

Important Notice

Manual Handling	Keep this manual in a safe place where you can access it quickly. This Manual must be passed to a new owner of the HIS-70R when it is transferred.
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The Global Positioning System (GPS) consists of a total 24 GPS satellites that orbit the earth, enabling you to determine your position anywhere in the world, 24 hours a day, if you can receive satellite signals. During actual navigation, carefully compare the position data with all available navigation sources such as Loran C, Decca, other navigators, charts, visual navigation, depth, water temperature and others. It is your responsibility to make navigation judgments.

DGPS Operation Note :

Your position can be improved by DGPS correction. However, when you are communicating with other ships, you may use a DGPS corrected position but they may not. Make your position source known during communication.

The Electronic Chart :

Only official authorized charts and notices to mariners contain all the information needed for the safety of navigation and, as always remember, the user is responsible for their prudent use.

Pictorials

This manual uses the following symbols for easy understanding safety instructions. Always follow these instructions carefully.

 WARNING	Always follow this safety instruction to prevent death or injury.
 CAUTION	Follow this safety instruction to avoid possible injury or damage to your property. Symbol “△” is a CAUTION or WARNING label indicating the safety instruction.
 WARNING	This symbol is an Electrical Shock WARNING label.
	Symbol “ ” is an instruction that you must not violate. (This symbol instructs NOT to disassemble the system components)
	Symbol “ ” is an operation instruction that you must follow. (This symbol shows the main power OFF instruction.)



WARNING <For System Operators>

Always follow this instruction to prevent death or personal injury.

	Turn power off During abnormality.	If smoke or a small of burning occurs, a fire or an electrical short circuit may result. Turn the power switch OFF and shut down the power supply immediately. Never try to repair the system yourself. Call for service.
 	Do not open Cabinet.	High voltage exists in the instrument. Contact with voltage may cause possible injury or death.
	Do not touch back side of the equipment.	Harmful line voltage is present on back side of the equipment. Never try to touch back side while power is turned on.
	Avoid excessive shock to display unit.	The LCD display module contains a liquid. Do not apply any mechanical shock to the display. If the display broken, liquid may leak and injure your skin and eyes.
	Do not use with poor ventilation.	If you cover this unit or use in an enclosed place, it may malfunction or become damaged as a result of overheating. Use only where there is sufficient ventilation.



Installation Cautions <For service Personnel>

Follow installation instructions to avoid personal injury and system malfunction.

Installation in rigid location.	Mount your AQUA on a rigid frame or base to prevent your unit from working loose.
Use correct Installation materials.	Use the installation materials provided in the standard accessory pack only. If you use hardware of insufficient strength, your system may loosen causing damaged.
Keep away from direct sunlight.	Keep your system out of direct sunlight as it may become damaged by overheating.
Keep away from water.	Take care not to get water on or in your unit as it may be damaged and/or cause an electrical shock.
Keep away from heat source.	Keep your system away from other heat source as it may malfunction, be damaged, or burn.
Use correct power source.	Operate your system within the specified power voltage. An incorrect power supply may cause



Maintenance Cautions<For Maintenance Personnel>

Use the following safety precaution internal inspection.

Discharge capacitors.	High voltage may be retained in the capacitors if the high-tension circuit several minutes after you have turned the power switch off.
Check that power is OFF	To prevent an electrical injury due to erroneous power switching, make sure that the main power supply and the system power switch are both in the off position. Additionally, attach a safety label showing that service is in progress.
Avoid EMI.	Take care not to damage the ESDs (Electrostatic Sensitive Devices) by static electricity from carpet and cloths.
Avoid dust.	Wear a safety mask so as not to breath in dust during inspection or cleaning inside your system instruments.

Operation Notes <For operators>

Observe the following operation notes, otherwise the system failure or deterioration can result. And periodical inspection and maintenance are required for keeping the system in an optimum condition.

Backup important data.	The waypoint and other registered data may become unreadable by unexpected failure. We recommend recording this data separately.
Use correct transducer only.	If you use incorrect transducer, the transmitter circuit may be damaged due to a matching error. Consult us for system information.
Check transducer Connection before power on	Do not turn the power switch ON if the transducer is disconnected or if it is not inserted into the water. If done, the transducer or transmitter circuit may be damaged.
Always clean the transducer	Since transducer performance can drop due to accumulated bottom growth, keep the transducer clean. Never paint transducer surface.
Transducer must be installed by authorized personnel.	Consult us for transducer installation by authorized personnel.

 WARNING	This product is designed to assist a navigation. When you are sailing, use the certified chart from the Government or IMO.
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HIS-70R System

Welcome

The HIS-70R System opens a new chapter of performance and integration in vessel navigation system display and management. Whether you are a Cruiser or Sport fisherman or both, HIS-70R gives you the information you need.



CAUTION

The HIS-70R is Color LCD Charting Systems employs the latest in proven technology to provide accurate navigation information. The Plotter functions of the HIS-70R are totally dependent upon the capability of the navigation source to provide accurate position information. This device is only an aid to navigation. It should be used in conjunction with all other navigation accuracy. For safety, always resolve any uncertainty before continuing navigation.



CAUTION

Electronic charts in AUQA are derived from geographical data – including official government charts – which we believe to be accurate. They are neither verified nor approved by Hydrographic Authorities. Electronic charts in HIS-70R are designed only to ease and speed navigation calculations and so must not be relied upon as a primary source of navigation information, but rather a backup to the use of official government charts and prudent navigation habits.

There is no direct relationship between the color of water areas and their depth. The navigator shall always query the area for depth information and use the official paper chart.



CAUTION

The performance of LCD displays are degraded by continuous direct exposure to ultraviolet rays. Locate your HIS-70R Display away from direct sunlight. When not in use. Keep the display covered.



DISPLAY BREAKAGE WARNING

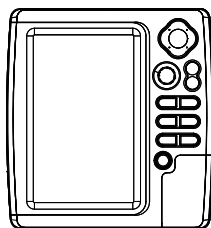
The LCD display module contains a liquid. If the display is broken and the liquid contacts your skin, wash it off immediately in running water for 15 minutes. If the liquid contacts your eyes, immediately flush your eyes with running water for 15 minutes. Contact a physician if any abnormal symptom is experienced.

HIS-70R System

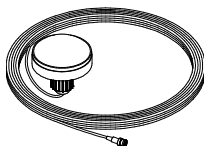
Introduction

The HIS-70R is a premium multifunction command and control center. HIS-70R front panel keyboard and its wide screen with wide viewing area make placement easy. Although HIS-70R offers many advanced features, operation is simplified through the use of popup menus similar to those found on personal computers.

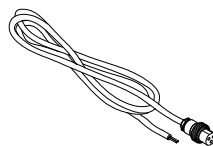
Standard Equipment Configuration List(Metal)



Display unit



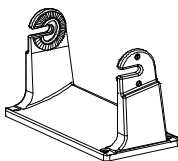
GPS ANT.



Power cable



Protector



Mounting Bracket



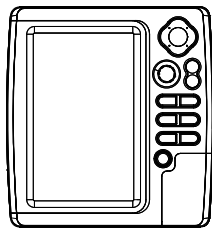
Knobs



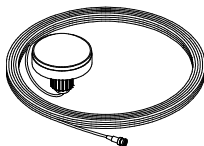
Manual

HIS-70R System

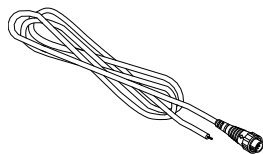
Standard Equipment Configuration List (Plastic)



Display unit



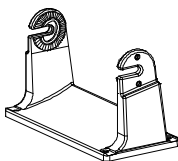
GPS ANT.



Power cable



Protector



Mounting Bracket



Knobs



Manual

HIS-70R System

GETTING STARTED

This getting Started section will help you become acquainted with the displays and the front panel keyboard functions of your HIS-70R System. This section is intended to demonstrate the main functions and basic operation of your HIS-70R System. More detailed procedures may be found in the Operation section.

HIS-70R has built-in simulators which present realistic displays of cartography, GPS and Sounder.

Note: Sounder option is required is required to use the sounder simulator. Simulators are interactive so the front panel keyboard can be used to browse through menus and change setting in the same manner as actual operation. The internal simulators allow HIS-70R to operate without having transducers or remote sensors connected. However, it is necessary to connect the power cable to 12 to 24 Vdc power source. Please refer to *Power Connection* in the installation section.

If HIS-70R is already installed on your vessel, simulators are still useful doe familiarity with displays and practice with operating procedures.

HIS-70R System

SPECIFICATION

GENERAL SPECIFICATION

1. Display Screen
wide 7 inch color TFT LCD(480 X 800 pixels)
2. Operating Temperature
Display Unit: -15°C ~ 50°C
Antenna Unit: -25°C ~ 70°C
3. Performance Standard
IMO Resolution MSC.112(73)
4. Back-up
SD Card (Optional)

CHARTPLOTTER SPECIFICATION

1. Display Method
Mercado Projection
2. Display Mode
True motion / North up / Course up / Head up
3. Latitude Limits
Between 85° N to 85° S
4. Map Scale
0.05nm to 1000nm
5. Map Datum
WGS-84(Standard), 270 different Datums
6. Chart Data
C-MAP
7. Input/Output Data
NMEA-0183

GPS RECEIVER GENERAL SPECIFICATION

1. Receive Type
L1 frequency(1575.42MHz), C/A code
2. Number of Channel
50 channels

HIS-70R System

3. Accuracy

Position 2.5m CEP

DGPS/SBAS 2.0m CEP

4. Sensitivity

Acquisition -140 dBm

Tracking -149 dBm

5. Data Update Rate

1 Second

6. Support

DGPS, SBAS (WAAS, EGNOS, etc)

AIS SPECIFICATION

1. Electrical Interfaces

RS232 38.4kBaud bi-directional

RS422 NMEA 38.4kBaud bi-directional

2. VHF Transceiver:

Transmitter x 1

Receiver x 2

(One receiver time shared between AIS and DSC)

Frequency: 156.025 to 162.025 MHz in 25 kHz steps

3. Output Power:

33dBm $\pm$ 1.5 dB

Channel Bandwidth:

25kHz

4. Modulation Modes:

25kHz GMSK (AIS, TX and RX)

25kHz AFSK (DSC, RX only)

