FURUNO

INSTALLATION MANUAL

GPS NAVIGATOR

MODEL GP-32

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NISHINOMIYA, JAPAN

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•Your Local Agent/Dealer

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GP-32/37
(DAMI)

⚠ SAFETY INSTRUCTIONS

Safety Instructions for the Operator

⚠ WARNING

Do not open the equipment.

Only qualified personnel should work inside the equipment.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

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

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

Use the proper fuse.

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

NOTICE

Be sure the power supply is compatible with the equipment.

Incorrect power supply may cause the equipment to overheat.

The useable temperature range for the antenna unit is -25°C to 70°C;
-15°C to 55°C for the display unit.

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

Safety Instructions for the Installer

⚠ WARNING

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

Improper handling can result in electrical shock.

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

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

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

Connection of an incorrect power supply can cause fire or equipment damage. The voltage rating of the equipment appears on the label above the power connector.

Use the proper fuse.

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

NOTICE

Observe the following compass safe distances to prevent interference to a magnetic compass:

	Standard compass	Steering compass
Display unit	0.8 m	0.55 m

TABLE OF CONTENTS

FOREWORD

A Word to the Owner of the GP-32

GP-32 GPS Navigator.

For over 50 years FURUNO Electric Company has enjoyed an enviable reputation for innovative and dependable marine electronics equipment. This dedication to excellence is furthered by our extensive global network of agents and dealers.

Your navigator is designed and constructed to meet the rigorous demands of the marine environment. However, no machine can perform its intended function unless installed, operated and maintained properly. Please carefully read and follow the recommended procedures for installation, operation, and maintenance.

We would appreciate hearing from you, the end-user, about whether we are achieving our purposes.

Thank you for considering and purchasing FURUNO equipment.

Features

The GP-32 is a totally integrated GPS receiver and video plotter, and mainly consists of a display unit and an antenna unit.

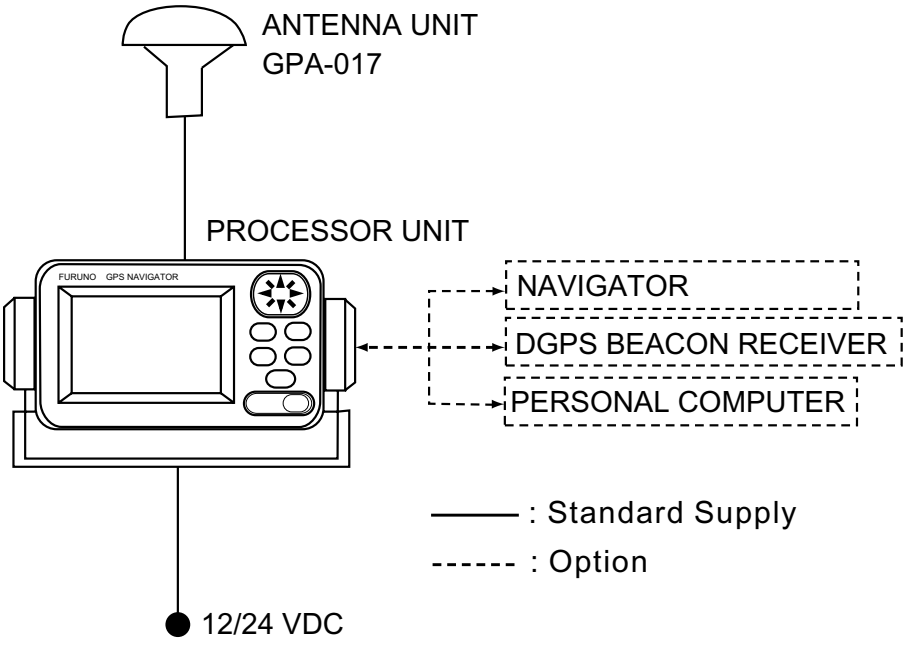
The high sensitivity GPS receiver tracks up to 13 satellites (12 GPS, 1 WAAS) simultaneously. An 8-state Kalman filter ensures optimum accuracy in determination of vessel position, course and speed.

The main features of the GP-32 are

- A DGPS beacon receiver may be connected to the GP-32 to add DGPS capability.
- WAAS capability.
- Storage for 999 waypoints and 50 routes
- Alarms: Arrival/Anchor Watch, XTE (Cross-track Error), Trip, Odometer, Time, WAAS/DGPS, and Speed.
- Man overboard feature records position at time of man overboard and provides continuous updates of range and bearing when navigating to the MOB position.
- Bright 95 x 60 mm LCD with adjustable contrast and brilliance.
- Autopilot (option) may be connected, and steering data output to the autopilot.
- Unique Highway display provides a graphic presentation of ship’s progress toward a waypoint.
- User displays definable by operator.
- Waypoint and route data can be uploaded from a PC and downloaded to a PC.

SYSTEM CONFIGURATION

Note: This equipment is intended for use on marine vessels. Do not use it in other applications.



GP-32 system configuration

1. INSTALLATION

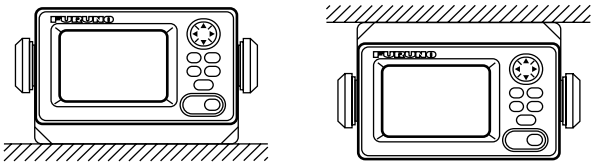
1.1 Installation of Display Unit

Mounting considerations

The display unit can be installed on a desktop, on the overhead, or in a panel (optional flush mounting kit required). Refer to the outline drawings at the end of this manual for installation instructions. When choosing a mounting location, keep in mind the following points:

- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Locate the unit away from equipment which generates electromagnetic fields such as a motor or generator.
- Allow sufficient maintenance space at the sides and rear of the unit and leave sufficient slack in cables, to facilitate maintenance and servicing.
- Observe compass safe noted on page ii to prevent interference to a magnetic compass.

