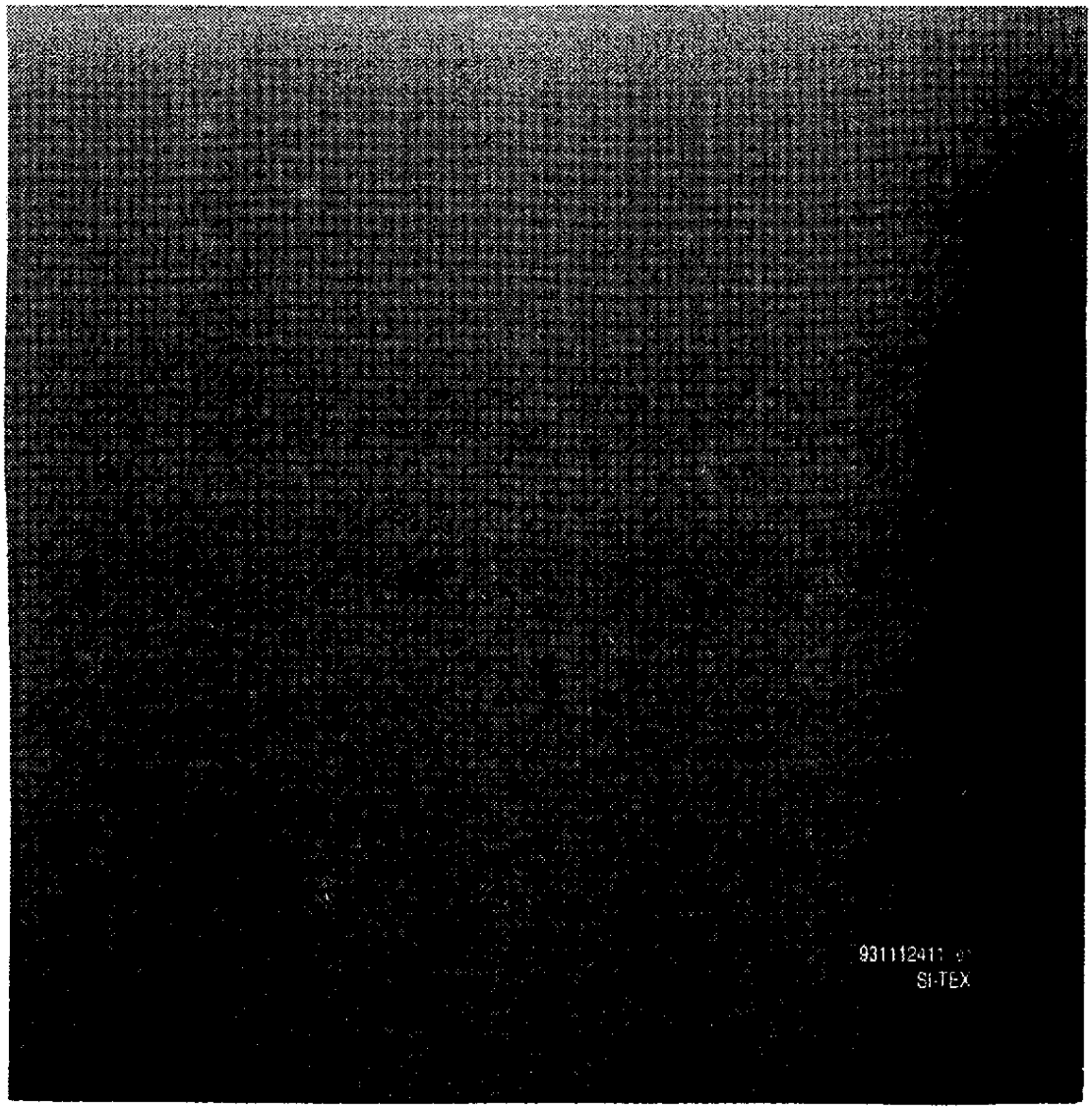
OPERATION MANUAL

Differential Ready Convertible Hand Held GPS

HG-7

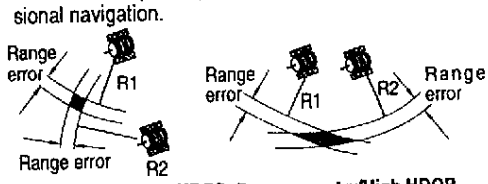


For Proper Operation

GPS signal reception (HDOP or PDOP)

The accuracy of position determination with GPS is affected by the geometrical position of satellites and the accuracy of the ranging to the satellite.

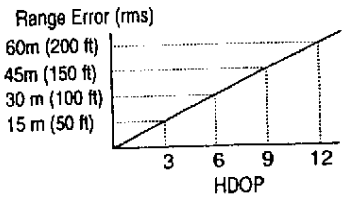
- The satellite geometrical position in comparison to the user is expressed in the Geometrical Dilution of Precision, GDOP (or DOP). Roughly speaking, the more "spread out" the satellites are, the better accuracy of the position. When the satellites are bunched together, the position may not be as accurate as normal.
- GPS receiver usually employs an algorithm which selects satellites based on the lowest DOP in accordance with satellites moving.
- Horizontal DOP (HDOP) is for the horizontal (lat/long) aspect of the error: 2-dimensional navigation.
- Position DOP (PDOP) is for both horizontal (lat/long) and vertical (altitude) aspect of error: 3-dimensional navigation.



Good geometry/Low HDOP **Poor geometry/High HDOP**

Horizontal position uncertainty

HDOP vs Range Error



Note:

- The value of DOP changes with time because all satellites move in orbit. As a result, even if the GPS receiver is fixed to a certain point, the value measured by the geometrical position is not fixed at all times.
- When satellites are positioned near the horizon (lower elevation), you cannot receive the GPS signal because of the interruption by mountains, buildings, etc.
- The GPS signal reception is not possible in a room. Please make sure to put the antenna in open site, away from any obstacles.
- The bearing data obtained from the GPS navigation system is a reference from the true north.

Time to fix position

It takes more time to fix position in the following cases.

- When you use your GPS receiver for the first time.
- When the stored orbital data is not suitable for the available satellite, or purged due to lengthy storage.
- When you use it after moving a long distance.

NAVIGATOR shortens position calculating time by storing the orbital data sent from the available satellites. When you first switch on the receiver, it may take about 15 minutes before the first fix is made. From the second operation, the receiver can fix your position within a minute because of stored satellite data from the previous operation.

When it takes more than 30 minutes, carry out the following operations:

(1) Press the **OFF** key to turn off the power.
(2) Press and hold the **POWER/DIM** key to turn on the power again.
(3) Press the **ENT** key while "Checking" is displayed.
(4) Move the cursor to **"1. INITIALIZE"** and press **ENT** key.

Tips for mounting GPS Receiver

Avoid following locations or situations:

- A place exposed to direct sun or near a heating device.
- A place adjacent to Magnetic Compass.
- A place exposed to strong vibration or shock.

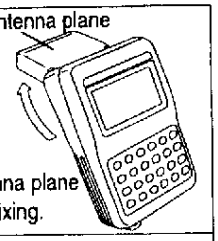
Special note for LCD (Liquid Crystal Display)

Avoid following conditions to insure good LCD visibility.

- Long-time exposure to direct sun rays or UV.
- Extremely hot (surrounding temperature more than 50°C, 120°F) or cold (less than 0°C, 32°F) environment.

Getting Started

When you first use NAVIGATOR, it must receive new orbital data from the satellites and it may take approximately 15 minutes to display your position (**COLD START**). Once this step is completed, your position is displayed immediately any time you wish. To make NAVIGATOR operational (to store orbital data of GPS satellites in system memory), use the following steps.



Lift and keep the antenna plane horizontal for position fixing.

PWR DIM Press for 3 seconds to power on. This is to avoid unnecessary battery consumption by accidental power on.

Dim/bright the display:

PWR DIM Press to dim/bright the screen.

Change the contrast:

CTRS Press to change display contrast (intensity) in 4 levels.

Power off:

OFF Press for 2 seconds to turn NAVIGATOR off. All data before power-off is kept in memory for later use.

What is failure of positioning?
If signals from three or more satellites are not received, your position cannot be fixed.

OP. TIMER of MENU 8-4 should be cleared when batteries are replaced.

Remove internal batteries when the unit is in storage to avoid damage by corroded batteries.

On-screen messages change in the following sequence when NAVIGATOR receives satellite signals.

```
GPS
ROM No. KM=A46
checking
```
Initial message.
Self checking function in process.

```
GPS
ROM No. KM=A46
check OK
```
Second message.
Self checking function completed.

```
GPS
Flip up ANTENNA
before operating
```
Flip up the antenna on the back side of the unit to horizontal position so that reception of satellite signals will not be impaired.

Blinking

```
NAVI  27°54.008N
      82°41.613W
SPEED     15.0kt
COURSE    359.9°
```
Blinks while GPS satellites are being searched or interrupted.

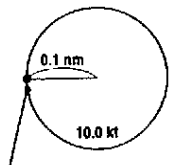
No blinking

```
NAVI  27°54.008N
      82°41.613W
SPEED     15.0kt
COURSE    359.9°
```
When signals from 3 or more satellites are received, present latitude and longitude position with solid N (or S) and W (or E) is displayed.

```
NAVI   °  '
       °  '
SPEED      kt
COURSE     °
```
If position is not obtained:
The data from previous operation is displayed. However, if you initialize, again the memory data is erased and no data is shown.

Operation by built-in simulator

The built-in simulator helps you practice operation before you use it in the field. Only a power source is required to turn on the unit. You enter the starting position of the simulated navigation at point number **150** in lat/long referring to "Storing Waypoints" (page 11). Then, turn the unit off. Turn the unit on again by pressing **PWR/DIM** key and press **"4"** key while **"CHECK OK"** is displayed on the screen. Your position draws a circle from the position in point number 150 at 10.0 kt speed with 0.1 nm radius. It takes about 3 min. 40 seconds for each circle. You can try every function of the unit as if in practical operation. Simply turn the power off to get back to normal operation.



Start position entered at point number 150.

How to Find Out Your Position

You can find your position by simply reading the present latitude and longitude on the screen.

MODE Press this key to recall NAV1 (Navigation 1) screen.

Blinks if positioning is interrupted.

NAV1 screen

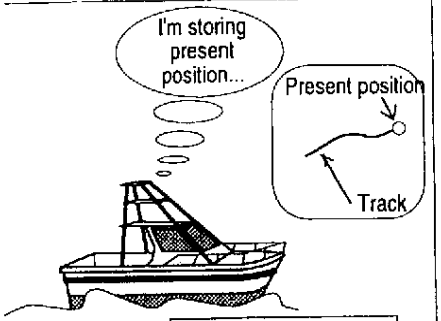
NAV1	27°54.005N	Present position, North or South latitude
	82°44.824W	East or West longitude
SPEED	15.0kt	Speed in knots
COURSE	359.9°	Bearing in degrees

Note: Positioning interruption
If NAVIGATOR has failed to receive signals from GPS satellites, it shows speed of zero (0) but keeps the last LAT/LONG and course data.

- Present position can also be shown as Loran C LOPs (see Page 30 for Loran C LOPs display).
- Speed can be shown in different units (see Page 29).

Storing present position (EVENT)

Event key stores position automatically.



EVT

CLR Returns to previous display screen.

Press this key to store the present position. You can store up to 20 points. The oldest data will be replaced with new data when you've used 20.

