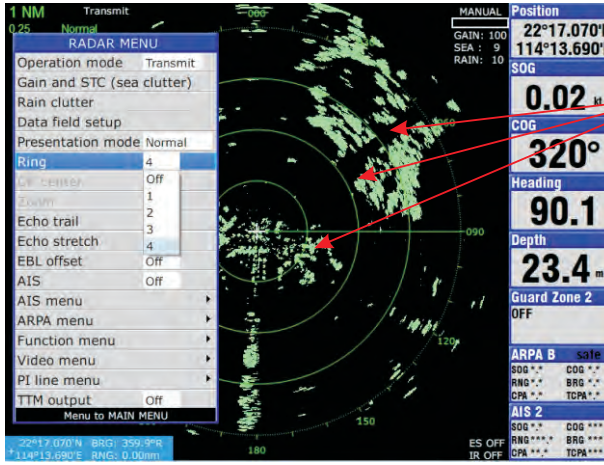
You can measure the range to a target by counting the number of range rings between the center of the display and the target. Check the range ring interval and judge the distance of the echo from the nearest ring

You can adjust the intensity of the range ring or turn off the range ring from the radar menu.

Select Range Ring from radar menu and press [✔] key,

The interval of Range Rings is shown here.
The interval of Range Rings changes with Range selected

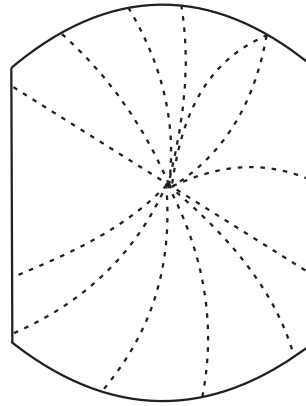




Adjust the intensity of Range Rings

12.2.5 Interference Rejection (IR)

Radar interference may occur when near another shipborne radar. Its on-screen appearance are many bright dots either scattered at random or in the form of dotted lines extending from the center to the edge of the display. Interference effects are distinguishable from normal echoes because they do not appear in the same place on successive rotations of the antenna.



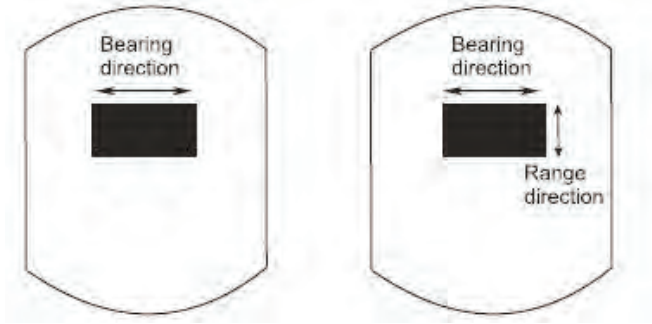
Four levels of interference rejection are available, IR1, IR2, IR3 and IR OFF, IR3 provides the highest level of rejection.

The level of Interference Rejection is shown here

12.2.6 Echo stretch (ES)

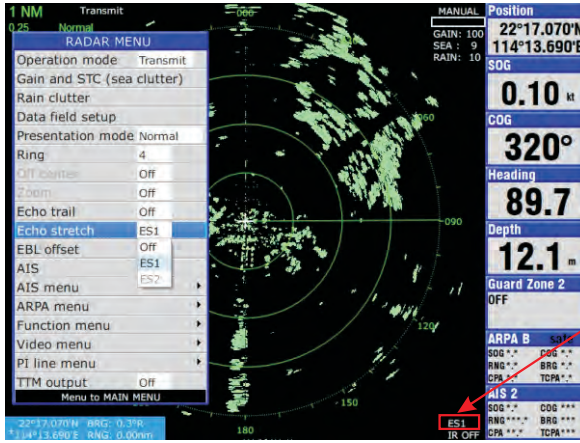
Normally the reflected echoes from long range target appear on the display as weaker and smaller. The echo stretch function magnifies these small targets, two types of echo stretch are available :

1) ES1 stretches echoes in bearing direction
2) ES2 stretches echoes in both range and bearing directions



ES1 ES2

Note 1 : This function magnifies not only targets but also sea clutter and radar interference. For this reason, be sure the adjustment of sea clutter and radar interference are properly adjusted before applying the echo stretch.
Note 2 : Echo stretch is not available on Short Range (below 3NM)



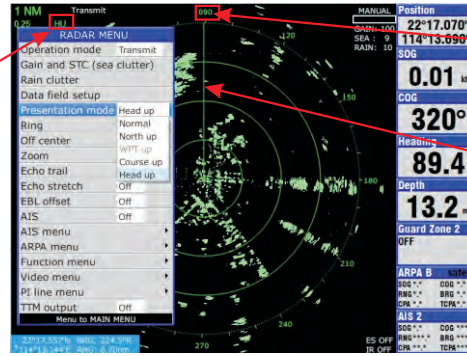
The level of Echo stretch is shown here

12.2.7 Presentation Mode

This radar provides three presentation modes, North up (NU), WPT up (WP), Course up (CU) and Head up (HU).

Head up

The picture is oriented so the heading line is at the top of the display. This mode is useful for navigation in congested waters.



The selected presentation mode shows here

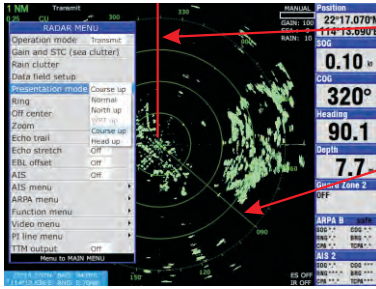
The bearing ring rotates to follow the boat's heading *1

In Head up mode the heading line always on the top center of the display

*1 In case there are no heading signal input then the bearing ring rotates to follow the boat's COG (Course Over Ground). The COG will show a big error when the boat is not moving.

Course up

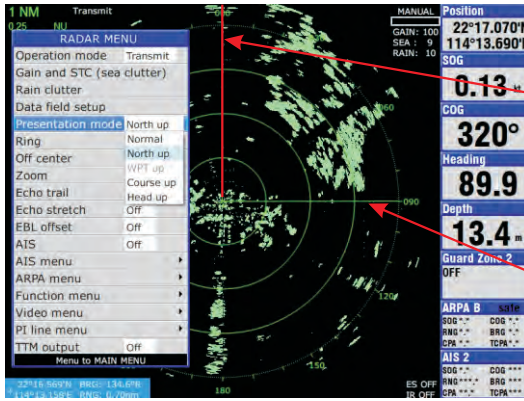
The course up mode shows boat's heading by the heading line at the top of the display. To get the desired heading, steer vessel in the desired direction and then select Course-up mode.



*2 In case there are no heading signal input in Course up mode the heading line will also follow the COG to stay on top center of the display.

North up

North is at the top of the display and the heading line moves with boat's heading. This mode is useful for determining boat's position and as a navigation monitor on a nautical chart.

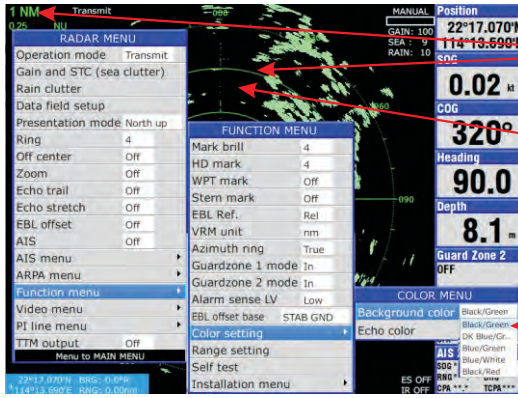


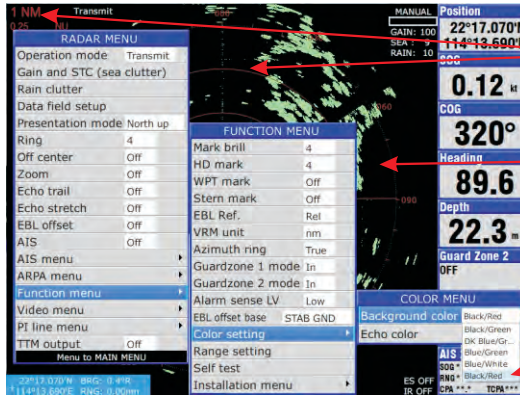
12.2.8 Background Color

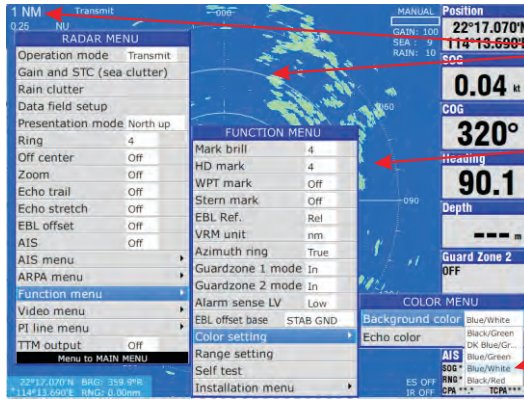
You can choose different background color and also the color of the information shows on the display.

There are 5 combination of color selections :

1) Black/Green (default color) : Background is black and information is green
2) DK Blue/Green : Background is dark blue and information is green
3) Blue/Green : Background is blue and information is green
4) Blue/White : Background is blue and information is white
5) Black/Red (suitable to use at night time) : Background is black and information is red

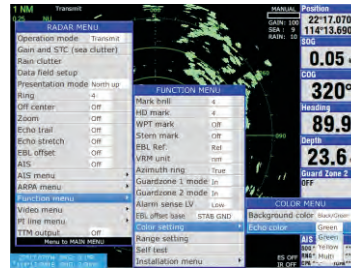

1 NM
Transmit
RADAR MENU
Operation mode Transmit
Gain and STC (sea clutter)
Rain clutter
Data field setup
Presentation mode North up
Ring 4
Off center Off
Zoom Off
Echo trail Off
Echo stretch Off
EBL offset Off
AIS Off
AIS menu
ARPA menu
Function menu
Video menu
PI line menu
TTM output Off
Menu to MAIN MENU
FUNCTION MENU
Mark brill 4
HD mark 4
WPT mark Off
Stern mark Off
EBL Ref. Rel
VRM unit nm
Azimuth ring True
Guardzone 1 mode In
Guardzone 2 mode In
Alarm sense LV Low
EBL offset base STAB GND
Color setting
Range setting
Self test
Installation menu
COLOR MENU
Background color Black/Green
Echo color
Position
22°17.070'N
114°13.690'E
0.02 kt
COG
320°
Heading
90.0
Depth
8.1 m
Guard Zone 2
OFF
The information is green
The background is black
Black/Green is selected


1 NM
Transmit
RADAR MENU
Operation mode Transmit
Gain and STC (sea clutter)
Rain clutter
Data field setup
Presentation mode North up
Ring 4
Off center Off
Zoom Off
Echo trail Off
Echo stretch Off
EBL offset Off
AIS Off
AIS menu
ARPA menu
Function menu
Video menu
PI line menu
TTM output Off
Menu to MAIN MENU
FUNCTION MENU
Mark brill 4
HD mark 4
WPT mark Off
Stern mark Off
EBL Ref. Rel
VRM unit nm
Azimuth ring True
Guardzone 1 mode In
Guardzone 2 mode In
Alarm sense LV Low
EBL offset base STAB GND
Color setting
Range setting
Self test
Installation menu
COLOR MENU
Background color Black/Red
Echo color
Position
22°17.070'N
114°13.690'E
0.12 kt
COG
320°
Heading
89.6
Depth
22.3 m
Guard Zone 2
OFF
The information is red
The background is black
Black/Red is selected

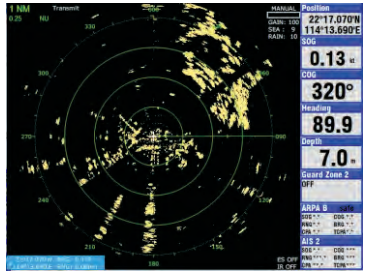

1 NM
Transmit
RADAR MENU
Operation mode Transmit
Gain and STC (sea clutter)
Rain clutter
Data field setup
Presentation mode North up
Ring 4
Off center Off
Zoom Off
Echo trail Off
Echo stretch Off
EBL offset Off
AIS Off
AIS menu
ARPA menu
Function menu
Video menu
PI line menu
TTM output Off
Menu to MAIN MENU
FUNCTION MENU
Mark brill 4
HD mark 4
WPT mark Off
Stern mark Off
EBL Ref. Rel
VRM unit nm
Azimuth ring True
Guardzone 1 mode In
Guardzone 2 mode In
Alarm sense LV Low
EBL offset base STAB GND
Color setting
Range setting
Self test
Installation menu
COLOR MENU
Background color Blue/White
Echo color
Position
22°17.070'N
114°13.690'E
0.04 kt
COG
320°
Heading
90.1
Depth
Guard Zone 2
OFF
The information is white
The background is blue
Blue/White is selected

12.2.9 Echo Color

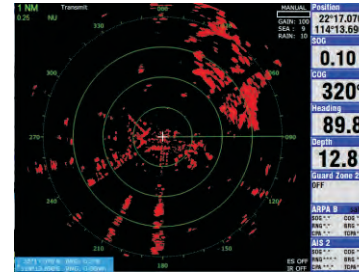
For the personal preference, 3 echo colors can be selected. They are green (default), yellow and multi.