Desktop and overhead mounting



Desktop Overhead

Desktop and overhead mounting methods

Flush mounting

There are two types of flush mounting kits. For details, see the outline drawings at the end of this manual.

Flush mount F kit

Flush mount F kit
Type: OP20-29 Code No. 000-041-405

Name	Type	Code No.	Qty
Cosmetic panel	20-016-1051	100-251-370	1
Tapping screw	5X20 SUS304	000-802-840	4
Hexagon-head bolt	M6X12 SUS304	000-862-127	2
Spring washer	M6 SUS304	000-864-260	2

1. Using the template (supplied), cut out a hole 92(H)X183(W) in the mounting location.
2. Fasten the cosmetic panel to the display unit with hexagon-head bolts and spring washers.
3. Set the display unit to the mounting location and fix it with tapping screws.

Flush mount S kit

Flush mount S kit
Type: OP20-17 Code No. 000-040-720

Name	Type	Code No.	Qty
Flush mount fixture	20-007-2401	100-183-190	2
Hexagon-head bolt	M6X12 SUS304	000-862-127	2
Wing bolt	M4X30 YBSC2 MBN12	000-804-799	4
Wing nut	M4 YBSC2 MBN12	000-863-306	4
Spring washer	M6 SUS304	000-864-260	2

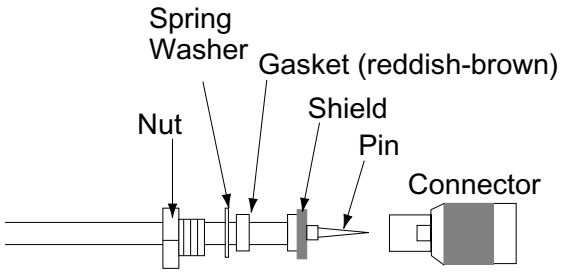
1. Using the template (supplied), cut out a hole (92(H)X167(W)) in the mounting location.
2. Fix the two flush mount fixtures to the display unit with hexagon-head bolts and spring washers.
3. Screw in wing nut in wing bolt.
4. Set the display unit to the mounting location and fix it with wing bolts and wing nuts from the rear side.

1.2 Installation of Antenna Unit

Mounting considerations

Install the antenna unit referring to the antenna installation diagram at the end of this manual. When choosing a mounting location for the antenna unit, keep in mind the following points:

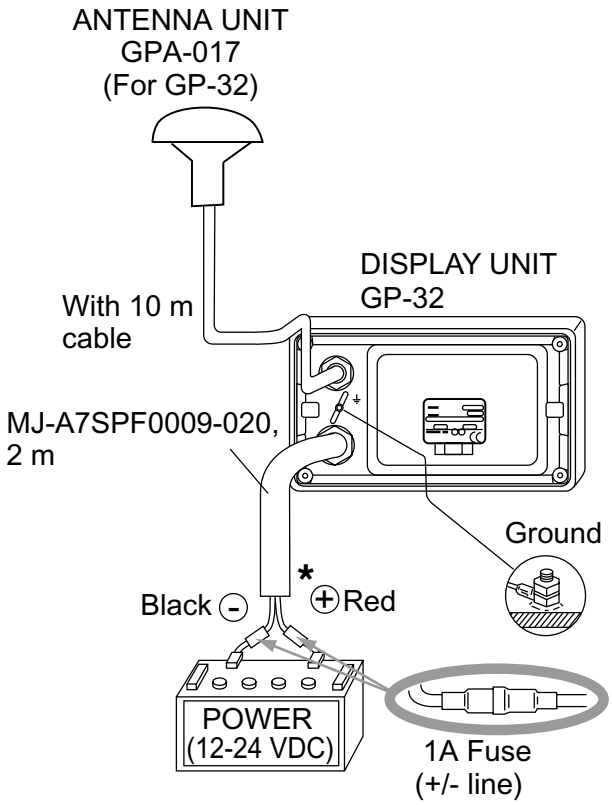
- Do not shorten the antenna cable.
- The antenna unit can be installed three ways: screwed into a pipe (local supply), fixed to a post with the optional mast mounting kit, or screwed into an optional mounting base. For fixing by post or pipe, it is recommended to use stays to secure the post or pipe to prevent damage to the GPS receiver by vibration.
- Choose a location out of the radar beam. The radar beam will obstruct or prevent reception of the GPS signal.
- The location should be well away from a VHF/UHF antenna. A GPS receiver is interfered by a harmonic wave of a VHF/UHF antenna.
- There should be no interfering object within the line-of-sight to the satellites. Objects within line-of-sight to a satellite, for example, a mast, may block reception or prolong acquisition time.
- Mount the antenna unit as high as possible to keep it free of interfering objects and water spray, which can interrupt reception of GPS satellite signal if the water freezes.
- See the outline drawing for the antenna unit at the back of this manual for minimum separation distances from other antennas.
- If the antenna cable is to be passed through a hole which is not large enough to pass the connector, you may unfasten the connector with a needle nose pliers and 3/8-inch open-end wrench. Refasten it as shown below, after running the cable through the hole.



How to assemble the connector

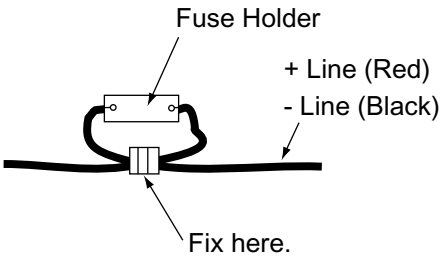
1.3 Wiring

The illustration below shows where to connect cables on the rear of the display unit. Please review the INSTALLATION GUIDELINES at the front of this manual before wiring the equipment.



Wiring

Note: The fuse holder contains a spring that fixes the fuse. To prevent detachment of the spring, which would cause loss of power, tie the line as shown below.