5. Bit rate

9600 b/s $\pm$ 50 ppm (GMSK)

1200 b/s $\pm$ 30 ppm (FSK)

6. VHF Receiver:

Sensitivity - 107dBm 25kHz (Message Error Rate 20%)

Co-Channel 10dB

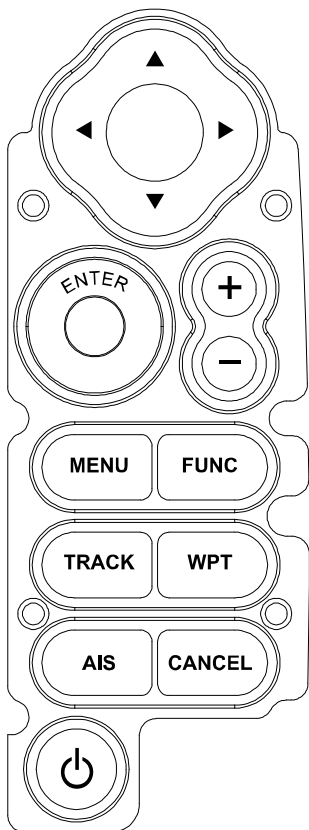
Adjacent Channel 70dB

IMD 65dB

Blocking 84dB

HIS-70R System

Keypad



KEY	Description
[Cursor Key]	With MENU: Choosing the menu. Without MENU: Cursor on.
[ENTER]	Button: Enter when menu table on the screen.
[+] & [-]	Change the chart of scale.
[MENU]	One step: Quick menu is displayed. Two step: Main menu is displayed.
[FUNC]	Setting up Using Frequently key function.
[TRACK]	Start and stop AIS tracks & Vessel tracks .
[WPT]	Places a WPT on the plotter main screen
[AIS]	Selects AIS menus
[CANCEL]	Return to the previous display, or canceled the set-up.

How to use [Power/Brightness]

► Press [PWR/BRT]

1. Use PWR:

To turn off the power, keep pressing the [BRT/PWR] until the end of counting.

2. Use BRT:

Press [BRT/PWR] shortly and the brightness can be controlled. Use the arrow keys [←][→] of the cursor to control the brightness and the contrast.

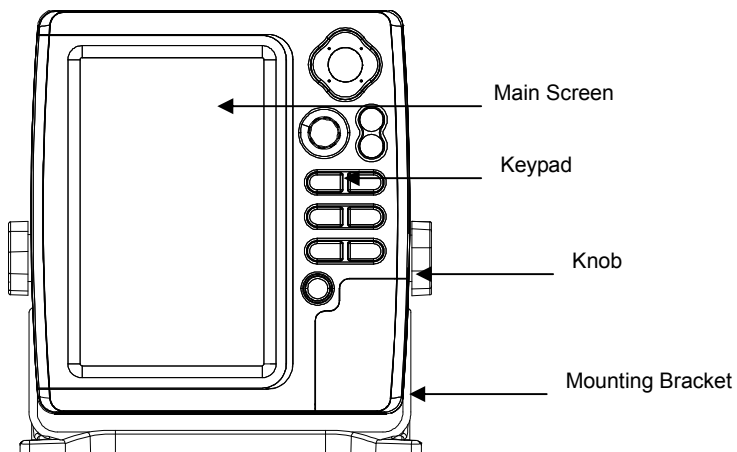
3. Use day/night mode

Press [BRT/PWR] shortly and change mode. Use the arrow keys [↓][↑] of the cursor to change mode.

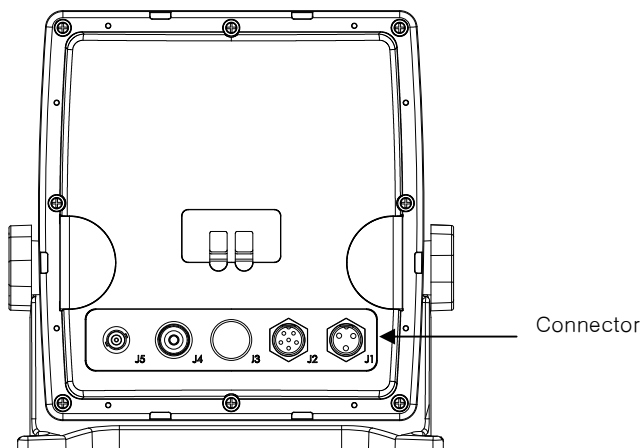
HIS-70R System

HIS-70R Metal

<Front>



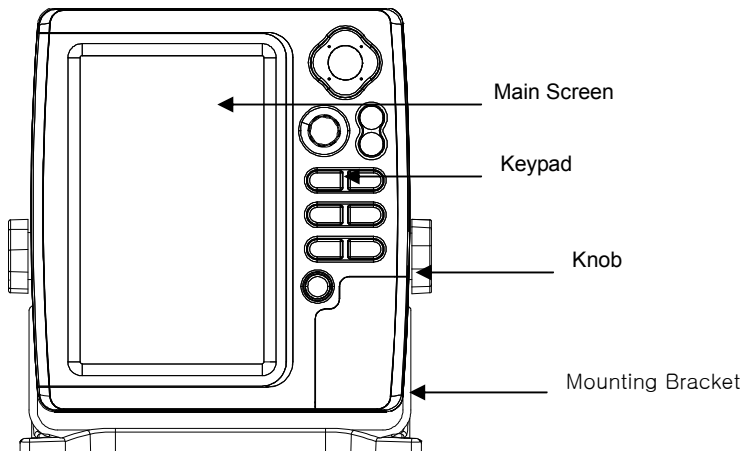
<Rear>



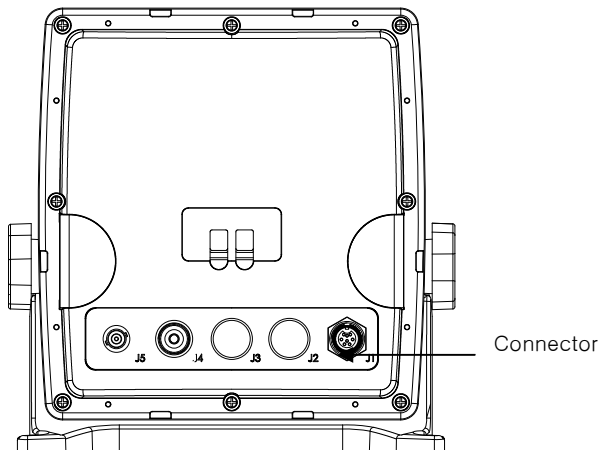
HIS-70R System

HIS-70R Plastic

<Front>



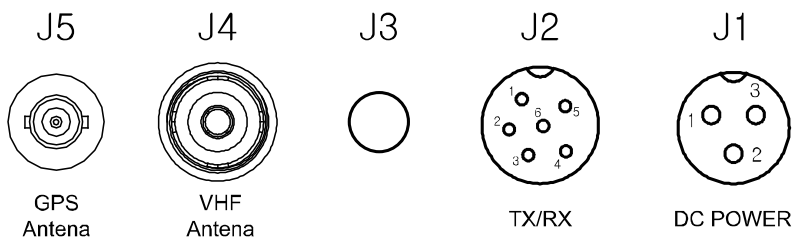
<Rear>



HIS-70R System

SPEC of the connectors

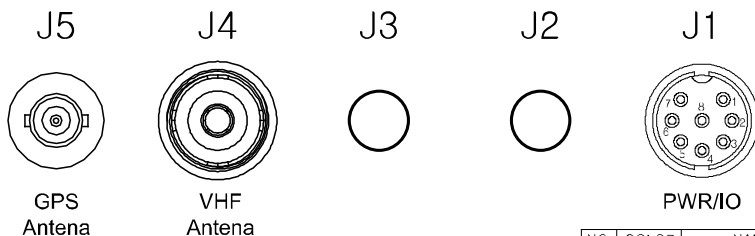
Metal



NO	NAME
1	GND
2	TX +
3	TX -
4	RX +
5	RX -
6	NC

NO	NAME
1	DC +(10V~40V)
2	DC -
3	NC

Plastic



NO	COLOR	NAME
1	Black	GND/COMMON
2	Red	PWR(12~36V)
3	White	INPUT1 +
4	Green	INPUT 1 -
5	Gray	NC
6	Yellow	OUTPUT1 +
7	Brown	NC
8	Blue	NC

Operations

AIS MENU

To obtain more information on AIS vessels or to configure the AIS

► Press [AIS]

1. List of Vessels.

Pressing the [ENTER] key will display a list of current AIS vessels in view. Initially these are sorted by showing the nearest first, additional pages of vessels can be displayed by pressing the [►] arrow key. The vessels Name, MMSI, Range and Bearing are shown.

To sort alphabetically by Name press the [ZOOM IN] button, alternate pressing of this button will toggle between A to Z and Z to A order.

To sort numerically by MMSI press the [ZOOM OUT] button, alternate pressing of this button will toggle between 0-9 and 9-0 order.

To sort by Range press the [MENU] button, alternate pressing of this button will toggle between nearest and furthest.

Pressing the [▲] or [▼] arrow keys will move the highlight blue bar over different vessels. Pressing [ENTER] when a vessel is highlighted will display another page showing all the details so far received from this vessel. Details of other vessels in the list can be accessed directly by scrolling through with the [◀] and [►] arrow keys. To return to the main list press the [CLEAR] button.

To GOTO a vessels position directly, scroll through the list to highlight the vessel you wish to go to and press the [AIS] key. The screen will now return to the main chart display and be centred on the vessel you have selected.

The display also has the ability to [TRACK] up to 5 different vessels at any one time, this feature can be enabled by either selecting a vessel in the list or directly from the [TRACK] key. Select vessel from the list and press the [TRACK] key, the selected vessel will now move to the top of the list and be highlighted with a yellow background. Pressing the [CLEAR] key twice will return the display to the main chart view and the vessel selected to be tracked will be highlighted in yellow. All the time this vessel is selected for tracking it will leave a yellow track of its past history of positions. Placing the cursor over the vessel that is being tracked and pressing the [ENTER] key will display an additional window in the lower half of the screen showing more details of the vessel. To deselect a vessel being tracked place the cursor over the vessel and press the [TRACK] key, the vessel will now revert to its normal color, and move back down the AIS List to its original location.