Green



Yellow



Multi

12.2.10 Self test

In case of radar problem such as no echoes or fail to connect the radar antenna you can check by run self test and report the problem to a radar technician.

12.2.11 Installation setup

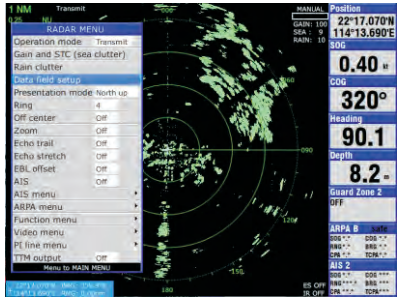
This installation setup menu is used only on new installation of radar antenna. It is not suggested to setup by a user, please contact dealer or an experience radar technician to do the setup.

12.2.12 Data field setup

The contents in the data fields on the right hand side of the display can be changed. Take an example if you want to change the “Range” field to “Date” field :

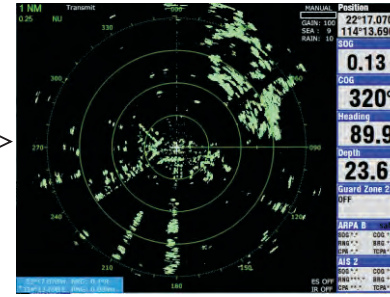
Press [MENU] key then scroll to “Data field setup” as shown in below picture 12.2.12_1 and press [✔] key.

The top data field topic will turn to black color as shown in below picture 12.2.12_2.



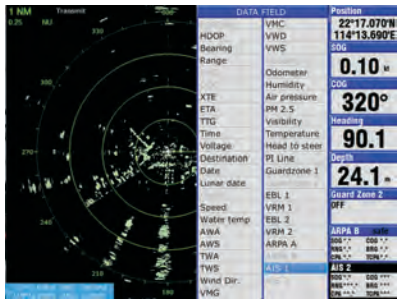
Picture 12.2.12_1

[✔]



Picture 12.2.12_2

Use the UP & DOWN arrow key scroll the black topic to the “AIS2” field. After you press [✔] key a DATA FIELD list will pop up as shown in picture 12.2.12_3 Scroll between the items in the DATA FIELD list and select “Time” as shown in picture 12.2.12_4

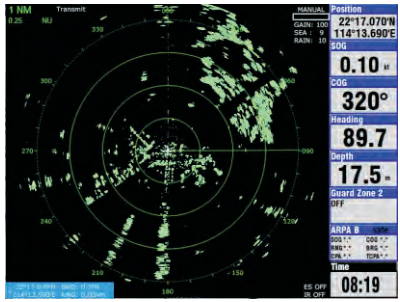


Picture 12.2.12_3

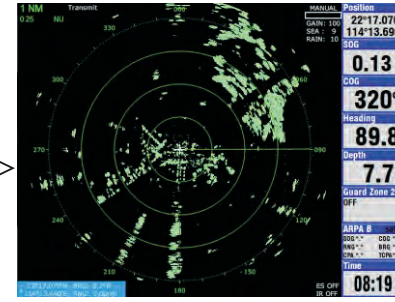
Picture 12.2.12_4

After press [✔] key the DATA FIELD list will disappear and the selected “AIS2” data field will change to “Time” as shown in picture 12.2.12_5.

Now you can press [✘] key to de-activate the “Data field setup” function and you will find the “Time” field topic will change from black to blue color as shown in picture 12.2.12_6



Picture 12.2.12_5



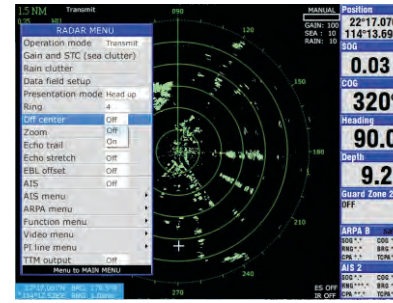
Picture 12.2.12_6

12.2.13 Off center

Your vessel's position can be shifted up to 75% of the range in use to view the situation around your vessel without changing range or size of targets.

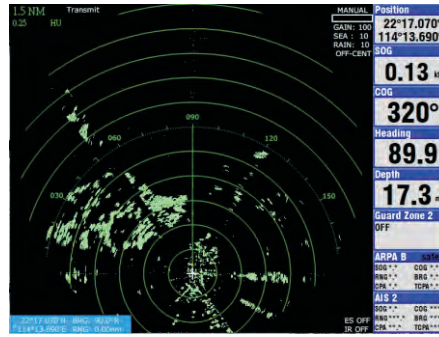
1. Place the cursor on the position you want the radar center to shift to, as shown in picture 12.2.13_1

Picture 12.2.13_1



Picture 12.2.13_2

2. Select RADAR MENU->Off center->On
3. The radar center will shift to the position of the cursor as shown in picture 12.2.13_3

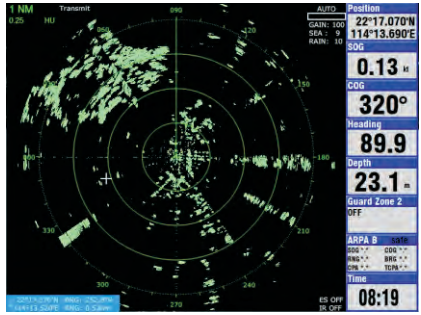


Picture 12.2.13_3

12.2.14 Zoom

The zoom feature allows you to double the size of the area between your vessel and any location within the current range to take a closer look at an area of interest.

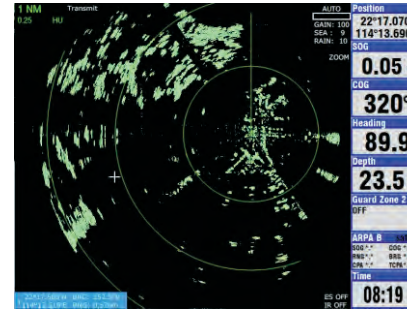
1. Select a location with the cursor as shown in picture 12.2.14_1.
2. Select RADAR MENU->Zoom->On as shown in picture 12.2.14_2.



Picture 12.2.14_1

Picture 12.2.14_2

Picture 12.2.14_3



Picture 12.2.14_4

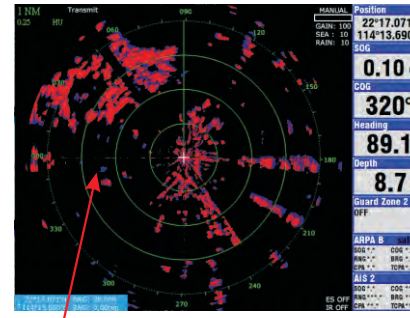
3. Press [ ] to withdraw the menu and you will see the radar image zoom 2 times.

12.2.15 Echo trail

You can show the movement of all radar targets relative to your vessel in afterglow. This function is useful for alerting you to possible collision situations.

Starting echo trail

Select RADAR MENU->Echo trail->On as shown in below picture



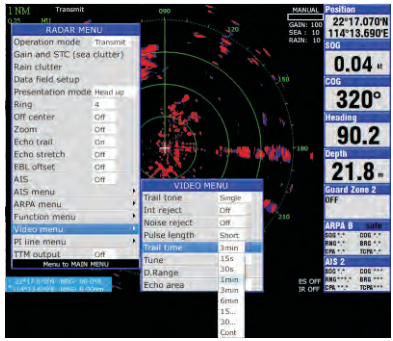
Trail displays in blue color

Change Trail time

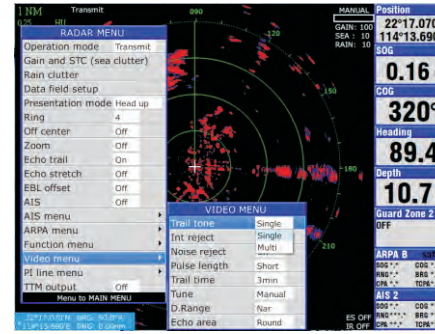
When the elapsed time clock counts up to the trail time selected, the oldest portions of trails are erased so only the latest trail equal in length to the trail time selected, refer to picture 12.2.15_1

Change trail attributes

Trail tone can be selected in the Video menu as shown in below picture 12.2.15_2 :

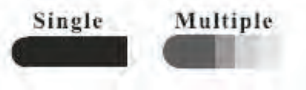


Picture 12.2.15_1



Picture 12.2.15_2

Trails can be shown in single or multiple gradations. Multiple paint trails getting thinner as shown below :

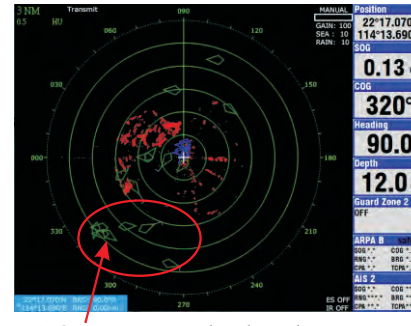


12.2.16 AIS overlay

Please study chapter 10 for more details about AIS.

If you want to overlay the AIS target on radar screen :

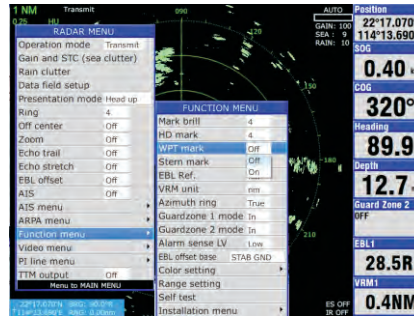
Select RADAR MENU->AIS->On



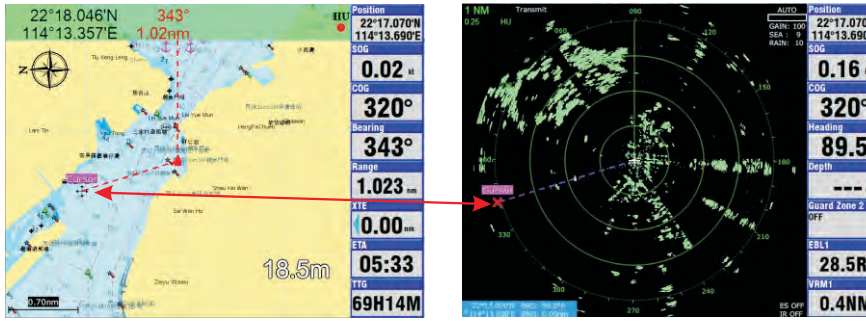
AIS targets are displayed

12.2.17 To display a GOTO waypoint

Simply select RADAR MENU->Function menu->WPT mark->On



When there is GOTO function is established on plotter screen, the waypoint mark and GOTO dotted line will also display on radar screen.