How to fix spring in fuse holder

Grounding

The display unit contains a CPU. While it is operating, it radiates noise, which can interfere with radio equipment. Ground the unit as follows to prevent interference:

- The ground wire for the display unit should be 1.25sq or larger and as short as possible.
- The signal ground and frame ground are separated, however the power line is not isolated. Therefore, do not connect the signal ground to the frame ground when connecting other equipment to a positive ground battery.

External equipment

The power supply port is commonly used for connection of external equipment such as a radar. Refer to the interconnection diagram on page S-1 or S-2 for connection of external equipment.

1.4 Initial Settings

This equipment can output navigation data to external equipment, in NMEA 0183 format. For example, it can output position data to a radar or echo sounder for display on its display screen.

Output data format, data sentences

NMEA 0183 version 1.5 or 2.0 can be selected from the I/O SETUP menu.

DATA1: Current loop data

With waypoint		
AP	REM1	REM2
GLL	GLL	GLL
VTG	GGA	GGA
ZDA	VTG	VTG
AAM[*2]	ZDA	ZDA
APB[*2]	RMC	RMA (Ver 2.0)[*1]
BOD[*2]	RMB[*2]	GTD (Ver 1.5)[*1]
BWC[*2]		RMC
XTE[*2]		RMB[*2]
(1 s interval)	(1s interval)	BWC[*2] (2 s interval)

[*1]: Output when Loran C TDs are displayed.

[*2]: Not output when no waypoint is set.

AP: Autopilot

REM1/REM2: Radar, echo sounder, etc.

DATA2: RS-232C level

With waypoint	
AP	REM
GLL	GLL
VTG	GGA
ZDA	VTG
AAM[*2]	ZDA
APB[*2]	RMA (Ver 2.0)[*1]
BOD[*2]	GTD (Ver 1.5)[*1]
BWC[*2]	RMC
XTE[*2]	RMB[*2]
	BWC[*2]

[*1]: Output when Loran C TDs are displayed.

[*2]: Not output when no waypoint is set.

DATA2

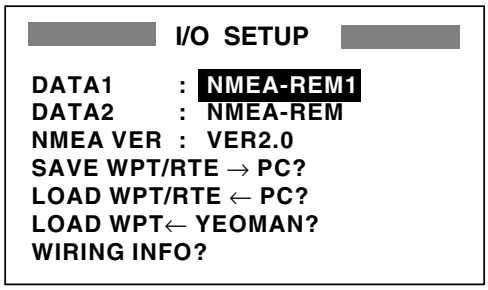
External Beacon Receiver Setting	Internal Beacon Receiver Setting
Output GGA MSK Input Correction data of external beacon receiver	Output of internal beacon receiver's correction data (correction data and $CRMSS)
BEACON on WAAS/DGPS SETUP menu set to EXT	BEACON on WAAS/DGPS SETUP menu set to INT

Data sentence description

Sentence	Description
AAM	Arrival alarm
APB	Autopilot data (XTE and bearing to waypoint)
BOD	Bearing from own ship to destination
BWC	Range and bearing to waypoint (great circle navigation)
GGA	GPS position fixing condition (time of fix, latitude, longitude, receiving condition, number of satellites used, DOP)
GLL	Latitude and longitude
GTD	Loran-C time difference
RMA	Generic navigational information (latitude, longitude, Loran-C time differences, ground speed, true course
RMB	Generic navigational information (cross track error, steering direction, starting waypoint no., destination waypoint no., latitude and longitude of starting waypoint, latitude and longitude of destination waypoint, range and bearing to waypoint, range and bearing from present position to destination waypoint, velocity to destination, arrival alarm)
RMC	Generic navigational information (UTC time, latitude, longitude, ground speed, true course, day, month, year)
VTG	Actual track and ground speeds
XTE	Course error amount and direction to steer
ZDA	UTC time (day, month, year)

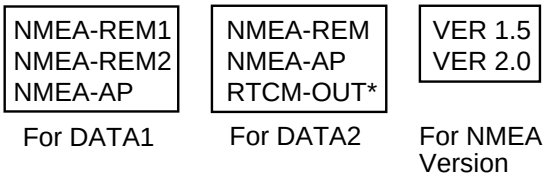
Output setting

1. Press the [MENU] key once or twice to open the menu.
2. Choose I/O SETUP.
3. Press the [ENT] key.



I/O SETUP menu

4. Choose DATA1, DATA2 or NMEA VER as appropriate.
5. Press the [ENT] key. One of the following screens appears depending on the item selected at step 4.



DATA1, DATA 2 and NMEA version options

6. Use ▲ or ▼ to choose desired option.
   NMEA-REM1, 2: Output data to radar, echo sounder, etc.
   NMEA-AP: Output data to an autopilot.
   RTCM-OUT: Choose when equipped with internal DGPS beacon receiver (GP-37).
   VER 1.5, 2.0: Choose the NMEA version of external equipment. If you are unsure of the version number, try both and choose the one which successfully outputs data.
7. Press the [ENT] key.
8. Press the [MENU] key twice to finish.

APPENDIX

Menu Tree

Default settings shown in bold italics.

