JLR-7500/7800
NWZ-4740

GPS NAVIGATOR

INSTRUCTION MANUAL

JRC Japan Radio Co., Ltd.

Foreword

Thank you for purchasing the JRC GPS Navigator JLR-7500/7800.
This equipment is a high-performance navigation equipment consisting of a DGPS/GPS sensor and navigator, can retrieve the position data using the DGPS/GPS sensor to display various navigation information on the display.

- Thoroughly read this instruction manual before operating the equipment.
- Keep this manual nearby the equipment to allow ready access to it if necessary. It may provide valuable information on how to deal with a given situation that may arise during the operation.

Symbols

Several symbols are used in this manual to ensure safety and proper operation of the equipment and to avoid possible human injury or property damage. These symbols and their meanings are shown below. Please read and understand these symbols before proceeding to read this manual.

⚠ **WARNING**	Instructions shown with this symbol represent what can cause death or serious injury if not observed.
⚠ **CAUTION**	Instructions shown with this symbol represent what may cause injury or property damage if not observed.

Examples of the Symbols

The symbols shown in the △ mark represent those that require attention (including potential dangers and warnings).
A depiction of the type of caution is shown inside the symbol (the left symbol indicates a general caution).

The symbols shown in the ⃠ mark represent actions which are prohibited. A depiction of the type of prohibited action is shown inside the symbol (the left symbol indicates that disassembly is prohibited).

The ● symbol indicates required actions. A depiction of the type of required action is shown inside the symbol (the left symbol indicates that the power plug must be disconnected from the outlet).

Precautions Upon the Operation

⚠ WARNING

Do not disassemble or modify the equipment. Doing so may result in fire, electric shock, or equipment failure.

Do not allow the display to become wet. Doing so may result in fire, electric shock, or equipment failure.

Operate the equipment only at the indicated voltage. Failure to do so may result in fire, electric shock, or equipment failure.

Install this unit at least 1 m away from any magnetic compasses. Installation near a magnetic compass may result in interference with the magnetic compass, and may result in an accident.

Do not perform internal inspections or modifications of the equipment. Inspection or modification by unauthorized personnel may result in fire, electric shock, or equipment failure. Please consult with JRC or an affiliate to perform internal inspections or repair.

When disposing of the used lithium battery, place insulating tape over the battery terminals, or otherwise insulate the battery. Failure to do so may result in heating, explosion, or fire due to a shorted battery.

Precautions Upon the Operation

⚠ CAUTION

This equipment is not designed to automatically make judgments on the position data. The navigation information including the position data needs to be judged by the user himself.

Do not use the equipment in the environment other than those provided in the specification. Doing so may result in equipment failure, malfunction, or injury.

Do not install the display unit in the location where it may come in contact with water, oil, or chemicals. Doing so may result in equipment failure, malfunction, or injury.

Do not install the equipment in the place subject to vibration or shock.
Doing so may result in the equipment falling or collapsing, resulting in equipment failure or injury.

Do not place any item on the top of the equipment.
Doing so may result in equipment failure, malfunction, or injury.

Please consult with JRC or an affiliate to perform installation. Installation by unauthorized personnel may result in malfunction.

Use only the specified battery. Failure to do so may result in battery leakage or rupture, resulting in fire, injury, or equipment failure.

Use the indicated screws when installing the display unit to a stable wooden surface. Failure to do so may result in the display unit falling over, causing injury or property damage.

Use only the specified fuse.
Failure to do so may result in fire or equipment failure.

Use only the specified battery.
Failure to do so may result in equipment failure or malfunction.

⚠ CAUTION

When connecting the cable attached to the equipment, do not bend it acutely, twist it, or impart excessive force. Doing so sometimes causes cracks or damage to the coating, resulting in fire or electrocution.

Do not install the sensor where there is excessive vibration.
Vibration may cause sensor failure.

Do not paint the sensor.
Doing so may result in reception problems.

The junction box rubber gaskets (ϕ 25 Gland side) fit ϕ 10 - 20 cables.

Install the sensor where there are no obstacles, in order to ensure that GPS signals can be directly received from satellites without interference or reflection of signals from surrounding objects.
Whenever possible, select a place with the following characteristics.

1. **An open space, which allows uniform reception of satellite signals.**
2. **Far away from any high power transmission antennas.**
3. **Outside radar beams.**
4. **Away from the INMARSAT antenna by at least 5 meters and outside the INMARSAT beam.**
5. **Away from the antenna of a VHF transmitter and a direction finder by at least 3 meters.**
6. **Away from a Magnetic Compass by at least 1 meter.**
7. **3 meters or more away from amateur radio antennas.**

If it is difficult to find an ideal site, select a place temporarily and install the equipment. Conduct a test to make sure that the proper performance can be obtained and then fix the equipment in position. If it is installed at an improper place, reception accuracy may be impaired.

Appearance of the Equipment

●NWZ-4740　Display Unit

●JLR-4341　DGPS Sensor Unit

●JLR-4340　GPS Sensor Unit

Terminology

Term	Meaning (Descriptions)
2D (2 dimension)	Positioning with antenna elevation height in addition to satellite data.
3D (3 dimension)	The three dimensional position fix, 4 or more satellites required.
Active route	Route that is currently used by a ship
Anchor alarm	This alarm monitors that the own ship is the preset distance or more away from the waypoint.
Arrival alarm	This alarm informs that the own ship has traveled the preset distance, approaching the waypoint.
Beacon information	Beacon data which is broadcast by message type 16.
Boundary alarm	This alarm informs that the own ship has got into the preset route.
CCRP	Abbreviation of Consistent Common Reference Point. Reference position of the own ship.
CDI	Abbreviation of Course Deviation Indicator. This indicator shows information on the deviation from the scheduled route and on the direction into which the ship should be steered.
Checksum	An error detection method to check that the data has been correctly transmitted.
COG	Course Over Ground.
Course	Direction in which the ship is traveling, which is the bearing mainly displayed by the GPS.
CURRENT	Sea and ocean currents, expressed in speed and direction.
Data route	Ship route data that is stored in the memory of the equipment
Default gateway	Equipment connected externally from a constructed network.
DISP-DPU	The main circuitry of display unit.
DGPS	Abbreviation of Differential Global Positioning System. GPS satellite error data sent from a reference station whose position is accurately known is received via beacon from a beacon station, improving positioning accuracy.
FRAM	Nonvolatile memory using a ferroelectric substance.
Geodetic	Conditions for expressing position via latitude and longitude.
GPS Satellite (GPS)	Abbreviation of Global Positioning System. Refers to satellites launched for navigational support of military vessels managed by the United States Department of Defense.
HDOP	Abbreviation of Horizontal Dilution of Precision. Indicates accuracy of positioning. The smaller the number, the higher the accuracy. If GPS satellites are unevenly distributed, this number will grow. If GPS satellites are evenly distributed, this number will be smaller.
IEC	IEC is the abbreviation of International Electrotechnical Commission. It is an international standard governing electrical and electronic technologies.
IP address	ID number assigned to equipment on a constructed network.

IPXX	IPXX is Degrees of protection provided by enclosures (IP Code) 1st numeral: Against ingress of solid foreign objects (0 – 6) 2nd numeral: Against ingress of water with harmful effects (0 - 8). (IPX4: splash-proof, IPX6: waterproof)
LAN	Abbreviation of Local Area Network. A network is constructed for transmitting and receiving data.
LCD Unit (LCD)	Liquid Crystal Display Unit.
Log Pulse	Contact output signal, output in 1 pulse per nm. Expressed in units of "p/nm". mi/h Unit of ship speed.
Loran time difference display	Method for expressing the present position with loran system time difference. (The method is for operators who have a background in loran navigation.)
MAC address	ID number assigned to LAN IC
Master reset	This function changes the settings of the display unit and GPS sensor back to the factory settings. The function clears all the data.
Multipath Wave	Waves received from multiple directions due to reflection or refraction of an initial wave by obstacles.
Mutual monitoring mode	When two navigators are installed, they monitor their position fixing status each other by using this function.
NMEA0183 (NMEA)	Abbreviation of National Marine Electrical Association 0183. International standard for naval equipment transmission established by the National Marine Electrical Association.
Positioning	Use of GPS or DGPS receiving functions to determine the current position of a ship.
RAIM Accuracy Standard (RAIM)	Abbreviation of Receiver Autonomous Integrity Monitoring. This system automatically detects failed satellites and deselects their positioning data from calculations. Including data from failed satellites will result in a decrease in positioning accuracy; the RAIM accuracy standard indicates the accuracy degradation base for removal of failed satellites from positioning calculations.
Ranging	Positioning with the use of SBAS satellite in addition to GPS satellite.
Reception Level	GPS signal reception level.
Route plan	Plan registered with multiple waypoints in the navigation order
RS-232C	Serial data transmission standard. It is unbalanced, and hence can only be used for short distance transmission.
RS-422	Balanced serial transmission standard.
SBAS	Abbreviation of Satellite Based Augmentation System. It is a blanket term for wide scale GPS support systems using fixed position satellites which send GPS error correction data over a wide range.
SBAS Search	SBAS reception mode (manual / automatic).
Shared route	Function that uses the same route as other functions such as ECDIS do. The route can be updated automatically by sharing the active route.
Smoothing	Function for averaging over a specified number of seconds.

SOG	Speed Over Ground, This is the ship's relative speed to the ground.
SPEED	The speed mainly measured by the GPS.
STW	Speed Through Water.
Subnet mask	Value for identifying the network address
Symbol information	Information of symbols displayed on the plotting screen. The information includes symbol positions, comments, etc.
TD	Abbreviation of Time Difference. Time difference from the master-station signal of the loran system to the slave-station signal.
Message Type 0	SBAS satellite test broadcasting.
UTC	Abbreviation of Coordinated Universal Time.
XTD alarm	This alarm informs that the own ship has got out of the scheduled route by the preset distance or more.

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Section1 Equipment Overview

1.1 Functions

This equipment (JLR-7800/JLR-7500) is a GPS navigator with a JLR-4341 DGPS or JLR-4340 GPS sensor being connected to the NWZ-4740 display unit.
The GPS navigator operates around-the-clock to measure the position with high accuracy anywhere in the world and in all weather conditions. In addition, the GPS navigator can increase the accuracy of position fixing by receiving correction data from the DGPS beacon station and SBAS satellites.

1.2 Features

- Registration of up to 100 routes and 10000 waypoints
- Availability of four output ports
- Sharing of a route with the ECDIS by installing a LAN
- High visibility 5.7-inch FSTN LCD
- Installation of multiple graphic display modes
- Mutual acknowledgment through the contact or ALR
- Improvement of operability by using various menus
- Built-in SBAS function
- Built-in RAIM function

1.3 Configuration

Standard Configuration

JLR-7800

No	Name	Model	Code	Q'ty	Notes
1	Display Unit	NWZ-4740	NWZ-4740	1	
1-1	Power Cable	CFQ-7257	CFQ-7257	1	2m/with Fuse holder
1-2	GPS Connection Cable	CFQ-9002	CFQ-9002	1	5m
1-3	Fuse	MF60NR 250V 2	5ZFGD00010	2	2A Fuse
1-4	Clamp Filter	TFC-23-11-14	5MBAT00002	1	5MBAT00002
1-5	Connector	LTWBU-12BFFA-LL7001	5JCDX00049	1	12 cores/Serial data transmission
1-6	Copper Plate	MPAE30207	MPAE30207	1	25W x 2000 x 0.3t
1-7	Model Identification Plate	MPNN45662	MPNN45662	1	
1-8	Installation Screw	MPTG31659	MPTG31659	1	4 tapping screws
1-9	Flush Mounting Screws Kit	MPTG31962	MPTG31962	1	4 screws
1-10	SHIP REGISTRATION FORM	7ZPJD0065	7ZPJD0065	1	
2	DGPS Sensor	JLR-4341	JLR-4341	1	
2-1	Screw Adapter	MTV302007A	MTV302007A	1	
2-2	Mounting Band	MPBP02520	MPBP02520	1	include 2 bands
2-3	Cable guard rubber	MPPK31468	MPPK31468	1	
2-4	Instruction Manual	7ZPNA4162	7ZPNA4162	1	
2-5	Warranty Card Europe North America Asia/Oceania	 7ZPBS2901C 7ZPBS2902D 7ZPBS2903C	 7ZPBS2901C 7ZPBS2902D 7ZPBS2903C	 1 1 1	
3	Instruction Manual	7ZPNA4137	7ZPNA4137	1	

JLR-7500

No	Name	Model	Code	Q'ty	Notes
1	Display Unit	NWZ-4740	NWZ-4740	1	
1-1	Power Cable	CFQ-7257	CFQ-7257	1	2m/with Fuse holder
1-2	GPS Connection Cable	CFQ-9002	CFQ-9002	1	5m
1-3	Fuse	MF60NR 250V 2	5ZFGD00010	2	2A Fuse
1-4	Clamp Filter	TFC-23-11-14	5MBAT00002	1	5MBAT00002
1-5	Connector	LTWBU-12BFFA-LL7001	5JCDX00049	1	12 cores/Serial data transmission
1-6	Copper Plate	MPAE30207	MPAE30207	1	25W x 2000 x 0.3t
1-7	Model Identification Plate	MPNN45662	MPNN45662	1	
1-8	Installation Screw	MPTG31659	MPTG31659	1	4 tapping screws

1-10	SHIP REGISTRATION FORM	7ZPJD0065	7ZPJD0065	1	
1-9	Flush Mounting Screws Kit	MPTG31962	MPTG31962	1	4 screws
2	GPS Sensor	JLR-4340	JLR-4340	1	
2-1	Screw Adapter	MTV302007A	MTV302007A	1	
2-2	Mounting Band	MPBP02520	MPBP02520	1	include 2 bands
2-3	Instruction Manual	7ZPNA4008	7ZPNA4008	1	
2-4	Warranty Card Europe North America Asia/Oceania	 7ZPBS2901C 7ZPBS2902D 7ZPBS2903C	 7ZPBS2901C 7ZPBS2902D 7ZPBS2903C	 1 1 1	
3	Instruction Manual	7ZPNA4137	7ZPNA4137	1	

NWZ-4740

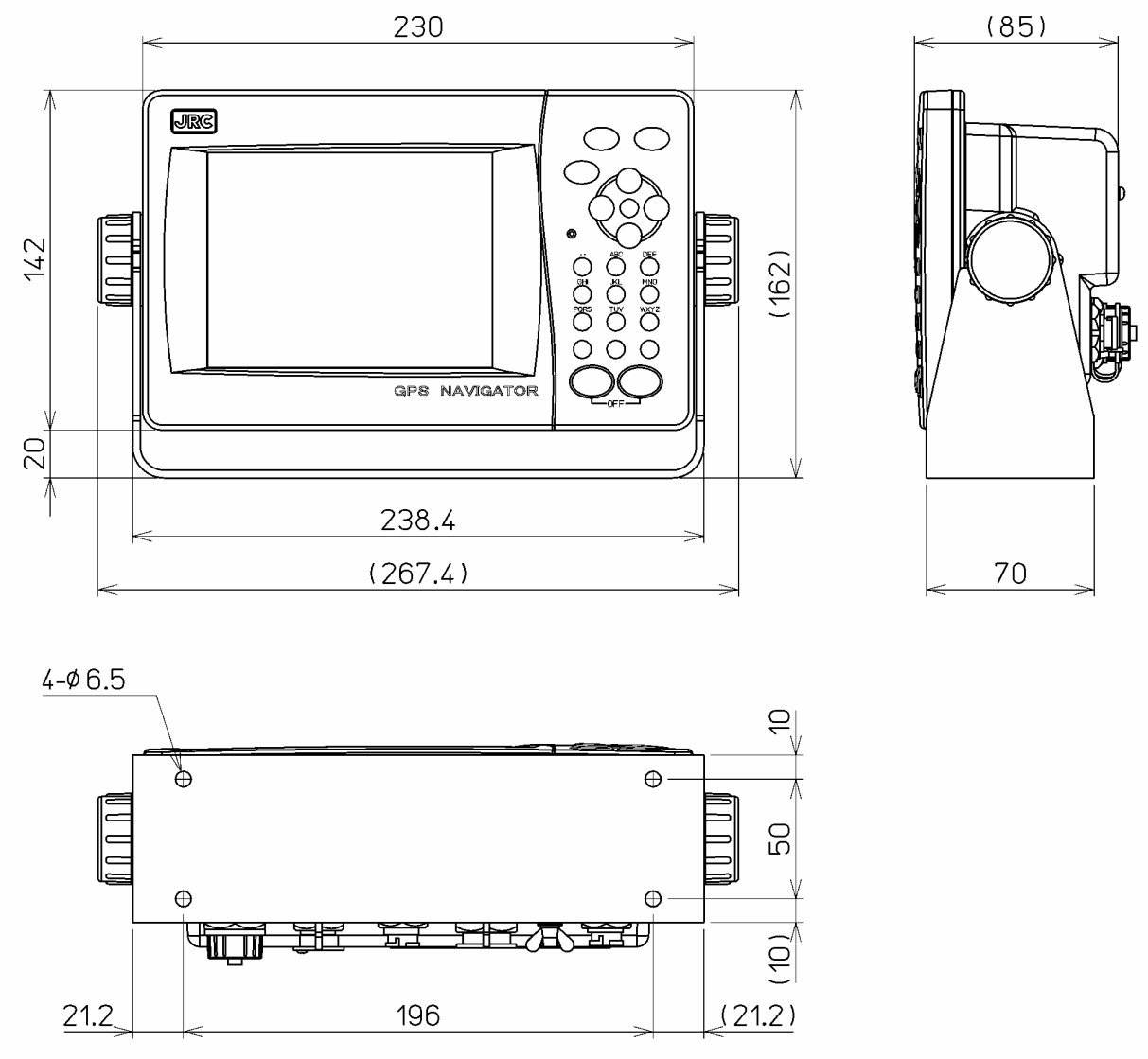
No	Name	Model	Code	Q'ty	Notes
1	Display Unit	NWZ-4740	NWZ-4740	1	
1-1	Power Cable	CFQ-7257	CFQ-7252	1	2m/with Fuse holder
1-2	GPS Connection Cable	CFQ-9002	CFQ-9002	1	5m
1-3	Fuse	MF60NR 250V 2	5ZFGD00010	2	2A Fuse
1-4	Clamp Filter	TFC-23-11-14	5JCDX00049	1	5MBAT00002
1-5	Connector	LTWBU-12BFFA-LL7001	5MBAT00002	1	12 cores/Serial data transmission
1-6	Copper Plate	MPAE30207	MPAE30207	1	25W x 2000 x 0.3t
1-7	Model Identification Plate	MPNN45662	MPNN45662	1	
1-8	Installation Screw	MPTG31659	MPTG31659	1	4 tapping screws
1-9	Flush Mounting Screws Kit	MPTG31962	MPTG31962	1	4 screws
1-10	SHIP REGISTRATION FORM	7ZPJD0065	7ZPJD0065	1	
2	Instruction Manual	7ZPNA4137	7ZPNA4137	1	

Option

No	Name	Model	Code	Q'ty	Notes
1	AC Power Rectifier	NBG-320	NBG-320	1	AC100/220V input
2	Power Cable	CFQ-7257-10	CFQ7252-10	1	10m
3	Power Cable	CFQ-7257-15	CFQ7252-15	1	15m
4	Data Cable	CFQ-5374	CFQ-5374	1	3m / 12 cores / serial transmission
5	Data Cable	CFQ-5374-15	CFQ5374-15	1	15m / 12 cores / serial transmission
6	Data Cable	CFQ-5374-20	CFQ5374-20	1	20m / 12 cores / serial transmission
7	Data Cable	CFQ-5404	CFQ-5404	1	3m / 14 cores / serial transmission
8	Data Cable	CFQ-5404-15	CFQ5404-15	1	15m / 14 cores / serial transmission
9	Data Cable	CFQ-5404-20	CFQ5404-20	1	20m / 14 cores / serial transmission
10	Ethernet Cable	CFQ-5473A	CFQ-5473A	1	5m / FTP / straight
11	Ethernet Cable	CFQ-5474A	CFQ-5474A	1	5m / FTP / cross
12	Flush Mounting Kit	MPBC43664	MPBC43664	1	For front mounting
13	Printer	DPU-414	DPU-414	1	
14	Printer Cable	7ZCJD0254A	7ZCJD0254A	1	Dual end D-Sub 9 pin 1.5 m
15	Printer Cable	7ZCJD0270B	7ZCJD0270B	1	Dual end D-Sub 9 pin 10 m
16	Printer Cable	7ZCNA4109	7ZCNA4109	1	Single end D-Sub 9 pin 3m
17	Printer Cable	7ZCNA4112	7ZCNA4112	1	Single end D-Sub 9 pin 10 m
18	Printer Connection Kit	7ZXJD0076	7ZXJD0076	1	For printer power cable extension
19	Printer Paper	6ZCAF00252A	6ZCAF00252	1	112 mm x ϕ50 mm 25m
20	Printer Power Cable	7ZCJD0257B	7ZCJD0257B	1	1.5m
21	Extension Cable	CFQ-9000	CFQ-9000	1	15m / 6 cores / serial transmission
22	Junction Box	NQE-7700A	NQE-7700AA	1	
23	Pole Mounting Kit	MPBP30608	MPBP30608	1	For NQE-7700A
24	Coaxial Cable Kit	NQD-4414	NQD-4414A	1	
25	Output Buffer	NQA-4251A	NQA-4251A	1	
26	GPS Select Switch	NCZ-777	NCZ777A	1	Manual switch
27	GPS Select Switch	NCZ-1573A	NCZ-1537A	1	Automatic switch
28	Junction Box	CQD-10	CQD-10A	1	

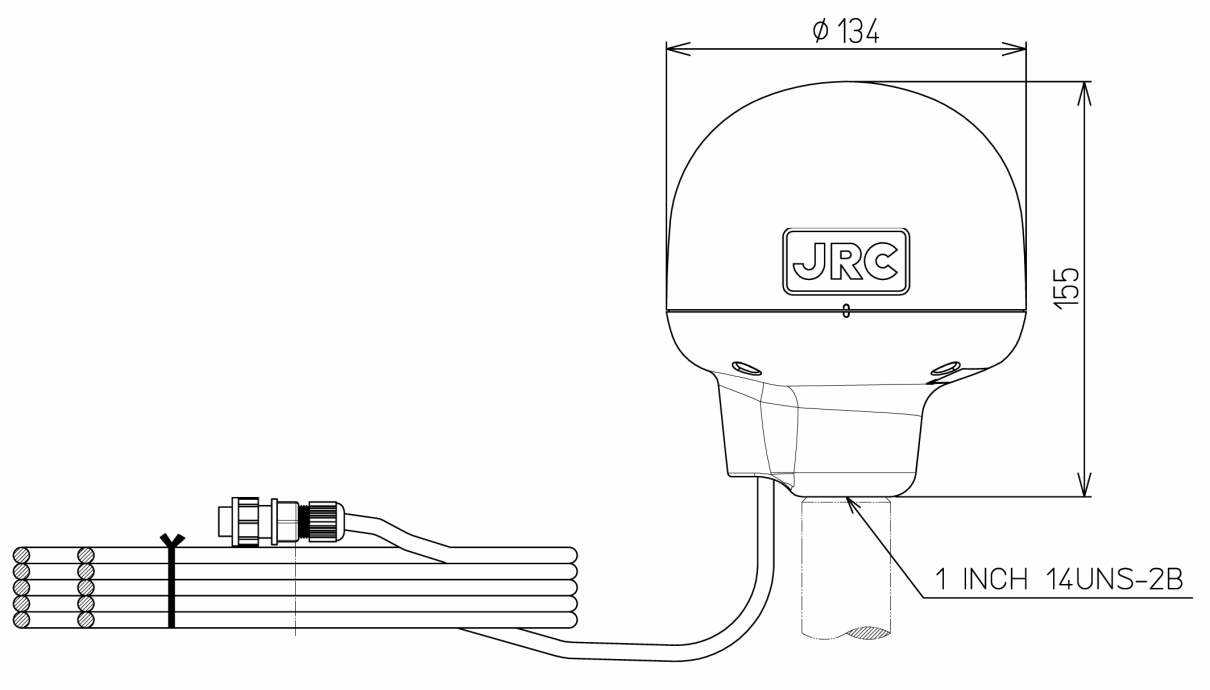
1.4 Construction

- NWZ-4740 Display Unit



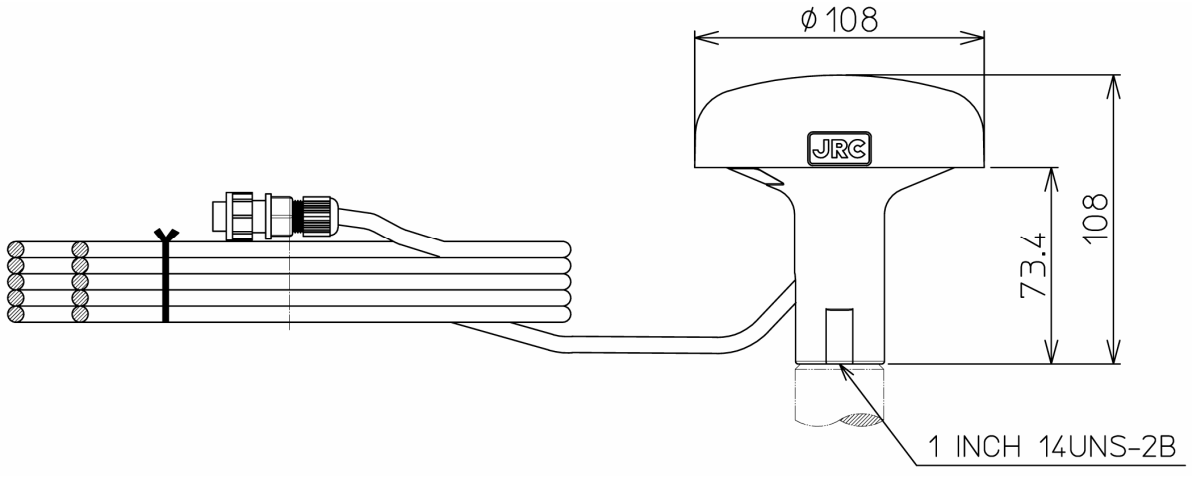
Unit: mm
Mass: Approximately 2.3 Kg

- **JLR-4341 DGPS Sensor Unit**



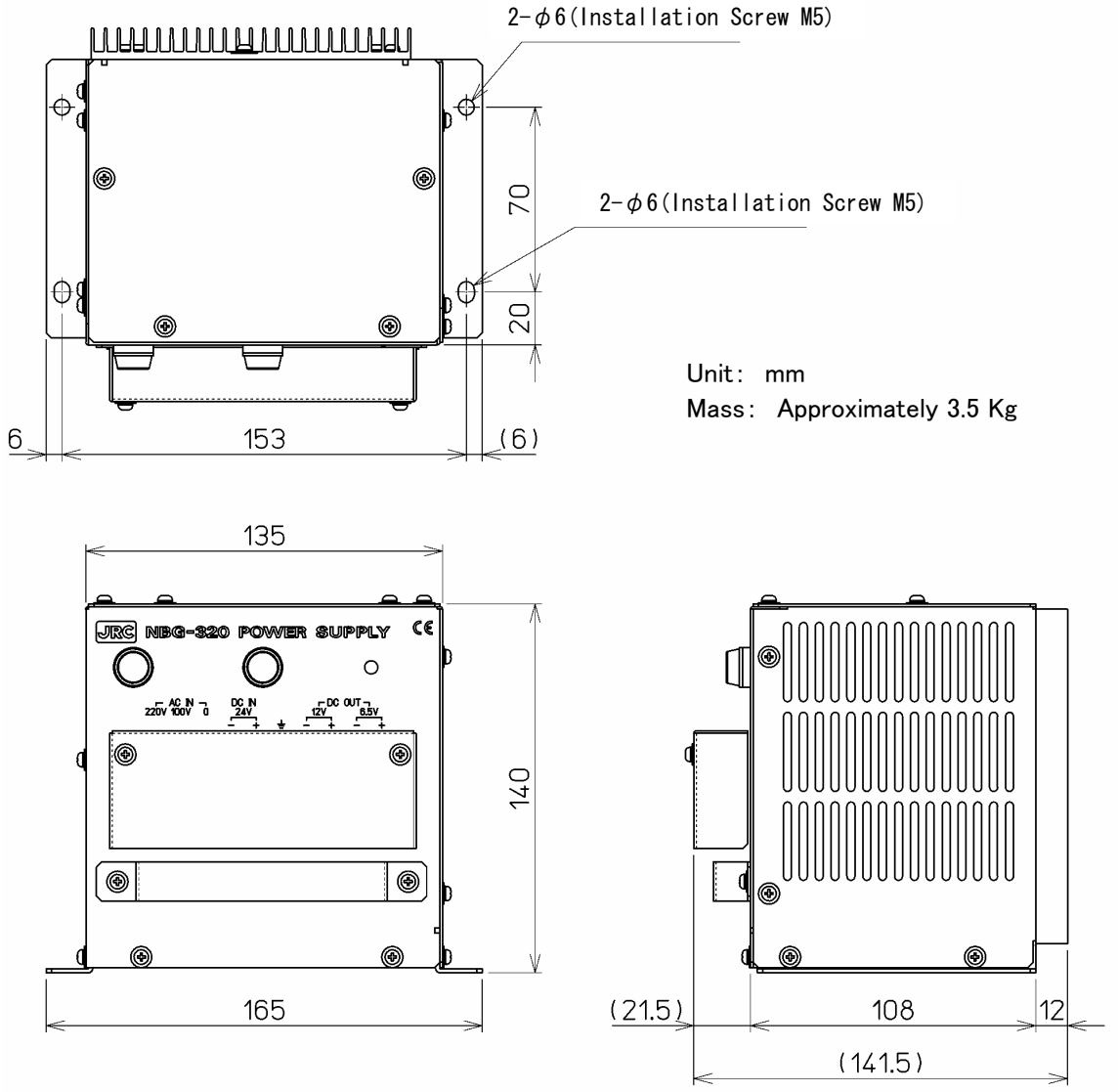
Unit: mm
Mass: Approximately 1.7 Kg
(Include Cable)

- **JLR-4340 GPS Sensor Unit**



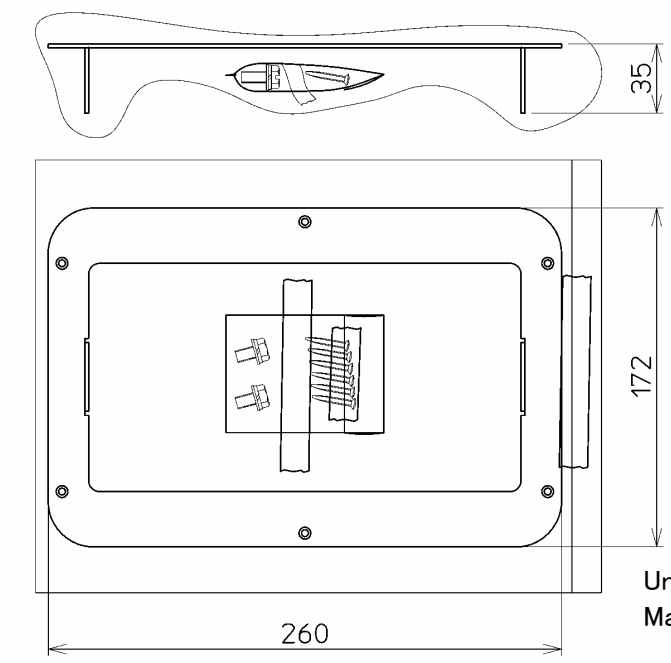
Unit: mm
Mass: Approximately 0.7 Kg
(Include Cable)

- **NBG-320 Power Supply**



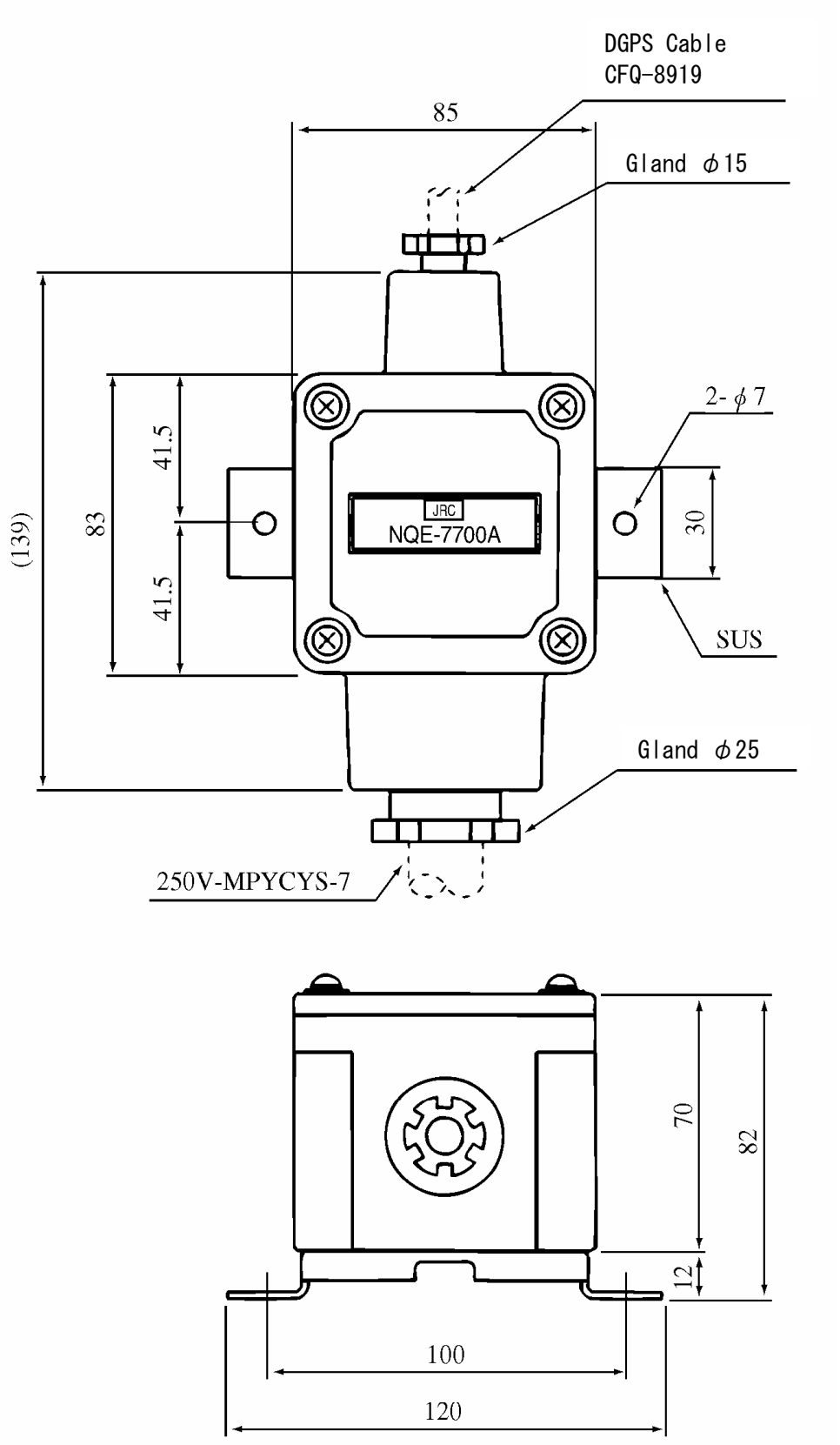
Unit: mm
Mass: Approximately 3.5 Kg

- **Flush Mounting Kit**



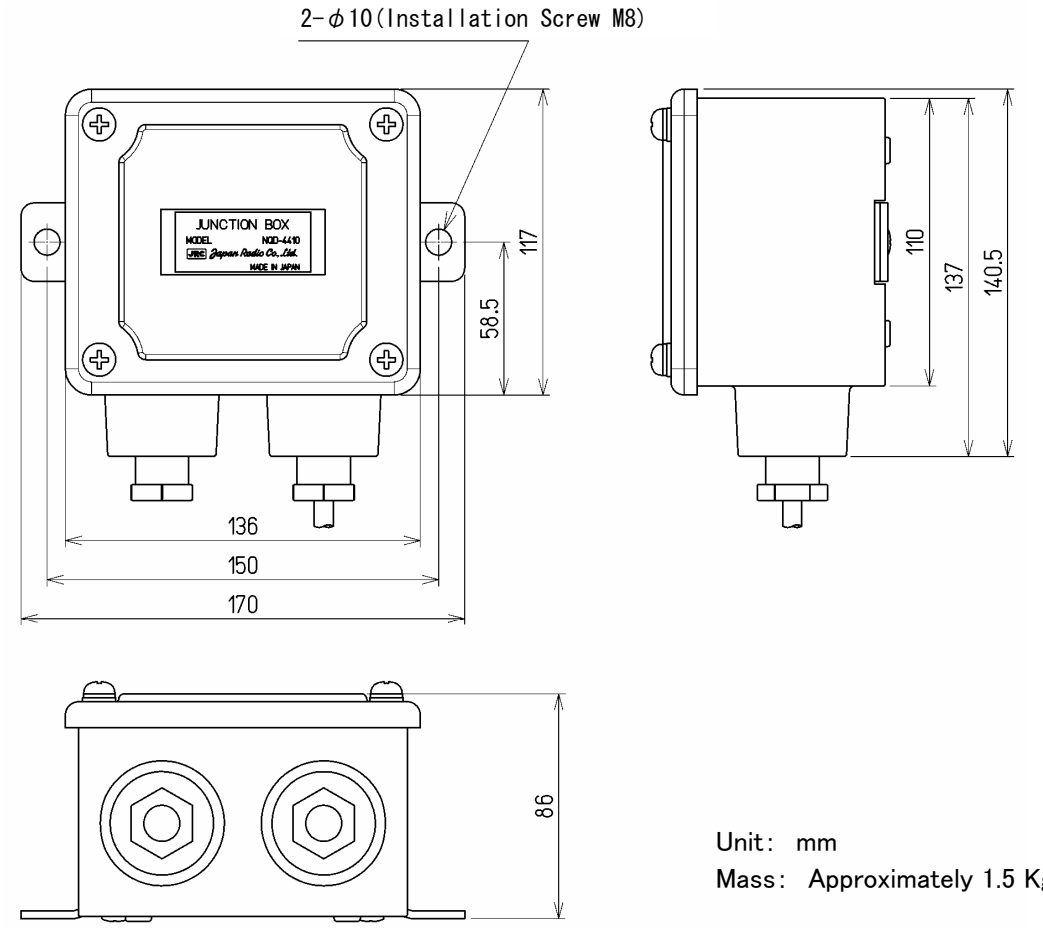
Unit: mm
Mass: Approximately 0.2 Kg

- **NQE-7700A Junction Box**



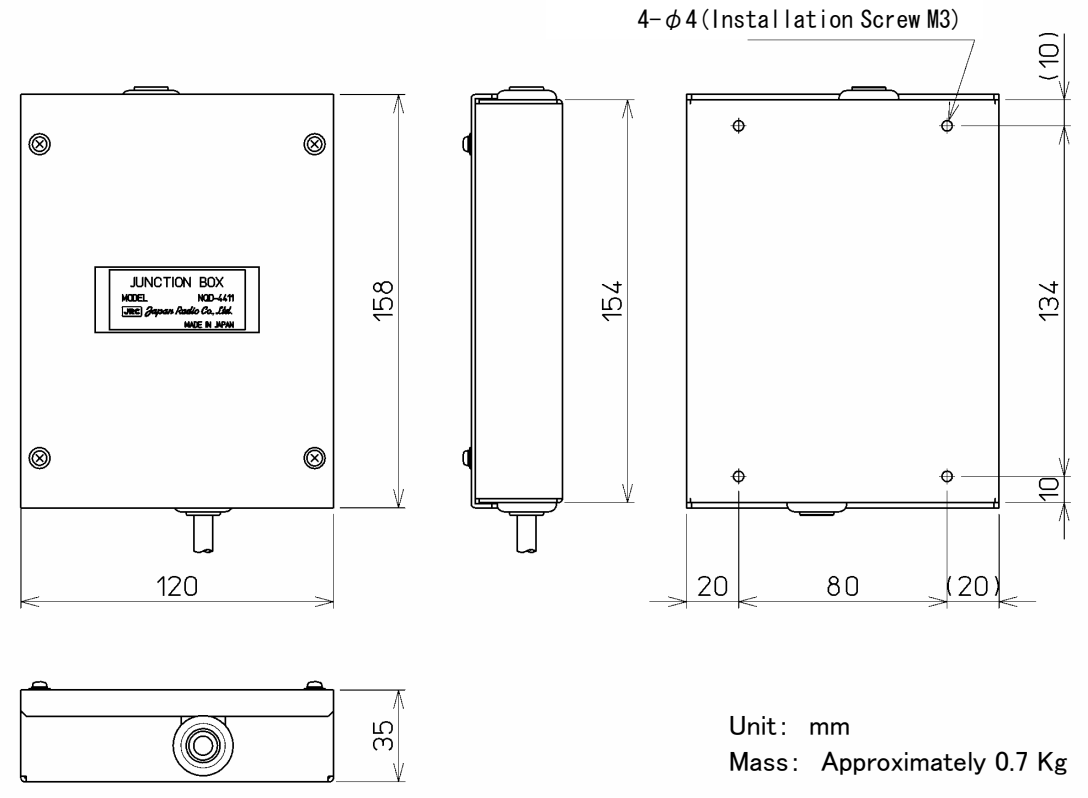
Unit: mm
Mass: Approximately 0.6 Kg

- **NQD-4414 Coaxial Cable Kit (NQD-4410)**



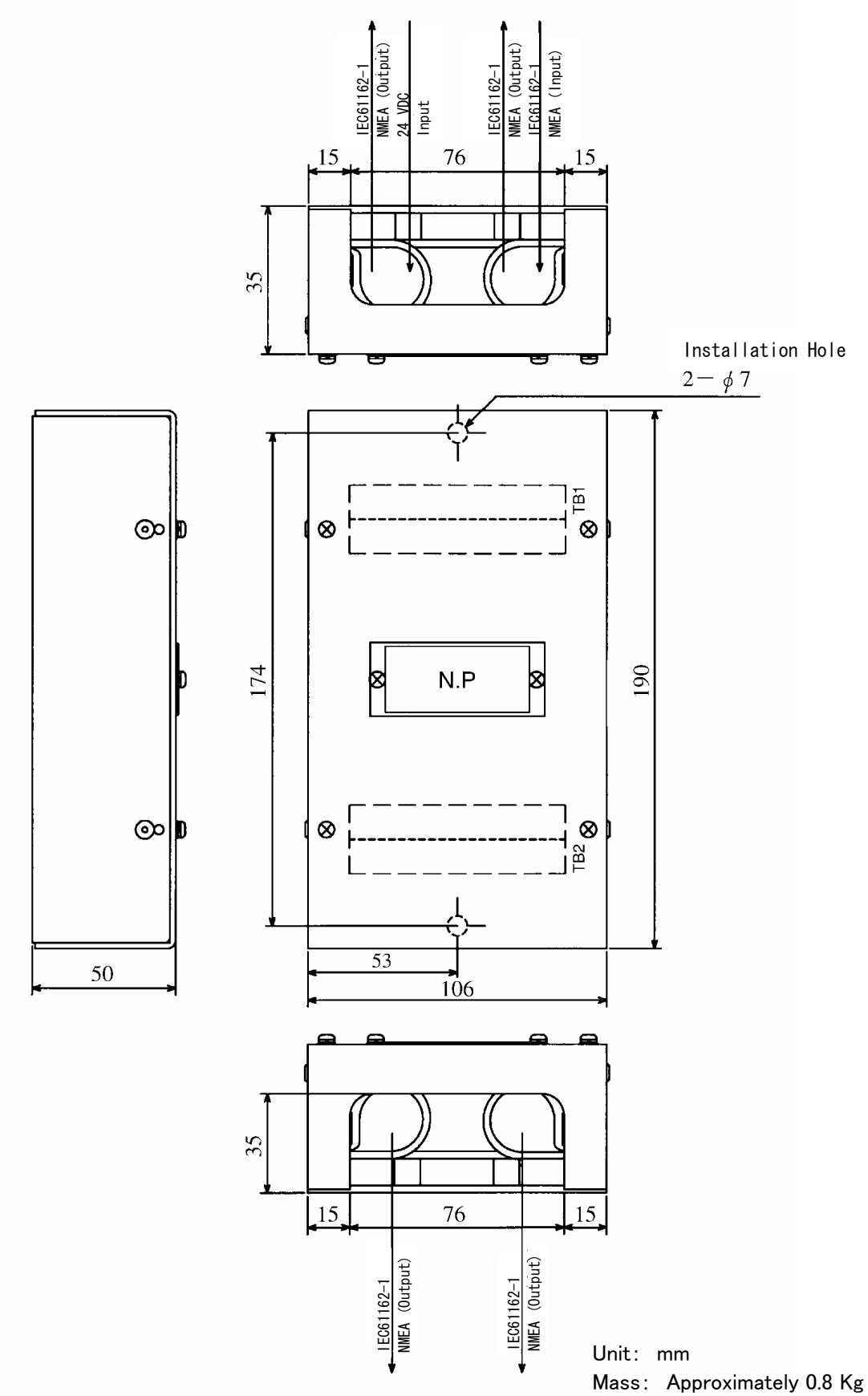
Unit: mm
Mass: Approximately 1.5 Kg

- **NQD-4414 Coaxial Cable Kit (NQD-4411)**



Unit: mm
Mass: Approximately 0.7 Kg

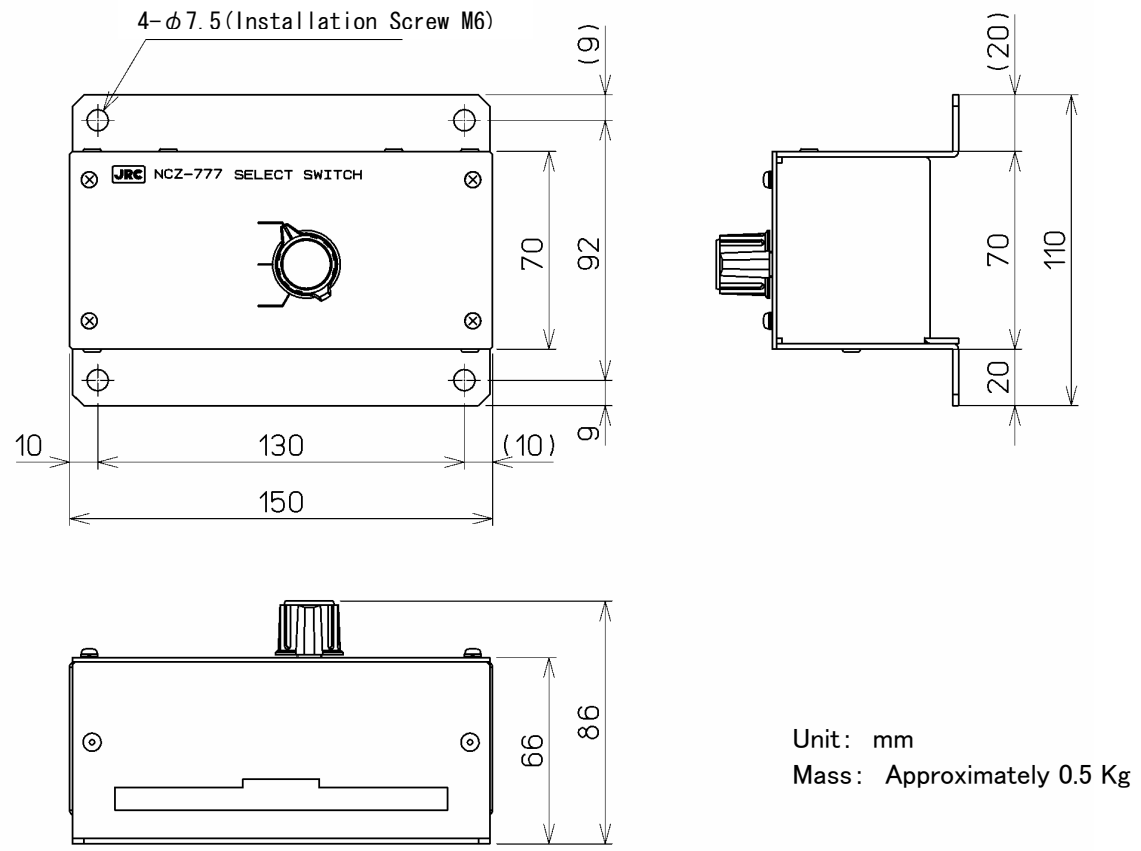
- **NQA-4251A Output Buffer**



Unit: mm

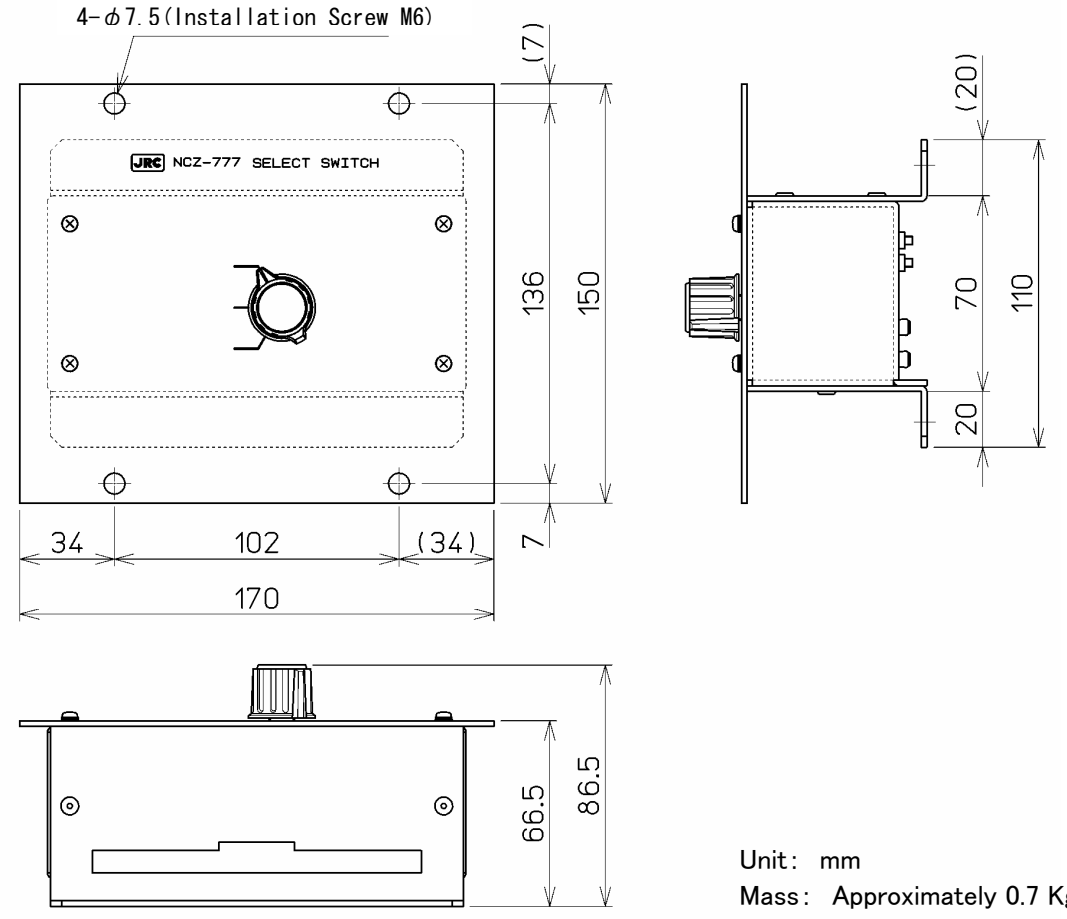
Mass: Approximately 0.8 Kg

- **NCZ-777 Select Switch**

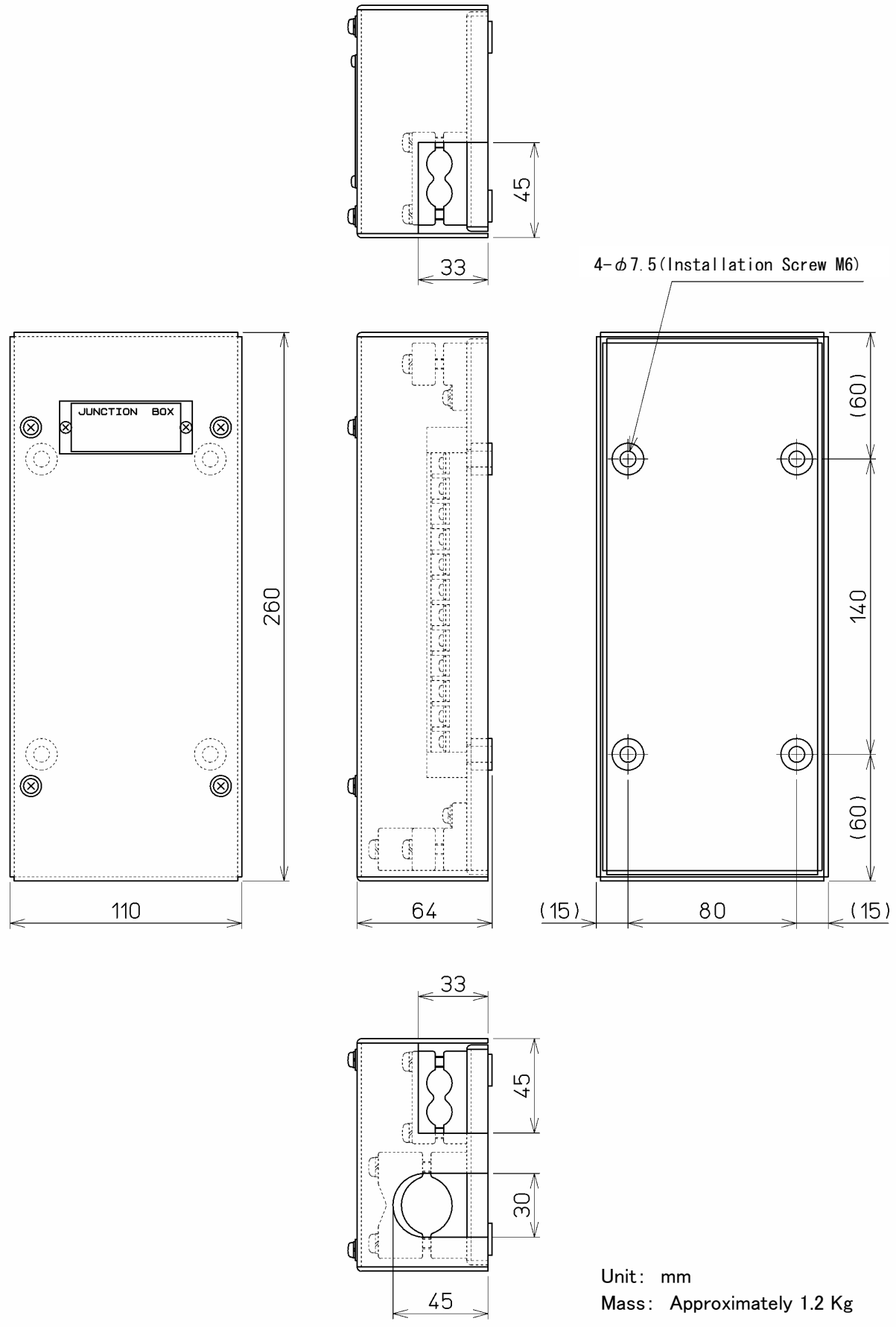


Unit: mm
Mass: Approximately 0.5 Kg

- **NCZ-777 Select Switch (Flush Mounting)**

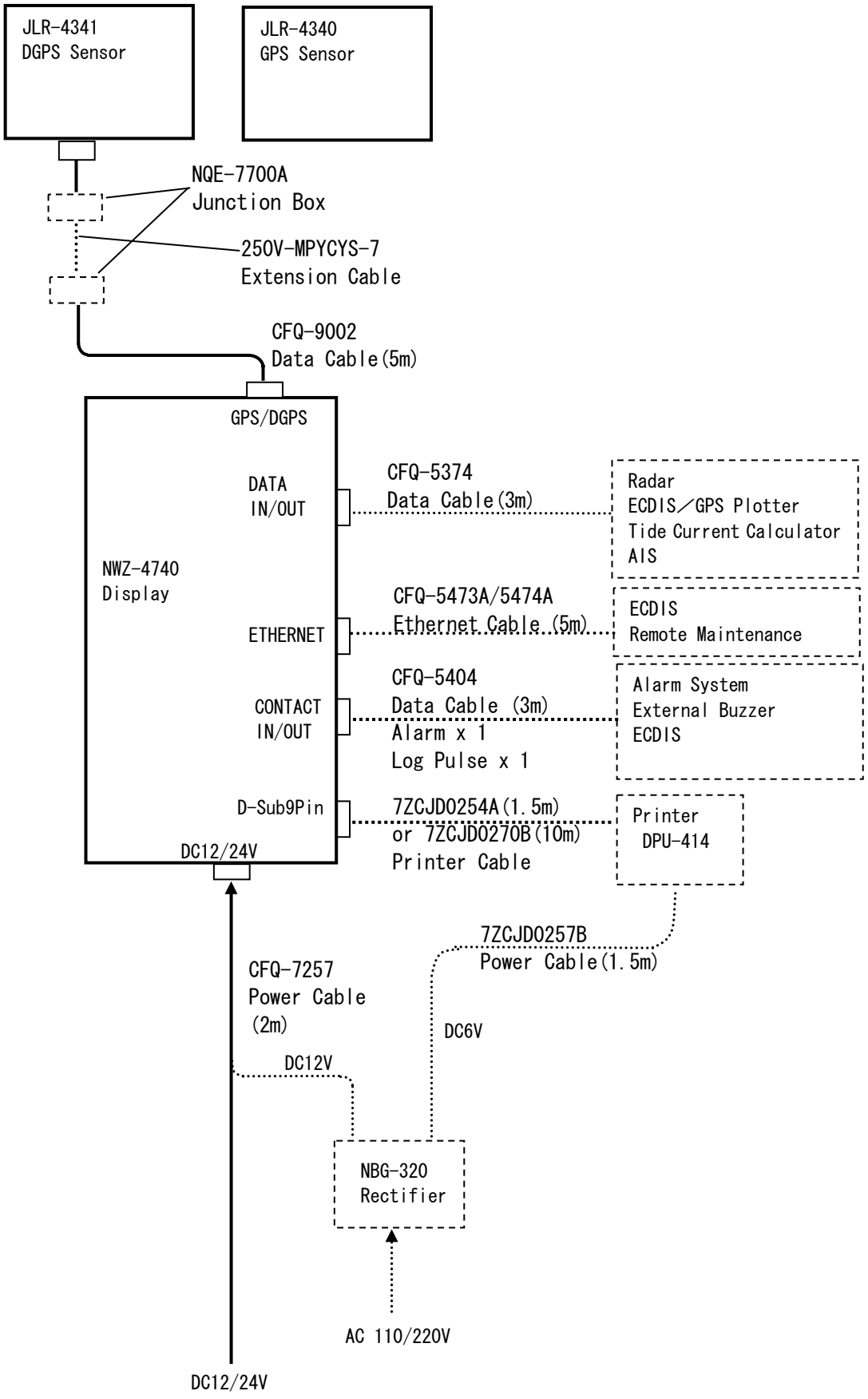


Unit: mm
Mass: Approximately 0.7 Kg



Unit: mm
Mass: Approximately 1.2 Kg

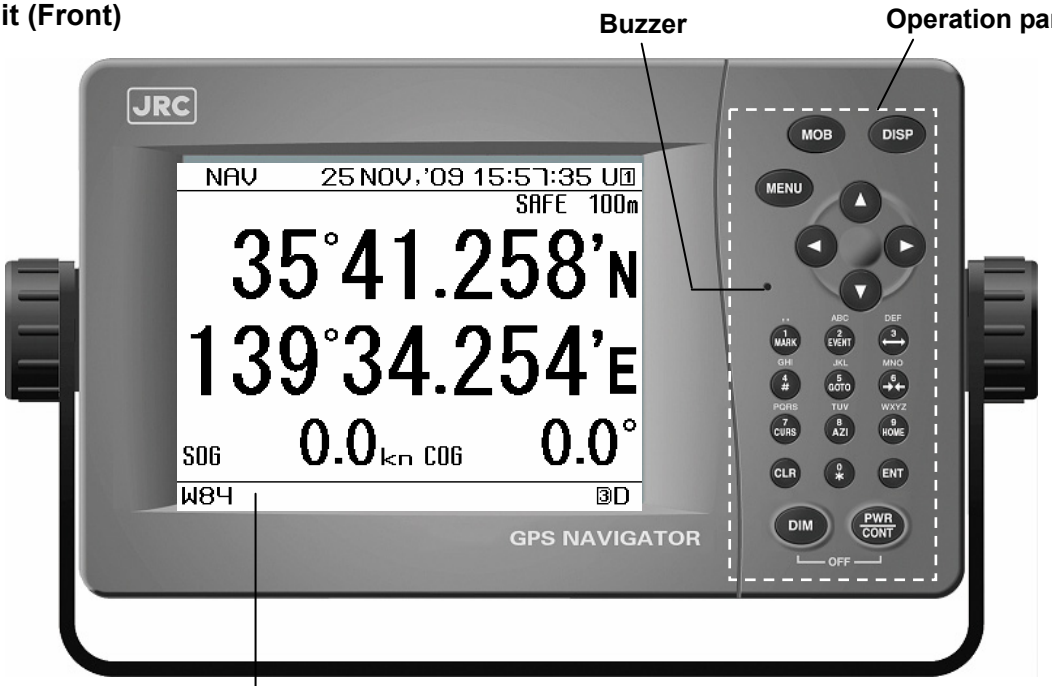
1.5 System Diagram



Section 2 Names and Functions of Each Unit

2.1 NWZ-4740 DISPLAY UNIT

- **Unit (Front)**



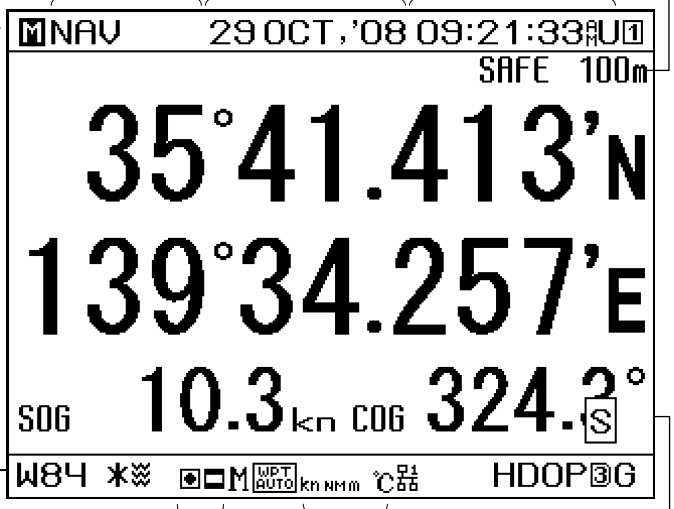
Display
Information received from the GPS receiver, the equipment setting screen, etc. are displayed.