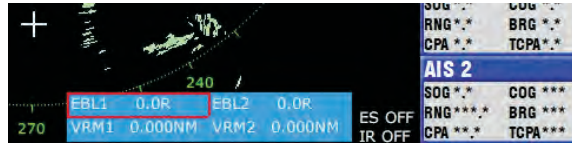
The GOTO waypoint displays on both plotter and radar screen

12.3 EBL and VRM

You can measure the range and bearing of a target by VRM and EBL

12.3.1 Measuring the range by VRM

1. Slight press [ ] key to call out the EBL/VRM window :



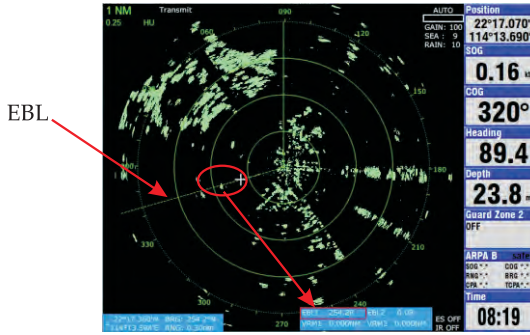
2. Select VRM1 or VRM2 by onmipad and press [ ] to confirm, example VRM1

3. move the cursor by onmipad to move the VRM1 over the target you want to measure and read the range of the target in EBL/VRM window

12.3.2 Measuring the bearing by EBL

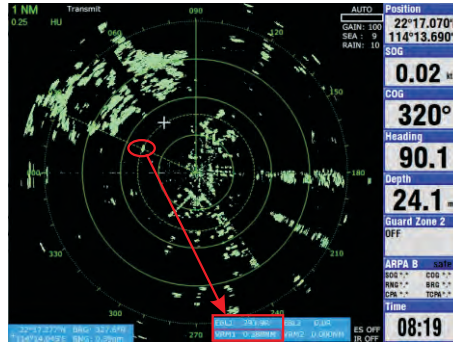
1. Slight press [ ] to call out the EBL/VRM window:

2. Select EBL1 or EBL2 by onmipad and press [ ] key to confirm, example EBL1
3. Move the cursor by onmipad to move the EBL1 over the target you want to measure and read the bearing of the target in EBL/VRM window



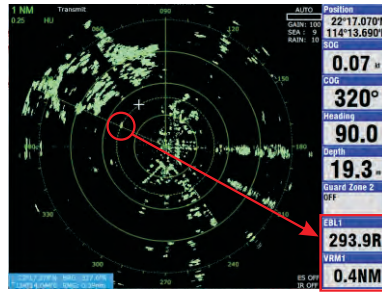
12.3.3 Measuring the range and bearing of a target

1. Slight press [fx] to call out the EBL/VRM window
2. Select EBL1 or EBL2 by onmipad and press [✔] to confirm, example EBL1
3. Move the cursor by onmipad to move the EBL over the target you want to measure
4. Slight press [fx] again to fix the position of EBL
5. Select VRM1 or VRM2 by onmipad and press [✔] to confirm, example VRM1
6. Move the cursor by onmipad to move the VRM over the same target in step 3
7. Slight press [fx] to fix the position of VRM



8. Now you can read the range and the bearing of the target in EBL/VRM window

Tips : you can also select VRM and EBL information display in databox, please study chapter 12.2.12



12.3.4 Cancelling EBL and VRM

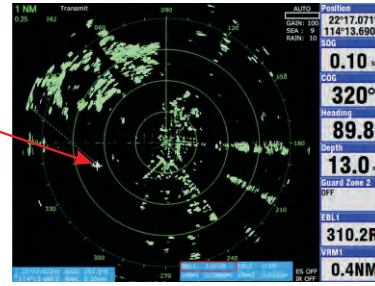
1. Long press [fx] to call out the EBL/VRM cancelling window
2. Select EBL1 or EBL2 you want to cancel by onmipad and press [✔] to cancel , example EBL1
3. Select VRM1 or VRM2 you want to cancel by onmipad and press [✔] to cancel, example VRM1
4. After finish cancelling, press [✖] to quit the EBL/VRM cancelling window

12.3.5 EBL offset

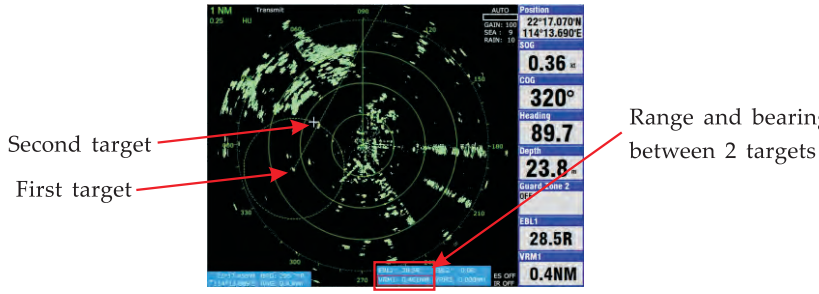
If you want to measure the range and bearing of two targets, you can use EBL offset function.

1. Move the cursor to the first target
2. Select RADAR MENU->EBL offset->on
3. Slight press [fx] key, the origin of EBL1 will shift to the position of the cursor in step 1

EBL1's origin shift to the position of the cursor



4. Select EBL1 by onmipad and press [✔] to confirm
5. Move the cursor by onmipad to move the EBL1 over the second target you want to measure
6. Slight press [fx] again to fix the position of EBL
7. Select VRM1 by onmipad and press [✔] to confirm
8. Move the cursor by onmipad to move the VRM over the same target in step 5
9. Slight press [fx] to fix the position of VRM
10. Press [✖] to quit the EBL/VRM window



12.4 Guard zone

The guard alarm allows the operator to set the desired range and bearing for a guard zone. When ships, islands, landmasses, etc. Violate the guard zone an audible alarm sounds and the offending target blinks to call the operator's attention.

Selection of guard zone type

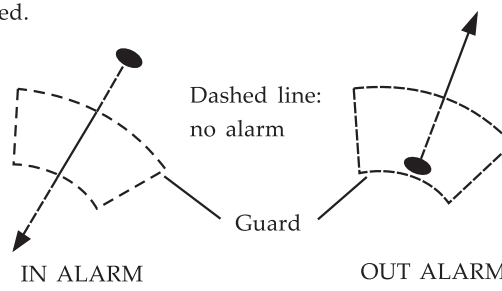
The guard alarm can be set to sound when a target either enters or exits the guard zone. You can select which type of guard alarm you want through the menu.

In alarm

The alarm sounds on targets entering the guard zone, the guard zone will flash if alarm is triggered.

Out alarm

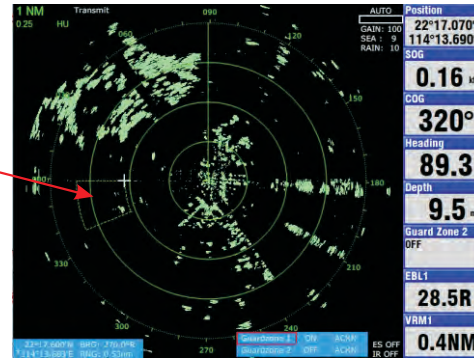
The alarm sounds on targets exiting the guard zone, the guard zone will flash if alarm is triggered.



12.4.1 Setting a guard zone

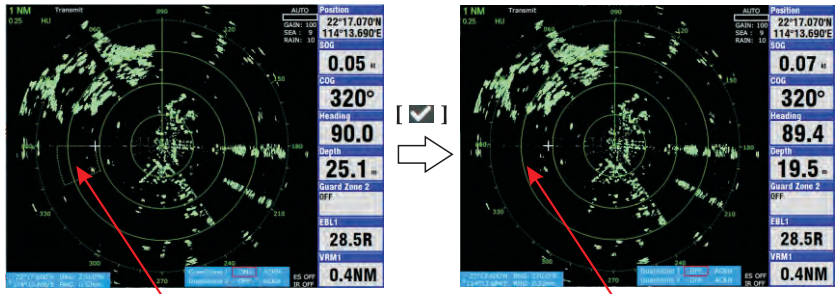
1. Long press [ ] key to call out the guard zone window.
2. Select Guardzone 1 or Guardzone 2 then press [ ] to confirm, example Guardzone 1
3. Move the cursor to the starting point of the Guardzone 1 and press [ ] to confirm.
4. Move the cursor to the ending point of the Guardzone 1 and press [ ] to confirm
5. Press [ ] to quit the guard zone window

A guard zone is set



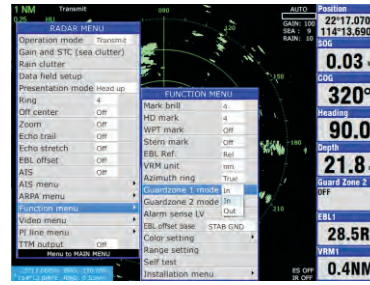
12.4.2 Cancelling guard zone

1. Long press [ ] to call out the guard zone window
2. Use onmipad to select "ON" beside Guardzone you want to cancel, example Guardzone 1
3. Press [ ] to turn "ON" to "OFF", now you can see the fan shape alarm zone of Guardzone 1 is disappeared
4. Press [ ] to quit the guard zone window



12.4.3 Setting In/Out alarm

Select RADAR MENU->Function menu->Guardzone 1(or Guardzone 2)-> In (or Out)



12.5 Menu operation

Item	Description
Mark brill	Select brilliance of VRM, EBL, cursor, guard zone and waypoint mark
HD mark	Select brilliance of heading mark.
WPT mark	Select “On” to display the waypoint mark.
Stern mark	Use for switching stern mark display
EBL Ref.	Select EBL reference for relative or true.
VRM unit	Select VRM unit
Azimuth ring	Select the Azimuth ring reference for relative or true
Guardzone 1 mode	Select condition which triggers guardzone 1 alarm; in or out
Guardzone 2 mode	Select condition which triggers guardzone 2 alarm; in or out
Alarm sense LV	Select minimum echo strength which triggers guard alarm
EBL offset base	Select the EBL offset base
Color setting	Set background color and Echo color
Range setting	Select range in use
Self test	To display connection IP
Installation menu	Go to the installation menu

Function menu

Item	Description
Trail tone	Select brilliance of echo trails
Int reject	Select level of interference rejection
Noise reject	Select “ON” to reject noise
Pulse length	Select pulse length for 1.5 and 3 NM ranges
Trail time	Select the trail time
Tune	Select automatic or manual tuning
D.Range	Select the video signal sampling ranges
Echo area	Select the echo display area on the screen

Video menu

Item	Description
Antenna on transmit	To turn on/off the antenna rotation during transmit
STC range	To set the sea clutter range according to the height of antenna installation, 1 = above 6 meters, 2 = above 4 meters, 3 = above 3 meters, 4 = above 2 meters
Tune/Video adjustment	To adjust tune and video amplifier level input
Heading alignment	Aligning heading, adjustment sector : 0 ~ 359.90
Sweep timing adjustment	Adjusting sweep timing, adjusting range : 0.000 ~ 4.266nm)
MBS adjustment	Adjusting main ban suppression, adjustment : 0.00~0.25
Hours used	Hours used
TX hours	Hours in radar transmitting

Installation menu

12.6 ARPA

⚠ WARNING

This auto plotter is not designed to replace the human eye nor make decisions for the navigator. It is intended for use as an aid to navigation. Always maintain watch while underway.
Data obtained from this auto plotter should always be double checked against other sources to verify the reliability of the data.

This auto plotter automatically tracks an acquired radar target and calculates its course and speed. Indicating it by a vector, Since the data generated by this unit are based on what radar targets are selected, the radar must always be optimally tuned for use with it to ensure that required targets will not be lost or unwanted targets such as sea returns and noise will not be acquired and tracked.