- MENU
  - WAYPOINTS — ***LIST***, NEAREST
  - ROUTES
    - VOYAGE ROUTE (START, ***STOP***)
    - INTERVAL (TIME, 00H01M - 99H99M, ***00H10M***; ***DISTANCE***, 0.1 - 99.9 nm, ***2 nm***)
  - PLOTTER
    - TRACK REC (OFF, ***DISTANCE***, AUTO)
    - INTERVAL (***0.10 nm***)
    - BRG. REF (***MAG***, TRUE)
    - MAG. VAR. (***AUTO***, MAN)
    - WPT NAME (***DSP GOTO***, DSP ROUTE, DSP ALL)
    - TTG/ETA SPD (***AUTO***, MAN)
  - ALARMS
    - BUZZER (SHORT, ***LONG***, CONSTANT)
    - ARV/ANC (***OFF***, ARV, ANC)
    - XTE (***OFF***, ON)
    - SPEED (***OFF***, LOW, HIGH)
    - WAAS/DGPS (***OFF***, ON)
    - TIME (***OFF***, ON)
    - TRIP (***OFF***, ON)
    - ODOMETER (***OFF***, ON)
  - ERASE
    - WAYPOINTS/MARKS?
    - ROUTES?
    - TRACK?
    - RESET TRIP?
    - RESET ODO?
    - GPS DATA?
    - MENU SETTINGS?
    - ALL BACKUP DATA?
  - WAAS/DGPS
    - MODE (***GPS***, WAAS, INT BEACON, EXT BEACON, AUTO)
    - WAAS SEARCH (***AUTO***, MANUAL)
    - CORRECTIONS DATA SET (00-99, ***02***)
    - DGPS STATION (***AUTO***, MANUAL, LIST)
    - RATE (50, 100, ***200*** BPS)
    - FREQ (***310.0*** kHz)
  - CALCULATE — MODE (***WAYPOINTS***, ROUTE), SPD (***AUTO***, MAN)
  - MESSAGES — Displays operational messages.
  - SATELLITE — Shows satellite status display.

(Continued on next page)

(Continued from previous page)

- USER DISP
  - 1 (OFF, ***DIGITAL***, SPEEDOMETER)
  - 2 (OFF, DIGITAL, ***SPEEDOMETER***)
    - DIGITAL (Display division: □, ⊟, ⊞, ⊞ Available data: Odometer, ***trip***, time, position, ***power voltage***, ***SOG***, ***COG***, range and bearing to waypoint, XTE, TTG and ETA)
    - SPEEDOMETER
      - START FROM (-99 to +99; ***0***)
      - INTERVAL (01 to 99; ***10***)
- GPS SETUP
  - SMOOTH POS (0-999 SEC; ***0 SEC***)
  - SMOOTH S/C (0-9999 SEC; ***5 SEC***)
  - AVR. SPEED (0-9999 SEC; ***60 SEC***)
  - LAT OFFSET
  - LON OFFSET
  - DISABLE SV (Disable GPS satellite.)
  - FIX MODE (2D/ ***2/3D***) For 2D, default antenna height is 5 m.
- SYS SETUP
  - LANGUAGE (***ENGLISH***, FRANCAIS, PORTUGUES, NEDERLANDS, TIENG VIET, ESPANOL, ITALIANO, DEUTSCH, (JAPANESE))
  - DATUM (***WGS84***, WGS72, OTHER)
  - UNITS (***nm, kt***; km, km/h; sm, mph)
  - TIME DIFF (***+00:00***)
  - TIME DISP (12HOUR, ***24HOUR***)
  - TEST?
  - SIMULATOR? (MODE: ON, ***OFF***, SPEED: 0-99 kt, ***20 kt***, COURSE: MAN (40°)***, AUTO***; LAT, ***38°00'N***, LON, ***123°00'W***)
  - EXCHANGE BATTERY?
- I/O SETUP
  - DATA1 (***NMEA-REM1***, NMEA-REM2, NMEA-AP)
  - DATA2 (***NMEA-REM***, NMEA-AP, RTCM-OUT*)
  - NMEA VER (VER 1.5, ***VER 2.0***)
  - SAVE WPT/RTE → PC?
  - LOAD WPT/RTE ← PC?
  - LOAD WPT ← YEOMAN?
  - WIRING INFO?
- TD SETUP
  - DISPLAY (***XX.XXX'***, XX'XX.X" LC TD, DE TD)
  - LORAN C (***7980: 23-43***)
  - LORAN C ΔTD1, ΔTD2 (-99.9-+99.9;***+00.0***)
  - DECCA (***25: G-P***)
  - DECCA ΔTD1, ΔTD2 (-9.99-+9.99;***+0.0***)

SPECIFICATIONS OF
GPS NAVIGATOR GP-32

1 GPS RECEIVER

1.1	Receiving Channels	
	GPS	12 channels parallel, 12 satellites tracking
	WAAS	1 channel
1.2	Rx Frequency	1575.42 MHz
1.3	Rx Code	C/A code, WAAS
1.4	Position Fixing System	All in view, 8-state Kalman filter
1.5	Position Accuracy	
	GPS	10 m (95% of the time, HDOP 4)
	WAAS	3 m (95% of the time)
1.6	Tracking Velocity	999 kt
1.7	Position-Fixing Time	Warm start: 12 s approx., Cold start: 90 s approx.
1.8	Position Update interval	1 s
1.9	Beacon Receiver (GP-37 only)	
	Frequency Range	283.5 kHz to 325.0 kHz
	MSK Rate	50,100,200 bps (Auto/Manual selectable)

2 RECEIVER UNIT

2.1	Display System	Monochrome LCD, 95 (W) x 60 (H) mm, 120 x 64 dots
2.2	Display Mode	Plotter, Steering, Highway, NAV data, Destination, User display
2.3	Projection	Mercator
2.4	Memory Capacity	Track: 1000 pts, Waypoint: 999 pts w/ comment
2.5	Storage Capacity	50 routes w/ 30 waypoint each
2.6	Alarms	Arrival and anchor watch, Cross track error, Odometer alarm, Ship's speed in and out alarms, Time alarm, Trip alarm, WAAS/DGPS alarm
2.7	Display Scale	
	Plotter Display	0.02/0.05/0.1/0.2/0.5/1/2/5/10/20/40/80/160/320 nm
	Highway Display	0.2/0.4/0.8/1/02/4/8/16 nm