You can also store the present position (memory number 000) using **MOB** key.

Last event point number is shown.

EVT	27°38.145N	
	82°43.280W	
001	27°54.008N	The position data of event point number 001.
	82°41.613W	

Recalling event or MOB position

MENU ⇨ 1 ⇨ ( ) ( ) ( )

Specified event point number is shown.

Event or MOB position is recalled.

WPT 001=	
	27°38.145N
	82°43.280W

Enter an event number (one of point number 000 to 020) you wish to recall. Point number 000 contains the position data when you have pressed **MOB** key.

Select **1: WAYPOINT**.

Press until Menu options 1 to 4 appear.

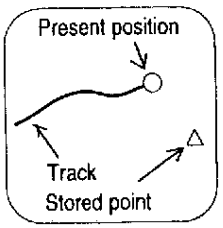
CLR Use this key if you have entered an incorrect number. You can reenter an event point number.

How to Get Distance and Bearing to WPT

You can obtain the following navigation information to the waypoint (WPT)

- *Distance and bearing from present position to a WPT or the final destination*
- *Ship's speed and time to go*

You can store up to 130 points (numbers 021 to 150).

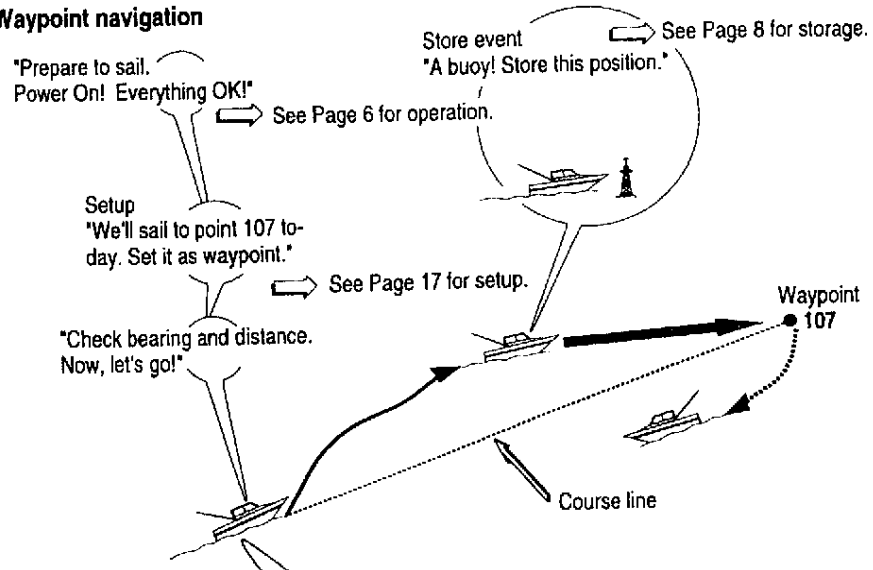


Navigation to WPT

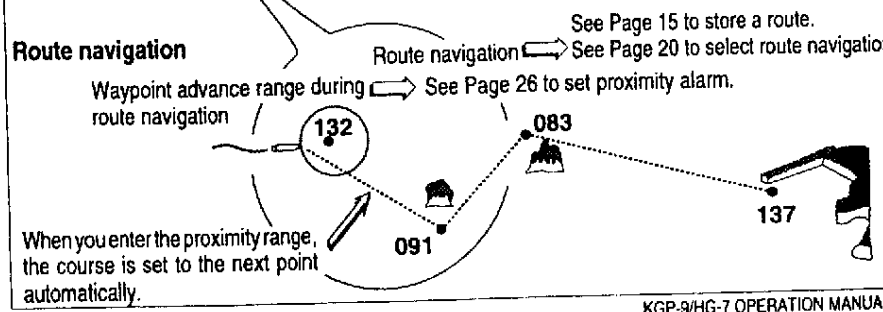
Use the following steps (see Page 11 for operation details).

1. Determine your waypoints and/or final destination from sea charts or other sources.
2. Store latitude and longitude data of waypoints.
3. Create a route by combining waypoints and events.
4. Start navigation.