A target echo does not always mean a landmass, reef, ships or other surface objects but can imply returns from sea surface or precipitation. As the level of these returns varies with environment, the operator is required to properly adjust the STC (anti-clutter sea), FTC (anti-clutter rain) and GAIN controls to ensure that target echoes within the affected area are not eliminated from the radar screen.
The optimum settings of these controls may slightly differ between normal radar operation and plotting, and it is recommended to readjust them in accordance with the operating mode selected.

NOTICE

The installation must be done by an representative or suitably qualified radar technician. Authorities require this.

Keep magnets and magnetic fields away from the equipment.
Magnetic fields will distort the picture and can cause equipment malfunction. Be sure the unit is well away from equipment which gives off magnetic fields (speaker, power transformer, etc.).

The following items affect calculation accuracy:
- echo intensity
- radar transmission pulsewidth
- radar bearing error
- gyrocompass error
- own vessel or other vessel course change

Data for CPA, TCPA, etc. are approximations only. Always use data obtained prudently.

12.6.1 Operation of ARPA

General

The Auto Plotter permits manual or automatic acquisition and automatic tracking of up to 40 radar targets. An internal microprocessor calculates target data such as speeds and courses and display the results in alphanumeric and by vectors. To ensure the reliability of the displayed target data, the radar must be properly adjusted for minimum sea returns and noise.

Principal Specifications

Acquisition and tracking:

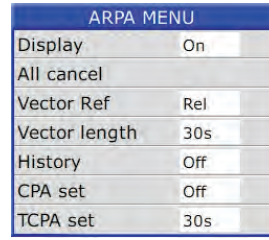
- Acquisition of up to 20 targets between 0.2 and 16 nm

Vectors:

Vector length: 30s, 1,3,6,15,30 mins.
Orientation: True velocity or relative velocity
Past positions: 5 past positions at intervals of 15,30s,1,2,3,6 mins.
Alarm: Visual and audible alarms against targets violating CPA/TCPA limits, Visual alarm against lost targets

Target discrimination: A target measuring about 800 m or more in the radial or circumferential direction is regarded as a landmass and not acquired or tracked. Echoes smaller than about 800 m are regarded as true targets.

12.6.2 ARPA menu operation



The ARPA menu includes the followings :

Display : Turns on/off the ARPA function

Vector Ref. : Select relative vector or true vectors.

Vector length : Select vector time

History : Select past position plot intervals

CPA set : Select CPA alarm limit. When a target is predicted to come within this limit, an aural alarm sounds and at the time the corresponding target symbol changes to a blinking triangle.

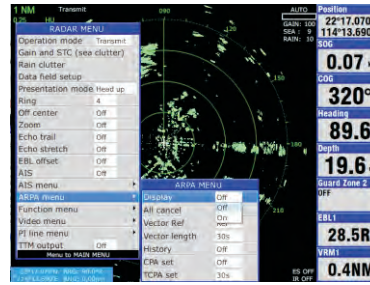
Note : If the preset CPA limit is set to OFF, a tracked target which is on collision course will not produce an alarm.

TCPA set : Selects TCPA alarm limit.

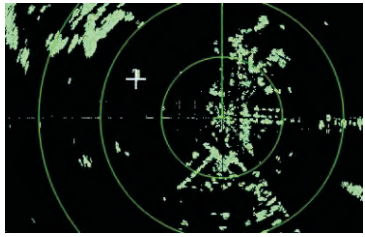
12.6.3 Acquiring targets

Follow the steps to acquire a target. Up to 20 target can be acquired.

1. Select RADAR MENU->ARPA menu->Display->On, turned on the ARPA function.

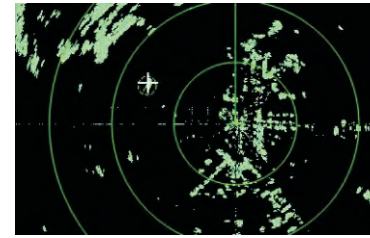


2. Now you can move the cursor by onmipad over a target you want to track then press [✔] to start tracking.



Place cursor over a target you want to track

[✔]



After press [✔] key, a dotted circle surrounded the tracked target

The plot symbol changes its shape according to the status as shown below. A vector appears in about one minute after acquisition indicating the target's motion trend. If the target is consistently detected for three minutes, the plot symbol changes to a solid mark. If acquisition fails, the target symbol blinks and disappears shortly.

CIRCLE (dotted)

Immediately after acquisition - Plot symbol shown in broken lines.

CIRCLE (dotted with a vector)

One minute after acquisition - Vector still unreliable.

CIRCLE(Solid with a vector)

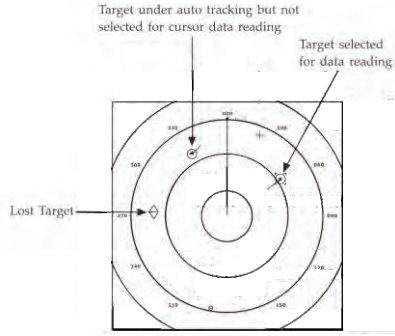
3 minutes after acquisition - Plot symbol changes to a solid circle indicating the stable tracking condition.

FRAME CIRCLE

The plot symbol of a target under tracking becomes a circle with a discontinuous outline when the target is selected for data reading.

Note 1: The target to be acquired should be within 0.2 to 16 nm from own ship and not obscured by sea or rain clutter for successful acquisition.

Note 2: When you want to acquire the 31st target, cancel tracking one of the less important target.



12.6.4 Terminating tracking of targets

When the ARPA has acquired 20 targets, no more acquisition occurs unless targets are lost. Should this happen, cancel tracking of individual target or all targets by procedure described below.

Individual targets

Place the cursor on a tracked target which you do not want to be tracked any longer and press [ ] key to cancel tracking.

All targets

All targets can be cancelled from "ARPA MENU"

1. Open the "ARPA MENU"
2. Select " All cancel"
3. Press [ ] key

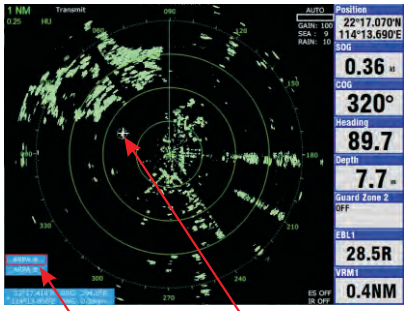
12.6.5 Display target data

The ARPA function calculates motion trends (range, bearing, course, speed, CPA and TCPA) of all targets.

⚠ CAUTION

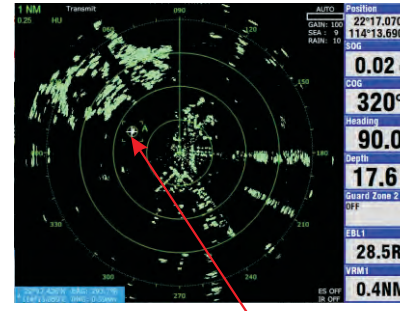
At the speed under 5 kts the target data is displayed with a delay because of the filtration

1. To show the information of tracked target in the data box, place the cursor on a tracked target and press [ ] key.



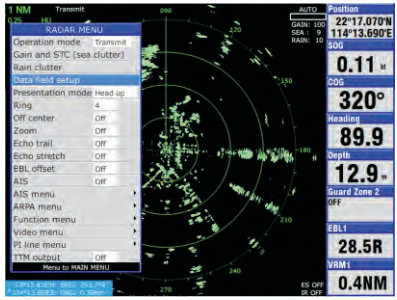
ARPA information selection box

Place the cursor over a tracked target

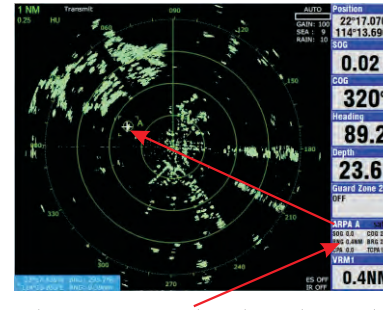


The selected target surrounded by a broken square frame

2. An ARPA information selection box appears, select “ARPA A” or “ARPA B” then press [✔] to confirm, example “ARPA A” is selected.
3. Change the content of any data box to “ARPA A”



Change data box content, please study chapter 12.2.12



The “ARPA A” data box shows the target data

RNG/BRG (Range/Bearing)
Range and bearing from own ship to the last-plotted or selected target position.
COG/SOG (Course/Speed)
Course and speed are displayed for the last plotted or selected target.
CPA (Cloest Point of Approach)
CPA is the closest range a traget will approach to own ship.
TCPA (Time of Closest Point of Approach)
TCPA is the time to CPA measured with preset or calculated speeds of own ship and the targets.
Both CPA and TCPA are automatically calculated. TCPA is counted up to 99.9 minutes and beyond this it is indicated as TCPA>99.9 min.

CPA/TCPA Alarm

Visual and audible alarm are generated when the predicted CPA and TCPA of any target become less than their preset limits. The audible alarm continues for 10 seconds.

The Auto plotter ARPA continuously monitors the predicted range at the Closest Point of Approach (CPA) and predicted time to CPA(TCPA) of each tracked target to own ship.

When the predicted CPA of any target becomes smaller than a preset CPA alarm range and its predicted TCPA less than a preset TCPA alarm limit, the ARPA releases an audible alarm. In addition, the target plot symbol changes to a triangle and flashes together with its vector.

Provided that this feature is used correctly, it will help prevent the risk of collision by alerting you to threatening targets, It is important that GAIN, A/C SEA, A/C RAIN and other radar controls are properly adjusted and the Auto Plotter is set up so that it can track targets effectively.

CPA/TCPA alarm ranges must be set up properly taking into consideration the size, tonnage, speed, turning performance and other characteristics of own ship.

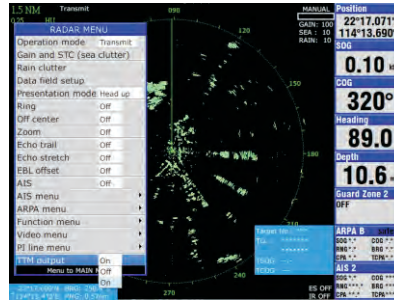
⚠ WARNING

The CPA/TCPA alarm feature should never be relied upon as a sole means for detecting the risk of collision. The navigator is not relieved of the responsibility to keep visual lookout for avoiding collisions, whether or not the radar or other plotting aid is in use.

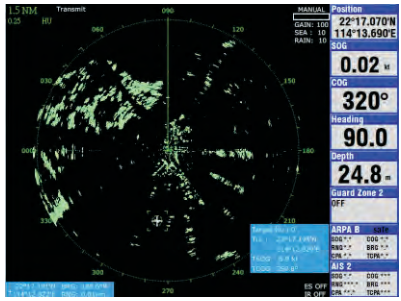
12.6.6 TTM output

When you want to output the TTM sentence of a tracked target, it require to turn on the TTM output by :

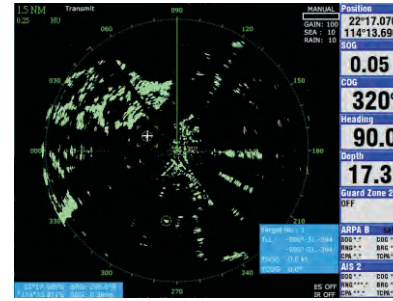
1. Select RADAR MENU->TTM output->ON
2. A blue window contains TTM information will appear as shown in picture 12.6.6_1
3. Now you can move the cursor over a target you want to track and output its TTM information and press **[✔]** key to confirm, as shown in picture 12.6.6_2
4. In case you want to change the TTM output to show the TTM information of another tracked target, you can just simply move the cursor over another target and press **[✔]** key to confirm as shown in picture 12.6.6_3.