Alternatively you can track a vessel directly from the main chart screen by placing the cursor over the vessel and pressing the [TRACK] key, and if you require more detail pressing the [ENTER] key.

Operations

2. Display radius

Displays range rings centred on your current position.

 The default setting is OFF.

3. Display vessels by color.

You can choose to display certain types of vessels by different color to help in quickly identifying what type of vessels are showing on the chart. Scroll down the list until the vessel type you want to alter is highlighted in blue, pressing the [►] arrow key will scroll you through the choice of colors, press the [◄] arrow key to go backwards, leave the color selection of your choice showing and press the [CLEAR] key to exit.

4. Display vessels by type

Different types of AIS transmissions can be selected to display different types of icons on the chart display. Scroll down the list until the type of AIS transmission you want to alter is highlighted in blue, pressing the [►] arrow key will scroll you through the choice of icons, press the [◄] arrow key to go backwards, leave your choice of icon showing and press the [CLEAR] key to exit.

5. Filter AIS types

This function allows you to turn on or off reception from different types of AIS transmissions, for instance if you only wanted to view Class B vessels on the chart display then select Class B On and all the others Off. Scroll down the list until the type of AIS transmission you want to switch on or off is highlighted in blue, pressing the [◄] arrow key will turn the type OFF, pressing the [►] arrow key will turn the type ON, leave your choice in the status you require and press the [CLEAR] key to exit. If you do not want to show vessels that are stationary, then select the option of vessels speed less than 0.2Kts to OFF

Operations

6. Alarm

The two alarm parameters can be changed to suit your particular circumstances. The CPA alarm is the closest approach alarm, this allows you to set a distance when the alarm will sound if a vessel comes within that distance. The alarm can be turned ON or OFF by use of the [◀] or [▶] keys. The range at which you want the alarm to sound can be adjusted by selecting CPA limit, pressing the [▶] key will increase the range, and pressing the [◀] key will decrease the range, pressing [CLEAR] will exit the function. A red range ring will be drawn on the chart screen centred on your own vessels position at the distance you have specified. The TCPA alarm is the time that a vessel will take to be in the same position as you currently are, this alarm can be turned ON or OFF by use of the [◀] or [▶] keys. The time at which you want the alarm to sound can be adjusted by selecting TCPA limit, pressing the [▶] key will increase the time, and pressing the [◀] key will decrease the time, pressing [CLEAR] will exit the function. If you want the alarms to ignore vessels that are travelling at less than a particular speed then switch the "Ignore vessels if speed less than" function ON, and adjust the speed control by use of the [▶] [◀] keys to the desired value.

7. Set up AIS time outs etc.

This menu controls certain specific AIS functions. If repeat transmissions are not received from a vessel after 7 minutes then the target is marked with a X . This time can be altered by using the [▶][◀] keys. If repeat transmissions are not received from a vessel after 10 minutes then the target is removed from the chart display. This time can be altered by using the [▶] [◀] keys. The AIS Status Bar shown at the bottom of the screen giving the reception of Channels A and B on the AIS frequency, and the GPS reception can be removed by selecting NONE with the [◀] key. It is possible to switch ON and OFF some AIS transponders transmitters connected to the display with the Transmitter function, pressing the [▶] key will turn the transmitter off, pressing the [◀] key will turn the transmitter On.

8. Labels on vessels.

This menu controls what details are displayed alongside the vessels icons on the chart display, the default is the MMSI number and Name of vessel. You can scroll up and down the list and turn ON or OFF what details you would like to be displayed alongside each vessel by use of the [▶] [◀] keys.

9. Cursor Box info.

When you move the cursor in chart mode over an AIS target a box appears showing details of that vessel. You can configure that box to show various details by turning ON or OFF the features in the menu with the [▶] [◀] keys.

10. Messages List.

This window displays lists of specific AIS messages, such as Safety Messages that the unit has received. Scrolling down the list and highlighting a message allows you to see the contents by pressing the ENTER key. Whilst in the main list pressing the MENU key when a message is highlighted will erase that message, pressing the [▶] [◀] keys will allow you to view any other pages of messages.

Pages

Select Page

Press [Page] key and then go to "Pages" screen

Selectable Pages by red box and then press [ENTER] key.

Pages [1/2]

[PAGE] : Modify SCR [ENT] : Select SCR [CANCEL] : Exit

red box

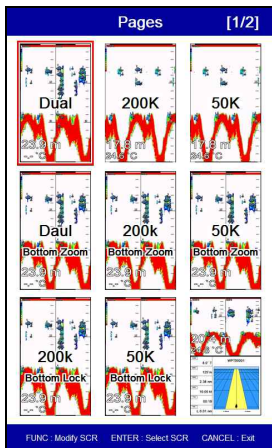
Customize

Customize of screen

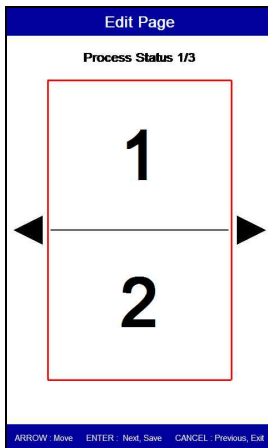
Press [PAGE] key on the Pages which selected red box.(*Refer Fig. 1.1.1 as below)

Select the layout of the formation of screen.(*Refer Fig. 1.1.2 as below)

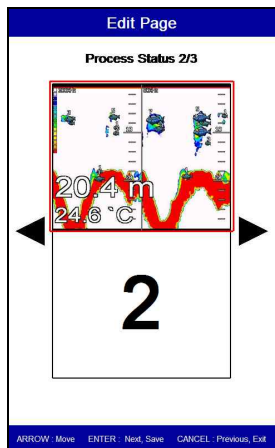
Select displays .(*Refer Fig. 1.1.3 & 1.1.4 as below)



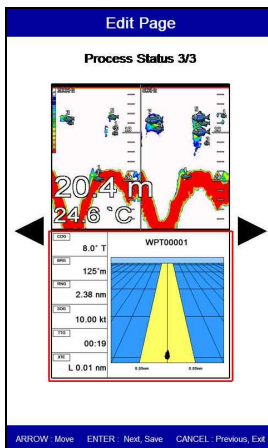
<Fig. 1.1.1>



<Fig. 1.1.2>



<Fig. 1.1.3>



<Fig. 1.1.4>

Customize

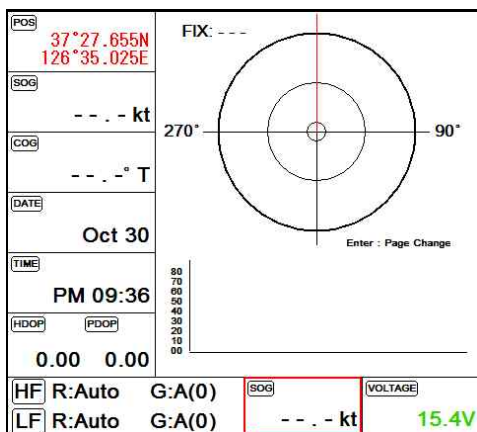
Customize of data bar

► [MENU]->Setup->Customizing->Datadar->Edit

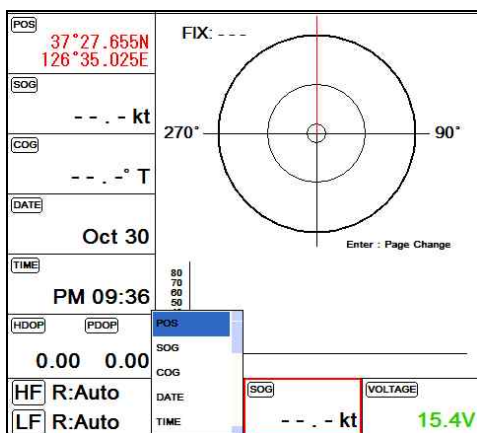
Select the section to edit by red box. (*Refer Fig. 1.2.1 as below)

Press [ENTER] key and select the data as a user want.(*Refer Fig. 1.2.2 as below)

Finish the formation of data bar, press [CANCEL] key to complete.



<Fig. 1.2.1>



<Fig. 1.2.2>

Customize

Navigation data edit

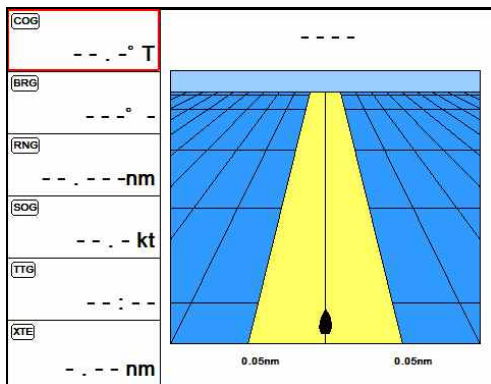
► [MENU]->Setup->Customizing->Navigation Data->Edit

Select the section to edit .(*Refer Fig. 1.3.1 as below)

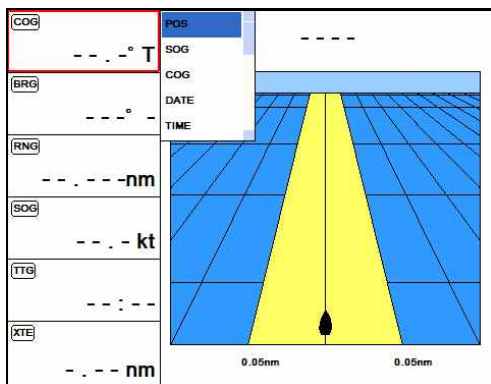
Press [ENTER] key and select the data as a user want. .(*Refer Fig. 1.3.2 as below)

Finish the formation of data bar, press [CANCEL] key to complete

(* If no navigation data on present activated display, it is not available to edit)



<Fig. 1.3.1>



<Fig. 1.3.2>

Map Orientation

1. True Motion

The True Motion is in the way the vessel position is presented. In True Motion mode, the vessel position symbol moves over the map while the map remains stationary.

Select True motion.

(* It is not available to operate on Course up and Head up.)

2. North Up/South Up/East Up/West Up

They setting the vessel present position remains fixed in the center of the Main Screen while the map moves under it.

3. Course Up

The Course Up mode screen orientation is determined by whether or not navigation is in progress. During navigation vessel present position is in the center of the Screen and the course line to the destination is straight up. As your present position changes, the map moves under the stationary vessel symbol.