Control Panel

Key	Name	Function
MOB	MOB key	Displays the plotting screen, and stores the location where a crewmember/passenger has fallen in the sea
DISP	Display key	Changes the display contents on the screen.
MENU	Menu key	Displays the main menu screen.
△▽◁▷	Up, Down, Left, and Right keys	These keys scroll the screen and move the cursor.
1/MARK	Numeric keys	Enters 1. This key also displays the symbol at the cursor position on the plotting screen, and stores its position.
2/EVENT		Enters 2. This key also displays the symbol at the present position on the plotting screen, and stores its position.
3/←→		Enters 3. This key also increases the size of the display area on the plotting screen.
4/#		Enters 4. This key also prints to printer and sets the print out interval.
5/GOTO		Enters 5. This key also sets the waypoint.
6/→←		Enters 6. This key also decreases the size of the display area on the plotting screen.
7/CURS		Enters 7. This key also selects whether to display/hide the cursor on the plotting screen.
8/AZI		Enters 8. This key also selects North Up, Course Up, or Relative North Up on the plotting screen.
9/HOME		Enters 9. This key also moves the own ship's position to the center on the plotting screen.
0/＊		Enters 0. This key also displays alarm information.
CLR	Clear key	Cancels operation and clears alarm information.
ENT	Enter key	Sets the entries.
DIM	Dimmer key	Adjusts the brightness.
PWR/CONT	Power/contrast key	Turns on the power. This key also adjusts the screen contrast. The power is turned off when the DIM and PWR/CONT keys are pressed at the same time.

● Reading the Display

The symbols and characters that appear in fixed locations on the screen are described below.



RAIM
Displays the preset accuracy level
In operation: 10m 30m 50m 100m
RAIM OFF : OFF
No faulty satellite: SAFE
RAIM impossible: CAUTION
Presence of faulty satellite: UNSAFE

1 Navigator number
Main display unit: Displays only the navigator number.
Sub display unit: S1 and S followed by the subsequent numbers are displayed.

Time Display
Time is displayed in order of hours: minutes: seconds.
In 12 hour display mode, " AM " or " PM " are displayed.
If a time difference is set, "L" is displayed. Otherwise, UTC:"U" is displayed.

Date Display

Screen Title
The title of the open screen is displayed.

M Equipment setting mode
Displayed when the equipment setting mode is selected

Preset alarm
If a preset alarm occurs, alarm information is displayed. For ship speed, trip, depth, and temperature alarms, the corresponding preset units are displayed.
Arrival: Anchor:
XTD: Boundary:
Ship speed: kn km/h mi/h
Trip: NM km mi Depth: m ft fm
Temperature: °C °F

Geodetic System

Alarm Information
This is displayed when alarm information messages have been updated.

Beacon Information Reception Display
This is displayed when meteorological information has been received from a beacon. A buzzer is generated when this is displayed.

M Magnetic correction
Displayed when magnetic correction is set

Waypoint update
The method for updating the waypoint for the current navigation is displayed.
Automatic update: WPT AUTO Manual update: WPT MAN

LAN sharing
Displayed when the active route sharing mode through LAN is selected
Sharing 1 S1 Sharing 2 S2 Sharing3 S3 Sharing4 S4

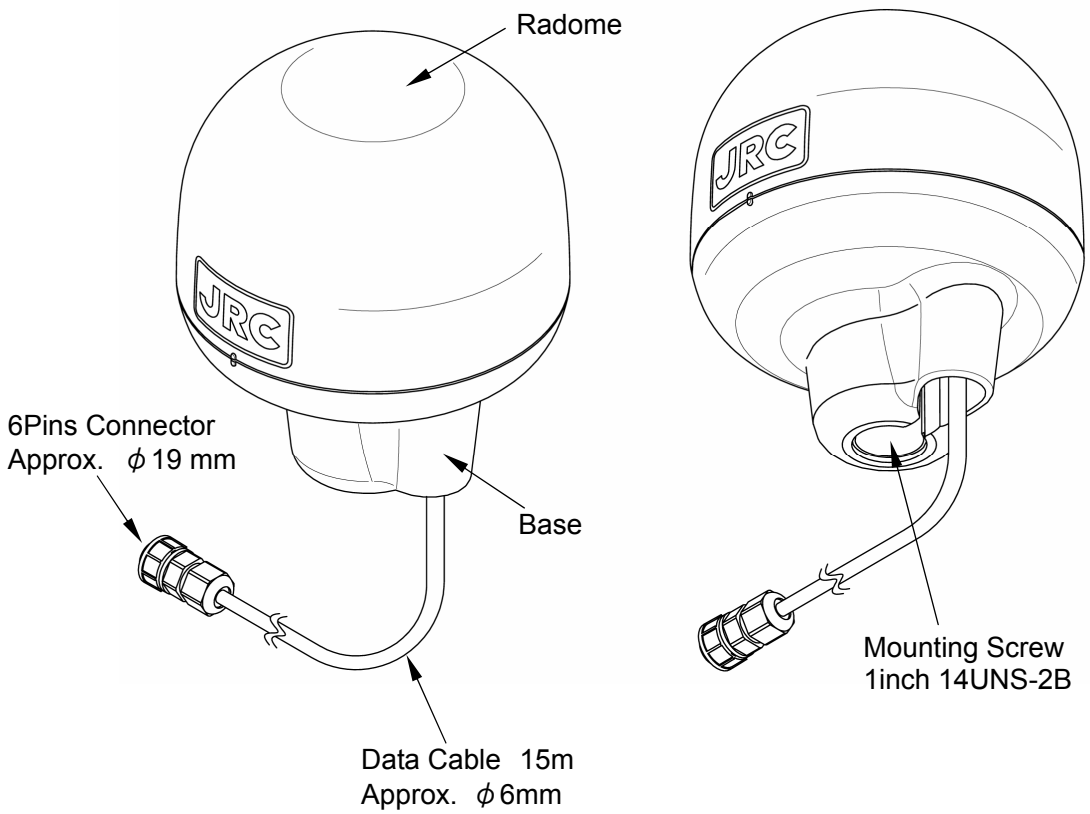
HDOP Alarm Display
Displayed when the number exceeds the configured value.

Position fixing mode
No position fixing: noFIX 2D position fixing: 2 3D position fixing: 3

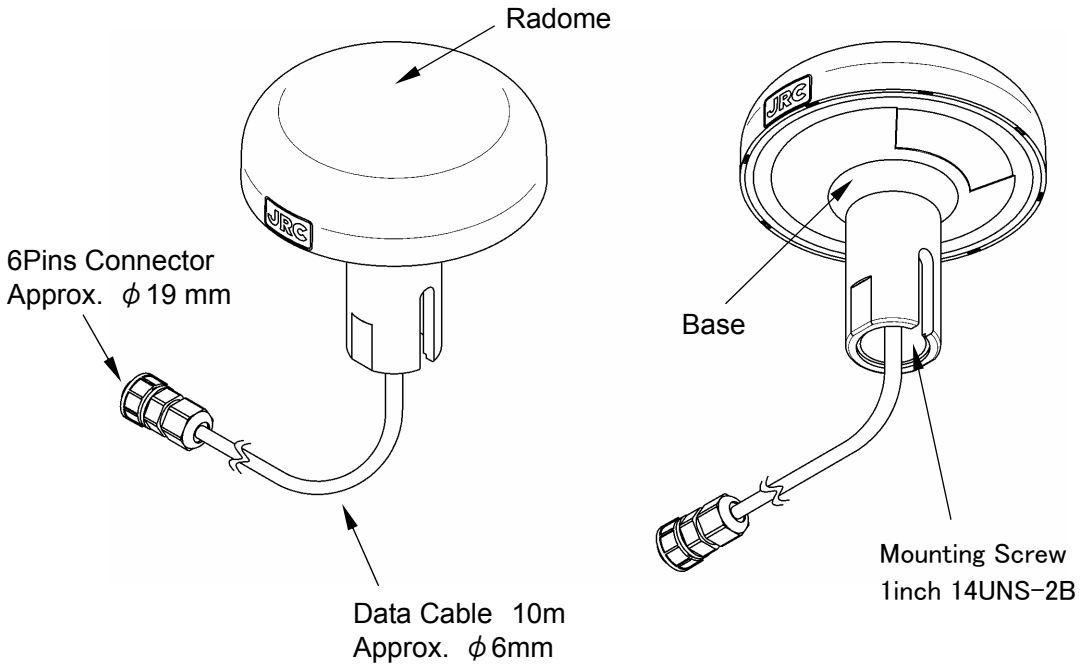
Position correction mode
GPS position fixing: G Beacon DGPS position fixing: D SBAS position fixing: Sb

S Demo mode
Displayed when the demo mode is active

2.2 JLR-4341 DGPS Sensor



2.3 JLR-4340 GPS Sensor



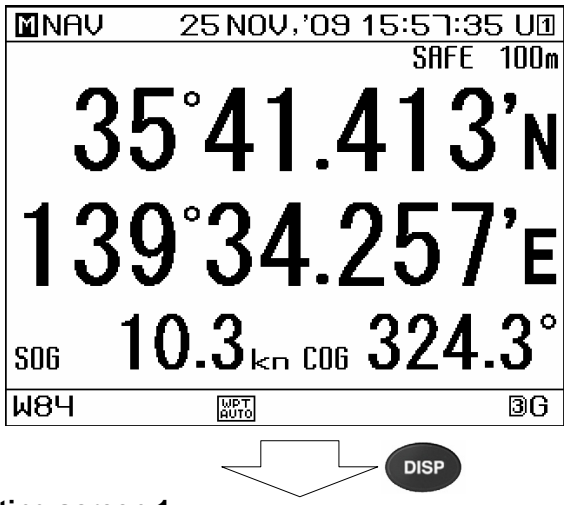
Section 3 Display Screen

Each screen is detailed in this section.

3.1 Display screen

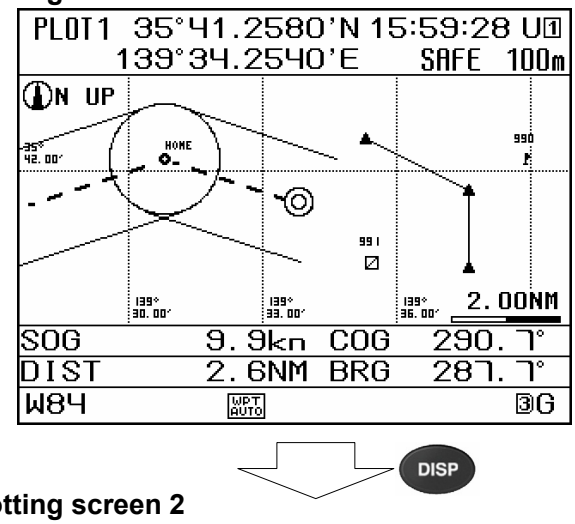
The screen is switched each time DISP is pressed. Users are allowed to set the screen displayed when the power is turned on. Users can also determine not to display unnecessary screens. The navigation information screen, CDI screen, and navigation assistance screen are provided with sub-screens which can be selected by pressing ◄ and/or ►.

Navigation information screen



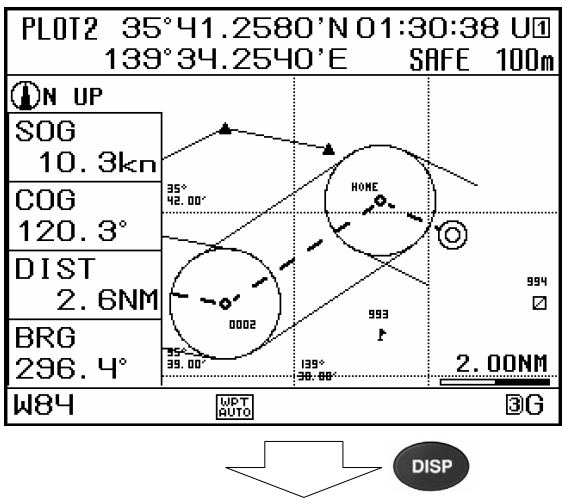
This screen displays information such as the own ship's position.
The sub-screens can be displayed by pressing ◄ and/or ►.

Plotting screen 1



This screen graphically displays the own ship's position.

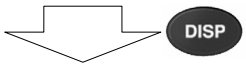
Plotting screen 2



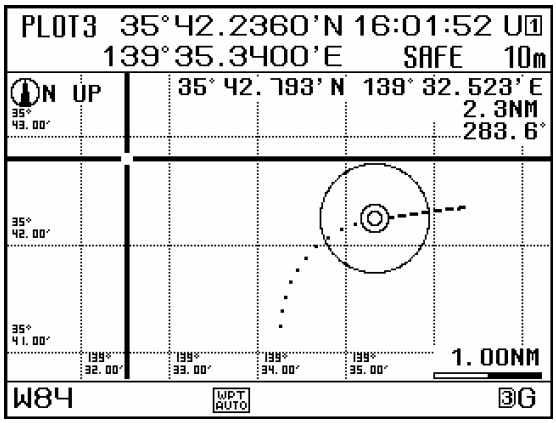
This screen graphically displays the own ship's position.

Plotting screen 3

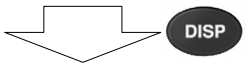
Plotting screen 2



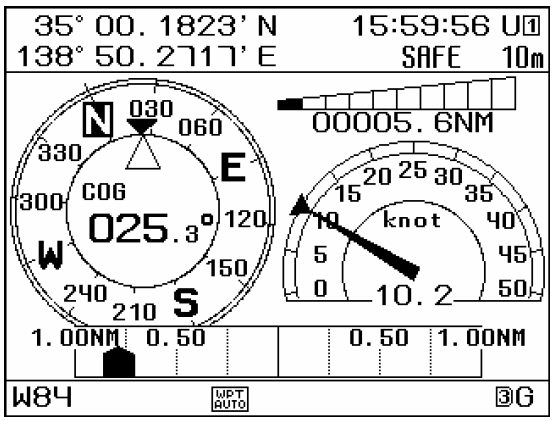
Plotting screen 3



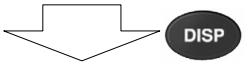
This screen graphically displays the own ship's position in full-screen mode.



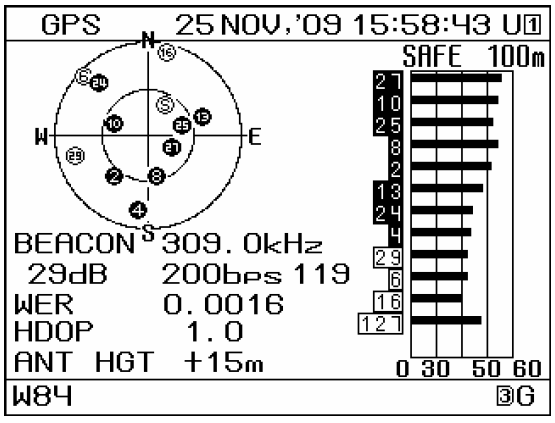
CDI screen



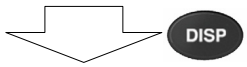
This screen graphically displays the CDI, course, speed, and leg.
The highway screen can be displayed by pressing ◄ and/or ►.



GPS information screen



This screen displays GPS satellite information.

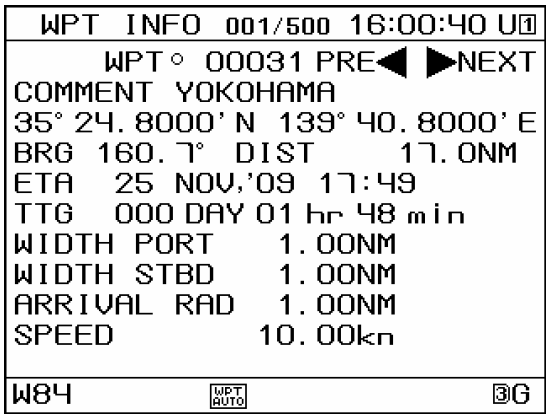


Waypoint information screen

GPS information screen

DISP

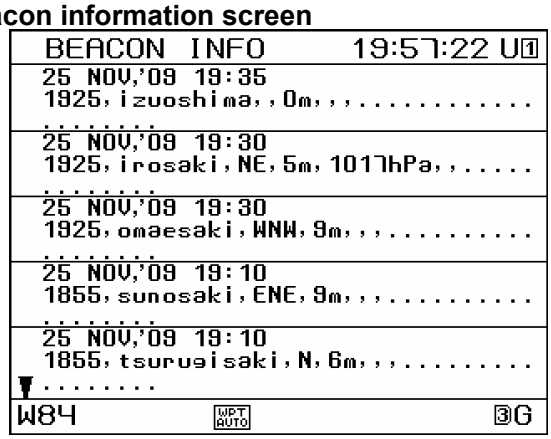
Waypoint information screen



This screen displays the information of waypoints on the route.
The information of the next waypoint can be displayed by pressing ◄ and/or ►.

DISP

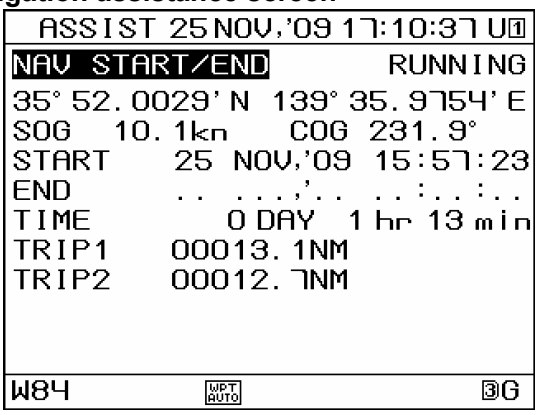
Beacon information screen



This screen displays information received with the beacon receiver.

DISP

Navigation assistance screen



This screen displays information such as the leg and time.
The sub-screens can be displayed by pressing ◄ and/or ►.

DISP

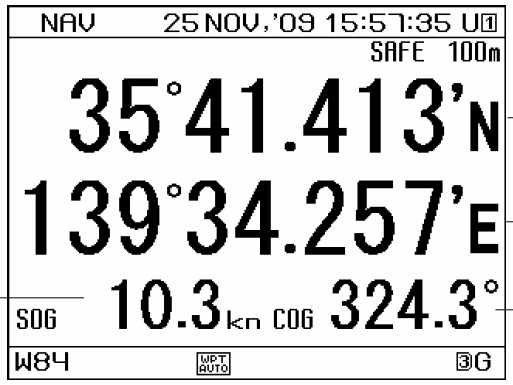
Navigation information screen

3.1.1 Navigation Information Screen

The navigation information screen displays the position, speed, and course of the own ship. If there are waypoints, the target waypoint number and estimated arrival time are displayed.
The sub-screens can be displayed by pressing ◄ and/or ►. The sub-screens vary depending on the presence or absence of waypoints.

(1) If there are waypoints:

Main screen (3 digit position screen)

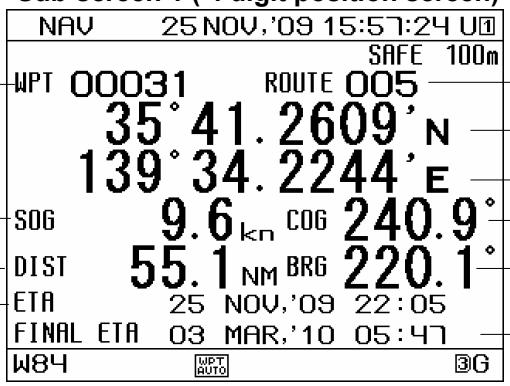


Own ship's position (latitude and longitude)

Speed

Course

Sub-screen 1 (4 digit position screen)



Number of the waypoint for which the ship is heading

Route number

Own ship's position (latitude and longitude)

Speed

Course

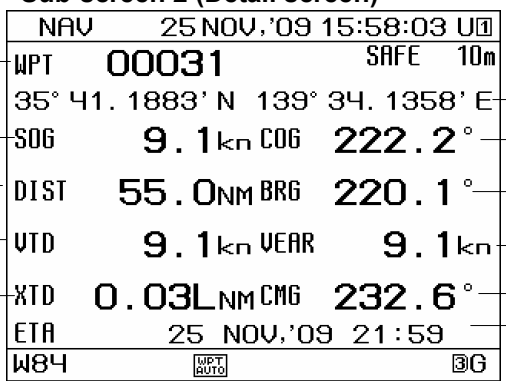
Distance from the own ship's position to the waypoint

Bearing from the own ship's position to the waypoint

Estimated arrival time at the waypoint

Estimated arrival time at the final waypoint

Sub-screen 2 (Detail screen)



Number of the waypoint for which the ship is heading

Own ship's position (latitude and longitude)

Speed

Course

Distance from the own ship's position to the waypoint

Bearing from the present position to the waypoint

Speed of the destination component (See Memo.)

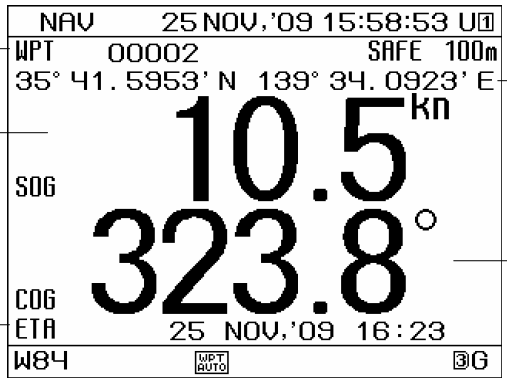
Speed of the COG component (See Memo.)

Deviation from the route and the steering direction
L: Steered to the left
R: Steered to the right

Average bearing (See Memo.)

Estimated arrival time at the waypoint

Sub-screen 3 (SOG and COG screen)



Number of the waypoint for which the ship is heading

Own ship's position (latitude and longitude)

Speed

Course

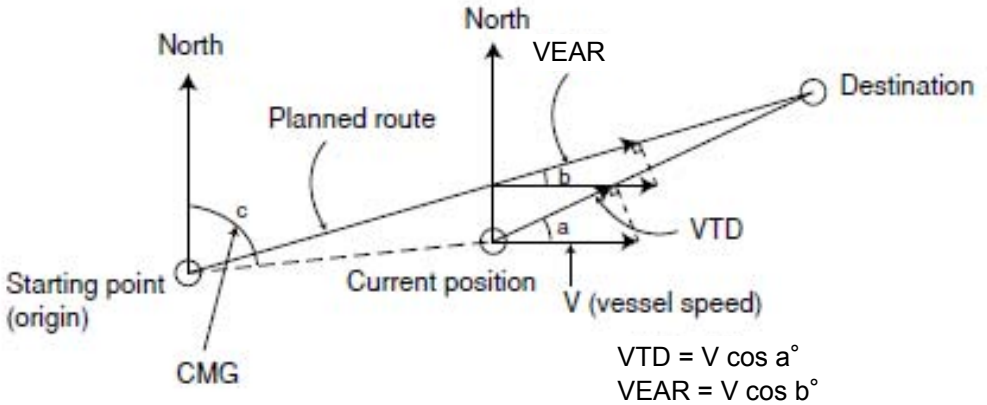
Estimated arrival time at the waypoint

Memo

VTD (Speed of the destination component)
VTD (An acronym of "Velocity Toward Destination)
This in an index that shows how fast the boat is approaching toward the destination in the unit of knot when it is navigation at a given bearing angle and speed.

VEAR(Speed of the COG component)
VEAR(An acronym of "Velocity Along Route")
This in an index that shows how fast the vessel is approaching along the planned route in the unit of knot when it is navigating at a given course and speed.

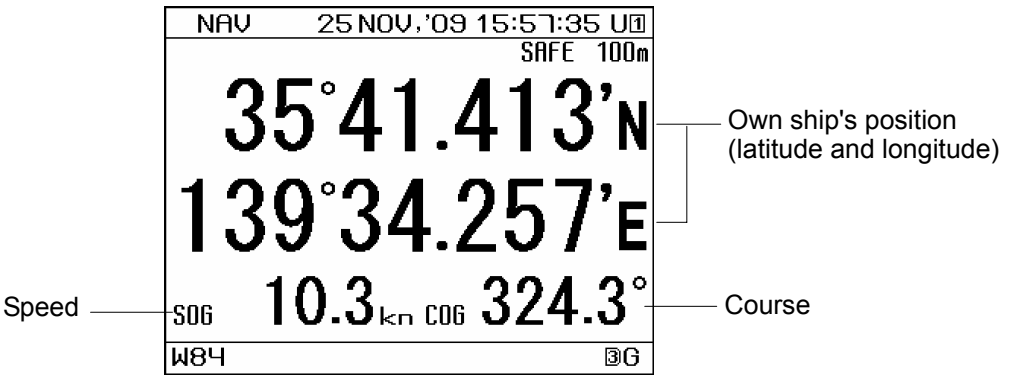
CMG(Average bearing)
CMG(An acronym of "Course Made Good")
The bearing angle to the current position when viewed from the starting point.



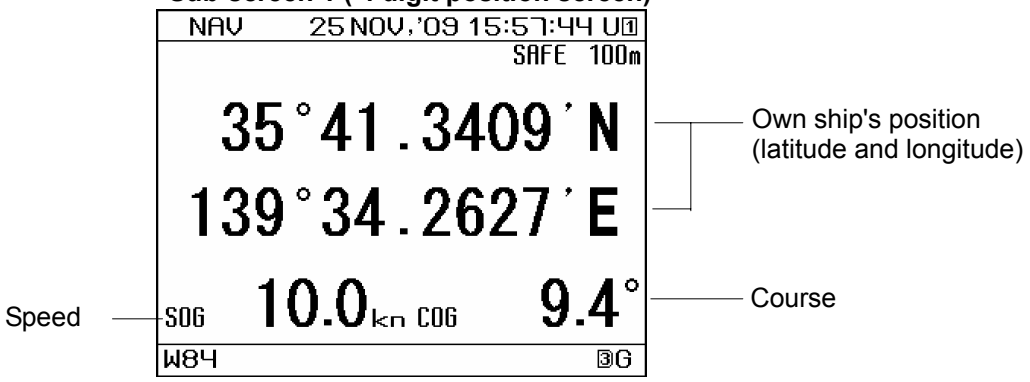
VTD = V cos a°
VEAR = V cos b°
CMG = c°

(2) If there are no waypoints:
If there are no waypoints, only the position, speed, and course of the own ship are displayed.

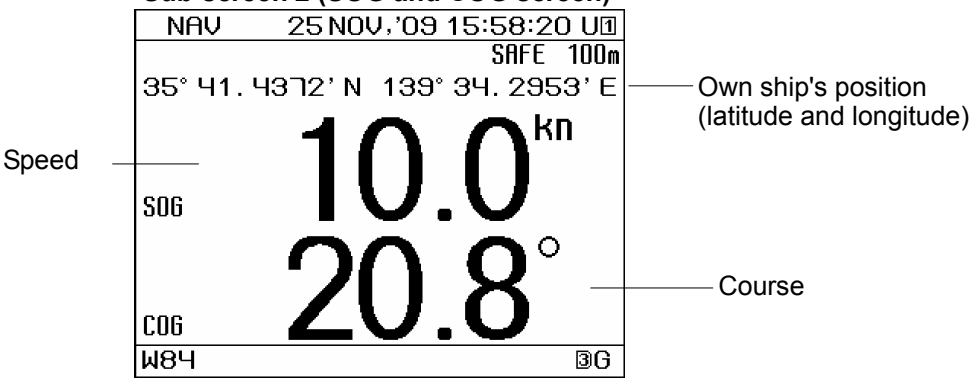
Main screen (3 digit position screen)



Sub-screen 1 (4 digit position screen)

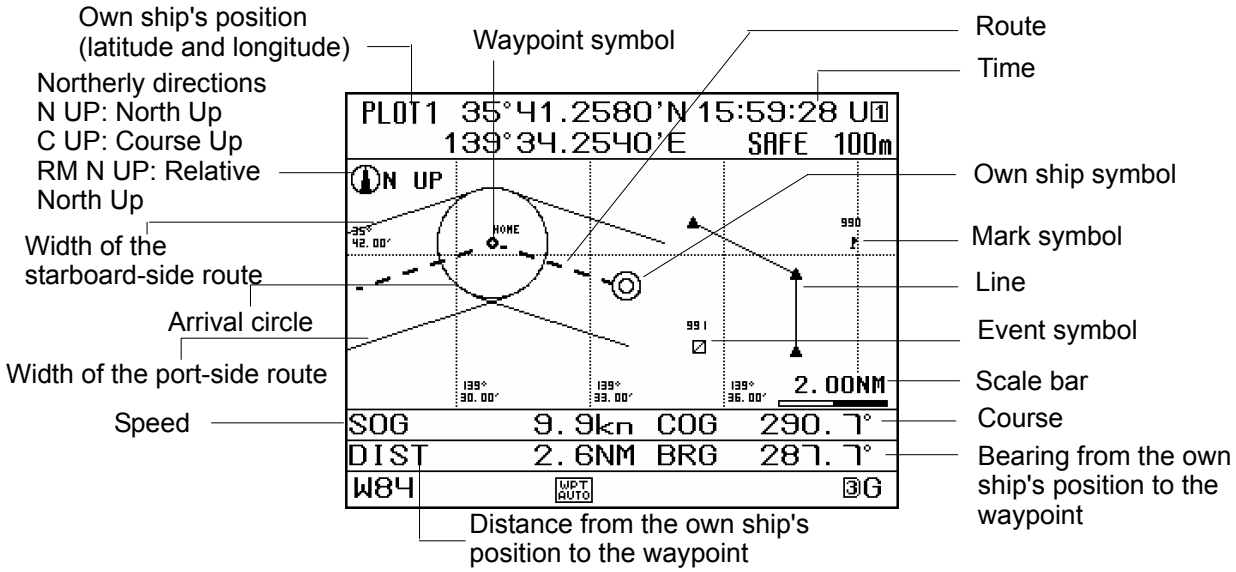


Sub-screen 2 (SOG and COG screen)



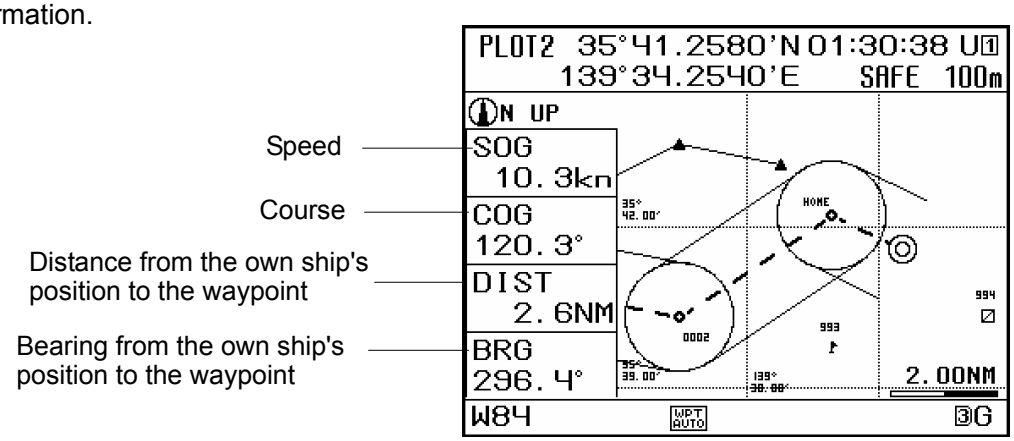
3.1.2 Plotting Screen 1

The plotting screen 1 displays the course, speed, bearing, and distance at the bottom of the screen. (Refer to "4.3 PLOT SCREEN OPERATION".)
There are three types of plotting screens, and all the plotting screens display the same information.



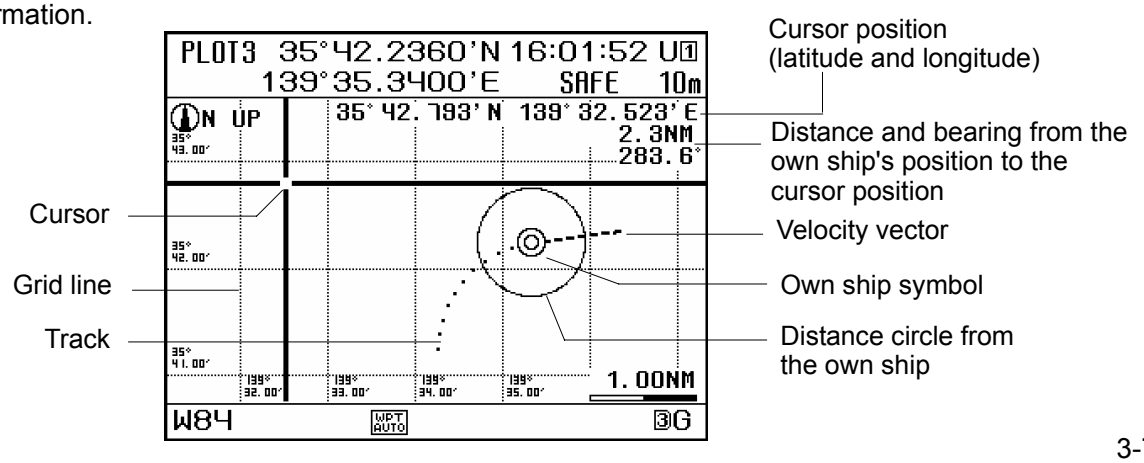
3.1.3 Plotting Screen 2

The plotting screen 2 displays the course, speed, bearing, and distance on the left side of the screen. (Refer to "4.3 PLOT SCREEN OPERATION".)
There are three types of plotting screens, and all the plotting screens display the same information.



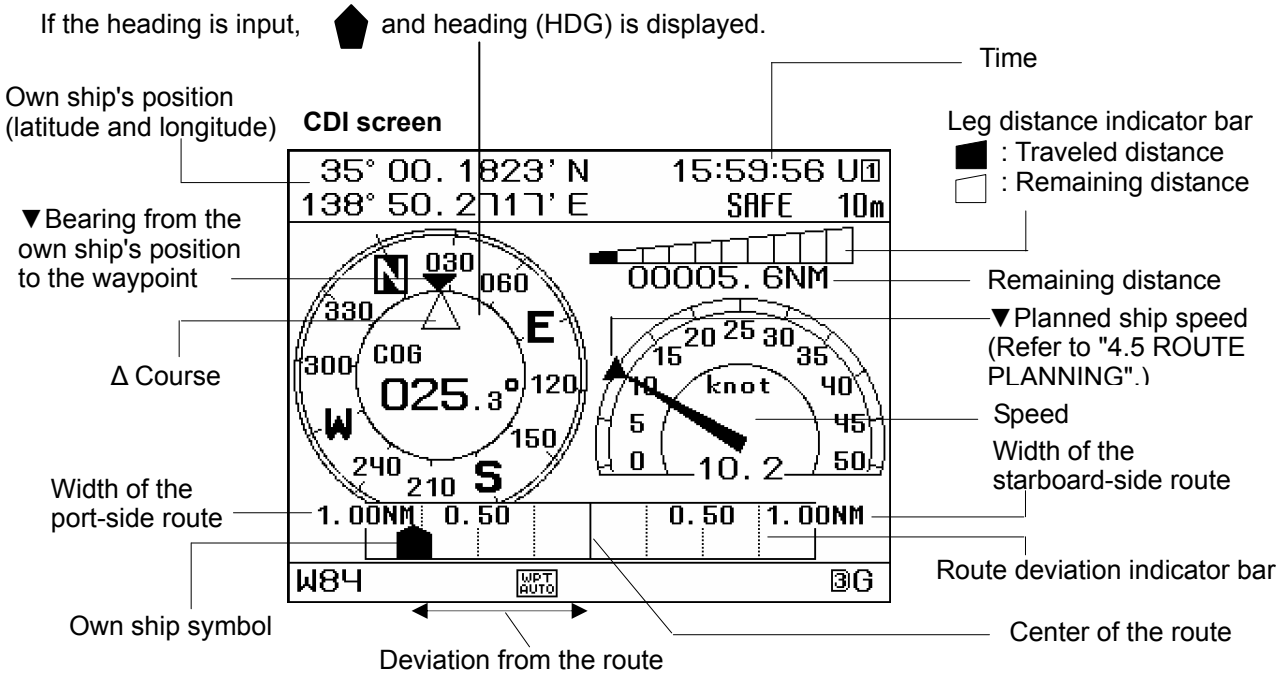
3.1.4 Plotting Screen 3

The plotting screen 3 displays information in full-screen mode. (Refer to "4.3 PLOT SCREEN OPERATION".)
There are three types of plotting screens, and all the plotting screens display the same information.

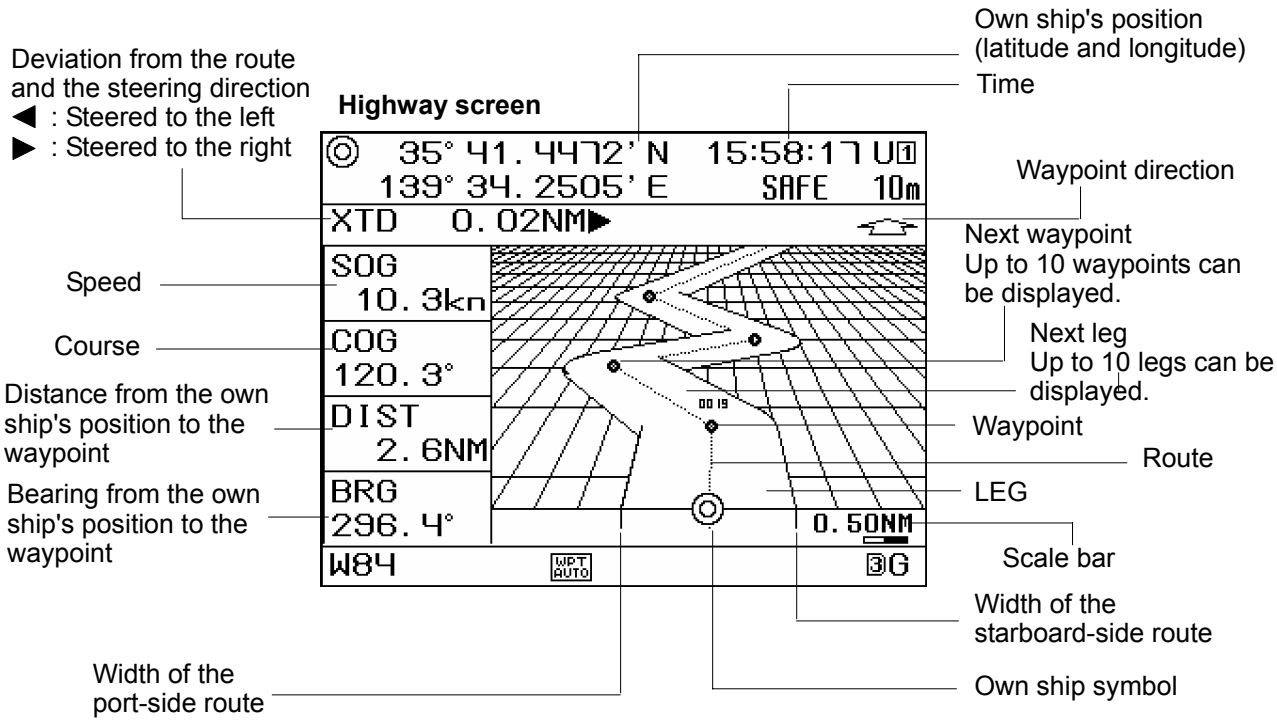


3.1.5 CDI Screen

The CDI screen can graphically display the CDI, course, speed, and leg.
The highway screen can be displayed by pressing ◄ and/or ►.



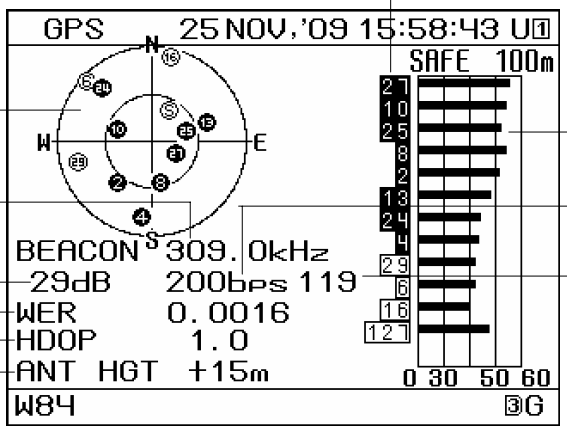
The highway screen displays information in Course Up mode while the own ship's position is fixed, so the route turns when the own ship turns. As a result, the route may not be displayed depending on the course.



The highway screen's scale can be changed by pressing 3 or 6. The scale width is the same as the plot screen's. Please refer to "4.3.3 Zooming the Screen In and Out".
When GC is selected as the distance calculation method, only one waypoint can be displayed.

3.1.6 GPS Information Screen

The GPS information screen displays the receiving status of GPS satellites and beacon.



GPS satellite location and the receiving status
Unframed: Search
○: Completion of demodulation
●: Use of position fixing

GPS satellite number
Unframed: Search
□: Completion of demodulation
■: Use of position fixing

GPS signal intensity bar
45 to 55 under normal conditions

Beacon frequency

Beacon bit rate

Beacon SNR

Beacon signal intensity

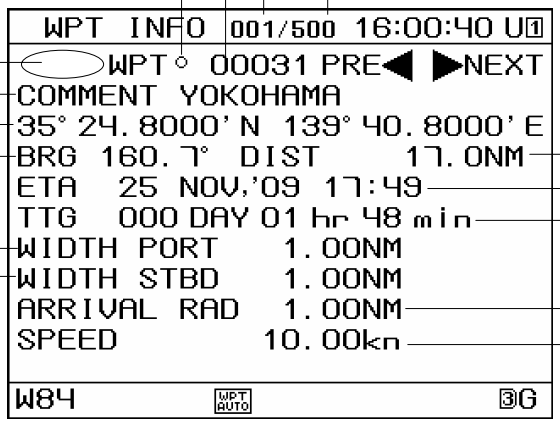
Beacon error rate

GPS HDOP

Antenna height

3.1.7 Waypoint Information Screen

The waypoint information screen displays the information of waypoints on the route.
The information of the next waypoint can be displayed by pressing ◄ and/or ►.
To display the final waypoint, press and hold * and ►. To display the current waypoint, press and hold * and ◄.



No display: Current waypoint
NEXT: Next waypoint
Fin: Final waypoint
PAST: Waypoint passed

Waypoint symbol

Waypoint number

n-th waypoint

Total number of waypoints

Distance from the own ship's position to the displayed waypoint

Comment on the waypoint

Waypoint position

Expected arrival time at the displayed waypoint

Bearing from the own ship's position to the displayed waypoint

Time required for reaching the displayed waypoint

Width of the port-side route

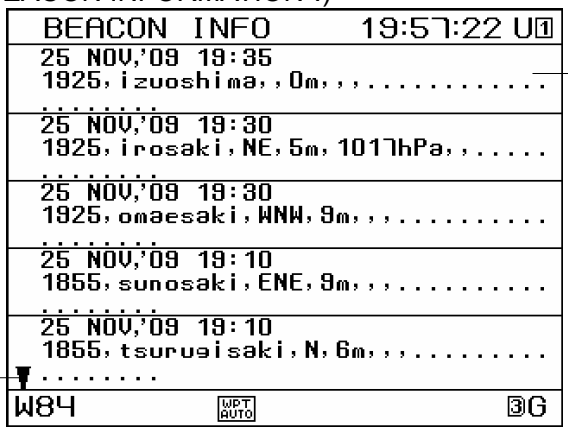
Width of the starboard-side route

Arrival-circle radius

Planned ship speed

3.1.8 Beacon Information Screen

The beacon information screen displays message type16 information received by the beacon receiver. (Refer to "4.13 BEACON INFORMATION".)



Display area

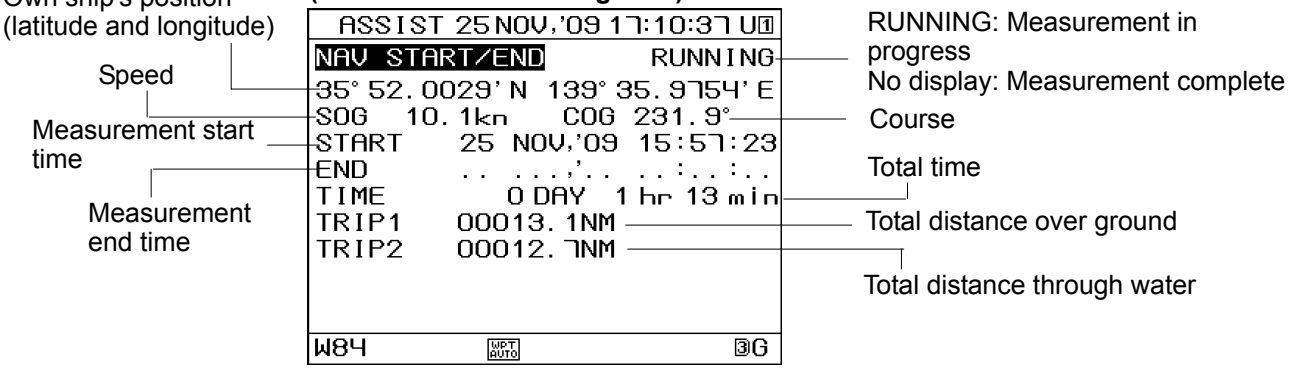
Use ▲ and/or ▼ to scroll the screen.

3.1.9 Navigation Assistance Screen

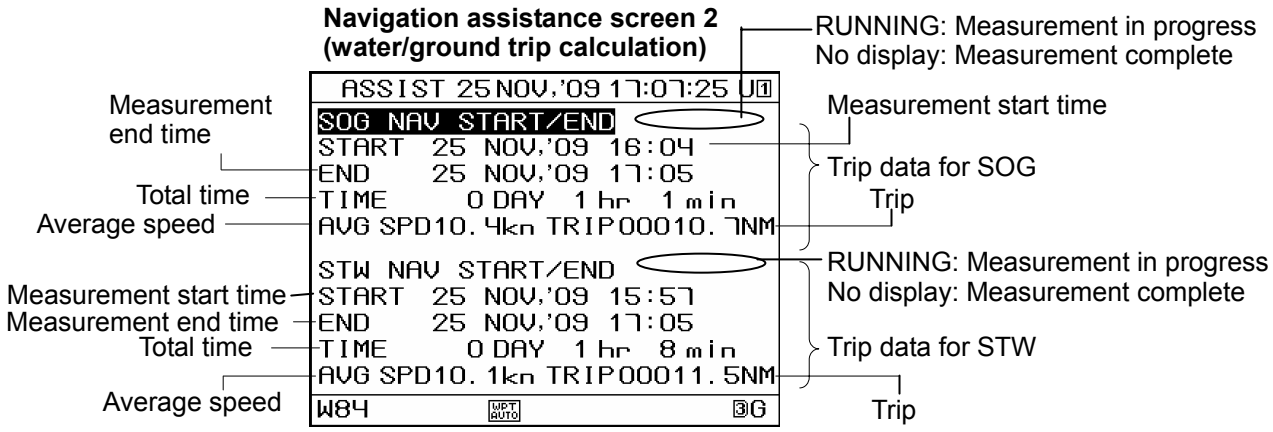
The navigation assistance screen calculates and displays navigation information such as the navigation start and end, leg distance, and total time. (Refer to "4.12 NAVIGATION ASSISTANCE".)

The trip calculation screen, the external equipment display screen, and the screen for calculating the distance/bearing between two points can be displayed by pressing ◄ and/or ►.

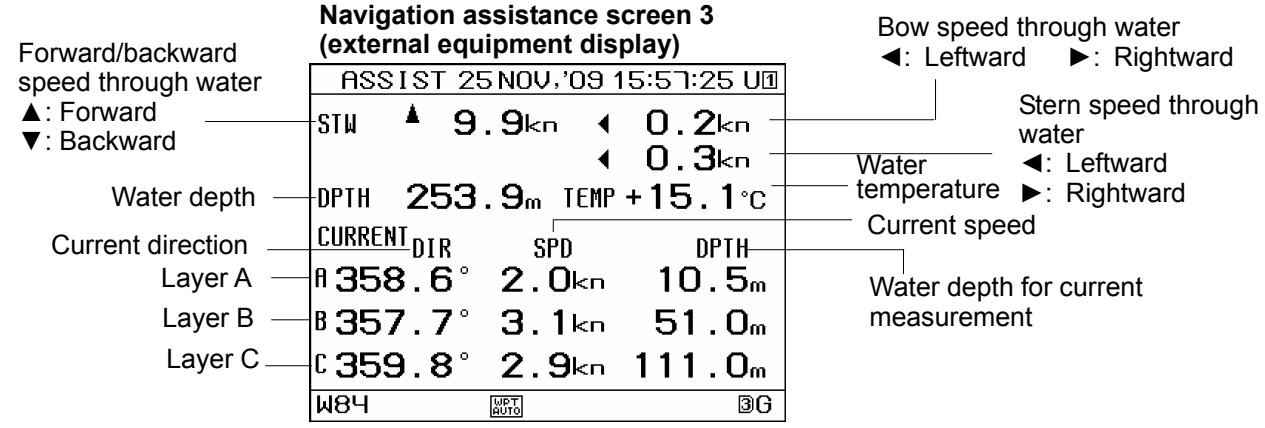
Navigation assistance screen 1
(measurement for navigation)



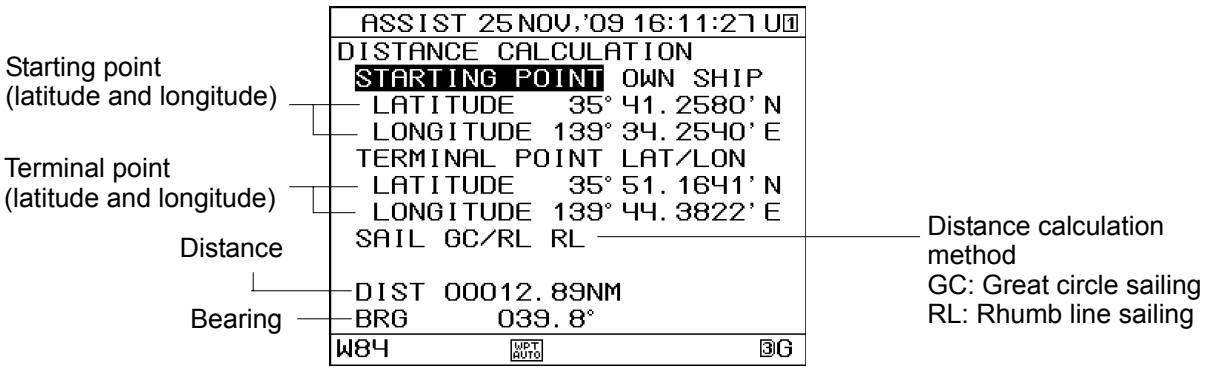
Navigation assistance screen 2
(water/ground trip calculation)



Navigation assistance screen 3
(external equipment display)



Navigation assistance screen 4
(calculation of a distance/bearing between two points)



Section 4 Operation

4.1 Menu List

Main Menu	Sub Menu	Sub Menu	Range	Reference
1.DISPLAY	1.CONTRAST		1-7-13	4.14.1
	2.DIMMER -MAXIMUM-		1-9-10	4.14.2
	3 -TYPICAL-		1-6-10	
	4. -MINIMUM-		1-4-10	
	5.CLICK SOUND		ON/OFF	4.14.3
	6.REVERSING MODE		NORMAL/REVERSE1 / REVERSE2	4.14.4
	7.INPUT ASSIST		ON/OFF	4.14.5
	8.DISPLAY SELECT	1.NAV	ON/START/OFF	4.14.6
		2.PLOT 1	ON/START/OFF	
		3.PLOT 2	ON/START/OFF	
		4.PLOT 3	ON/START/OFF	
		5. CDI	ON/START/OFF	
		6. GPS INFO	ON/START/OFF	
		7.WPT INFO	ON/OFF	
		8.BEACON INFO	ON/OFF	
		9.NAV ASSIST	ON/OFF	
2.PLOT	1.WPT		○ etc.	4.4.3
	2.MARK		● etc.	4.3.9.3
	3.EVENT		□ etc.	
	4.TRACK PERIOD		OFF/TIME/DIST	4.3.8.1
	5.TRACK		・ etc.	4.3.8.2
	6.LINE		— etc.	4.3.10.3
	7. EVENT/MARKLIST			4.7.1
	8.DELETE EVENT/ MARK/TRACK	1.DELETE EVENT/MARK LIST		4.7.4
		2.DELETE ALL EVENT		
		3.DELETE ALL MARK		
		4.DELETE ALL EVENT/MARK		
		5.DELETE TRACK		4.3.8.3
	8.VISIBLE/INVISIBLE	1.WPT	ON/OFF	4.3.12
		2.WPT No.	ON/OFF	
		3.MARK	ON/OFF	
		4.EVENT	ON/OFF	
		5.EVENT/MARK No.	ON/OFF	
		6.TRACK	ON/OFF	
		7.LINE	ON/OFF	
		8.ARRIVAL CIRCLE	ON/LEG/OFF	
		9.XTD	ON/LEG/OFF	
		0.NEXT PAGE		
		1.SCALE BAR	ON/OFF	
		2.SYMBOL INFO	ON/OFF	
		3.CURSOR INFO	ON/OFF	
		4.GRID LINE	ON/OFF	
		5.GRID LAT	ON/OFF	
		6.GRID LON	ON/OFF	
		0.PREVIOUS PAGE		
	0.NEXT PAGE			
	1.CURSOR		LARGE/MIDDLE/SMALL	4.3.1.4
	2.OWN CIRCLE		OFF/0.1-9.9NM	4.3.11.1
	3.OWN VECTOR		OFF/0.1-9.9 min	4.3.11.2
	0.PREVIOUS PAGE			

Main Menu	Sub Menu	Sub Menu	Range	Reference
3.WPT/ROUTE	1.ENTRY WPT/ WPT LIST			4.4.1/4.4.2
	2.MAKE ROUTE/ ROUTE LIST			4.5.1/4.5.2
	3.ROUTE START/END	1.LEG CHANGE	AUTO/MANUAL	4.6.1/4.6.3.2
		2.DIRECTION	ORDER/REVERSE	
		3.NAVIGATION	START/END	
	4.COPY WPT/ROUTE	1.WPT COPY		4.4.5
		2.ROUTE COPY		4.5.4
	5.DELETE WPT/ROUTE	1.WPT DEL		4.4.6
		2.ROUTE DEL		4.5.5
	6. TRANSFER WPT/ROUTE (LAN)	1.OUT / IN		4.5.6
		2.CONNECT / FROM IP		
		3.TO IP		
		4.PORT No.		
		5.FORMAT		
		6.OUT TYPE		
		0.START		
	7.DEFAULT SETTINGS	1.WIDTH PORT	OFF/0.01-9.99NM	4.5.7
		2.WIDTH STBD	OFF/0.01-9.99NM	
		3.ARRIVAL RAD	OFF/0.01-9.99NM	
		4.SPEED	OFF/0.01-99.99kn	
		5.SAIL GC/RL	GC/RL	
		6.SOG SMOOTHING	OFF/1-99 sec	
4.ALARM	1.ARRIVAL/ANCHOR		OFF/ARV/ANC	4.11.1
	2.XTD/BOUNDARY		OFF/XTD/ BOUNDARY	
	3. DGPS		OFF/ON→OFF/ OFF→ON/ ON ↔ OFF	
	4. HDOP		OFF/1-20	
	5.TEMP		OFF/OVER/UNDER / IN RANGE / OUT RANGE	
	6.DPTH		OFF/OVER/UNDER / IN RANGE / OUT RANGE	
	7.TRIP		OFF/OVER	
	8.SPD		OFF/OVER/UNDER / IN RANGE / OUT RANGE	
	0.ALARM SOUND SET	1.SYSTEM	1/2/3	4.11.2
		2.ARRIVAL/ANCHOR	OFF/1/2/3	
		3.XTD/BOUNDARY	OFF/1/2/3	
		4. DGPS	OFF/4/5/6	
		5. HDOP	OFF/1/2/3/4/5/6	
		6.TEMP	OFF/1/2/3/4/5/6	
		7.DPTH	OFF/1/2/3/4/5/6	
		8.TRIP	OFF/1/2/3/4/5/6	
		9.SPEED	OFF/1/2/3/4/5/6	

Main Menu	Sub Menu	Sub Menu	Range	Reference
5.SYSTEM	1.TIME DIFF		-13:30－13:30	4.15.1
	2.DATE DISP		'YY-MM-DD/ DD MM,'YY/ MM DD,'YY	4.15.2
	3.TIME DISP		24hr/12hr	4.15.3
	4.DATUM		WGS84 etc.	4.15.4
	5.UNIT - DIST/SPEED		NM,kn km,km/h mi,mi/h	4.15.5
	6. HEIGHT, DEPTH		m/ft/fm	4.15.6
	7. TEMPERATURE		℃/℉	4.15.7
	8.MAG CORR		OFF/AUTO/MANUAL	4.15.8
	9.SPEED METER		10-100kn	4.15.9
6. GPS/BEACON/ SBAS	1.GPS MODE		AUTO/GPSALONE / SBAS/BEACON	4.16.1
	2.FIX MODE		AUTO/2D/3D	4.16.2
	3.SAT ELV MASK		5-89 Degrees	4.16.3
	4. HDOP		4/10/20	4.16.4
	5.SMOOTHING POSITION		0-99 sec	4.16.5
	SPEED		0-99 sec	
	COURSE		0-99 sec	
	6. RAIM ACCURACY LEVEL		OFF/10/30/50/100	4.16.6
	7. GPS INITIALIZATION	1.LATITUDE		4.16.7
		2.LONGITUDE		
		3.ANT HEIGHT		
		4.DATE		
		5.TIME		
		0.SET		
	8.BEACON/SBAS	1.STATION SELECT	AUTO/MANUAL	4.16.8
		2.FREQUENCY	283.5-325.0kHz	
		3.BIT RATE	50/100/200bps	
		4. BEACON INFORMATION	ON/OFF	
		6.SBAS SEARCH	AUTO/MANUAL	
		7. TYPE0 INFORMATION	ON/OFF	
		8.RANGING	ON/OFF	
	9.LORAN	1.LORAN A/C	OFF/LORAN A/ LORAN C	4.16.9
		LORAN A		
		1.LORAN A/C		
		2.STN SELECT STN 1		
		3. STN 2		
		4. TD CORR TD1		
		5. TD2		
		LORAN C		
		1.LORAN A/C		
		2. GRI CHAIN		
		3. TD DATA TD1		
		4. DATA TD2		
		5. TD CORR TD1		
		6. TD2		
7.VERSION				4.17
8.LANGUAGE	1.LANGUAGE		JAPAN/ ENGLISH	4.18

Main Menu	Sub Menu	Sub Menu	Range	Reference
0.EQUIP SET	1.DISPLAY TYPE		MAIN/SUB	4.20.1
	2.SENSOR No.		1-9	4.20.2
	3. CCRP	1.SHIP	ENABLE/DISABLE	4.20.3
		2.BEAM	1.0-70.0m	
		3.LENGTH	1.0-700.0m	
		4.SENSOR	ENABLE/DISABLE	
		5.X	-35.0-+35.0m	
		6.Y	0.0-700.0m	
		7.CCRP	ENABLE/DISABLE	
		8.X	-35.0-+35.0m	
		9.Y	0.0-700.0m	
	4.CHECK		OFF/INPUT DATA / DIAGNOSIS/ERROR LOG / CONFG OUT	4.20.4
	5.RESET		OFF/ALL/SENSOR/ DISPLAY	4.20.5
	6.DEMO	1.DEMO TYPE	STATIC/ STRAIGHT / RIGHT/LEFT/ ROUTE/AUTO	4.20.6
		2.DATE		
		3.TIME		
		4.LATITUDE		
		5.LONGITUDE		
		6.SPEED		
		7.COURSE		
		8.RADIUS		
		9.ROUTE		
		0.START		
	7.DATA I/O	1.DATA IN/OUT1	NMEA/JRC/IEC/ ROUTE/SWITCH/ PRINTER	4.20.7.1
		2.DATA OUT2	NMEA/JRC/IEC/ ROUTE/SWITCH	4.20.7.2
		3.DATA OUT3	NMEA/JRC/IEC/ ROUTE/SWITCH	4.20.7.3
		4.DATA IN/OUT4	NMEA/JRC/IEC/ ROUTE/SWITCH/ EXT EQUIP	4.20.7.4/ 4.20.7.8
		5.CONTACT OUTPUT 1	ALARM ACK/SYSTEM /SYS+XTD+ARV/ 200p/NM/400p/NM	4.20.7.5
		6.CONTACT OUTPUT 2	ALARM ACK/SYSTEM /SYS+XTD+ARV/ 200p/NM/400p/NM	4.20.7.6
		7. LAN	ACTIVE ROUTE/ DATA ROUTE/ MUTUAL/DATA OUT/ REMOTE MAINTE	4.20.7.7
	8.SOFT UPDATE	1.UPDATE AREA	DISPLAY/ SENSOR	
		2.BIT RATE	SENSOR AUTO DISPLAY 38400/57600/ 115200bps	
		3.UPDATE STANDBY		
	9. IP	1. IP ADDR	DEFAULT/INPUT	4.20.8
		2.SUBNET MASK	DEFAULT/INPUT	
		3.DEFAYLT GATWAY	DEFAULT/INPUT	

4.2 Basic Operation

4.2.1 Turning the Unit On

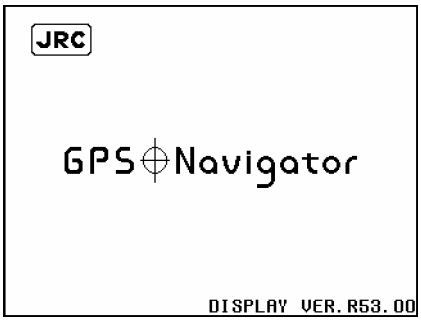
Press the PWR/CONT button to turn the unit power on. System initialization will start.

Once initialization has been completed, self-diagnosis will start, and once the equipment's status has been confirmed, the screen will switch to the standard screen.

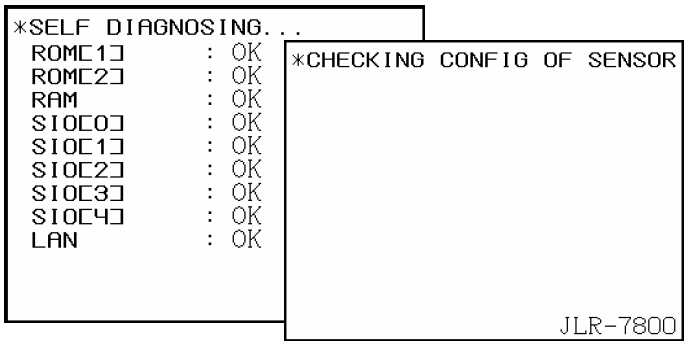
Attention

If the unit cannot be turned on, check the main power supply and the connection of display unit cable.