Picture 12.6.6_1



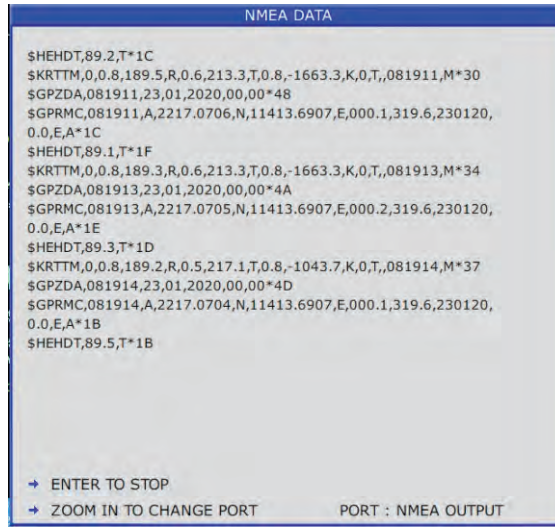
Picture 12.6.6_2



Picture 12.6.6_3

Note : You can check the NMEA output by select MAIN MENU->Setup->NMEA data display :

Before turn on TTM output



After turn on TTM output

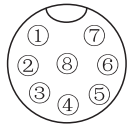
13.1 How to connect output data to external equipment

13.1.1 Output navigation data

The below NMEA0183 sentences can be selected output to external equipment : GGA, GLL, RMC, GSA, GSV, AAM, APA, APB, BOD, BWC, BWR, DBT, DPT, HDT, MTW, RMB, TLL, VTG, WPL, XTE, ZDA, ZTG, ZDL, MWD, VPW, VWR, VWT.
The below output baudrate can be selected : 4800, 9600, 19200 and 38400

13.1.1.1 Wiring output to external equipment

Connect pin 5 + and pin 8 – to the input of external equipment as shown :



DATA INPUT/OUTPUT

① NMEA0183 IN+

② NMEA0183 IN−

③ NC

④ AIS OUT

⑤ NMEA0183 OUT+（RS232）

⑥ Temperature sensor In+

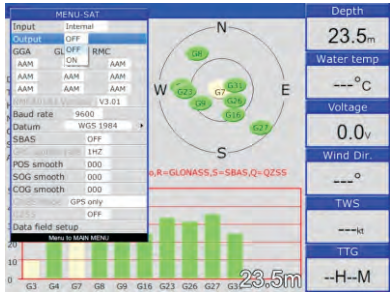
⑦ +5V OUT

⑧ Ground

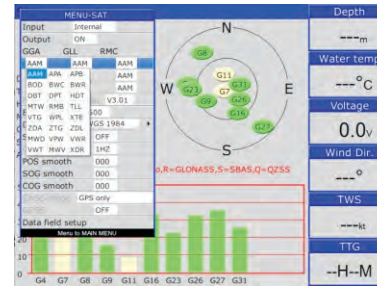
External equipment

13.1.1.2 Select output sentences

Firstly you need to turn on the output in Satellite menu as shown in picture 13.1.1.2_1:



Picture 13.1.1.2_1



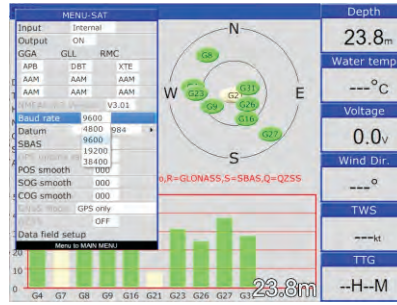
Picture 12.1.1.2_2

Then scroll the cursor to one of "AAM" below to select the desire output NMEA 0183 sentences.

Note : There are 3 default output sentences , GGA, GLL and RMC

13.1.1.3 Select output baudrate

There are 4 different baudrate provided for selection, 4800, 9600, 19200 and 38400.



13.1.2 Output AIS data (For 8A, 8X, 12A and 12X)

You can connect the AIS data output to external equipment as shown below.
There are no require any menu selection for AIS data ouput, once you connect AIS data output to external equipment you can find the AIS data appear on external equipment if the connection is correct and your external equipment can accept AIS data input.

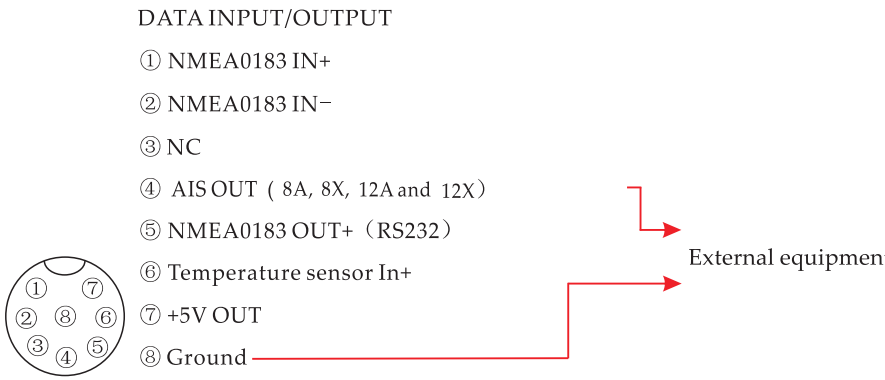
13.1.2.1 AIS data sentences

The below NMEA0183 sentences output from AIS OUT port as default :
GGA, GSA, GSV, RMC, VTG, VDM, VDO

The baudrate from AIS OUT port : 38400

13.1.2.2 Wiring output to external equipment

Connect pin 4 + and pin 8 - to input of external equipment as shown :



13.2 How to connect NMEA0183 sentences from external equipment

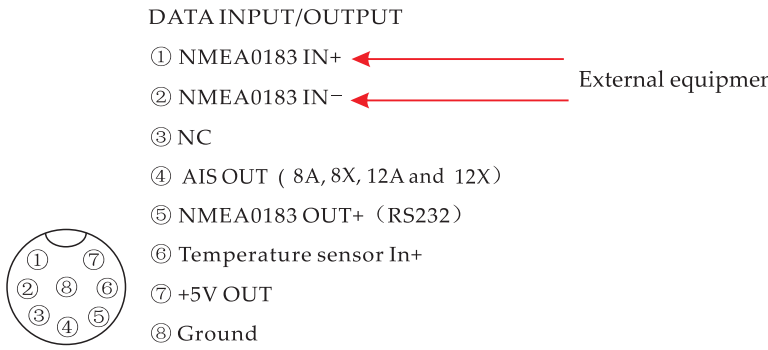
13.2.1 Input navigation data

The below NMEA0183 sentences can be accepted input from external equipment : GGA, GLL, GSA, GSV, RMC, HDG, HDM, HDT, VTG, ZDA, MTW, VWR, VWT, MWD, VPW, VHW, TLL, TTM, VDO, VDM, GNS, MTA, RMA, DBT, DPT, MWV, BWC, XTE, ZDL, WPL, AAM, APB, BOD, RMB, DSC, MDA, RPM, XDR.

The below input baudrate is auto scan so no setting is required.
Supported auto scan baudrate : 4800, 9600, 19200, 38400

13.2.2 Wiring input from external equipment

Connect pin1 + and pin2 – to the output of external equipment as shown :

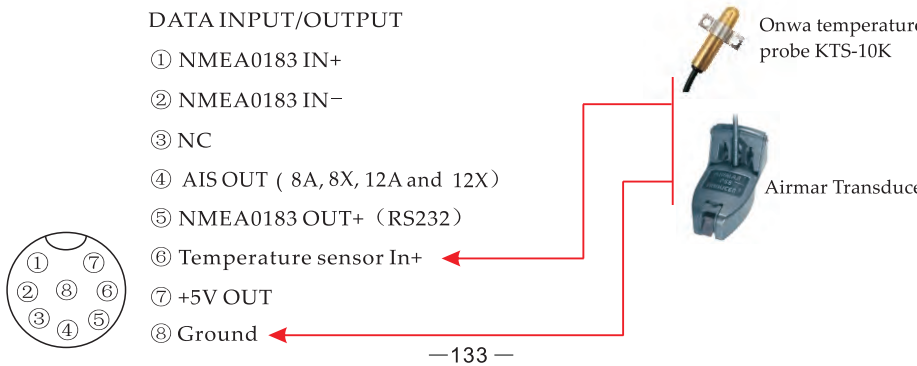


13.3. Connecting a temperature probe

A Onwa 10K (10K resistance at 20°C or 68°F) temperature probe or Airmar temperature sensor can be connected to the chartplotter as shown below to display temperaure on sounder screen and data box.

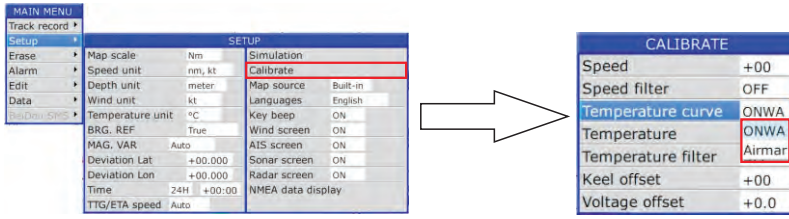
13.3.1 Wiring of temperature probe

Connect a temperature probe to pin 6 and pin 8 as shown:



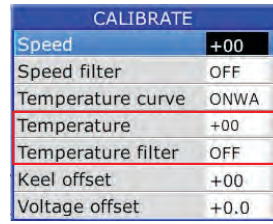
13.3.2 Selection of temperature probe

In order to select correct temperature probe after installation you need to access MAIN MENU-> SETUP->Calibrate->Temperature curve.



13.3.3 Calibrate temperature accuracy

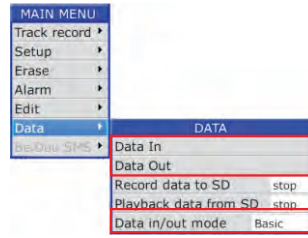
No matter temperature probe or Airmar temperature sensor it just provides a reference temperature reading. In some condition you might need to adjust the temperature accuracy or apply temperature filter.



13.4 Import and Export user data

All user data, such as waypoint, route, track, drawing mark, drawing line and drawing place names, can be import or export from chartplotter through a SD card.

13.4.1 Basic mode



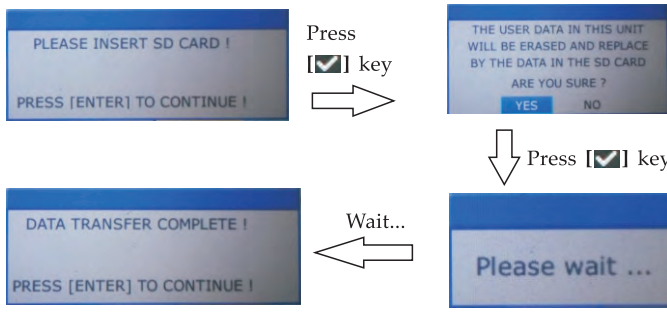
The format of import and export user data is called Data Format (ODF). You can import one type of user data, example : waypoint, or combine all user data into one file by using merging function of KDX PC software. You can download the KDX PC software from website.

For the export function, all user data will be merged into one ODF file. You can convert ODF to GPX format (Google Earth format) by using KDX PC software.

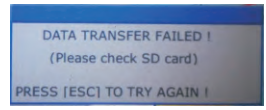
13.4.1.1 Import data in basic mode

Insert SD card contains user data (waypoint, routes etc.) in ODF format you want to transfer into chartplotter.

In any screen press [MENU] x 2 -> MAIN MENU -> Data -> Data In.