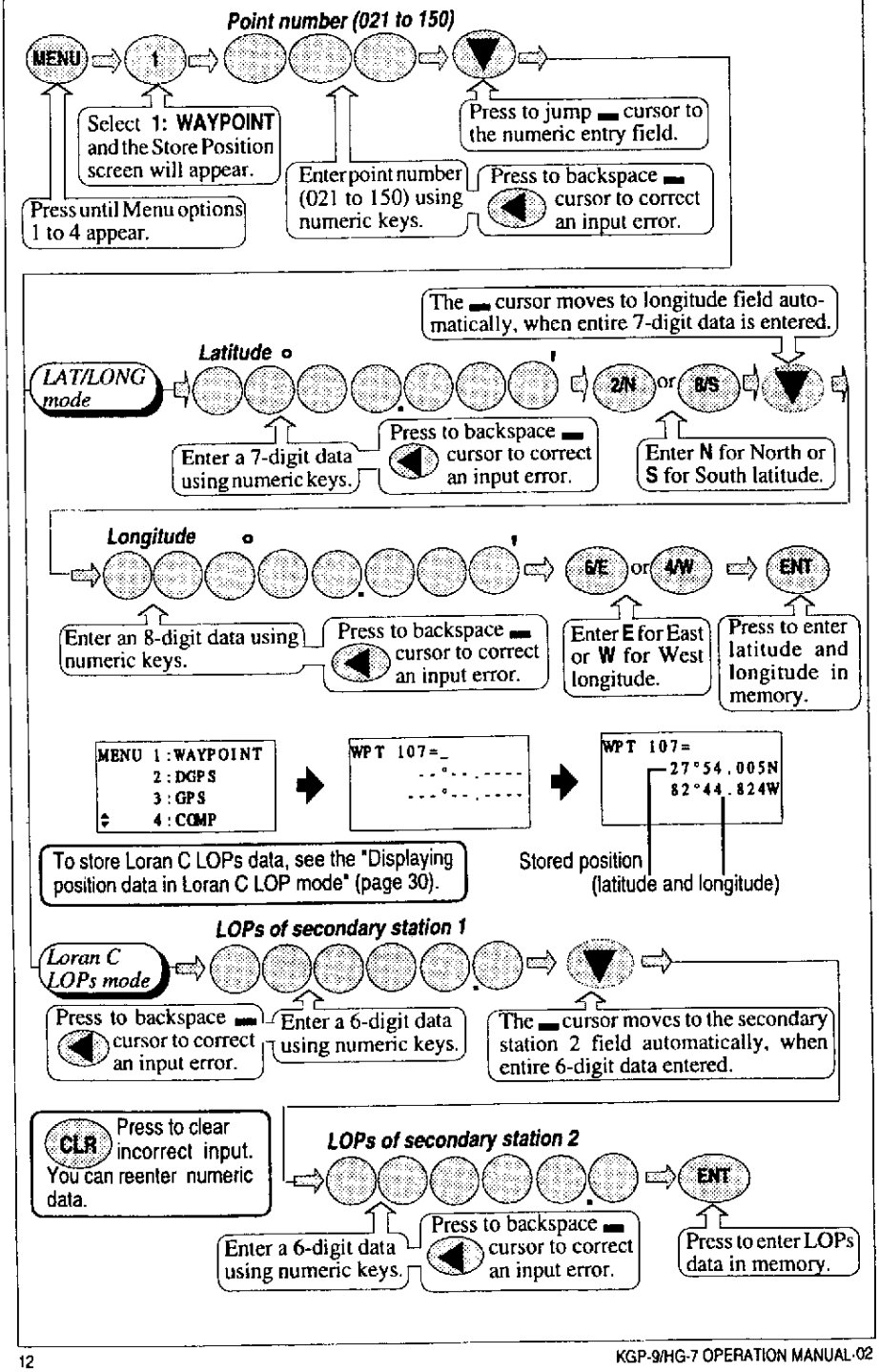
Waypoint navigation



Route navigation

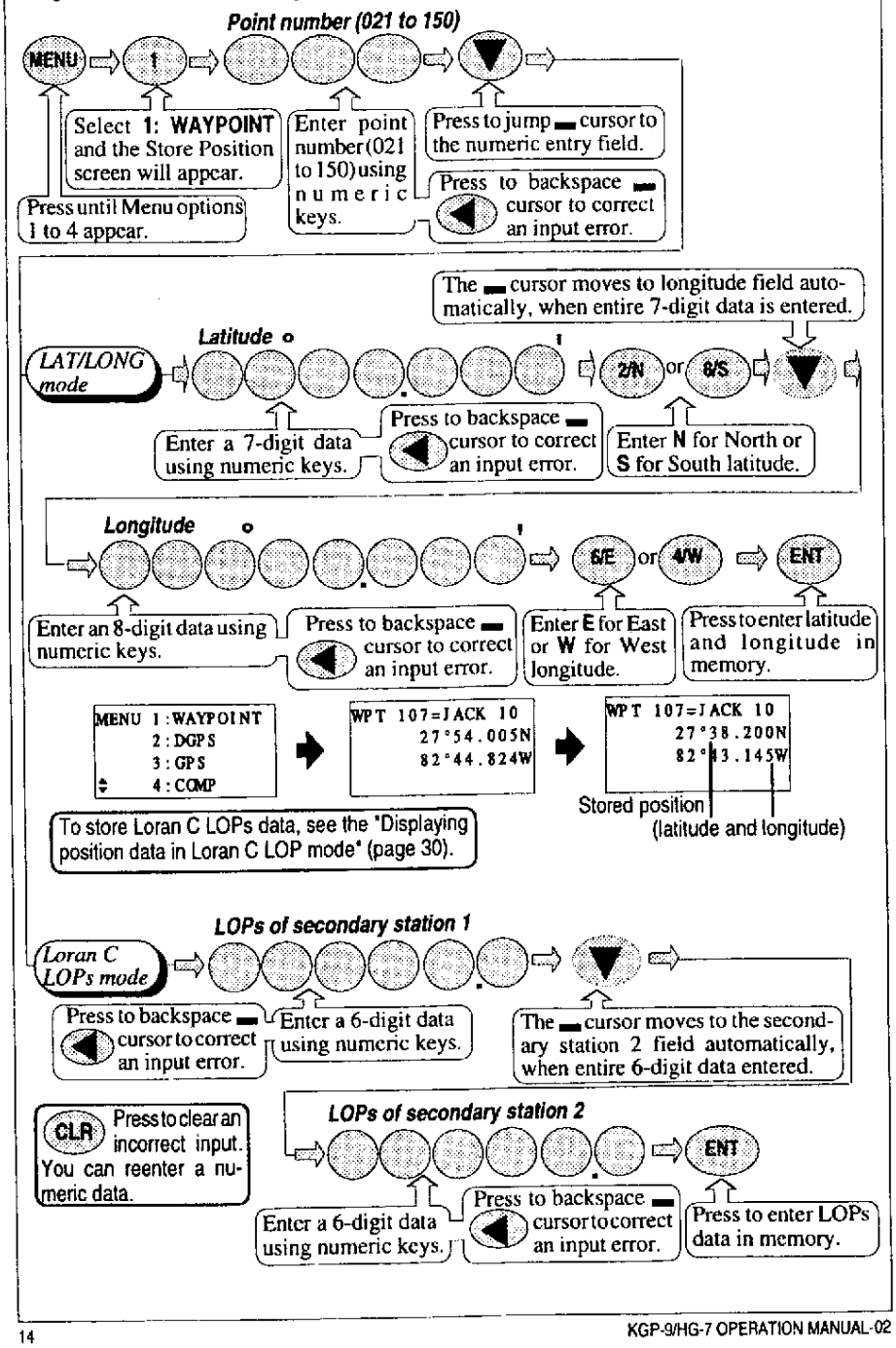


Skipping name entry

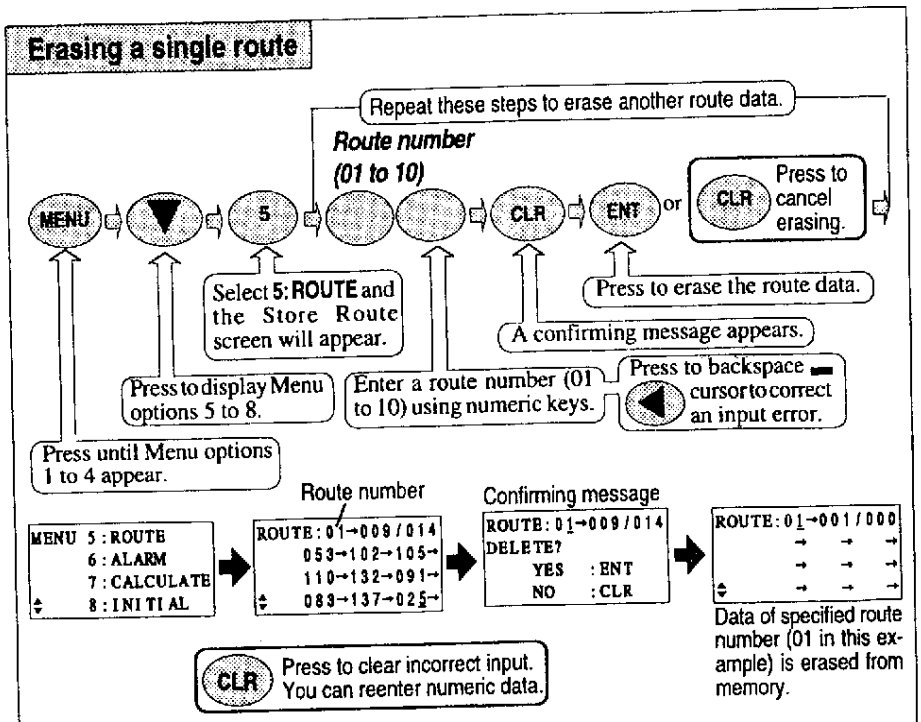


Changing position data

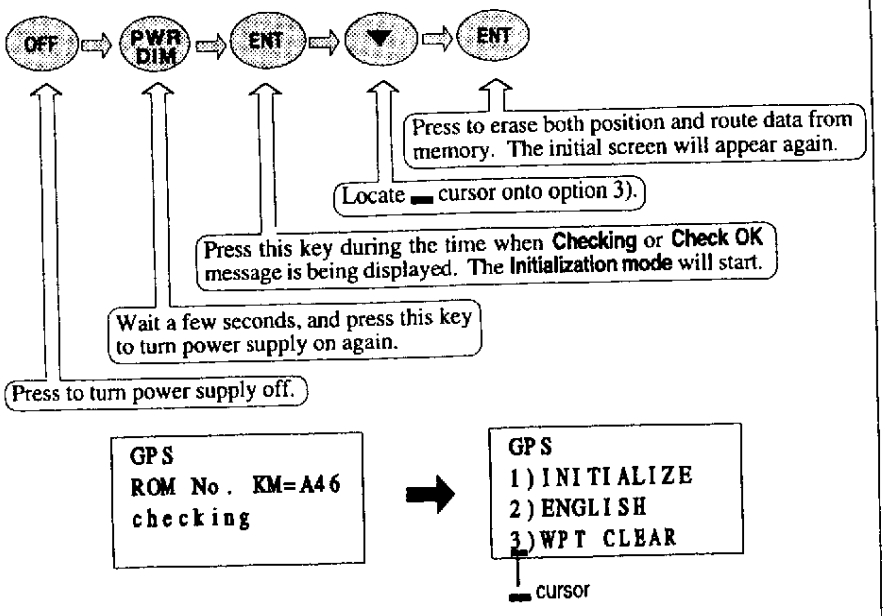
You can not edit a waypoint position data when the point number is used as a waypoint or in a route navigation. **NO EDITING** message will be displayed.



Erasing a single route



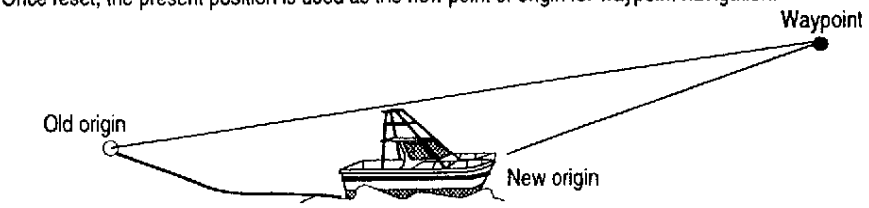
Erasing entire data from memory



Note: All waypoints and routes are permanently lost after performing this step.

Reentering the point of origin in waypoint navigation

Once reset, the present position is used as the new point of origin for waypoint navigation.



MODE ⇨ SEL ⇨ ENT

Press to set the point as WPT.

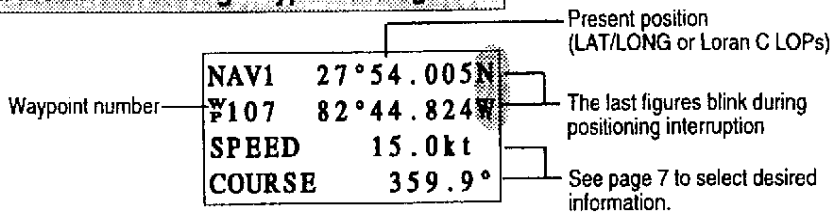
Press until WPT_ _ _= appears.

Press until NAV2 screen appears.

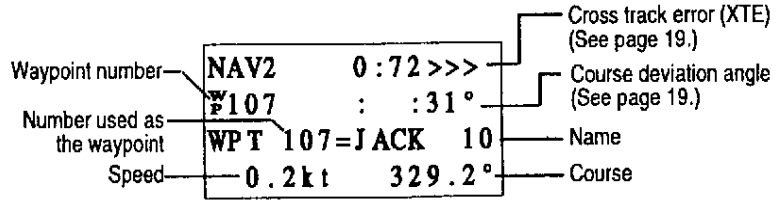
Reenter the point number.

```
NAV2        0.00
W P107      :00:
WPT 107=JACK 10
 15.0kt     359.9°
```

NAV1 screen during waypoint navigation



NAV2 screen during waypoint navigation



Canceling waypoint navigation

To cancel waypoint navigation, turn WPT to OFF on NAV2 screen.

MODE ⇨ SEL ⇨ ENT

Press to confirm.

Press until OFF screen appears.

Press until NAV2 screen appears.

"WP" and numbers are cleared (Display Off).

"OFF" message appears.

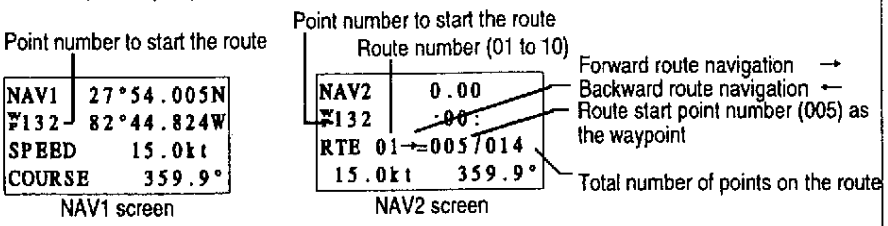
```
NAV2
          :  :
OFF
 15.0kt     359.9°
```

"WP" and number are cleared.

```
NAV1  27°54.005N
      82°44.824W
SPEED     15.0kt
COURSE    359.9°
```

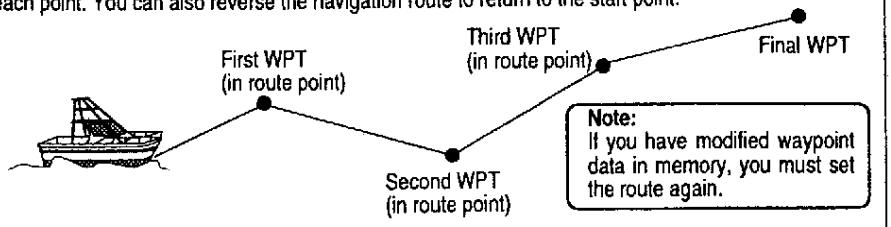
Route Setup

Following procedure shows how to set up a new navigation route using previously entered route number and route point number. Recall the first waypoint in NAV2 screen, by entering the route and route point number respectively. If you want to trace back the route, the direction of navigation can be reversed.

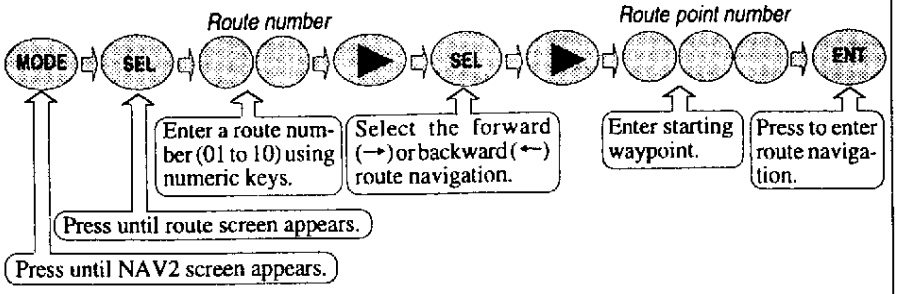


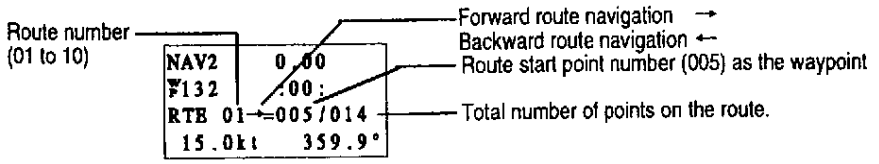
Selecting route navigation

You navigate on a route, following the course line, which is automatically updated as you enter each point. You can also reverse the navigation route to return to the start point.

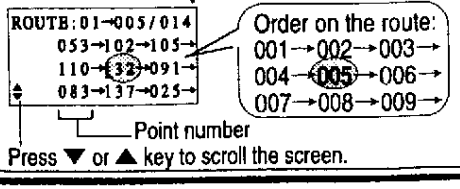


Note:
If you have modified waypoint data in memory, you must set the route again.



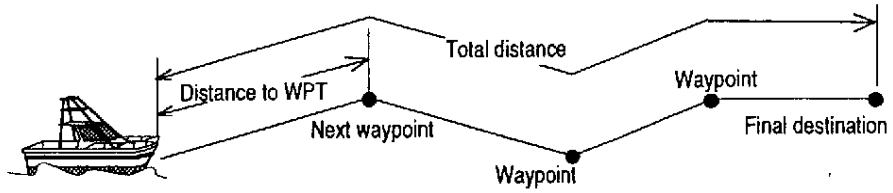


What is the route point number?