Unit Initialization



Self-Diagnosis Screen



(Display Unit Diagnosis)

(Sensor Setting Confirmation)

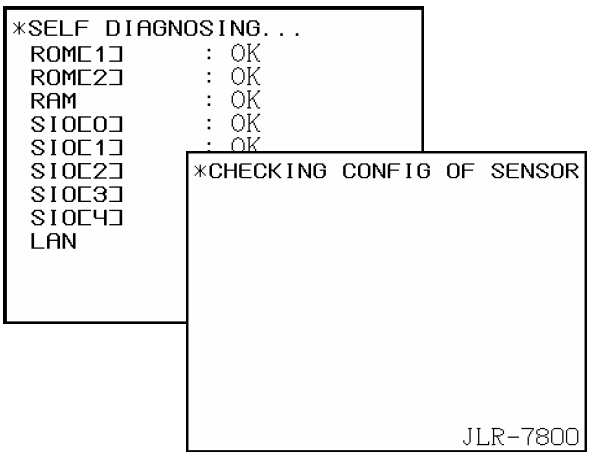
Memo

Press the CLR key to stop self-diagnosis and return to the standard screen.

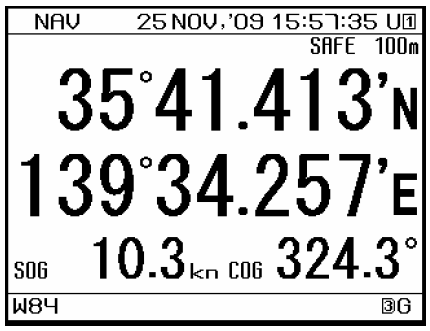
4.2.1.1 Startup (Standard)

If the self-diagnosis results are all "OK", the unit automatically switches to the standard screen.

Self-Diagnosis



Standard Screen



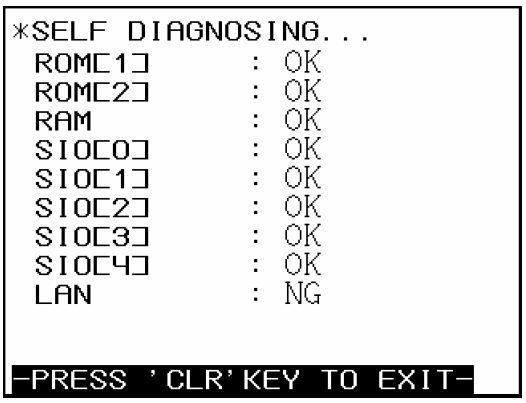
4.2.1.2 Startup (Error-1)

If any of the self-diagnosis results are "NG", the results are displayed.

The unit does not switch to the standard screen unless the CLR key is pressed.

Attention

If any errors (NG) are detected, please contact JRC or an affiliate.



4.2.1.3 Startup (Error-2)

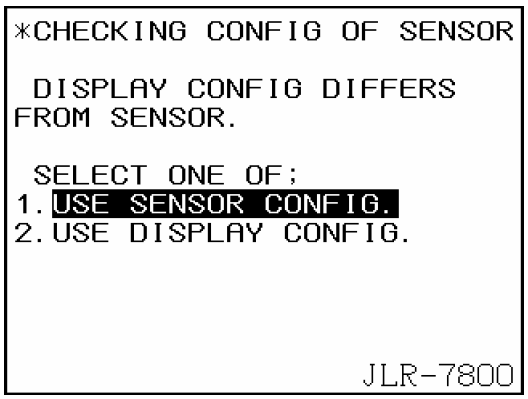
Messages shown below may be displayed during sensor diagnostics.
The message appears when display unit and sensor configuration settings do not match, such as when equipment has been replaced.

When this occurs, select one of the items, and press the ENT key to perform it.

[1. USE SENSOR CONFIG.]: Replaces display configuration with the sensor configuration.
[2. USE DISPLAY CONFIG.]: Replaces the sensor configuration with the display configuration.

Attention

Consult with JRC or its affiliate if this is displayed frequently.



4.2.1.4 Startup (Error-3)

If the following screen is displayed after the unit is turned on, press the PWR/CONT key and DIM key simultaneously to turn off the power.

Attention

Contact JRC or its affiliate.

4.2.2 Turning the Unit Off

If the DIM key and PWR/CONT key are pressed and held down simultaneously, the power will be turned off and the screen display will turn off.

4.2.3 Adjusting the Backlight

The brightness of the display can be set to one of four levels (bright, medium, dark, off).
The brightness is set to medium when the unit is turned on.
The brightness cycles in the following order when the DIM button is pressed: Bright → Medium → Dark → Off → Dark → Medium → Bright...

Memo

- Level settings can be performed for all brightness levels except "Off". (Refer to "4.14 Display Settings")
- The key panel brightness changes in accordance with the display brightness.

4.2.4 Adjusting the Contrast

The contrast of the display can be set to one of 13 levels.
Each time the PWR CONT button is pressed, the current contrast will decrease, and once the minimum contrast is reached, the contrast will increase.

4.2.5 Stopping the Alarm Buzzer

The buzzer can be stopped by pressing the CLR key.

The buzzer sounds when one of the following occurs.
- Position measurement is interrupted
- An error occurs

Memo

- Mutual Acknowledgement Function
  When positioning is stopped and the buzzer sounds, the mutual acknowledgement function can be used to stop the buzzer from another unit. To use this function, units must be connected via contact input / output or ALR, ACK sentences.

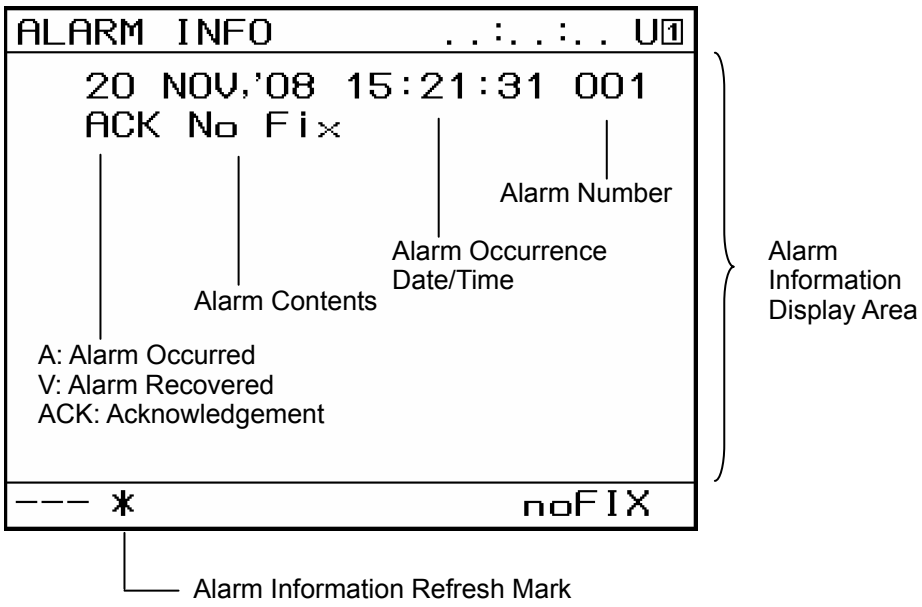
4.2.6 Changing the Display

Each time the DISP key is pressed, the screen display changes. (Refer to "3.1 Display Screen")

4.2.7 Displaying Alarm Information

Each time the 0 * key is pressed, the screen display changes.

When alarm information is updated, the * symbol appears on the status bar.

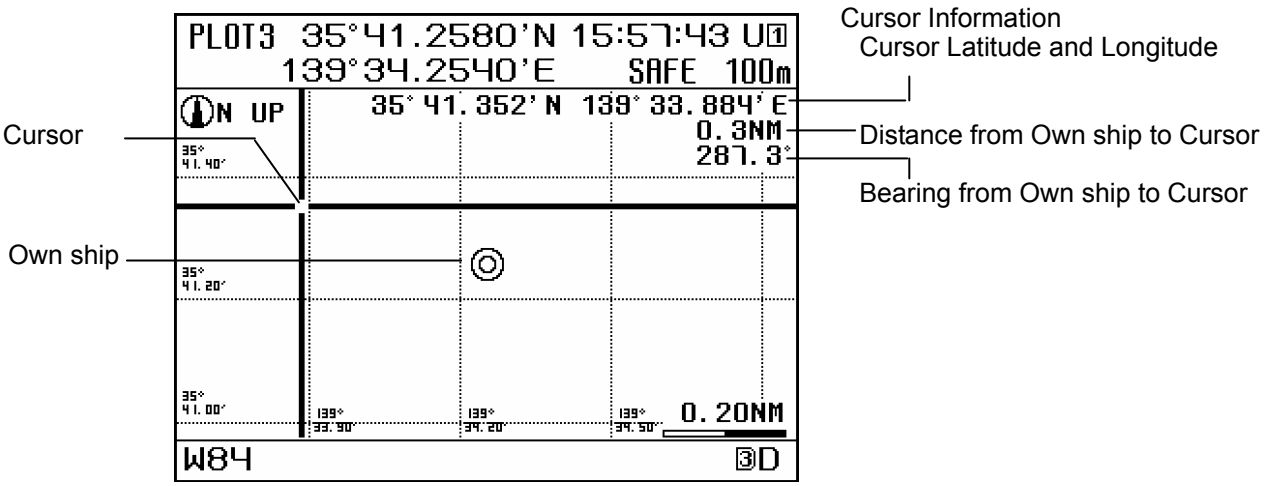


Memo

- If no alarm has occurred, "NO ALARMS" is displayed.

4.3 Plot Screen Operation

4.3.1 Cursor Operation



4.3.1.1 Displaying the Cursor

- Cursor display can be turned off and on.
- When the cursor is displayed, cursor information (cursor latitude and longitude, bearing and distance from ship to cursor) will be shown on the top right of the screen.

Procedure

1. Press the 7 CURS key on the plot screen to display the cursor.

2. To hide the cursor, press the 7 CURS key again.

   To automatically hide cursor information when the cursor has not moved for 10 seconds, set "CURSOR INFO" to "OFF" as directed in "4.3.12 Hiding Plot Screen Symbols". Set it to "ON" to always display cursor information.

4.3.1.2 Moving the Cursor

- The cursor can be moved up, down, left, right, and diagonally.

Procedure

1. Use ▲ ▼ ◄ ► to move the cursor up, down, left, and right.

   Press ▲ ◄ , ▲ ► , ▼ ◄ , or ▼ ► simultaneously to move the cursor diagonally. Holding the buttons down will cause the screen to accelerate while continuing its movement.

4.3.1.3 Centering the Cursor Position

· The position of the cursor can be displayed at the center of the screen.

Procedure

1. Display the cursor.
2. Move the cursor to the point on the screen which you want to be centered.
3. Press 9 HOME.

   The position the cursor was at will be moved to the center of the screen.

4.3.1.4 Changing Cursor Size

· The cursor size can be set to one of 3 sizes.

Procedure

1. Press MENU, then 2 EVENT, then 0 * to display the "PLOT SET2" Screen.
2. 1 MARK Press "CURSOR".
3. Use ▲ ▼ to select the size, and then press ENT.

4.3.2 Moving the Screen

· The screen can be moved up, down, left, right, and diagonally

Procedure

1. If the cursor is displayed, press 7 CURS to hide the cursor.
2. Press ▲ ▼ ◄ ► to move the screen up, down, left, or right.

   Press ▲ ◄, ▲ ►, ▼ ◄ or ▼ ► simultaneously to move the screen diagonally. Holding the buttons down will cause the screen to accelerate while continuing its movement.

4.3.3 Zooming the Screen In and Out

· The plot screen width can be changed to any of the widths below.
0.2, 0.5, 1.0, 2.0, 5.0, 10.0, 20.0, 50.0, 100.0, 200.0, 300.0[NM]

Procedure

1. Each time 3 is pressed, the screen will zoom in (a narrower area will be displayed).
2. Each time 6 is pressed, the screen will zoom out (a wider area will be displayed).

   A scale bar is displayed at the bottom right of the screen.
   To turn off the scale bar, turn the "SCALE BAR" "OFF" as described in "4.3.12 Hiding Plot Screen Symbols".

4.3.4 Selecting North Up, Course Up, Relative North Up

· The screen mode can be switched between north up, course up, and relative north up.
North Up: The top of the screen shows north, and own ship moves.
Course Up: The top of the screen shows the direction of the route of own ship, and the surroundings move.
Relative North Up: The top of the screen shows north, the ship is fixed, and the surroundings move.

Procedure

1. Press 8 AZI.

   Each time the key is pressed, selection rotates as follows:
   "N UP" → "C UP" → "RM N UP"
   ↑ ←

   The top left of the screen displays the direction of north and the screen mode.

4.3.5 Centering the Screen on the Ship

· The ship can be displayed at the center of the screen.

Procedure

1. If the cursor is displayed, press 7 CURS to hide the cursor.
2. Press 9 HOME.

   Own ship will be displayed at the center of the screen.

Memo

· When own ship reaches the edge of the screen, the screen will automatically reposition the display such that own ship is at the center of the screen. When Course Up is selected, own ship will be displayed somewhat below the center of the screen.

4.3.6 Waypoint Symbol Display

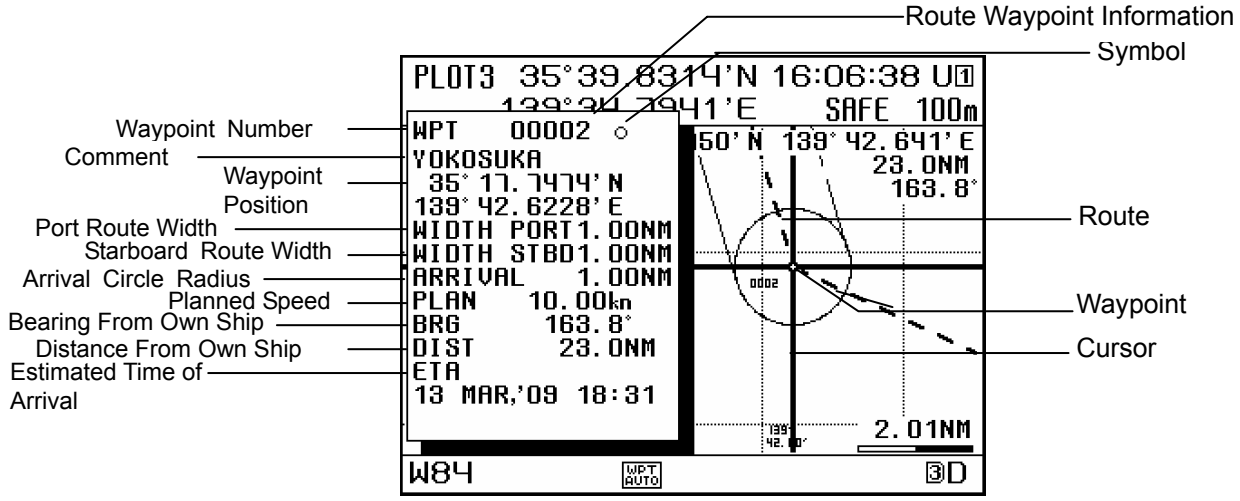
- The symbols and numbers of waypoints registered in the waypoint list are displayed on the plot screen.
- Up to 1000 waypoints can be displayed on one screen.
- To turn off waypoint symbol display, set "WPT" to "OFF" as described in "4.3.12 Hiding Plot Screen Symbols".

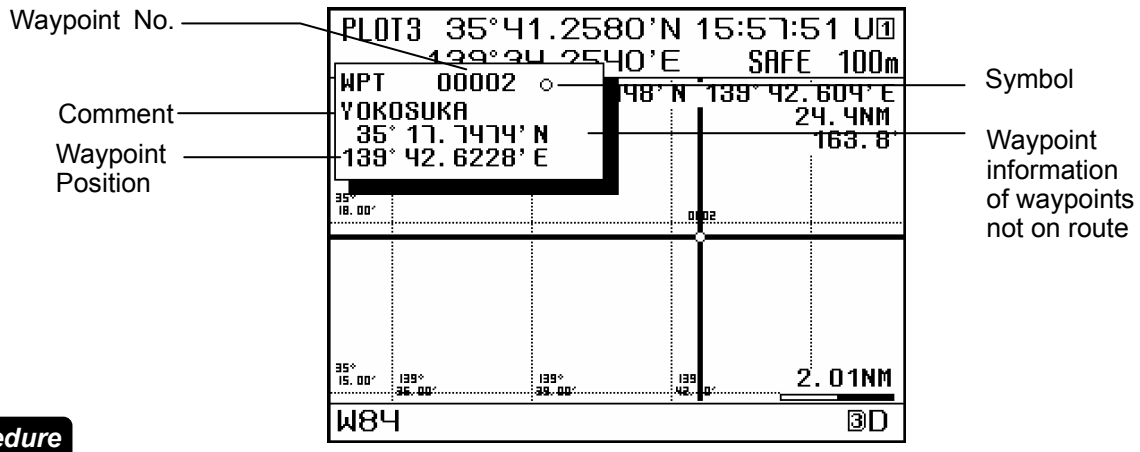
4.3.6.1 Displaying Waypoint Information

Waypoint information can be displayed by moving the cursor to the waypoint and leaving it in place for 1 second or longer.
If the cursor is moved off of the waypoint, the waypoint information will be hidden.
The following waypoint information is shown.

- For waypoints on route
  Symbol shape, number, comments, latitude, longitude, arrival circle radius, port route width, starboard route width, bearing from own ship, distance, estimated time of arrival.

- For waypoints off route Symbol shape, number, comments, latitude, longitude





Procedure

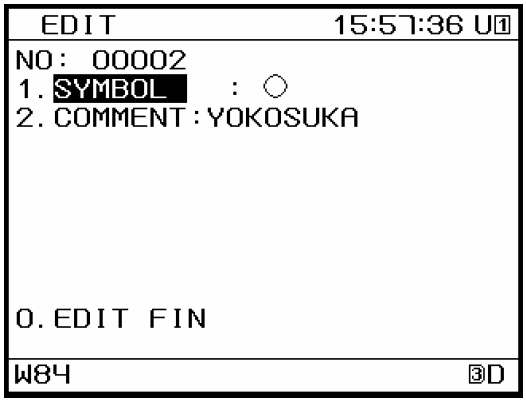
1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the waypoint symbol.
   Leave the cursor in place for 1 second or longer, and the waypoint information will be displayed.

4.3.6.2 Editing Waypoint Symbols

- Waypoint symbol shapes and comments can be edited, but the symbols on the active route or sharing route can not be edited.
- Waypoint symbols can also be edited from the menu. Please refer to "4.4.4 Editing Waypoint Information".

Procedure

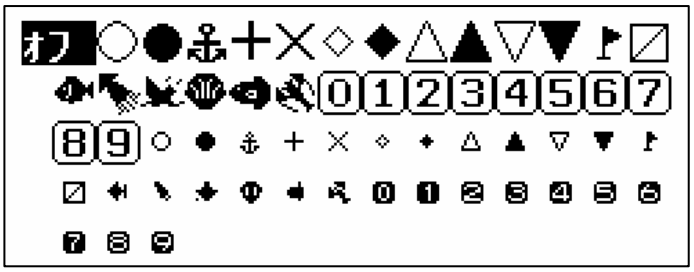
1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the waypoint symbol and display the waypoint information.
3. Press ENT to display the edit screen.



Edit Screen

(1) To Change Symbol Shape

4. Press 1 MARK "SYMBOL".
5. Press ▲ ▼ ◄ ► to select the shape, and press ENT.



Symbol Shape List

(2) To Change Comment

6. Press 2 EVENT "COMMENT" and enter the comment.
   Please refer to "4.9 Entering Comments" for instructions on how to enter comments.
7. Press 0 * "EDIT FIN".

4.3.6.3 Deleting Waypoint Symbols

Waypoints can be deleted.
Deleted waypoints will also be deleted from the waypoint list. However, waypoints on the active route will be deleted from the route, but will not be deleted from the waypoint list (skip). For details regarding skipping, refer to "4.3.7.3 Skipping Route Waypoints".
Deletion is also possible from the menu. Please refer to "4.4.6 Deleting Waypoints".

Procedure

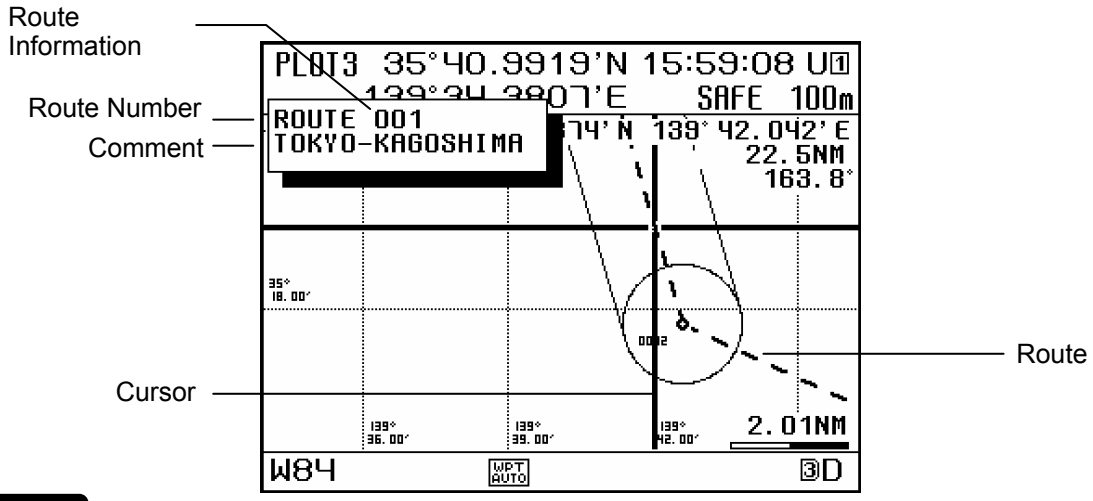
1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the waypoint symbol and display the waypoint information.
3. Press CLR.

4.3.7 Route Display

- When navigation starts, the active route, arrival circle, and route width are displayed on the plot screen.
- To hide the arrival circle and route width, set "ARRIVAL CIRCLE" and "XTD" to "OFF" as directed in "4.3.12 Hiding Plot Screen Symbols".
- To display only the arrival circle and route width for the LEG, set "ARRIVAL CIRCLE" and "XTD" to "LEG" as described in "4.3.12 Hiding Plot Screen Symbols". If set to "ON", the arrival circles and route widths for each LEG will be displayed.
- Arrival circles and route widths for routes for which navigation is underway cannot be edited.
- Refer to "4.5.2 Creating Routes" for information regarding how to create routes.
- Refer to "4.6 Performing Navigation" for information regarding how to perform navigation.

4.3.7.1 Displaying Route Information

If the cursor is moved onto a route, and left in place for 1 second or longer, the route information will be displayed.
If the cursor is moved off the route, the route information will be hidden.
The route information displayed consists of the route number and comments.
Only the active route can be displayed.



Procedure

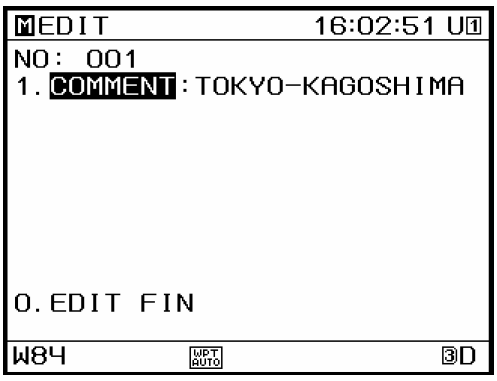
1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the route.
   Leave the cursor in place for 1 second or longer, and the route information will be displayed.

4.3.7.2 Editing Route Information

Route comments can be edited. However, shared routes cannot be edited.
Editing is also possible from the menu. Please refer to "4.5.3 Editing Routes".
Only the active route can be displayed.

Procedure

1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the route, and display the route information.
3. Press ENT to display the edit screen.



4. Press 1 MARK "COMMENT" and enter the comment.
   Please refer to "4.9 Entering Comments" for instructions on how to enter comments.
6. Press 0 * "EDIT FIN".

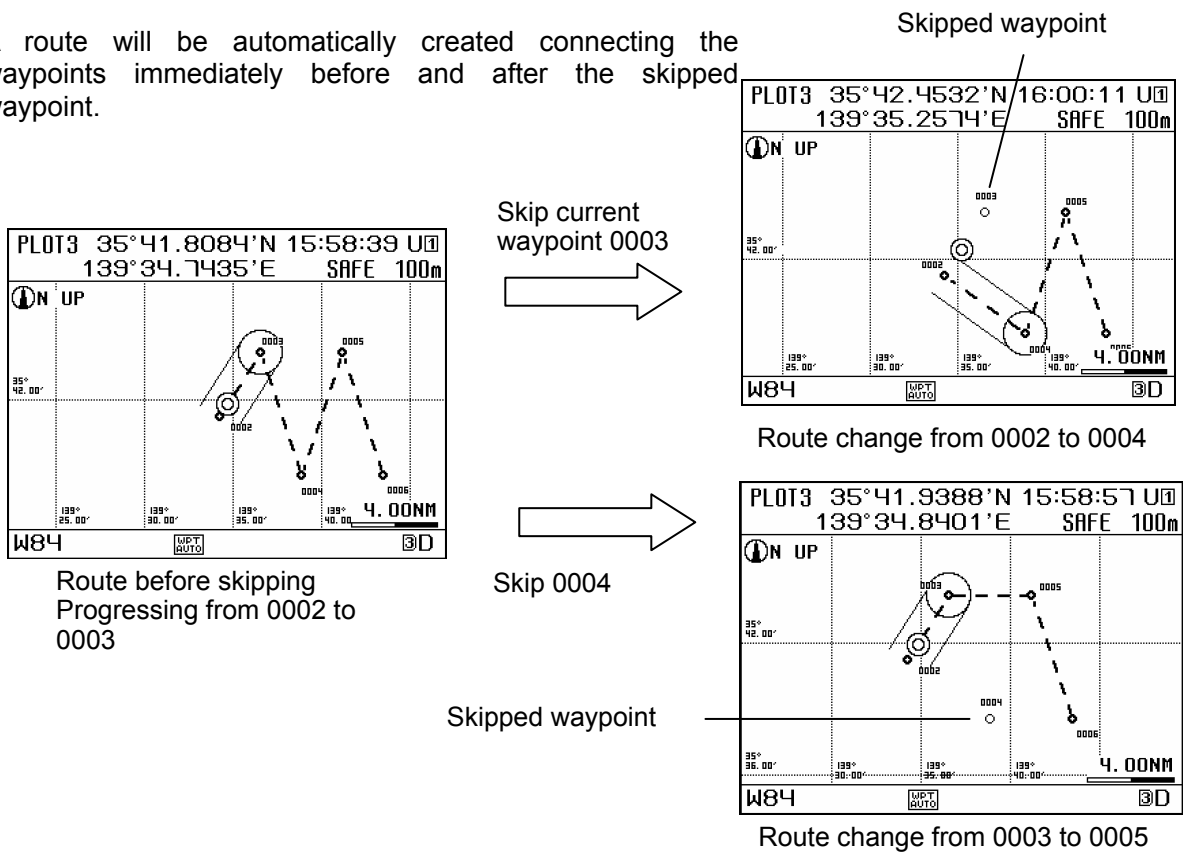
4.3.7.3 Skipping Route Waypoints

Waypoints on routes can be skipped.
Waypoints on sharing route can not be skipped.
If skipped, they will disappear from the route, and a route connecting the previous and next waypoints will be created, but the waypoint will not be deleted from the route planning.
Skipping is also possible from the menu. Please refer to "4.5.3.1 Changing Waypoint Information".
Waypoints which have already been passed cannot be skipped.
Once skipped, the skipped state will be retained, and the waypoint will be skipped again if the same route is performed. To set a waypoint which has been skipped to no longer be skipped, set the waypoint information "STATE" setting to "USE" as directed in "4.5.3.1 Changing Waypoint Information".
The only route which can be displayed is the active route.

Procedure

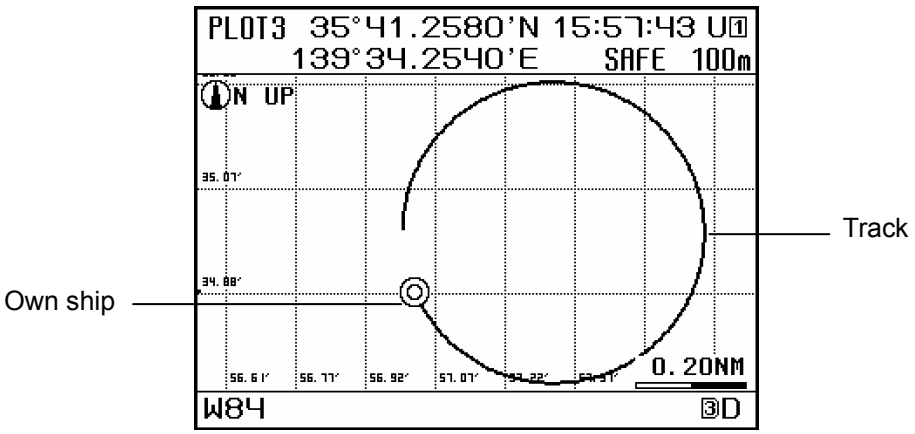
1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the waypoint on the route, and display the waypoint information.
3. Press CLR.

A route will be automatically created connecting the waypoints immediately before and after the skipped waypoint.



4.3.8 Track Display

- The own ship's track can be displayed.
- A maximum of 2000 points of track can be stored. Once this number is exceeded, old track points will be automatically deleted.
- To turn off track display, set "TRACK" to "OFF" as described in "4.3.12 Hiding Plot Screen Symbols".



4.3.8.1 Setting the Track Period

Memory intervals can be set to units of time or of distance.
The following periods can be set:

Time: Can be set in 1 second increments between 1 and 60 minutes.
Distance: Can be set in 0.01 NM increments between 0.01 and 99.99 NM.

Procedure

1. Press MENU, 2 EVENT, and then 4 # and select "TRACK PERIOD".
2. Press ▲ ▼ to select either "TIME" or "DIST", and press ENT.
3. Use the numeric keypad to enter the period, and press ENT.

Memo

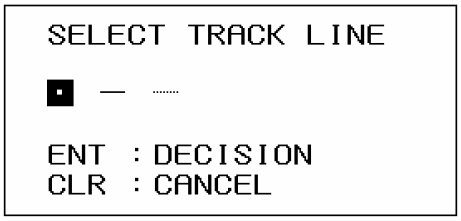
- If the period is set to "OFF", track memory will be deactivated. Previously stored data will be retained.

4.3.8.2 Changing Track Line Type

The track line type (dots, line, dotted line) can be selected.

Procedure

1. Press MENU, 2 EVENT, and then 5 GOTO and select "TRACK".
2. Press ENT to select the line type, and press ENT.



Line Type List

4.3.8.3 Deleting Tracks

All tracks can be deleted.
Partial deletion cannot be performed.

Procedure

1. Press MENU, 2 EVENT, 8 AZI, and then 5 GOTO, and select "DELETE TRACK".

4.3.9 Event and Mark Symbol Display

- Events and marks registered in the event/mark list can be displayed on the plot screen.
  Event: When the event key is pressed, a symbol is displayed at the own ship's position, and is registered in the event/mark list.
  Mark: When the mark key is pressed, a symbol is displayed at the cursor position, and is registered in the event/mark list.
- Up to a total of 1000 symbols (including MOB and line change points) can be registered and displayed.
- To disable event and mark display, set "EVENT" and "MARK" to "OFF" as described in "4.3.12 Hiding Plot Screen Symbols".

4.3.9.1 Entering Events

Event symbols are displayed at the own ship's position on the plot screen, and are registered to the event/mark list.
They are registered to the event/mark list in ascending numerical order.

Procedure

1. Press 2 EVENT.

Memo

- As long as the menu screen, waypoint information screen, or navigation assistance 4 screen are not displayed, the ship's position can be registered by pressing the 2 EVENT button without exiting the plot screen.

4.3.9.2 Entering Marks

Mark symbols are displayed at the cursor position on the plot screen, and are registered to the event/mark list.
They are registered to the event/mark list in ascending numerical order.

Procedure

1. Press 7 CURS, and display the cursor.
2. Move the cursor to the position you wish to register, and press 1 MARK.

Memo

- If 1 MARK is pressed without displaying the cursor on the plot screen, an event symbol will be displayed at the own ship's position, and registration will occur.

4.3.9.3 Changing Event/Mark Shapes

The default symbol types of events and marks displayed when setting events or marks can be selected. Individually selected symbol types are not changed.

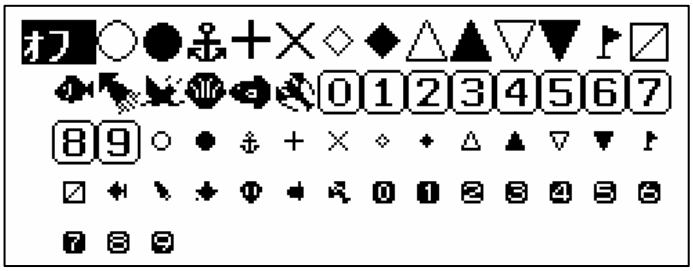
Procedure

(1) Changing Event Symbol Shape

1. Press MENU, 2 EVENT, and then 3 ⟷, and select "EVENT".
2. Press ▲ ▼ ◄ ► to select the shape, and press ENT.

(2) Changing Mark Symbol Shape

1. Press MENU, 2 EVENT, and then 2 EVENT, and select "MARK".
2. Press ▲ ▼ ◄ ► to select the shape, and press ENT.



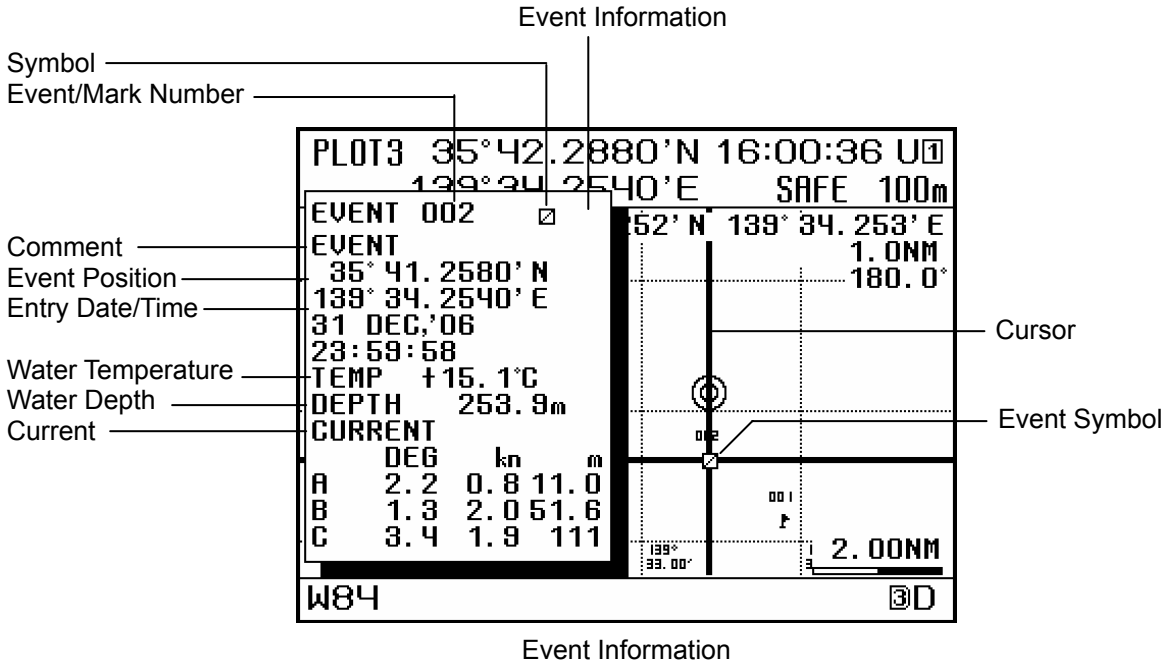
Symbol Shape List

4.3.9.4 Displaying Event/Mark Information

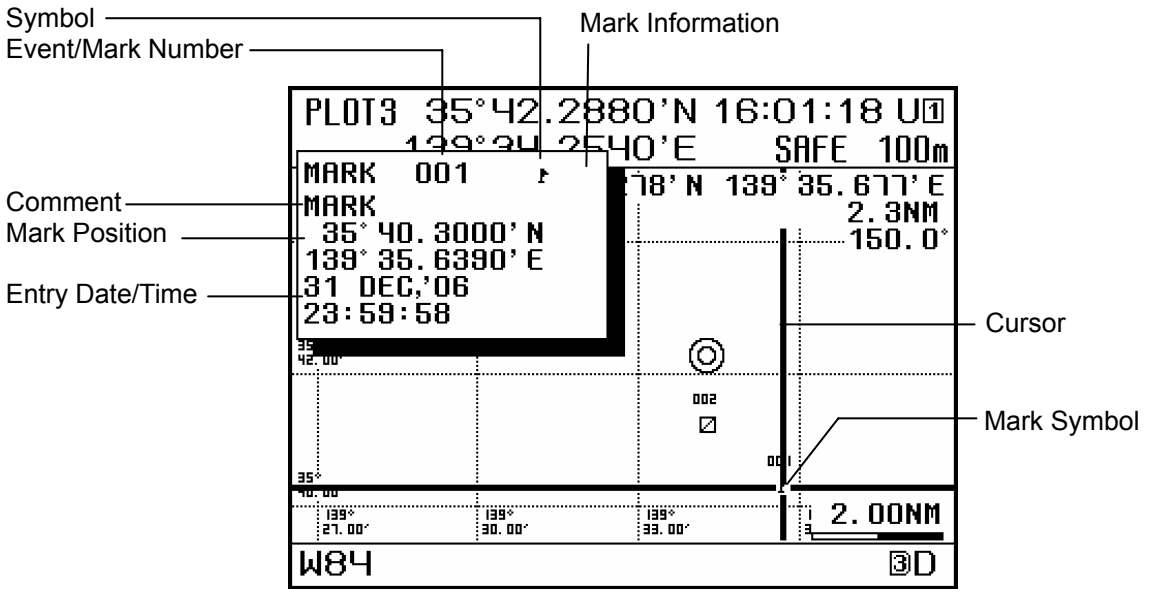
- Event and mark information can be displayed.
- The following event information is displayed.
  Event symbol, event number, comment, latitude, longitude, registration date and time
  When an external unit is connected, the water temperature, depth, and current at the time of registration.
- The following mark information is displayed.
  Mark symbol, mark number, comment, latitude, longitude, registration date and time
- Move the cursor to the event or mark symbol, and leave the cursor there for 1 second or longer to display the event or mark information.
- If the cursor is moved off of the event or mark symbol, the event or mark information will be hidden.

Procedure

1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the event or mark symbol.
   Leave the cursor in place for 1 second or longer, and the event or mark information will be displayed.



Event Information



Mark Information

Memo

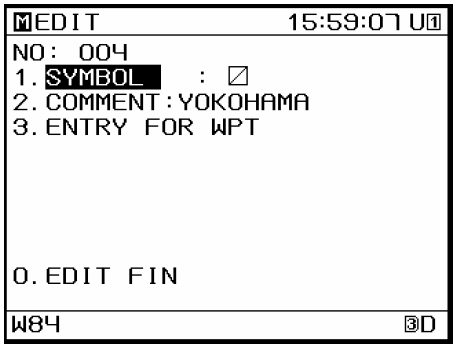
· Event and mark information can also be displayed from the event/mark list.
Please refer to "4.7.3 Editing Event and Mark Information".

4.3.9.5 Editing Event/Mark Information

Event and mark symbol shapes and comments can be edited.

Procedure

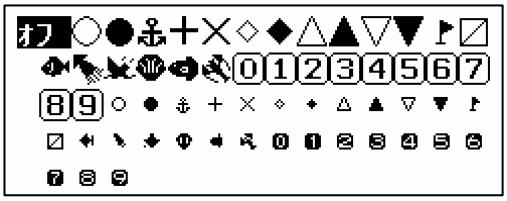
1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the event or mark symbol, and the event or mark information will be displayed.
3. Press ENT to display the edit screen.



Event / Mark Editing Screen

(1) To Change Symbol Shape

4. Press 1 MARK "SYMBOL".
5. Press ▲ ▼ ◄ ► to select the shape, and press ENT.



Symbol Shape List

(2) To Change Comment

6. Press 2 EVENT "COMMENT" and enter the comment.
   Please refer to "4.9 Entering Comments" for instructions on how to enter comments.
8. Press 0 * "EDIT FIN".

Memo

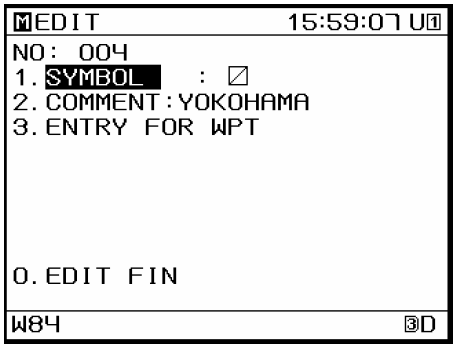
· Event and mark information can also be edited from the event/mark list.
  Please refer to "4.7.3 Editing Event and Mark Information".

4.3.9.6 Registering Event/Mark Positions to the Waypoint List

Event and mark positions can be registered to the waypoint list.
This enables them to be used as waypoints.

Procedure

1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the event or mark symbol you wish to register to the waypoint list, and display the event or mark information.
3. Press ENT to display the edit screen.



4. Press 3 ⟷ "ENTRY FOR WPT".
5. The waypoint list will be displayed. Select the number of the waypoint you wish to register, and press ENT.
   Please refer to "4.8 List Screen Operation" for details regarding how to select waypoint numbers.

4.3.9.7 Deleting Event/Mark Symbols

Registered events and marks can be deleted.

Procedure

1. Press 7 CURS, and display the cursor.
2. Press CLR to move the cursor to the event or mark symbol you wish to delete, and display the event or mark information.
3. Press CLR.

Memo

· Event and mark symbols can also be deleted from the event/mark list.
  Please refer to "4.7.4 Deleting Event/Mark Information".

4.3.10 Line Display

- Lines can be drawn between any two points on the plot screen.
- To turn off line display, set "LINE" to "OFF" as described in "4.3.12 Hiding Plot Screen Symbols".

4.3.10.1 Drawing Lines

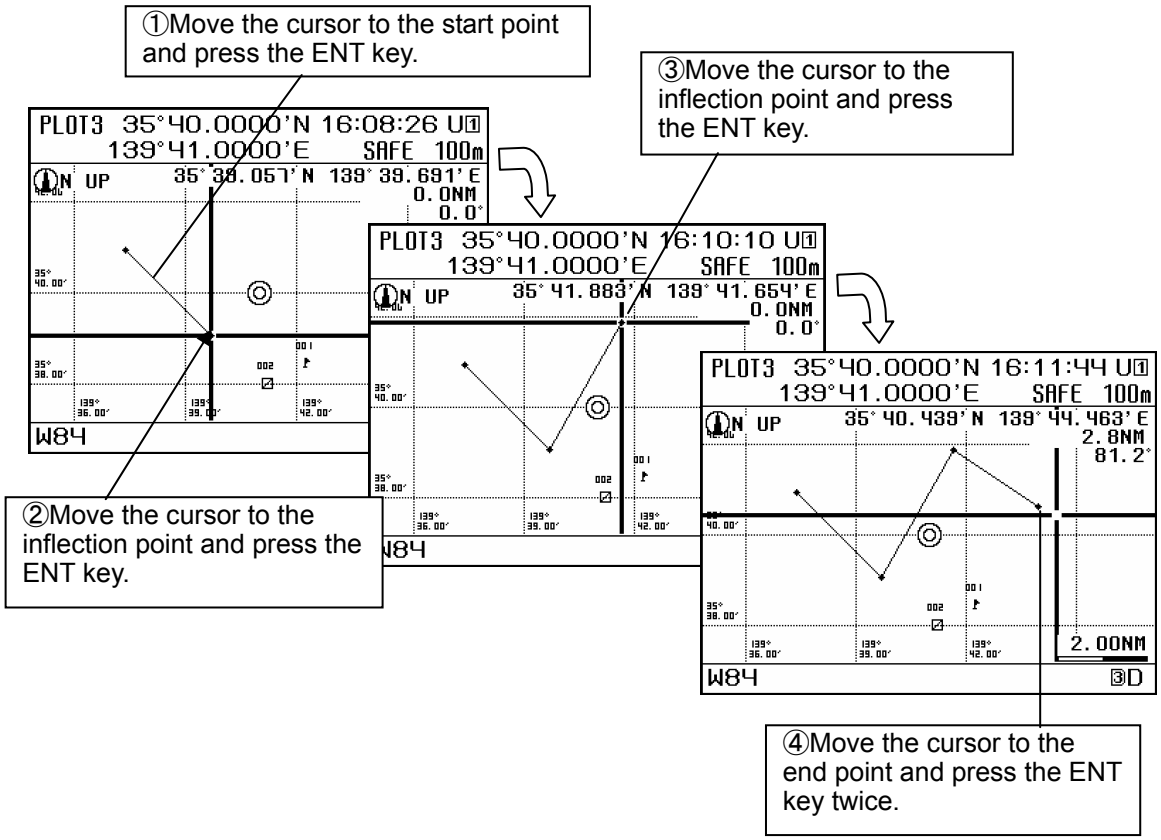
The cursor is used to set start and end points on the plot screen, and a line is drawn connecting them.
Line start and end points can be registered as marks in the event/mark list.

If CLR is pressed before an end point is selected, the previous inflection point is deleted.

Procedure

1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the start point, and press ENT.
3. Press ▲ ▼ ◄ ► to move the cursor to the end point, and press ENT.
4. At the same position as the end point, press ENT again.

   If steps 2 and 3 are repeated before step 4, a line will be drawn using the end point as an inflection point.

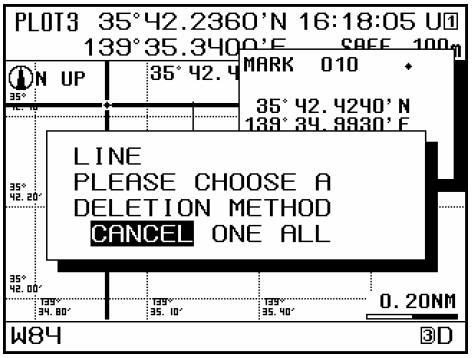


4.3.10.2 Deleting Lines

If an inflection point on a line is deleted, the inflection points before and after it will be connected. Entire lines can also be deleted.

Procedure

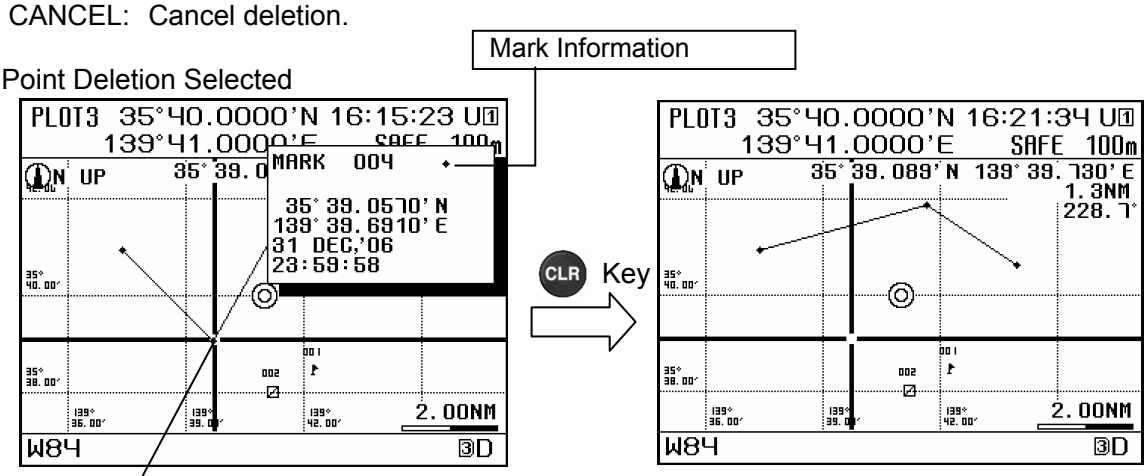
1. Press 7 CURS, and display the cursor.
2. Press ▲ ▼ ◄ ► to move the cursor to the inflection point you wish to delete, and display the mark information.
3. CLR Pressing will display the following. Select one or all points to be deleted, and press ENT.



The following is an overview of the display.

ONE: Delete only the selected inflection point, and connect the points immediately before and after it.
ALL: Delete the selected line.
CANCEL: Cancel deletion.

1 Point Deletion Selected



Memo

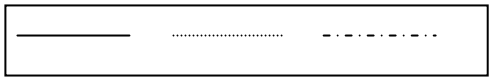
- If a line consists of only a start point and an end point, if either are deleted, the entire line will be deleted.
- Inflection points are registered in the event/mark list as marks, and as such can be deleted by deleting the mark. Please refer to "4.7.4 Deleting Event/Mark Symbols" for details regarding how to perform deletion.

4.3.10.3 Changing Line Types

The line type can be changed.
Line types can be set for each line, but cannot be changed after the line has been set.

Procedure

1. Press MENU, 2 EVENT, and then 6, and select "LINE".
2. Press ◄ ► to select the line type, and press ENT.



Line Type List

4.3.11 Own Ship Display

· The distance circle from own ship, and the ship's vector, are displayed.
· The own ship symbol cannot be changed.

4.3.11.1 Displaying the Distance Circle

A circle, centered on own ship, is displayed by specifying the radius.
Settings can be made between 0.1 and 9.9 NM.

Procedure

1. Press MENU, 2 EVENT, 0 *, and then 2 EVENT, and select "OWN CIRCLE".
2. Press ▲ ▼ to select "SET", and press ENT.
3. Use the numeric keypad to enter the distance radius [NM], and press ENT.

4.3.11.2 Displaying the Own Ship Vector

Setting the time allows the vector line to the point own ship will arrive at in the set time to be displayed.
Settings can be made between 0.1 and 9.9 minutes.

Procedure

1. Press MENU, 2 EVENT, 0 *, and then 3, and select "OWN VECTOR".
2. Press ▲ ▼ to select "SET", and press ENT.
3. Use the numeric keypad to enter the time [min], and press ENT.

4.3.12 Hiding Plot Screen Symbols

- Individual symbols on the plot screen can be hidden.
- Set symbols to "OFF" to hide them.
- Set symbols to "ON" to display them.
- The following symbols can be set:
  Waypoints, waypoint numbers, marks, events, event / mark numbers, tracks, lines, arrival circles, route widths, scale bars, symbol information, cursor position information, grid lines, grid latitude, grid longitude.

Procedure

1. Press MENU, 2 EVENT, and then 9 HOME, and select "VISIBLE/INVISIBLE".
   Press 0 * "NEXT PAGE" for items which are not displayed.
2. Use the numeric keypad to select the item to hide.
3. Press ▲ ▼ "OFF", and then press ENT.

Memo

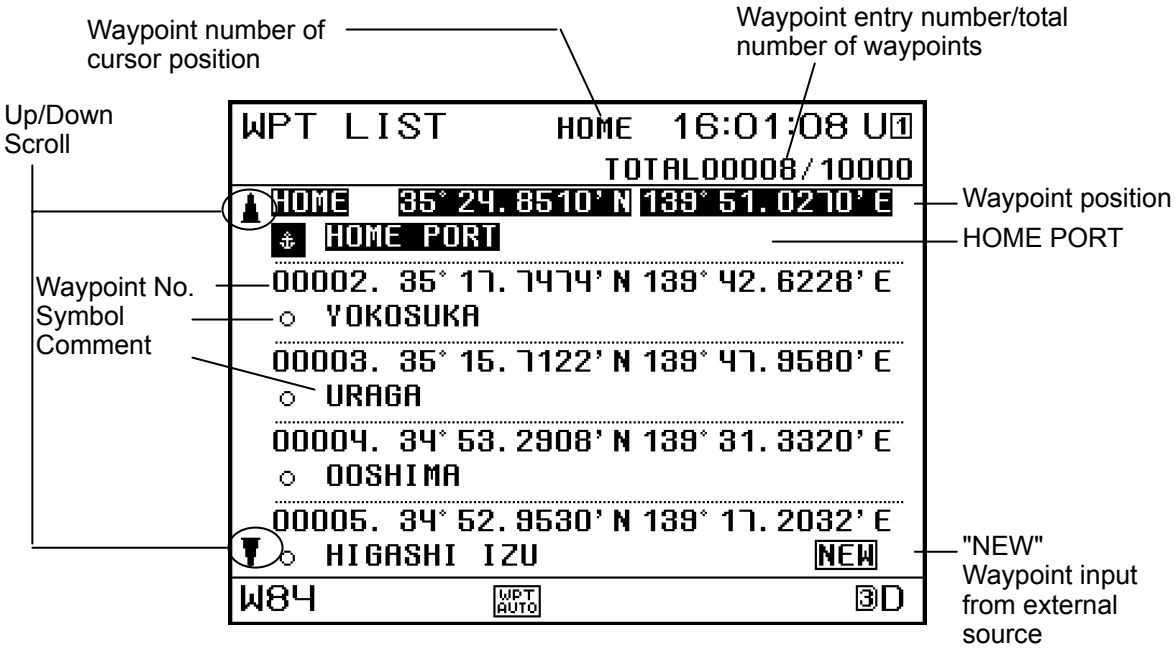
- If mark or event are pressed when marks or events are hidden, marks and events will be displayed.
- If GOTO is used to create a temporary route with the cursor when waypoints are hidden, waypoints will be displayed.
- If a line is drawn when lines are hidden, lines will be displayed.

4.4 Registering Waypoints

- Waypoints must be registered to the waypoint list to start navigation.
- Up to 10000 waypoints can be registered in this unit.
- The waypoint list is divided into 3 regions, managed via numbering from 1 - 11024.
  1 - 10000: Waypoints registered in this unit.
  10001 - 10512: Waypoints on shared active routes sent by ECDIS are registered.
  10513 - 11024: Waypoints used in temporary routes are registered.
- Numbers 1 - 10512 are saved, and remain even if the power is turned off. 10513 - 11024 are not saved, and will disappear if the power is turned off.
- Waypoints can be set between 89 degrees north and 89 degrees south.

4.4.1 Displaying the Waypoint List

Registered waypoints (waypoint number 1 - 10000) can be displayed.
Waypoint number 00001 is registered as "HOME PORT".



Procedure

1. Press MENU, 3 ⟷, and then 1 MARK, and display the waypoint list.

Memo

- The position registered as HOME in the waypoint list can be easily set as the waypoint using the GOTO function.
  It is convenient to register a frequently used waypoint (such as the home port) as HOME.
  Please refer to "4.6.2 Starting Navigation with the GOTO Key" for details regarding the GOTO function.
- The waypoint on the route entered from an external device is displayed NEW at the extreme right of the waypoint list and then registered. The NEW is displayed when a waypoint on the next route has been entered or until the power is shut off.

4.4.2 Registering Waypoints

The following 5 positions can be registered in the waypoint list.
(1) Own ship position
(2) Specified latitude and longitude
(3) Cursor position
(4) Position defined by a bearing and distance from a specified point
(5) A position registered in the event/mark list
Up to 10000 points can be registered.

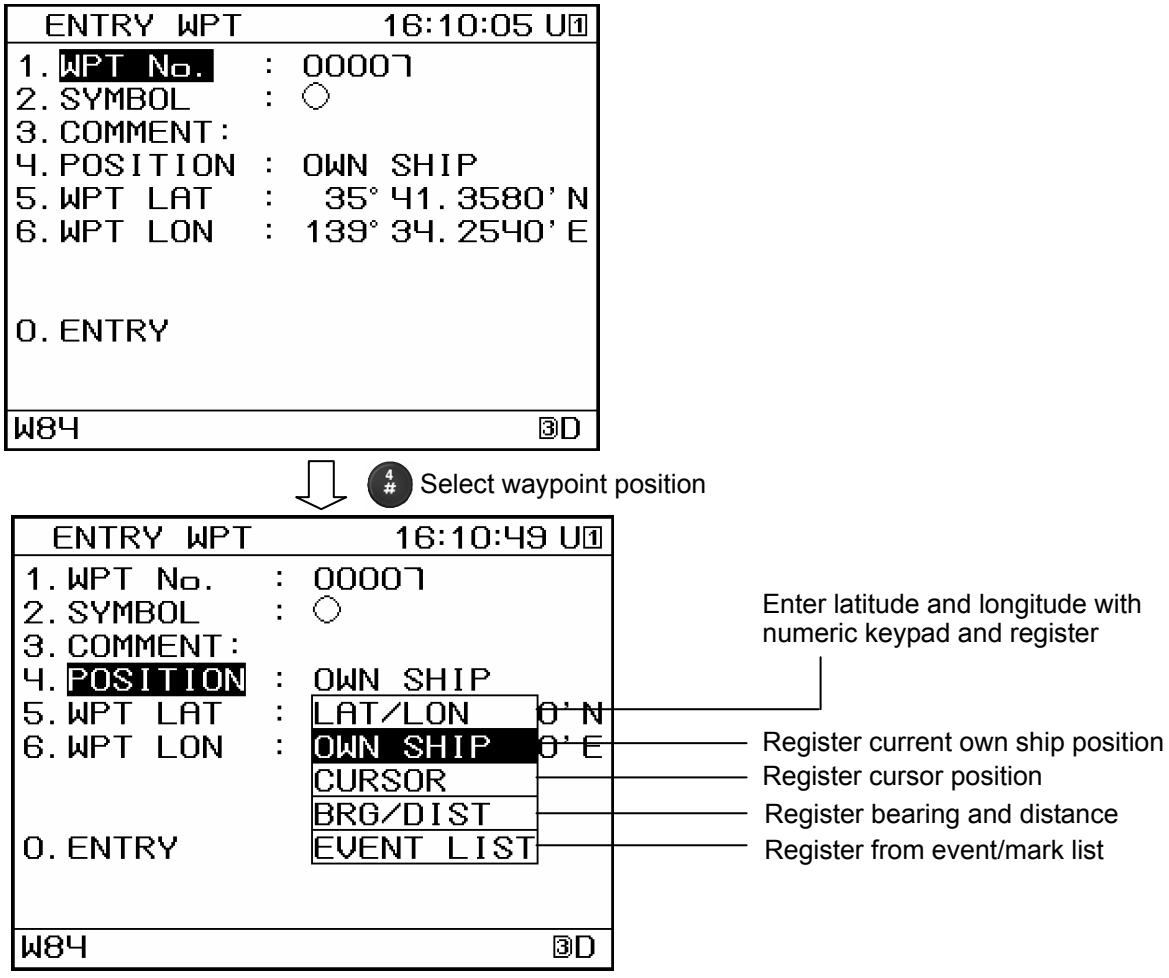
To register, first display the waypoint registration screen.

Procedure

1. Press MENU, 3 ⟷, and then 1 MARK, and display the waypoint list.
2. Move the cursor to the number you wish to register, and press ENT.

   To move the cursor to the desired number, you can use the following methods:
   (1) Move with the up and down keys
   (2) Enter the desired number with the numeric keypad
   (3) Jump to a number without registered contents
   Please refer to "4.8.2 Moving the Cursor to an Unregistered Number" for details.

3. The waypoint registration screen will be displayed.



4.4.2.1 Registering the Own Ship Position

The own ship position can be registered to the waypoint list.

Procedure

1. Please refer to "4.4.2 Registering Waypoints" and display the waypoint registration screen.
2. Press 4 # "POSITION".
3. Press ▲ ▼ and move the cursor to "OWN SHIP", and then press ENT.
4. The ship's position is shown in "5. WPT LAT", "6. WPT LON".
5. Press 0 * "ENTRY".

4.4.2.2 Registering Latitude and Longitude

Any desired latitude and longitude can be registered in the waypoint list.

Procedure

1. Please refer to "4.4.2 Registering Waypoints" and display the waypoint registration screen.
2. Press 4 # "POSITION".
3. Press ▲ ▼ and move the cursor to "LAT/LON", and press ENT.
4. Press 5 GOTO "WPT LAT", enter the latitude with the numeric keypad, and press ENT.
   N/S can be selected via ▲ ▼.
5. Press 6 "WPT LON", enter the longitude with the numeric keypad, and press ENT.
   E/W can be selected via ▲ ▼.
   When "WPT LAT" is entered, the cursor moves automatically to the latitude numerical entry position. If "WPT LON" entry is unnecessary, press ENT.
6. Press 0 * "ENTRY".

4.4.2.3 Registering the Cursor Position

Any cursor position on the plot screen can be registered to the waypoint list.

Procedure

1. Please refer to "4.4.2 Registering Waypoints" and display the waypoint registration screen.
2. Press 4 # "POSITION".
3. Press ▲ ▼, move the cursor to "CURSOR", and press ENT.
4. The plot screen will be displayed.
   Press ▲ ▼ ◄ ► to move the cursor, and press ENT at the position you wish to register.
   When the cursor is moved, the cursor position is displayed at the top right of the screen.
5. The cursor position is shown in "5. WPT LAT", "6. WPT LON".
6. Press 0 * "ENTRY".

4.4.2.4 Registering a Bearing and Distance from a Specified Position

A position can be specified as a start point, and then another position defined by its bearing and distance from said start point can be registered to the waypoint list.
Any of the following 6 can be used as a start point.

(1)	Specified Longitude Latitude:	Select "LAT/LON".
(2)	Own Ship Position:	Select "OWN SHIP".
(3)	Cursor Position on Plot Screen:	Select "CURSOR".
(4)	Position Registered in Waypoint List:	Select "WPT LIST".
(5)	Position Registered in Event/Mark List:	Select "EVENT LIST".
(6)	When Continually Setting Waypoints, the Last Registered Position:	Select "PRE WPT"

Procedure

1. Please refer to "4.4.2 Registering Waypoints" and display the waypoint registration screen.
2. Press 4 # "POSITION".
3. Press ▲ ▼, move the cursor to "BRG/DIST", and press ENT.
4. The start position setting screen will be displayed.
   Press 1 MARK "START POINT", press ▲ ▼ to select the start point, and press ENT.

(1) When "LAT/LON" is Selected

Press 2 EVENT "START LAT", enter the latitude with the numeric keypad, and press ENT.

N/S can be selected via ▲ ▼.

Press 3 ⟷ "START LON", enter the longitude with the numeric keypad, and press ENT.

E/W can be selected via ▲ ▼.

When "START LAT" is entered, the cursor moves automatically to the latitude numerical entry position. If "START LON" entry is unnecessary, press ENT.

(2) When "OWN SHIP" is Selected

The ship's position is shown in "2. START LAT", "3. START LON".

(3) When "CURSOR" is Selected

The plot screen will be displayed.
Press ▲ ▼ ◄ ► to move the cursor, and press ENT at the position you wish to register.
When the cursor is moved, the cursor position is displayed at the top right of the screen.
The cursor position is shown in "2. START LAT", "3. START LON".

(4) When "WPT LIST" is Selected

The waypoint list will be displayed. Move the cursor to the position you wish to use as the start point, and press ENT.

The cursor can be moved to the number you wish to use as the start point in the following ways:
(1) Move with the up and down keys
(2) Enter the desired number with the numeric keypad
Please refer to "4.8.1 Moving the Cursor within a List" for more details.