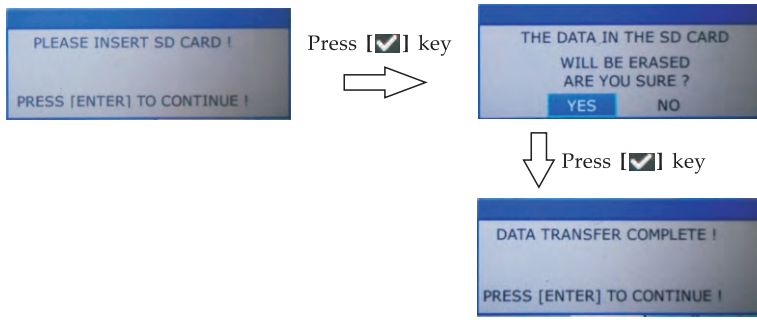
In case of import failed, appear the below message. It is either no ODF data in your SD card or SD card is not detected in the SD card slot. Please check and try again.



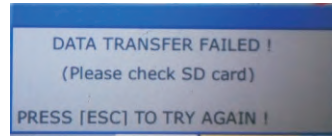
13.4.1.2 Export data in basic mode

Insert a SD card onto your chartplotter.

In any screen press [MENU] x 2 -> MAIN MENU -> Data -> Data Out.

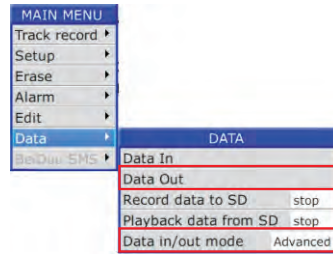


In case of export failed, appear the below message. Please check the SD card and try again.



13.4.2 Advance mode

In advance mode, beside direct export the user data you can add condition on export user data.



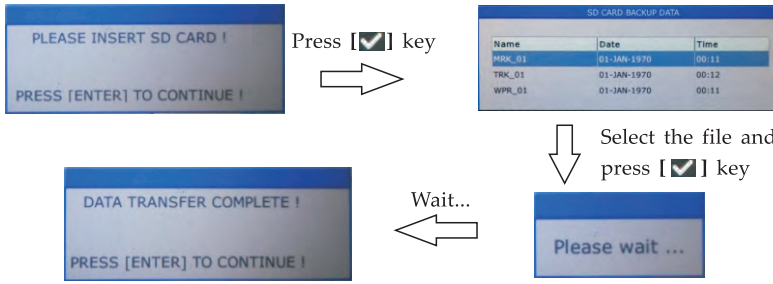
Instead of export all user data on basic mode, advance mode provides selection of user data types and range of data creation date

13.4.2.1 Import data in advance mode

Insert SD card contains user data (waypoint, routes etc.) in ODF format you want to transfer into chartplotter.

In any screen press [MENU] x 2 -> MAIN MENU -> Data -> Data In

The ODF files in the SD card will show up as below :

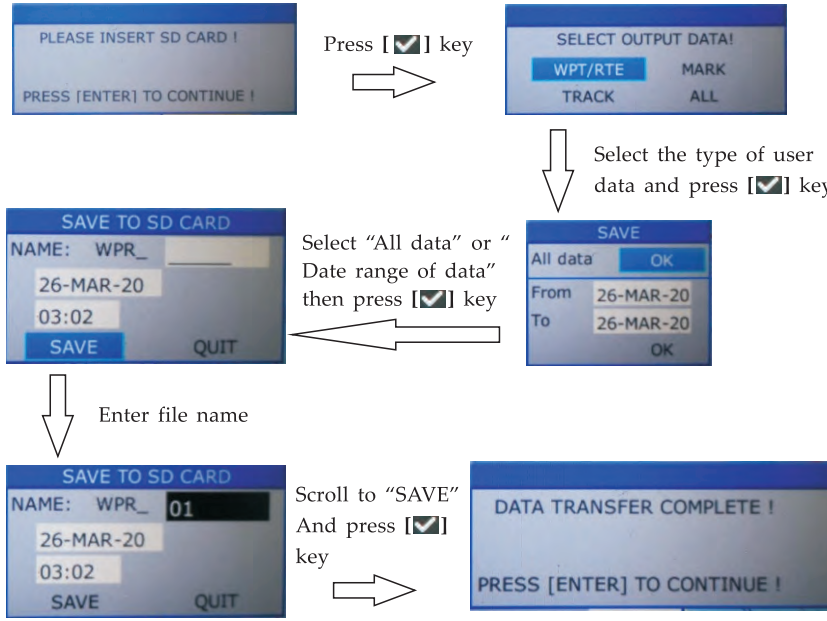


Note : The Import data in advance mode only accept filename with prefix of WPR (waypoints and routes), TRK (tracks) and MRK (drawing mark, drawing lines and drawing place names)

13.4.2.2 Export data in advance mode

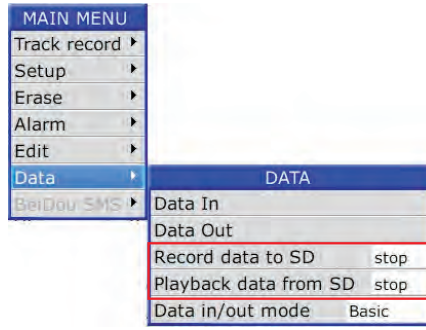
Insert a SD card onto your chartplotter

In any screen press [MENU] x 2 -> MAIN MENU -> Data -> Data Out



13.5 Record and Playback

In some condition you might want to record all navigational data, such as position, SOG, COG, AIS data and depth data, over a voyage or a certain period.
You can use the "Record data to SD" function to record the above navigational data in a SD card and you can use "Playback data from SD" function to playback the recorded navigational data at anytime you want.



14. INSTALLATION

14.1 Verifying the contents

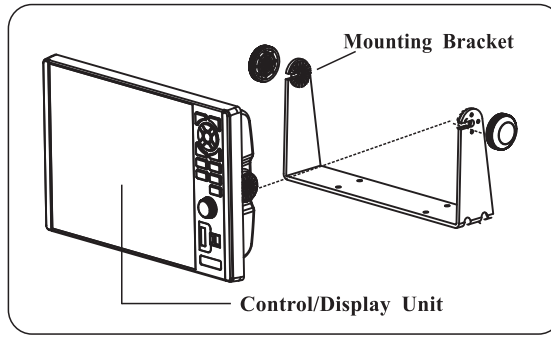
When you first time open the box of your 8 or 12 series plotter please confirm you have following items inside the box :

- Display unit
- GPS antenna with 10 meters cables
- Mounting brackets
- Quick start and installation manual
- Flush mount template
- Standard accessories pack (one power cable, 2 spare fuses, 2 mounting nuts, 4 desktop mounting screws, 4 panel mounting screws, one 8-pins data plug)

14.2 Installing the unit

There are two ways to fix the unit on position, they are desk top mounting and flush mounting.

14.2.1 Desk top mounting

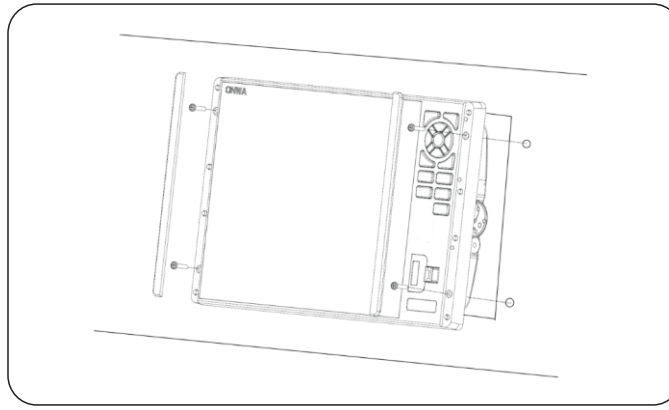


Notice: The unit should be mounted on a flat, solid surface for maximum stability. Be sure to fix the mounting bracket with screws. Otherwise, the display unit may fall down by the boat's pitching and rolling to the lead to the fire or the injury.

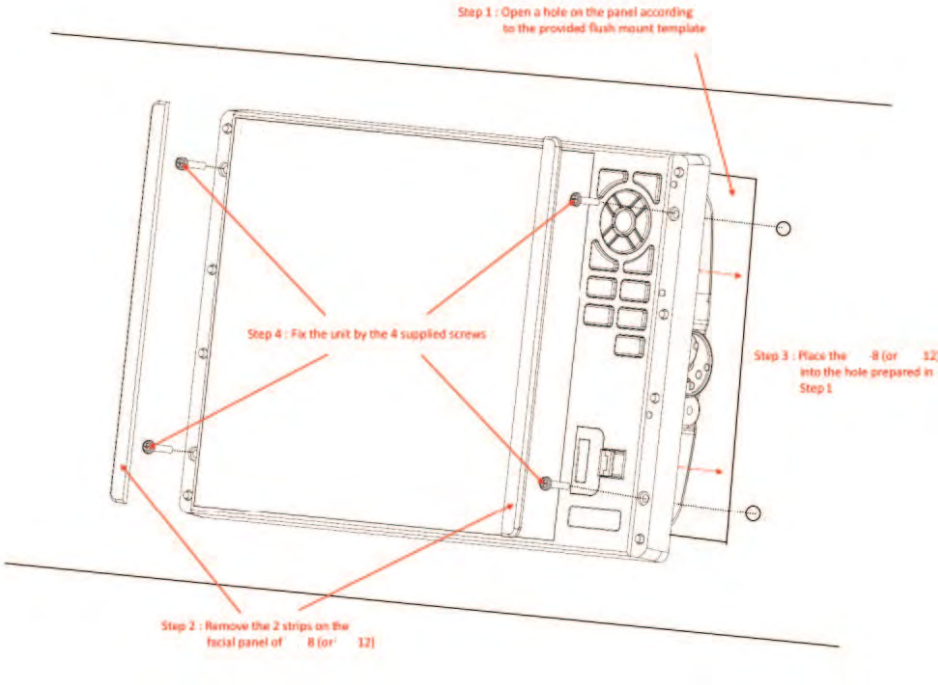
(1) The mounting bracket should be fixed with 6mm screws.
- Do not install the unit at the places that are affected by vibration or might be affected with spray or rain.
- Avoid the places where there is sunlight because visibility might be limited and the unit will be exposed to heat too much.
- Be sure that the space between the rear side of the unit and the wall is more than 10cm.

(2) Fix the unit to the mounting bracket firmly with the knobs so as to prevent it to get out of the bracket while running.