3 INTERFACE

3.1	Data 1	Current Loop
	Output Data:	NMEA0183 Ver 1.5/2.0 selected

		NMEA-REM1: GLL, GGA, VTG, ZDA, RMC, RMB
		NMEA-REM2: GLL, GGA, VTG, ZDA, RMC, RMB, BWC, RMA (Ver2.0), GTD (Ver1.5) when TD indication selected
		NMEA-AP: GLL, VTG, ZDA, AAM, APB, BOD, BWC, XTE
3.2	Data 2	RS-232C
	Output Data:	NMEA0183 Ver 1.5/2.0 selected
		NMEA-REM: GLL, GGA, VTG, ZDA, RMC, RMB, BWC, RMA (Ver2.0), GTD (Ver1.5) when TD indication selected
		NMEA-AP: GLL, VTG, ZDA, AAM, APB, BOD, BWC, XTE
		Downloading to PC (WP/ Route Data)
	Input Data:	DGPS RTCM SC-104 Ver 2.1
		Uploading from PC (WP/ Route Data)
		NMEA WPL (WP Data)

4 POWER SUPPLY

4.1	GP-32:	12-24 VDC: 240-120 mA

5 ENVIRONMENTAL CONDITION

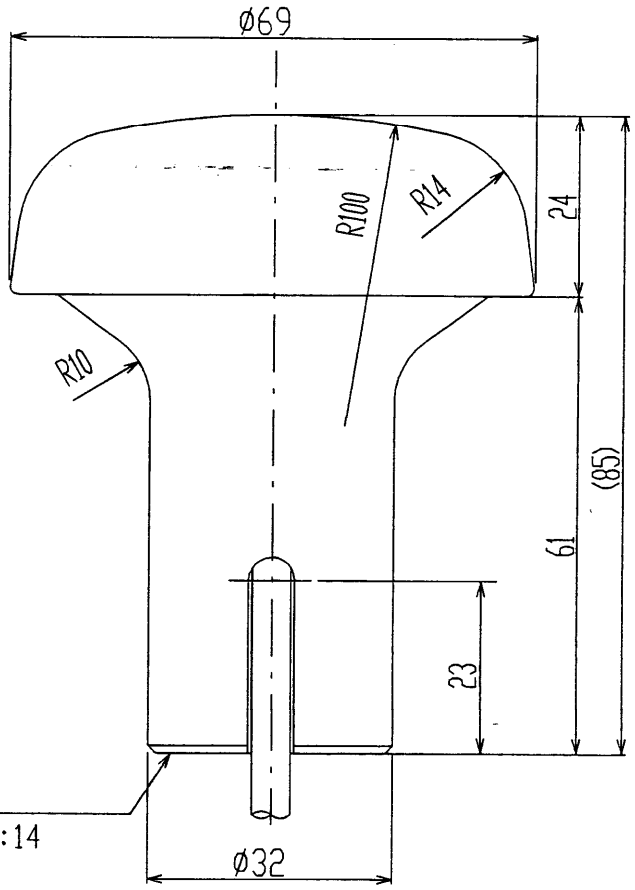
5.1	Ambient Temperature	Antenna unit: -25°C to +70°C
		Receiver unit: -15°C to +55°C
5.2	Damp Heat	93% or less at 40°C
5.3	Waterproofing	Antenna unit: IPX6
	(IEC 60529)	Receiver unit: IPX5 (USCG CFR-46)
5.4	Vibration	IEC 60945

6 COATING COLOR

6.1	Antenna Unit	N9.5
6.2	Receiver Unit	Chassis: 2.5GY5/1.5, Panel: N3.0

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
L ≦ 50	±1.5
50 ＜ L ≦ 100	±2.5
100 ＜ L ≦ 500	±3

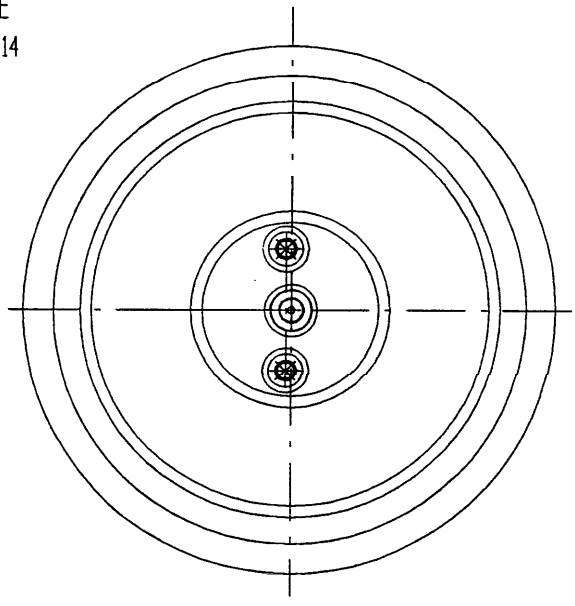
表1 TABLE 1



1-14UNS1B

ねじ山数（25.4mmにつき）：14
ピッチ： 1.8143 mm
オネジ有効長さ： 24.17 mm
オネジ有効径：19 mm以上

THREAD PER 25.4mm (1 INCH): 14
PITCH: 1.8143 mm
THREAD LENGTH: 15.17 mm
PITCH DIAMETER: 24.17 mm



注記
指定外の寸法公差は表1による。

NOTE
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

型式 TYPE	ケーブル長(m) CABLE LENGTH	プラグ PLAG	質量 MASS
GPA-017	10	TNC-P-3	585±30g
GPA-017S	0.2	TNC-J-3	125±30g

表 2 TABLE 2

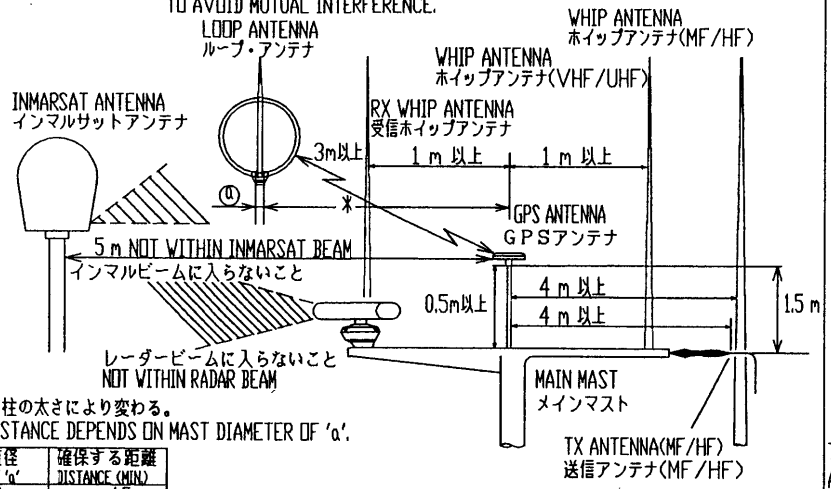
DRAWN July 22 '02 T.YAMASAKI		TITLE	GPA-017/017S
CHECKED July 22 '02 Y.Kimura		名称	空中線部
APPROVED July 22 '02 Y.Kimura			外寸図
SCALE 1/1 MASS TABLE 2 表2参照		NAME	ANTENNA UNIT
DWG.No. C4384-G04-H			OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