(*If navigation is stopped, the Main Screen appears as Head up.)

4. Head Up

For Head Up mode, vessel present position is fixed in the center of the Main Screen and vessel heading is upward. As your present position changes, the map moves under the vessel symbol.

Menu

Menu

It is available to load the window of the menu on.

► Press [MENU]

1. Page

Select the configuration & modification you wish.

2. Active

Select the activated section

3. Map orientation

3.1. True motion

You can select "True motion"

(☞ The default setting is OFF.)

3.2. Up mode

You can select "Map Orientation"

(☞ The default setting is North Up.)

4. Vessel offset

It is possible to be set up positions of 0, 1/3, and 2/3 by the standard of the center of Main Screen.

(☞ The Vessel offset does not work on True Motion.)

5. Track

The Track function provides a record of the path over which your vessel has traveled. A track is a series of lines connecting points of vessel present position which are plotted at wither time or distance intervals. Tracks are recorded and stored one at a time. HIS-70R supports 50,000 points of track history.

(☞ The default setting is OFF.)

6. Track color

Changes the color of the track line.

7. WPT symbol

Changes the color of the WPT

8. WPT color

Changes the symbol of the WPT

9. Track color

Changes the color of the track line.

10. WPT symbol

Changes the color of the WPT

11. WPT color

Changes the symbol of the WPT

12. Recording

This is the function of recording current screen.

Marked [● REC] in red color on the upper right on the data bar during recording.

Note: The recording file is stored in SD card.

(*The storage location is "E9\Recording\" in SD card).

(* Recording time is different by the size of the memory card)

13. Screen capture

This is the function of save the current screen

Note: The capture file is stored in external SD card.

(*The storage location is "E9\Capture\" in SD card).

(* Recording time is different by the size of the memory card)

14. Navigation

11.1. Previous WPT

It is available to set up a previous WPT in the Present preferred route.

11.2. Next WPT

It is available to set up a next WPT in the Present preferred route.

11.3. Route order

It is available to set up the route forward and reverse in the Present preferred route.

11.4. Navigation Time

Setting up navigation time for TTG or ETA during navigating.

(☞ The default setting is TTG.)

11.5 Stop Navi

It is available to stop navigating.

12. Advance

It is available to load advanced menu.

Advanced menu

The advanced menu and explanation of operation are displayed.

► [MENU] ->Advance or [MENU]->[MENU]

1. Userdata

1.1. WPT

Waypoints may be entered and stored in the waypoint library by any of two different methods.

You may use the cursor to select locations from a chart, or store vessel present position as a waypoint

1.1.1. List

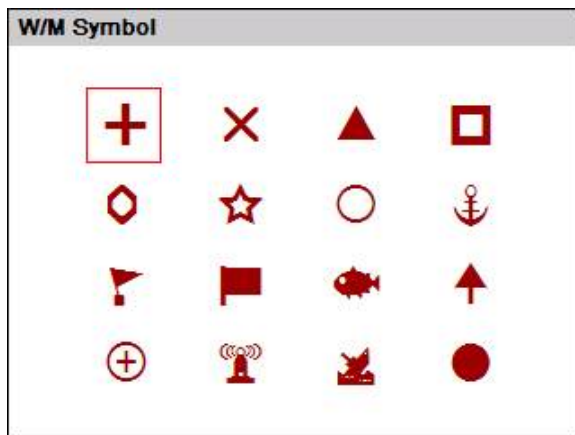
Verification of saved WPT information and edit, delete, navigation.

(*Refer the menu from bottom list on the list window)

1.1.2. Symbol

You can select shape of WPT.

(There are 16 sort of * WPT symbols as picture)



Advanced menu

1.1.3. Symbol size

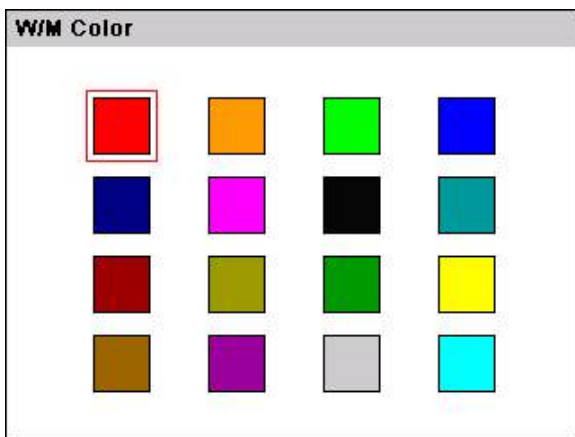
You can select the size of "WPT symbol"

(☞ The default setting is Auto.)

1.1.4. Color

You can select the color of WPT symbol

(There are 16 sort of * WPT symbols as picture)



1.2. Route

Use waypoints to create a instant route for your sailing. The capacity of waypoints are 20 point.

Every time you put waypoints on the screen, the temporary route is drawn on the screen.

1.2.1. List

Verification of saved "Route" information and edit, delete, navigation.

(*Refer the menu from bottom list on the list window)

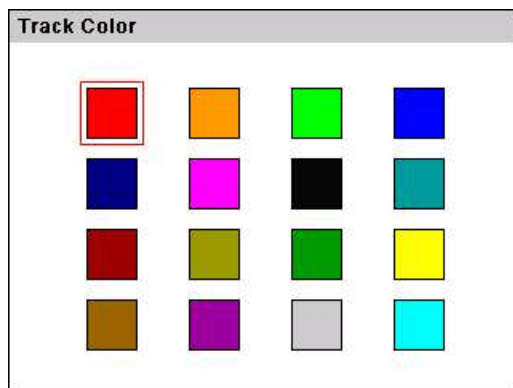
Advanced menu

1.3. Track

1.3.1. Color

You can select the color of "Track"

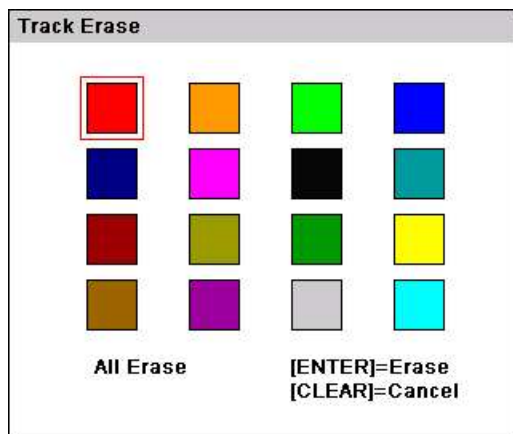
(There are 16 sort of * WPT symbols as picture)



1.3.2. Erase

You can erase all tracts by the selected color.

(* If you want to delete to be being used the track , choose "All Erase")



Advanced menu

1.3.3. Setup

1.3.3.1. Thickness

The size of a track is selectable between thin and pan.

( The default setting is Thin.)

1.3.3.2. Record setup

Track display interval is adjustable by distance or time.

( The default setting is Time.)

1.3.3.3. Time interval

If track interval is set in time, a track displays by track time interval. The track time interval and the maximum capacity is 10,000 points.

( The default setting is 10 seconds.)

1.3.3.4. DIST interval

If track interval is set in distance, a track displays by track distance interval. The track distance interval and the maximum capacity is 10,000 points.

( The default setting is 0.03nm.)

1.4. Save Userdata

You can save the "User data" in SD card

1.5. Load UserData

You can load the "User data" from SDcard.

Advanced menu

2.GPS

It is available to control and confirm information in GPS receiver.

2.1. Coordinate System

It sets coordinate system of GPS or Loran.

( The default setting is GPS.)

2.2. Datum

It shows GPS Datum. WGS-84, which is the worldwide standard is only available.

( The default setting is WGS-84.)

2.3. LAT. Modification

There could be a receiving signal error from satellites. If it is on the latitude, modify in the latitude modification.

2.4. LOT. Modification

There could be a receiving signal error from satellites. If it is on the longitude, modify in the longitude modification.

2.5. POG filter

Step 1(OFF)~59(MAX) the POG Filter. When it is On(over step 1), you can filter the POG of the vessel, to optimize it.

( The default setting is incorrect every the country.)

2.6. COG filter

Step 1(OFF)~119(MAX) the COG Filter. When it is On(over step 1), you can filter the COG of the vessel, to optimize it.

( The default setting is incorrect every the country.)

2.7. SOG filter

Step 1(OFF)~119(MAX) the SOG Filter. When it is On(over step 1), you can filter the SOG of the vessel, to optimize it.

( The default setting is incorrect every the country.)

2.8. LAT/LON Unit

It is to select the number of the unit for Lat/Lon.

( The default setting is 4 unit.)

2.9. Receiving Port

It is to select Inter receiver Internal and External.

( The default setting is Internal.)

Advanced menu

3. Setup

It is available to set the menu or units for user's visual confidence.

3.1. Unit

3.1.1. DIST/Speed

Select desired unit of measure for distance and speed. Choose from: nautical mile/knots (nm/kt), kilometer/kilometers per hour(km/kmh), yard/knot(yd/kt).

cf) 1nm = 1.852km, 1kt /h= 1.852km/h, less than 1nm display in yard and over 1nm display in mile

( The default setting is Nm/Kt.)

3.1.2. Depth

Select desired unit of measure for depth of water. Choose from: meter(M), feet(ft), fathom(fm), Italian Fathom(lfm), Japanese fathom(Jfm).

cf) 1m = 3.281ft = 0.549fm = 0.609lfm = 0.660jfm

( The default setting is Meter.)

3.1.3. TEMP

Select desired unit of measure for temperature of water. Choose from: Celsius(~~Cel~~), Fahrenheit(~~F~~).

cf) 1°C = +32°F

3.2. Compass

3.2.1. BRG

There is a difference degree where you are in the earth. This function is to modify the error from true and Magnetic.

( The default setting is Auto.)

3.2.2. Variation

There could be a difference between the magnetic compass and the GPS compass. An error depends upon your area.

3.3. Time&Date

3.3.1. Reference

Available to adjust the collect local time by the UTC time from the GPS.

( The default setting is incorrect every the country.)

3.3.2. Time Format

Sets you preferred time between 12 hour or 24 hour.

( The default setting is 12 hour.)

Advanced menu

3.3.3. Date Format

Sets you preferred date among YY-MM-DD, MM-DD-YY or DD-MM-YY.