Example: Waypoint 32 is the 5th waypoint in this route.

Switching between distance to WPT and total distance

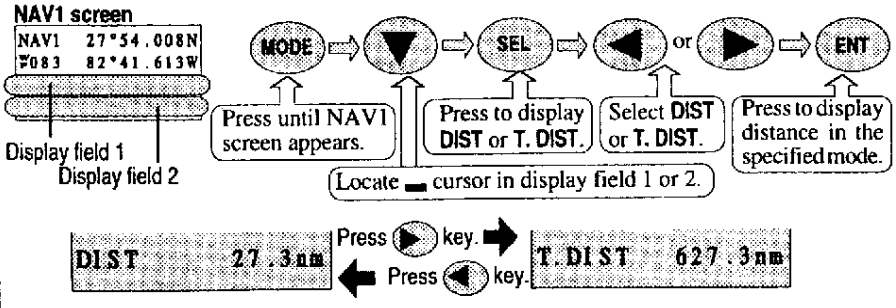


To switch the display between the distance (**DIST**) to the next waypoint and the total distance (**T. DIST**) to the final destination:

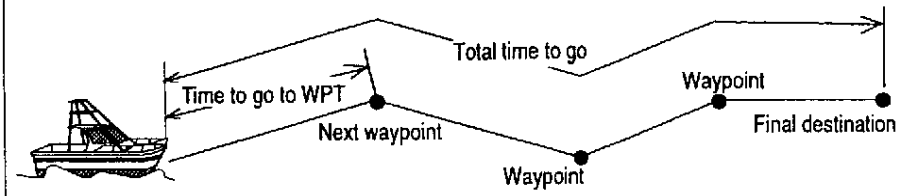
9999	Positioning has failed or the required distance has exceeded 9999 nm, sm, or km.

When "**DIST** (Distance)" is shown:
The distance to the next waypoint is shown.
When "**T.DIST** (Total Distance)" is shown:
The total distance required to arrive at final destination is shown (9999 nm, sm , km maximum).

NAV1 screen



Switching between time to go and total time

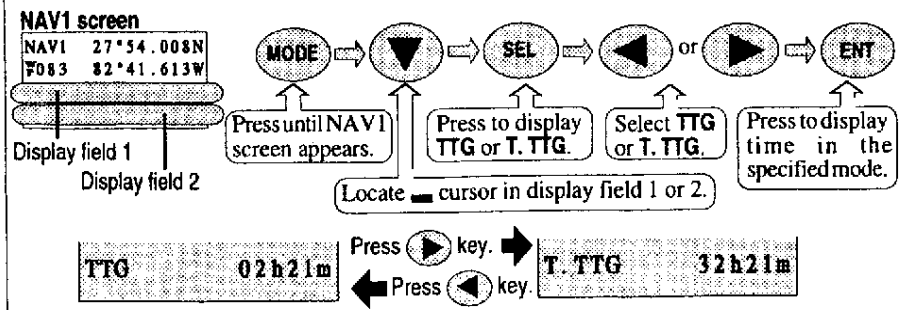


To switch the display between the time to go (**TTG**) to the next waypoint and the total time (**T.TTG**) required to the final destination:

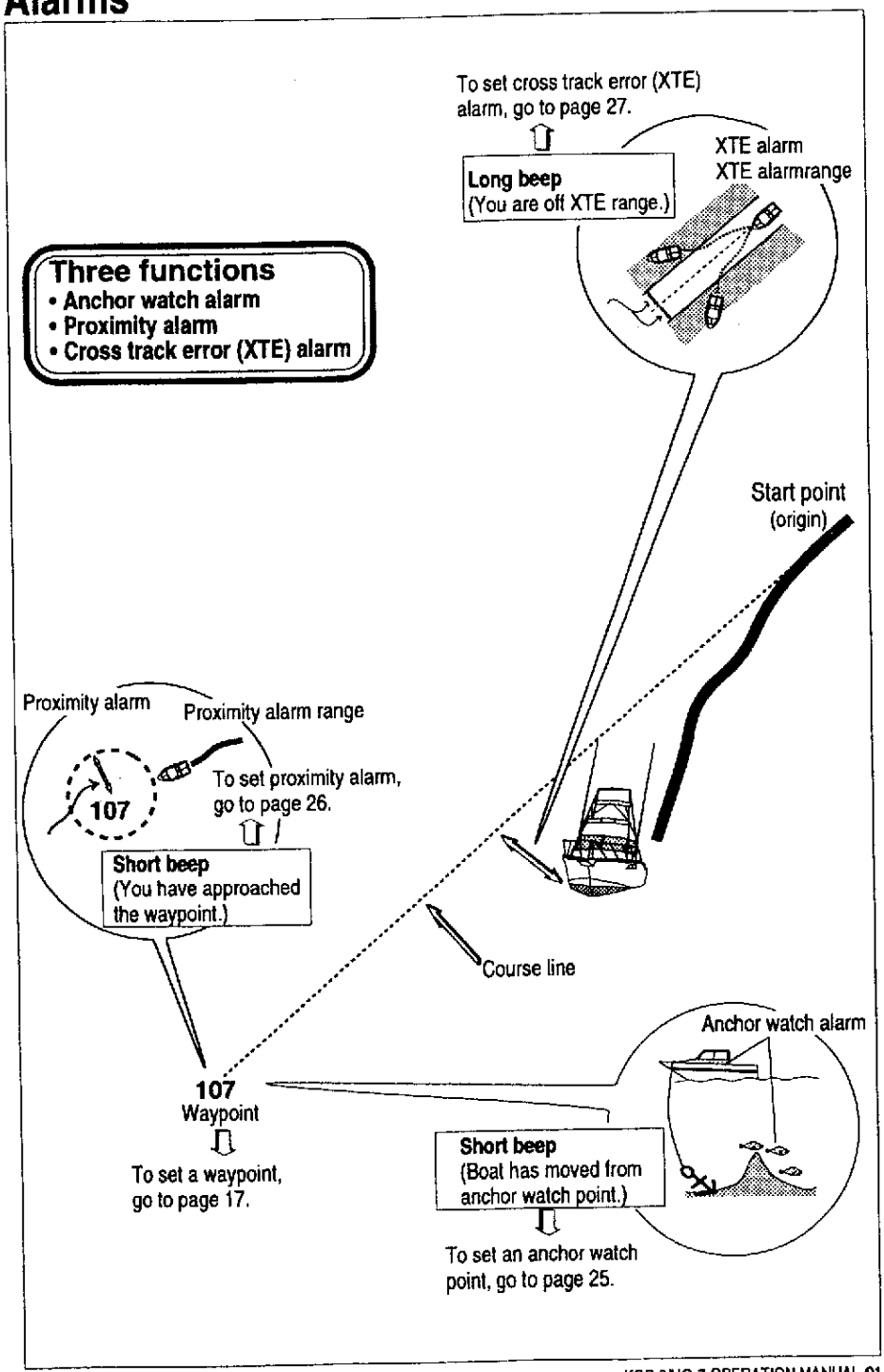
99h99m	Positioning has failed or the in route time has exceeded 99 hours 59 minutes.

When "**TTG** (Time to Go)" is shown:
The time to go to the next waypoint is shown.
When "**T.TTG** (Total Time)" is shown:
The total time required to arrive at final destination is shown (99 hours 59 minutes maximum).

NAV1 screen



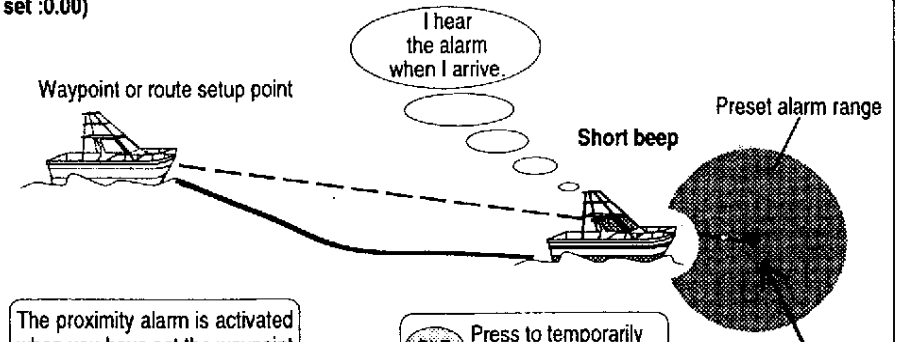
Alarms


To set cross track error (XTE) alarm, go to page 27.
Long beep
(You are off XTE range.)
XTE alarm
XTE alarmrange
Three functions
• Anchor watch alarm
• Proximity alarm
• Cross track error (XTE) alarm
Start point
(origin)
Proximity alarm
Proximity alarm range
107
To set proximity alarm, go to page 26.
Short beep
(You have approached the waypoint.)
Course line
Anchor watch alarm
107
Waypoint
To set a waypoint, go to page 17.
Short beep
(Boat has moved from anchor watch point.)
To set an anchor watch point, go to page 25.

Setting and Canceling a Proximity Alarm

What is a proximity alarm?

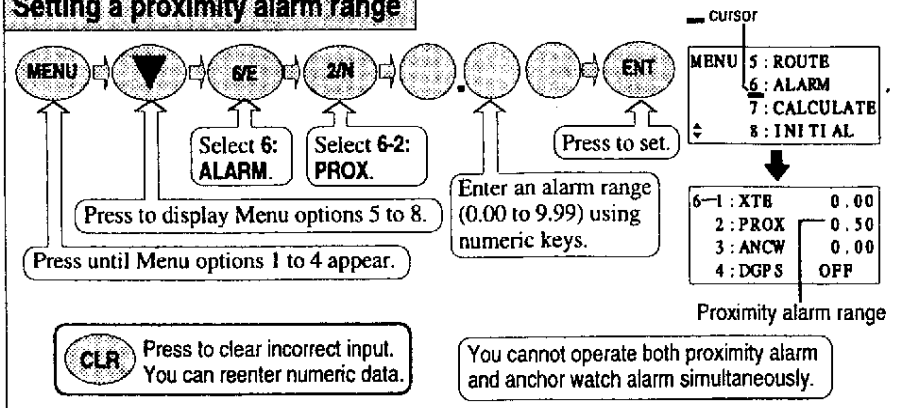
The buzzer sounds when you have arrived at the waypoint during waypoint or route navigation. This alarm is set automatically when you have selected the waypoint or route navigation. However, the proximity alarm does not operate if its alarm range is set to 0.00 or if an anchor watch alarm has been set. **(Initial set :0.00)**



The proximity alarm is activated when you have set the waypoint or route navigation.

CLR Press to temporarily stop the alarm sound.

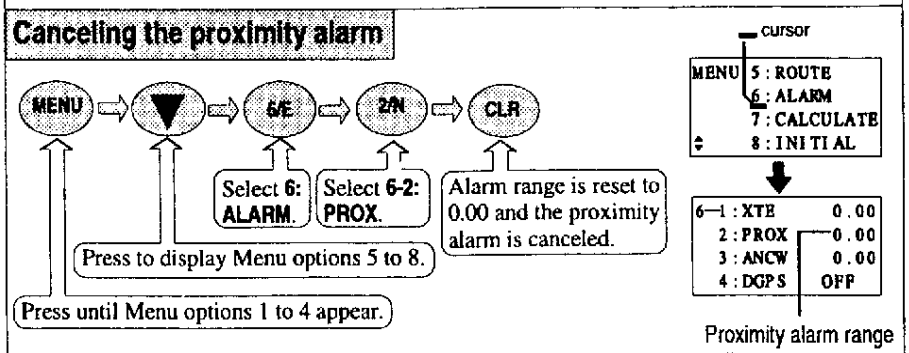
Setting a proximity alarm range



CLR Press to clear incorrect input. You can reenter numeric data.