The waypoint list position is shown in "2. START LAT", "3. START LON".

(5) When "EVENT LIST" is Selected

The event/mark list will be displayed. Move the cursor to the position you wish to use as the start point, and press ENT.

The cursor can be moved to the number you wish to use as the start point in the following ways:
(1) Move with the up and down keys
(2) Enter the desired number with the numeric keypad
Please refer to "4.8.1 Moving the Cursor within a List" for more details.
The event/mark list position is shown in "2. START LAT", "3. START LON".

(6) When "PRE WPT" is Selected

When waypoints are continuously registered, selection can be performed from the second or later registered waypoint.
The last registered position is shown in "2. START LAT", "3. START LON".

5. Press 4 # "BEARING", enter the bearing with the numeric keypad, and press ENT.
6. Press 5 GOTO "DISTANCE", enter the distance with the numeric keypad, and press ENT.
   When "BEARING" is entered, the cursor moves automatically to the distance numerical entry position. If "DISTANCE" entry is unnecessary, press ENT.
   The latitude and longitude of the position calculated from the start point, bearing, and distance will be displayed.
7. Press 0 * "ENTRY".

4.4.2.5 Registering from the Event/Mark List

Positions registered in the event/mark list can be registered as waypoints.

Procedure

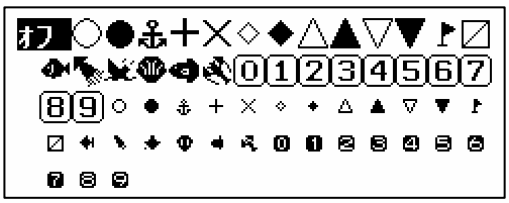
1. Please refer to "4.4.2 Registering Waypoints" and display the waypoint registration screen.
2. Press 4 # "POSITION".
3. Press ▲ ▼, move the cursor to "EVENT LIST", and press ENT.
4. The event/mark list will be displayed. Move the cursor to the number you wish to register, and press ENT.
   Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.
   The event/mark list position is shown in "5. WPT LAT", "6. WPT LON".
5. Press 0 * "ENTRY".

4.4.3 Changing the Waypoint Symbol Shape

- The default symbol shape displayed when a waypoint is registered can be changed.
- The shapes of symbols which have been selected and specified individually for waypoints are not changed.
- Please refer to "4.3.6.2 Editing Waypoint Symbols" and "4.4.4 Editing Waypoint Information" for details regarding individual changes.

Procedure

1. Press MENU, 2 EVENT, and then 1 MARK, and select "WPT".
2. Press ▲ ▼ ◄ ► to select the shape, and press ENT.



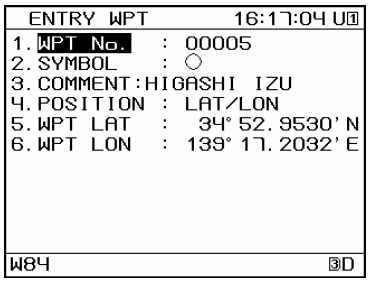
Waypoint Symbol Shape List

4.4.4 Editing Waypoint Information

- Registered waypoint information (symbol shape, comment, waypoint position) editing can be performed.
- Waypoints on routes which are currently being executed cannot be edited.

Procedure

1. Press MENU, 3 ⟷, and then 1 MARK, and display the waypoint list.
2. Move the cursor to the waypoint number you wish to edit.
   The cursor can be moved in the following ways:
   (1) Move with the up and down keys
   (2) Enter the desired number with the numeric keypad
   Please refer to "4.8.1 Moving the Cursor within a List" for more details.
3. Press ENT and display the waypoint registration screen.



Waypoint Registration Screen

(1) To Edit the Waypoint Number

4. Press 1 MARK "WPT No.".
5. Use the numeric keypad to enter the waypoint number.
   The information will change to the entered waypoint number.

(2) To Edit the Symbol Shape

6. Press 2 EVENT "SYMBOL".
7. Press ▲ ▼ ◄ ► to select the shape, and press ENT.

(3) To Edit a Comment

8. Press 3 ⟷ "COMMENT" and enter the comment.
   Please refer to "4.9 Entering Comments" for instructions on how to enter comments.

(4) To Edit the Waypoint Position

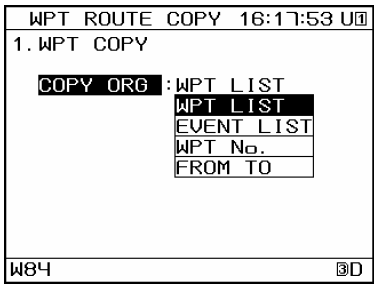
9. Press 4 # "POSITION", and enter the waypoint position.
   Refer to "4.4.2 Registering Waypoints" for details regarding entering the waypoint position.
10. Press 0 ✱ "ENTRY".

4.4.5 Copying Waypoint Information

- Waypoint information can be copied to another waypoint number. Event and mark information can also be copied to the waypoint list. HOME is treated as number 1 on the waypoint list.
- The waypoints used by the shared active routes received from ECDIS, which are stored in number 10001 - 10512, are automatically overwritten when the next route is received. Waypoints which you wish to retain must be copied to a number between 1 and 10000.
- The temporary route waypoints stored in numbers 10513 to 11024 disappear when a different temporary route is created or the power is turned off. Waypoints which you wish to retain must be copied to a number between 1 and 10000.
- When there is no more space available, entries can be overwritten. However, waypoints used by a route cannot be overwritten.
- Select the source to copy from, and specify the number to which the information is to be copied.

Procedure

1. Press MENU, 3, and then 4 #, and display the waypoint/route copy screen.
2. Press 1 MARK "WPT COPY".
3. The cursor will move to the "COPY ORG", so press ENT.



4. Press ▲ ▼ to select the copy source, and then press ENT.
   The following is an overview of the copy source submenu.
   (1) WPT LIST: From the waypoint list, choose 1 waypoint number, or a string of contiguous waypoint numbers.
   Any number can be selected, from 1 to 11024.
   (2) EVENT LIST: From the event/mark list, choose 1 event/mark number, or a string of contiguous event/mark numbers.
   (3) WPT No: Use the numeric keypad to enter the waypoint number.
   (4) FROM TO: Use the numeric keypad to enter the start and end numbers from the waypoint list.

(1) When "WPT LIST" is Selected

The range to be copied is confirmed when ENT is pressed after selecting the start and end point.
Please refer to "4.8.3 Selecting a Range within a List" for details regarding range selection.

(2) When "EVENT LIST" is Selected

The range to be copied is confirmed when ENT is pressed after selecting the start and end point.
Please refer to "4.8.3 Selecting a Range within a List" for details regarding range selection.

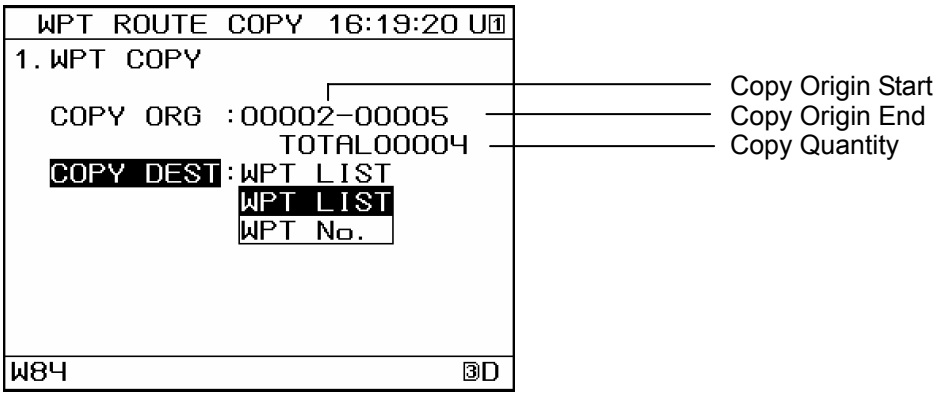
(3) When "WPT No." is Selected

Use the numeric keypad to select the waypoint number to be copied, and press ENT.

(4) When "FROM TO" is Selected

Multiple waypoint numbers can be copied. Use the numeric keypad to enter the start and end point waypoint numbers, and press ENT.

4. The cursor will move to the "COPY DEST", so press ENT.



5. Press ▲ ▼ to select the copy destination, and then press ENT.

The following is an overview of the copy destination submenu.

(1) WPT LIST: Select the waypoint number from the waypoint list to copy information to.

(2) WPT NO.: Use the numeric keypad to enter the waypoint number to copy information to.

When multiple numbers are selected as the copy source, the information will be pasted sequentially starting from the selected copy destination number.

(1) When "WPT LIST" is Selected

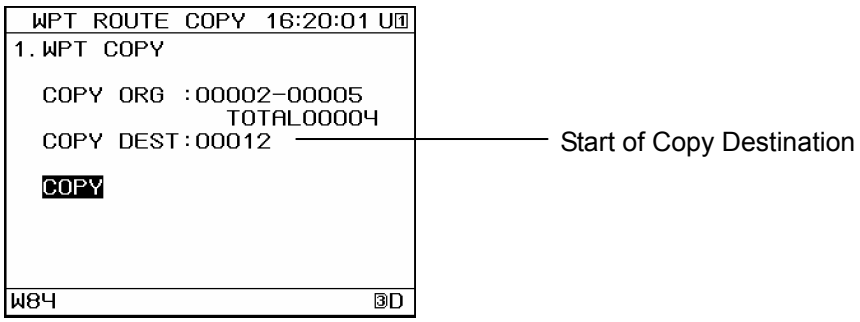
Numbers 1 - 10000 of the waypoint list will be displayed. Move the cursor and press ENT.

Please refer to "4.8.2 Moving the Cursor to an Unregistered Number" for more details.

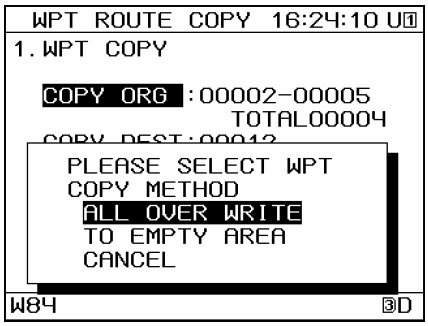
(2) When "WPT No." is Selected

Use the numeric keypad to select the waypoint number to be copied to, and press ENT.

6. The cursor will move to the "COPY", so press ENT.



If there is insufficient continuous free space at the copy destination, the following will be displayed. Press ▲ ▼ to select the copy method, and press ENT.



The following is an overview of the display.

ALL OVER WRITE :Overwrites from selected copy destination.
Waypoints which are used by routes cannot be overwritten.
In this case, "ALL OVER WRITE" is not displayed.

TO EMPTY AREA : Copying is performed to a different empty area.
When there are no empty area in list, "TO EMPTY AREA" is not displayed.

CANCEL : Copying is cancelled.

Memo

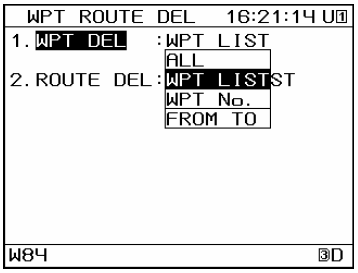
· When multiple contiguous numbers are selected as the copy source, selections which span registration group boundaries (10000 and 10512) cannot be made.
Ex.) 9999 - 10001 and 10511 - 10513 cannot be selected.

4.4.6 Deleting Waypoints

- Waypoints registered between 1 and 10000 can be deleted.
- Waypoints on routes which are currently being executed cannot be deleted.
- When a waypoint on a route which is not currently being performed is deleted, it will be deleted from the route as well.

Procedure

1. Press MENU, 3, and then 5 GOTO, and the "DELETE WPT/ROUTE" Screen will be displayed.
2. Press 1 MARK "WPT DEL".



The following is an overview of the delete waypoint submenu.

(1) ALL: Delete all waypoints from 1 to 10000.
(2) WPT LIST: Specify the range to be deleted on the waypoint list.
(3) WPT NO.: Specify the waypoint number to be deleted with the numeric keypad.
(4) FROMTO: Enter the start and end points of the range to be deleted with the numeric keypad.

3. Press ▲ ▼ to select the waypoint to be deleted, and then press ENT.

(1) When "FROM TO" is Selected

Enter the start point and end point with the numeric keypad, and press ENT.

(2) When "WPT LIST" is Selected

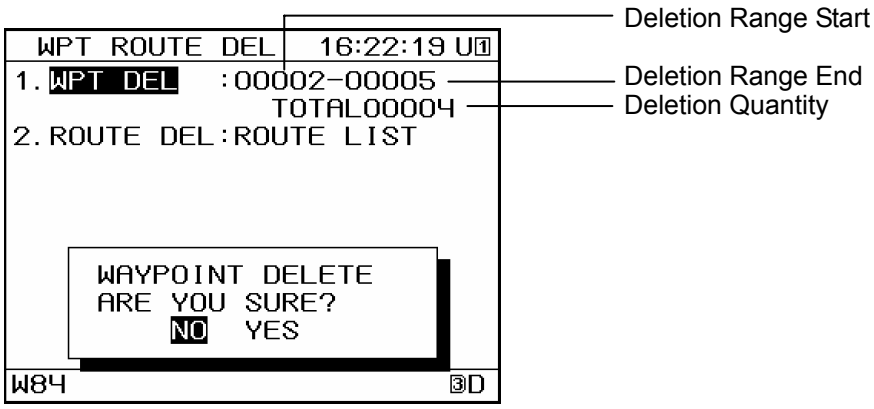
The waypoint list will be displayed. Move the cursor to the start and end points, and press ENT to select the range.

Please refer to "4.8.3 Selecting a Range within a List" for more details.

(3) When "WPT No." is Selected

Enter the waypoint number with the numeric keypad, and press ENT.

4. The following will be displayed. Press ◄ ► to select "YES", and press ENT.

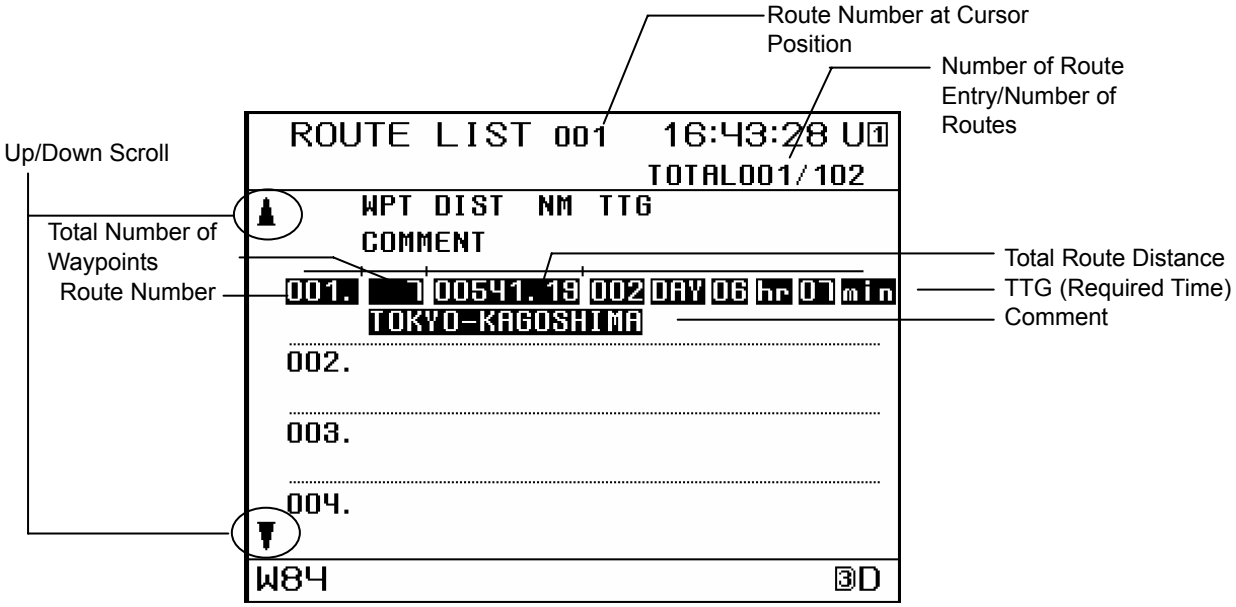


4.5 Route Planning

- Routes can be made from registered waypoints.
- A maximum of 100 routes can be created with this unit, with each route having up to 512 waypoints. Route widths, arrival circle radii, GC/RL, and other waypoint information can be set for each LEG. Please refer to "4.5.1 Displaying the Route List" for details regarding what waypoint information can be set.
- Created routes can be shared with external equipment such as ECDIS.
- Created routes are registered in the route list.
- The route list is divided into 3 regions, managed via numbering from 1 - 102.
  1 - 100: Routes created on this unit can be registered here.
  101: A shared active route received from ECDIS can be registered here.
  102: A temporary route can be registered here.
- Routes 1 - 101 are saved, so they remain even if the power is turned off. Route 102 is not saved, and will disappear if the power is turned off.

4.5.1 Displaying the Route List

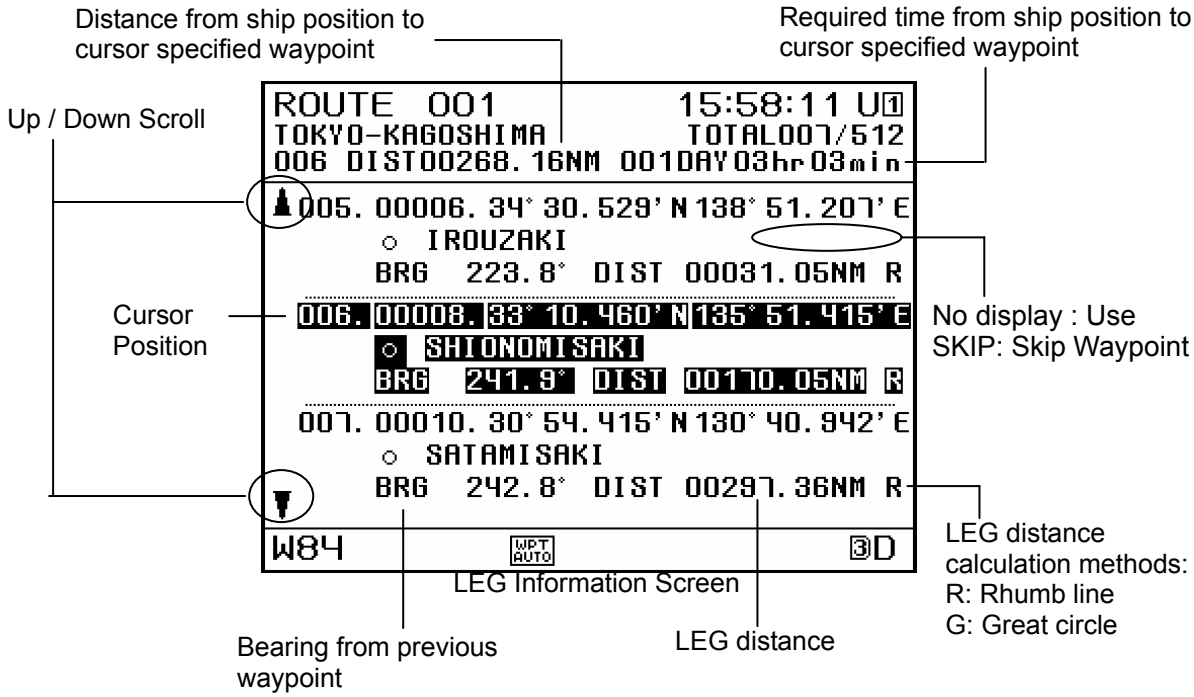
Created routes can be displayed in the route list. LEG information for each LEG of the route, and waypoint information for each LEG, can also be displayed.
TTG (required time) cannot be calculated for routes containing LEGs for which no planned speed has been set.



Procedure

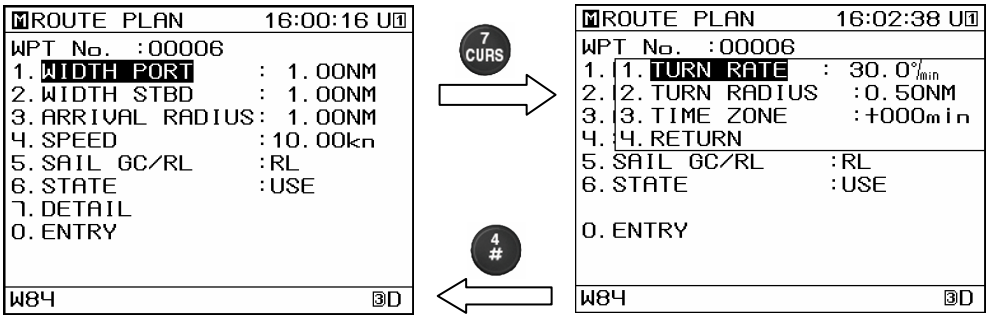
1. Press MENU , 3 , and then 2 EVENT to display the route list.
2. Move the cursor to the route number whose LEG information you wish to display, and press ENT
   Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.
   The LEG information screen will be displayed.

   On the LEG information screen, the route waypoints are listed in order.



3. Move the cursor to the waypoint whose waypoint information you wish to display, and press ENT .

Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.



WPT Info WPT Info (Details)

The following items can be set.

(1) WIDTH PORT: The port route width can be set.
(2) WIDTH STBD: The starboard route width can be set.
(3) ARRIVAL RAD: The arrival circle radius can be set.
(4) SPEED: The planned speed of the LEG can be set.
(5) SAIL GC/RL: The LEG distance calculation method can be set.
GC: Distance is calculated using the great circle method.
Even if GC is set, RL is shown on plot screen.
RL: Distance is calculated using the rhumb line method.
(6) STATUS: You can set whether the waypoint will be used or not.
(For newly created routes and routes with one waypoint, waypoints can not be set as unused or deleted)
USED: The waypoint is used.
SKIP: The waypoint remains on the route, but is skipped.
All waypoints cannot be skipped.
DELETE: Delete from the route. The waypoint will remain on the waypoint list.
The waypoint on the active route cannot be deleted.
(7) DETAILS: ROT, turn radius, and time zone settings can be performed.
(7-1) TURN RATE: The rate of turn when passing a waypoint can be set.
(7-2) TURN RADIUS: The turn radius when passing a waypoint can be set.
(7-3) TIME ZONE: The time difference with the waypoint can be set.

Memo

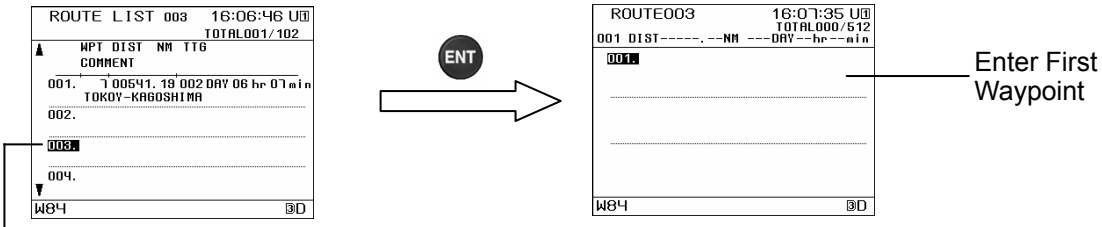
- Great-Circle Sailing: The shortest distance from the current position to the waypoint can be used, but the bearing will be different from that determined on a nautical chart, and will change during movement.
- Rhumb line Sailing: Sailing can be performed directly from the current position to the waypoint, without changing bearing.
  The ship bearing will match that obtained by drawing a straight line on a nautical chart between the current position and the waypoint.
- Great-Circle sailing is generally used for long distance sailing, as it results in a shorter route than that obtained in Rhumb line sailing.

4.5.2 Creating Routes

- To create a route, decide the route number and select, in order, the waypoints to be used as way points.
- The same waypoint cannot be selected in a continuous manner.
- Up to 100 routes can be created.
- Up to 512 waypoints can be set on 1 route.

Procedure

1. Press MENU , 3 , and then 2 EVENT to display the route list.
2. Move the cursor to the number you wish to register, and press ENT to switch to the waypoint entry screen.
   Please refer to "4.8.2 Moving the Cursor to an Unregistered Number" for more details.

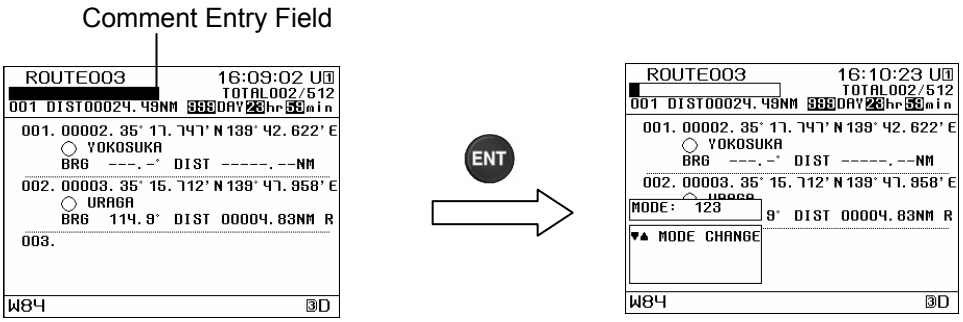


Move cursor to number you wish to register Waypoint Entry Screen

3. Press ENT to display the waypoint list.
4. Move the cursor to the waypoint number you wish to register, and press ENT .
   Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.
5. The waypoint information screen will be displayed. Select the item you wish to enter with the numeric keypad, and enter the waypoint information.
   Please refer to "4.5.1 Displaying the Route List" for details.
   Select "7. DETAIL" to set the TURN RATE, turn radius, or time zone. This is only used for routes shared with ECDIS.
6. Press 0 * "ENTRY".
7. The screen will return to the route information screen where the waypoint is registered. To continue setting waypoints, repeat steps 4 to 6 above.

8. Enter a comment.
   Use the up and down keys to move the cursor to the comment entry field, and press ENT .

   The unit will enter comment entry mode. Enter the comment.
   Please refer to "4.9 Entering Comments" for instructions on how to enter comments.



Move the cursor to the comment entry field Comment Entry Mode

9. When you have completed route creation, press CLR , DISP or MENU to exit the route information screen.

4.5.3 Editing Routes

· Route waypoint information can be changed, and waypoints can be skipped, added, or deleted.

4.5.3.1 Changing Waypoint Information

Procedure

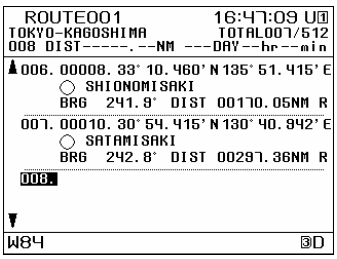
1. Refer to "4.5.1 Displaying the Route List", and select the waypoint information you wish to change.
2. Use the numeric keypad to select the item number you wish to change, and change the waypoint information.
   Please refer to "4.5.1 Displaying the Route List" for details.
   Select "7. DETAILS" to set the TURN RATE, turn radius, and time zone. This is only used for routes shared with ECDIS.
   If "SKIP" is selected for "6. STATE", the waypoint will be skipped. Please refer to "4.3.7.3 Skipping Route Waypoints" for details regarding skip operation.
   If "DELETE" is selected for "6. STATE", the waypoint will be deleted from the route.
3. To change a comment, move the cursor to the comment field on the LEG information screen and perform changes.
4. When you have completed route editing, press CLR , DISP , or MENU to exit the route information screen.

4.5.3.2 Adding Route Waypoints

Waypoints can be added at any position along routes.

Procedure

1. Please refer to "4.5.1 Displaying the Route List", select the route to which you wish to add a waypoint, and display the LEG information.



LEG Information Screen

2. Move the cursor to the position where you wish to perform addition.
   Ex 1) To add a waypoint between 3 and 4, move the cursor to waypoint 4.
   Ex 2) To add a waypoint before 1, move the cursor to waypoint 1.
   Ex 3) To add a waypoint after the final waypoint, move the cursor past the final waypoint.

   Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.

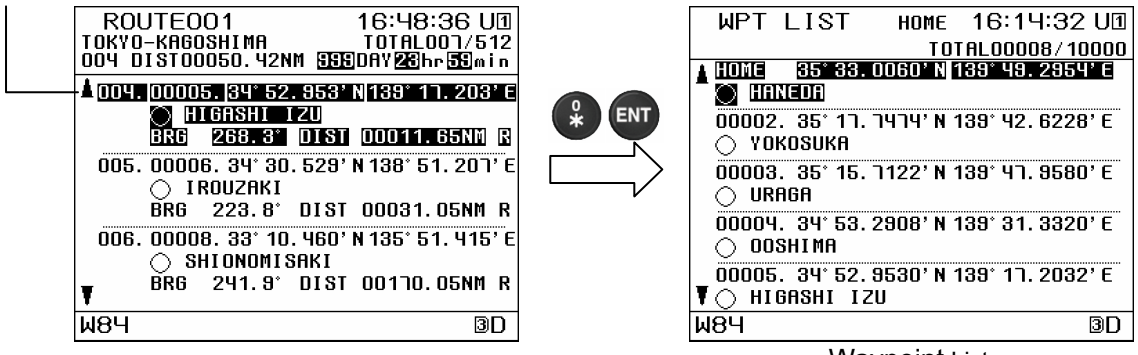
   To make an addition, press ENT after the final waypoint.

   To make an addition between waypoints, or before the first waypoint, press and hold 0 * and ENT.

   The waypoint list will be displayed.

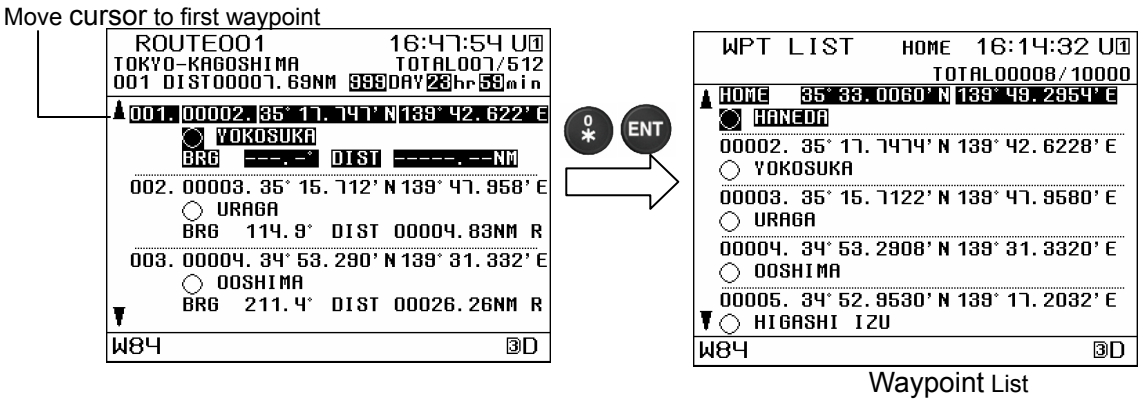
Ex 1) Adding a waypoint between 3 and 4

Move cursor to fourth waypoint



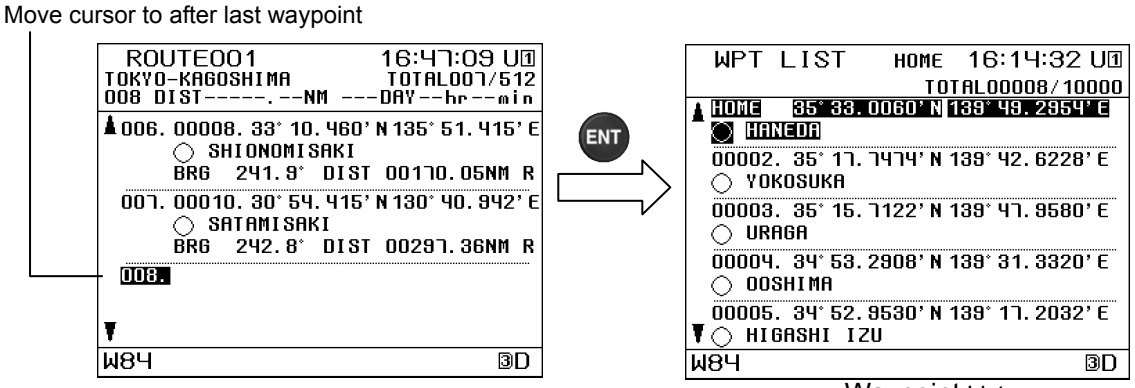
Waypoint List

Ex 2) Adding a waypoint at the start



Waypoint List

Ex 3) Adding a waypoint at the end



Waypoint List

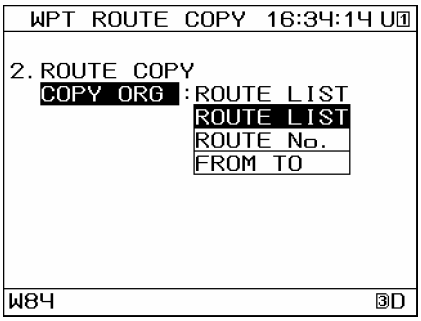
4. Move the cursor to the waypoint number you wish to register, and press ENT .
   Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.
5. The waypoint information screen will be displayed. Select the item number you wish to enter with the numeric keypad, and enter the waypoint information.
   Please refer to "4.5.1 Displaying the Route List" for details.
   Select "7. DETAIL" to set the "TURN RATE","TURN RADIUS, or "TIME ZONE". This is only used for routes shared with ECDIS.
6. Press 0 * "ENTRY".
7. When you have completed waypoint addition, press CLR , DISP , or MENU to exit the route information screen.

4.5.4 Copying Routes

- Routes which have been created can be copied to different route numbers.
- The waypoints used by the shared active routes received from ECDIS in number 101 are automatically overwritten when the next route is received. Routes which you wish to retain must be copied to a number between 1 and 100.
- The temporary route waypoints stored in number 102 disappear when a different temporary route is created or the power is turned off. Routes which you wish to retain must be copied to a number between 1 and 100.
- Multiple waypoints can be copied, as long as their numbers are contiguous.
- When there is no more space available, entries can be overwritten. Overwriting cannot be performed for active routes.
- Select the source to copy from, and specify the number to which the information is to be copied.
- In the case a temporary route and sharing route are copied, the waypoint need also be copied.

Procedure

1. Press MENU , 3 , and then 4 # to display the waypoint/route copy screen.
2. Press 2 EVENT "ROUTE COPY".
3. The cursor will move to the "COPY ORG", so press ENT .



4. Press ▲ ▼ to select the copy source, and then press ENT .
   The following is an overview of the copy source submenu.

   (1) ROUTE LIST: From the route list, choose 1 route number, or a string of contiguous route numbers.
   Any number can be selected, from 1 to 102.
   (2) ROUTE NO.: Enter the route number with the numeric keypad.
   (3) FROM TO: Enter the start and end numbers from the route list with the numeric keypad.

(1) When "ROUTE LIST" is Selected

The range to be copied is confirmed when ENT is pressed after selecting the start and end point.
Please refer to "4.8.3 Selecting a Range within a List" for details regarding range selection.

(2) When "ROUTE No." is Selected

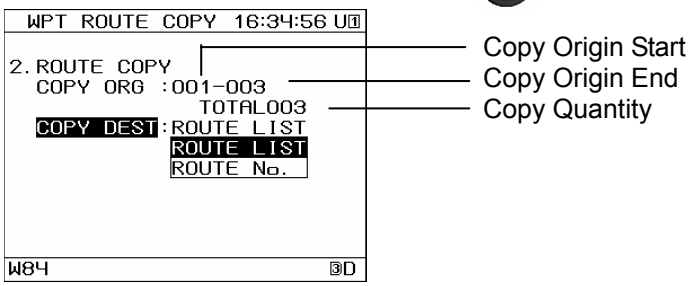
Enter the route number you wish to copy with the numeric keypad, and press ENT .

(4) When "FROM TO" is Selected

Multiple route numbers can be copied.

Enter the start point and end point with the numeric keypad, and press ENT .

4. The cursor will move to the "COPY DEST", so press ENT .



5. Press ▲ ▼ to select the copy destination, and then press ENT .

The following is an overview of the copy destination submenu.

(1) ROUTE LIST: Select the destination route number to copy to from the route list.

(2) ROUTE NO.: Use the numeric keypad to enter the route number to copy information to.

When multiple numbers are selected as the copy source, the information will be pasted sequentially starting from the selected copy destination number.

(1) When "ROUTE LIST" is Selected

The route list, from 1 to 100, will be displayed, so move the cursor and press ENT .

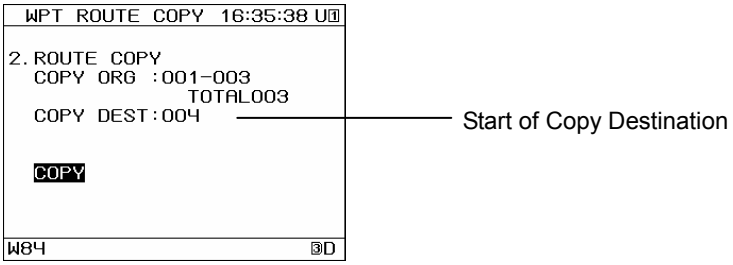
Please refer to "4.8.2 Moving the Cursor to an Unregistered Number" for more details.

(2) When "ROUTE No." is Selected

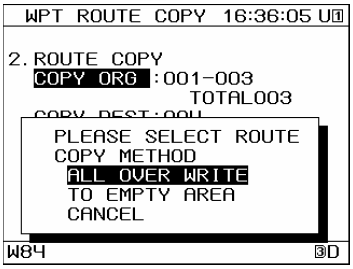
Use the numeric keypad to select the route number to be copied to, and press ENT .

6. In the case a temporary route and sharing route are copied, select the copy destination of waypoint. Please refer to "4.4.5 Copying Waypoint Information" procedure 5 for selection of copy destination.

7. The cursor will move to the "COPY", so press ENT .



If there is insufficient continuous free space at the copy destination location, the following will be displayed. Press ▲ ▼ to select the copy method, and press ENT .



The following is an overview of the display.

ALL OVERWRITE: Overwrites from selected copy destination.
Overwriting cannot be performed for active routes.
In this case, "ALL OVER WRITE" is not displayed.

TO EMPTY AREA: Copying is performed to a different empty area:
When there are no empty area in list, "TO EMPTY AREA" is not displayed.

CANCEL: Copying is cancelled.

Memo

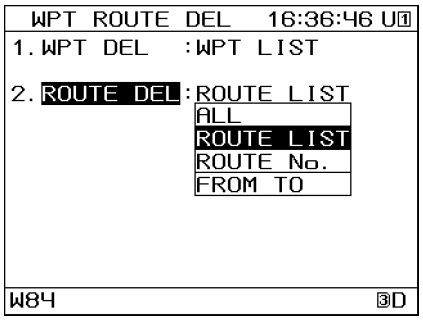
· The boundary of 100 cannot be crossed when selecting multiple numbers as the copy source.
Ex) A selection such as "99 - 101" is invalid.

4.5.5 Deleting Routes

· Routes registered between 1 and 100 can be deleted.
· The waypoint on the route to be deleted can be deleted at the same time.
· In the case the waypoint is also deleted, the waypoint used on the different route is not deleted.
· Active routes cannot be deleted.

Procedure

1. Press MENU , 3 , and then 5 GOTO to display the waypoint/route deletion screen.
2. Press 2 EVENT "ROUTE DEL".



The following is an overview of the route deletion submenu.

(1) ALL: Delete all routes between 1 and 100.
(2) FROM TO: Enter the start and end points of the range to be deleted with the numeric keypad.
(3) ROUTE LIST: Specify the range to be deleted on the waypoint list.
(4) ROUTE No.: Specify the route number to be deleted with the numeric keypad.

3. Press ▲ ▼ to select the route to be deleted, and then press ENT .

(1) When "FROM TO" is Selected

Enter the start point and end point with the numeric keypad, and press ENT .

(2) When "ROUTE LIST" is Selected

The route list will be displayed. Move the cursor to select the start and end points, and press ENT to select the range.

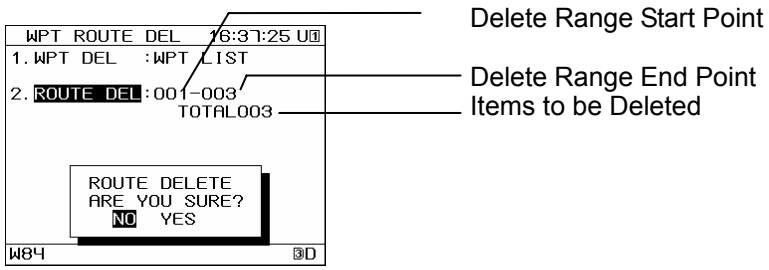
Please refer to "4.8.3 Selecting a Range within a List" for more details.

(3) When "ROUTE No." is Selected

Enter the route number with the numeric keypad, and press ENT .

4. Press ▲ ▼ to select whether the waypoint is deleted, and the press ENT.
   The following is an overview of the waypoint deletion submenu.
   (1) ROUTE: Only the route is deleted.
   (2) ROUTE + WPT: The route as well as the waypoint used on the route are deleted. The waypoint used on the different route is not deleted.
   (3) CANCEL: Deleting is cancelled.

5. The following will be displayed. Press ◄ ► to select "YES", and press ENT .



4.5.6 Sharing Routes with ECDIS

This unit can be used to send routes to ECDIS or radars, and also to receive routes created by ECDIS (data route sharing). Routes which are underway (active routes) can be shared.
If a route is switched on this unit or on ECDIS when sharing the active route, the connecting equipment's route will also switch.
In order to share routes, the equipment must support sharing (ECDIS, radar), and be connected in a LAN.

4.5.6.1 Sharing Data Routes

This unit can be used to send routes to ECDIS, and also to receive routes created by ECDIS. If data route sharing is configured, data route reception will occur automatically.
First, configure data route sharing.
If data routes are not shared, configure sharing as directed in "4.20.7.7 Setting LAN Settings ".

To send a data route, follow the procedures below to select and send the desired route.

Procedure

1. Press MENU, 3, and 6, and select "TRANSFER WPT / ROUTE (LAN)".
2. 1 MARK Press "OUT / IN".
3. Press ▲ ▼ to select "OUT", and then press ENT.
4. 2 EVENT Press "CONNECT".
5. Select the connection destination with ▲ ▼, and press ENT.
   Normally, "MULTICAST" should be selected for the destination.
   To send to a specific unit, select "UNICAST".

6. When "UNICAST" is selected, press 3 ⟷ and 4 # to select the Destination IP "TO IP" and "PORT No.".

7. 5 GOTO Press "FORMAT".

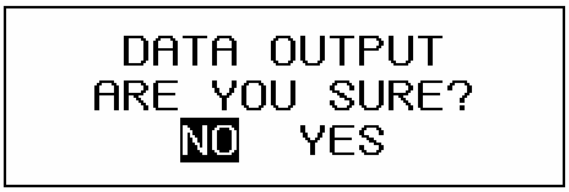
8. Press ▲ ▼ to select "SHARE ROUTE", and press ENT.

9. 6 →← Press "OUT TYPE".

10. Press ▲ ▼ to select the output data, and press ENT.
    The following is an overview of the output data submenu.
    (1) ALL: Output all routes between 1 and 101.
    (2) ROUTE LIST: Select a range on the route list to be output.
    (3) ROUTE No.: Specify the route number to be sent with the numeric keypad.
    (4) FROM TO: Enter the start and end points of the range to be sent with the numeric keypad.
    Please refer to "4.8.3 Selecting a Range within a List" for details regarding range selection.

11. 0 * Press "START".

12. The following will be displayed. Select "YES", and press ENT.



4.5.6.2 Sharing Active Routes

If a route is switched on this unit or on ECDIS when sharing the active route, the connecting equipment's route will also switch.
Sharing must be enabled to share active routes.
The following is an overview of the active route sharing configuration submenu.

(1) SHARE1: If the active route is switched on the unit, the route will automatically be sent out to connected equipment.
When a shared route is received, the route is automatically switched.

(2) SHARE2: If the active route is switched on the unit, a request is made to the user of the unit before the route is sent. Transmission of the route to the connected equipment is dependant on the permission of the user.
If the user has not authorized sending, the active route will only be executed on the local unit.
When a shared route is received, the route is automatically switched.

(3) SHARE3: If the active route is switched on the unit, the route will automatically be sent out to connected equipment.
When a shared route is received, the user is asked whether or not they want to switch routes.
If the user does not authorize route switching, the route will not be switched.

(4) SHARE4: If the active route is switched on the unit, a request is made to the user of the unit before the route is sent. Transmission of the route to the connected equipment is dependant on the permission of the user.
If the user has not authorized sending, the active route will only be executed on the local unit.
When a shared route is received, the user is asked whether or not they want to switch routes.
If the user does not authorize route switching, the route will not be switched.

If the active route is configured for sharing, an icon will be displayed on the status bar at the bottom of the screen.
If the icon is not displayed, refer to "4.20.7.7 Setting LAN Settings" and configure sharing.

SHARE1 Icon:  SHARE2 Icon:  SHARE3 Icon:  SHARE4 Icon: 

Procedure

(1) SHARE 1 Active Route Sharing

Route Start / Output

1. Start the route as directed in "4.6 Performing Navigation".
   LAN route output starts automatically.

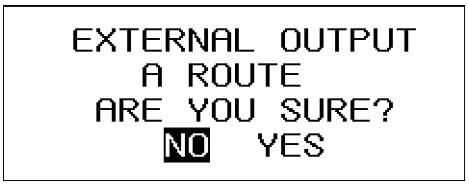
Route Reception

Route switching occurs automatically.

(2) SHARE 2 Active Route Sharing

Route Start / Output

1. Start the route as directed in "4.6 Performing Navigation".
2. When the route is started, the following will be displayed.
   Select "YES" to output the active route externally.
   Select "NO" to not output the active route externally. If no external output is performed, the active route is performed only on the local unit.



Route Reception

Route switching occurs automatically.

(3) SHARE 3 Active Route Sharing

Route Start / Output

1. Start the route as directed in "4.6 Performing Navigation".
   LAN route output starts automatically.

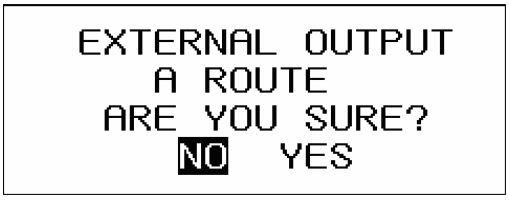
Route Reception

When an active route is received, the following is displayed.
Select "YES" to switch the active route.
Select "NO" to not switch the active route. If the active route is not switched, the unit will not switch routes and will stop sharing route navigation.

(4) SHARE 4 Active Route Sharing

Route Start / Output

1. Start the route as directed in "4.6 Performing Navigation".
2. When the route is started, the following will be displayed.
   Select "YES" to output the active route externally.
   Select "NO" to not output the active route externally. If no external output is performed, the active route is performed only on the local unit.



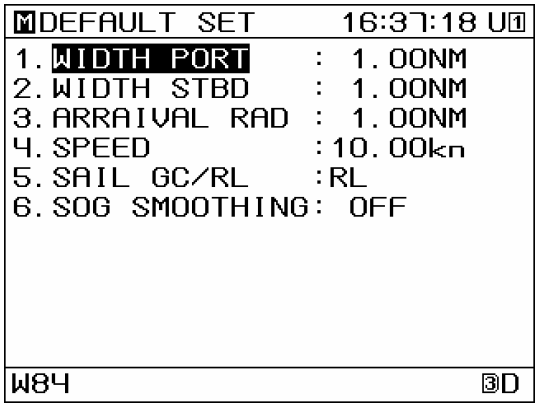
Route Reception

When an active route is received, the following is displayed.
Select "YES" to switch the active route.
Select "NO" to not switch the active route. If the active route is not switched, the unit will not switch routes and will stop sharing route navigation.

4.5.7 Setting Route Default Settings

· The route default value is applied to routes created via GOTO.
· The following is an overview of the route default settings submenu.

(1) WIDTH PORT: The port route width can be set.
(2) WIDTH STBD: The starboard route width can be set.
(3) ARRIVAL RAD: The arrival circle radius can be set.
(4) SPEED: The planned speed can be set.
(5) SAIL GC/RL: GC or RL can be selected as the sail calculation method.
(6) SOG SMOOTHING: Smoothing can be applied to ship speed when calculating expected arrival time and expected time required.
Up to 99 seconds of smoothing can be set. When the estimated arrival time has a large degree of variance, use a large smoothing value.



Procedure

1. Press MENU , 3 , and then 7 CURS to display the route default setting screen.
2. Select the number of the item you wish to set.
3. Select "SET" with ▲ ▼ and press ENT .
   If you do not wish to set an item, select "OFF" and press ENT .
4. Enter values with the numeric keypad, and press ENT .

4.6 Performing Navigation

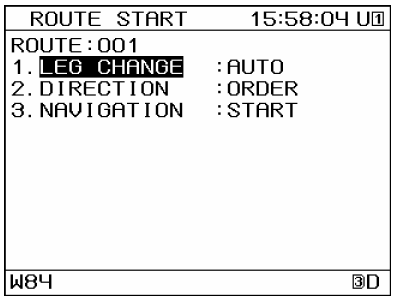
· Registered and temporary routes can be started.
· Navigation can be performed via the following methods.
(1) Selecting a route from the route list
(2) Selecting a waypoint with the GOTO key
(3) Selecting a route with the GOTO key
(4) Creating a route with the GOTO key
· Navigation cannot be performed above 89 degrees north or south.
· Temporary routes created with GOTO use the route widths, arrival circle radiuses, and planned speeds set as route default setting values.
Please refer to "4.5.7 Setting Route Default Settings" for details regarding setting route default setting values.
· Waypoint switching occurs when the arrival circle is reached.

4.6.1 Selecting a Route from the Route List

Routes can be selected from the route list and started.

Procedure

1. Press MENU , 3 , and then 3 to display the route start/end screen.
2. The route list will be displayed. Move the cursor to the route number you wish to start, and press ENT .
Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.
3. The route start/end screen will be displayed, so perform route settings.



The following is an overview of each submenu.
(1) LEG CHANGE: You can set whether LEG change is performed automatically or manually when own ship arrives within the waypoint arrival circle.
AUTO: The waypoint automatically changes to the next waypoint. WPT AUTO is displayed in the status bar.
When the arrival circle is reached, the alarm of the unit will be sounded, and the waypoint will be updated, displaying the following. The display will disappear automatically in 5 seconds.
When the final waypoint is reached, the arrival alarm sound configured in the alarm settings will be sounded.

MANUAL: Switching to the next waypoint is performed manually. WPT MAN is displayed in the status bar.
When the arrival circle is reached, the arrival alarm sound configured in the alarm settings will be sounded, and the following will be displayed. Press ► to stop the alarm and update the waypoint.

(2) DIRECTION: You can set whether to navigate in the order of the waypoints, or to navigate starting from the final waypoint.
ORDER: Navigation is performed in the order of the waypoints.
REVERSE: Navigation is performed starting with the final waypoint.

(3) NAVIGATION: Starts and stops navigation.
START: Navigation is started.
END: Navigation is stopped.

(1) Setting the LEG CHANGE Method

1 MARK Press "LEG CHANGE", press ▲▼ to select the LEG change method, and then press ENT .

(2) Setting the DIRECTION

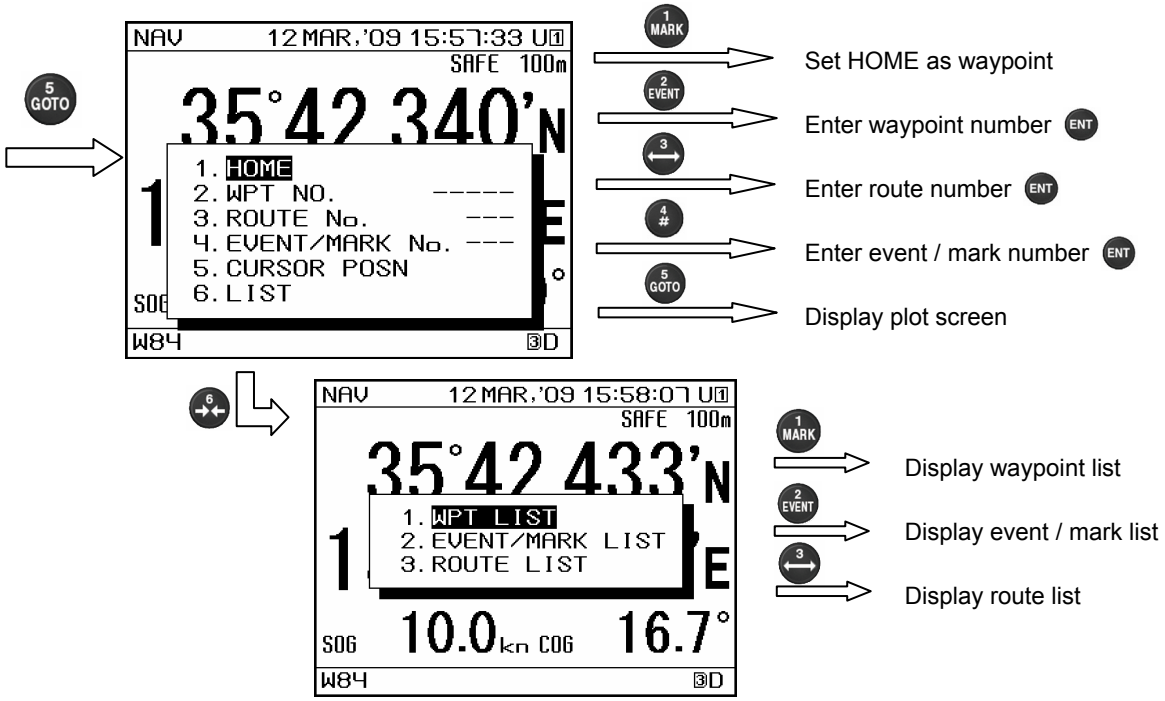
1 MARK Press "DIRECTION", press ▲▼ to select the direction, and then press ENT .

4. Press 3 ⟷ "NAVIGATION" to start navigation.

4.6.2 Starting Navigation with the GOTO Key

- If a waypoint or route is selected with the GOTO key, navigation starts to that waypoint.
- If a waypoint on the active route is selected with the GOTO key, navigation restarts from that waypoint.
- Routes created with GOTO are stored as a temporary route with route number 102.
- The GOTO key can be used from any screen other than the menu screen, waypoint information screen, or Navigation Assistance 4 screen.
- The following methods can be used to select the waypoint.

(1) Set HOME PORT as the waypoint.
(2) Enter the waypoint number.
(3) Enter the route number.
(4) Enter the event / mark number.
(5) Set the cursor position as the waypoint (Up to 512 waypoints can be set, allowing temporary route creation)
(6) Select from each list (waypoint list, route list, event / mark list).
(7) Enter the waypoint number on the active route to restart the navigation.



Procedure

(1) Set HOME PORT as the waypoint

HOME sets the HOME PORT registered at the start of they waypoint list as the waypoint. If a waypoint is set as HOME, it can be easily set as a waypoint.
If no HOME PORT is registered, "1. HOME" will not be displayed.

1. Press 5 GOTO and then 1 MARK.
   Navigation will start with the HOME PORT as the destination waypoint.

(2) Enter the waypoint number

If you know the waypoint number, you can enter the number to set the waypoint.

1. Press 5 GOTO and then 2 EVENT.
2. Enter the waypoint number, and press ENT to start navigation.

(3) Select a route number

If you know the route number, you can enter the number to set the route.

1. Press 5 GOTO and then 3 ⟷.
2. Enter the route number, and press ENT.
3. The route start / end screen will be displayed, so perform route settings.
   Please refer to "4.6.1 Selecting a Route from the Route List" for details regarding each submenu and configuration methods.
4. 3 ⟷ Press "NAVIGATION" to start navigation.

(4) Select from the event / mark number

If you know the event / mark number, you can enter the number to set the waypoint.

1. Press 5 GOTO and then 4 #.
2. Enter the event / mark number, and press ENT to start navigation.

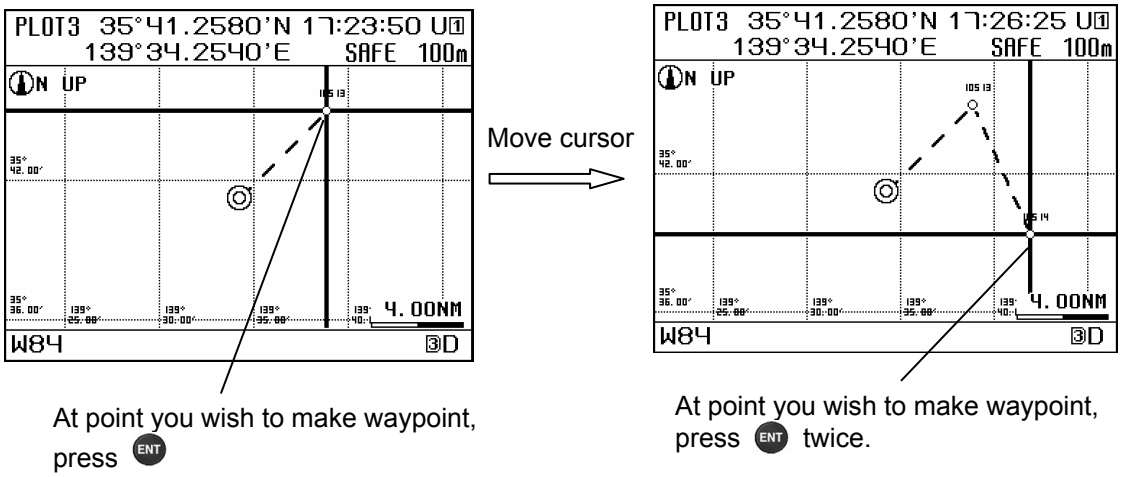
(5) Set the cursor position as the waypoint

Any cursor position on the plot screen can be set as waypoints. Multiple waypoints can be selected and a temporary route created. Temporary routes can also be added to the route list as a permanent route.

1. Press 5 GOTO, and then 5 GOTO, and display the plot screen.
2. Move the cursor to the waypoint position, and press ENT.

   For multiple waypoints, move the cursor again, and press ENT.

   Pressing CLR deletes the previous waypoint.



3. Press ENT again at the final waypoint to start navigation.
4. The following will be displayed.

5. If you don't wish to register the route in the route list, select "No" and press ENT.
   Navigation will start without route registration.
   If you wish to register the route in the route list, select "Yes" and press ENT. The route list will be displayed.
   Move the cursor to the number you wish to register, and press ENT. The route will be registered in the route list, and navigation will start.
   Please refer to "4.8.2 Moving the Cursor to an Unregistered Number" for more details.
   The waypoints selected with the cursor will also be registered in the waypoint list. Registered waypoint numbers will be displayed as waypoint symbols on the plot screen.

(6) Select from the waypoint list
A waypoint can be selected from the waypoint list.

1. Press 5 GOTO, 6, and then 1 MARK, and display the waypoint list.
2. Move the cursor to the waypoint number you wish to set as the waypoint, and press ENT to start navigation.
   For details regarding moving the cursor, please refer to "4.8.1 Moving the Cursor Within a List".

(7) Select from the event / mark list
A waypoint can be selected from the event / mark list.

1. Press 5 GOTO, 6, and then 2 EVENT, and display the event / mark list.
2. Move the cursor to the number you wish to set as the waypoint, and press ENT to start navigation.
   Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.

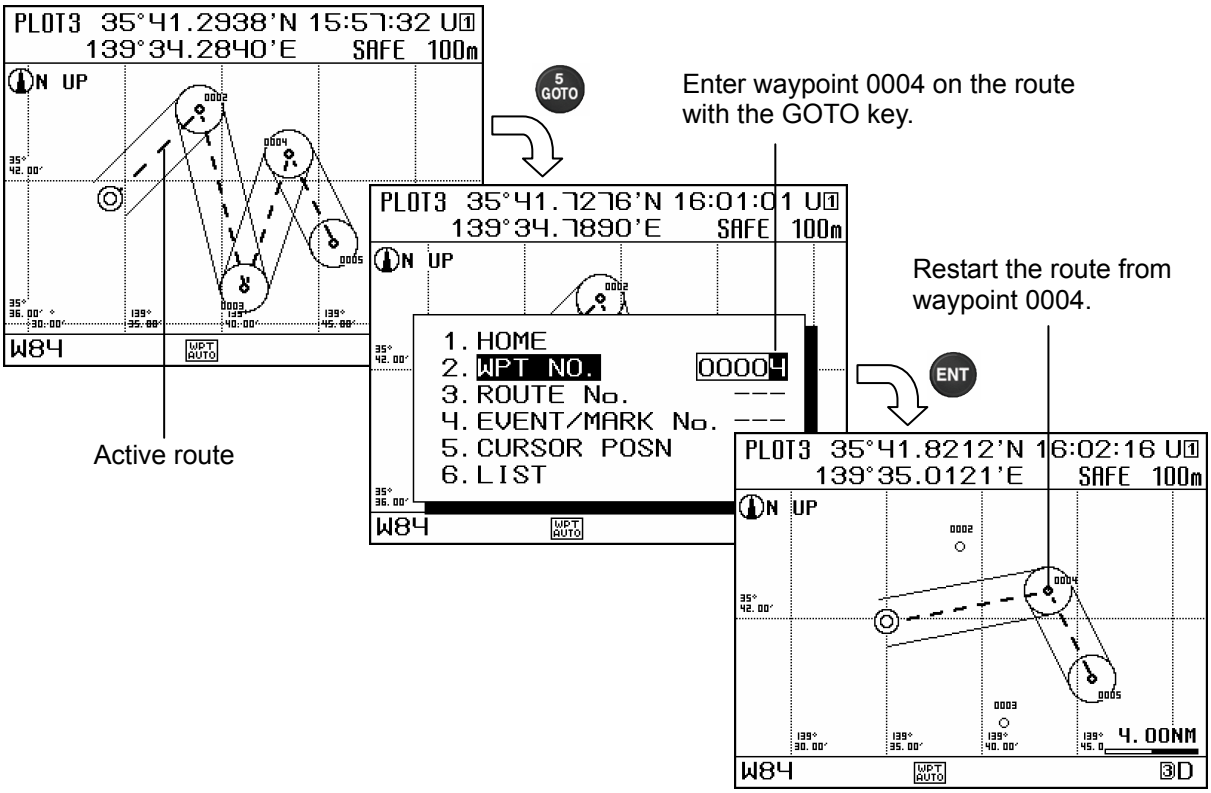
(8) Select a route from the route list
The GOTO key can be used to select and execute a route.

1. Press 5 GOTO, 6, and then 3, and display the route list.
2. Move the cursor to the number you wish to execute, and press ENT.
   Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.
3. The route start / end screen will be displayed, so perform route settings.
   Please refer to "4.6.1 Selecting a Route from the Route List" for details regarding each submenu and configuration methods.
4. Press 3 "NAVIGATION" to start navigation.

(9) Enter the waypoint number on the active route.
If a waypoint number on the active route is entered, navigation will restart from the configured waypoint after discarding the route currently executed.