取付場所
MOUNTING LOCATION

他の機器のアンテナから下の図の距離以上離す。
THIS FIGURE SHOWS THE SEPARATION DESTANCES FROM OTHER ANTENNAS TO AVOID MUTUAL INTERFERENCE.

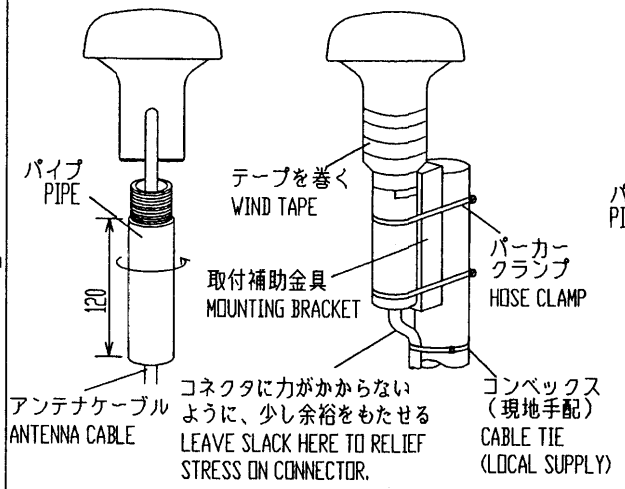


※：支柱の太さにより変わる。
※: DISTANCE DEPENDS ON MAST DIAMETER OF 'a'.

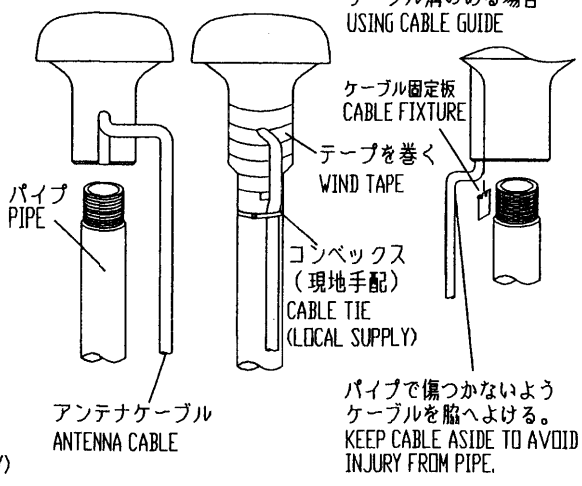
a の直径 DIA. OF 'a'	確保する距離 DISTANCE (MIN)
10 cm	1.5 m
30 cm	3 m

A) マストへの取付け　MAST MOUNTING

a) マスト取付金具CP20-01111(工事材料)でマストに固定する。
USE MAST MOUNTING KIT CP20-01111.



b) パイプのみを使うとき
USE A PIPE ONLY.

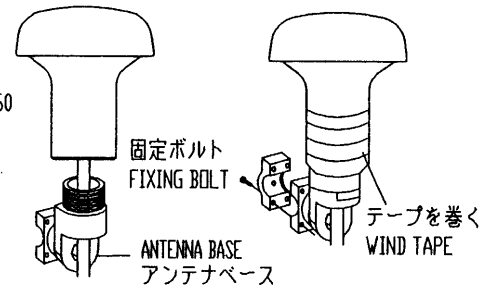


B) スタンションやパルピットにつけるとき

レール用アンテナベース No.13-RC5160
(取付可能レール直径：ø19~ø32)
(コード番号：000-806-114)

HANDRAIL MOUNTING

USE HANDRAIL MOUNTING BASE No.13-RC5160 (CODE No.000-806-114, OPTION).
THE DIAMETER OF THE HANDRAIL MAY BE FROM ø19mm TO ø32mm.

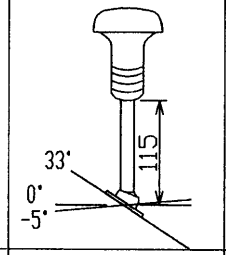
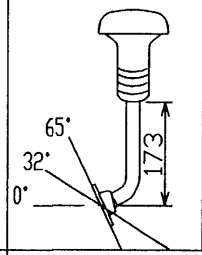
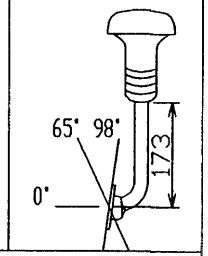


注記 1) パイプやアンテナベースはアンテナユニットにねじ込んだ後に固定する。
2) アンテナを固定するときはパイプ(アンテナベース)をアンテナにねじ込むこと。
アンテナ側をねじるとコネクタ部やケーブルに無理がかかり、故障の原因となる。

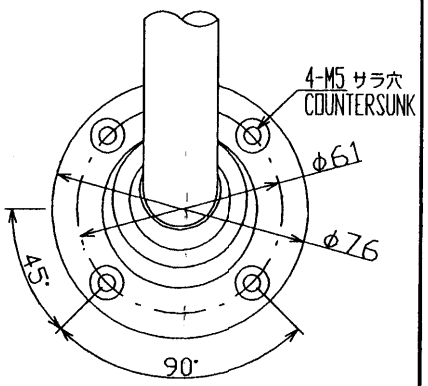
NOTE 1. FASTEN PIPE(ANTENNA BASE) TO ANTENNA UNIT FIRST THEN FIX THEM TO MAST OR HANDRAIL.
2. WHEN FIXING ANTENNA, TURN PIPE OR ANTENNA BASE, NOT THE ANTENNA.
TURNING THE ANTENNA MAY TWIST THE CABLE AND PLACE STRESS ON CONNECTOR.