(☞ The default setting is YY-MM-DD.)

3.3.4. Month format

Sets you preferred date between Character or Number.

3.3.5. Calendar setup

3.3.5.1. Week starts on

You can select the first day of week.

(☞ The default setting is SUN.)

3.3.5.2. Color Saturday

You can setup the color of Saturday.

3.3.5.3. Color Sunday

You can setup the color of Sunday.

3.4 Buzzer

It is can be buzzer on/off.

(☞ The default setting is on.)

3.5 Input/Output

3.5.1. Output Sentences

The chartplotter allows customizing the NMEA-0183 sentence.

DESCRIPTIONS	CONTENTS OF DATA FIELD	DEFAULT
\$GPGGA	Global Positioning System Fix Data	ON
\$GPVTG	Course and Ground Speed	ON
\$GPZDA	Time and Date	OFF
\$GPRMB	Recommended minimum navigation information	OFF
\$GPRMC	Recommended Minimum Specific GPS/TRANSIT DATA	OFF
\$GPAPB	Heading/track controller (Autopilot) sentence B	ON
\$GPXTE	Cross-track error, measured	OFF
\$GPBOD	Bearing, origin to destination	OFF
\$GPBWC	Bearing and distance to waypoint	ON
\$SYPLT	Samyoung autopilot	OFF

3.5.1. Transmit

Available to adjust transmit speed of input/output in each ports.

Advanced menu

3.6. Backlight time out

It is the screen sets the time to sleep mode.

( The default setting is off.)

3.7. Customizeing

3.7.1. Databar

3.7.1.1. Display

Setting up shown/hide the databar on the display.

( The default setting is shown.)

3.7.1.2. Position

It can change the position of databar.

( The default setting is down.)

3.7.1.3. Edit

It customizes the data bar information.

3.7.2. Navigation Data

3.7.2.1. Type

It is available to setup the size type on the display.

( The default setting is type1.)

3.7.2.2. Edit

It customizes the Navigation data section.

3.7.3. TD Setup

It sets Chain, Pair, ASF

Advanced menu

4. Maintenance

It is necessary to check the system or the version for maintenance and demonstrate HIS-70R with the simulators

4.1. Program VER.

It contains ID and the program version, and it has important information for maintenance and upgrade.

4.2. OS VER.

It contains the version of OS, which is necessary for maintenance and upgrade

4.3. MAP VER.

It contains the version of the chart, the datum and the number, which is necessary for maintenance and upgrade

4.4. Simulator

It is necessary for an indoor demonstration. The simulations of GPS, AIS.in the memory..

4.5. Language

Select the language.

4.6. Initialization

4.6.1. Setup Initialization

reset without deleting user data.

4.6.1. Factory Initialization

returning to the initial system from the releasing of factory. (*All user data will be deleted)

Advanced menu

5. Others

5.1. Recording List

Available to display and delete the recording file

5.2. Capture List

Available to display and delete the capture file

5.3. Calendar

It is available to check the solar/moon calendar and tide.

2009 11 November						
SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
9/15	9/16	9/17	9/18	9/19	9/20	9/21
Full Moon	Full Moon	Full Moon	Full Moon	Full Moon	11Tide	12Tide
8	9	10	11	12	13	14
9/22	9/23	9/24	9/25	9/26	9/27	9/28
1Tide	Neap Tide		1Tide	2Tide	3Tide	4Tide
15	16	17	18	19	20	21
9/29	9/30	10/1	10/2	10/3	10/4	10/5
5Tide	6Tide	7Tide	8Tide	9Tide	10Tide	11Tide
22	23	24	25	26	27	28
10/6	10/7	10/8	10/9	10/10	10/11	10/12
12Tide	1Tide	Neap Tide		1Tide	2Tide	3Tide
29	30					
10/13	10/14					
4Tide	Full Moon					
[F/L]=Year Changing [-I-]=Month Changing [CANCEL]=Return To Main Menu						

5.4. Key Setup

It is available to set up [FUNK] key and [EVENT] key on the HD-70F.

5.4.1. [FUNC] key:

Set the function frequently used for your convenience.

(☞ The default setting is Page.)

[FUNC]KEY SETUP
1.Page
2.Active
3.Recording
4.Capture

Chartplotter menu

1. Map setting

1.1. UserData Display

Setting up shown/hide the user data on the display.

1.2. INFO Display

Setting up shown/hide common item between the HY-MAP and the C-MAP on the display.

1.3. Map scale

Setting up the map scale on the display.

1.4. Palette

It is possible to the palette used to enhance the visibility of the screen depending on the surround light condition. The possible choices are listed in the table below:

1.4.1. Normal

It set the maps are displayed in ordered to use colors as similar as possible to the ones used in the original paper charts.

1.4.2. Sunlight

It is designed to enhance the visibility of the screen when HIS-70R is exposed to the sunlight.

The maps are much brighter than in the other displays.

1.4.3. NOAA

Allows setting NOAA paper chart colors presentation.

(*It is available NOAA menu on C_MAP mode.)

1.5. LAT. Modification

Though GPS information is accurate, there could be an error in the chart at latitude. The error can be modified in the chart latitude modification.

1.6. LOT. Modification

Though GPS information is accurate, there could be an error in the chart at longitude. The error can be modified in the chart longitude modification.

1.7. Map Select

Select the chart among HY-MAP,C-MAP and External map.

Chartplotter menu

1.8-1. HY-Map (*Only for *HY-MAP mode.)

1.8-1. 1.2M

Setting up 2m of the depth line on the HY-MAP.

1.8-1.2. 5M

Setting up 5m of the depth line on the HY-MAP.

1.8-1.3. 10M

Setting up 10m of the depth line on the HY-MAP.

1.8-1.4. 20M

Setting up 20m of the depth line on the HY-MAP.

1.8-1.5. Fishing Banks

Setting up the Fishing Banks on the HY-MAP.

( The default setting is shown.)

1.8-1.6. Land Color

Select the land color as you want.

( The default setting is yellow.)

1.8-1.7. Lighthouse Info

Setting up the Lighthouse on the HY-MAP.

( The default setting is shown.)

1.8-1.8. EEZ

Setting up the EEZ line on the HY-MAP.

1.8-1.9. Screen Magnification

Setting up the Screen Magnification on the HY-MAP.

(*MAX Magnification [ON = 0.05nm, OFF = 0.2nm])

Chartplotter menu

1.8-2. C-Map (*Only for *C-MAP mode.)

1.8-2. 1. SAT.Image

Setting up the overlay Satellite Image on the C-MAP.

(☞ The default setting is shown.)

1.8-2. 2. Font&Symbols

On charts it is possible to set the size of all names and symbols drawn on the charts, selecting between Normal size and Large size.

(☞ The default setting is normal.)

1.8-2. 3. Mixing Level

When the map coverage at the current zoom level does not fill the entire screen, the chartplotter draws the rest of the map expanding the cartographic information read from, at most, two zoom levels above the current zoom level. For this reason the map is drawn three times; firstly it draws the two levels before the current level and then the current level. The area covered by the cartographic data read from the previous levels is identified by a dotted pattern. When the cursor is moved area not covered by data of the current level the chartplotter zooms out to the first level covered by cartographic data. The default setting is ON.

(☞ The default setting is on.)

1.8-2. 4. Perspective View

Chart data may be projected in perspective mode during navigation. This function allows setting the panoramic View of the chart.

As the upper side of the map is more compressed than the lower side, a wider map area is visible. The perspective view allows showing more chart information immediately ahead and around the cursor.

(☞ The default setting is off.)

1.8-2. 5. Chart Boundaries

Sets ON/OFF the displaying of the chart boundaries, which represents the boundaries of the charts available on the chartplotter. Selecting Auto instead, if we are in background charts only the first chart levels contained in the C-CARD are displayed, if we are in a charts level contained in the C-CARD the next four charts level are displayed.

(☞ The default setting is auto.)

1.8-2. 6. Multi Language

Select language for name of the place, lighthouse or buoy.

(☞ The default setting is English.)

Chartplotter menu

1.8-2. 7. QuickView

It is available to set up. Place the cursor on buoys or icons on the C-MAP, the information window is shown up automatically.

( The default setting is hidden.)

2. Vessel

2.1. Vessel Icon Size

The size of the present position is adjustable from 0 to 9. The biggest size is '0'.

( The default setting is 9.)

2.2. Heading Line

The length of the heading line is adjustable from 50 until 300. The bigger number, the longer line.

The heading line is used in modes of the true motion and the north up.

( The default setting is 270.)

2.3. Vessel Style (Circle/Arrow/Vessel)

Select the vessel symbol among Circle, Arrow and vessel.

( The default setting is circle.)

2.4. Orient. Resolution

Sets you preferred Rolling Road Scale.

( The default setting is 0.)

3. Alarm

3.1. Navigation

3.1. 1. Arrival Alarm:

When you approach into the waypoint range, it gives you a notice with alarm.

( The default setting is OFF.)

3.1.2. Arrival Radius:

It is to adjust the range of arrival from your waypoint. If you have a route, it changes to the next waypoint automatically.

( The default setting is 0.05nm.)

3.1.3. XTE Alarm:

If you are out of the course, it gives you a notice with alarm.

( The default setting is OFF.)

3.1.4. XTE Radius:

It is to adjust the range of the off course.

( The default setting is 0.25nm.)

Chartplotter menu

3.2. Anchor

3.2.1. Anchor Alarm:

It is necessary when your vessel anchors.

( The default setting is OFF.)

3.2.2. Anchor Radius:

If your vessel is out of the range of the anchor, it gives you notice with alarm.

( The default setting is 0.05nm.)

3.3. Interval

3.3.1. Interval Alarm:

It alarms every time you set.

( The default setting is OFF.)

3.3.2. Interval Time

The time is available from one minute until sixty minutes.

( The default setting is 3 min.)

Introduction

How AIS Works

The marine Automatic Identification System (AIS) is a location and vessel information reporting system. It allows vessels equipped with AIS to automatically and dynamically share and regularly update their position, speed, course and other information such as vessel identity with similarly equipped craft. Position is derived from a Global Navigation Satellite System (GNSS) network and communication between vessels is by Very High Frequency (VHF) digital transmissions. A sophisticated and automatic method of time sharing the radio channel is used to ensure that even where a large number of vessels are in one location, blocking of individual transmissions is minimised, any degradation of the expected position reporting interval is indicated to the user and even if the unit suffers extreme channel overload conditions it will always recover to normal operation.