1. Press 5 GOTO and then 2 EVENT.
2. Enter the waypoint number, and press ENT to start navigation.

Ex) To restart the route from waypoint number 0004.



4.6.3 Stopping Navigation

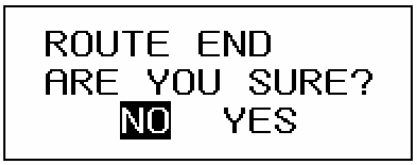
· Navigation currently underway can be stopped.
· To end the navigation, there are two methods: selecting in the menu and holding down 5 GOTO .

4.6.3.1 Ending Navigation with GOTO key

· Operation can be performed on any screen other than the menu, waypoint information, navigation assistance 4 screen.

Procedure

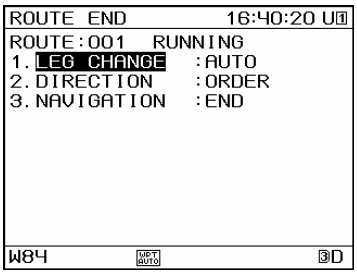
1. Press and hold down 5 GOTO (over 3 seconds).
2. The following will be displayed, and then select "YES".



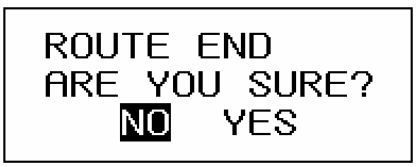
4.6.3.2 Ending Navigation in Menu

Procedure

1. Press MENU , 3 , and then 3 to display the route start/end screen.



2. Press 3 "NAVIGATION" to stop navigation.
3. The following will be displayed. Select "YES".



4.7 Events/Marks

· Events, marks, MOB, and lines are all registered in the event/mark list.

4.7.1 Displaying Events/Marks

· A list of all registered events and marks can be displayed.
· MOB is registered as event number 000.

Event/Mark List

Procedure

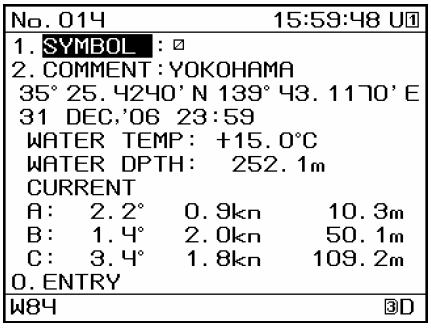
1. Press MENU, 2 EVENT, and 7 CURS in order to display the event / mark list.

4.7.2 Event and Mark Information Display

· Registered event and mark information can be displayed.

Procedure

1. Press MENU, 2 EVENT, and 7 CURS in order to display the event / mark list.
2. Move the cursor to the number of the event or mark you wish to display, and press ENT to display the event or mark information.
   Refer to "4.8.1 Moving the Cursor within a List" for details regarding cursor movement.



Event/Mark Information

If there are no externally connected devices, and for mark information, water temperature, water depth, and current information is not displayed.

4.7.3 Editing Event and Mark Information

· Registered event (including MOB) and mark information (symbol, comment) can be edited.

Procedure

1. Display the event or mark information to be displayed using the procedure given in "4.7.2 Event and Mark Information Display".

(1) To Change the Symbol Shape

2. Press 1 MARK "SYMBOL".
3. Press ▲ ▼ ◄ ► to select the shape, and press ENT .

(2) To Change Comment

4. Press 2 EVENT "COMMENT" and enter the comment.
   Please refer to "4.9 Entering Comments" for instructions on how to enter comments.
5. Press 0 * "ENTRY".

4.7.4 Deleting Event/Mark Information

· Registered events and marks can be deleted.
  Deletion can be performed using one of the methods below.
  (1) Specify a range on the event/mark list for deletion
  (2) Delete all events
  (3) Delete all marks
  (4) Delete all events and marks

Procedure

1. Press MENU, 2 EVENT, and 8 AZI in order to display the delete screen.
   To specify a range on the event/mark list for deletion
2. Press 1 MARK "DELETE EVENT/MARK LIST" to display the event/mark list.
3. Select the range you wish to delete.
   The range to be copied is confirmed when ENT is pressed after selecting the start and end point.
   Please refer to "4.8.3 Selecting a Range within a List" for details regarding range selection.

To delete all

2. To delete all events, press 2 EVENT "DELETE ALL EVENT".
   To delete all marks, press 3 ⟷ "DELETE ALL MARK".
   To delete all events and marks, press 4 # "DELETE ALL EVENT/MARK".

4.8 List Screen Operation

· This unit displays waypoints, events, marks, and routes in list form.
· All lists use the same operating procedures.

4.8.1 Moving the Cursor within a List

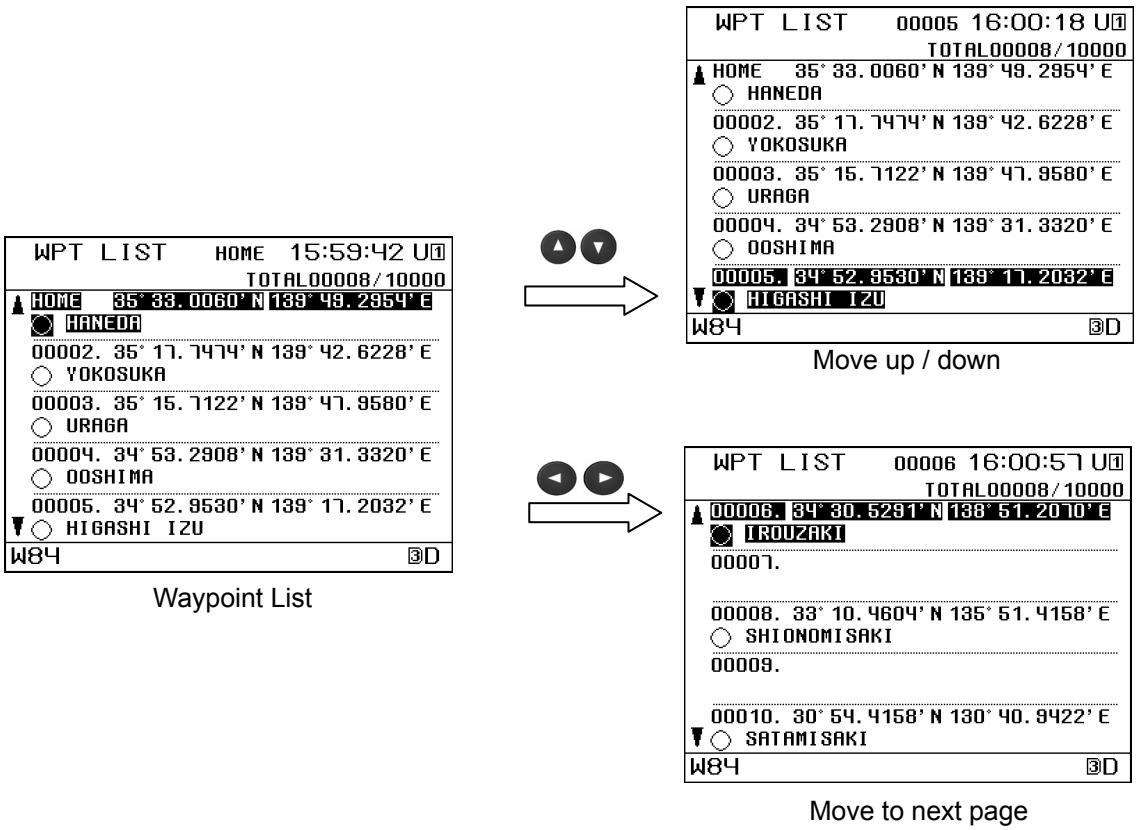
· The cursor can be moved within a list in the following ways:
  (1) The cursor can be moved via the directional keys
  (2) The cursor can be moved by entering a number with the numeric keypad
  These function for cursor operation in all lists.

4.8.1.1 Moving the Cursor with the Directional Keys

The operation examples show cursor movement within the waypoint list, but the instructions provided apply to operation within all lists.
The up and down keys can be used to move the cursor up and down, while the left and right keys can be used to advance to the next page.

Procedure

1. Display the list.
2. Press ▲ ▼ to move the cursor up or down, and ◄ ► to move to the next page.



Waypoint List

Move up / down

Move to next page

4.8.1.2 Using the Numeric Keypad to Enter a Number and Move the Cursor

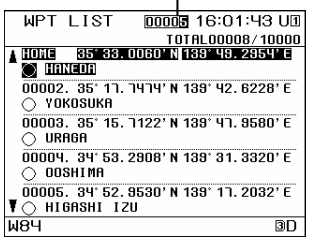
The operation examples show selection of waypoint 5 in the waypoint list, but the instructions provided apply to operation within all lists.

Procedure

1. Display the list.
2. Enter the destination number "5" with the numeric keypad, and press ENT .

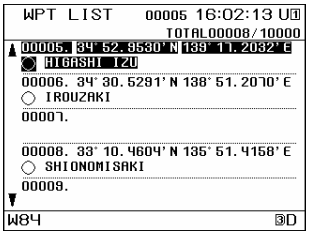
   The cursor moves to number 5.

The number entered with the numeric keypad is displayed



Enter move destination, "5", with numeric keypad

ENT



Cursor moves to number entered, "5"

Memo

· In the list that displays only the registered number, when the input number with numeric keypad doesn't exist, the cursor moves to a number that is the nearest the input number.

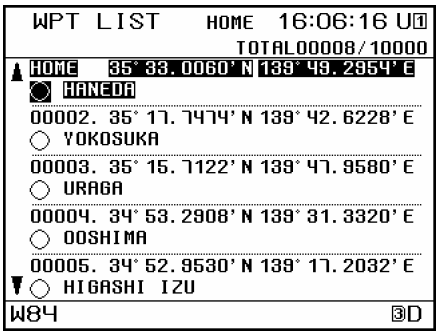
4.8.2 Moving the Cursor to an Unregistered Number

· The cursor can be moved within a list in the following ways:
  (1) The cursor can be moved via the up and down keys
  (2) You can jump to an unregistered number.
  (3) The cursor can be moved by entering a number with the numeric keypad
· This is used when registering waypoints, selecting copy destinations for waypoints, creating routes, and selecting copy destinations for routes.

4.8.2.1 Moving the Cursor with the Directional Keys

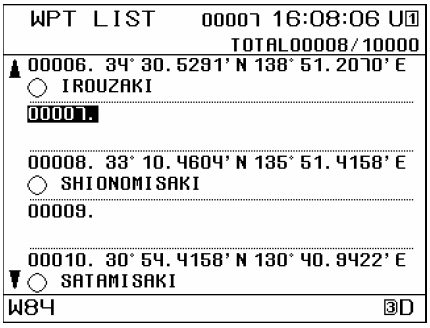
Procedure

1. Display the list.
2. Press ▲ ▼ to move the cursor.



Waypoint List

▲ ▼ Keys



The cursor moves

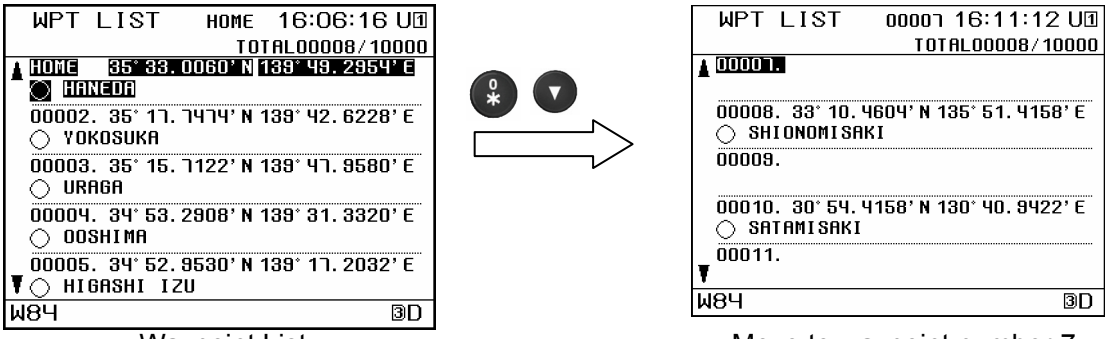
Press ◄ ► to move the cursor to the next page.

4.8.2.2 Jumping to an Unused Number

The cursor can jump to the nearest unused number (unregistered number) in a list. This can be used when you want to register an item, but do not know of an unused number.

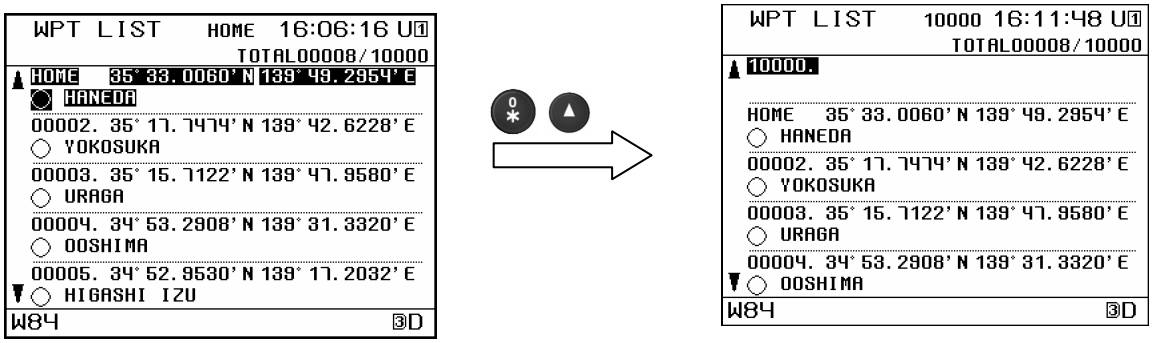
Procedure

1. Display the list.
2. Each time ▼ is pressed while pressing 0 ✱ , the cursor will jump to the start of the unused field.



Waypoint List　　Move to waypoint number 7

3. Each time ▲ is pressed while pressing 0 ✱ , the cursor will jump to the end of the unused field.



Waypoint List　　Move to waypoint number 10000

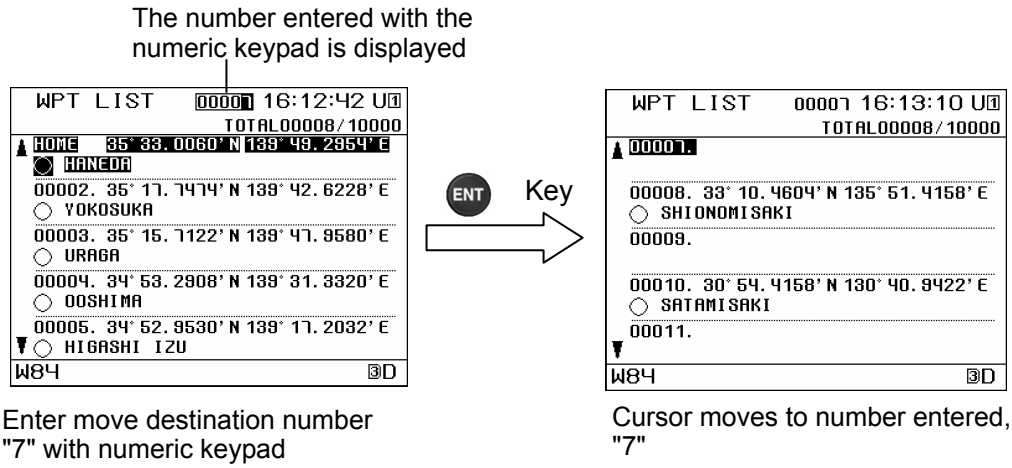
4.8.2.3 Using the Numeric Keypad to Enter a Number and Move the Cursor

The operation examples show selection of waypoint 7 in the waypoint list, but the instructions provided apply to operation within all lists.

Procedure

1. Display the list.
2. Enter the destination number "7" with the numeric keypad, and press ENT .

   The cursor moves to number 7.



Enter move destination number "7" with numeric keypad

Cursor moves to number entered, "7"

4.8.3 Selecting a Range within a List

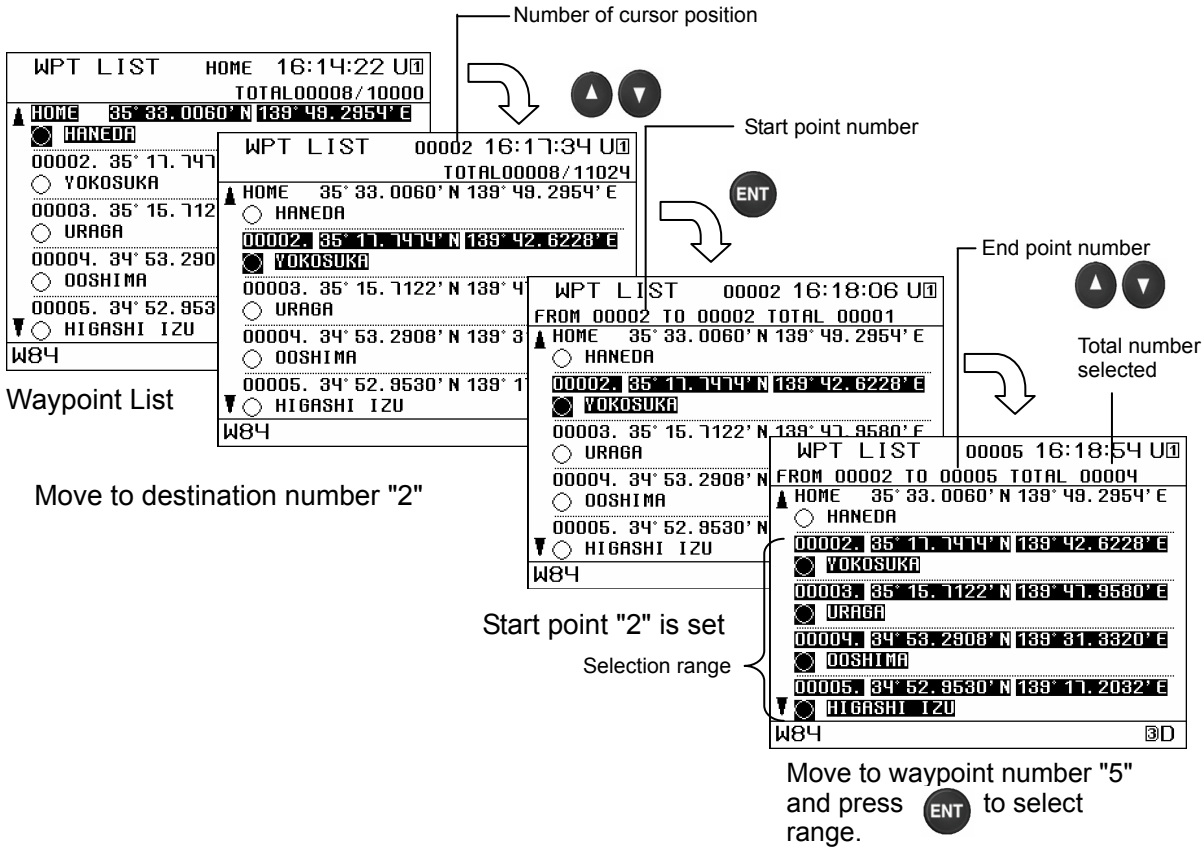
- The following methods can be used to select a range in a list:
  (1) The cursor can be moved via the up and down keys to select the start and end points
  (2) The cursor can be moved by entering a number with the numeric keypad to select the start and end points
- The two methods can be combined, such as selecting the start point with the up and down keys, and the end point with the numeric keypad.
- This function is used when selecting a range of waypoint copy sources, route copy sources, waypoints to be deleted, routes to be deleted, and events/marks to be deleted.

4.8.3.1 Moving the Cursor with the Directional Keys and Selecting a Range

The operation examples show selection of waypoints 2 to 5 in the waypoint list, but the instructions provided apply to operation within all lists.

Procedure

1. Display the list.
2. Press ▲▼ to move the cursor to "2", and press ENT to set the start point.
3. Press ▲▼ to move the cursor to "5", selecting the range from 2 to 5.
   Press ▲▼ to move the cursor to the next page.
4. Press ENT to set the range.

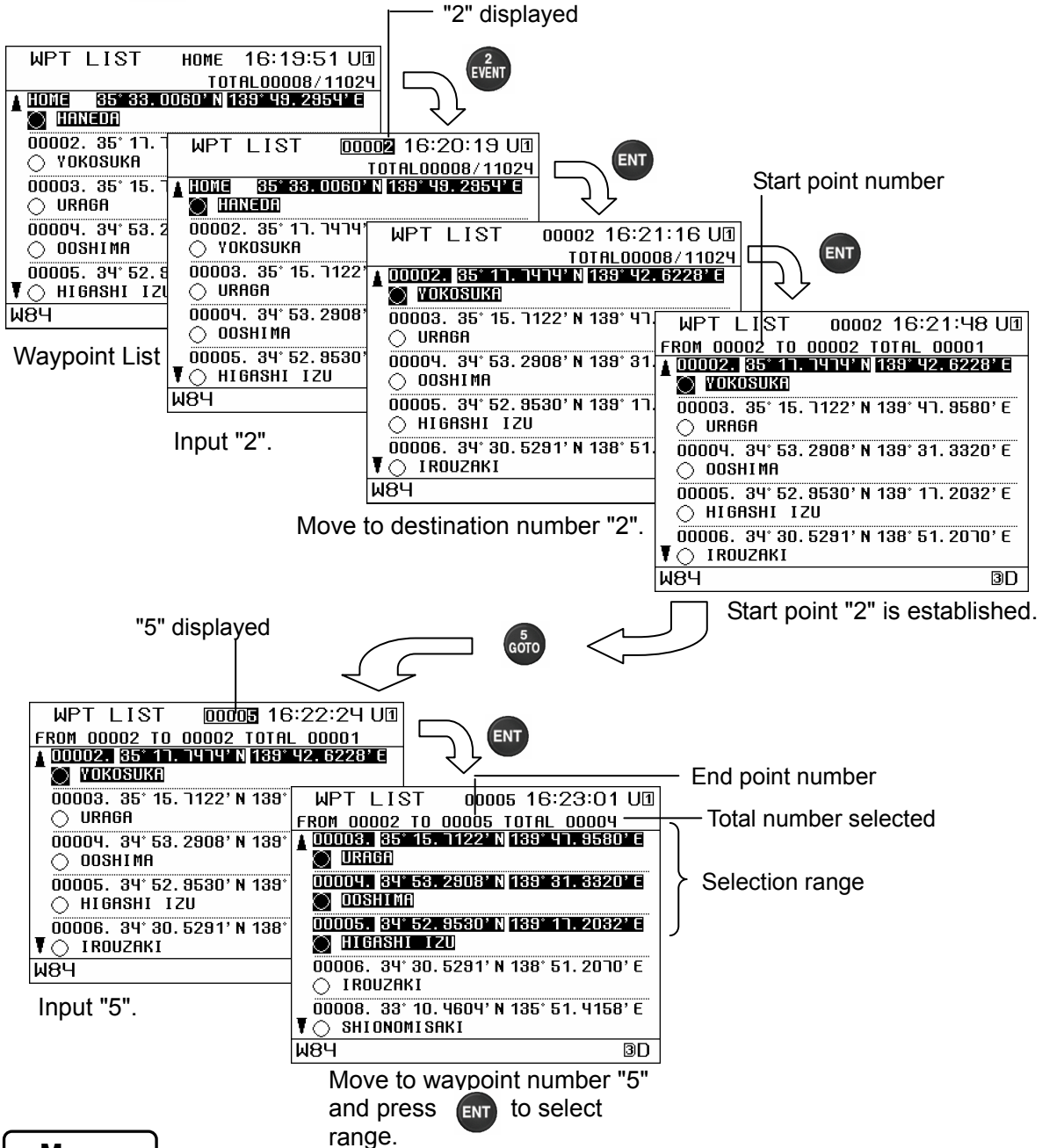


4.8.3.2 Moving the Cursor with the Numeric Keypad and Selecting a Range

The operation examples show selection of waypoints 2 to 5 in the waypoint list, but the instructions provided apply to operation within all lists.

Procedure

1. Display the list.
2. Use the numeric keypad to enter number "2" and press ENT to move the cursor to "2".
3. Press ENT to establish the start point.
4. Use the numeric keypad to enter number "5" and press ENT to move the cursor to "5" and select the range.
5. Press ENT to establish the range.



Memo

· In the list that displays only the registered number, when the input number with numeric keypad doesn't exist, the cursor moves to a number that is the nearest the input number.

4.9 Entering Comments

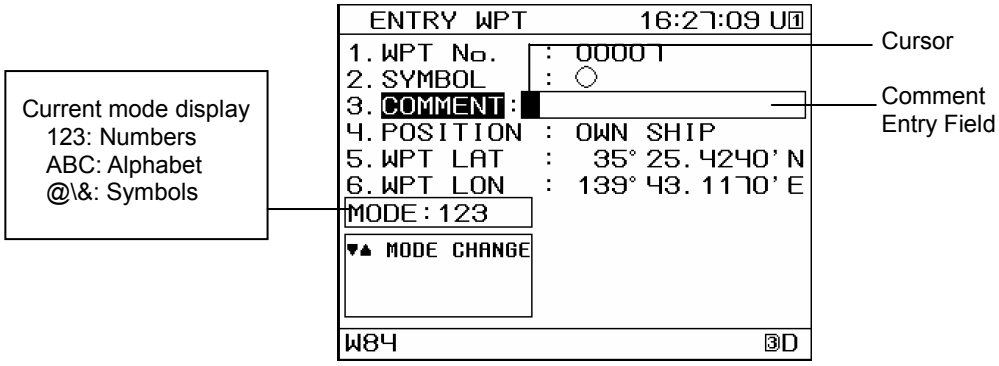
- Comments of up to 16 characters can be added to waypoints, events, marks, and routes.
- Characters are assigned to the numeric keypad, and can be entered by pressing the keypad keys.
- If the display language is set to Japanese, katakana entry can be performed.
- The characters assigned to the numeric keypad can be displayed onscreen.

4.9.1 Text Entry

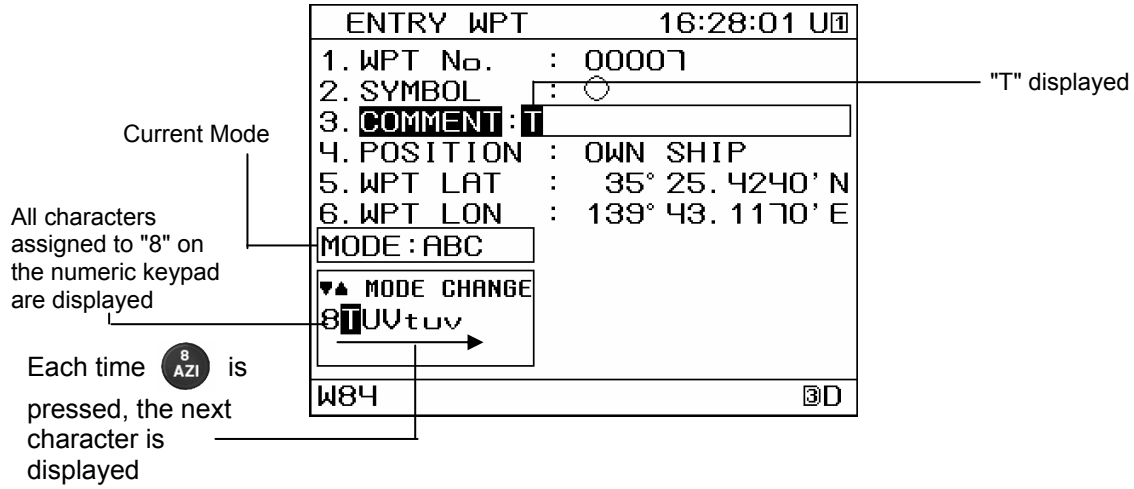
- The entry example will show how to input "Tokyo" on the waypoint entry screen.
- Katakana is only available when the display language is set to Japanese.

Procedure

1. Please refer to "4.4.2 Registering Waypoints" and display the waypoint registration screen.
2. Press 3 "COMMENT" to enter comment entry mode.



3. Press ▲ to set "MODE" to "ABC".
   Press ▲ ▼ to change modes as follows: Numbers → Alphabet → Symbols.
4. The "T" in "Tokyo" is assigned to numeric keypad number 8, so press 8 AZI .
   The characters assigned to the numeric keypad are printed on the key tops.
5. Press 8 AZI until a "T" is displayed at the cursor position in the comment field.
   All characters assigned to numeric keypad key 8 are displayed onscreen.
   Press 8 AZI to select the next letter.



6. The "o" in "Tokyo" is assigned to numeric keypad number 6, so press 6 .

   Press 6 until an "o" is displayed at the cursor position in the comment field.

7. The "k" in "Tokyo" is assigned to numeric keypad number 5, so press 5 GOTO .

   Press 5 GOTO until a "k" is displayed at the cursor position in the comment field.

8. The "y" in "Tokyo" is assigned to numeric keypad number 9, so press 9 HOME .

   Press 9 HOME until an "o" is displayed at the cursor position in the comment field.

9. The "o" in "Tokyo" is assigned to numeric keypad number 6, so press 6 .

   Press 6 until an "o" is displayed at the cursor position in the comment field.

10. Press ENT .

List of Characters Assigned to Numeric Keypad for Each Mode

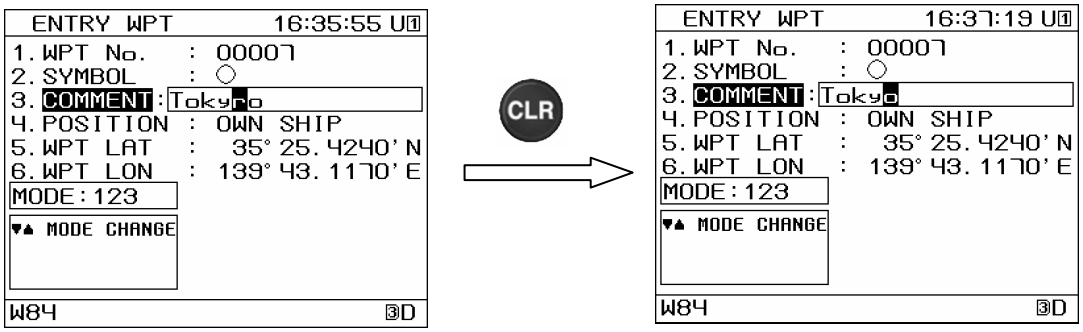
MODE / Numeric Keypad	123 Number	ABC Alphabet	@\& Symbol
1	1	1＋－＊／ () %	1＋－＊／ () % space
2	2	2ABCabc	2 ▲▼◀▶□■ →←
3	3	3DEFdef	3ⅠⅡⅢⅣⅤⅥ❶❷❸
4	4	4GHIghi	4；＜＝＞ {} ± 「」、。[]・
5	5	5JKLjkl	5#@＼&？, . '"_:!
6	6	6MNOmno	6
7	7	7PQRSpqrs	7
8	8	8TUVtuv	8
9	9	9WXYZwxyz	9
0	0	0#@\&？, . '"_ : !	0

4.9.2 Deleting Text

· Letters and characters in comments can be deleted.

Procedure

1. Use ◄ ► to move the cursor to the letter or character which you wish to delete.
2. Press CLR .



Move the cursor to the "r" position

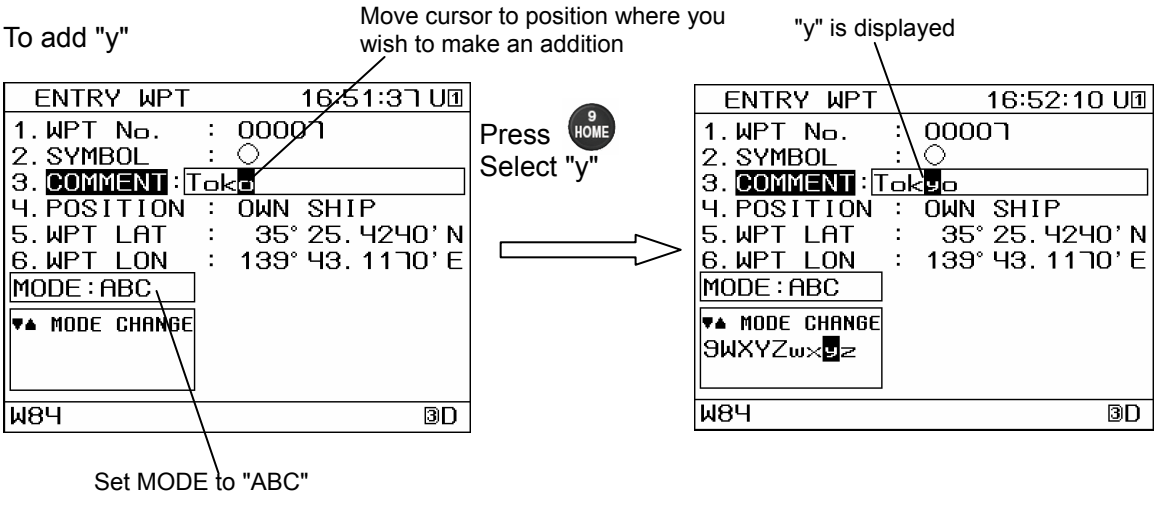
The "r" is deleted

4.9.3 Adding Text

· Letters and characters can be added to comments.

Procedure

1. Move the cursor to the position where you wish to insert a letter or character.
2. Refer to "4.9.1 Text Entry", and enter the desired letter(s) or character(s).



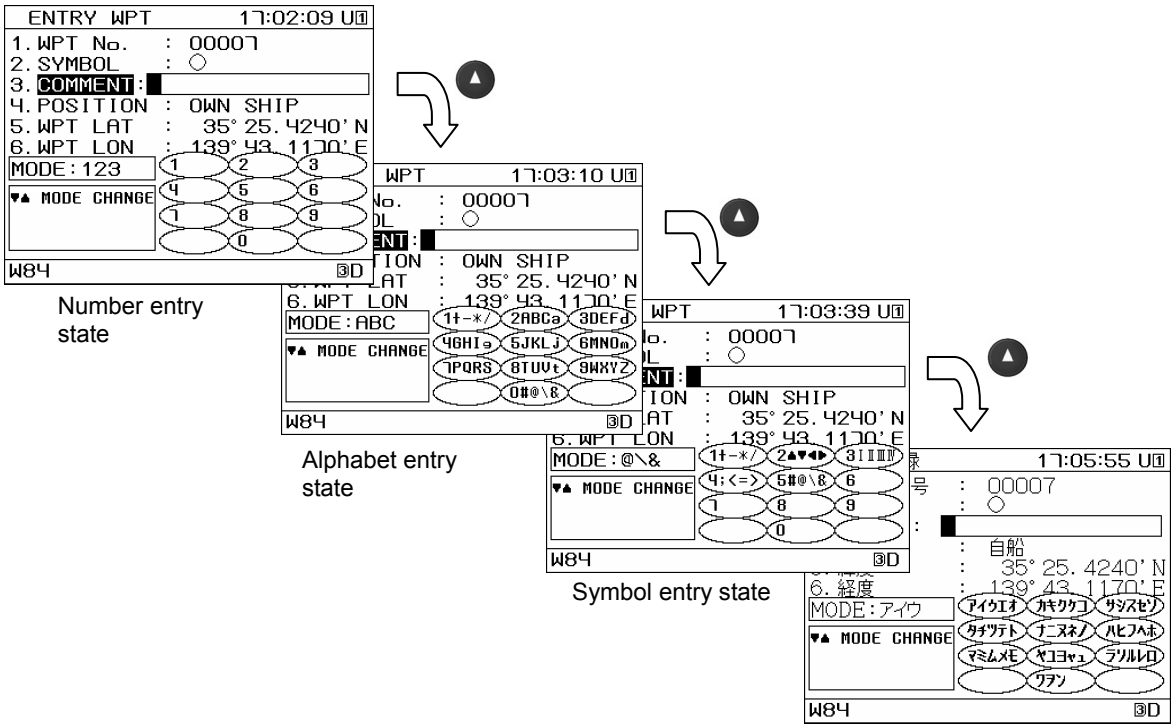
4.9.4 Displaying Characters Assigned to the Numeric Keypad

- Characters assigned to numeric keypad keys can be displayed on screen.
- The characters are displayed onscreen in the same positions as they are on the numeric keypad, allowing you to match their positions.

Procedure

1. Press MENU , 1 MARK , and then 7 CURS to select "INPUT ASSIST".
2. Press ▲ ▼ to select "ON", and then press ENT .

   When input assistance is turned "ON", the following is displayed onscreen during comment entry in accordance with the MODE.
   To hide this display, turn input assistance "OFF".



Number entry state

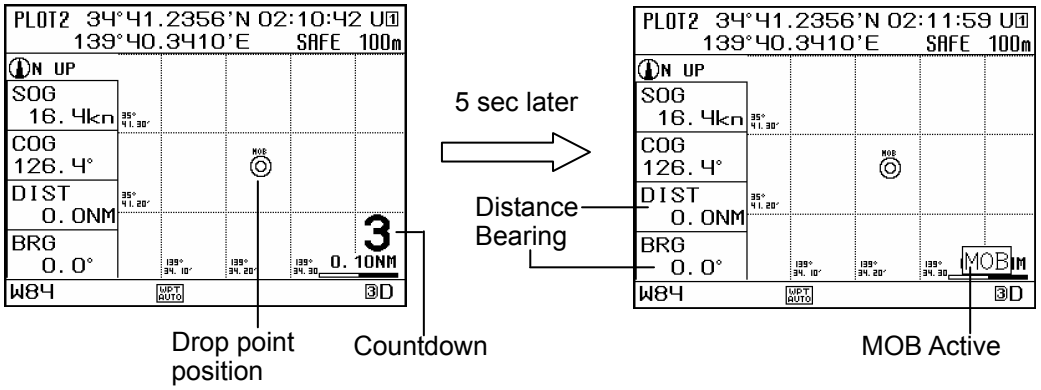
Alphabet entry state

Symbol entry state

Katakana entry state (only when characters displayed on the screen are Japanese language)

4.10 MOB

- The MOB (Man Overboard) function is used to save the position at which a person or object has fallen overboard. This allows rapid return to that location.
- The MOB function is valid on all screens.
- When MOB is performed, the plot screen is automatically displayed, a MOB mark is displayed at the point where the man overboard occurred, and the distance and direction from the current position to the man overboard position is displayed.



Procedure

1. Press MOB .

   A 5 second countdown will start at the bottom right of the screen. If MOB is pressed again within 5 seconds, the MOB function will be cancelled.

   To stop the MOB function, press and hold MOB for 3 or more seconds.

Memo

- The following are not available during MOB.
  Waypoint registration, route creation, navigation start, navigation stop, waypoint copy, route copy, waypoint deletion, route deletion, event/mark deletion, data route sharing, active route sharing
- The route number displayed during MOB operation is 103.
- MOB is registered as number 0 in the event/mark list.

4.11 Alarm Settings

9 types of alarms can be configured. The can be individually turned off or on, and the alarm sounds can be set individually.
The following alarms can be configured.

(1) SYSTEM: An alarm sounds when positioning is stopped. This cannot be set to Off.
(2) ARRIVAL/ANCHOR: An alarm sounds when own ship reaches or leaves the arrival circle.
Alarms cannot be set for both arrival and departure.
(3) XTD/BOUNDARY: An alarm sounds when own ship leaves or enters the route.
Alarms cannot be set for both leaving and entering.
(4) DGPS: An alarm sounds when switching from GPS positioning to DGPS positioning, or from DGPS positioning to GPS positioning.
(5) HDOP: An alarm sounds when the GPS positioning HDOP value exceeds the set value.
(6) TEMP: An alarm sounds when the water temperature matches the set parameters.
(7) DPTH: An alarm sounds when the water depth matches the set parameters.
(8) TRIP: An alarm sounds when the trip exceeds the set value.
(9) SPEED: An alarm sounds when the speed matches the set parameters.

Externally connected equipment is needed for water temperature or depth alarms to function.

When an alarm occurs, the alarm will sound, and a blinking icon will be displayed on the status bar.

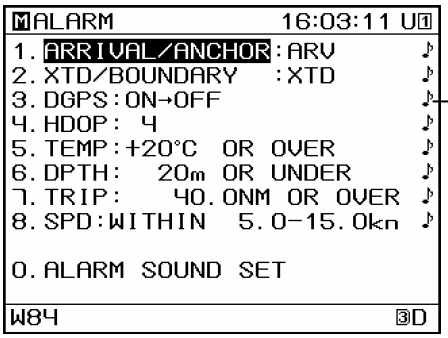
The alarm sound can be pressed by CLR , but the icon will continue appearing until the alarm has been resolved.
If you do not want an alarm to sound, set it to "OFF".

4.11.1 Setting Alarms

Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , and then 4 # to display the alarm screen.



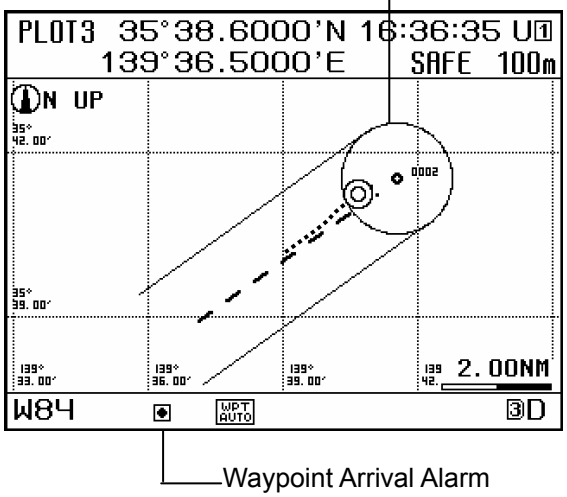
2. Select the alarm you wish to set.

(1) ARRIVAL/ANCHOR

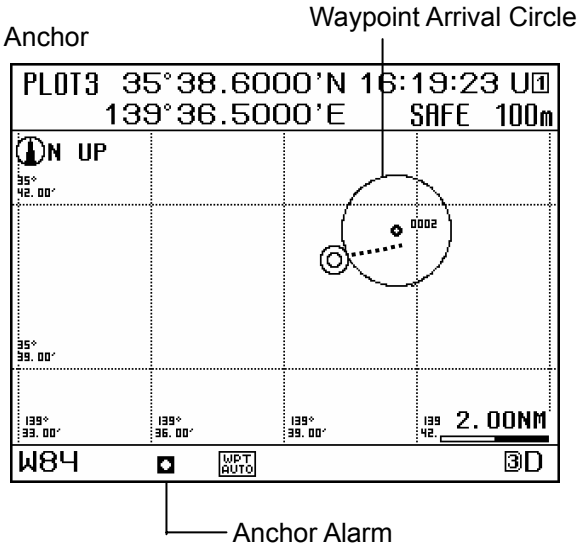
3. Press 1 MARK "ARRIVAL/ANCHOR".
4. Press ▲ ▼ to select "ARV", "ANC", or "OFF", and press ENT .

   An alarm will sound when own ship enters or exits the arrival circle set for the course. If no arrival circle is set, then an alarm will sound when own ship enters or exits the default course value arrival circle radius.
   Alarms cannot be set for both "ARRIVAL" and "ANCHOR".

Arrival



Anchor

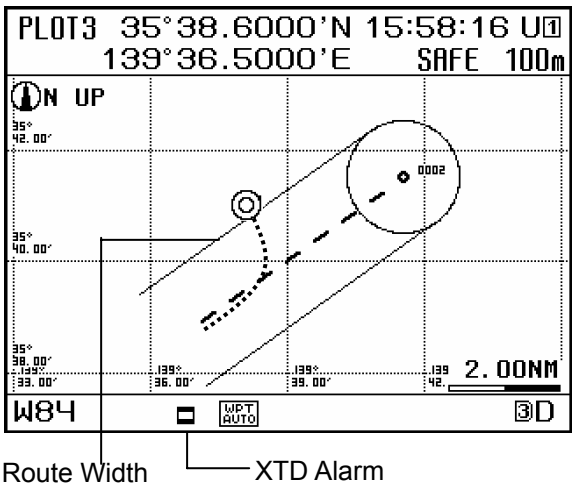


(2) XTD/BOUNDARY

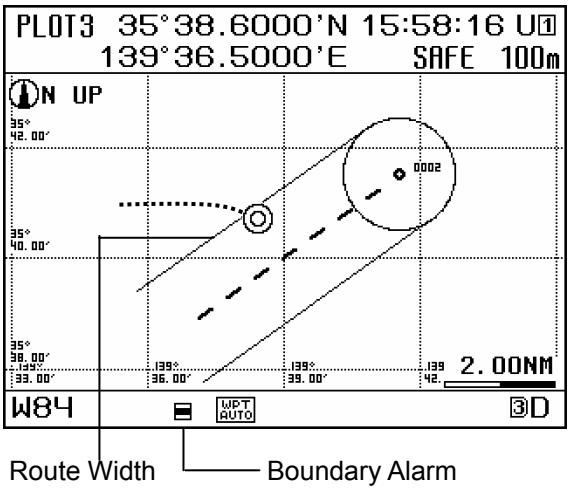
5. Press 2 EVENT "XTD/BOUNDARY".
6. Press ▲ ▼ to select "XTD", "BOUNDARY", or "OFF", and press ENT .

   If the ship leaves or enters the set route, the alarm will sound. If no route is set, then an alarm will sound when the ship enters or exits the default route width.
   Alarms cannot be set for both "XTD" and "BOUNDARY".

XTD



Boundary



(3) DGPS

7. Press 3 "DGPS".
8. Press ▲ ▼ to select "OFF" or the alarm trigger state, and press ENT .

   ON → OFF: An alarm will sound when DGPS positioning switches to GPS positioning.
   OFF → ON: An alarm will sound when GPS positioning switches to DGPS positioning.
   ON ↔ OFF An alarm will sound when DGPS positioning switches to GPS positioning, or when GPS positioning switches to DGPS positioning.

(4) HDOP

9. Press 4 # "HDOP".
10. Press ▲ ▼ to select "OFF" or "SET", and press ENT .
11. Enter the HDOP value with the numeric keypad, and press ENT .

    An alarm sounds when the GPS positioning HDOP value exceeds the set value.

(5) TEMP

12. Press 5 GOTO "TEMP".
13. Press ▲ ▼ to select "OFF" or "RANGE", and press ENT .
14. Enter the water temperature with the numeric keypad, and press ENT .

    OVER: An alarm will sound when the water temperature exceeds the set value.
    UNDER: An alarm will sound when the water temperature falls below the set value.
    IN RANGE: An alarm will sound when the water temperature is within the set range.
    OUT RANGE: An alarm will sound when the water temperature is outside the set range.
    Water temperature data must be obtained from externally connected equipment for the water temperature alarm to be used.

(6) DEPTH

15. Press 6 "DEPTH".
16. Press ▲ ▼ to select "OFF" or "RANGE", and press ENT .
17. Enter the water depth with the numeric keypad, and press ENT .

    OVER: An alarm will sound when the water depth exceeds the set value.
    UNDER: An alarm will sound when the water depth falls below the set value.
    IN RANGE: An alarm will sound when the water depth is within the set range.
    OUT RANGE: An alarm will sound when the water depth is outside the set range.
    Water depth data must be obtained from externally connected equipment for the water depth alarm to be used.

(7) TRIP

18. Press 7 CURS "TRIP".
19. Press ▲ ▼ to select "OFF" or "SET", and press ENT .
20. Use the numeric keypad to enter the trip distance, and press ENT .

    An alarm will sound if the set trip distance value is exceeded. The trip distance is calculated using the total distance over ground from Navigation Assistance 1 screen.

(8) SPD

21. Press 8 AZI "SPD".
22. Press ▲ ▼ to select "OFF" or "RANGE", and press ENT .
23. Enter the speed with the numeric keypad, and press ENT .

    OVER: An alarm will sound when the speed exceeds the set value.
    UNDER: An alarm will sound when the speed falls below the set value.
    IN RANGE: An alarm will sound when the speed is within the set range.
    OUT RANGE: An alarm will sound when the speed is outside the set range.

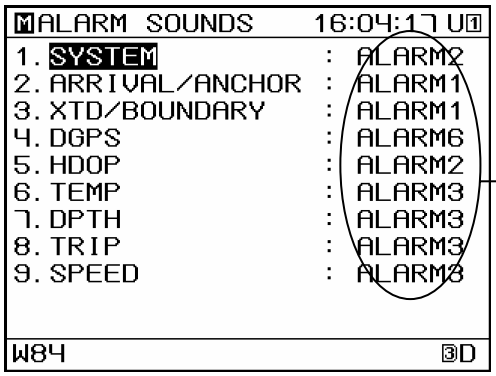
4.11.2 Setting Alarm Sounds

- Individual alarm sounds can be set for each item.
- If the alarm is set to "OFF" in the alarm settings, the alarm sound cannot be set, but even if the alarm is set to "ON", the alarm sound itself can be set to "OFF". In that case, when the alarm occurs, no alarm sound will play, but a blinking alarm icon will appear.
- When an alarm sound is set, the " ♪" icon will appear on the alarm screen.
- You can preview the alarm sound when setting it.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 4 # , and then 0 * to display the alarm sound screen.

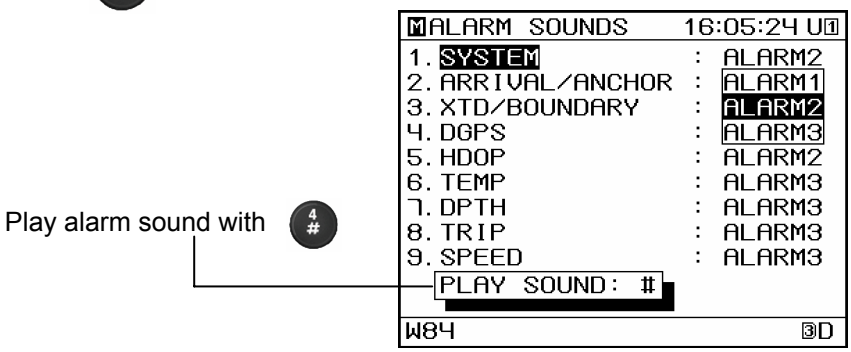
   Only items whose alarms have been set will be displayed.



2. Select the alarm you wish to set with the numeric keypad.
3. Press ▲ ▼ to select the alarm sound, and then press ENT .

   The following will be displayed. Press 4 # to hear the alarm sound.

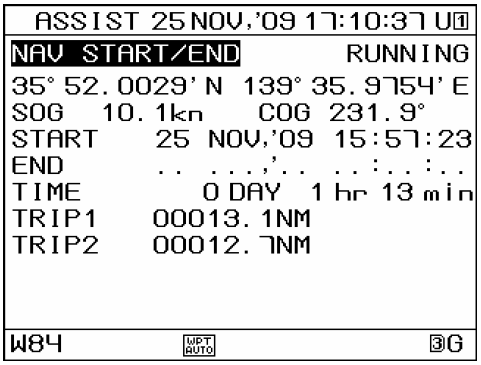
   Press 4 # again to stop the alarm sound.



4.12 Navigation Assistance

4.12.1 Measuring the Trip Distance and Time During Navigation (Navigation Assistance 1)

- Navigation Assistance 1 shows the time when measurement started, the time measurement ended, the total time, and the total distance over ground. If the speed through water is input from external equipment, the distance through water is also displayed.
- When measurement is started, the time that measurement was started is displayed, and the total time and total distance will gradually increase.
- When measurement is stopped, the time that measurement was stopped is displayed, as well as the total time and total distance.
- To start measurement, start navigation, or start measurement from the Navigation Assistance 1 screen.
- Stop measurement from the Navigation Assistance 1 screen.
- Measurement does not stop even if navigation is stopped. This allows total time and distance to be measured even when routes are changed during navigation.



Navigation Assistance 1 Screen
(Refer to "3.1.9 Navigation Assistance Screen" for screen details)

Procedure

(1) Starting Measurement

1. Press DISP several times to display the Navigation Assistance screen.
2. Press ◄ ► several times to display the Navigation Assistance 1 screen.
3. The cursor will move to "NAV START/END", so press ENT .

(2) Ending Measurement

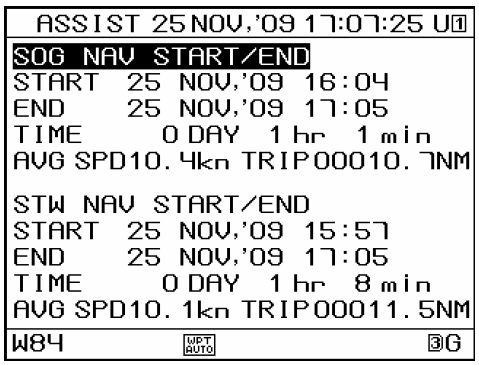
1. Press DISP several times to display the Navigation Assistance screen.
2. Press ◄ ► several times to display the Navigation Assistance 1 screen.
3. The cursor will move to "NAV START/END", so press ENT .

Memo

- Measurement starts automatically when navigation is started.
- In order to perform distance through water, speed through water must be input from externally connected equipment.

4.12.2 Measuring the Trip Distance and Time (Navigation Assistance 2)

- Navigation Assistance 2 shows the time when measurement started, the time measurement ended, the total time, the average speed during measurement, and the distance over ground. If the speed through water is input from external equipment, the speed through water is also displayed.
- When measurement is started, the time that measurement was started is displayed, and the total time, the average speed and total distance will gradually increase.
- When measurement is stopped, the time that measurement was stopped is displayed, as well as the total time and distance.
- To start measurement, start measurement from the Navigation Assistance 2 screen.
- Stop measurement from the Navigation Assistance 2 screen.



Navigation Assistance 2 Screen
(Refer to "3.1.9 Navigation Assistance Screen" for screen details)

Procedure

(1) Starting Measurement

1. Press DISP several times to display the Navigation Assistance screen.
2. Press ◄ ► several times to display the Navigation Assistance 2 screen.
3. The cursor will move to the "SOG NAV START/END", so press ENT to start measurement of distance over ground.
4. Pressing ▼ will cause the cursor to move to "STW NAV START/END", so press ENT to start measurement of distance through water.

(2) Ending Measurement

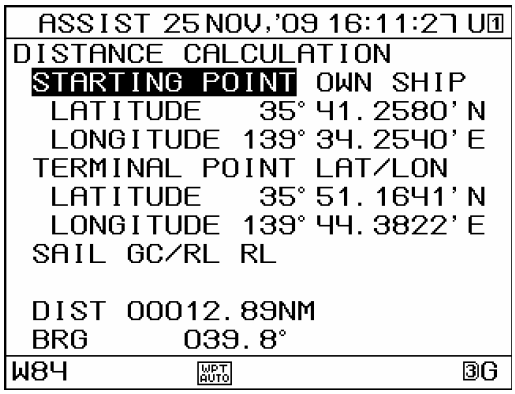
1. Press DISP several times to display the Navigation Assistance screen.
2. Press ◄ ► several times to display the Navigation Assistance 2 screen.
3. The cursor will move to "SOG NAV START/END", so press to end measurement of distance over ground.
4. Pressing ▼ will cause the cursor to move to "STW NAV START/END", so press ENT to end measurement of distance through water.

Memo

- In order to perform distance through water, speed through water must be input from externally connected equipment.

4.12.3 Measuring the Distance and Bearing Between 2 Points (Navigation Assistance 4)

- Navigation Assistance 4 allows you to specify a start point and an end point, and calculate the distance and bearing between the two points.
- The start and end points can be selected from the following 5 items.
  (1) Own ship's position
  (2) Specified latitude and longitude
  (3) Cursor position
  (4) Waypoint list:
  (5) Event/mark list



Navigation Assistance 4 Screen
(Refer to "3.1.9 Navigation Assistance Screen" for screen details)

Procedure

1. Press DISP several times to display the Navigation Assistance screen.
2. Press ◄ ► several times to display the Navigation Assistance 4 screen.
3. The cursor will move to "STARTING POINT", so press ENT .
4. Press ▲ ▼ to select the start point selection method, and press ENT .

   (1) If you select "OWN SHIP", the latitude and longitude of your ship position will be displayed.
   (2) If you select "LAT/LON", the cursor will move to the latitude and longitude position, so please enter your desired latitude and longitude values.
   (3) If you select "CURSOR", the plot screen will be displayed, so move the cursor to select the desired position.
   (4) If you select "WPT LIST", the waypoint list will be displayed, so move the cursor to select the desired waypoint.
   (5) If you select "EVENT LIST", the event/mark list will be displayed, so move the cursor to select the desired event/mark.

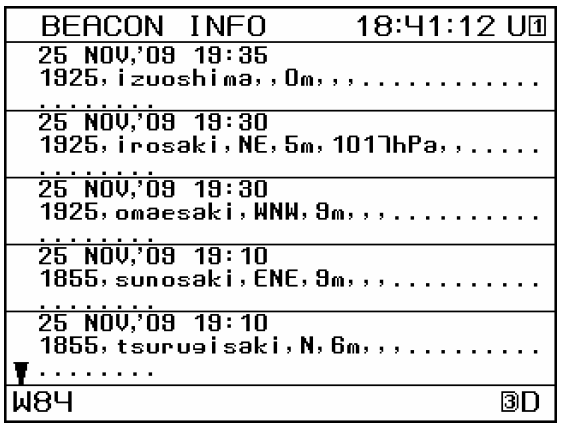
5. The cursor will move to "TERMINAL POINT", so press ENT .
6. Press ▲ ▼ to select the end point selection method, and press ENT .
   Select the end point using the same procedures provided for selecting start points.
7. The cursor will move to "SAIL GC/RL", so press ENT .
8. Press ▲ ▼ to select the distance measurement method, and press ENT .
   For distance calculation, select RL for "RHUMB LINE" measurement, and GC for "GREAT CIRCLE" measurement.
9. The distance and bearing between the specified start and end points will be displayed.
   When GC is selected as the distance measurement method, bearing is not displayed.

4.13 Beacon Information

When the beacon information is set to "ON" based on "4.16.8 Setting Beacon/SBAS", the beacon information (Type 16 message) from the beacon broadcast stations can be displayed.
Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 6 , and then 8 AZI .
2. Press 4 # "BEACON INFORMATION", press ▲ ▼ to select "ON", and press ENT .
3. Press DISP several times to display the beacon information screen.

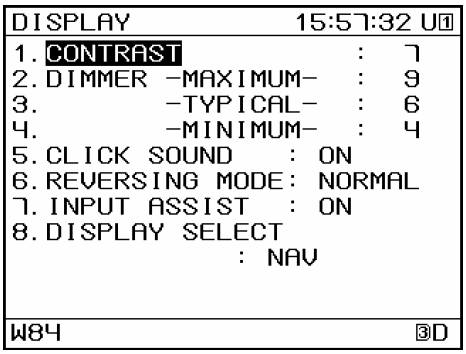


Memo

· The beacon information is not limited to information obtained from every beacon broadcast station.

4.14 Display Settings

If "1.DISPLAY" is selected on the main menu, the display menu will be displayed. On the display menu, you can set the contrast, dimmer, click sound, reversed display, input assistance, and screen display.



The following is an overview of each submenu.

(1) CONTRAST: You can set the LCD contrast.
(2) DIMMER: You can set the LCD's brightness levels.
(3) CLICK SOUND: You can turn the click sound when keys are pressed on or off.
(4) REVERSING MODE: You can switch the display's black/white setting.
(5) INPUT ASSIST: You can turn screen display of the characters assigned to the numeric keypad on or off.
(6) DISPLAY SELECT: You can set which screen is displayed, and which screen is shown on startup.

4.14.1 Adjusting Contrast

- You can set the LCD contrast.
- Contrast value 1 is the highest amount of contrast, while 13 is the least amount of contrast.
- The default value is 7.

Procedure

1. Press MENU , 1 MARK , and then 1 MARK to select "CONTRAST".
2. Press ▲ ▼ to adjust the contrast, and press ENT .

4.14.2 Adjusting Brightness

- Brightness adjustment can be performed by pressing DIM to select bright, medium, dark, or off.
  Here, you can set the levels for each brightness level.

Procedure

1. Press MENU , 1 MARK , and then 2 EVENT and select "DIMMER".
2. Press ▲ ▼ to increase or decrease the value by one. The screen brightness will change at the same time.
3. Press ENT . (Medium and Dark can be adjusted the same way.)

Memo

- Set the highest value for "Bright", and the smallest value for "Dark".
- The key brightness setting changes in accordance with the dimmer setting.

4.14.3 Setting the Click Sound

- You can turn the key operation click sound on or off.
  ON: The click sound is enabled
  OFF: The click sound is disabled

Procedure

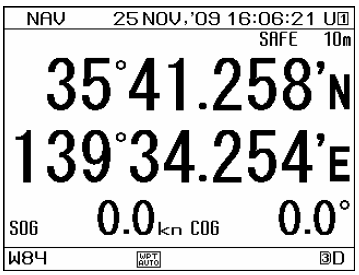
1. Press MENU , 1 MARK , and then 5 GOTO to select "CLICK SOUND".
2. Press ▲ ▼ to select "ON" or "OFF" and press ENT .

4.14.4 Setting Reversed Display

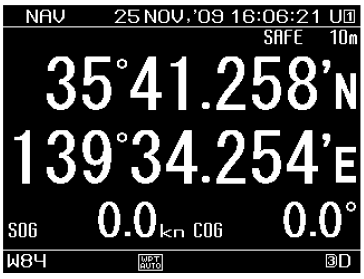
- The black/white display can be reversed.
  NORMAL: The letters are black. (The background is white)
  REVERSE1: The letters are white. (The background is black)
  REVERSE2: The letters are white, and the letters on the status bar are black.

Procedure

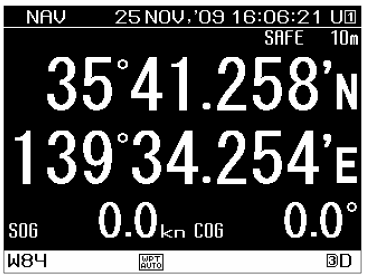
1. Press MENU , 1 MARK , and then 6 to select "REVERSING MODE".
2. Select the reversal mode with ▲ ▼ , and press ENT .



Normal



Reverse1



Reverse2

4.14.5 Input Assistance Settings

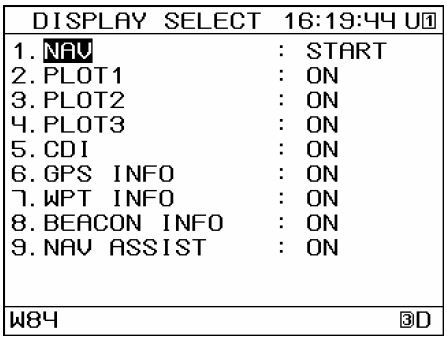
· Input assistance display can be turned on or off.
  ON: Input assistance display enabled
  OFF: Input assistance display disabled

Procedure

1. Press MENU , 1 MARK , and then 7 CURS to select "INPUT ASSIST".
2. Press ▲ ▼ to select "ON" or "OFF", and press ENT .

4.14.6 Selecting the Display Screen

· You can select which screen is displayed.
· Set screens which you wish to display to "ON", and screens which you do not wish to display to "OFF".
· You can set the navigation information , PLOT1, PLOT2, PLOT3, CDI, or GPS information screens to be displayed when the unit is started. Set the screen you wish to display on startup to "START".
· Only one screen can be set to "START". To change the "START" screen, change the value of the currently set "START" screen to something other than "START" before setting the new "START" screen.