C) 取付ける場所が傾斜しているとき　ANTENNA BASE MOUNTING

オプションのアンテナベースを使う。
USE OPTIONAL ANTENNA BASE.

傾斜 INCLINATION	-5° - 33°	32° - 65°	65° - 98°
装備方法 MOUNTING METHOD			
アンテナベース型式 ANT. BASE TYPE コード番号 CODE No.	直型アンテナベース RIGHT ANGLE ANTENNA BASE No.13-QA330 000-803-239	L型アンテナベース L-TYPE ANTENNA BASE No.13-QA310 000-803-240	

アンテナベース基部
MOUNTING DIMENSIONS OF ANTENNA BASE.



DRAWN	July 22 '02 T.YAMASAKI		TITLE GPA series
CHECKED	July 22 '02 Y.K'mae		名称 空中線部
APPROVED	July 22 '02 Y.K'mae		装備要領図
SCALE	MASS		NAME ANTENNA UNIT
DWG.No.	C4384-Y01- A		INSTALLATION PROCEDURE

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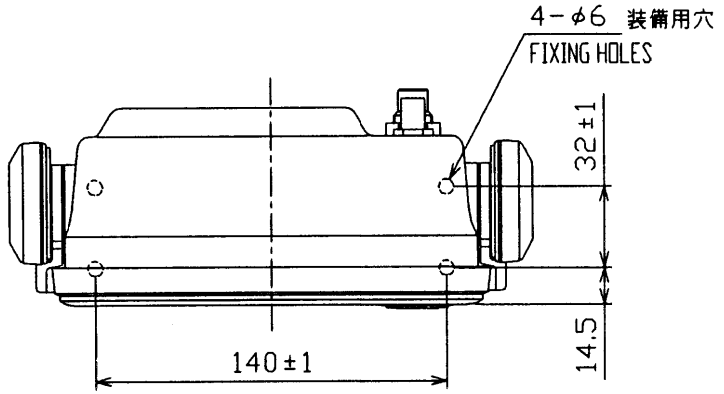
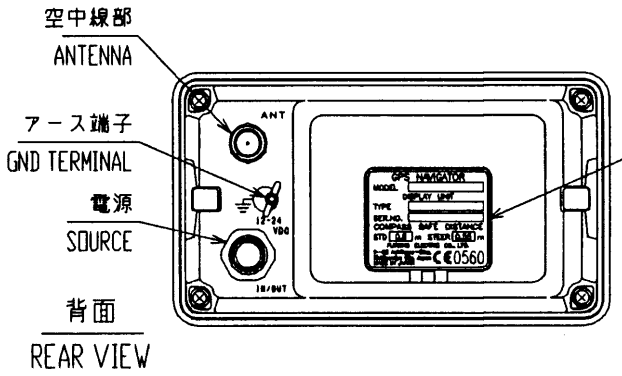
寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

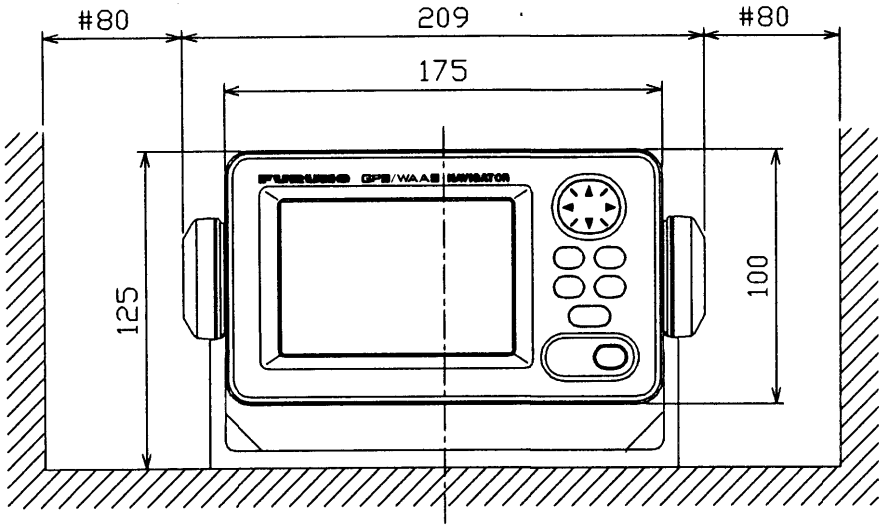
表1 TABLE 1

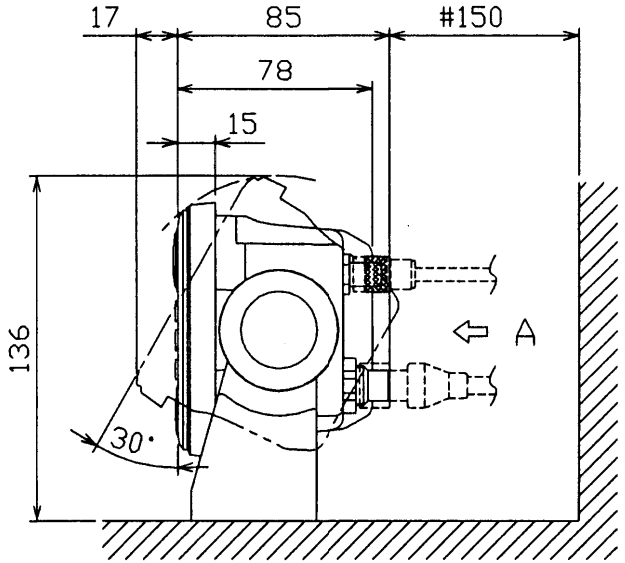




型式 TYPE	質量(kg±10%) MASS
GP-32	0.54
GP-37	0.68

表2 TABLE 2





注　記　1）装備ケーブルはサービス時、本体を前方に引出せるよう余裕を持たせること。
　　2）取付用ネジはトラスタッピンネジ呼び径５×１６を使用のこと。
　　3）＃印寸法は推奨する最小サービス空間を示す。
　　4）指定外寸法公差は表１による。