AIS Classes

There are two classes of AIS unit fitted to vessels, Class A and Class B. In addition AIS base stations may be employed by the Coastguard, port authorities and other authorised bodies. AIS units acting as aids to navigation (A to Ns) can also be fitted to fixed and floating navigation markers such as channel markers and buoys.

Class A units are a mandatory fit under the safety of life at sea (SOLAS) convention to vessels above 300 gross tons or which carry more than 11 passengers in International waters. Many other commercial vessels and some leisure craft also fit Class A units.

Class B units are currently not a mandatory fit but authorities in several parts of the world are considering this. Class B units are designed for fitting in vessels which do not fall into the mandatory Class A fit category.

The SVS-300 is a Class B unit

Information Transmitted and Received

A Class A unit will transmit its IMO number (if known), MMSI, Call sign and Name, length and beam, ship type, time, course over ground (COG), speed over ground (SOG), heading, navigational status, rate of turn, draught, cargo type, destination and safety related messages via a short message service (SMS) facility. Message lengths are variable with static and voyage related information being transmitted less often.

Introduction

Class A ship borne reporting intervals

Ships dynamic conditions	Rate
Ship at anchor or moored	3 min
Ship 0-14 Knots	10 sec
Ship 0-14 Knots and changing course	3.3 sec
Ship 14-23 Knots	6 sec
Ship 14-23 Knots and changing course	2 sec
Ship > 23 Knots	2 sec
Ship > 23 Knots and changing course	2 sec
Ships Static Information	6 min

A Class B unit will transmit its MMSI, Call Sign and Name, length and beam, ship type, time, course over ground (COG), speed over ground (SOG).

Class B ship borne reporting intervals

Ships dynamic conditions	Rate
Ship with Speed Over the Ground < 2 Knots	3 min
Ship with Speed Over the Ground > 2 Knots	30 sec
Ships Static Information	6 min

NMEA 0183 Messages

Receipt of a VHF transmission on either AIS radio channel causes a VDM message to be output via the data port.

VDM Message Format

!-VDM,x1,x2,x3,a,s--s,x*hh<CR><LF>

x1 = Total number of sentences needed to transfer the message , 1 to 9

x2 = Sentence number, 1 to 9

x3 = Sequential message identifier, 0 to 9

a = AIS Channel, "A" or "B"

s - - s = Encapsulated ITU-R M.1371 radio message

x = Number of fill-bits, 0 to 5

VDM Message Types

For example, the information contained in the s - - s portion of the VDM = Encapsulated ITU-R M.1371 radio message. Note that messages 5 and 19 may be sent as multi part messages using the x1, x2 and x3 parameters for message sequence control

VDO Message Format

This sentence sends the own vessels details.

Message Format

!-VDO,x1,x2,x3,a,s--s,x*hh<CR><LF>

x1 = Total number of sentences needed to transfer the message , 1 to 9

x2 = Sentence number, 1 to 9

x3 = Sequential message identifier, 0 to 9

a = AIS Channel, "A" or "B"

s - - s = Encapsulated ITU-R M.1371 radio message 4

x = Number of fill-bits , 0 to 5

ACA Message Format

The SAS SERIES unit can receive regional channel management information (ACA) in two ways:
ITU-R M.1371 message 22 or a DSC telecommand received on channel 70,

Message Format

\$--ACA,x,IIII.II,a,yyyy.yy,a,IIII.II,a1,y1y1y1y1y1y1,a2,x1,x2x2x2x2,

x3,x4x4x4x4, x5,x6,x7,a3,x8,hhmmss.ss*hh <CR><LF>

x = Sequence Number , 0 to 9

IIII, II, a = Region Northeast corner latitude – N/S

yyyy.yy,a1 = Region Northeast corner longitude – E/W

IIII.II,a = Region Southwest corner latitude – N/S

y1y1y1y1y1y1,a2 = Region Southwest corner longitude – E/W

x1 = Transition Zone Size

x2x2x2x2 = Channel A

x3 = Channel A bandwidth

x4x4x4x4 = Channel B

x5 = Channel B bandwidth

x6 = Tx/Rx mode control

x7 = Power level control

a3 = Information source

x8 = In-Use Flag

hhmmss.ss = Time of "in-use" change

NMEA 0183 Messages

ACS Message Format

This sentence is used in conjunction with the ACA sentence and identifies the originator of an ACA message.

\$--ACS,x,xxxxxxxx, hhmmss.ss,xx,xx,xxx*hh <CR><LF>

x = Sequence Number , 0 to 9

xxxxxxxx = MMSI of originator

hhmmss.ss = UTC of receipt of channel management information

xx = UTC Day, 01 -31

xx = UTC Month, 01 -12

xxxx = UTC Year

ALR Message Format

Alarm message

\$--ALR,hhmmss.ss,xxx,A,A,c--c*hh<CR><LF>

hhmmss.ss = Time of alarm (UTC)

xxx = Unique alarm number

A = Alarm condition

A = Alarm acknowledge state

c--c = Alarm description, text

Alarms descriptions presented are:

AIS: TX malfunction

AIS: Antenna VSWR exceeds limit

AIS: Rx channel 1 malfunction

AIS: Rx channel 2 malfunction

AIS: general failure

AIS: no sensor position in use

AIS: no valid SOG information

AIS: no valid COG information

AIS: 12V alarm

AIS: 5V alarm

AIS: Loss of serial interface integrity

AIS: Background noise above -77dBm

ACK Message Format

Can be generated by a minimum keypad and display (MKD) unit, chart plotter or other display device connected to the HIS-70R to acknowledge an alarm condition reported by the SAS SERIES.

\$--ACK,xxx*hh <CR><LF>

xxx = Unique alarm number

II Installation

GPS Antenna

The GPS antenna used must be of the active type (i.e. it should incorporate an LNA) and must be suitable for marine shipboard applications (index of protection, ruggedness, means of mounting, etc.). An antenna should be selected with a gain (in dB) depending on the length of cable between the antenna and the AIS unit; after subtraction of cable and connector losses, a minimum total gain of 25 dB should be available at the SAS SERIES unit GPS antenna connector.

The GPS antenna to be used for AIS use must be a dedicated antenna, i.e. not shared with any other

GPS receiver.

Installation of the GPS antenna is critical for the performance of the built in GPS receiver which is used for timing of the transmitted time slots and for the supply of navigational information should the main navigational GPS fail. We strongly recommend that:

The GPS antenna is mounted in an elevated position and free of shadow effect from the ship's superstructure

The GPS antenna has a free view through 360 degrees with a vertical angle of 5 to 90 degrees above the horizon.

As the received GPS signal is very sensitive to noise and interference generated by other onboard transmitters, ensure that the GNSS antenna is placed as far away as possible from radar, Inmarsat and Iridium transmitters and ensure the GPS antenna is free from direct view of the radar and the Inmarsat beam.

It is also important that the MF/HF and other VHF transmitter antennas are kept as far away as possible from the GNSS antenna. It is good practice never to install a GNSS antenna within a radius of 5 meters from these antennas.

VHF antenna

The VHF antenna employed for AIS use:

Must be a dedicated antenna, i.e. not shared with any other VHF transmitter/receiver.

Must be suitable for marine shipboard applications (index of protection, ruggedness, means of mounting, etc.)

Should be omni-directional and vertically polarised with unity gain (0 dB) with a bandwidth sufficient to maintain VSWR <1.5 over the frequency range 156 – 163 MHz. As a minimum the 3dB bandwidth must cover the two AIS channels and the DSC Channel.

Should be mounted with at least a two metre vertical separation distance from any other VHF antenna used for speech or DSC communication.

VHF Antenna Connection

Connecting a badly mismatched VHF antenna, leaving the VHF antenna port disconnected, or

Installation

shorting the VHF antenna port will activate the VSWR alarm, cause the unit to stop sending position reports or cause damage to the transponder.

Radio Frequency Exposure

To meet the requirements for Radio Frequency Exposure it is necessary to install the VHF antenna correctly and operate the AIS equipment according to the instructions.

The VHF antenna must be mounted at a minimum distance (vertical separation) of 3 metres from the head of any person standing on deck in order to meet international safety directives on Maximum Permissible Exposure (MPE) / Specific Absorption Rate (SAR).

Where no suitable structure exists to achieve a 3 metre vertical separation then the antenna base must be mounted at least 1 metre above the head of any person within range, all persons should stay outside the 3-metre safety radius and if practical a grounded RF shield should be interposed between people and the antenna.

Failure to adhere to these limits could expose persons within the 3 metre radius to RF radiation in excess of the MPE / SAR limits.

HIS-70R brings expandable display technology to your bridge or navigation station. A careful installation will assure maximum benefit from HIS-70R integrated features.

Display Unit Location

Select a location for your HIS-70R display unit that provides easy viewing from all likely operator's positions. The display unit is designed to be mounted on either a console or from an overhead surface. The HIS-70R display is also designed for flush mounting using six threaded holes on the rear panel. Locate the display in an area with protection from the elements and avoid direct sunlight on the viewing window. Also, consider access to the rear panel of the unit for connecting power and cables to the various remote sensors. The mounting surface must be flat and solid to support the unit and prevent vibration. There should be access to the inside of the surface to permit through bolt fastening for the mounting bracket.

Installation

Display Unit Installation

Temporarily install the mounting bracket on the Genesis display unit and place the unit at the selected location.



The HIS-70R display unit is unstable when the mounting bracket is not secured. Hold the unit in place at all times.

Check the suitability of the location and make any adjustments. When all is satisfactory, use the holes in the mounting bracket as a guide and mark the holes locations on the mounting surface.

Drill a 1/4 in. diameter hole at each marked location. Mount the HIS-70R display bracket using bolts through the mounting surface. Place large flat washers on the opposite side of the mounting surface from the bracket and then install lock washers and nuts. Tighten securely.

Install the display unit into the mounting bracket. Check alignment and operation of the pivots and security of the mounting. Make any adjustments necessary to prevent binding and assure even meshing of the pivot locking washers. It is advised to remove the display unit and store it in a safe place to prevent damage during the rest of the installation process.