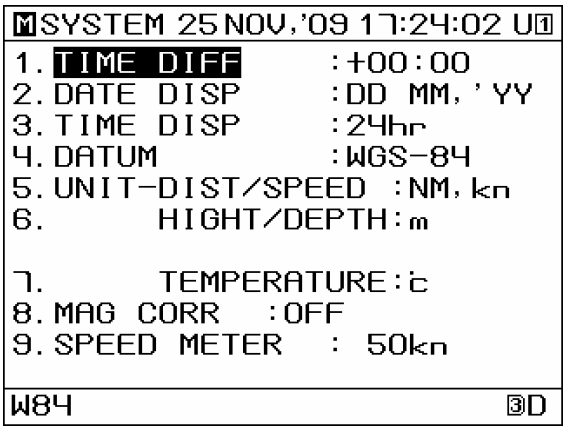


Procedure

1. Press MENU , 1 MARK , and then 8 AZI to select "DISPLAY SELECT".
2. Enter the number of the screen you wish to set with the numeric keypad.
4. Press ▲ ▼ to select "START", "OFF", or "ON", and press ENT .

4.15 System Settings

· Select "5. SYSTEM" on the main menu to display the system settings screen.



The following is an overview of each submenu.

(1) TIME DIFF: To display the time at the current location, enter the difference between the local time and UTC.
(2) DATE DISP: Select " 'YY-MM-DD", "DD MM, 'YY", or "MM DD, 'YY".
(3) TIME DISP: You can select 24 hour or 12 hour display.
(4) DATUM: You can select a geodetic system from the list in "Appendix 1 Geodetic Systems".
(5) UNIT - DIST/SPEED: You can choose units of "NM, kn", "km, km/h", or "mi, mi/h".
(6) UNIT - HEIGHT/DEPTH: You can select m, ft, or fm.
(7) UNIT - TEMPERATURE: You can select ℃ or ℉ .
(8) MAG CORR: You can select automatic or manual magnetic correction, or turn magnetic correction off.
(9) SPEED Meter: You can set the maximum value of the analogue speed meter on the CDI screen.

4.15.1 Setting the Time Difference

· You can set the time difference between your current location and UTC.
An YY denotes a year, an MM denotes a month, and a DD denotes a day.
· For Japan, the time difference is +9 hours, so you would input +09:00.
· When a time difference is set, the local time will be displayed (shown with an "L").
· Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 5 GOTO , and then 1 MARK to select "TIME DIFF".
2. Select + or - with ▲ ▼ , enter the time with the numeric keypad, and press ENT .

4.15.2 Setting the Date Display

· You can set the date display format to " 'YY-MM-DD", "DD MM, 'YY", or "MM DD, 'YY".
· Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 5 GOTO , and then 2 EVENT to select "DATE DISP".
2. Select the display format with ▲ ▼ , and press ENT .

4.15.3 Setting the Time Display

- You can select 24 hour or 12 hour time display.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 5 GOTO , and then 3 ⟷ to select "TIME DISP".
2. Select the display format with ▲ ▼ , and press ENT .

4.15.4 Setting the Geodetic System

- You can select the geodetic system to use.
- You can choose between 46 types of geodetic systems. Please refer to "Appendix 1 Geodetic Systems" for details.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 5 GOTO , and then 4 # to select "DATUM".
2. Select the geodetic system with ▲ ▼ , and press ENT .

4.15.5 Setting Distance and Speed Units

You can select "NM, kn", "km, km/h", or "mi, mi/h" for distance and speed units.
Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 5 GOTO , and then 5 GOTO to select "UNIT - DIST/SPEED".
2. Select the units with ▲ ▼ , and press ENT .

4.15.6 Setting Height and Depth Units

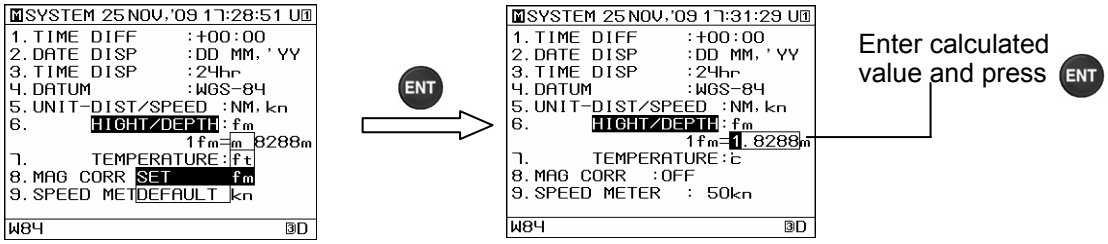
- You can select m, ft, or fm for height and depth units.
- If you select fm, enter the conversion value from "m". The default value is 1 fm = 1.8288 m.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 5 GOTO , and then 6 ⟷ to select "HEIGHT/DEPTH".
2. Select the units with ▲ ▼ , and press ENT .

If you select fm, you must enter the conversion value from "m".

3. Press ▲ ▼ to select "SET", enter the conversion value with the numeric keypad, and press ENT .



To keep the default value, or restore the unit to the default value, select "DEFAULT".

4.15.7 Setting Temperature Units

- You can set the temperature unit to ºC or ºF.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 5 GOTO , and then 7 CURS to select "TEMPERATURE".
2. Select the units with ▲ ▼ , and press ENT .

4.15.8 Setting Magnetic Correction

- You can set the method of magnetic correction to be automatic or manual, or turn magnetic correction off.
- If you select automatic, correction is automatically calculated for the correction value from the GPS position.
- If you select manual, correction is performed using a manually entered value.
- If you turn magnetic correction off, no correction is performed.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

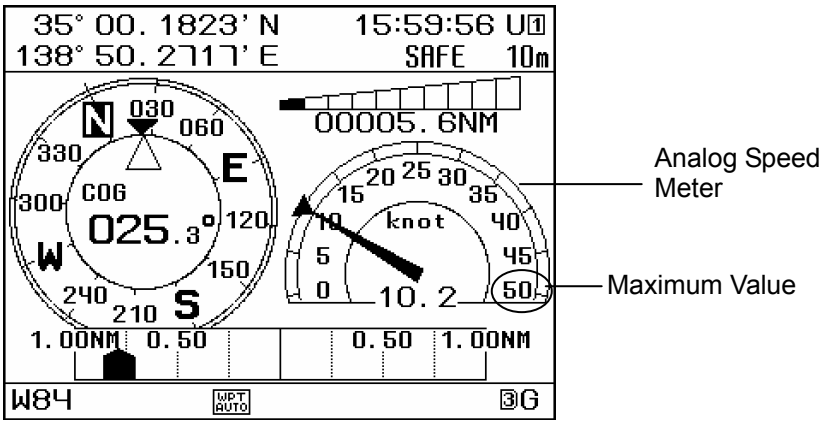
1. Press MENU , 5 GOTO , and then 8 AZI to select "MAG CORR".
2. Select the correction method with ▲ ▼ , and press ENT .

When Manual is selected

3. Select E/W using ▲ ▼ , enter the correction value with the numeric keypad, and press ENT .

4.15.9 Setting the Maximum Analogue Speed Meter Value

- You can set the maximum value of the CDI screen analogue speed meter.
- Set the value to one appropriate for the ship in which the unit is installed. The maximum value is 100 kn.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

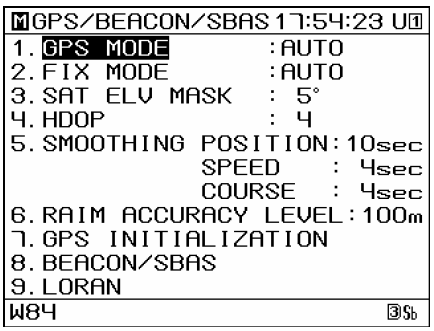


Procedure

1. Press MENU , 5 GOTO , and then 9 HOME to select "SPEED METER".
2. Enter the speed with the numeric keypad, and press ENT .

4.16 GPS/Beacon/SBAS Settings

· Select "6. GPS/BEACON/SBAS" on the main menu to display the GPS/beacon/SBAS settings screen.
The items which can be set will vary depending on the connected sensor.



The following is an overview of each submenu.
(1) GPS MODE: You can select AUTO (JLR-7800 only), GPS Alone, Beacon, or SBAS.
(2) FIX MODE: You can select AUTO, 3D, or 2D.
(3) SAT ELV MASK: You can limit which satellite(s) you use based on the angle.
(4) HDOP: You can set the measured HDOP.
(5) SMOOTHING - POSITION: You can set position smoothing.
(6) SMOOTHING - SPEED: You can set speed smoothing.
(7) SMOOTHING - COURSE: You can set course smoothing.
(8) RAIM ACCURACY LEVEL: You can set the RAIM accuracy level used.
(9) GPS INITIALIZATION: You can perform sensor initialization.
(10) BEACON/SBAS: You can perform beacon and SBAS settings.
(11) LORAN: You can display a position based on the time difference (Loran A/C).

Memo

・RAIM
Abbreviation of Receiver Autonomous Integrity Monitoring. This system automatically detects failed satellites and deselects their positioning data from calculations. Including data from failed satellites will result in a decrease in positioning accuracy; the RAIM accuracy standard indicates the accuracy degradation base for removal of failed satellites from positioning calculations.

4.16.1 Setting the GPS Mode

· You can set the GPS mode to AUTO, GPS alone, beacon, or SBAS.
· The sensor must support SBAS to use SBAS positioning mode.
The selections are as follows:
(1) AUTO: The best method is selected from GPS alone, SBAS, and beacon.
(2) GPS Alone: Positioning is performed using only the GPS. SBAS positioning and beacon-based DGPS positioning is not performed.
(3) BEACON: Beacon based DGPS or GPS only positioning is performed. SBAS positioning is not performed.
(4) SBAS: SBAS or GPS only positioning is performed. Beacon-based DGPS positioning is not performed.
· Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 6 , and then 1 MARK to select "GPS MODE".
2. Select the GPS mode with ▲ ▼ , and press ENT .

4.16.2 Setting the Fixing Mode

- You can set Fix mode to AUTO, 3D, or 2D.
- The selections are as follows:
  (1) AUTO: Positioning mode is automatically switched between 3D and 2D, with the optimal method being used.
  (2) 3D: 3D positioning is performed.
  (3) 2D: 2D positioning is performed.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 6 , and then 2 EVENT to select "FIX MODE".
2. Select the positioning mode with ▲ ▼ , and press ENT .

4.16.3 Setting the Elevation Mask

- If the elevation mask is set, satellites at an elevation lower than the set value will not be used in positioning.
- The elevation mask can be set between 5 and 89 degrees.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 6 , and then 3 to select "SAT ELV MASK".
2. Use the numeric keypad to enter the elevation mask, and press ENT .

4.16.4 Setting HDOP

- If HDOP is set, positioning is only performed if HDOP is lower than the set value.
- HDOP can be set to 4, 10, or 20.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 6 , and then 4 # to select "HDOP".
2. Press ▲ ▼ to select the HDOP value, and then press ENT .

4.16.5 Setting Position, Speed, and Course Smoothing

- Smoothing can be applied to measured positions, speeds, and courses.
- The higher the smoothing value, the smoother the results will be, but the greater the time lag. Conversely, if the smoothing value is set low, a great number of changes will occur, but there will be little time lag. As such, it is important to choose the optimal value for your own usage situation.
- Smoothing values can be set between 0 and 99 seconds.
- Smoothing can be set individually for position, speed, and course on the JLR-4341.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 6 , and then 5 GOTO to select "SMOOTHING".

(1) When Position, Speed, and Course can be Individually Set

2. Press ▲ ▼ to select position, speed, or course, and then press ENT .
3. Use the numeric keypad to enter the smoothing value, and press ENT .

(2) When Position, Speed, and Course can not be Individually Set

2. Use the numeric keypad to enter the smoothing value, and press ENT .

Attention

- Setting a high smoothing level to position and speed, can cause the receiver to react slowly to fast turns and sudden speed changes.
  A setting of less than 10 seconds is recommended for normal circumstances, default is 10 seconds. Higher settings must be used in caution.

4.16.6 Setting RAIM

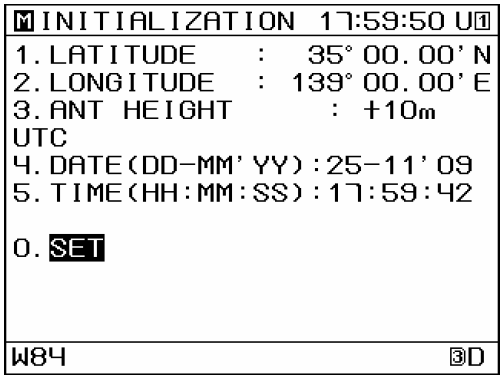
- Receiver autonomous integrity monitoring (RAIM) is an integrity monitoring which determine if GPS accuracy is within the performance standards to provide an integrity indication.
  The integrity indications with a confidence level above 95% for different position accuracy levels are expressed in two states: "safe" and "unsafe".
  In the case of the confidence level under 95%, the indication is expressed "caution".
  Safe: position error is within the selected accuracy level.
  Caution: insufficient information to reliably calculate for the selected accuracy level.
  the probability of false alarms is large or the probability of not detecting an error condition is large.
  Unsafe: position error exceeds the selected accuracy level.
- You can set the RAIM accuracy level.
- You can choose "OFF", "10m", "30m", "50m", or "100m" as accuracy levels.
  Set to 30 m or greater when GPS positioning is used alone. If GPS-only positioning is used with a setting of 10 m, then the 95% reliability condition will not be met, and a "CAUTION" may occur.
- If you choose accuracy level "OFF", "RAIM OFF" displays on the screen and the RAIM function will turn off. During "OFF" status, no calculations as to the integrity status of satellites are made.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 6 , and then 6 to select "RAIM ACCURACY LEVEL".
2. Press ▲ ▼ to select the accuracy level value, and then press ENT .

4.16.7 Initializing the GPS

· GPS initialization can be performed.



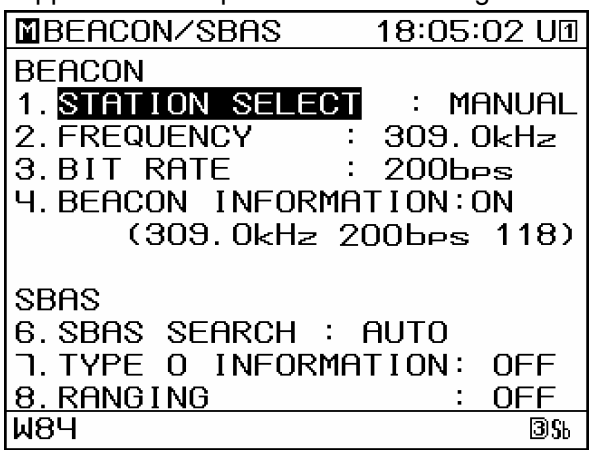
· The submenus on the GPS initialization screen are as described below.
  (1) LATITUDE: Enter the approximate ship latitude.
  (2) LONGITUDE: Enter the approximate ship longitude.
  (3) ANT HEIGHT: Enter the height above the draft line of the sensor. This height is used in 2D positioning. It is not used in 3D positioning.
  (4) DATE: Enter the current date in UTC.
  (5) TIME: Enter the current time in UTC.
· Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 6 , and then 7 CURS to display the GPS initialization screen.
2. Select the item you wish to set with the numeric keypad, enter each value using the numeric keypad, and press ENT .
3. Press 0 * "SET".

4.16.8 Setting Beacon/SBAS

Beacon and SBAS settings can be performed.
The sensor must support SBAS to perform SBAS settings.



· The submenus on the beacon/SBAS settings screen are as follow.

(1) STATION SELECT: Set the beacon station selection method.
AUTO: The best beacon station is selected automatically from the GPS position.
MANUAL: You can set the frequency and bit rate manually.
(2) FREQUENCY: Set the frequency when station selection is set to manual.
(3) BIT RATE: Set the bit rate when station selection is set to manual.
(4) BEACON INFORMATION: Set to "ON" to display received beacon information.
(5) SBAS SEARCH: The SBAS satellite can be set.
AUTO: The SBAS satellite is automatically set.
MANUAL: The SBAS satellite number is set manually.
(6) TYPE 0 INFORMATION: Set whether test broadcast data is used.
ON: Used.
OFF: Not used. (default)
(7) RANGING: You can set whether SBAS satellite information are used like GPS satellites in positioning.
ON: Used.
OFF: Not used. (default)

· Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 6 , and then 8 AZI to display the Beacon/SBAS setting screen.

(1) Setting Beacon station

2. Press 1 MARK "STATION SELECT".
3. Press ▲ ▼ to select the method, and press ENT .
   If set to Manual, "2. FREQUENCY" and "3. BIT RATE" can be selected.
   Press 2 EVENT "FREQUENCY".
   Enter the frequency with the numeric keypad, and press ENT .
   Press 3 "BIT RATE".
   Press ▲ ▼ to select the bit rate, and press ENT .

(2) Setting Beacon Information

Refer to "4.13 Beacon Information".

(3) Setting SBAS Satellites

4. Press 6 "SBAS SEARCH".
5. Press ▲ ▼ to select the search method, and press ENT .
   If set to Manual, the SBAS satellite number can be selected.
   Press ▲ ▼ to select the SBAS satellite number, and press ENT .

(4) Setting Type 0 Information

6. Press 7 CURS "TYPE 0 INFORMATION".
7. Press ▲ ▼ to select "ON" or "OFF" and press ENT .

(5) Setting Ranging

8. Press 8 AZI "RANGING".
9. Press ▲ ▼ to select "ON" or "OFF", and press ENT .

4.16.9 Setting LORAN A/C

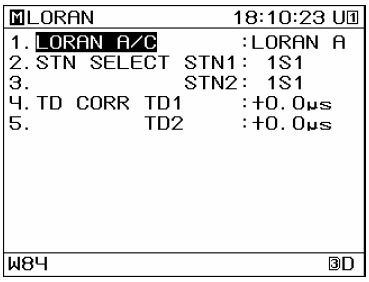
- Position displays and settings can be performed based on time differences.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

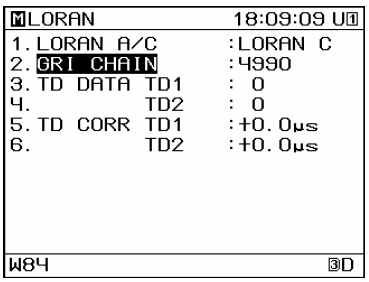
1. Press MENU , 6 , and then 9 HOME to display the LORAN setting screen.
2. Press 1 MARK "LORAN A/C".
3. Press ▲ ▼ to set the time difference display, and press ENT .

The time difference display settings are as follow.

(1) OFF: Latitude and longitude is displayed.
(2) LORAN A: Switches to the LORAN A setting screen.
(3) LORAN C: Switches to the LORAN C setting screen.



LORAN A



LORAN C

4. The LORAN A or LORAN C setting screens are displayed.
5. Select the item you wish to set with the numeric keypad.
6. Enter each value with the numeric keypad or ▲ ▼ , and press ENT .

Memo

- Configurable LORAN A stations:
  1S1 1S2 1S3 1S4 1S6 1L0 1L1 1L4 1L5 2S0 2S1 2S2 2S3 2S4 2S5 2S6 2S7 2H4 2H5 2H6

- Configurable LORAN C chains:
  4990 5930 5970 5980 5990 6730 6731 6780 7001 7030 7170 7270 7430 7499 7930 7950 7960 7970 7980 7990 8000 8290 8390 8830 8930 8970 8990 9007 9610 9930 9940 9960 9970 9980 9990

4.17 Version Display

· The GPS sensor and display version number can be displayed.
· The details of each submenu are shown below.
(1) SENSOR
(1-1) SERIAL No.: The serial number of the GPS sensor is displayed.
(1-2) BARCODE: The GPS sensor barcode number is displayed.
(1-3) VERSION: The GPS core version number is displayed.
(1-4) CONTROLLER: The controller version number is displayed.
(2) DISPLAY
(2-1) SERIAL No.: The serial number of the display is displayed.
(2-2) BARCODE: The display barcode number is displayed.
(2-3) VERSION: The display version number is displayed.
(2-4) IP: The display IP address is displayed.

Procedure

1. Press MENU and then 7 CURS , select "VERSION".

4.18 Language Settings

- Select "8. LANGUAGE" on the main menu to display the language settings screen.
- You can select English or Japanese.
- Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.

Procedure

1. Press MENU , 8 AZI , then 1 MARK to select "LANGUAGE".
2. Select the language with ▲ ▼ , and press ENT .

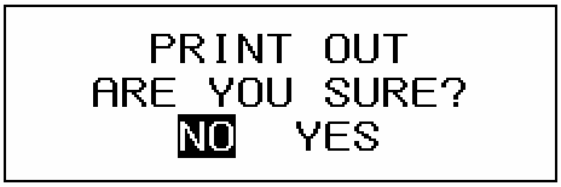
4.19 Print

- When # key is pressed to print, ship information is printed on DPU-414 Printer.
- To print with the # key is DPU-414 printer exclusive use. Please operate the printer when printing on NKG-84 Printer.
- The # key can be used from any screen other than the menu screen, waypoint information screen, or Navigation Assistance 4 screen.
- To print, please switch DATA IN/OUT1 setting to "PRINTER" .

4.19.1 Ship information is printed when it is necessary

Procedure

1. Press 4 #.
2. The following will be displayed. Press ◄ ► to select "YES", and press ENT.



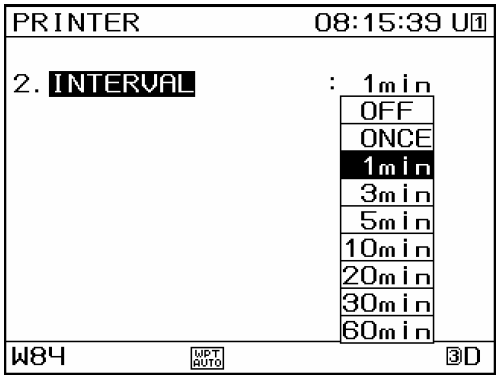
Ship information is printed.

4.19.2 Setting the output interval

- The output interval is set, and it is possible to print regularly.
- You can choose "1 min", "3 min", "5 min", "10 min", "20 min", "30 min", "60 min", "OFF" and "ONCE" as interval time.
- If "OFF" is selected, data is not output. If "ONCE" is selected, data is output one time.

Procedure

1. Press and hold 4 # for 3 seconds.
2. Press 2 EVENT "INTERVAL".



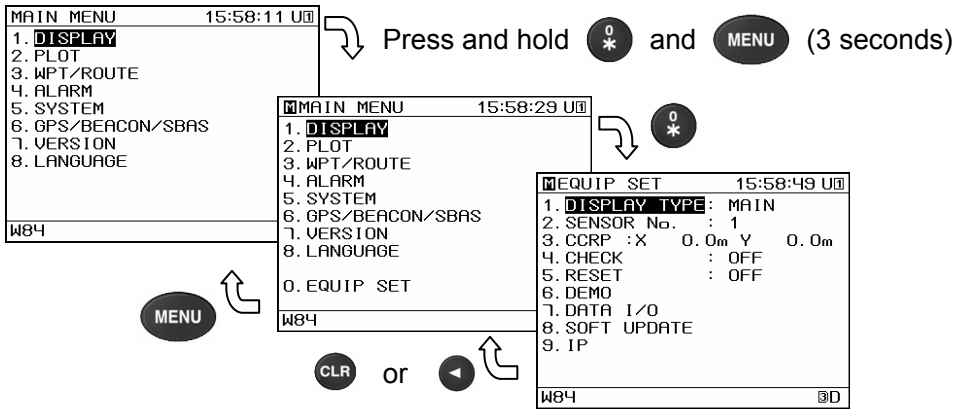
3. Press ▲ ▼ to select interval time and press ENT .

4.20 Equipment Configuration

- In order to change settings or perform installation configuration, you must switch the unit to equipment configuration mode.
- When the unit is in equipment configuration mode, " M " will be displayed at the top left of the title bar.

Procedure

1. Press and hold 0 * and MENU for 3 seconds, and " M " will appear at the top left of the title bar, indicating that the unit is now in equipment configuration mode.
   "0. EQUIP SET" will appear on the main menu screen. Press 0 * to display the equipment configuration menu.



equipment configuration menu

Memo

- Pressing CLR or ◄ on the equipment configuration menu will return to the main menu.
- Equipment configuration mode will end when one of the following occurs:
  - when MENU is pressed again on the main menu screen.
  - when the power is turned off
- When making settings, check that the unit is in equipment configuration mode.

4.20.1 Setting the Display Type

- You can set whether the display is the main display connected to the GPS sensor, or a sub-display.
- Set the display connected to the GPS sensor as "MAIN".
- Set the display used as a sub-display as "SUB".

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press (1 MARK) "DISPLAY TYPE".
3. Press (▲) (▼) to select "MAIN" or "SUB", and press (ENT) .
   If the unit is set to be the sub-display, " S_1 " will appear at the top right of the title bar.

Memo

- Settings cannot be performed for the GPS sensor from the sub-display.

4.20.2 Setting the GPS Sensor Number

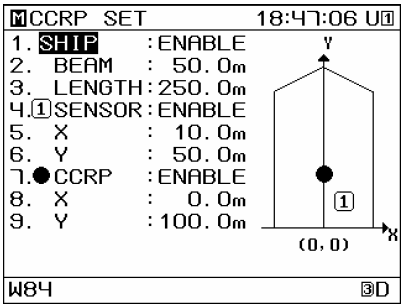
- A number can be assigned to each GPS when there is more than one GPS sensor.
- This number is used for IP address management of each display, and for GPS identification when outputting data, so always perform GPS number configuration.
- When only 1 GPS is used, set the number to No1.
- Set a number for each display type, main and sub. Sub-displays are not connected to GPS sensors, but must be set.
- Always set numbers in order starting from No1.

Procedure

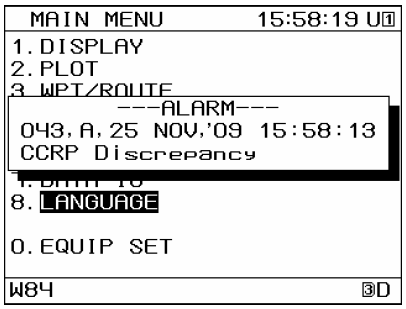
1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press (2 EVENT) "SENSOR No.".
3. Enter the number with the numeric keypad, and press (ENT) .
   The number will appear at the top right of the title bar.

4.20.3 Setting Sensor Position / CCRP

- You can set the ship size, CCRP position, and GPS sensor position.
- The CCRP position and GPS position are set on a coordinate system with the center of the ship as the point where the axes cross.
- Set the ship size (ship length and width), and set the CCRP position and GPS sensor position.
- The set CCRP position can be output to externally connected equipment. For output, refer to "4.20.7 Data I/O Settings ", and select "CCRP" as the output sentence.
  To output to external equipment, the equipment must have CCRP send / receive functionality.
- CCRP cannot be set from a sub-display. Set CCRP from the main display.



The CCRP position can be received. If the set position and received position differ, the following alert will occur, so please perform the settings again. A "*" will appear on the status bar until the settings have been redone.



Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 3 "CCRP" to display the CCRP settings screen.
3. Press 1 MARK "SHIP".
4. Press ▲ ▼ to set the value to "ENABLE", and press ENT .
5. Select the ship width and length, enter the values with the numeric keypad, and press ENT .
6. The SENSOR and CCRP x and y values are set in the same way.

Memo

- If the sensor position does not fit within the ship, the sensor position will change to "DISABLE". Perform settings again such that the position is within the ship, and change the setting to "ENABLE". The same is true for the CCRP position.

4.20.4 Equipment Check

· An equipment check can be performed for the GPS sensor and the display.
  (1) Input port check
  (2) Self-diagnosis
  (3) Error log display and output
  (4) Setting value output

4.20.4.1 Input Port Check

The display has 4 input ports (input from sensor, data IN1, IN4, and LAN).
The data being received by each port can be displayed.

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 4 # "CHECK".
3. Press ▲ ▼ to select "INPUT DATA" and press ENT .
4. Press 1 MARK "PORT SELECTION".
5. Press ▲ ▼ to select the port you wish to display, and press ENT to confirm the port.
6. Press ENT to display the input data, and CLR to stop the data display.

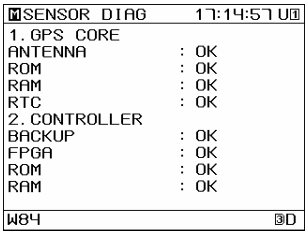
4.20.4.2 Performing Self-diagnosis

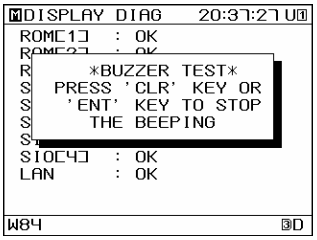
· Self-diagnosis can be performed for the display, sensor, and LCD display.
  The submenus are outlined below.
  (1) DISPLAY: Self-diagnosis is performed for the buzzer after completion of self-diagnosis for ROM, RAM, serial ports, and LAN ports.
  (2) SENSOR: Self-diagnosis is performed for the antenna, ROM, and RAM within the sensor. This function only available on JLR-7800
  (3) LCD: Self-diagnosis is performed for the LCD display.

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 4 # "CHECK".
3. Press ▲ ▼ to select "DIAGNOSIS".
4. Select the diagnosis target with the numeric keypad.
5. Press ▲ ▼ to select "START", and then press ENT .

6. The diagnosis results will be displayed.





After self-diagnosis has been performed for the screen, the entire screen is highlighted repeatedly such as black to white, white to black. Check if some dots are omitted.

If you wish to stop the operation, press CLR .

Attention

If the results were not good, contact JRC or its affiliate.

4.20.4.3 Displaying and Outputting Error Logs

· Up to 100 recent errors can be displayed. They can also be output externally.

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 4 # "CHECK".
3. Press ▲ ▼ to select "ERROR LOG", and then press ENT .

The error log will be displayed.

3. If you want to output the log, press ENT and set output settings.
4. Set the output port and bit rate, and press 0 * "SEND" to output the log in text format.

4.20.4.4 Outputting Settings

· Current setting values can be output. This function is for use by service engineer.

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 4 # "CHECK".
3. Press ▲ ▼ to select "CONFG OUT", and then press ENT .
4. Set the output port and bit rate, and press 0 * "SEND" to output the log in binary format.

4.20.5 Performing a Master Reset (Reset)

- The GPS sensor, display, or both can be reset.
- Resetting will restore all settings to their default values.
- To reset the display, select "ALL" or "EXCEPT FOR LISTS".
  If "EXCEPT FOR LISTS" is selected, everything except the waypoint list, the route list, and the event / mark list will be reset.
  If "ALL" is selected, the display will be reset, and the waypoint list, route list, and event / mark list will be deleted.

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 5 GOTO "RESET".
3. Press ▲ ▼ to select the equipment to reset, and then press ENT .

(1) If "SENSOR" is selected, a master reset of the GPS sensor will be performed.
(2) If "DISPLAY" is selected, the display will be reset. Select "ALL" or "EXCEPT FOR LISTS", and press ENT .
(3) If "ALL" is selected, a master reset of the GPS sensor will be performed, and the display will also be reset.
The display lists will also be reset.

4.20.6 Performing a Demo

- The unit can perform a demo, where it behaves as if it is actually functioning, even without GPS reception.
- The following is an overview of the demo type submenu.
  (1) STATIC: Keeps at set position.
  (2) STRAIGHT: Goes in set straight line at constant speed.
  (3) RIGHT: Turns right at set turn radius.
  (4) LEFT: Turns left at set turn radius.
  (5) ROUTE: Performs selected route. Moves at set speed from set position to route start point.
  (6) AUTO: Moves in set direction a set distance from set position.

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 6 →← , and then 1 MARK to select "DEMO TYPE".
3. Select demo type with ▲ ▼ , and press ENT .
4. Enter the demo type operation base values with the numeric keypad.
5. Press 0 ✱ and the demo will start.

Memo

- To stop the demo, display the demo screen again, and press 0 ✱ "STOP", or turn the power off.
- When the demo is being performed, "S" will blink at the bottom right of the screen.
- When the demo is being performed, "MOB" does not operate.
- After end of demo, the setting performed during in the demo is not available.

4.20.7 Data I/O Settings

- You can confirm settings for connection with external connected equipment.
- Data input and output data consists of serial data, contact data, and LAN data.
- Output sentences, bit rate, and output intervals can be set for each port. However, some combinations of bit rates, intervals, and numbers of sentences cannot be made. In this case, set the sentence to the minimum needed value.
- To connect a Current, Temperature and Depth meter, use a input port in DATA IN/OUT4.

- The following is an overview of the serial data.

NMEA:	NMEA format data output.
IEC:	IEC format data output.
JRC:	JRC format data output. Fixed at 1200 bps.
ROUTE:	Output or input of memory route and waypoint data. Route and waypoint data can be sent to / from externally connected computers and equipment.
SWITCH:	Outputs automatic switch (NCZ-1537A) control data.
PRINTER:	Outputs printer formatted data (Data IN/OUT1 only).
EXT EQUIP:	Input configuration for tidal current meter (Data IN/OUT4 only).

- The following is an overview of contact data.

SYSTEM:	A contact is made when the positioning stopped alarm occurs.
SYS+XTD+ARV:	Generates contact when positioning is not performed, when entering or leaving a route, or when arriving at or departing from a waypoint. The XTD / Boundary and Arrival / Anchor alarms are those set in "4.11 Alarm Settings".
200p/NM:	200 pulse/NM LOG pulse is output.
400p/NM:	400 pulse/NM LOG pulse is output.
ALARM ACK:	Acknowledgment output for externally input alarm.

- The following is an overview of the LAN data.

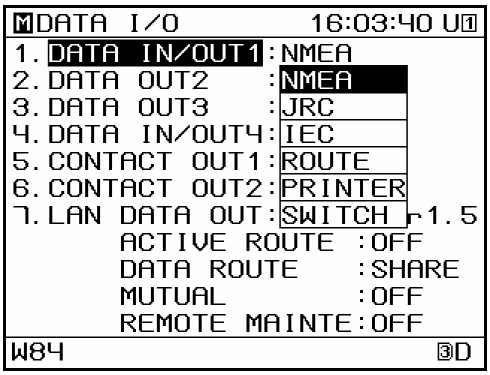
ACTIVE ROUTE:	The current active route is shared with other equipment.
DATA ROUTE:	Route(s) in memory are shared with other equipment.
DATA OUT:	NMEA and/or IEC data output is performed.
MUTUAL:	Mutual monitoring is performed when two of this unit are connected. When GPS positioning is not being performed, the GPS positioning information from other units can be used.
REMOTE MAINTE:	Remote maintenance data output is performed.

4.20.7.1 Configuring Data IN/OUT1

- NMEA, JRC, IEC, route WPT, automatic switch control data, and printer data can be output via data IN/OUT1.
- To connect a DPU-414 printer, use a D-sub9 pin connector.

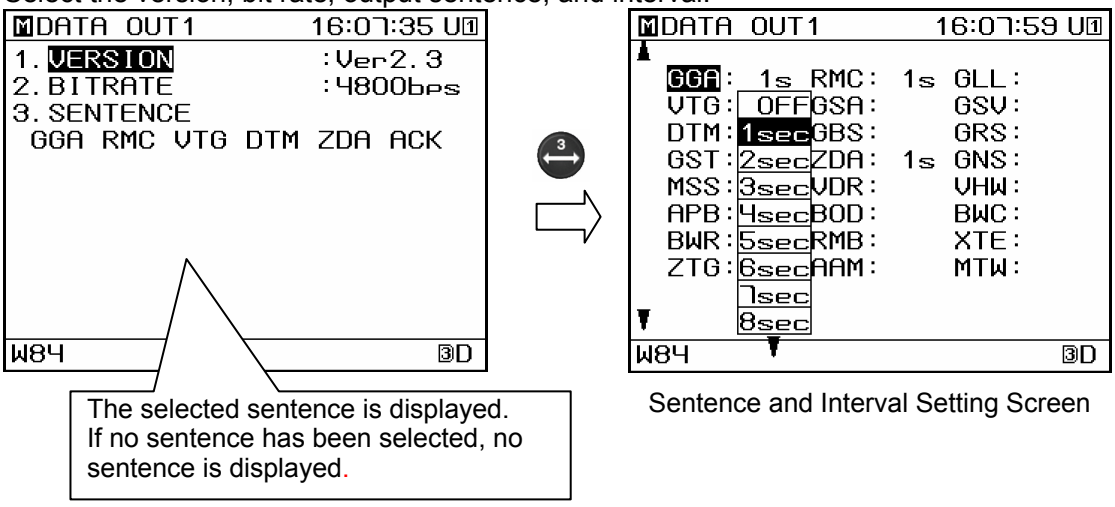
Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 7 CURS, and then 1 MARK, and select "DATA IN/OUT1".
3. Select the data type with ▲ ▼ and press ENT.



(1) When "NMEA" is Selected

Select the version, bit rate, output sentence, and interval.



The selected sentence is displayed.
If no sentence has been selected, no sentence is displayed.

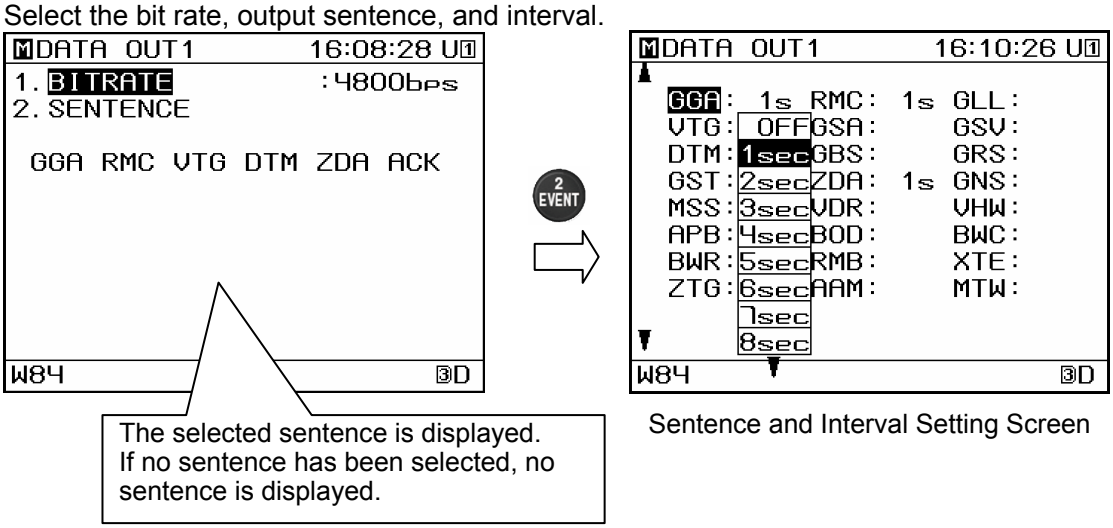
Sentence and Interval Setting Screen

If no sentence is displayed, the output sentence has not been selected.

4. 3 Press "SENTENCE".
5. Move the cursor to the sentence you wish to output, and press ENT.
6. The output interval is displayed. Select the interval and press ENT.

(2) When "IEC" is Selected

Select the bit rate, output sentence, and interval.



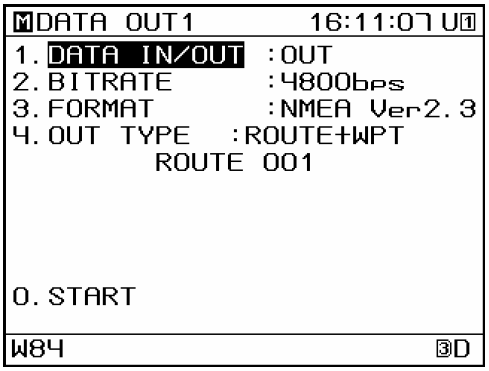
Sentence and Interval Setting Screen

If no sentence is displayed, the output sentence has not been selected.

4. 2 EVENT Press "SENTENCE".
5. Move the cursor to the sentence you wish to output, and press ENT.
6. The output interval is displayed. Select the interval and press ENT.

(3) Selecting "ROUTE" and sending data

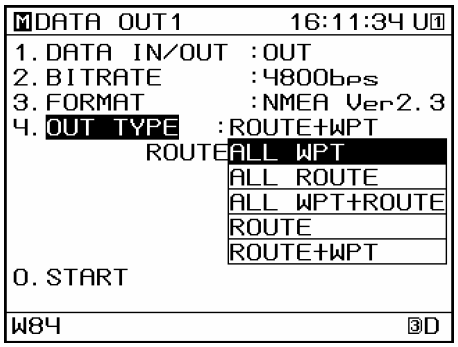
Saved routes and waypoints are output as RTE and WPL sentences.
Select the version, bit rate, and output type.



3. 1 MARK Press "DATA IN/OUT".
4. Press ▲ ▼ to select "OUT", and then press ENT.
5. 2 EVENT Press "BITRATE", and select the bit rate.
6. 3 ⟷ Press "FORMAT", and select the format.

"NMEA Ver1.5", "NMEA Ver2.1", and "NMEA Ver2.3" can be chosen as data formats.

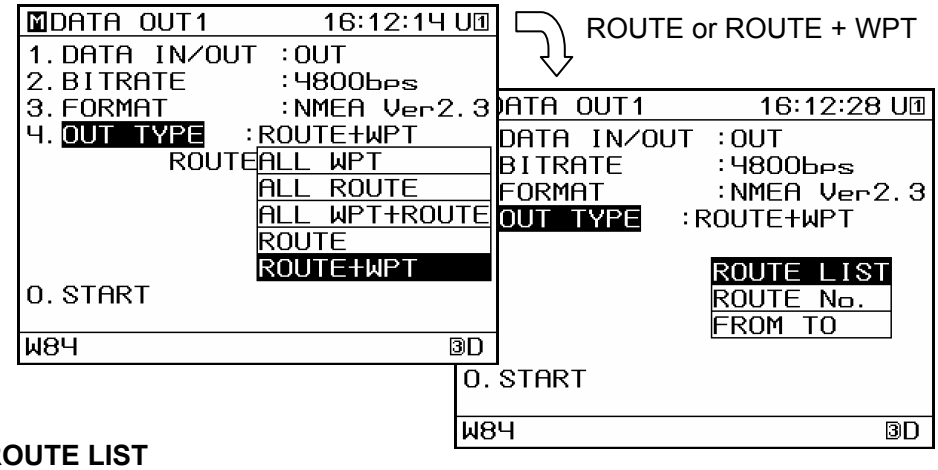
7. Press "OUT TYPE", and select the data you wish to output.



Output data types:

- **ALL WPT**
  All waypoint data in the waypoint list is output as WPL sentences.
- **ALL ROUTE**
  All route data in the route list is output as RTE sentences.
- **ALL WPT + ROUTE**
  All waypoint data in the waypoint list, and all route data in the route list, is output as WPL and RTE sentences.
- **ROUTE**
  The specified route data is output as an RTE sentence.
  Route specification can be performed from the "ROUTE LIST", "ROUTE No.", or "FROM TO".
- **ROUTE + WPT**
  The specified route data and route waypoint data is output as RTE and WPL sentences.
  Route specification can be performed from the "ROUTE LIST", "ROUTE No.", or "FROM TO".

  Select "ROUTE" or "ROUTE + WPT" as the output type, and the route selection method will be displayed. Select one and set the route to be output.



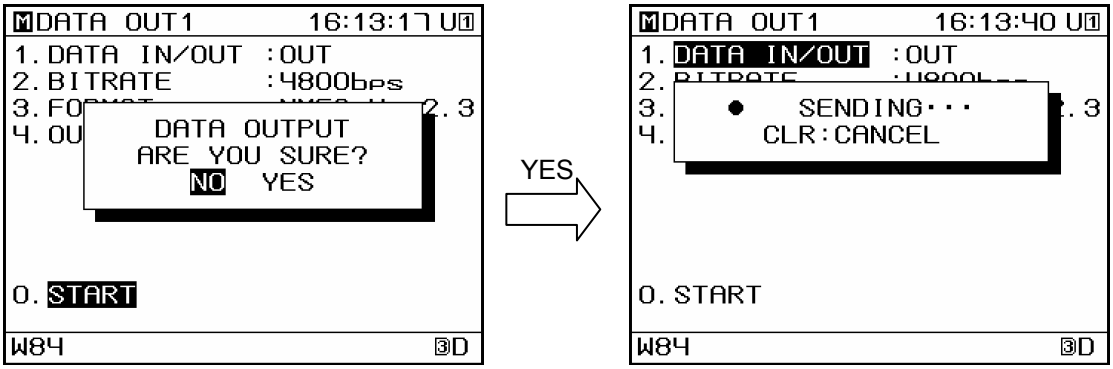
- **ROUTE LIST**

  The route list will be displayed. Select the route you wish to output, and press ENT.

  Multiple contiguous route numbers can be selected.
  Please refer to "4.8.3 Selecting a Range within a List" for details regarding range selection.
- **ROUTE No.**

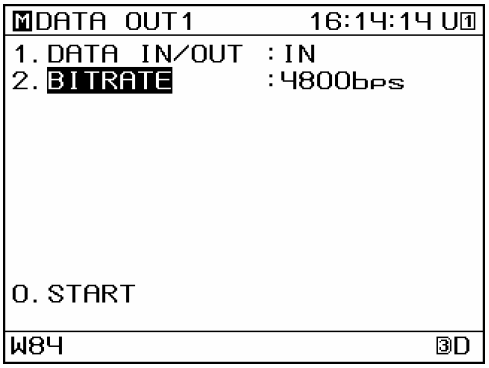
  Enter the route number and press ENT.
- **FROM TO**
  Multiple contiguous route numbers can be selected. Enter the route numbers you want to output from the first route to the last, and press ENT.

8. (0 *) Press "START" to display the following, and press "YES" to start data output.

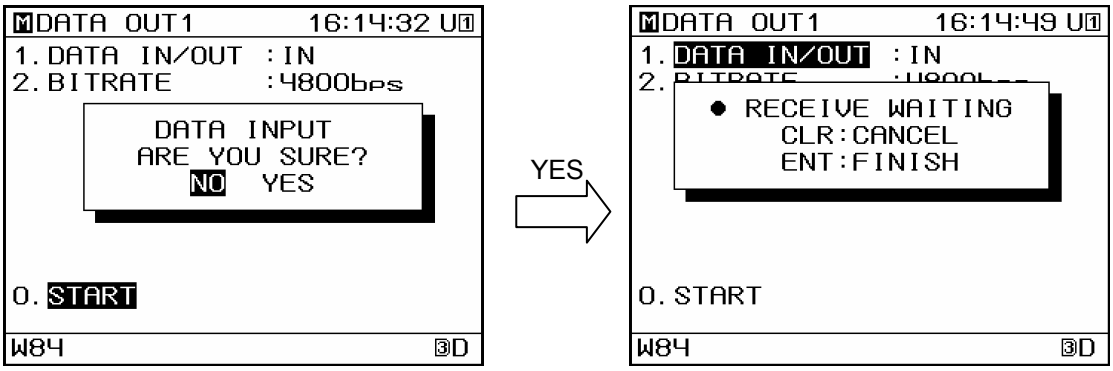


(4) Selecting "ROUTE" and receiving data

Routes and waypoints are received from external sources as RTE and WPL sentences. Select the bit rate.



3. (1 MARK) Press "DATA IN/OUT".
4. (▲ ▼) Press (ENT) to select "IN", and then press (ENT).
5. (2 EVENT) Press "BITRATE", and select the bit rate.
6. (0 *) Press "START" to display the following, and press "YES" to enter data receiving mode.

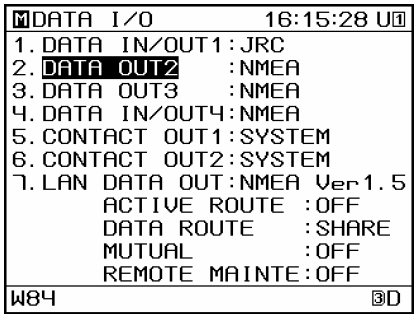


7. Once the unit is awaiting data reception, send RTE or WPL sentences from externally connected equipment.
   Received data is stored in the internal memory.
8. When all data transmission has been completed, press (ENT).

   The unit will continue awaiting data until (ENT) is pressed.

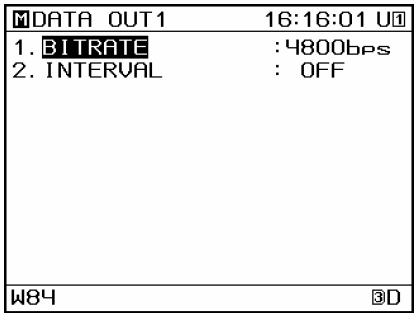
(5) When "JRC" is Selected

The bit rate is fixed at 1200 bps.



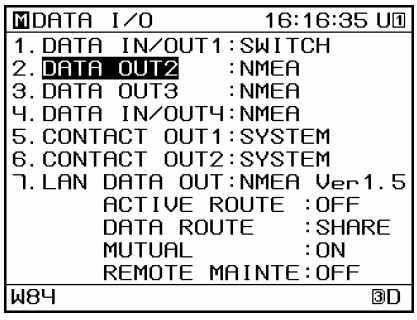
(6) When "PRINTER" is Selected

Data is output in dedicated printer format.
Select the bit rate and output interval.
The bit rate is selected at 4800bps for DPU-414 Printer.
Select the interval. If "OFF" is selected, data is not output. If "ONCE" is selected, data is output one time.

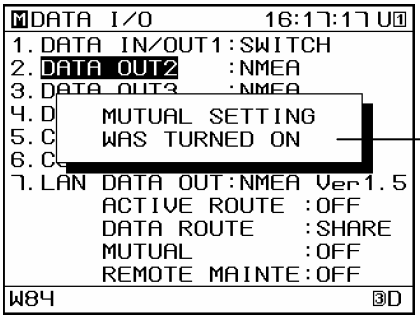


(7) When "SWITCH" is Selected

The bit rate is fixed at 4800 bps, and data is output for automatic switching control (NCZ-1573A).



If "SWITCH" is selected when the LAN mutual monitoring mode is set to "OFF", the screen at right will be displayed and the mutual monitoring mode will be set to "ON".



Mutual monitoring mode is "ON"

If you do not need automatic switching control, do not set this field to "SWITCH".

4.20.7.2 Setting Data OUT2

· NMEA, JRC, IEC, route WPT, and automatic switch control data can be output via data OUT2.

Procedure

1. Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.
2. Press 7 CURS , and then 2 EVENT to select "DATA OUT2".
   From this point on, operation is identical as that described for "DATA IN/OUT1".
   However, routes and waypoints can not be received from external sources as RTE and WPL sentences.

4.20.7.3 Setting Data OUT3

· NMEA, JRC, IEC, route WPT, and automatic switch control data can be output via data OUT3.

Procedure

1. Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.
2. Press 7 CURS , and then 3 to select "DATA OUT3".
   From this point on, operation is identical as that described for "DATA IN/OUT1".
   However, routes and waypoints can not be received from external sources as RTE and WPL sentences.

4.20.7.4 Setting Data IN/OUT4

· NMEA, JRC, IEC, route, and switch data can be output via data IN/OUT4.
· To connect Current, temperature and Depth meter, set to only bit rate and use a Pin No.1,2 in DATA IN/OUT connector.
· The layer and data number for displaying tidal current data can be set by setting externally connected equipment. Please refer to "4.20.7.8 Setting Tidal Current Meter Input" for setting method.

Procedure

1. Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.
2. Press 7 CURS , and then 4 # to select "DATA IN/OUT4".
   From this point on, operation is identical as that described for "DATA IN/OUT1".

4.20.7.5 Setting Contact Output 1

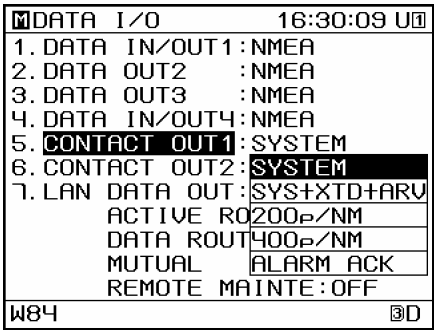
- The following contact outputs can be set for contact output 1: System, System + XTD + ARV, Log Pulse (200 pulse/NM), Log Pulse (400 pulse/NM), and Alarm ACK.
- Please refer to "6.3 Cable Connection" for connection.

The following is an overview of the contact output 1 submenu.

- SYSTEM: A contact is made when the No positioning fixing alarm occurs.
- SYS+XTD+ARV: A contact is made when No positioning fixing, XTD / boundary, or arrival / anchor alarms occur.
- 200p/NM: 200 pulse/NM LOG pulse is output.
- 400p/NM: 400 pulse/NM LOG pulse is output.
- ALARM ACK: Operates as an ACK when an alarm has been generated by externally connected equipment.

Procedure

1. Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.
2. Press 7 CURS , and then 5 GOTO to select "CONTACT OUT1".
3. Select the state for which you want contact operation with ▲ ▼ , and then press ENT .



4.20.7.6 Setting Contact Output 2

- The following contact outputs can be set for contact output 2: System, System + XTD + ARV, Log Pulse (200 pulse/NM), Log Pulse (400 pulse/NM), and Alarm ACK.
- Please refer to "6.3 Cable Connection" for connection.

1. Please refer to "4.20 Equipment Configuration" and switch the unit to equipment configuration mode.
2. Press 7 CURS , and then 6 to select "CONTACT OUT2".

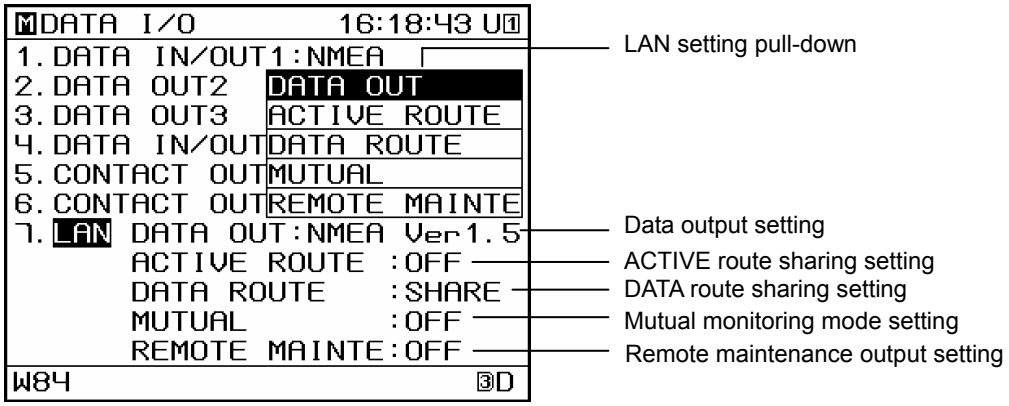
   From this point on, operation is identical as that described for "CONTACT OUT1".

4.20.7.7 Setting LAN Settings

- LAN configuration can be performed for active route sharing, data route sharing, data output, mutual monitoring, and remote maintenance output.
- In data output, the output NMEA sentence can be selected.
- To share active or data routes, sharing route configuration must be performed.
  Set the route sharing setting to "SHARE" for data routes.
  When set to "SHARE", data route reception will occur automatically.
  For active routes, set the route sharing setting to "SHARE 1", "SHARE 2", "SHARE 3", or "SHARE 4".
  (1) SHARE1: If the active route is switched on the unit, the route will automatically be sent out to connected equipment.
  When a shared route is received, the route is automatically switched.
  (2) SHARE2: If the active route is switched on the unit, a request is made to the user of the unit before the route is sent. Transmission of the route to the connected equipment is dependant on the permission of the user.
  If the user has not authorized sending, the active route will only be executed on the local unit.
  When a shared route is received, the route is automatically switched.
  (3) SHARE3: If the active route is switched on the unit, the route will automatically be sent out to connected equipment.
  When a shared route is received, the user is asked whether or not they want to switch routes.
  If the user does not authorize route switching, the route will not be switched.
  (4) SHARE4: If the active route is switched on the unit, a request is made to the user of the unit before the route is sent. Transmission of the route to the connected equipment is dependant on the permission of the user.
  If the user has not authorized sending, the active route will only be executed on the local unit.
  When a shared route is received, the user is asked whether or not they want to switch routes.
  If the user does not authorize route switching, the route will not be switched.
  The following icon is displayed when active routes are shared.

SHARE1 Icon:  SHARE2 Icon:  SHARE3 Icon:  SHARE4 Icon: 

- To perform mutual monitoring, mutual monitoring mode must be configured. With mutual monitoring mode, when GPS positioning is not being performed, the GPS positioning information from other units can be displayed.
- Remote maintenance output configuration can be used to regularly output data for use in remote maintenance.



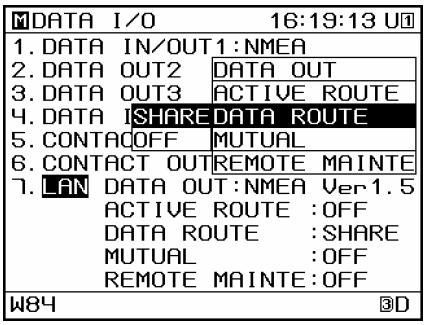
LAN Selection Screen

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 7 CURS, then 7 CURS, and select "LAN".

(1) Data route sharing setting

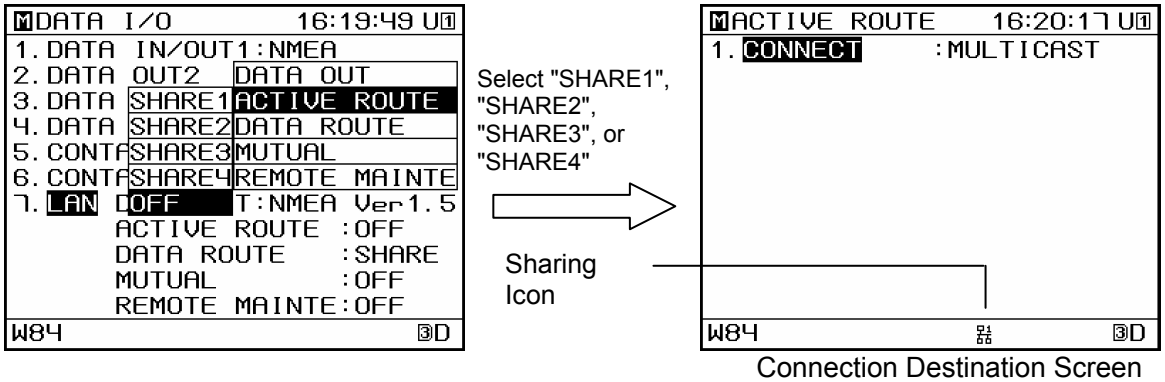
3. Press ▲ ▼ to select "DATA ROUTE", and press ENT.
4. Press ▲ ▼ to select "SHARE", and press ENT.
   Select "OFF" to disable sharing.



Data Route Selection Screen

(2) Active route sharing setting

3. Press ▲ ▼ to select "ACTIVE ROUTE", and press ENT.
4. Press ▲ ▼ to select "SHARE1", "SHARE2", "SHARE3", or "SHARE4", and press ENT to display the connection destination screen.
   Select "OFF" to disable sharing.

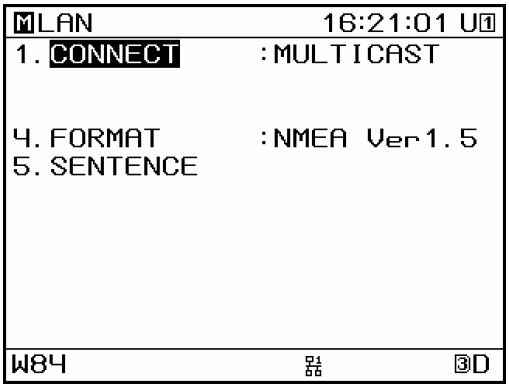


Connection Destination Screen

5. Press 1 MARK "CONNECT", select the destination, and press ENT.
   Normally, "MULTICAST" should be selected for the destination.
   To send to a specific unit, select "UNICAST".
6. When "UNICAST" is selected, press 2 EVENT and 3 ⟷ to select the destination IP "2.TO IP" and "3.PORT No.".

(3) Data output setting

3. Press ▲▼ to select "DATA OUT", and press ENT.

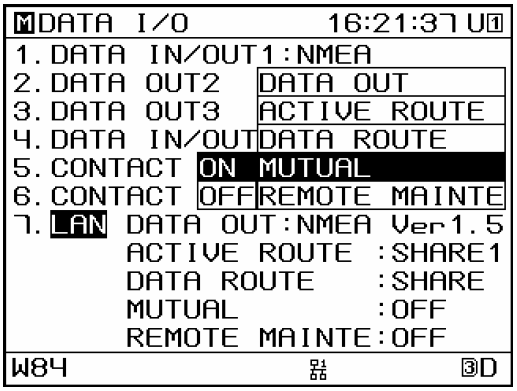


4. Press 1 MARK "CONNECT".
5. Select the connection destination with ▲▼, and press ENT.
   "MULTICAST", "UNICAST", or "BROADCAST" can be set as connection destinations.
   Normally, "MULTICAST" should be selected.
   When "UNICAST" is selected, destination IP "2. To IP" and "3. Port No." can be set.
6. Press 4 # "FORMAT".
7. Press ▲▼, select the data format, and press ENT.
   "IEC", "NMEA Ver1.5", "NMEA Ver2.1", and "NMEA Ver2.3" can be chosen as data formats.
8. Press 5 GOTO "SENTENCE".
9. Press ▲▼ to select the output sentence, and press ENT.
10. Press ▲▼ to select the sentence output interval, and press ENT.
11. After you have selected all sentences you wish to output, press CLR.

(4) Mutual monitoring mode setting

3. Select "MUTUAL" with ▲▼, and press ENT.
4. Press ▲▼ to select "ON", and then press ENT.

To stop mutual monitoring, select "OFF".
When "ON" is selected, and select "CONNECT". Normally, "MULTICAST" should be selected.



(5) Remote maintenance data output setting

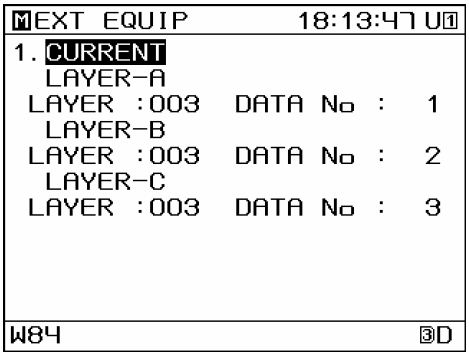
3. Use ▲▼ to select "REMOTE MAINTE", and press ENT.
4. Press ▲▼ to select "ON", and then press ENT.
5. Press 1 MARK "CONNECT".
6. Select the connection destination with ▲▼, and press ENT.
   "MULTICAST", "UNICAST", or "BROADCAST" can be set as connection destinations.
   Normally, "MULTICAST" should be selected.
   When "UNICAST" is selected, destination IP "2. To IP" and "3. Port No." can be set.
7. Press 4 # "INTERVAL".
8. Press ▲▼ to select the output period, and press ENT.