You cannot operate both proximity alarm and anchor watch alarm simultaneously.

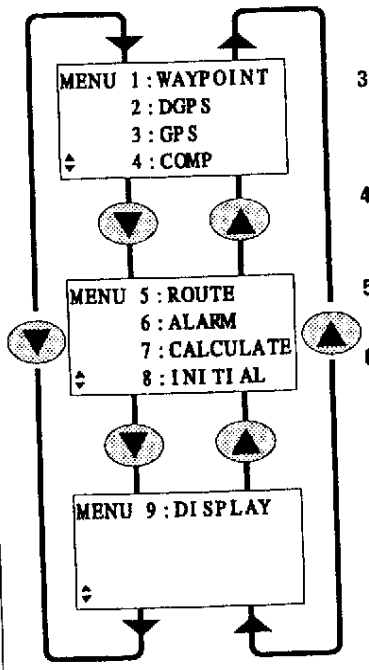
Canceling the proximity alarm



When you set an anchor watch alarm, the proximity alarm is canceled automatically.

Setup Procedure

Menu options

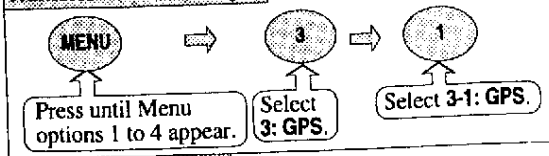


1. **Waypoints**
   Store, edit, copy, and erase waypoints.
   (see pages 11 to 19).
2. **Differential GPS (DGPS)** ..... See page 37.
   Select DGPS mode.
   Set DGPS timeout.
   Monitor DGPS data.
3. **GPS**
   Display GPS satellite status.
   Switch (2- and 3-dimensional) positioning modes.
   Set antenna height (above sea level).
   Select datum.
4. **Select or remove corrections.**
   Position correction (LAT/LONG or Loran C LOPs)
   Compass correction
   Set the time difference.
5. **Route**
   Store, set, cancel, and erase a route
   (see pages 11 to 16 and 20 to 23).
6. **Alarm**
   Enter alarm range and disarm alarms
   XTE alarm
   Proximity alarm
   Anchor watch alarm
   DGPS alarm ..... See page 37.
7. **Calculation**
   Distance and bearing between two points
   LAT/LONG into LOPs data conversion
8. **Initial value setup**
   Set average constants.
   Select distance, speed, and altitude units.
   Select and edit the output format.
   Set off timer.
9. **Display**
   Select the position indication (LAT/LONG or Loran C LOPs).
   Select 1/1000 or 1/100 minute in LAT/LONG position.
   Accumulated operation time.

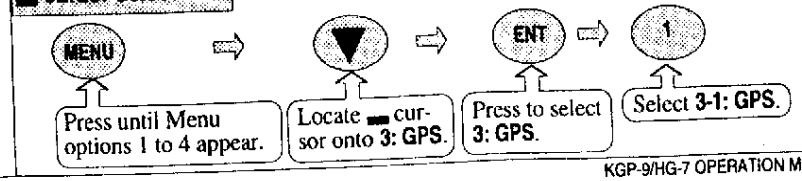
Selecting a Menu option

You can select an option on the Menu screen in two ways: by direct numeric number entry and by selection using ▬ cursor. This manual explains numeric key entry for easy understanding, but you can also use the cursor for option selection. The following compares these two methods when you check the GPS satellite signal monitor status (page 29) as an example:

Numeric number entry

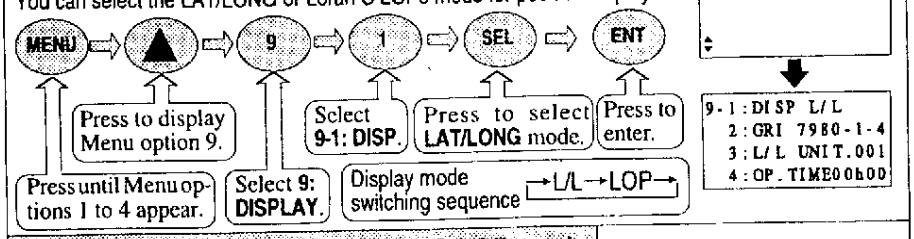


▬ cursor selection



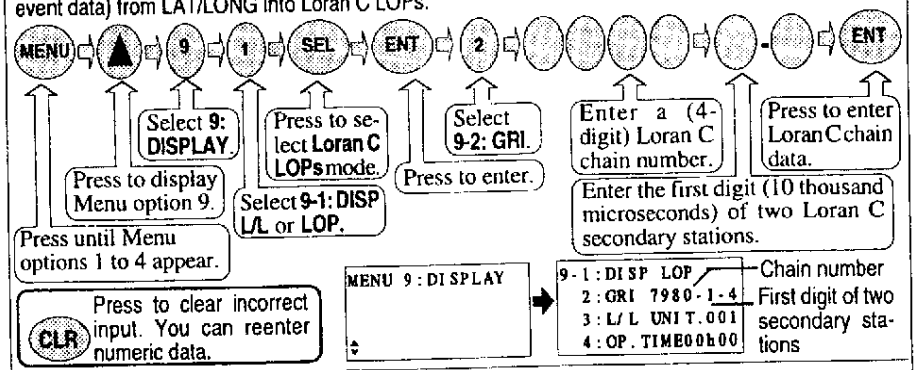
Displaying position data in LAT/LONG mode

You can select the LAT/LONG or Loran C LOPs mode for position display.



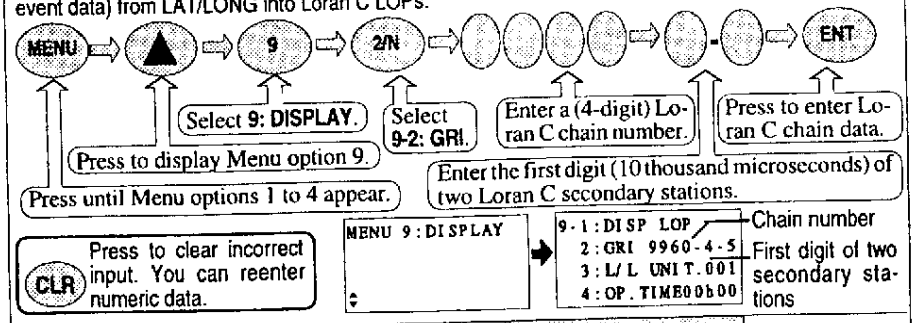
Displaying position data in Loran C LOP mode

You can convert both your present position given by GPS and stored position data (waypoints and event data) from LAT/LONG into Loran C LOPs.



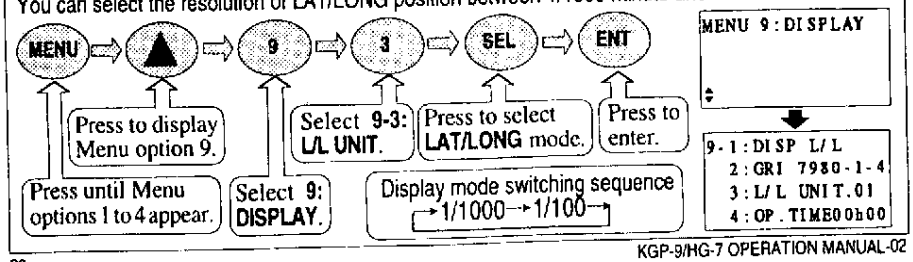
Changing Loran C chain

You can convert both your present position given by GPS and stored position data (waypoint and event data) from LAT/LONG into Loran C LOPs.



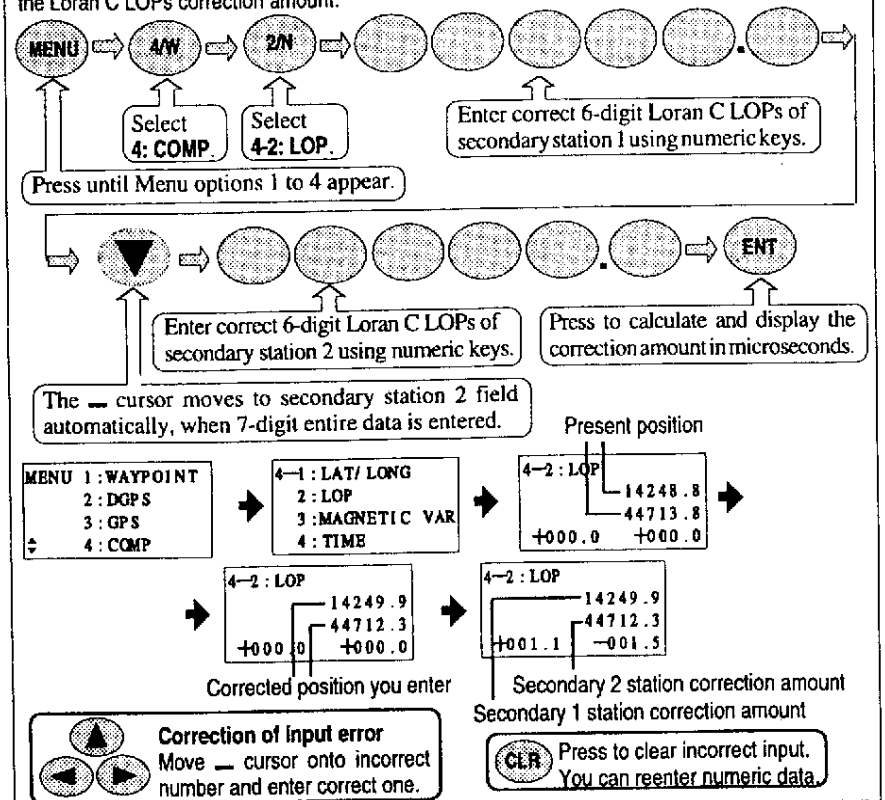
Changing the resolution in LAT/LONG position

You can select the resolution of LAT/LONG position between 1/1000 minute and 1/100 minute.



Correction by Loran C LOPs data entry

When your present position is indicated in Loran C LOPs mode, you can correct it by entering the Loran C LOPs correction amount.