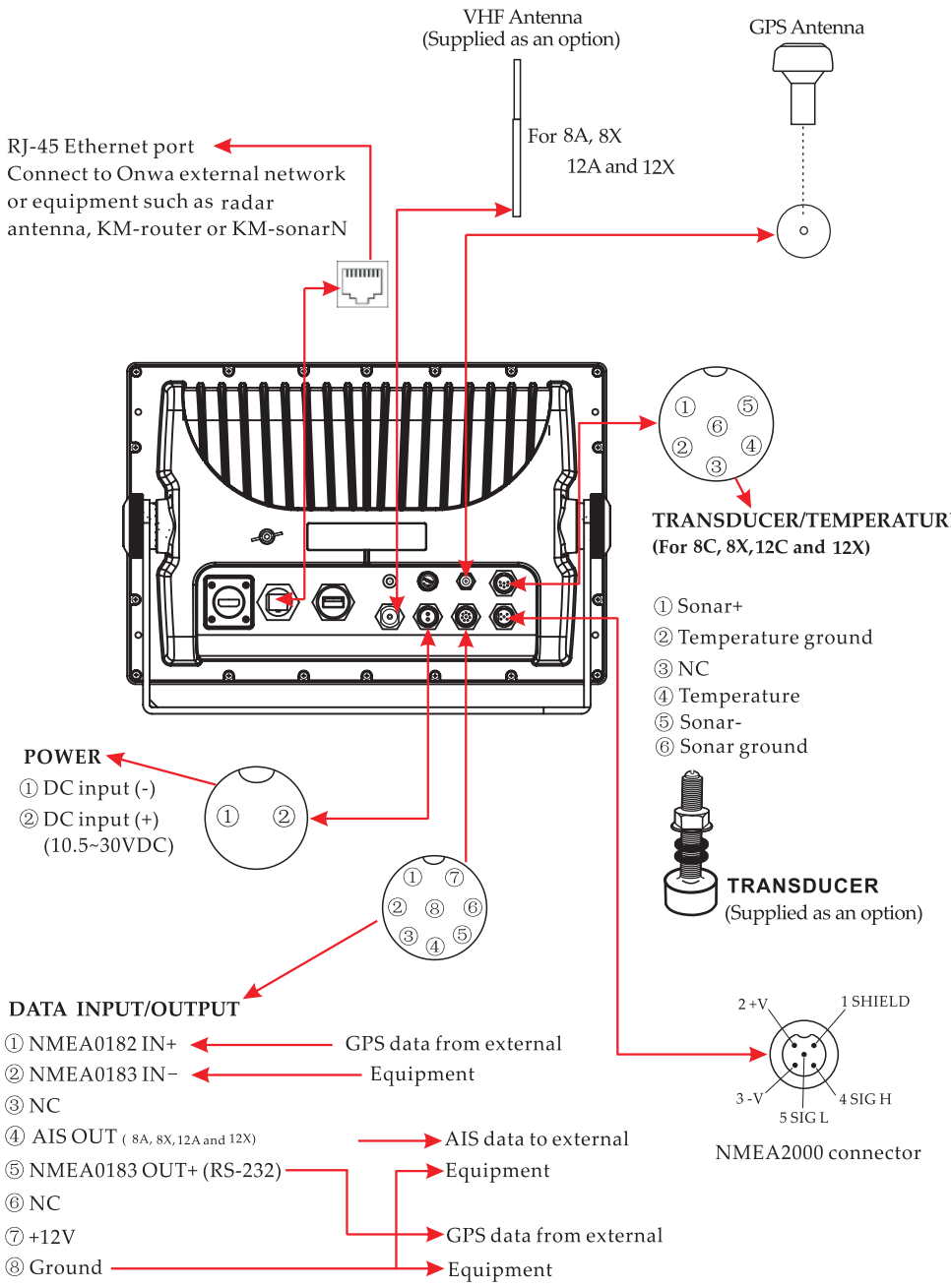
14.2.2 Flush Mounting



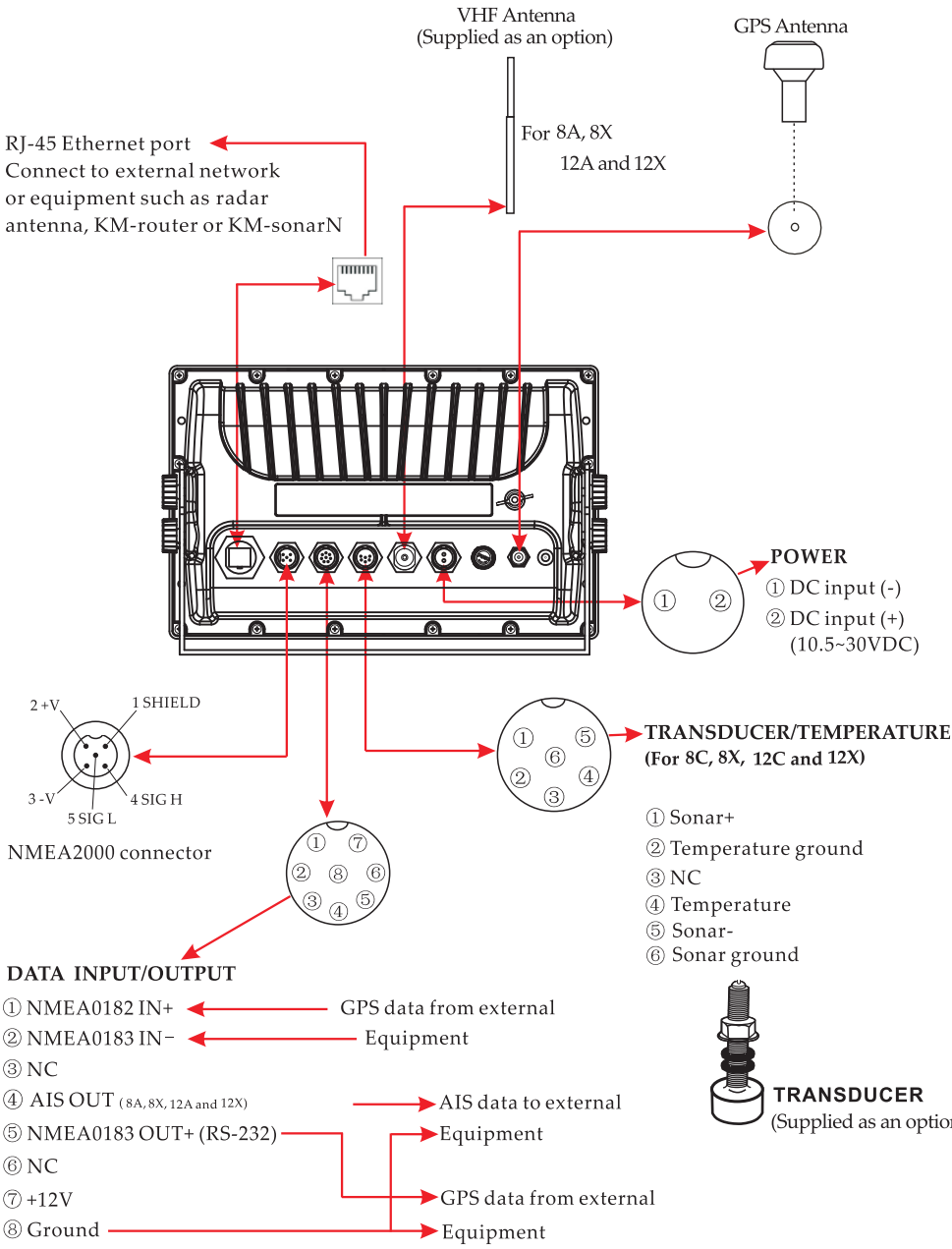
Step 1: Open a hole on the panel according to the provided flush mount template
Step 2 : Remove the 2 strips on the facial panel of 8 (or 12)
Step 3 : Place the 8 (or 2) into the hole prepared in Step 1
Step 4 : Fix the unit by the 4 supplied screws
Step 5 : Place back the 2 strips that removed in Step 2



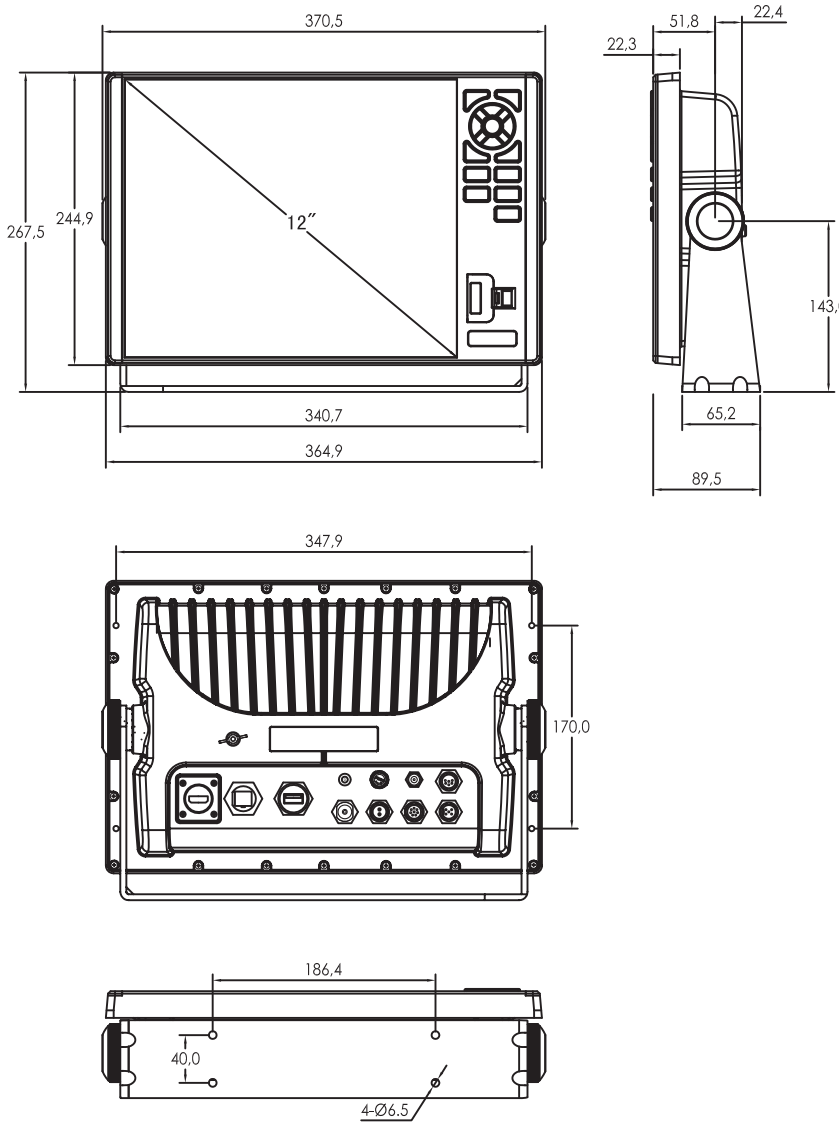
14.3.1 Interconnection for 12, 12A, 12C and 12X



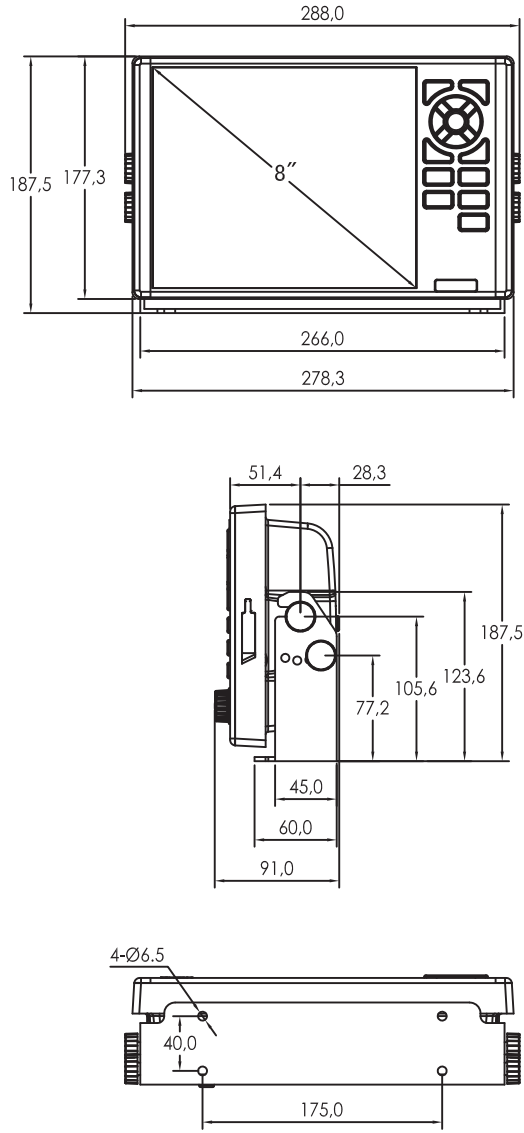
14.3.2 Interconnection for 8, 8A, 8C and 8X



14.4.1 12 series display unit size



14.4.2 8 series display unit size



15. SHORTCUTS

Shortcuts in Plotter screen

1) Press and hold [MENU] to change the track color.
2) Press and hold [MENU] to turn track recording ON/OFF.
3) Press and hold [✓] to activate the User Mark drawing function.