4.20.7.8 Setting Tidal Current Meter Input

· You can perform tidal current meter input settings.
· Data need to be entered starting with DATA IN4.

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 7 CURS , and then 4 # to select "DATA IN/OUT4".
3. Select "EXT EQUIP" with ▲▼ , and press ENT .
4. The tidal current meter input screen will be displayed.
   You can select the layer and data number you wish to display.



4.20.8 Setting the IP Address

· The display's IP address, subnet mask, and default gateway can be set. The MAC address can be displayed.

Procedure

1. Refer to "4.20 Equipment Configuration" and display the equipment configuration menu.
2. Press 9 HOME "IP".

(1) IP ADDRESS Configuration

3. Press 1 MARK "IP ADDR".
4. Press ▲ ▼ to select "INPUT", and press ENT .
5. Enter the IP address with the numeric keypad, and press ENT .

   To return the value to the default value, select "DEFAULT" and press ENT .

(2) SUBNET MASK Configuration

6. Press 2 EVENT "SUBNET MASK".
7. Press ▲ ▼ to select "INPUT", and press ENT .
8. Enter the subnet mask with the numeric keypad, and press ENT .

   To return the value to the default value, select "DEFAULT" and press ENT .

(3) DEFAULT GATEWAY Configuration

9. Press 3 ⟷ "DEFAULT GATEWAY".
10. Press ▲ ▼ to select "INPUT", and press ENT .
11. Enter the default gateway with the numeric keypad, and press ENT .

    To return the value to the default value, select "DEFAULT" and press ENT .

Section 5 Maintenance and Inspection

Proper maintenance may greatly affect the lifespan of the equipment. In order to maintain the equipment in peak state, perform the following regularly.

⚠ WARNING

Do not perform internal inspections or modifications of the equipment. Inspection or modification by unauthorized personnel may result in fire, electric shock, or equipment failure. Please consult with JRC or an affiliate to perform internal inspections or repair.

⚠ CAUTION

Use only the specified fuse.
Failure to do so may result in fire or equipment failure.

Use only the specified batteries.
Failure to do so may result in equipment failure or malfunction.

5.1 General Maintenance and Inspection

・Operate the equipment under standard power voltage levels (DC 10.8 - 31.2 V).

・The following shows general maintenance and inspection methods using standard tools.

No.	Item	Maintenance and Inspection
1	Cleaning	Clean the panel screen, knobs, and switches with a soft cloth. There are no gears in the unit, so oil lubrication is unnecessary.
2	Parts Securing	Check for loose screws, nuts, and connectors, and connect securely any that have loosened.

Perform inspection of the displayed items when the equipment is functioning normally. Compare operating results to the normal operation values in order to detect problems quickly.

5.2 Alarms

Refer to 4.2.7 and check if any alarm is given or not. If it is, check the details referring to the list shown below.

Alarm List

Message Number	Message Contents	Alarm Causes
001	No Fix	No Fix
002	HDOP OVER	HDOP value has been exceeded setting level
003	GPS Antenna Open	GPS Antenna Open(Sensor)
004	GPS Antenna Short	GPS Antenna Short(Sensor)
005	Core ROM Error	Memory Error(GPS core of Sensor)
006	Core RAM Error	Memory Error(GPS core of Sensor)
007	Core RTC Error	RTC(Real Time Clock) Error(GPS core of Sensor)
008	Controller ROM Error	Memory Error(Processing Unit of Sensor)
009	Controller RAM Error	Memory Error(Processing Unit of Sensor)
010	Controller FPGA Error	FPGA Error(Processing Unit of Sensor)
011	Controller Backup Error	Data Buck up Error(Processing Unit of Sensor)
012	Flash ROM Access Error	Flash ROM Deletion, Write Error(ROM[1])
013	Flash ROM2 Access Error	Flash ROM Deletion, Write Error(ROM[2])
014	RAM Access Error	RAM Read, Write Error
015	SIO(0) Error	Serial Port Error(GPS/DGPS)
016	SIO(1) Error	Serial Port Error(DATA OUT1)
017	SIO(2) Error	Serial Port Error(DATA OUT2)
018	SIO(3) Error	Serial Port Error(DATA OUT3)
019	SIO(4) Error	Serial Port Error(DATA OUT4)
020	LAN Error	LAN Port Error
021	No Sensor Data	Sensor periodic input not possible（Position measurement data unobtainable）
030	Temperature Alarm	Temperature alarm is occurred
031	Depth Alarm	Depth alarm is occurred
032	Dist Alarm	Trip alarm is occurred
033	Speed Alarm	Speed alarm is occurred
040	Sensor Data Invalid	Sensor data is invalid(Position, Time, etc,)
041	Sensor IF error	Sensor unconfigurable (Configuration not possible)
042	No Mutual Data	Unable to obtain mutual data
043	CCRP Discrepancy	CCRP disagreement with other equipment
050	Arrival Wpt	Arrival at final waypoint
051	Anchor Out	Anchor alarm is occurred
052	Boundary	Boundary alarm is occurred
053	Xtd	XTD alarm is occurred
060	Inner Error	Display inside Error

5.3 Troubleshooting

5.3.1 Troubleshooting

⚠ WARNING

Do not perform internal inspections or modifications of the equipment. Inspection or modification by unauthorized personnel may result in fire, electric shock, or equipment failure. Please consult with JRC or an affiliate to perform internal inspections or repair.

The following is reference information concerning identification of problems.

Problem Behavior	Possible Causes	Troubleshooting Measures
The power does not turn on when the power switch is pressed.	Power is not being supplied by the ship junction box.	Check the cabling from the junction box.
	Power is not being supplied by the power supply equipment (option).	Check the power supply unit cabling.
	The fuse connected to the power cable has blown.	If there are no problems in the cabling, replace the fuse.
	The power supply equipment (option) fuse has blown.	If there are no problems in the cabling, replace the fuse.
	The display unit switch is broken.	Consult with JRC or an affiliate.
The LCD display does not display anything.	The LCD display is broken.	Consult with JRC or an affiliate.
The display does not light up.		
The alarm sound. Is not generated	The buzzer is broken.	Consult with JRC or an affiliate.
	The alarm sound is turned off.	Refer to 4.11.2 for setting the alarm sound.
The click does not sound.	The key press sound is turned off.	Refer to 4.14.3 for setting the Click sound.
There is no reception. (from sensor)	The sensor connection cable is cut.	Check the connection cable.
	The sensor is broken.	Consult with JRC or an affiliate.
There is no reception. (from external devices)	The polarity of the serial cable is incorrect.	Check the polarity of the cable.
	The interface does not match.	Check the interface.
	An unsupported sentence has been entered.	Check the entered commands and version.
There is no transmission. (to external devices)	Output settings have not been configured.	Refer to 4.20.
	The configured channel is incorrect.	Refer to 4.20.
	The DISP-DPU or connector board is broken.	Consult with JRC or an affiliate.

5.3.2 Repair Unit

Repair units and their models are shown below.

No	Name	Model	Notes
1	DISP-DPU	CMJ-551	NWZ-4740 Display Unit
2	LCD Unit	CCN-392A	NWZ-4740 Display Unit
3	Keyboard Unit	CMD-953T	NWZ-4740 Display Unit
4	Connector Board	CMH-2292	NWZ-4740 Display Unit
5	Beacon Antenna	CAW-1	For JLR-4341 Sensor
6	Beacon Controller	CMA-920	For JLR-4341 Sensor

Fuse

No	Name	Model	Notes
1	2A Fuse	MF60NR 250V 2	NWZ-4740 Display Unit

If Beacon Controller or Sensor is replaced, then a Sensor shall be reset.

5.3.3 Regular Replacement Parts

Parts which should be regularly replaced are shown below.
Contact JRC or an affiliate to order.
Replace the radome and packing when replacing the lithium batteries.
Please refer to "4.3 Entering Serial No./Barcode No." in Service Manual and enter the Serial No. or Barcode No. , when replacing the lithium batteries.

No	Name	Model	Life	Notes
1	LCD Unit (Inside display unit)	CCN-392A	40000 hours	Approximately 5 years of continuous use
2	Lithium Battery (Inside Sensor)	CR2354-1VC	Approximately 5 years	Reception is possible even without battery power. (It will takes 30 to 60 seconds longer to fix the position)
3	Radome Kit (JLR-4341 Sensor Radome and Packing)	MPAE30534	Battery replacement	Opening the radome decreases waterproofing effectiveness, so replace the radome and packing as well when performing battery replacement.

Section 6 Installation

⚠ Caution

Please consult with JRC or an affiliate to perform installation.
Installation by unauthorized personnel may result in malfunction.

6.1 GPS Sensor Installation

6.1.1 Selecting the Position for Installation

⚠ Caution

When connecting the cable attached to the equipment, do not bend it acutely, twist it, or impart excessive force. Doing so sometimes causes cracks or damage to the coating, resulting in fire or electrocution.

Do not install the sensor where there is excessive vibration.
Vibration may cause sensor failure.

Do not paint the sensor.
Doing so may result in reception problems.

The junction box rubber gaskets fit ϕ 10 - 20 cables.

Install the sensor where there are no obstacles, in order to ensure that GPS signals can be directly received from satellites without interference or reflection of signals from surrounding objects.
Whenever possible, select a place with the following characteristics.

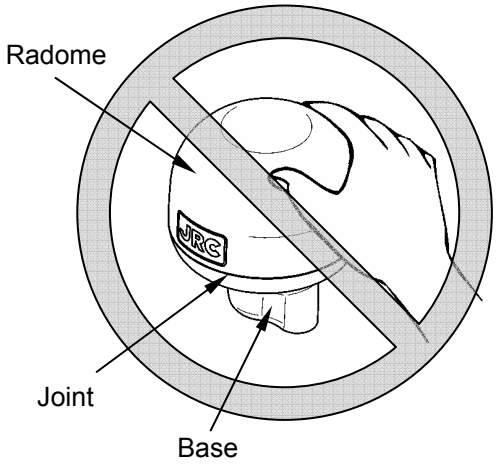
1. **An open space, which allows uniform reception of satellite signals.**
2. **Far away from any high power transmission antennas.**
3. **Outside radar beams.**
4. **Away from the INMARSAT antenna by at least 5 meters and outside the INMARSAT beam.**
5. **Away from the antenna of a VHF transmitter and a direction finder by at least 3 meters.**
6. **Away from a Magnetic Compass by at least 1 meters.**
7. **3 meter or more away from amateur radio antennas.**

If it is difficult to find an ideal site, select a place temporarily and install the equipment. Conduct a test to make sure that the proper performance can be obtained and then fix the equipment in position. If it is installed at an improper place, reception accuracy may be impaired.

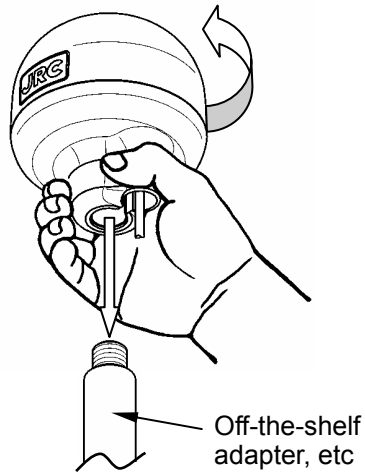
6.1.2 Sensor Installation Procedure

The sensor base contains 1 inch-14UNS-2B screw holes. It can be attached to poles with cut male screws, or off-the-shelf adapters.

(1) When performing attachment, always hold and turn the sensor base. Holding and turning the radome may result in a large amount of force applied at the junction of the base and the radome, resulting in damage to the sensor. The diagram shows the JLR-4341, but these instructions apply equally to the JLR-4340 as well.

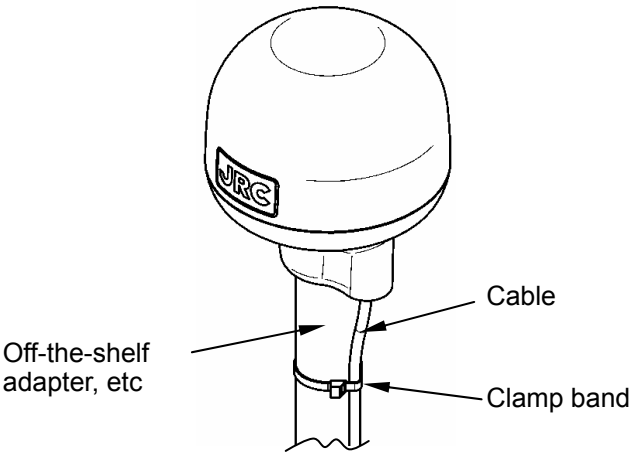


Do not apply force to the joint.



Hold and turn the base.

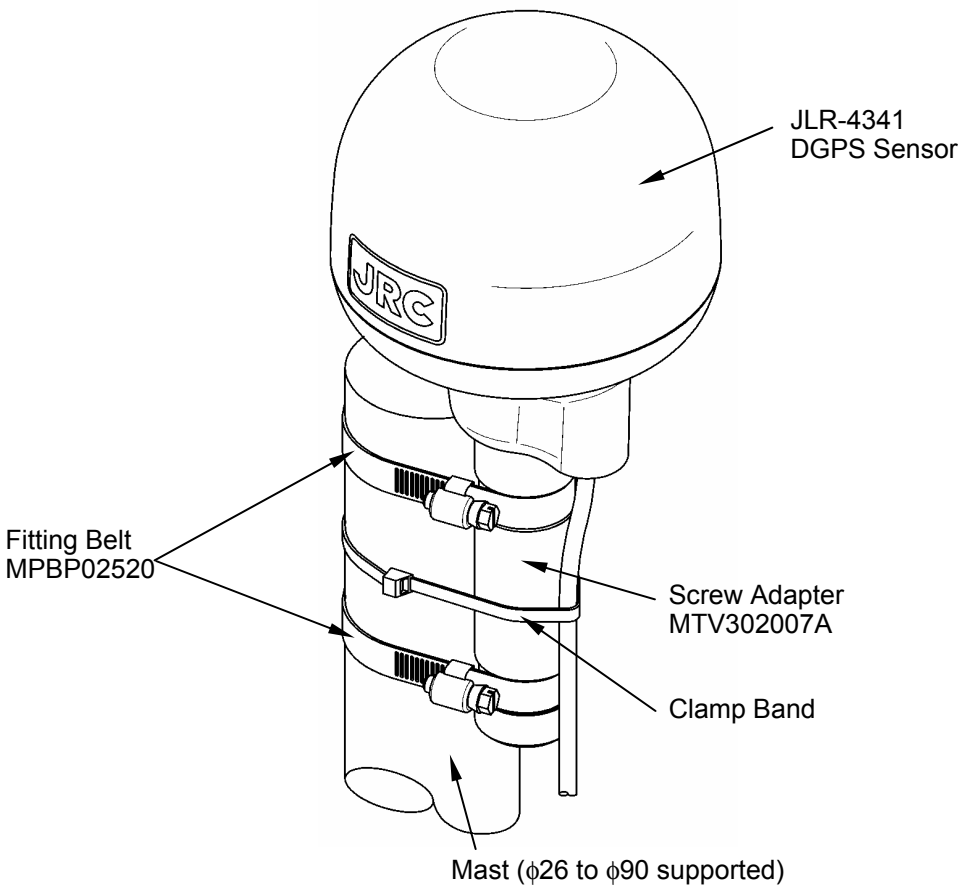
(2) Secure the sensor cable in position with a clamp band as shown below to protect it against damage due to vibration.



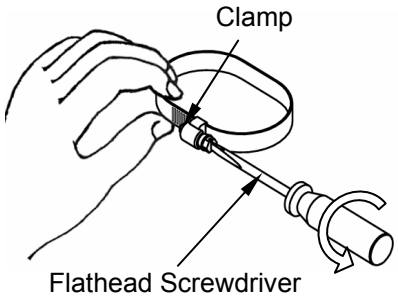
(3) When connecting an extension cable to the DGPS sensor, always seal with self-bonding tape in order to waterproof the connector, and wrap this section with vinyl tape to protect it.

6.1.3 Installation of the Sensor on the Mast

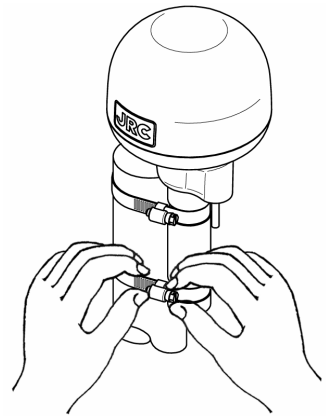
Use a screw adapter (optional component or equivalent) to connect the sensor to the mast.
The diagram shows the JLR-4341, but these instructions apply equally to the JLR-4340 as well.



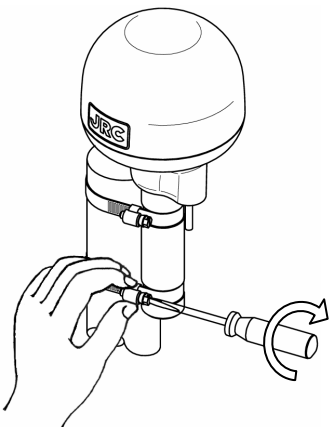
1. Loosen the fitting belt screw with a screwdriver to remove the clamp.



2. Coil the fitting belt around the mast as shown below.



3. Tighten the clamp screw with the screwdriver.

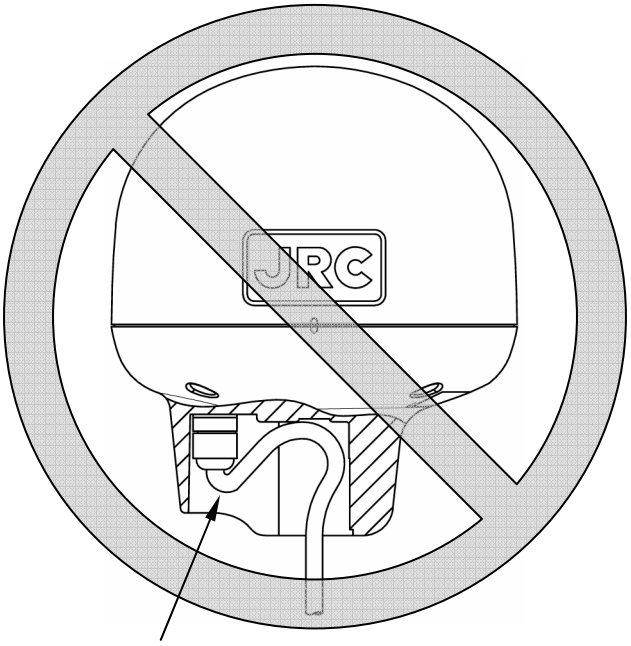


How to Install the Sensor on the Mast

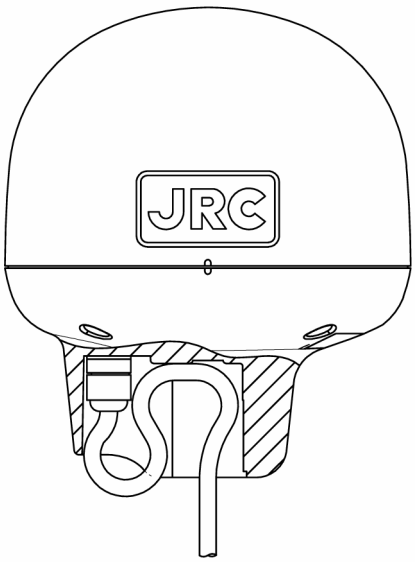
6.1.4 Installation of the Sensor to pass a cable through a pole

It is possible to pass a cable through a pole, when DGPS sensor attached to poles with cut male screws. (1inch-14 UNS-2A). In this case, Cable guard rubber (attached article) used.

(1) The cable is installed as following figure.
Do not bend the cable acutely. Doing so may result in damage to the cable.

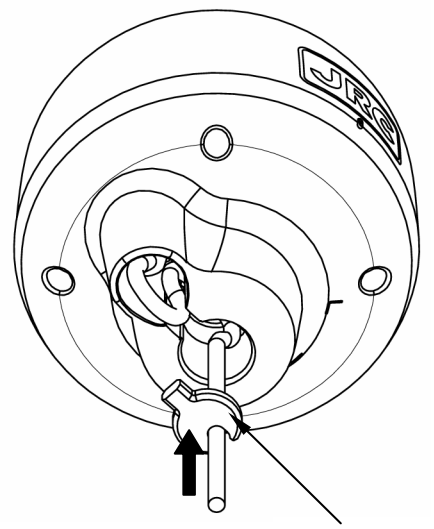


Do not bend it acutely

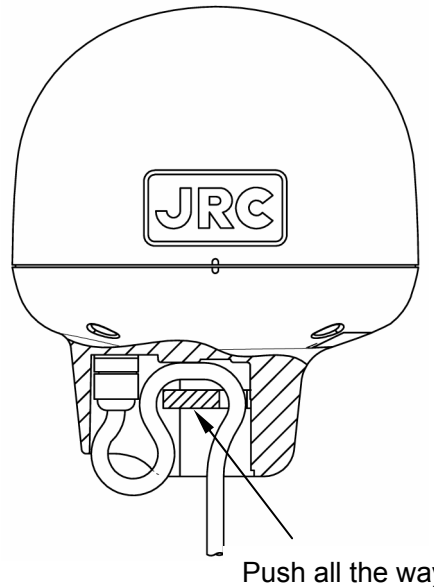


Cable installation figure

(2) Cable guard rubber is set in DGPS sensor.

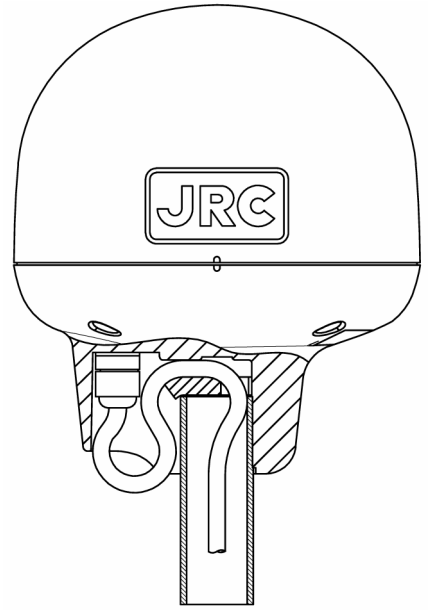


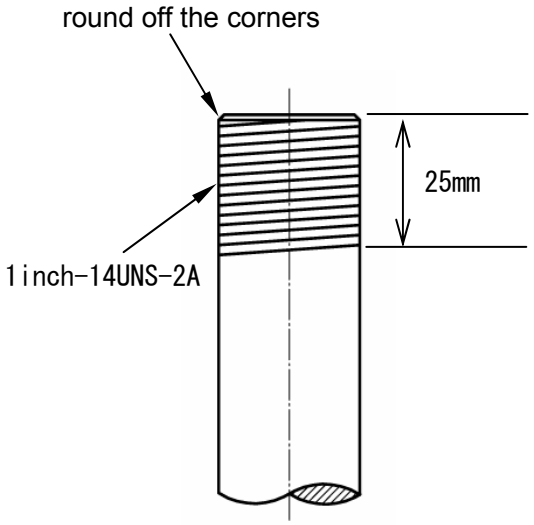
Cable guard rubber
(attached article)



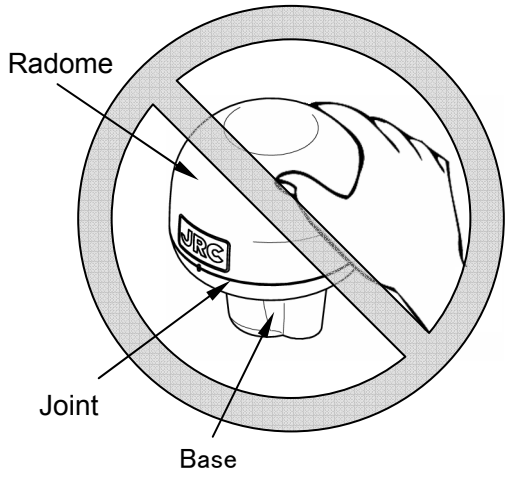
Push all the way in

(3) When DGPS sensor attached to poles with cut male screws, round off the corners.

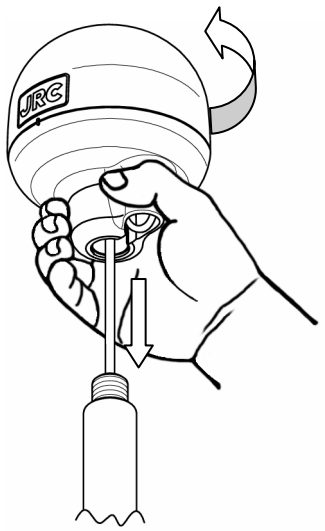




(4)When performing attachment, always hold and turn the sensor base. Holding and turning the radome may result in a large amount of force applied at the junction of the base and the radome, resulting in damage to the sensor.



Do not apply force to the joint.



Hold and turn the base.

6.2 Display Unit Installation

6.2.1 Selecting the Position for Installation

⚠ Warning

Install this unit at least 1 m away from any magnetic compasses.
Installation near a magnetic compass may result in interference with the magnetic compass, and may result in an accident.

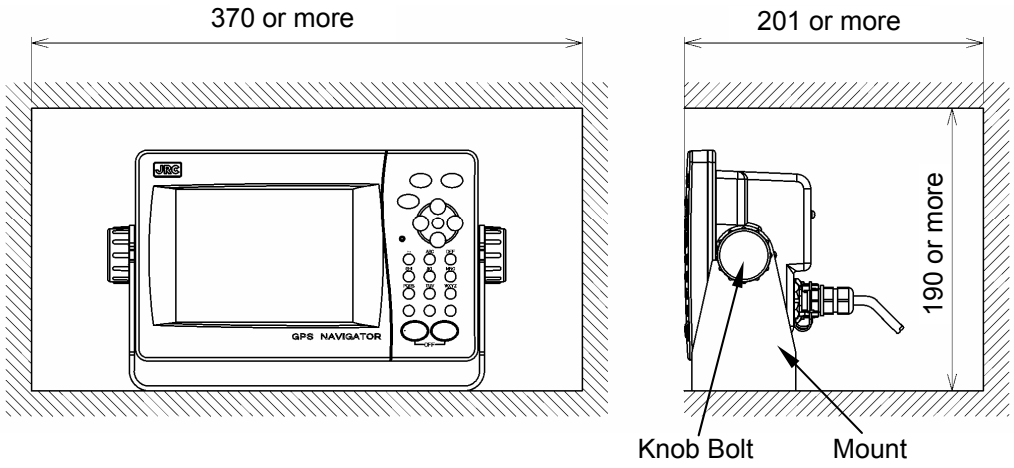
⚠ Caution

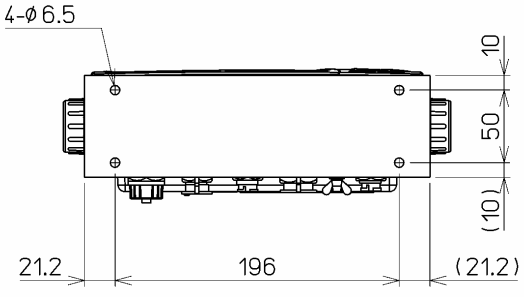
Use the indicated screws when installing the display unit to a stable wooden surface. Failure to do so may result in the display unit falling over, causing injury or property damage.

The installation stand (trestle) allows this display to be set up on table-tops, walls, ceilings, etc. Select an installation location that meets the following conditions.

6.2.2 Display Installation Procedure

Mount the unit as described below.
(1) Loosen the unit knob, and disconnect the mount from the unit.
(2) Use the included screws to secure the mount where desired.
(3) Return the unit to the mount, and tighten it with the knob.



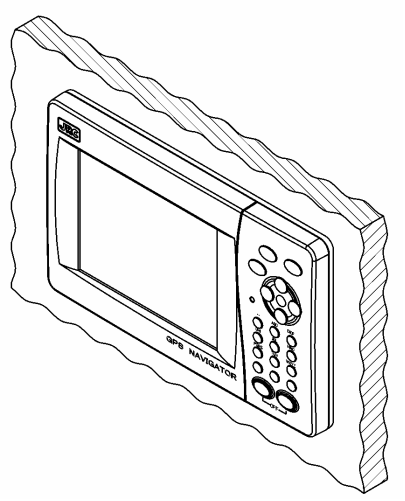


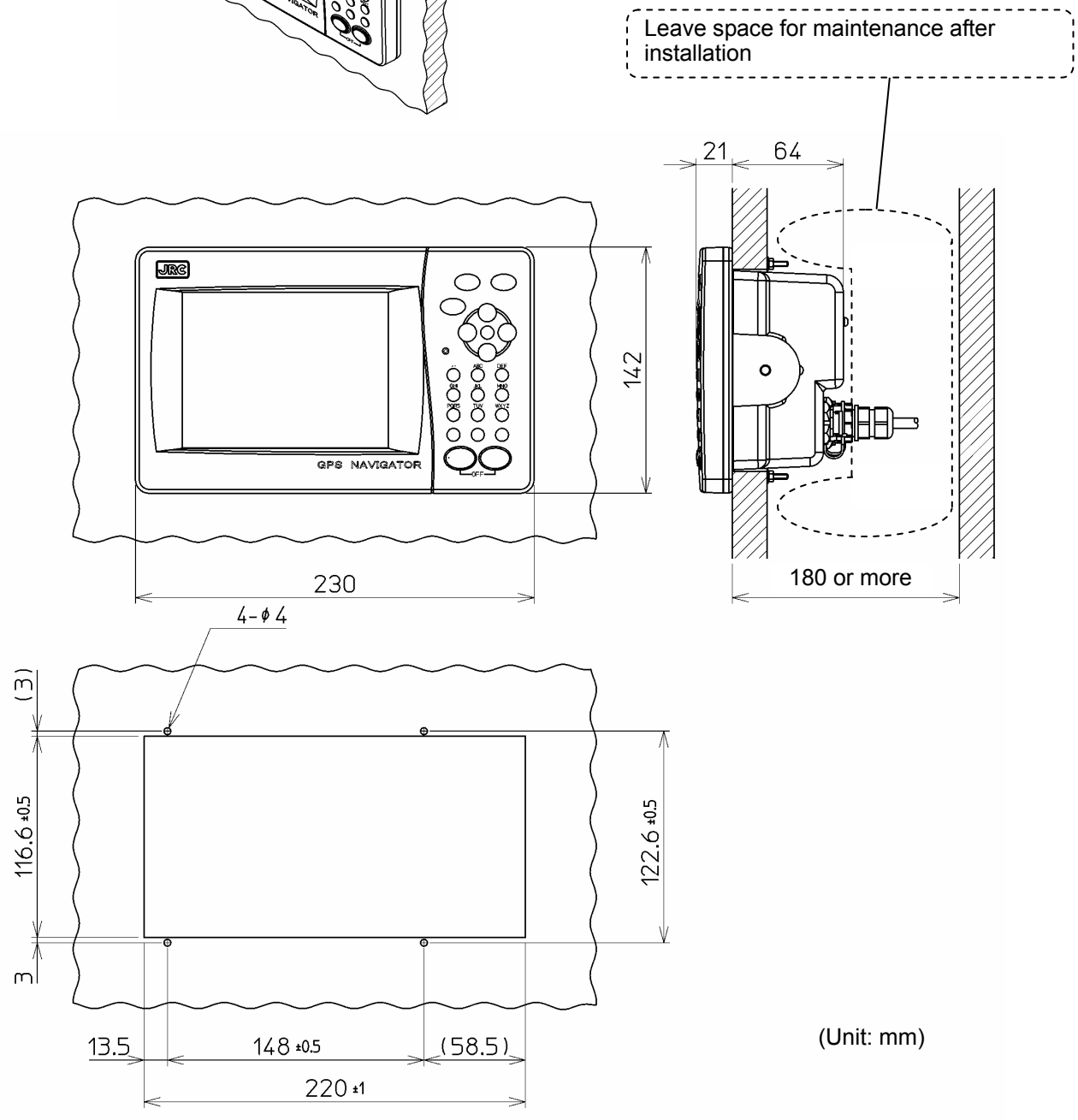
(Unit: mm)

Mount (Bottom)

6.2.3 How to Flush Mount the Display

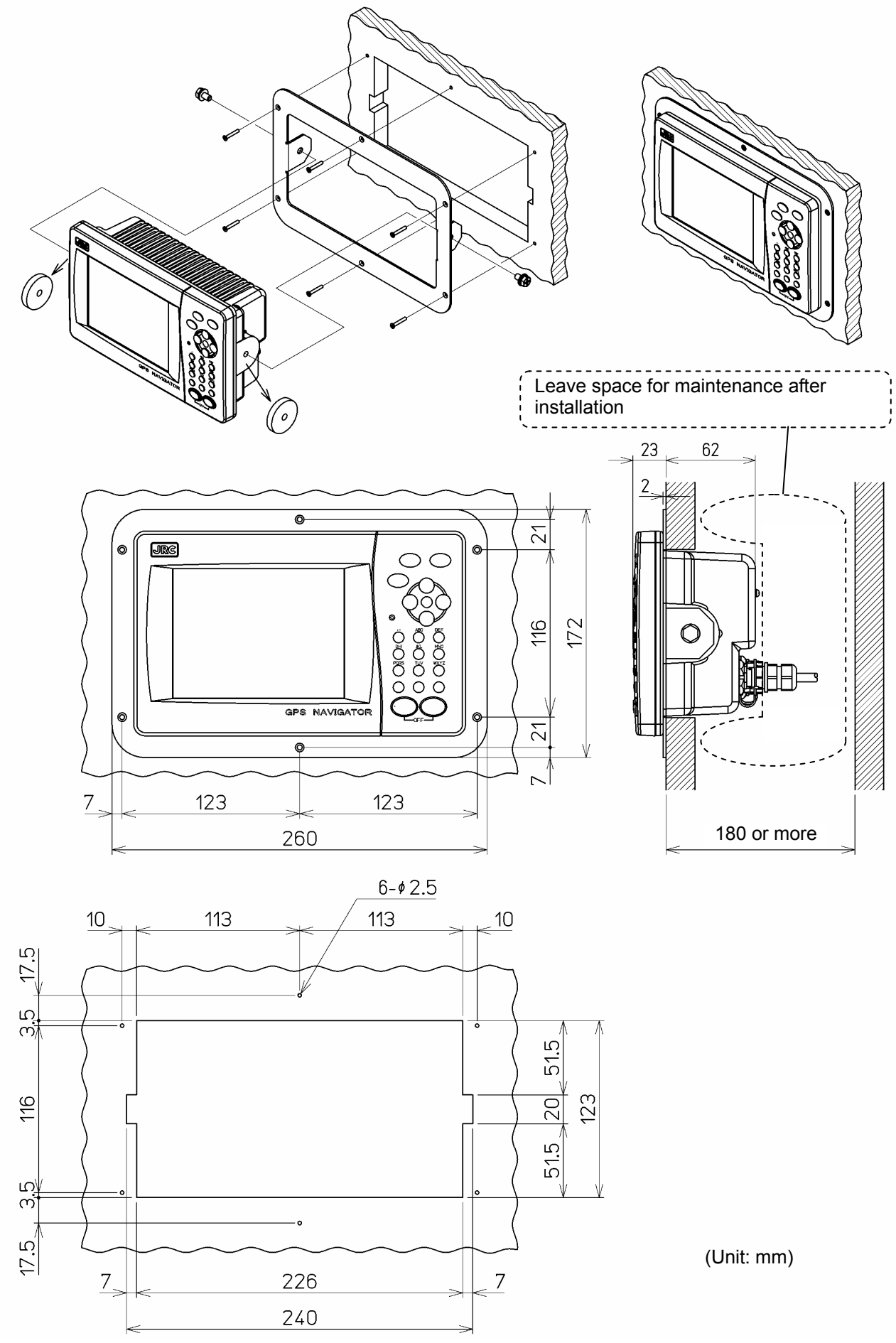
- **Flush Mount** (Connection with standard included components)
  Refer to the flush mount overview diagram to perform flush mount installation.
  Refer to the diagrams shown below for mount hole and installation space details.





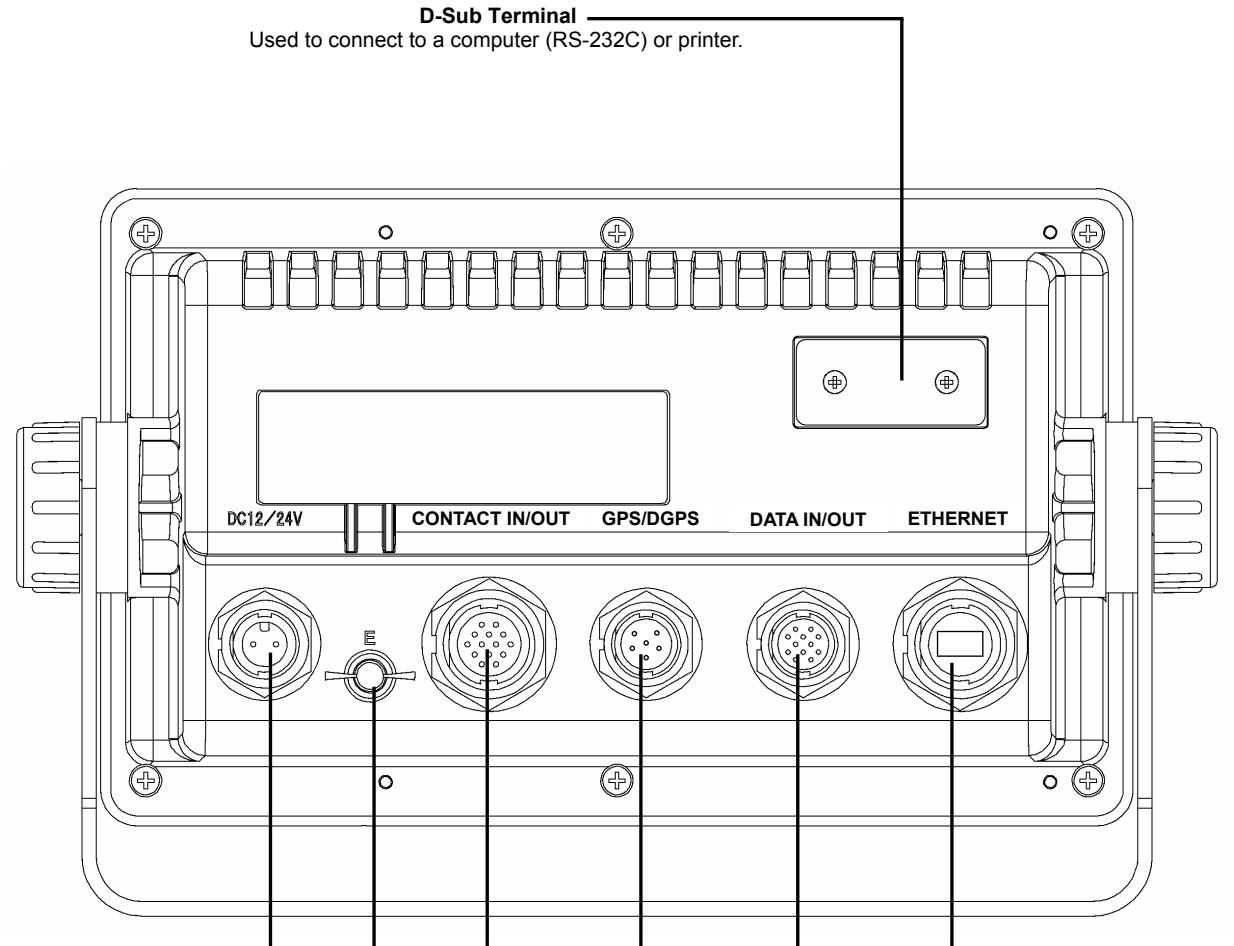
(Unit: mm)

- **Flush Mount** (Connection with optional component)



6.3 Cable Connection

- **Unit (Rear Connectors)**



D-Sub Terminal
Used to connect to a computer (RS-232C) or printer.

External Equipment Connection Terminal (Ethernet)
Used for ECDIS connection, etc.

External Equipment Connection Terminal (Serial Transmission)
Used for radar equipment connection, etc.

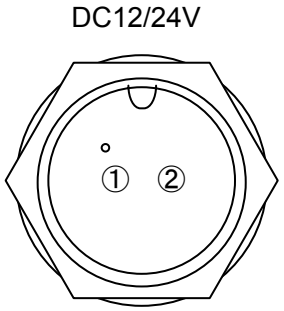
Receiver Connection Terminal
GPS/DGPS receiver connection.

External Equipment Connection Terminal (Contact Signal)
Used for connection to external buzzers and optional peripherals.

Chassis Earth Terminal
Used for connection to ship earth as needed.

Power Input Terminal
Used for power input to unit.
Always use the included power cable.

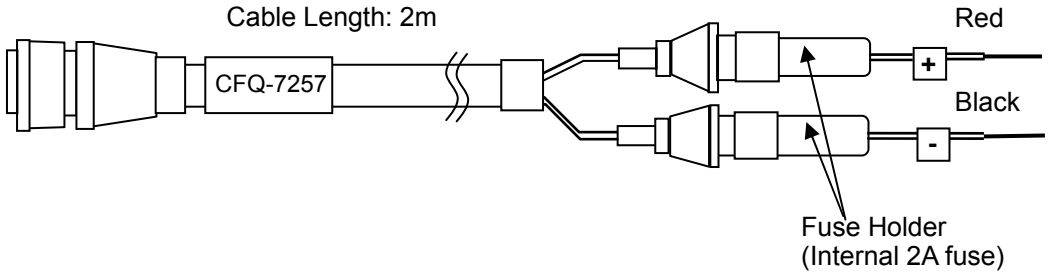
[Power Supply Connector]



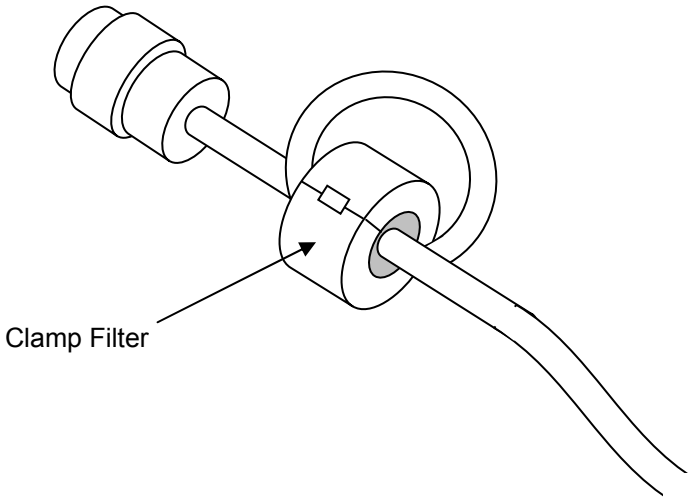
Power Cable: CFQ-7257 (Included)

Terminal Number (CFQ-7252)	Name		Explanation
1 (Black)	DC12/24V	DCIN -	Connect the included power cable.
2 (Red)		DCIN +	The voltage shall be 10.8 - 31.2 V DC.

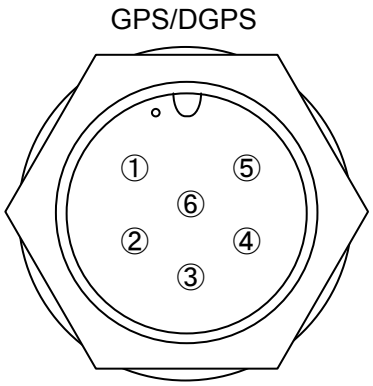
Connection Cable Appearance



- **Noise Filtering**
  Make a loop with the cable and clamp it with the included Clamp Filter as shown below.



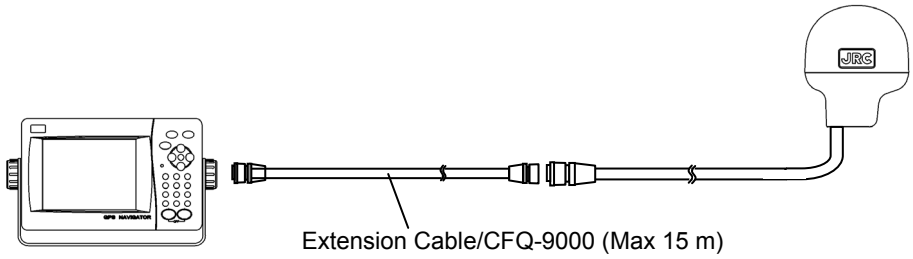
[GPS/DGPS Connector]



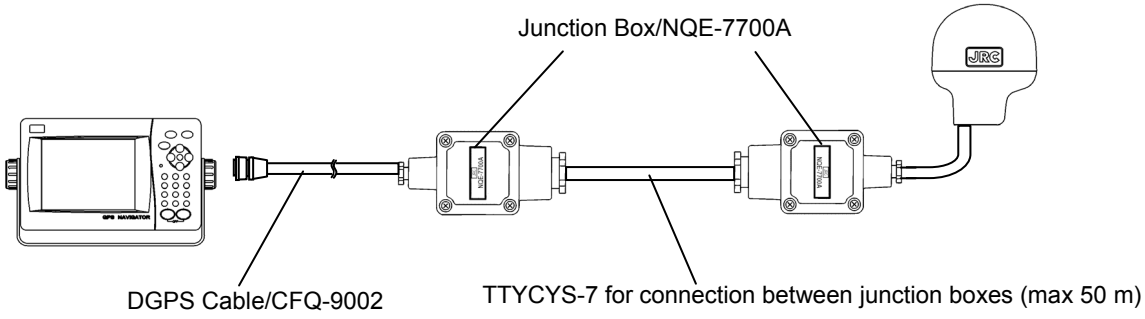
Terminal Number (CFQ-9000/ CFQ-9002)	Name		Explanation
1 (Red)	GPS/DGPS Power	13V	Power to the sensor is supplied by the display unit.
2 (Black)		GND	
3 (White)	RXD0	B	Receives data from the sensor.
4 (Green)		A	
5 (Yellow)	TXD0	A	Sends configuration data to the sensor.
6 (Brown)	Unused		

- **Cable Extension**

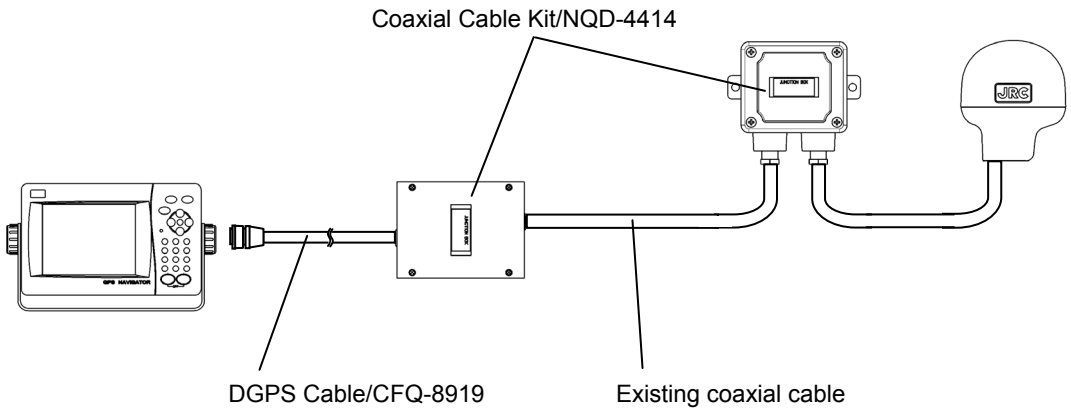
(1) For cable lengths of less than 15 m
Use the extension cable (CFQ-9000).



(2) For cable lengths of more than 15 m
Use the junction box (NQE-7700A).

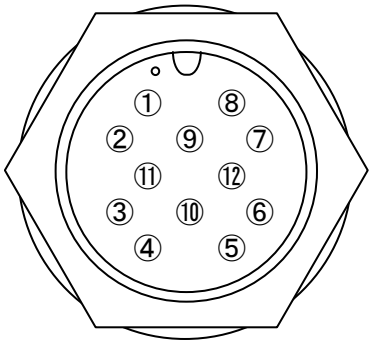


- **Coaxial Cable Kit Connection**
  When using a pre-existing coaxial cable, such as when switching from a JLR-6800, use a coaxial cable kit (NQD-4414).



[Data IN/OUT Connector]

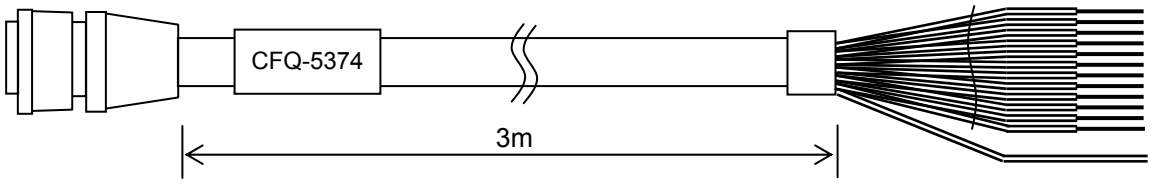
DATA IN/OUT

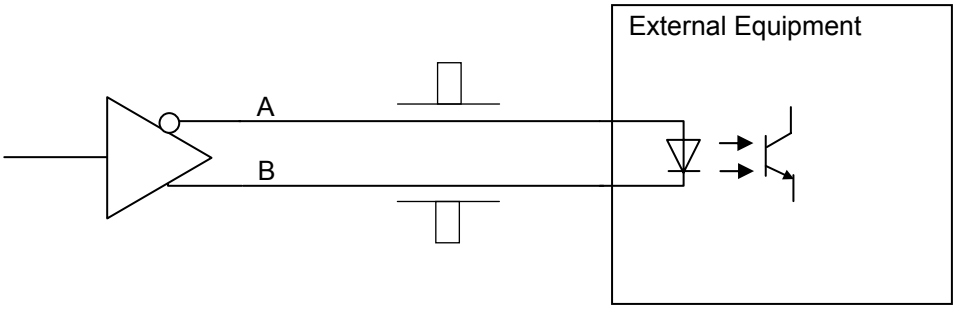


Data Cable: CFQ-5374 (Option)

Terminal Number (CFQ-5374)	Name		Explanation
1 (Brown)	RXD4	A	Receives tide, water temperature, and water depth data, as well as alarm ACK. (Data IN4) (Refer to "5.19.7.8 Setting Tidal Current Meter Input" for details regarding tidal current display configuration)
2 (Red)		B	
3 (Orange)	TXD1	A	Performs output in accordance with "Data IN/OUT1" configured specifications. (Refer to "5.19.7.1 Configuring Data IN/OUT1" for details)
4 (Yellow)		B	
5 (Green)	TXD3	A	Performs output in accordance with "Data OUT3" configured specifications. (Refer to "5.19.7.3 Setting Data OUT3" for details)
6 (Blue)		B	
7 (Purple)	TXD2	A	Performs output in accordance with "Data OUT2" configured specifications. (Refer to "5.19.7.2 Setting Data OUT2" for details)
8 (Grey)		B	
9 (White)	TXD4	A	Performs output in accordance with "Data OUT4" configured specifications. (Refer to "5.19.7.4 Setting Data IN/OUT4" for details)
10 (Black)		B	
11 (Pink)		GND ISO	GND connection for serial transmission cable.
12 (Light Blue)		GND	Chassis earth

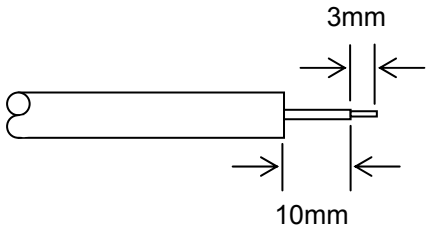
Connection Cable Appearance



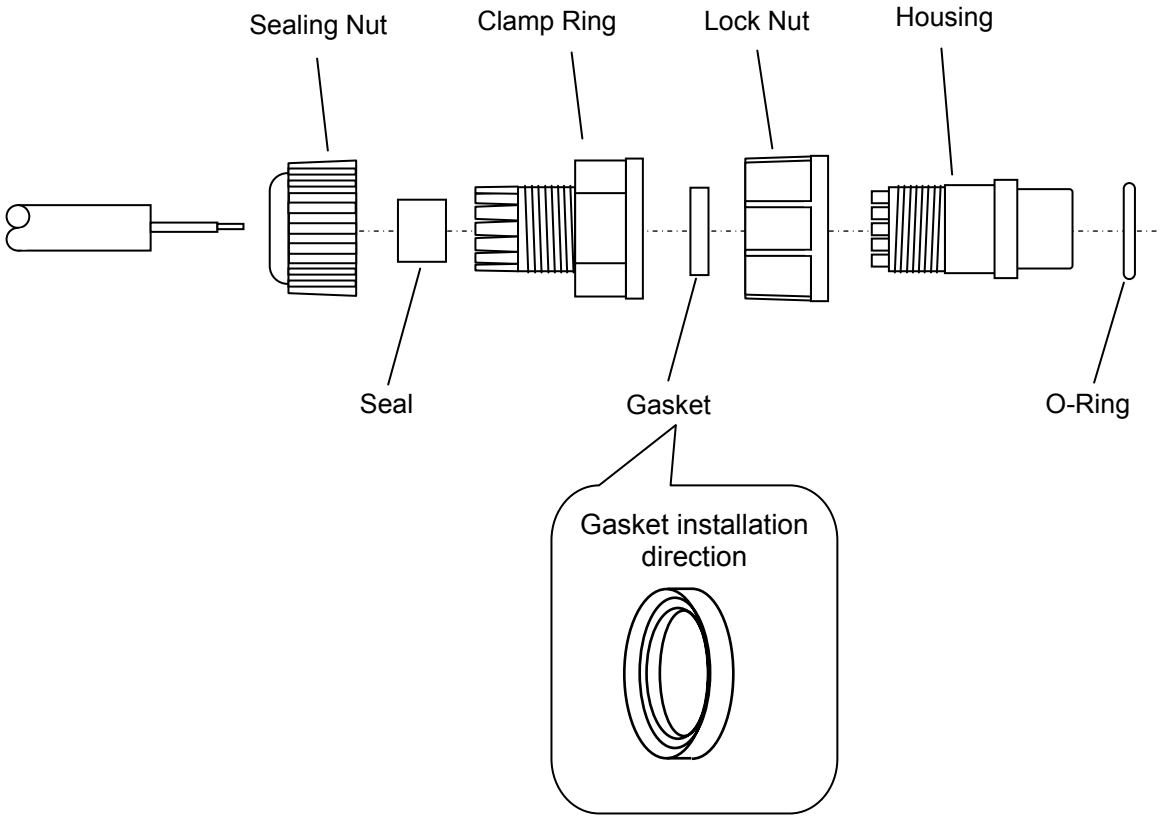


- **Connector Assembly**

(1) Prepare the cable to the following dimensions.



(2) Assemble the included components in the following order.



Clamp Ring tightening torque: 1.2 - 1.5 kgf-cm
Sealing Nut tightening torque: 1.3 - 1.8 kgf-cm

[Contact Signal IN/OUT Connector]

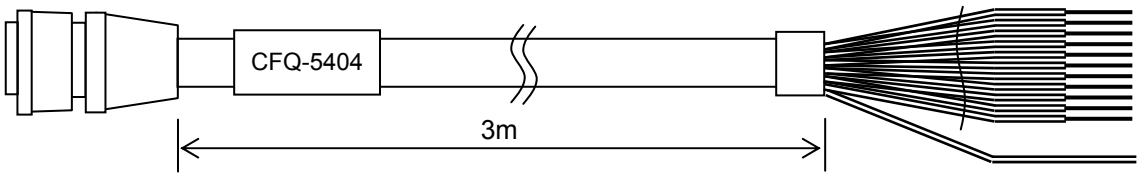
CONTACT IN/OUT

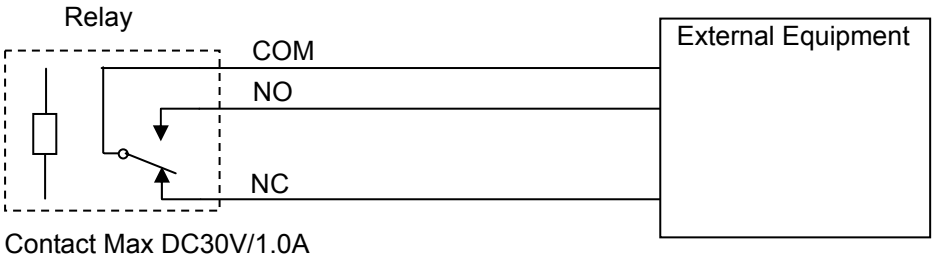
Data Cable: CFQ-5404 (Option)

Terminal Number (CFQ-5404)	Name		Explanation
1	Unused		
2			
3			
4	Unused		
5			
6			
7 (Purple)	Contact Output 1	COM	Outputs contact signal. (Refer to "5.19.7.5 Setting Contact Output 1" for configuration details)
8 (Grey)		NC	
9 (White)		NO	
10 (Black)	Contact Output 2	COM	Outputs contact signal. (Refer to "5.19.7.6 Setting Contact Output 2" for configuration details)
11 (Pink)		NC	
12 (Light Blue)		NO	
13 (Light Green)	Contact Input	ACKIN+	Inputs contact signal. (Performed by shorting both terminals)
14 (Light Brown)		ACKIN-	

NO: Normally Open NC: Normally Closed

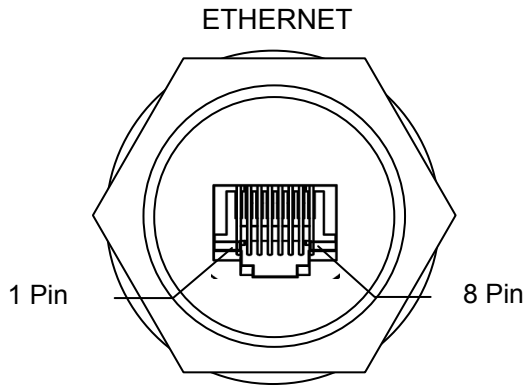
Connection Cable Appearance





Contact Max DC30V/1.0A

[Ethernet Connector]

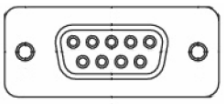


Cable: CFQ-5473 A(Option)
CFQ-5474 A(Option)

Terminal Number (CFQ-5473)	Name		Explanation
1 (Orange/White)	TX	+	Outputs data. (Refer to "5.19.7.7 Setting LAN Settings" for configuration details)
2 (Orange)		-	
3 (Green/White)	RX	+	Inputs data. (Refer to "5.19.7.7 Setting LAN Settings" for configuration details)
4 (Blue)			
5 (Blue/White)			
6 (Green)	RX	-	Inputs data. (Refer to "5.19.7.7 Setting LAN Settings" for configuration details)
7 (Brown/White)			
8 (Brown)			

[RS232C Connector]

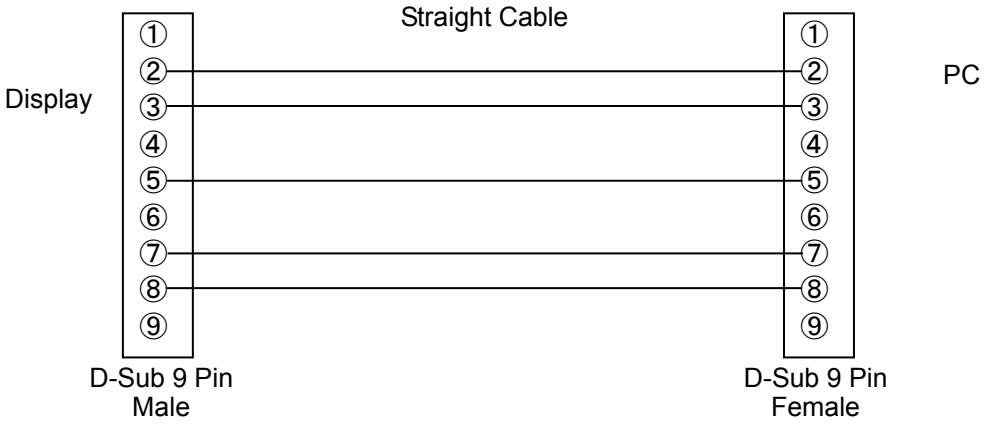
This port is a dedicated port for updates and printer connection.
Remove the two screws from the rear, remove the cover, and connect the cable.
Perform printer configuration via Data IN/OUT1.
Use a straight cable for updating, and a cross cable when connecting a printer.



Female (S-type)

Terminal Number	Name	Explanation
1	Unused	
2	TXD	Transmitted data
3	RXD	Received data
4	Unused	
5	GND ISO	Signal ground
6	Unused	
7	CTS	Transmission possible
8	RTS	Transmission request
9	Unused	

RS232C Cable for updating



* An all-pin cable can also be used.

6.4 Optional Peripheral Connection

6.4.1 Sub Display Connection

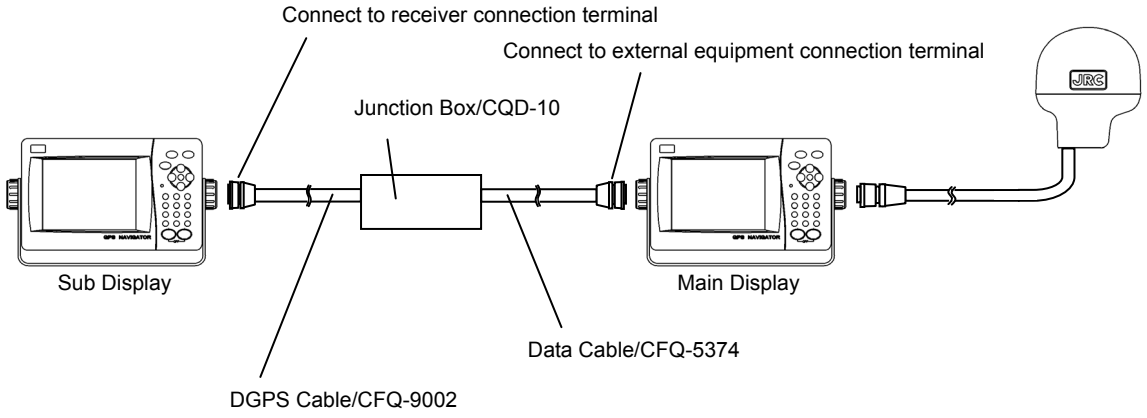
Connect the sub display sensor connection terminal to the main display external equipment connection terminal (serial).
Use a junction box (CQD-10).

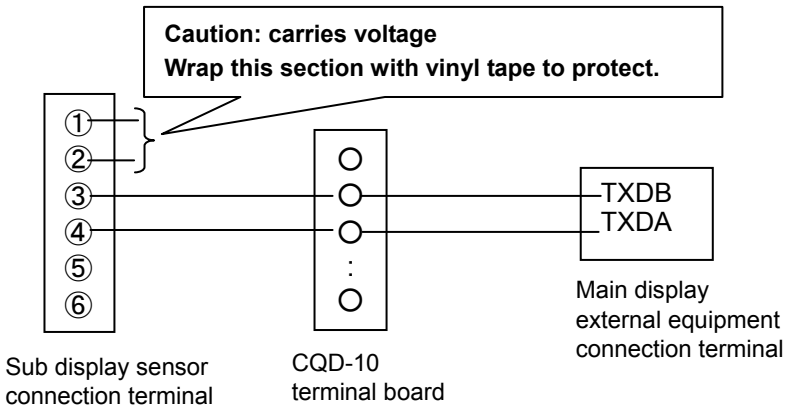
Any main display external equipment connection terminal can be used. The following specifications apply to the terminal.