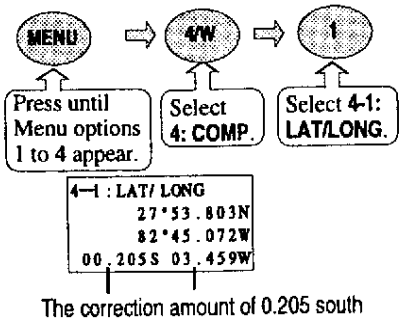


	Present position	Entered position	Correction amount
Secondary station 1	14248.8 µsec	14249.9 µsec	+001.1 µsec
Secondary station 2	44713.8 µsec	44712.3 µsec	−001.5 µsec

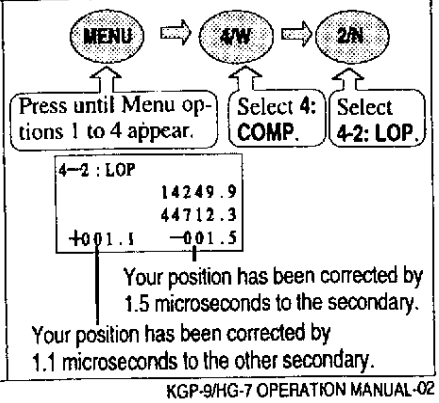
Check the correction amount

You can check the correction amount as follows:

LAT/LONG mode

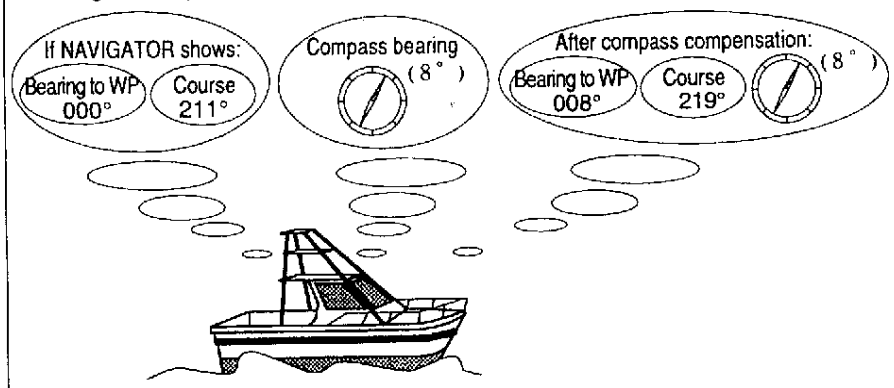


Loran C LOPs mode



Compensation of compass

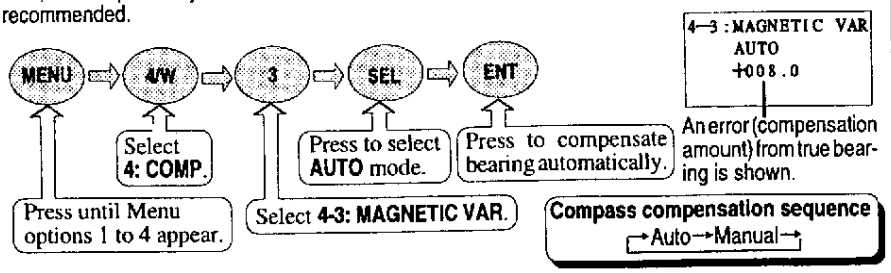
The course and bearing to waypoint are shown in true bearing. You can adjust the GPS true bearing to the magnetic compass bearing.



Automatic compensation

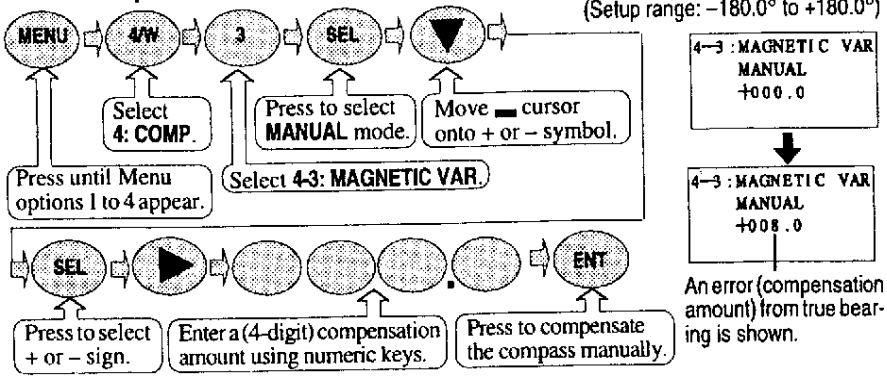
(Initial setup: **Auto**)

In the Auto mode, the magnetic compass is compensated based on the built-in global magnetic variation maps. However, avoid using this mode if you are higher than 75 degrees North or South latitude. Also, the compass may have a small error as the system contains world maps. Correction manually is recommended.



Manual compensation

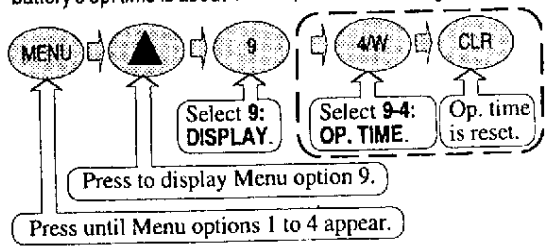
(Initial setup: 0°)
(Setup range: −180.0° to +180.0°)

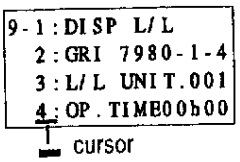


Accumulated OP. (operation) time

(Initial setup: **00:00**)

This function displays the accumulated operation time with batteries. Typical alkaline battery's op. time is about 10 hours, and standard battery's op. time is about 4 hours, when the backlight of the display is off.



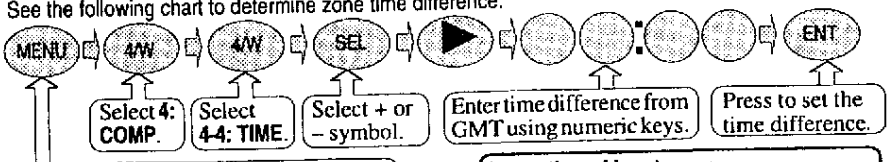


The unit will automatically shut off when battery voltage becomes lower than minimum operating voltage.

Displaying local time

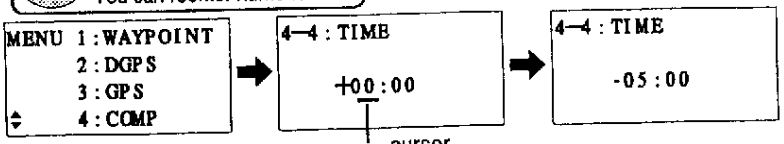
(Initial setup: **00:00**)

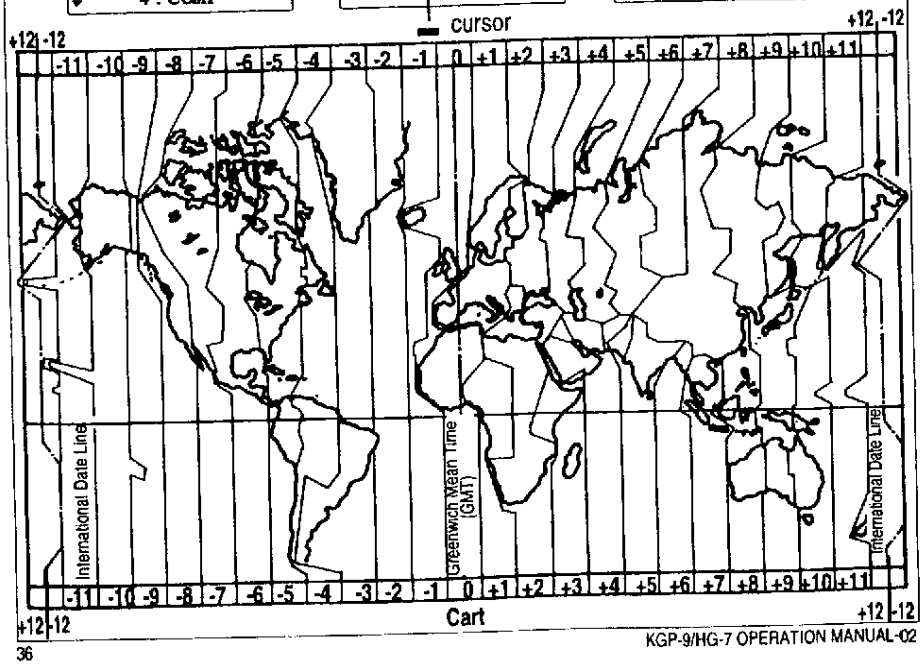
You can display your local time by entering a time difference from the Greenwich Mean Time (GMT). See the following chart to determine zone time difference.



Correction of input error
Move ▬ cursor onto incorrect number and enter correct one.

CLR Press to clear incorrect input. You can reenter numeric data.

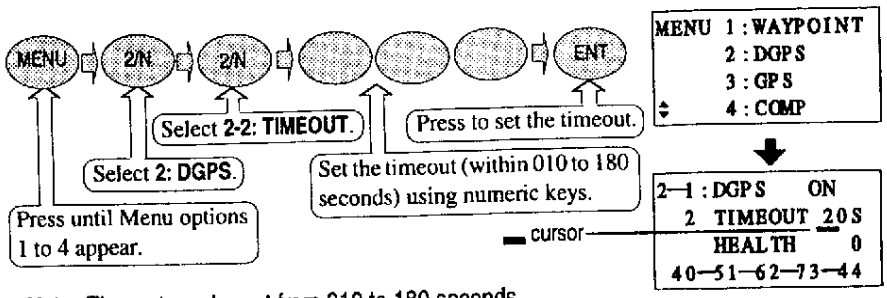




Setting a DGPS timeout

(Initial time: **100** sec)

If the correction data from a beacon receiver is interrupted or with errors, NAVIGATOR holds the last differential correction for the duration of the time out. You can set TIMEOUT to 10 to 180 seconds. However position accuracy degrades as TIMEOUT becomes longer.



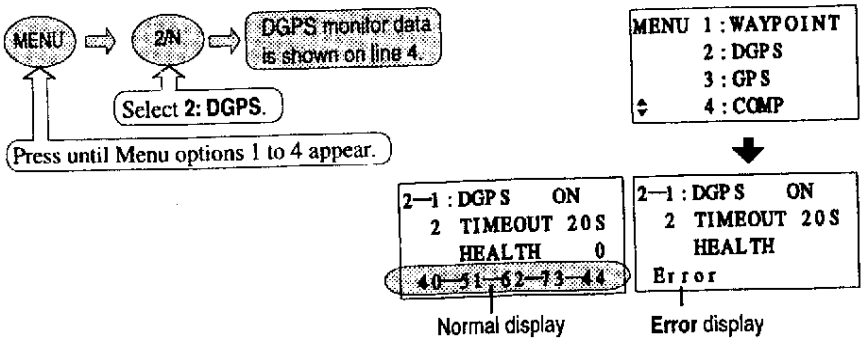
Note: Timeout can be set from 010 to 180 seconds.

Correction of input error

◀ ▶ Move ▬ cursor onto incorrect number and enter correct one.