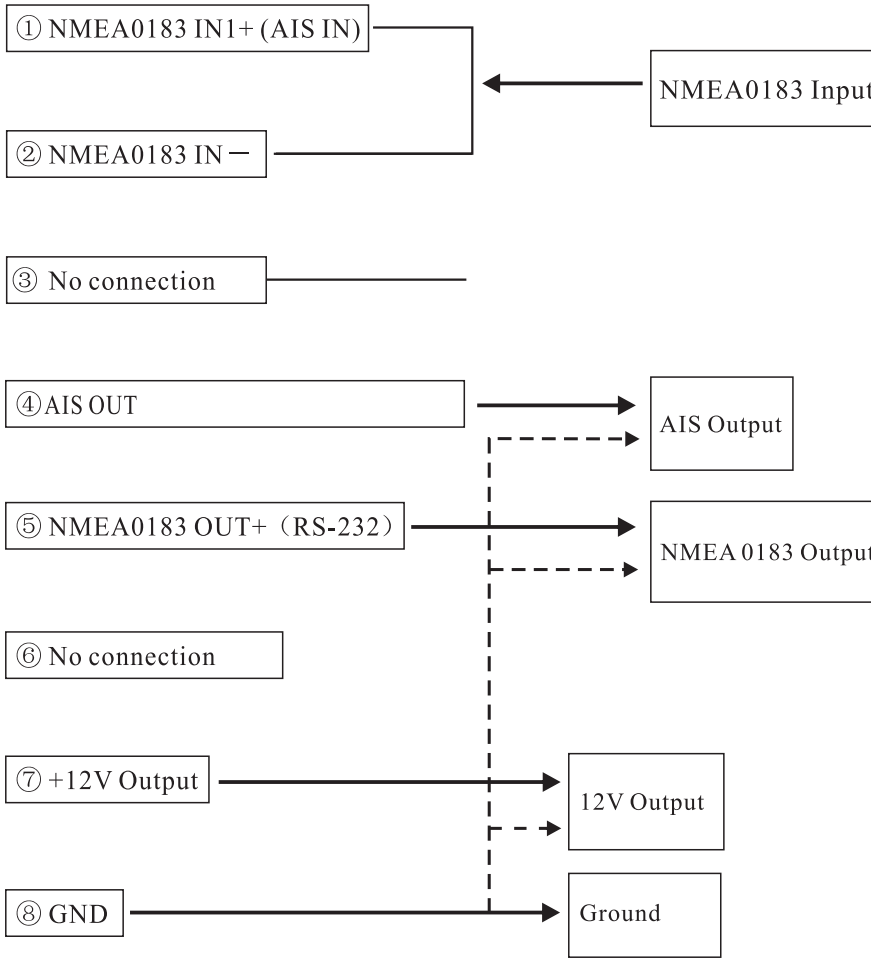
Shortcuts in Fishfinder (Sounder) screen

1) Press and hold [MODE] to change the Sonar mode, 50KHz, 200KHz, DUAL, 50KHz/ZOOM and 200KHz/ZOOM.
2) Press and hold [✓] key to switch between Auto and Manual gain.
3) On manual gain slightly press [✓] key to adjust manual gain.
4) On auto gain slightly press [✓] key to switch between Auto-1 and Auto-2 mode.
5) Press and hold either [⤢] or [⤡] key to switch between Auto and Manual range.
6) Slightly press [ƒx] key to change Signal Level.
7) Press and hold [▶] key to adjust picture advance speed.
8) Slightly press [◀] [▶] key to shift range.
9) Slight press [▲] [▼] key to move VRM.
10) Slight press [▶] to activate position line.

Shortcuts in Radar screen

1) Press and hold [✓] to call out the guardzone window.
2) Slight press [ƒx] to call out the EBL/VRM window.
3) Press and hold [ƒx] to call out the EBL/VRM cancelling window.

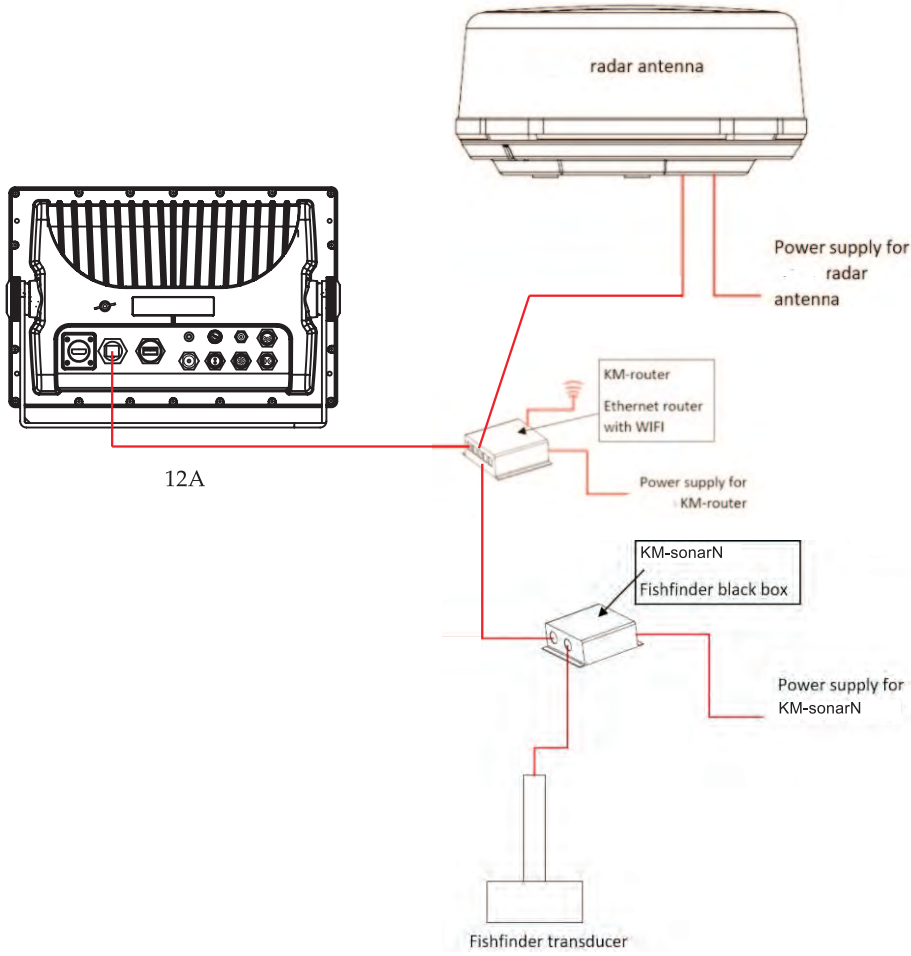
16. NMEA0183 DATA IN/OUT DESCRIPTION



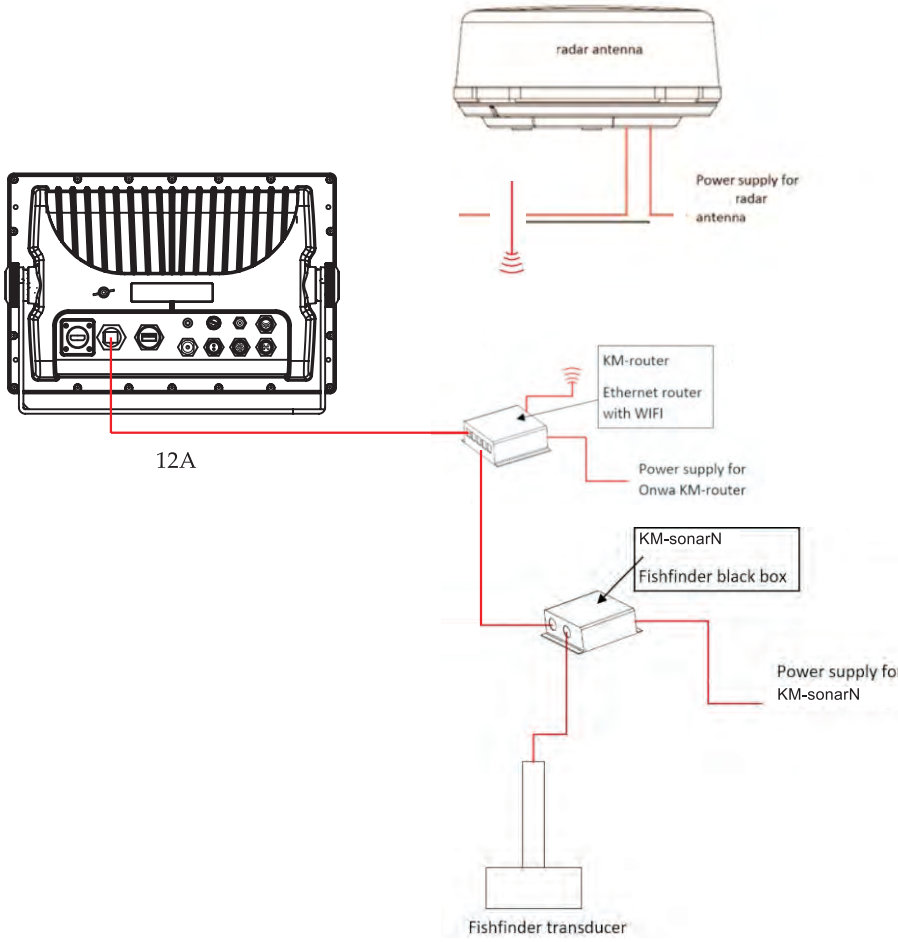
17. OPTIONS

In 8 and 12 series besides the standard functions it also can extend other functions. Take an example: If you bought a 12A but you want to add fishfinder or radar functions in the future then you can simply add an option accessories, such as network radar antenna or Fishfinder back box (KM-sonarN).
Below pictures show how to connect those option accessories to 12A chartplotter.

17.1 Connect external network radar antenna and fishfinder backbox



17.2 Connect external WIFI radar antenna and fishfinder black box



For more detail information you can contact dealers.

18. ABBREVIATIONS

Abbreviations	Meanings
ARPA	Automatic Radar Plotting Aid
AWA	Apparent Wind Angle
AWS	Apparent Wind Speed
Beidou	A China Navigation Satellite System
BL (B/L)	Bottom Lock
BRG	Bearing
BRG REF	Bearing Reference
BZ	Bottom Zoom
C-Map	A marine mapping system
COG	Course over Ground
CPU	Central Processing Unit
CU	Course Up
DST	Destination
ENT	Enter
ES	Echo Stretch
ESC	Escape
ETA	Estimate Time of Arrival
F/A	Fish Alarm
Galileo	A Europe Navigation Satellite System
GLONASS	A Russia Navigation Satellite System
GMSK	Gaussian Minimum Shift Keying
GNSS	Global Navigation Satellite System
GOTO	Go To
GPX	GPS Exchange Format
HDG	Heading
HDMI	High-Definition Multimedia Interface
HDOP	Dilution of precision
HU	Head Up
INFO	Information
IR	Interference Rejection
KChart	ONWA marine mapping system
KDX	ONWA data exchange
km	Kilometer
kmh	Kilometer per Hour
kt	Knot
LAT	Latitude

Abbreviations	Meanings
LCD	Liquid Crystal Display
LON	Longitude
MAX	Maximum
MIN	Minimum
MMSI	Maritime Mobile Service Identity
MOB	Man OverBoard
mhp	Miles per Hour
Navionics	A marine mapping system
NC	No Connection
nm	Natical Miles
NMEA0183	A marine data exchange system
NMEA2000	A marine data exchange system
NOAA	National Oceanic and Atmospheric Administration.
NU	North Up
ODF	Onwa Data Format
ONENET	A marine data exchange system
PGN	Message format and parameter group numbers
PIC	Picture
POS	Position
PPI	Plan Position Indicator
RX	Receive
SBAS	Satellite-based Augmentation System
sm	Miles
SOG	Speed Over Ground
SOTDMA	Self-organized time-division multiple access
STC	Sensitivity time control
T	True
TTG	Total Time to Go
TTM	Tracked Target Message
TVG	Time Variable Gain
TWA	True Wind Angle
TWD	True Wind Direction
TWS	True Wind Speed
TX	Transmit
XTE	Cross Track Error
VMG	Velocity Made Good
WHT	White
WP	Waypoint Up