Data format: IEC
Bit rate: 4800 bps
Sentence Sub Display: "On"

To display satellite information on the sub display, change the bit rate to "9600 bps", and add "GSV" and "CD, GP, 3" to the sentence setting.

Set the display type to "Sub" to use the unit as a sub-display.





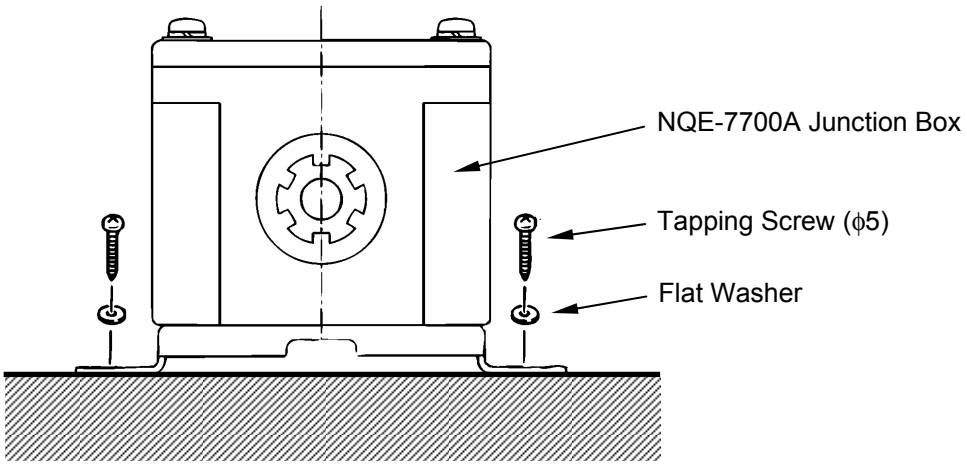
6.4.2 Junction Box Connection

⚠ Caution

The junction box rubber gaskets (ϕ25 Gland side) fit ϕ 10 - 20 cables.

- **How to Mount the Junction Box on a Flat Surface**

  Securely mount the junction box on a given flat surface using self-tapping screws and flat washers as shown below.

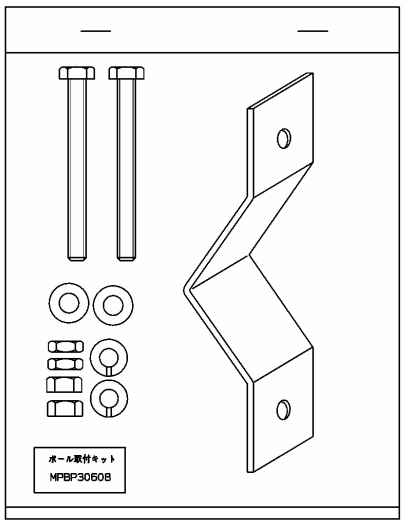


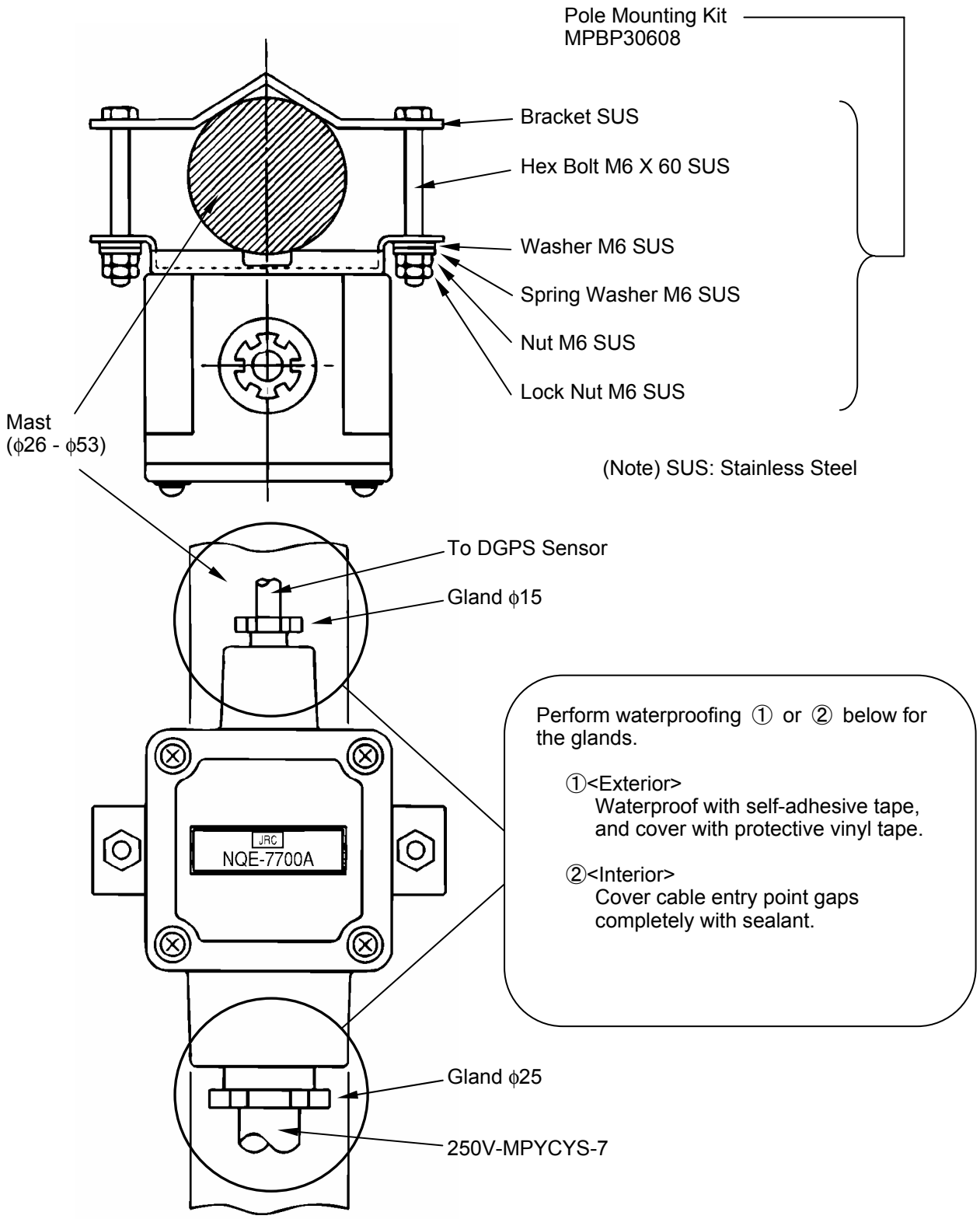
Memo

The self tapping screws and flat washers in the figure above are not included with this equipment.

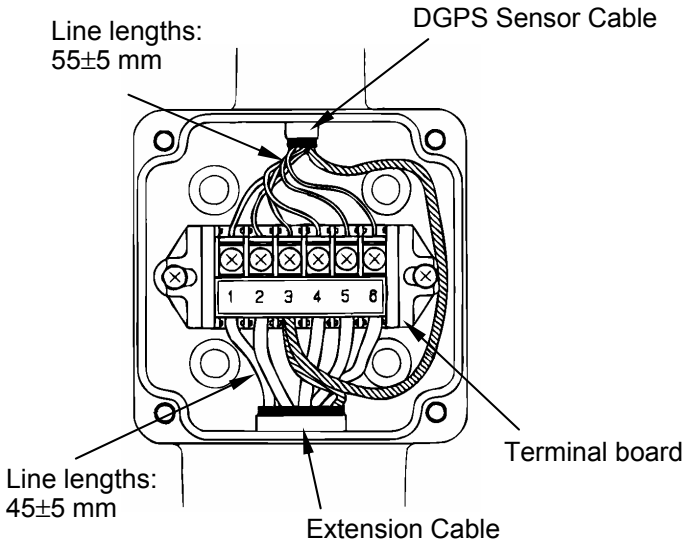
- **How to Mount the Junction Box on the Mast**

  Securely mount the junction box on the mast using the pole mounting kit (option: MPBP30608).




Pole Mounting Kit
MPBP30608
Bracket SUS
Hex Bolt M6 X 60 SUS
Washer M6 SUS
Spring Washer M6 SUS
Nut M6 SUS
Lock Nut M6 SUS
Mast
(ϕ26 - ϕ53)
(Note) SUS: Stainless Steel
To DGPS Sensor
Gland ϕ15
JRC
NQE-7700A
Perform waterproofing ① or ② below for the glands.
①<Exterior>
Waterproof with self-adhesive tape, and cover with protective vinyl tape.
②<Interior>
Cover cable entry point gaps completely with sealant.
Gland ϕ25
250V-MPYCYS-7

- **Internal Connection**
  Connect the respective cables (cable from the DGPS sensor and extension cable) to the terminals provided in the junction box as shown in the following figure.

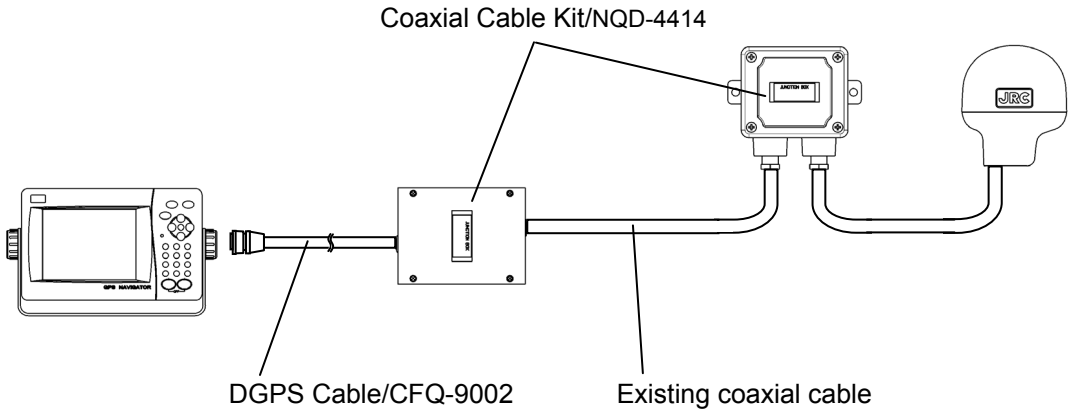


DGPS Sensor Cable	Junction Box Terminal
Red	1
Black	2
White	3
Green	4
Yellow	5
Brown	6
Shield Line	3

JLR-4340 GPS Sensor Cable	Junction Box Terminal
Red	1
Black	2
White	3
Green	4
Yellow	5
Brown	6
Blue	3
Shield Line	3
Orange(not use)	

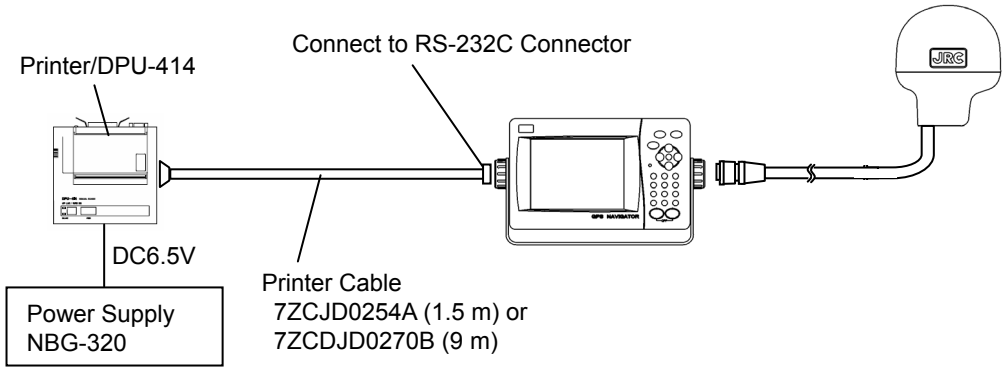
6.4.3 Coaxial Cable Kit Connection

Please refer to the instructions included in the coaxial cable kit for details regarding coaxial cable kit connection.



6.4.4 Printer Connection

The RS-232C connector can be connected to the printer (DPU-414).
The RS-232C connector can be configured via Data IN/OUT1.Set the Data IN/OUT1 data format to "Printer". The printer format data is output from RS-232C connector and also DATA IN/OUT connector No.3,4-pin. Another equipment cannot be connected this pin.



Please refer to "DPU-414 Operation Manual" and set the DIP switches on DPU-414.

DIP SW1

Switch No.	Function	Settings	
			ON/OFF
1	Input Method	Serial	OFF
2	Printing speed	High	ON
3	Auto loading	ON	ON
4	CR Function	Carriage return	OFF
5	DIP SW setting Command	Enable	ON
6	Print density	100%	OFF
7			ON
8			ON

DIP SW2

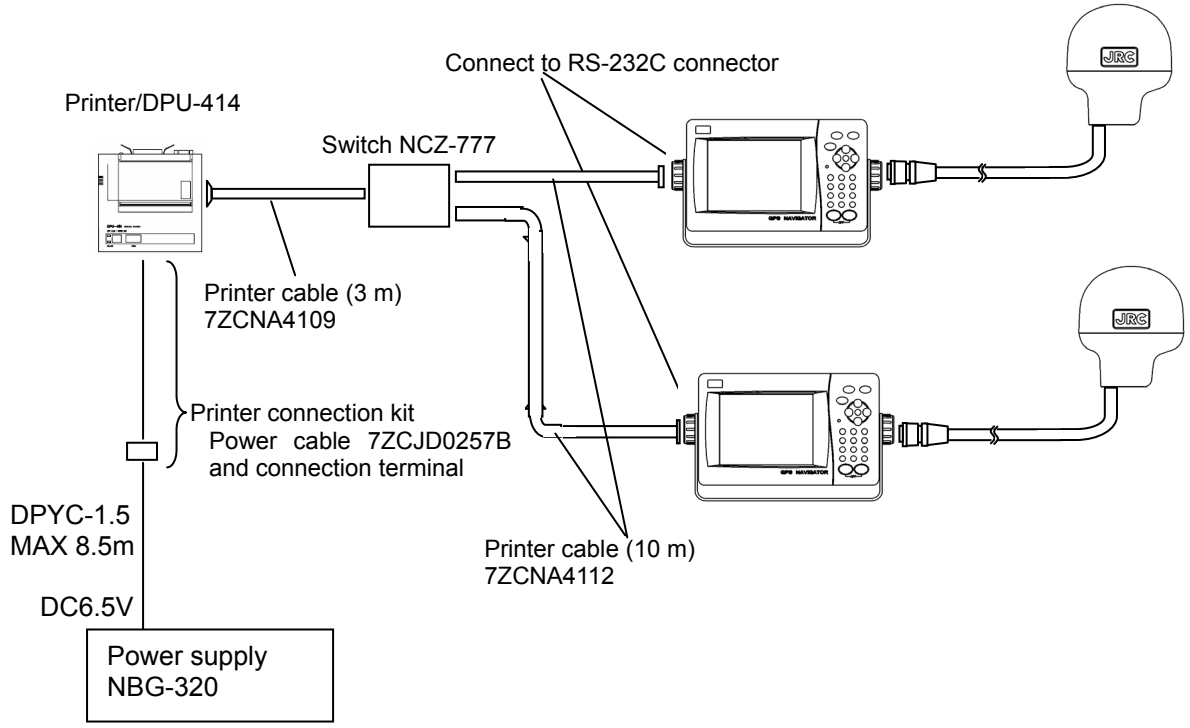
Switch No.	Function	Settings	
			ON/OFF
1	Print mode	Normal printing(40 columns)	ON
2	User-defined characters buck-up	ON	ON
3	Character type	Ordinary characters	ON
4	Zero font	0	ON
5	International character set	Japanese	ON
6			ON
7			ON
8			ON

DIP SW3

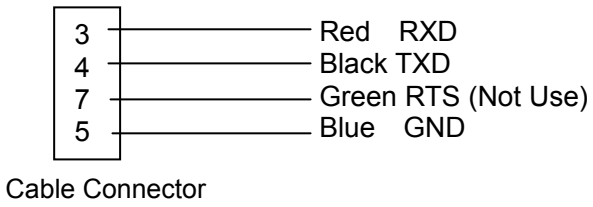
Switch No.	Function	Setting	
			ON/OFF
1	Data bit length	8 bits	ON
2	Parity permission	Without	ON
3	Parity condition	Odd	ON
4	Flow control	H/W BUSY	ON
5	Baud rate	4800bps	ON
6			OFF
7			OFF
8			OFF

6.4.5 Connecting Two Navigation Devices to a Printer

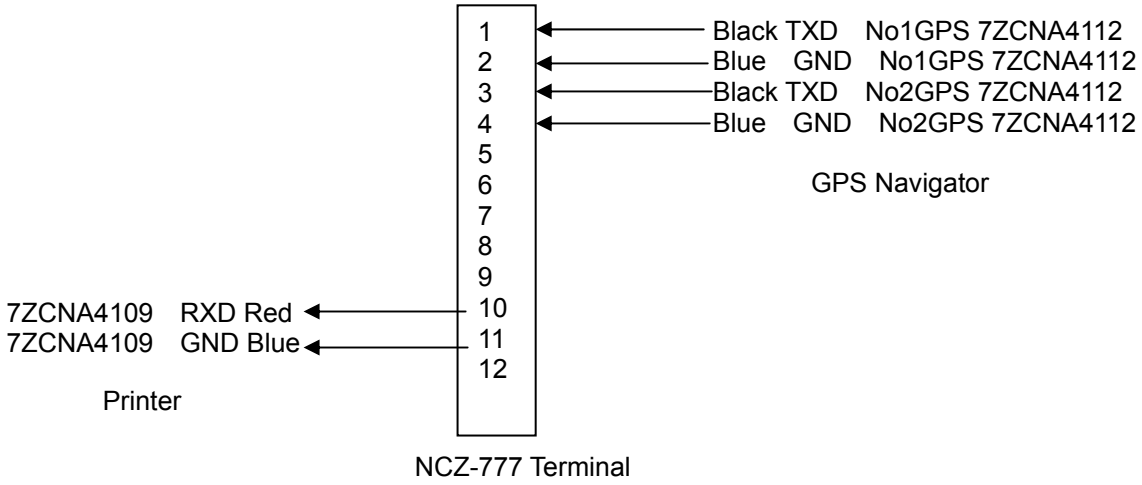
A switch (NCZ-777) is necessary when connecting 2 GPS units to printer (DPU-414).
RS-232C connectors and printer (DPU-414) can be connected.
The RS-232C connectors for both units are configured in Data IN/OUT1. The Data IN/OUT1 data format should be set to "printer".
Use the printer connection kit (7ZXJD0076) to extend the printer power cable.



Printer Cable (7ZCNA4109/7ZCNA4112) Pin

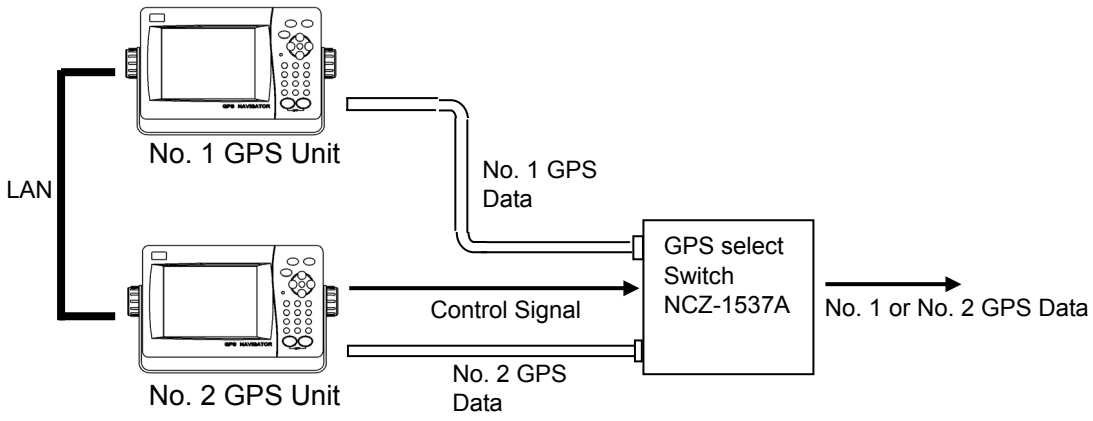


Connection Example

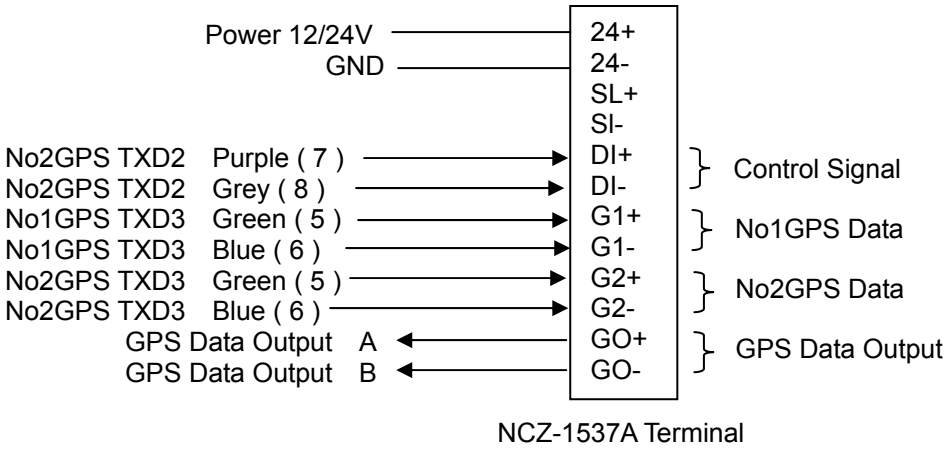


6.4.6 Connecting 2 GPS Units to an Automatic GPS Select Switch

An automatic GPS select switch (NCZ-1537A) can be used to connect and automatically switch between two GPS units. The No. 1 GPS unit normally outputs data, but when it is not performing positioning, the No. 2 GPS unit is automatically switched over to.
To perform automatic switching, the two GPS units must be connected in a LAN, and the No. 2 GPS unit must output control signaling to the automatic GPS select switch.
Set the No. 1 GPS unit LAN setting mutual monitoring to "On".
Set the No. 2 GPS unit LAN setting mutual monitoring to "On", and set the control signal output port data format to "SWITCH".
Set the Dip switch (S1) on NCZ-1537A to 1: ON and 2: ON.



Connection Example
The following connection conditions apply to the connection example.
・GPS Data is output from TXD3 Port (DATA OUT3) of each GPS Unit.
・Control signal is output from TXD2 Port (DATA OUT2) of No2 GPS Unit.

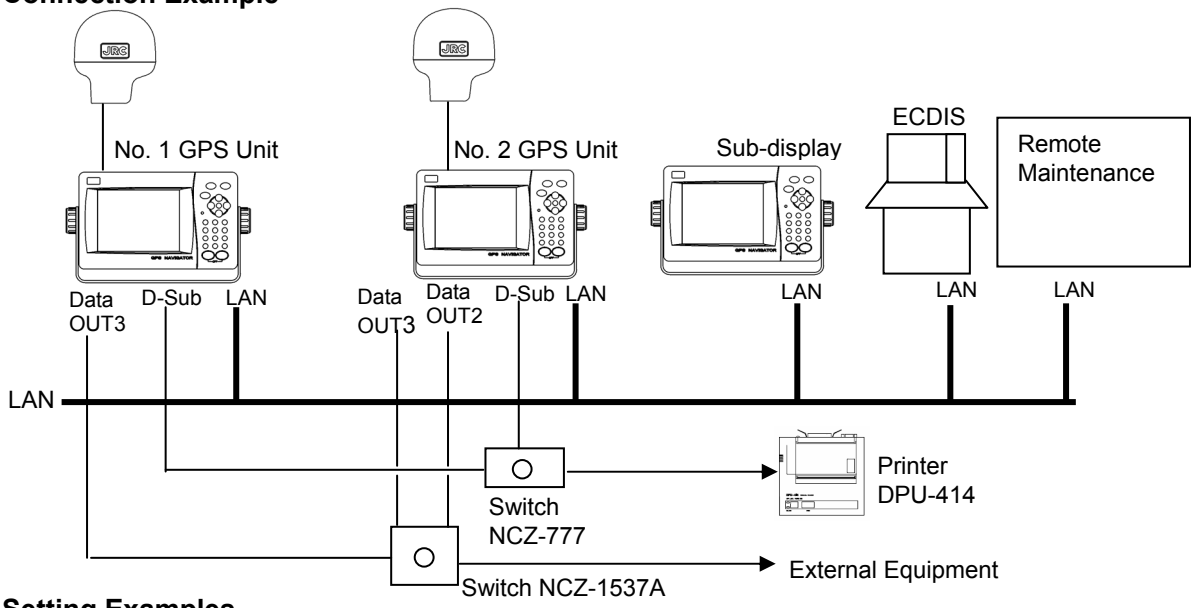


6.5 LAN and Serial Connection

This section contains representative examples of LAN and serial connections and settings. Please refer to "5.19.7 Configuring Data I/O" for details regarding configuration.
The following connection conditions apply to the connection example.

- Two GPS units, 1 sub-display, and ECDIS are connected via LAN and are sharing routes
- The LAN is connected to remote maintenance
- Serial cabling is used to connect to the automatic GPS select switch and printer.
- The HUB of ECDIS is used.

Connection Example



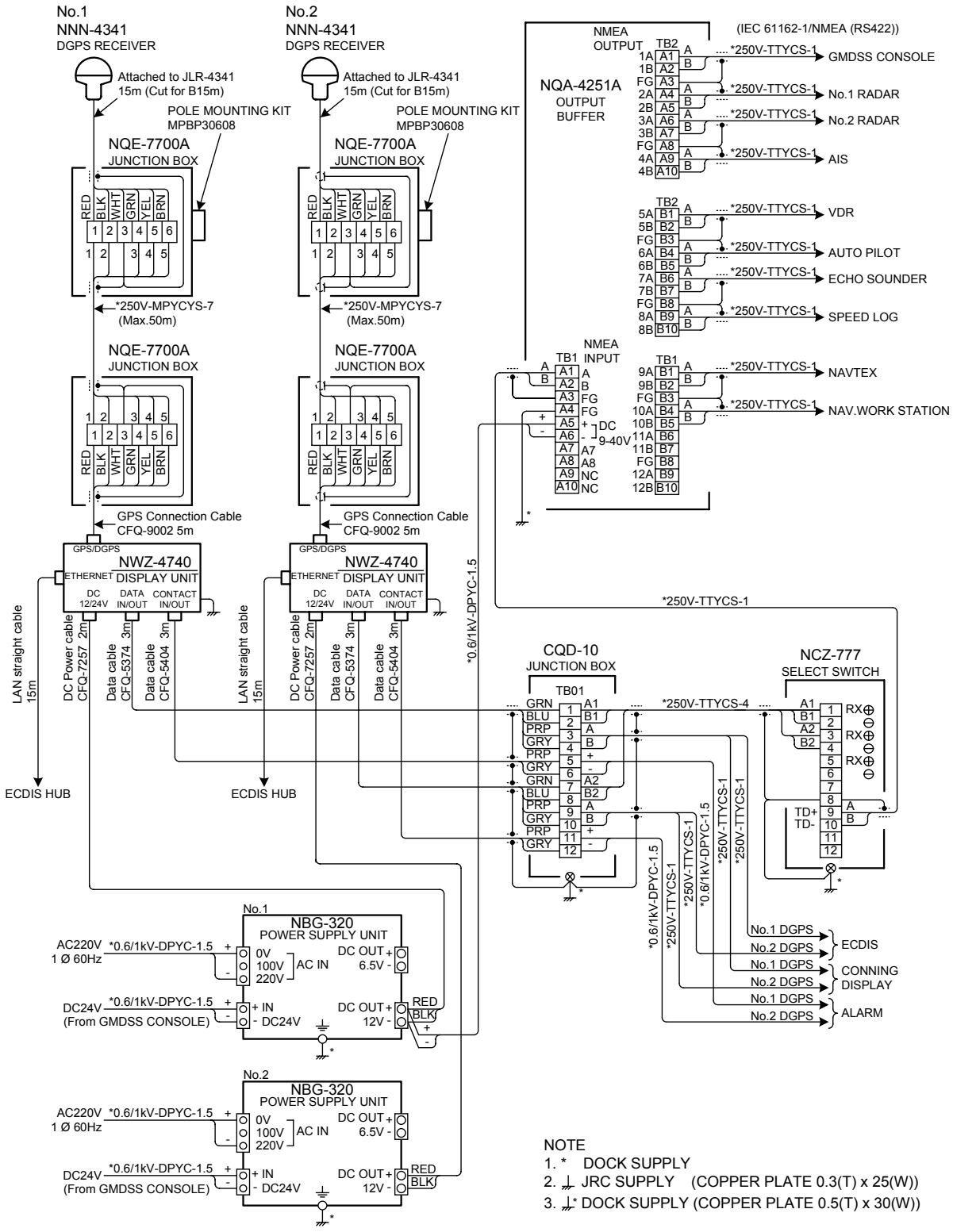
Setting Examples

Setting Item		No. 1 GPS Unit	No. 2 GPS Unit	Sub-Display
1. Display Type		Main	Main	Sub
2. Sensor No.		1	2	1
3. LAN				
ACTIVE Route		Share4	Share4	Share4
DATA Route		Share	Share	Share
Mutual Monitoring		On	On	On
Data OUT	Connect	Multicast	Multicast	Multicast
	Format	IEC	IEC	IEC
	Sentence	Sub-Display ALR, ACK	Sub-Display ALR, ACK	ALR, ACK
Remote Maintenance		On	On	Off
4. Serial				
Data IN/OUT1	Data Format	Printer	Printer	Not yet determined
	Bit Rate	4800	4800	
Data OUT2	Data Format	Unused	Switch	
Data OUT3	Data Format	IEC	IEC	
	Bit Rate	4800	4800	
	Sentence	User Selected	User Selected	
Data IN/OUT4		Unused	Unused	

If the "PRINTER" data format is selected, output will be in a printer-only dedicated format.
If the "SWITCH" data format is selected, automatic GPS select switch control signaling will be output.
Selecting "SUB-Display" as the sentence will allow you to select the necessary sentence for the sub-display.

6.6 Connection Diagram

Typical Connection Example



NOTE
1. * DOCK SUPPLY
2. ⏚ JRC SUPPLY (COPPER PLATE 0.3(T) x 25(W))
3. ⏚* DOCK SUPPLY (COPPER PLATE 0.5(T) x 30(W))

Section 7 After-Sales Service

7.1 Warranty

- Specific periods may vary based on our warranty policies, but the standard warranty period is **one year** from the date of purchase.

7.2 Repair parts stocking Period

- We keeps functional repair parts for this equipment (parts necessary for the functioning of this equipment) in stock for 10 years from the discontinuation of production.

7.3 When Requesting Service

When you think the equipment is not operating properly, please read "5.3 Troubleshooting" carefully, and inspect the equipment again. If the problem persists, stop using the equipment, and consult your dealer, or a JRC branch or affiliate.

- **Repairs during the warranty period**
  Should a malfunction or failure occur when the equipment is operated according to the descriptions and instructions contained herein, it is repaired free of charge during the warranty period by JRC or another location specified by your dealer. However, any repair for failures resulting from misuse, negligence, or natural disasters, fire, or other Acts of God is charged.

- **Repairs after the warranty period**
  Repairs to restore the proper equipment operation can be made at a specified rate with the user's consent. In this case, the equipment can either be sent to JRC or an affiliate, or on-ship repairs can be performed at a location specified by JRC or a sales affiliate. Repairs which cannot be performed on-board the ship needs to be performed in a repair plant.

- **Information that needs to be provided when requesting service**
  - Name, model, production date, and serial number
  - Detailed description of the malfunction (alarm number, etc.)
  - Name, address, and telephone number of your company or organization

7.4 Recommended Checks and Inspection

Equipment performance is subject to degradation due to age and change of component conditions over time. In addition to your own routine check, additional inspection and maintenance is recommended. Please consult with your dealer or one of our local offices. Note that this inspection and maintenance is not free of charge.

If you have any other questions about after-sales service, please direct your inquiries to your dealer or nearest local office.

A list of branches is provided at the end of the "Contact List".

Section 8 Disposal

⚠ WARNING

When disposing of the used lithium battery, place insulating tape over the battery terminals, or otherwise insulate the battery. Failure to do so may result in heating, explosion, or fire due to a shorted battery.

8.1 Disposal of the Equipment

- Observe all rules and regulations of the local authorities when disposing of this equipment.

8.2 Disposal of Used Batteries

This equipment contains a lithium battery.

- When disposing of the used lithium battery, place insulating tape over the battery terminals, or otherwise insulate the battery. Dispose of the battery properly as directed by the local authorities. Consult your dealer, our sales office, or the local authorities for further details on disposal methods.

Section 9 Specification

9.1 NWZ-4740 DISPLAY UNIT

9.1.1 Basic

- Display Unit : 5.7 inch FSTN LCD 320×240 dots
- Backlight : LCD and Key lighting
- Dimmer Levels : Bright, Medium, dark, off
- Memories : Waypoints 10000points maximum
  Event/Mark 1000points maximum (include MOB)
  Track 2000points maximum
  Route 100routes maximum
- Route plan : 512 waypoints per one route
- Geodetic datum : Selection among 46 geodetic datum
- Magnetic Variation : Automatic or manual
- Navigation Calculation : Grate circle or Rhumb line selectable
- Alarm : Arrival, Anchor, Boundary, XTD, No position fix, Speed,
  Trip, Temperature*, Depth*, HDOP
- Plot Function Scale : 0.2,0.5,1,2,5,10,20,50,100,200,300NM
  Interval : 1～60min(1 sec) or 0.01～99.99NM(0.01NM) selectable
- Data Input/Output : RS-422 4 output ports, 1 input port, 1 LAN port
- Contact : 2 output ports, 1 input port
- Selectable Unit : Distance, Speed NM,kn or km,km/h or mi,mi/h selectable
  height, Depth m or ft or fm selectable
  Temperature ℃ or ℉ selectable
- Loran Conversion Function : Latitude and longitude can be converted into the Loran time difference.
- Display Language : Japanese or English
- Power Supply Voltage : DC12/24V（+30%,-10%）
- Power Consumption : less than 10W (JLR-7800)
  less than 9W (JLR-7500)
  less than 7W (NWZ-4740)
- Dimension : 267.4(W)×162(H)×85(D)mm
- Mass : Approximately 2.3Kg

*: External sensor must be connected.

9.1.2 Environment

- Operating Temperature : -15℃～+55℃
- Storage Temperature : -25℃～+70℃
- Vibration : IEC60945 ed.4 conformant
- EMC : IEC60945 ed.4 conformant
- Waterproofing : IP44

9.1.3 External Interface

(1)Serial Transmission

Channel	Specification			Notes
DATA IN/OUT1	RS-422	Output	NMEA,IEC,JRC	
	RS-232C	Input/Output	-	for PC or Printer
DATA OUT2	RS-422	Output	NMEA,IEC,JRC	
DATA OUT3	RS-422	Output	NMEA,IEC,JRC	
DATA IN/OUT4	RS-422	Input	NMEA	External Equipment
		Output	NMEA,IEC,JRC	

(1-1)NMEA

- Specification : NMEA0183
- Version : Ver1.5,2.1,2.3
- Bit Rate : 4800,9600,19200,38400bps
- Data Bit : 8bit
- Parity Bit : None
- Start Bit : 1bit
- Stop Bit : 1bit
- Output Sentence : GGA,RMC,GLL,VTG,GSA,GSV,DTM,GBS,GRS,GST,ZDA,GNS, MSS**,ALR,VDR*,VHW*,APB,BOD,BWC,BWR,RMB,XTE,ZTG, AAM,ALR,RTE,WPL,ACK, HDT*,THS*,DBT*,DPT*,MTW*,CUR*,VBW*
- Output Interval : 1s,2s,3s,4s,5s,6s,7s,8s,9s,OFF
- Input Sentence : HDT,THS,DBT,DPT,MTW,CUR,VBW,VHW,ACK,WPL,RTE,ALR

**Function only available on JLR-7800
*External sensor must be connected

1）Some combinations of output sentence, bit rates, and output intervals may not be possible.

(1-2)IEC

- Specification : IEC61162

(1-3)JRC

- Specification : JRC
- Bit Rate : 1200bps
- Data Bit : 8bit
- Parity Bit : None
- Start Bit : 1bit
- Stop Bit : 2bit

(2)Contact Signal

Channel	I/O	Notes
CONTACT OUT1	Output	Alarm,200p/NM,400p/NM,ACK
CONTACT OUT2	Output	Alarm,200p/NM,400p/NM,ACK
CONTACT 3	Input	ACK

(3)LAN

- Specification : JRC
- Bit Rate : 10/100Mbps
- Common Route : JRC
- Data output : NMEA,IEC

9.2 JLR-4341 DGPS Sensor

9.2.1 Basic

(1)GPS Unit

- Reception Method : Multi channel 12ch + SBAS 1ch
- Reception Frequency : 1575.42MHz±1MHz（C/A code）
- Maximum Number of Tracked Satellites : 12 satellites
- Accuracy : 13m 2DRMS （HDOP≦4 SA off）
  5m 2DRMS （Beacon selected）
  7m 2DRMS （SBAS selected）
- SBAS : WAAS、MSAS、EGNOS
- Geodetic datum : Selection among 46 geodetic datum

(2)Beacon Unit

- Reception Frequency : 283.5～325kHz
- Selection of Beacon Station : Automatic or manual

(3)Power Supply

- Power Supply Voltage : DC12/24V（+30%,-10%）
- Power Consumption : less than 2.5W

(4)Dimensions and Mass

- Dimensions : φ134mm×H155mm
- Mass : Approximately 1.7kg (Include Cable)

9.2.2 Environment

- Operating Temperature : -25℃～+55℃
- Storage Temperature : -40℃～+70℃
- Vibration : IEC60945 ed.4 conformant
- EMC : IEC60945 ed.4 conformant
- Waterproofing : IP56

9.3 JLR-4340 GPS Sensor

9.3.1 Basic

(1)GPS Unit

- Reception Method : Multi channel 12ch + SBAS 1ch
- Reception Frequency : 1575.42MHz±1MHz（C/A code）
- Maximum Number of Tracked Satellites : 12 satellites
- Accuracy : 13m 2DRMS （HDOP≦4 SA off）
  7m 2DRMS （SBAS selected）
- SBAS : WAAS、MSAS、EGNOS
- Geodetic datum : Selection among 46 geodetic datum

(2)Power Supply

- Power Supply Voltage : DC12/24V（+30%,-10%）
- Power Consumption : less than 1.5W

(3)Dimension and Mass

- Dimensions : φ108mm×H108mm
- Mass : Approximately 0.7Kg (Include Cable)

9.3.2 Environment

- Operating Temperature : -25℃～+55℃
- Storage Temperature : -40℃～+70℃
- Vibration : IEC60945 ed.4 conformant
- EMC : IEC60945 ed.4 conformant
- Waterproofing : IP56

Appendix

Appendix1 List of Geodetic System

Screen Display	Setting		Geodetic System
W84	WGS-84	0	WGS-84
W72	WGS-72	1	WGS-72
TOY	JAPAN	2	Tokyo Datum
NAS	NAD27 USA	3	North American 1927 (USA)
NAS	NAD27 CAN	4	North American 1927 (Canada, Alaska)
EUR	EUROPE 50	5	Europe 1950 (Europe)
AUA	AUSTRA 66	6	Australian geodetic 1966 (Australia)
OGB	OSGB-36	7	Ordnance Survey of Great Britain (England)
008	NAD-83	8	NAD-83
ADI	ADI	11	Adindan (Ethiopia, Sudan)
ARF	ARF	12	ARC 1950 (Botswana)
AUG	AUG	13	Australian Geodetic 1984 (Australia)
BER	BER	14	Bermuda 1957 (Bermuda islands)
BOO	BOO	15	Bogota Observatory (Columbia)
CAI	CAI	16	Compo Inchauspe (Argentine)
CHI	CHI	17	Chatham 1971 (Chatham Islands)
CHU	CHU	18	Chua Astro (Paraguay)
COA	COA	19	Corrego Alegre (Brazil)
BAT	BAT	20	Djakarta (Vatavia) (Sumatra)
EUR	EUR	21	European 1979 (Europe)
GEO	GEO	22	Geodetic Datum 1949 (New Zealand)
GUA	GUA	23	Guam 1963 (Guam)
024	024	24	Hayford 1910 (Finland)
HJO	HJO	25	Hjorsey 1955 (Iceland)
IND	IND	26	Indian (India, Napal)
IRL	IRL	27	Ireland 1965 (Ireland)
KEA	KEA	28	Kertau 1948 (West Malaysia, Singapore)
LCF	LCF	29	L.C.5 Astro (Cayman Brac island)
LIB	LIB	30	Liberia 1964 (Liberia)
LUZ	LUZ	31	Luzon (Philippines)
MER	MER	32	Merchich (Morocco)
MIN	MIN	33	Minna (Cameroon)
NAH	NAH	34	Nahrwan (Oman)
NAP	NAP	35	Naparima, BWI (Trinidad and Tobago)
OEG	OEG	36	Old Egyptian (Egypt)
OHA	OHA	37	Old Hawaiian (Hawaiian Islands)
PLN	PLN	38	Pico de las Nieves (Canary Islands)
PRP	PRP	39	Provisional south American 1956 (South America)
HIT	HIT	40	Provisional south Chilean 1963 (South Chile)
PUR	PUR	41	Puerto Rico (Puerto Rico, Virgin Islands)
QUO	QUO	42	Qornoq (South Greenland)
043	043	43	RT90 (Sweden)
SAO	SAO	44	Santa Braz (San Miguel, Santa Maria islands)
SAN	SAN	45	South American 1969 (South America)
046	046	46	Southwest Base (Faial, Gracinao, Pico, San Jorge, Terceira islands)
TIL	TIL	47	Timbalai 1948 (Brunei, Malaysia)

Appendix2 List of standard terms, units and abbreviations

Term	Abbreviation
Acknowledge	ACK
Acquire, Acquisition	ACQ
Acquisition Zone	AZ
Adjust, Adjustment	ADJ
Aft	AFT
Alarm	ALARM
Altitude	ALT
Amplitude Modulation	AM
Anchor Watch	ANCH
Antenna	ANT
Anti Clutter Rain	RAIN
Anti Clutter Sea	SEA
April	APR
Audible	AUD
August	AUG
Automatic	AUTO
Automatic Frequency Control	AFC
Automatic Gain Control	AGC
Automatic Identification System	AIS
Automatic Radar Plotting Aid	ARPA
Autopilot	AP
Auxiliary System/Function	AUX
Available	AVAIL
Azimuth Indicator	AZI
Background	BKGND
Bearing	BRG
Bearing Waypoint To Waypoint	BWW
Bow Crossing Range	BCR
Bow Crossing Time	BCT
Brilliance	BRILL
Built in Test Equipment	BITE
Calibrate	CAL
Cancel	CNCL
Carried (for example, carried EBL origin)	C
Central Processing Unit	CPU
Centre	CENT

Term	Abbreviation
Change	CHG
Circularly Polarised	CP
Clear	CLR
Closest Point of Approach	CPA
Compact Disk Read Only Memory	CDROM
Consistent Common Reference Point	CCRP
Consistent Common Reference System	CCRS
Contrast	CONT
Coordinated Universal Time	UTC
Correction	CORR
Course	CRS
Course Over the Ground	COG
Course Through the Water	CTW
Course To Steer	CTS
Course Up	C UP
Cross Track Distance	XTD
Cursor	CURS
Dangerous Goods	DG
Date	DATE
Day	DAY
Dead Reckoning, Dead Reckoned Position	DR
December	DEC
Decrease	DECR
Delay	DELAY
Delete	DEL
Departure	DEP
Depth	DPTH
Destination	DEST
Deviation	DEV
Differential GLONASS	DGLONASS
Differential GNSS	DGNSS
Differential GPS	DGPS
Digital Selective Calling	DSC
Display	DISP
Distance	DIST

Term	Abbreviation
Distance Root Mean Square	DRMS
Distance To Go	DTG
Drift	DRIFT
Dropped (for example, dropped EBL origin)	D
East	E
Echo Reference	REF
Electronic Bearing Line	EBL
Electronic Chart Display and Information System	ECDIS
Electronic Chart System	ECS
Electronic Navigational Chart	ENC
Electronic Position Fixing System	EPFS
Electronic Range and Bearing Line	ERBL
Emergency Position Indicating Radio Beacon	EPIRB
Enhance	ENH
Enter	ENT
Equipment	EQUIP
Error	ERR
Estimated Position	EP
Estimated Time of Arrival	ETA
Estimated Time of Departure	ETD
European Geo-Stationary Navigational Overlay System	EGNOS
Event	EVENT
Exclusion Zone	EZ
External	EXT
F - Band (applies to Radar)	F-Band
February	FEB
Foreword	FWD
Fishing Vessel	FISH
Fix	FIX
Forward	FWD
Frequency	FREQ
Frequency Modulation	FM
Full	FULL
Gain	GAIN
Geographics	GEOG

Term	Abbreviation
Geometric Dilution Of Precision	GDOP
Global Maritime Distress and Safety System	GMDSS
Global Navigation Satellite System	GNSS
Global Orbiting Navigation Satellite System	GLONASS
Global Positioning System	GPS
Great Circle	GC
Grid	GRID
Ground	GND
Grounding Avoidance System	GAS
Group Repetition Interval	GRI
Guard Zone	GZ
Gyro	GYRO
Harmful Substances (applies to AIS)	HS
Head Up	H UP
Heading	HDG
Heading Control System	HCS
Heading Line	HL
High Frequency	HF
High Speed Craft	HSC
Horizontal Dilution Of Precision	HDOP
I - Band	I-Band
Identification	ID
In	IN
Increase	INCR
Indication	IND
Information	INFO
Infrared	INF RED
Initialisation	INIT
Input	INP
Input/Output	I/O
Integrated Bridge System	IBS
Integrated Navigation System	INS
Integrated Radio Communication System	IRCS
Interference Rejection	IR

Term	Abbreviation
Interswitch	ISW
Interval	INT
January	JAN
July	JUL
June	JUN
Label	LBL
Latitude	LAT
Latitude/Longitude	L/L
Leeway	LWY
Limit	LIM
Line Of Position	LOP
Log	LOG
Long Pulse	LP
Long Range	LR
Longitude	LON
Loran	LORAN
Lost Target	LOST TGT
Low Frequency	LF
Magnetic	MAG
Man Overboard	MOB
Manoeuvre	MVR
Manual	MAN
Map(s)	MAP
March	MAR
Maritime Mobile Services Identity number	MMSI
Maritime Pollutant (applies to AIS)	MP
Maritime Safety Information	MSI
Marker	MKR
Master	MSTR
Maximum	MAX
May	MAY
Medium Frequency	MF
Medium Pulse	MP
Menu	MENU
Minimum	MIN
Missing	MISSING
Mute	MUTE
Navigation	NAV

Term	Abbreviation
Night	NT
Normal	NORM
North	N
North Up	N UP
Not Less Than	NLT
Not More Than	NMT
Not Under Command	NUC
November	NOV
October	OCT
Off	OFF
Officer On Watch	OOW
Offset	OFFSET
On	ON
Out/Output	OUT
Own Ship	OS
Panel Illumination	PANEL
Parallel Index Line	PI
Past Positions	PAST POSN
Passenger Vessel	PASSV
Performance Monitor	MON
Permanent	PERM
Person Overboard	POB
Personal Identification Number	PIN
Pilot Vessel	PILOT
Port/Portside	PORT
Position	POSN
Positional Dilution Of Precision	PDOP
Power	PWR
Predicted	PRED
Predicted Area of Danger	PAD
Predicted Point of Collision	PPC
Pulse Length	PL
Pulse Modulation	PM
Pulse Repetition Frequency	PRF
Pulse Repetition Rate	PRR
Pulses Per Revolution	PPR
Racon	RACON
Radar	RADAR

Term	Abbreviation
Radar Plotting	RP
Radius	RAD
Rain	RAIN
Range	RNG
Range Rings	RR
Raster Chart Display System	RCDS
Raster Navigational Chart	RNC
Rate Of Turn	ROT
Real-time Kinemetic	RTK
Receive	Rx RX
Receiver	RCDR
Receiver Autonomous Integrity Monitoring	RAIM
Reference	REF
Relative	REL
Relative Motion	RM
Revolutions per Minute	RPM
Rhumb Line	RL
Roll On/Roll Off Vessel	RoRo
Root Mean Square	RMS
Route	ROUTE
Safety Contour	SF CNT
Sailing Vessel	SAIL
Satellite	SAT
S-Band	S-BAND
Scan to Scan	SC/SC
Search And Rescue	SAR
Search And Rescue Transponder	SART
Search And Rescue Vessel	SARV
Select	SEL
September	SEP
Sequence	SEQ
Set (i.e., set and drift, or setting a value)	SET
Ship's Time	TIME
Short Pulse	SP
Signal to Noise Ratio	SNR
Simulation	SIM
Slave	SLAVE
South	S

Term	Abbreviation
Speed	SPD
Speed and Distance Measuring Equipment	SDME
Speed Over the Ground	SOG
Speed Through the Water	STW
Stabilized	STAB
Standby	STBY
Starboard/Starboard Side	STBD
Station	STN
Symbol(s)	SYM
Synchronised/Synchronous	SYNC
Target	TGT
Target Tracking	TT
Test	TEST
Time	TIME
Time Difference	TD
Time Dilution Of Precision	TDOP
Time Of Arrival	TOA
Time Of Departure	TOD
Time to CPA	TCPA
Time To Go	TTG
Time to Wheel Over Line	TWOL
Track	TRK
Track Control System	TCS
Tracking	TRKG
Trail(s)	TRAIL
Transmit and Receive	TXRX
Transceiver	TCVR
Transferred Line Of Position	TPL
Transmit	TX
Transmitter	TMTR)
Transmitting Heading Device	THD
Transponder	TPR
Trial	TRIAL
Trigger Pulse	TRIG
True	T
True Motion	TM
Tune	TUNE
Ultrahigh Frequency	UHF
Uninterruptible Power Supply	UPS

Term	Abbreviation
Universal Time, Coordinated	UTC
Universal Transverse Mercator	UTM
Unstabilised	UNSTAB
Variable Range Marker	VRM
Variation	VAR
Vector	VECT
Very High Frequency	VHF
Very Low Frequency	VLF
Vessel Aground	GRND
Vessel at Anchor	ANCH
Vessel Constrained by Draught	VCD
Vessel Engaged in Diving Operations	DIVE
Vessel Engaged in Dredging or Underwater Operations	DRG
Vessel Engaged in Towing Operations	TOW
Vessel Not Under Command	NUC
Vessel Restricted in Manoeuvrability)	RIM
Vessel Traffic Service	VTS

Term	Abbreviation
Vessel Underway Using Engine	UWE
Video	VID
Visual Display Unit	VDU
Voyage	VOY
Voyage Data Recorder	VDR
Warning	WARNING
Water	WAT
Waypoint	WPT
Waypoint Closure Velocity	WCV
West	W
Wheel Over Line	WOL
Wheel Over Point	WOP
Wheel Over Time	WOT
World Geodetic System	WGS
X-Band	X-BAND

Appendix3 Default Settings

Main Menu	Sub Menu	Sub Menu	Default
1.DISPLAY	1.CONTRAST		7
	2.DIMMER -MAXIMUM-		9
	3 -TYPICAL-		6
	4. -MINIMUM-		4
	5.CLICK SOUND		ON
	6.REVERSING MODE		NORMAL
	7.INPUT ASSIST		OFF
	8.DISPLAY SELECT	1.NAV	START
		2.PLOT 1	ON
		3.PLOT 2	ON
		4.PLOT 3	ON
		5. CDI	ON
		6. GPS INFO	ON
		7.WPT INFO	ON
		8.BEACON INFO	ON
		9.NAV ASSIST	ON
2.PLOT	1.WPT		○ (small size)
	2.MARK		● (small size)
	3.EVENT		⊠ (small size)
	4.TRACK PERIOD		TIME 0min10sec
	5.TRACK		▪
	6.LINE		—
	7. EVENT/MARKLIST		
	8.DELETE EVENT/ MARK/TRACK	1.DELETE EVENT/MARK LIST	
		2.DELETE ALL EVENT	
		3.DELETE ALL MARK	
		4.DELETE ALL EVENT/MARK	
		5.DELETE TRACK	
	8.VISIBLE/INVISIBLE	1.WPT	ON
		2.WPT No.	ON
		3.MARK	ON
		4.EVENT	ON
		5.EVENT/MARK No.	ON
		6.TRACK	ON
		7.LINE	ON
		8.ARRIVAL CIRCLE	LEG
		9.XTD	LEG
		0.NEXT PAGE	
		1.SCALE BAR	ON
		2.SYMBOL INFO	ON
		3.CURSOR INFO	ON
		4.GRID LINE	ON
		5.GRID LAT	ON
		6.GRID LON	ON
		0.PREVIOUS PAGE	
	0.NEXT PAGE		
	1.CURSOR		LARGE
	2.OWN CIRCLE		OFF
	3.OWN VECTOR		OFF
	0.PREVIOUS PAGE		
3.WPT/ROUTE	1.ENTRY WPT/ WPT LIST		
	2.MAKE ROUTE/ ROUTE LIST		

Main Menu	Sub Menu	Sub Menu	Default
	3.ROUTE START/END	1.LEG CHANGE	
		2.DIRECTION	
		3.NAVIGATION	
	4.COPY WPT/ROUTE	1.WPT COPY	
		2.ROUTE COPY	
	5.DELETE WPT/ROUTE	1.WPT DEL	
		2.ROUTE DEL	
	6. TRANSFER WPT/ROUTE (LAN)	1.OUT / IN	OUT
		2.CONNECT / FROM IP	MULTICAST
		3.TO IP	0.0.0.0(at shipment)
		4.PORT No.	0(at shipment)
		5.FORMAT	SHARE ROUTE
		6.OUT TYPE	ROUTE+WPT
		0.START	
	7.DEFAULT SETTINGS	1.WIDTH PORT	1.00NM
		2.WIDTH STBD	1.00NM
		3.ARRIVAL RAD	1.00NM
		4.SPEED	10.00kn
		5.SAIL GC/RL	RL
		6.SOG SMOOTHING	OFF
4.ALARM	1.ARRIVAL/ANCHOR		ARV
	2.XTD/BOUNDARY		XTD
	3. DGPS		ON→OFF
	4. HDOP		4
	5.TEMP		OFF
	6.DPTH		OFF
	7.TRIP		OFF
	8.SPD		OFF
	0.ALARM SOUND SET	1.SYSTEM	2
		2.ARRIVAL/ANCHOR	1
		3.XTD/BOUNDARY	1
		4. DGPS	6
		5. HDOP	2
		6.TEMP	3
		7.DPTH	3
		8.TRIP	3
		9.SPEED	3

Main Menu	Sub Menu	Sub Menu	Default
5.SYSTEM	1.TIME DIFF		+00:00
	2.DATE DISP		DD MM,'YY
	3.TIME DISP		24hr
	4.DATUM		WGS84
	5.UNIT - DIST/SPEED		NM,kn
	6. HEIGHT, DEPTH		m
	7. TEMPERATURE		℃
	8.MAG CORR		OFF
	9.SPEED METER		50kn
6. GPS/BEACON/ SBAS	1.GPS MODE		AUTO
	2.FIX MODE		AUTO
	3.SAT ELV MASK		5 Degrees
	4. HDOP		10
	5.SMOOTHING POSITION		10 sec
	SPEED		10 sec
	COURSE		10 sec
	6. RAIM ACCURACY LEVEL		100m
	7. GPS INITIALIZATION	1.LATITUDE	35° 00.00'N
		2.LONGITUDE	139° 00.00'E
		3.ANT HEIGHT	+10m
		4.DATE	Fixing Value / -(No Fix)
		5.TIME	Fixing Value /-(No Fix)
		0.SET	
	8.BEACON/SBAS	1.STATION SELECT	AUTO
		2.FREQUENCY	321.0KHz(MANUAL)
		3.BIT RATE	200bps(MANUAL)
		4. BEACON INFORMATION	ON
		6.SBAS SEARCH	AUTO
		7. TYPE0 INFORMATION	OFF
		8.RANGING	OFF
	9.LORAN	1.LORAN A/C	OFF
		LORAN A	
		1.LORAN A/C	LOLAN A
		2.STN SELECT STN 1	2S0
		3. STN 2	2S2
		4. TD CORR TD1	+0.0 μ s
		5. TD2	+0.0 μ s
		LORAN C	
		1.LORAN A/C	LOLAN C
		2. GRI CHAIN	8930
		3. TD DATA TD1	11
		4. DATA TD2	30
		5. TD CORR TD1	+0.0 μ s
		6. TD2	+0.0 μ s
7.VERSION			
8.LANGUAGE	1.LANGUAGE		ENGLISH

Main Menu	Sub Menu	Sub Menu	Default	
0.EQUIP SET	1.DISPLAY TYPE		MAIN	
	2.SENSOR No.		1(At shipment)	
	3. CCRP	1.SHIP	DISABLE(At shipment)	
		2.BEAM	1.0m（At shipment）	
		3.LENGTH	1.0m（At shipment）	
		4.SENSOR	DISABLE(At shipment)	
		5.X	0.0m（At shipment）	
		6.Y	0.0m（At shipment）	
		7.CCRP	DISABLE(At shipment)	
		8.X	0.0m（At shipment）	
		9.Y	0.0m（At shipment）	
	4.CHECK		OFF	
	5.RESET		OFF	
	6.DEMO	1.DEMO TYPE	OFF	
		2.DATE		
		3.TIME		
		4.LATITUDE		
		5.LONGITUDE		
		6.SPEED		
		7.COURSE		
		8.RADIUS		
		9.ROUTE		
		0.START		
	7.DATA I/O	1.DATA IN/OUT1	NMEA(default)	1.VERSION: Ver2.3 2.BIT RATE: 4800bps 3.SENTENCE: GGA RMC VTG DTM ZDA APB RMB ACK (all interval 1s)
			JRC	
			IEC	1.BITRATE 4800bps 2.SENTENCE GGA RMC VTG DTM ZDA APB RMB ACK (all interval 1s)
			ROUTE	1.DATA IN/OUT: OUT 2.BIT RATE: 4800bps 3.FORMAT: NMEA Ver2.3 4.OUT TYPE: ROUTE+WPT
			PRINTER	1.BITRATE: 4800bps 2.INTERVAL: OFF
			SWITCH	
		2.DATA OUT2	NMEA (default)	1.VERSION: Ver2.3 2.BIT RATE: 4800bps 3.SENTENCE: GGA RMC VTG DTM ZDA APB RMB ACK (all interval 1s)

Main Menu	Sub Menu	Sub Menu	Default	
			JRC	
			IEC	1.BITRATE 4800bps 2.SENTENCE GGA RMC VTG DTM ZDA APB RMB ACK (all interval 1s)
			ROUTE	1.BIT RATE: 4800bps 2.FORMAT: NMEA Ver2.3 3.OUT TYPE: ROUTE+WPT
			SWITCH	
		3.DATA OUT3	NMEA(default)	1.VERSION: Ver2.3 2.BIT RATE: 4800bps 3.SENTENCE: GGA RMC VTG DTM ZDA APB RMB ACK (all interval 1s)
			JRC	
			IEC	1.BITRATE 4800bps 2.SENTENCE GGA RMC VTG DTM ZDA APB RMB ACK (all interval 1s)
			ROUTE	1.BIT RATE: 4800bps 2.FORMAT: NMEA Ver2.3 3.OUT TYPE: ROUTE+WPT
			SWITCH	
		4.DATA IN/OUT4	NMEA(default)	1.VERSION: Ver2.3 2.BIT RATE: 4800bps 3.SENTENCE: GGA RMC VTG DTM ZDA APB RMB ACK (all interval 1s)
			JRC	
			IEC	1.BITRATE 4800bps 2.SENTENCE GGA RMC VTG DTM ZDA APB RMB ACK (all interval 1s)
			ROUTE	1.DATA IN/OUT: OUT 2.BIT RATE: 4800bps 3.FORMAT: NMEA Ver2.3 4.OUT TYPE: ROUTE+WPT
			SWITCH	

Main Menu	Sub Menu	Sub Menu	Default	
			EXT EQUIP	1.CURRENT LAYER-A LAYER:001 DATA No:ALL LAYER-B LAYER:002 DATA No:ALL LAYER-C LAYER:003 DATA No:ALL
		5.CONTACT OUTPUT 1	SYSTEM	
		6.CONTACT OUTPUT 2	ALARM ACK	
		7. LAN	ACTIVE ROUTE OFF	1.CONNECT MULTICAST
			DATA ROUTE: SHARE	
			MUTUAL:OFF	1.CONNECT MULTICAST
			DATA OUT : NMEA Ver2.3	1.CONNTECT: MULTICAST 2.TO IP: 0.0.0.0 (at shipment) 3.PORT NO: 0(at shipment) 4.FORMAT: NMEA Ver2.3 5.SENTENCE: OFF
			REMOTE MAINTE: OFF	1.CONNTECT: UNICAST 2.TO IP: 192.168.60.3 (at unicast) 3.PORT NO: 6001(at unicast) 4.INTERVAL: 1s
	8.SOFT UPDATE	1.UPDATE AREA	DISPLAY	
		2.BIT RATE	SENSOR AUTO DISPLAY 115200bps	
		3.UPDATE STANDBY		
	9. IP	1. IP ADDR	MAIN SENSOR No.1 192.168.60.163 MAIN SENSOR No.2 192.168.60.164 MAIN SENSOR No.3 192.168.60.165 SUB SENSOR No.1 192.168.60.166 SUB SENSOR No.2 192.168.60.167 SUB SENSOR No.3 192.168.60.168	
		2.SUBNET MASK	255.255.255.0	
		3.DEFAYLT GATWAY	192.168.1.1	

有毒有害物质或元素的名称及含量

(Names & Content of toxic and hazardous substances or elements)

形式名(Type): JLR-7800/7500　　名称(Name): GPS Navigator

部件名称 (Part name)	有毒有害物质或元素 (Toxic and Hazardous Substances and Elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
GPS接收器 (Antenna)	×	○	×	×	×	×
船内装置(Inboard Unit) ・显示装置(Display Unit) ・信号处理装置 (Processing Unit)	×	○	×	×	×	×
外部设备(Peripherals) ・选择(Options) ・电线类(Cables) ・手册(Documennts)	×	○	×	×	×	×

○:表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 标准规定的限量要求以下。
(Indicates that this toxic, or hazardous substance contained in all of the homogeneous materials for this part is below the requirement in SJ/T11363-2006.)

×:表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。
(Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T 11363-2006.)

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