Monitoring DGPS measurement

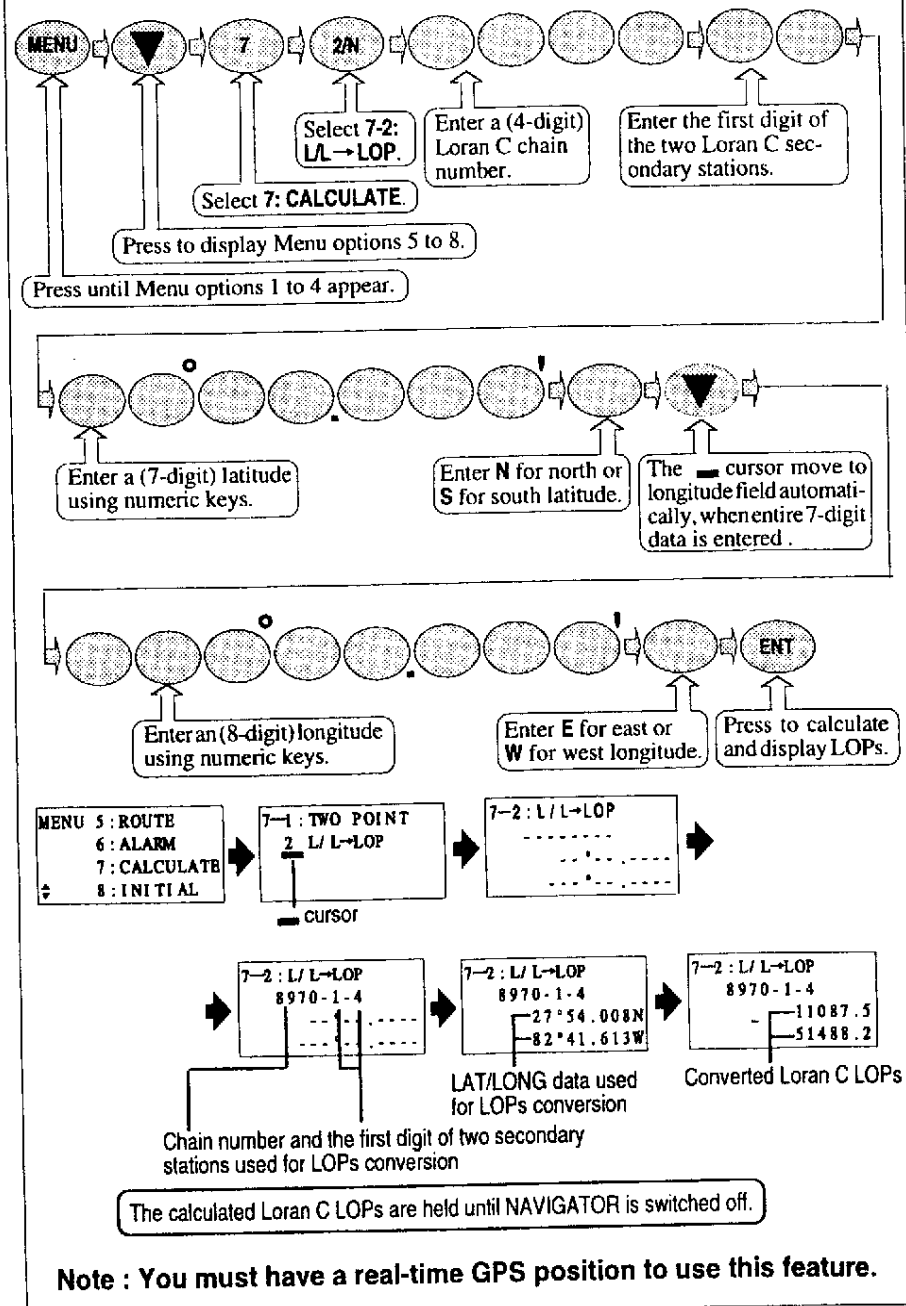
You can monitor RTCM SC-104 format data sent from beacon receiver. If the communication fails due to baud rate matching error or others, an Error message appears.



HEALTH indicates health status of reference station.
0 is best. Reliability degrades as the number increases up to **5**.
6 indicates reference station not monitored.
7 means reference station not working.

Calculating Loran C LOPs based on LAT/LONG data

When you enter a Loran C chain number and the first digit of two secondary stations, NAVIGATOR calculates the Loran C LOPs based on the specified LAT/LONG data and displays the LOP values.



Note : You must have a real-time GPS position to use this feature.

Troubleshooting Guide

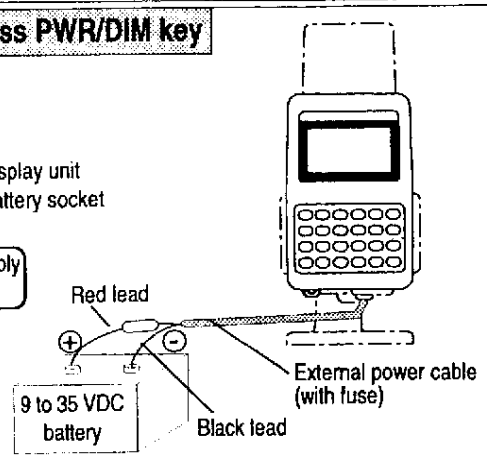
If NAVIGATOR does not function properly, check the following items. If the problem continues, call for service.

Nothing appears when you press PWR/DIM key

Check the following points:

- Blown fuse
- Low battery voltage
- Poor contact of external power cable to display unit
- Poor contact of external power cable to battery socket

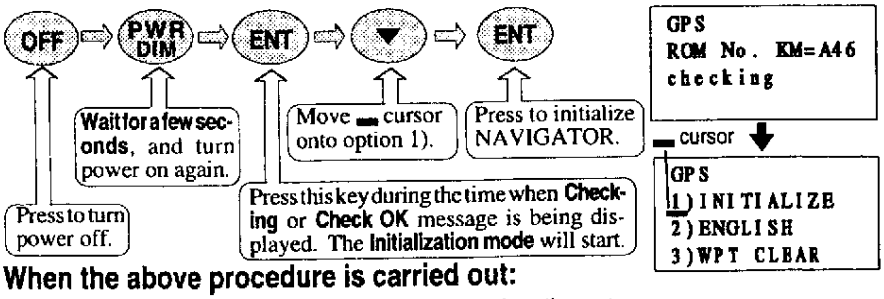
WARNING! Always turn Off the power supply before replacing the fuse.



No information appears on the screen (during initial setup)

Check the following points.

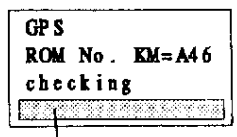
- The antenna cable may not be connected securely between the antenna and receiver.
- If signals not received, or key operation not effective, try the following steps.



When the above procedure is carried out:

- The stored position data is NOT lost even when you perform these steps.
- The present positioning data is erased and NAVIGATOR returns to the initial setup.
- All setup parameters are initialized and you need to set them again.

Error message appears as you power on (Self-test function)



Error message display area

Error message list	
BACKUP ERROR	An error has occurred in backup RAM.
ROM changed	A checksum error has occurred.
RAM ERROR	A RAM error has occurred.
ERR RAM adrs	An error has occurred in backup RAM.
ERR RAM data	Mismatching between write and read data has occurred.
ERR LSI	An KCD-57 internal error has occurred.
RTC ERROR	An RTC operation error has occurred.

- If you have replaced the ROM chip, the **ROM changed** message may appear. In this case, turn on the power switch again.
- If display of **ERROR** message is in the above table, **CHECK START** and **END checksum** is sequentially repeated, call for service.

Specifications

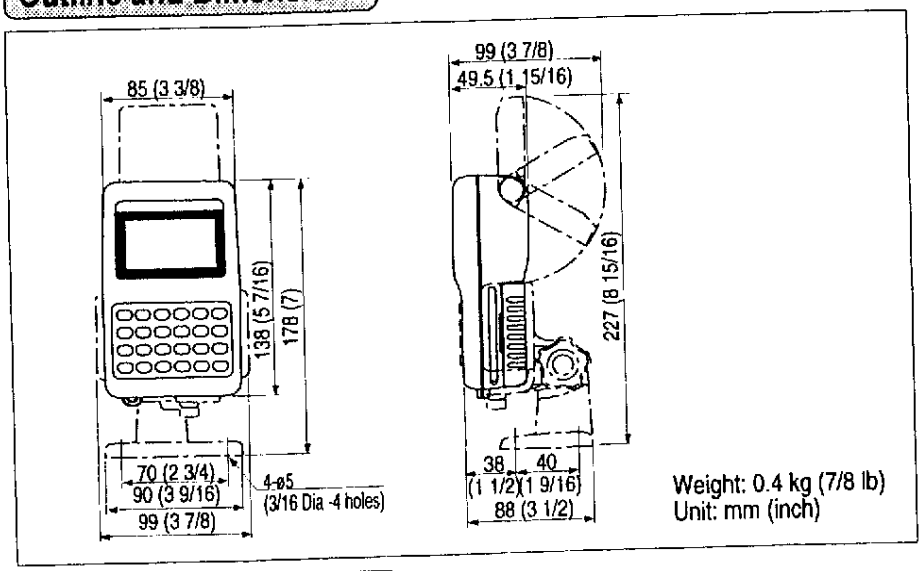
Major Specifications

GPS receiver section		
Receiving frequency		1575.42 MHz ±1 MHz
Receiving channel		Digital 11-channel parallel/sequential
Receiving code		C/A code
Sensitivity		Better than -130 dBm (elevation angle: 5° or over)
Tracking speed		200 knots maximum
Accuracy (PDOP≦3)	**Position**	15 meters RMS (without SA), 100 meters 2DRMS (with SA)
	Velocity	0.1 knot RMS (without SA)
Note: Accuracy is subject to change in accordance with DoD civil GPS user policy.		
GPS display section		
Display		LCD with backlight (16 x 4 characters, usual picture area: 56.9 x 27.2 mm)
Display mode		NAV1, NAV2, NAV3, MOB (Man Over Board), MENU
Position data display		Latitude/longitude in increments of 1/1000 minute or converted Loran C LOPs
Differential		ON, OFF, AUTO
Navigational display		Speed, course, velocity made good/course made good/elapsed time, altitude, distance/bearing/cross track error/course deviation/time to go to waypoint, total time to go and distance on route, DOP value, present time (UTC or LTC), satellite status, distance/bearing between two points, MOB display, operation time, off timer
Instant (event) memory		20 points
Waypoint memory		130 points (usable as waypoint)
Route memory		10 routes (Max. 130 waypoints) with reverse trail
Alarm		Proximity, cross track error, anchor watch, DGPS
Position compensation		latitude/longitude, Loran C LOPs, Datum
Magnetic compensation		Auto or manual
Parameters		LOP conversion, memory of waypoints and name (up to 8 letters), selection of measuring unit (nm,sm,km), antenna height, averaging (smooth) factor, position mode (2D or 3D automatic selection)
Input data format		RTCM SC-104 (for DGPS: 4800 baud rate)
Output data format		NMEA-0183 (AAM, APB, BOD, BWC, GGA, GLL, GSA, GSV, GTD, RMB, RMC, SGR, VTG, WDC, WPL, XTE, and ZDA), NMEA 1, NMEA 2, CIF, SHIPMATE 0183
Data output interval		1 second (CIF, SHIP, and NMEA 1), 3 seconds (NMEA 2), and 1 to 99 seconds selectable (NMEA-0183)
Data level		RS-232C
Memory protection		By built-in battery
Power supply		4AA alkaline/mangan batteries or 9 to 35 VDC
Power consumption		2 W or less (9 to 35 VDC)
Environmental condition		Display unit: -10° to +60°C (14° to 140°F) Antenna unit: -30° to +70°C (-22° to 158°F)