- Power Connection

Power is supplied to the HIS-70R System through a connector on the rear panel of the display unit.

Route the power cable from the HIS-70R location to the ship's power distribution panel.

Connect the black wire to a battery negative (-) terminal of the power panel.

Connect the white wire to a fused battery positive (+) terminal of the power panel (12 to 24 Vdc nominal). If a fused terminal is not available, install an in-line fuse holder.

Reference

- Care and Cleaning

Your HIS-70R is made to withstand marine elements but a little care ensures a trouble free life. Accumulations of salt and sand, if not removed, will eventually mar the finish. No solvents or harsh cleaners should be used. The display unit may be wiped down with a damp cloth while avoiding the display window. Be careful not to scratch the display window surface. Gently remove any sand or other grit particles before cleaning the display window. The display window should be cleaned only with water and a clean soft cloth using very light pressure.

- NMEA

A standard developed by the National Marine Electronics Association and used by most marine equipment manufacturers for data communication is known as NMEA 0183 version 1.5 and version 2.0. NMEA0183 specifications offer many recognized sentences for exchanging data between many types of marine equipment.

The following technical information is provided for reference and is accurate to the best of our knowledge at the time of printing. Please refer to the appropriate NMEA specifications for details and the latest information.

The data sentences used by the HGP-660 are as follows.

Output sentences:

DESCRIPTIONS	CONTENTS OF DATA FIELD
\$GPGGA	Global Positioning System Fix Data
\$GPGLL	Geographic Position, Latitude/Longitude
\$GPGSA	GPS DOP and active satellites
\$GPGSV	GPS Satellites in View
\$GPVTG	Course and Ground Speed
\$GPZDA	Time & Date
\$GPRMC	Recommended Minimum Specific GPS/TRANSIT DATA
\$GPAPB	Heading/track controller (Autopilot) sentence B
\$GPXTE	Cross-track error, measured
\$GPBOD	Bearing, origin to destination
\$GPRMB	Recommended minimum navigation information

GPS

For centuries, sailors have been searching for a reliable and precise method of travelling the world's waterways. From celestial navigating to the modern navigation techniques as Loran, Decca navigator, Omega or Transit Satnav, each system has had its problems with weather, range and reliability. Without doubt, the "Global Positioning System", or GPS for short, is the most significant advance in navigation: it gives the navigator a position 24 hours a day, 365 days a year in any weather condition. GPS is a satellite based navigation system which provides suitably equipped users with accurate position, velocity and time data. Originally the GPS, developed by the U.S. Department of Defense, was conceived for military purposes, but now it is used in a host of civilian applications.

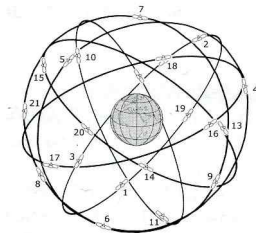
GPS navigation uses satellite signals to determine your position in relation to a set of satellites orbiting the earth. The GPS constellation of satellites continuously send radio signals, containing the precise position for each satellite back to earth. By knowing the position of 3 or 4 satellites and calculating various time differences between transmitted signals, the GPS receiver can determine its present position anywhere on earth, and thanks to continuous updates, calculate speed and course information.

HOW GPS WORKS

Currently, the GPS constellation consists of 26 orbiting satellites (including 3 spares), but this number will increase in the future.

The GPS receiver computes an accurate position by calculating the distance to the GPS satellites that orbit the earth. Signals are required from 3 satellites for two dimensional (2D) position calculation whilst 4 satellites are required for three dimensional (3D) position calculation.

As mentioned earlier, GPS satellites are not geostationary, but they are orbiting the earth as illustrated on the following figure:



[The GPS constellation]

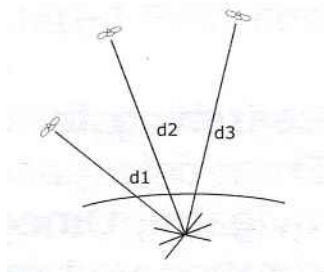
Note that position is repeatedly fixed through the following three steps while any 3 satellites are in line of sight.

The position calculation procedure is indicated in the following three steps:

1. GPS satellites continuously transmit their own precise orbital data and the GPS receiver computes their locations by receiving this data.
2. In this receiving process, the GPS receiver measures very accurate distances to the satellites, using

the "Spread Spectrum Modulation" method. Excellence in GPS's position-fixing accuracy is mainly due to this technology.

- When the satellite locations and their distances are known, the GPS receiver fixes its own position by triangulation:

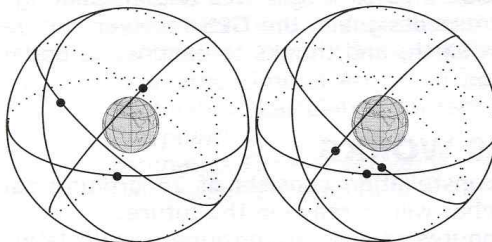


[The GPS position calculation]

As illustrated in the previous figure, the position is calculated as the meeting point of three spheres which are drawn around the three satellites with diameters d_1 , d_2 and d_3 .

Position Fixing Accuracy: HDOP

The GPS fix accuracy is due to the locations of 3 satellites in the sky. High accuracy is obtainable when the satellites are widely scattered in the sky; on the contrary, accuracy is reduced when the satellites have gathered in a narrow space. In the following figure, in both cases it is possible to obtain the GPS fix, but in the left case the accuracy will be higher than the right:



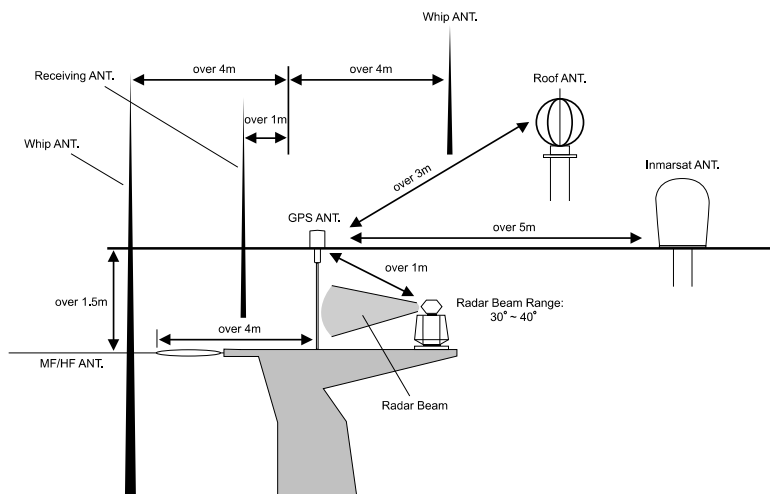
[HDOP]

The index for position-fixing accuracy is called HDOP ("Horizontal Dilution Of Precision"). The smaller the HDop value, the more accurately the position can be fixed.

The installation of the GPS ANT.

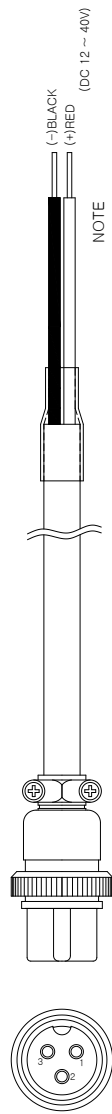
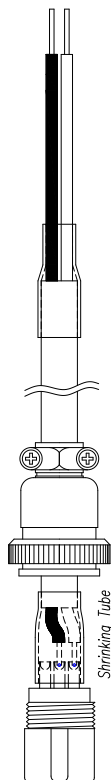
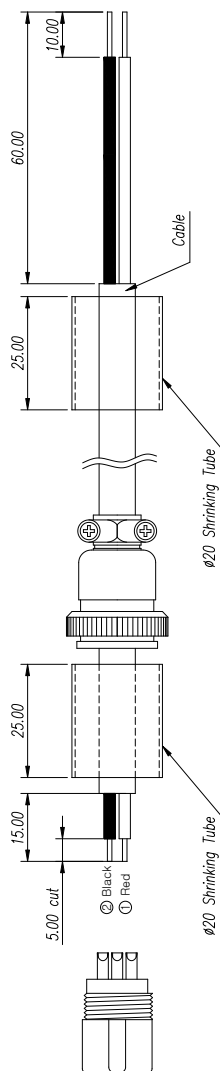
The GPS ANT must be installed at the highest area of the boat and the easiest place to catch the signal from the satellites. If there are obstacles around the GPS ANT, it isn't able to catch all signals. The receiving time would be longer or the receiving power would be weaker. Please, follow the instruction for your installation.

1. Keep from a metal.
2. Over 4m away from a MF/HF ANT, VHF or HF whip ANT.
3. Over 1.5m upper away from MF/HF ANT.
4. Over 1m away from a receiving ANT.
5. Don't put the GPS ANT into the range of radar's beam. (Range: $30^{\circ} \sim 40^{\circ}$)
6. Over 1m away from the scanner of the radar.
7. Over 5m away from the ANT of the inmarsat.
8. Over 3m away from the ANT of the roof.
9. Over 2m away from the engine.
10. Over 0.5m away from the metal surface.



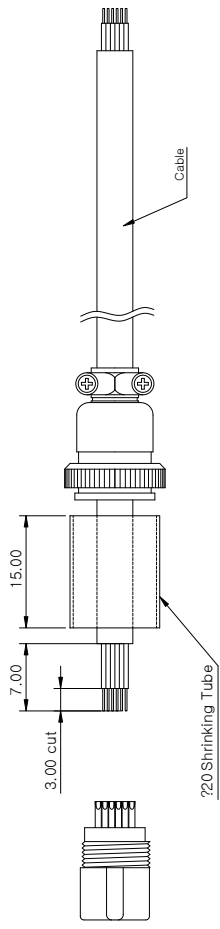
※Warning: Not less than 0.5m away from the metal surface.

If the environment can't be satisfied from 1 to 10, have NO. 10 satisfied and consider the others.