NOTE　1. KEEP SUFFICIENT CABLE LENGTH BEHIND THE UNIT.
　　2. USE TAPPING SCREWS 5x16 FOR FIXING THE UNIT.
　　3. #: RECOMMENDED SERVICE CLEARANCE.
　　4. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN Mar. 29 '02 T.YAMASAKI			TITLE GP-32/37
CHECKED Mar 29 '02 Y.Kimura			名称 受信演算部（卓上装備）
APPROVED Mar 29 '02 Y.Kimura	GP-32/37		外寸図
SCALE 1/3 MASS 表2 TABLE 2			NAME RECEIVER UNIT (DESKTOP MOUNT)
DWG No. C4420-G01-A	20-022-100G-0		OUTLINE DRAWING

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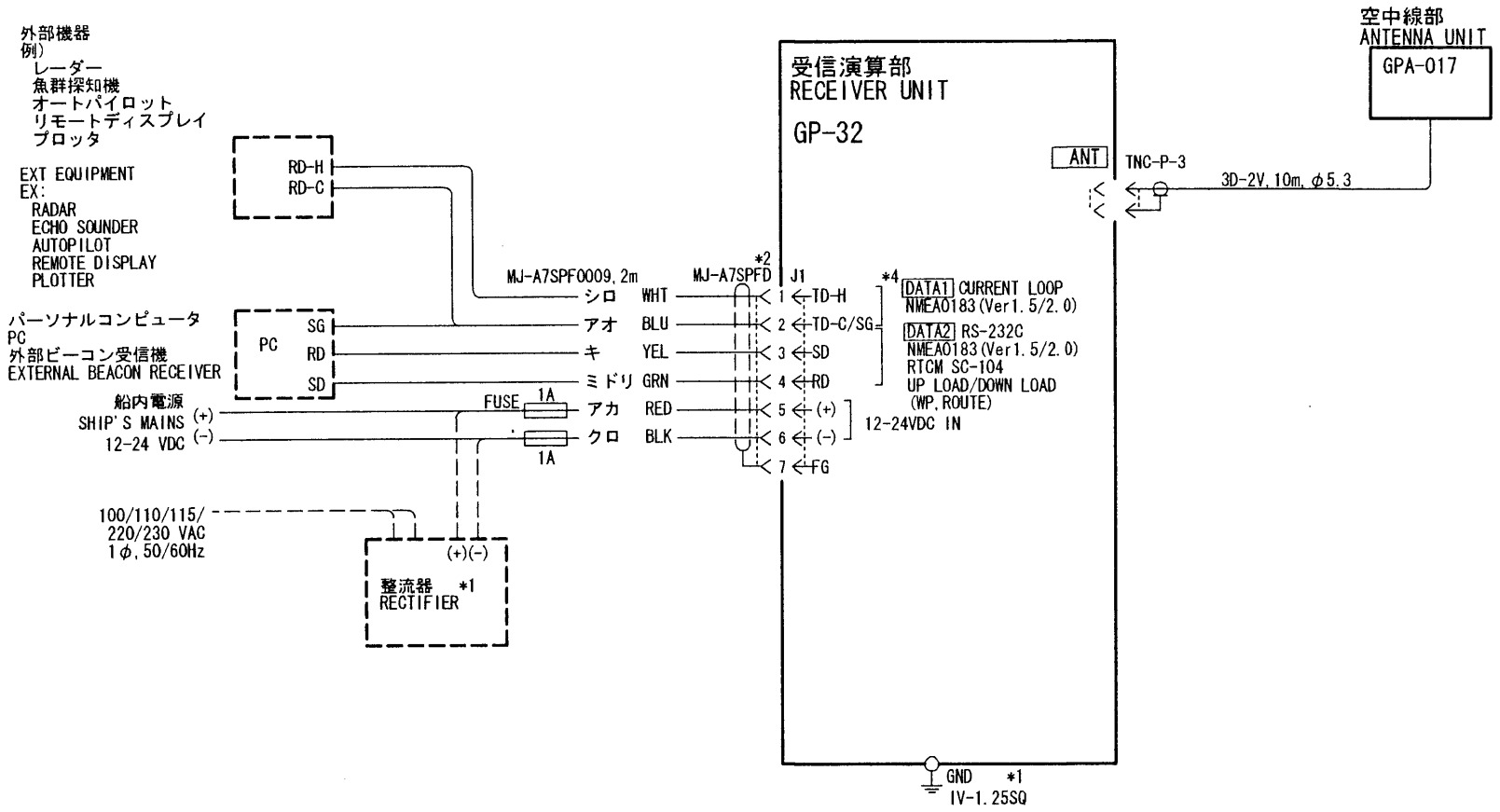

注記
＊1）現地手配
＊2）コネクタは工場にて取付済み
＊3）オプション
＊4）メニューにより選択

NOTE
*1. LOCAL SUPPLY.
*2. FITTED AT FACTORY.
*3. OPTION.
*4. SELECT ON MENU.

DRAWN Mar. 14 '02 T. YAMASAKI		TITLE	GP-32
CHECKED Mar 28 '02 Y. K.		名称	GPS航法装置
APPROVED Mar 28 '02 Y. K.			相互結線図
SCALE / MASS kg		NAME	GPS NAVIGATOR
DWG. No. C4420-C01- A			INTERCONNECTION DIAGRAM

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