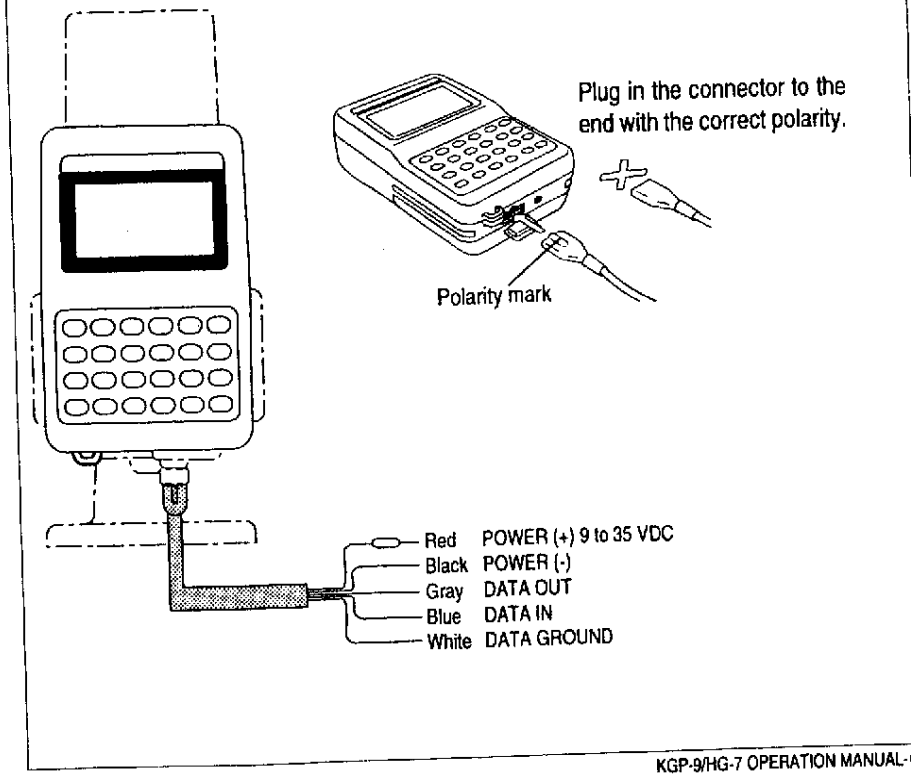
*** Specifications subject to change without notice.**

Outline and Dimensions

Scale differs among drawings.

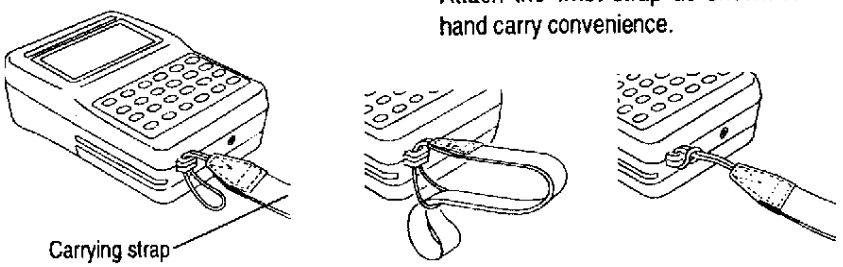


Interconnecting Diagram

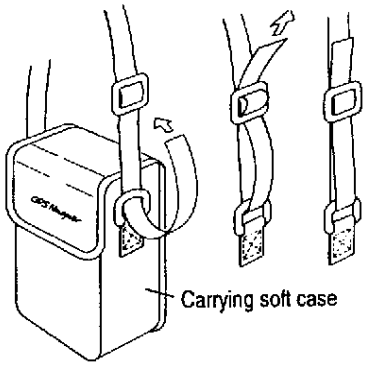


Installing carrying strap

Attach the wrist strap as shown for hand carry convenience.



Installing shoulder belt

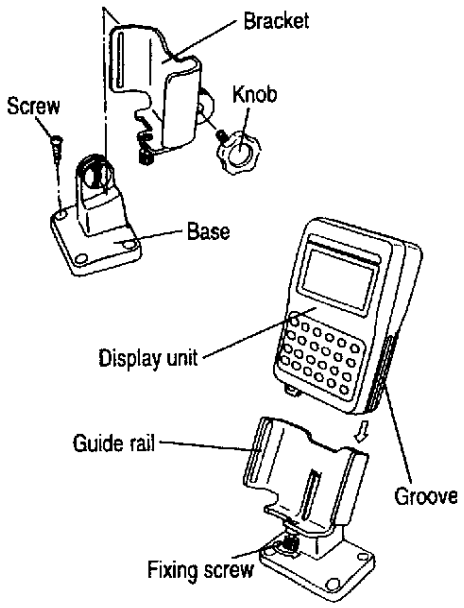


(1) Pass the belt end through the ring at side of carrying soft case.

(2) Pass the belt end through the ring on the belt.

Installing the mounting bracket

Optional – Not included

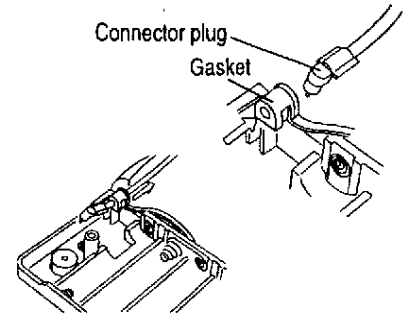


(1) Install the base with screws supplied at desired installation site.

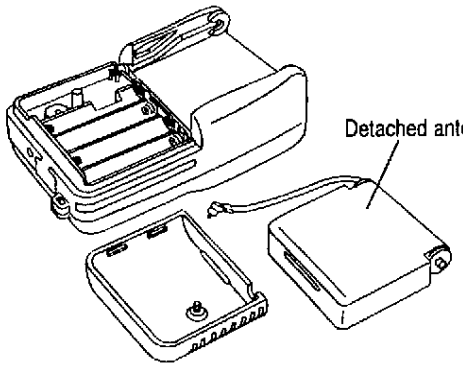
(2) Set the bracket at desired angle and set it using the knob.

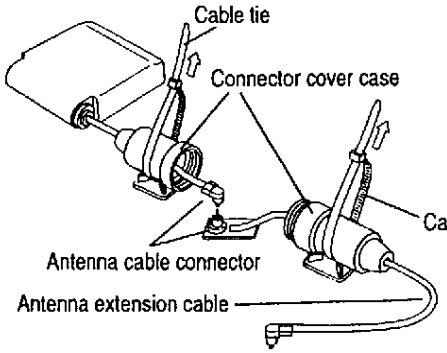
(3) Slide unit to the bottom with the guide rail fitting into the groove.

(4) Secure the unit to the mounting bracket with the fixing screw.

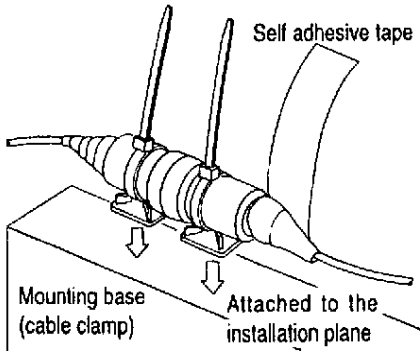


(7) Remove the twisted wire tape and pull out the connector through the gasket.





(8) Before making a connection, each half of the connector cover case should be attached to the end of both cables as illustrated.



(9) After wrap up connector junction by self adhesive tape supplied in kit, close the case by twisting from both sides.

(10) Put adhesive tape at both end of the case for sealing.

(11) Secure tie-wrap of the mounting base. Then attach both mounting bases to installation place with adhesive material at the bottom.

Local geodetic systems

In alphabetical order

Name	No.	Name	No.
ALASKA/CANADA	04	LIBERIA 64	57
ARC 50	29	MAHA 71	58
ARC 60	30	MALAYSIA	23
ARGENTINA	39	MALDIVE	48
ASCENSION	31	MARCUS	35
AUSTRALIAN 84	06	MARSHALL	82
BAHRAIN	27	MASCARENE	73
BERMUDA	37	MIDWAY 61	62
BRAZIL	45	MOROCCO	61
CANARY	68	NAD-27	03
CAYMAN BRAC	56	NAD-83	10
CHATHAM	43	NEW GEORGIA	46
COCOS	28	NEW ZEALAND	13
COLOMBIA	38	NIGERIA	63
CORVO/FLORES	65	OMAN	67
DIEGO GARCIA	52	PARAGUAY	44
DJAKARTA	22	PHILLIPPINES	19
EAST FALKLAND	76	PHOENIX	40
EAST MALAYSIA	79	PITCAIRN	69
EASTER	47	PORTO SANTO	77
EFATE	36	PUERTO RICO	71
EGYPT	66	QATAR	72
ENGLAND	20	ROME 40	15
ERITREA	60	SALVAGE	59
ETHIOPIA	25	SANTA MARIA	75
EUROPEAN 50	05	SANTO	74
EUROPEAN 79	14	SAUDI ARABIA	17
FAIAL	78	SOMALIA	26
FIJI	81	SOUTH AFRICA	16
FINLAND	84	SOUTH AMERICA	08
FLORIDA	41	SOUTH ASIA	07
GREENLAND	09	SOUTH CHILE	70
GUADAL CANAL	50	SRI LANKA	54
GUAM 63	49	ST. HELENA	34
HAWAII	21	SURINAM	83
HONG KONG 63	51	SWEDEN	85
ICELAND 55	11	TERN	33
IRELAND 65	12	TOKYO	02
INDIAN/NEPAL	18	TRINIDAD	64
IWO JIMA	32	TRISTAN	80
JAPAN	24	TUNISIA	42
JOHNSTON	53	WGS-72	01
KELGUELEN	55	WGS-84	00

In numerical order

No.	Name	No.	Name
00	WGS-84	43	CHATHAM
01	WGS-72	44	PARAGUAY
02	TOKYO	45	BRAZIL
03	NAD-27	46	NEW GEORGIA
04	ALASKA/CANADA	47	EASTER
05	EUROPEAN 50	48	MALDIVE
06	AUSTRALIAN 84	49	GUAM 63
07	SOUTH ASIA	50	GUADAL CANAL
08	SOUTH AMERICA	51	HONG KONG 63
09	GREENLAND	52	DIEGO GARCIA
10	NAD-83	53	JOHNSTON
11	ICELAND 55	54	SRI LANKA
12	IRELAND 65	55	KELGUELEN
13	NEW ZEALAND	56	CAYMAN BRAC
14	EUROPEAN 79	57	LIBERIA 64
15	ROME 40	58	MAHA 71
16	SOUTH AFRICA	59	SALVAGE
17	SAUDI ARABIA	60	ERITREA
18	INDIAN/NEPAL	61	MOROCCO
19	PHILLIPPINES	62	MIDWAY 61
20	ENGLAND	63	NIGERIA
21	HAWAII	64	TRINIDAD
22	DJAKARTA	65	CORVO/FLORES
23	MALAYSIA	66	EGYPT
24	JAPAN	67	OMAN
25	ETHIOPIA	68	CANARY
26	SOMALIA	69	PITCAIRN
27	BAHRAIN	70	SOUTH CHILE
28	COCOS	71	PUERTO RICO
29	ARC 50	72	QATAR
30	ARC 60	73	MASCARENE
31	ASCENSION	74	SANTO
32	IWO JIMA	75	SANTA MARIA
33	TERN	76	EAST FALKLAND
34	ST. HELENA	77	PORTO SANTO
35	MARCUS	78	FAIAL
36	EFATE	79	EAST MALAYSIA
37	BERMUDA	80	TRISTAN
38	COLOMBIA	81	FIJI
39	ARGENTINA	82	MARSHALL
40	PHOENIX	83	SURINAM
41	FLORIDA	84	FINLAND
42	TUNISIA	85	SWEDEN

NOTES PAGE