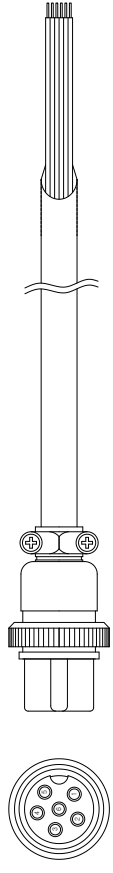
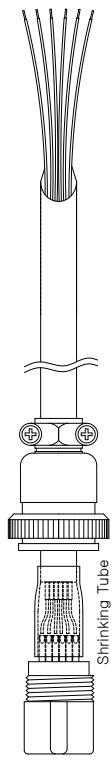


16-03P
To HD-70 series (J1)

MATERIAL		DESCRIPTION	
SCALE	MODEL	Power Cable	
NONE	Smart7 Series		
PERN	CHK. BY	DRA. BY	DATE
Y.S.KIM	Y.S.KIM	Y.S.KIM	05.07.2012
		DWG. NO.	S7-DC10303M
		HAIYANO OLUX CO.,LTD	



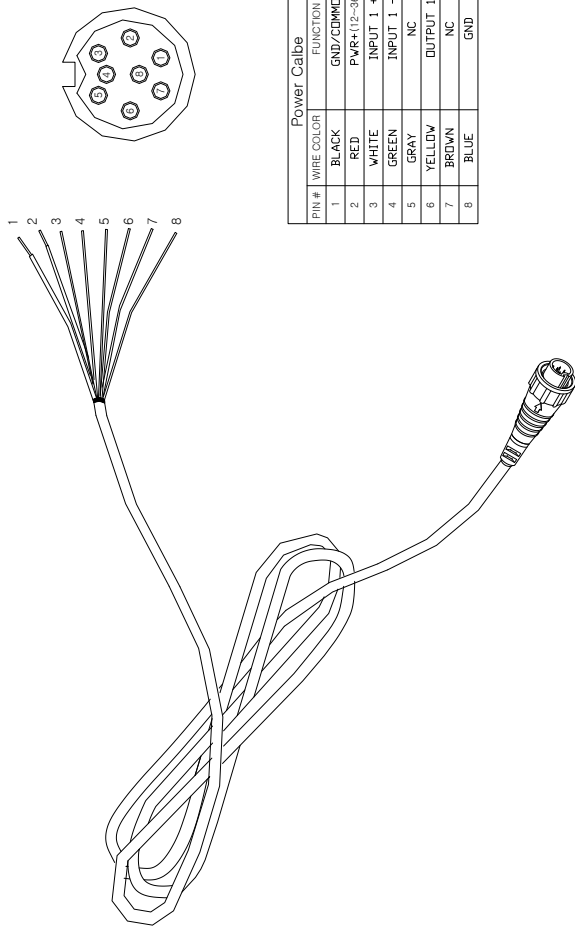
Data Cable	
Pin #	FUNCTION
1	GND
2	TX+
3	TX-
4	RX+
5	RX-
6	NC



16-03P
To HD-70 series (J1)

MATERIAL		DESCRIPTION	
SCALE	NONE	MODEL	Smart7 Series
PERN	CHK. BY	DES. BY	DRA. BY
Y.S.KIM	Y.S.KIM	Y.S.KIM	Y.S.KIM
		DATE	05.07.2012
		DWG. NO.	S7-DC10303M
		Data Cable	

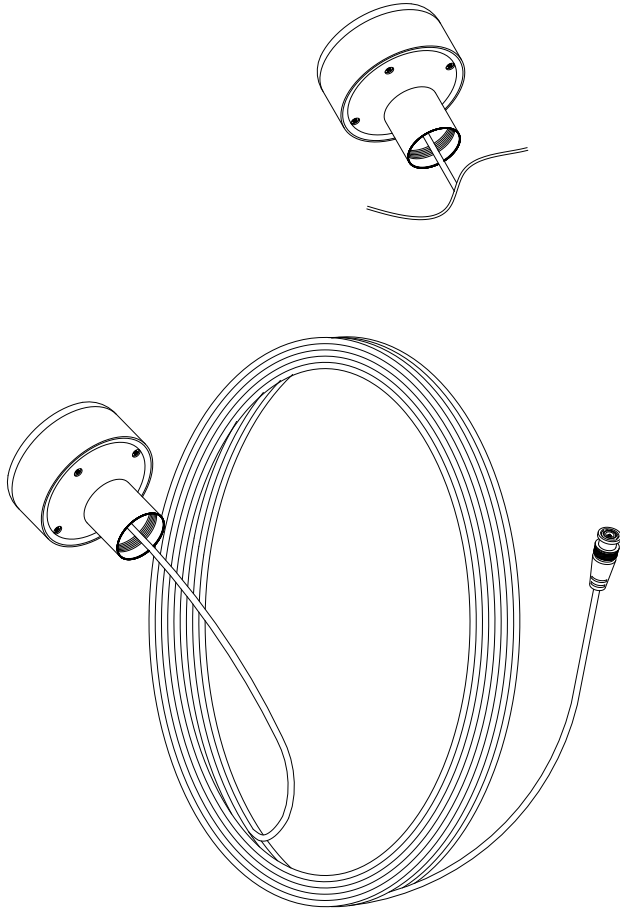
HAIYANG OULIX CO.,LTD



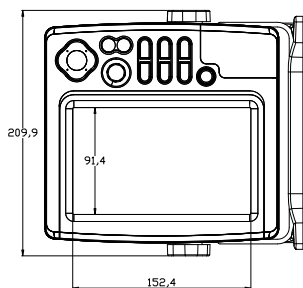
Power Cable	
PIN #	WIRE COLOR
1	BLACK
2	RED
3	WHITE
4	GREEN
5	GRAY
6	YELLOW
7	BROWN
8	BLUE

FUNCTION	
1	GND/COMMON
2	PWR+ (12-36)
3	INPUT 1 +
4	INPUT 1 -
5	NC
6	OUTPUT 1
7	NC
8	GND

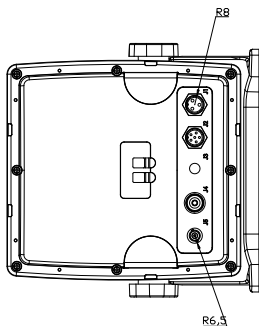
MATERIAL		DESCRIPTION	
SCALE	1/2	MODEL	HIS-70A
PERIN	Kim Y.S.	CHK. BY	Kim Y.S.
Kim Y.S.	Kim Y.S.	DRA. BY	DATE
		Perk D.J.	2012.05.07
		Power Cable & I/O	
		DWG. NO.	
		S7-DC10301P_A	
		HAIYANO OJIX CO.,LTD	



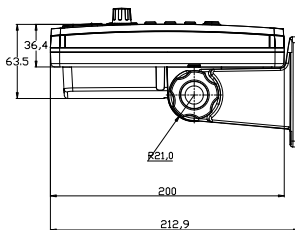
MATERIAL		DESCRIPTION	
SCALE 1/1		GPS ANT	
MODEL Smart7 series		DWG. NO. S7-PA90101	
PERF.N KIM Y.S	CHK. BY KIM Y.S	DES. BY KIM Y.S	DATE 2012.05.07
D.J.PARK			
HAIYANO OLUX CO.,LTD			



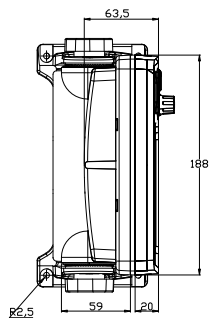
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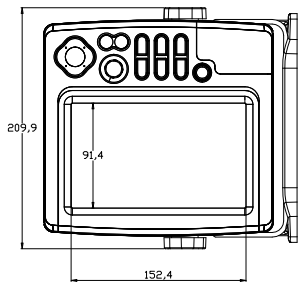


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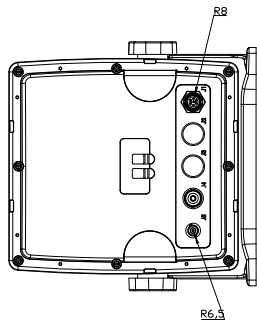


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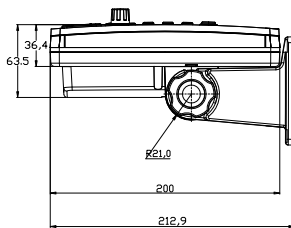
DESCRIPTION		PLAN & DIMENSIONS	
SCALE	MODEL	HIS-70A METAL	
PERN	CHK. BY	DES. BY	DATE
Kim Y.S.	Kim Y.S.	Kim Y.S.	2012.02.16
DWG. NO. S7-PL00DM.V			
HAIYANO OILUX CO.,LTD			



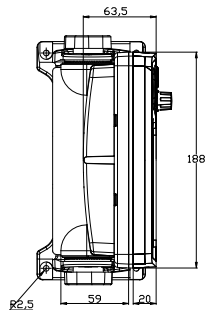
<FRONT>



<BACK>



<LEFT>



<TOP>

MATERIAL		DESCRIPTION	
MODEL	HIS-70A PLASTIC	PLAN & DIMENSIONS	
SCALE	1:1	DWG. NO.	SY-FL00DP_V
PERIN	Kim Y.S.	CHK. BY	Kim Y.S.
NS	Kim Y.S.	DES. BY	Park D.J.
		DATE	2012.02.16

HAIYANG POLIX CO.,LTD

Declaration of Warranty

Declares of under his sole responsibility that the produced Plotter with Fish Finder manufactured by

HAIYANG OLIX Co., LTD.

103-903 BucheonTechnopark 364 Samcheongdong

Ojeonggu Bucheon Gyeonggi, Korea

TEL +82 2 3240381 FAX +82 32 327 4713

Web-site: <http://www.haiyang.co.kr>

Guarantee for One Year

Haiyang Electronic Equipment Co., LTD warrants the produced equipment, Equipment for One (1) year for guarantee as bellows.

1. Main Unit: One (1) year guarantee after a user purchases the product within one (1) year
2. Accessories: One (1) year for consumed accessories (including TD) after a user purchases them.

Service in Charge

1. Over the term from the guarantee
2. Damage from user's carelessness (inundation, impact)
3. Intentional dismantle, modification or remodeling of the unit.
4. Unauthorized parts, components or accessories are used in the unit.
5. Installed or maintained by unauthorized person
6. Consumed parts and components (batteries, LCD, etc) run out.
7. Faults or damages from other reasons.

Model	HIS-70R	Serial No.	
Date of Purchase		Customer Name	
Name of Dealer		Price	

※ Caution – Keep this warranty card with the receipt for fast and good service