FURUNO®

Installation Manual
GPS RECEIVER GP-310B

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FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

PRINTED IN JAPAN

⚠ SAFETY INSTRUCTIONS

⚠ CAUTION

Do not use the equipment for other than its intended purpose.

Improper use of the equipment can result in personal injury or equipment damage.

No one navigation device should ever be solely relied upon for the navigation of a vessel.

Always confirm position against all available aids to navigation, for safety of vessel and crew.

⚠ CAUTION

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

Connection to the wrong power supply can cause fire or equipment damage.

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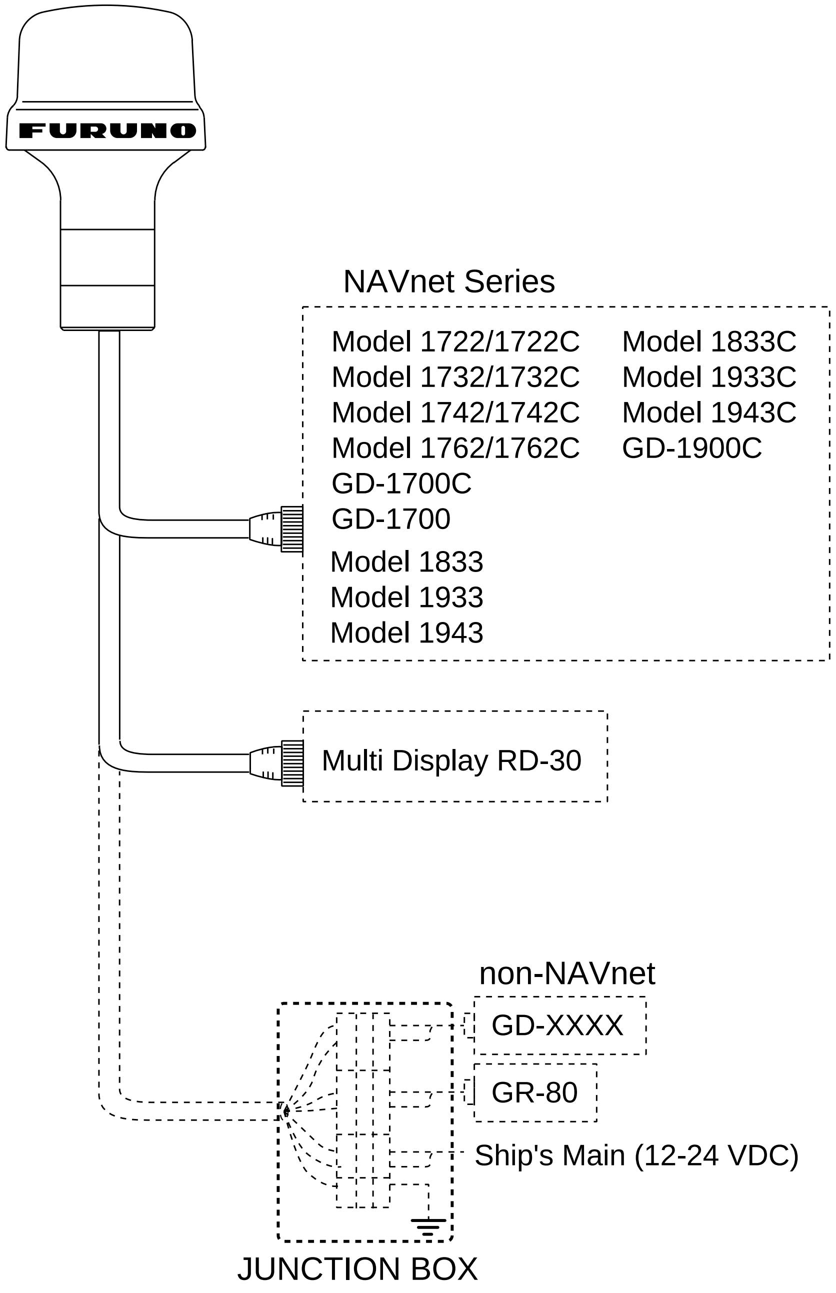
SYSTEM CONFIGURATION

This antenna incorporates a GPS receiver. It can be connected directly to NAVnet equipment and Multi Display RD-30. However, if it connected to an equipment other than the NAVnet product, a junction box (local supply) is required.


FURUNO
NAVnet Series
Model 1722/1722C
Model 1732/1732C
Model 1742/1742C
Model 1762/1762C
GD-1700C
GD-1700
Model 1833
Model 1933
Model 1943
Model 1833C
Model 1933C
Model 1943C
GD-1900C
Multi Display RD-30
non-NAVnet
GD-XXXX
GR-80
Ship's Main (12-24 VDC)
JUNCTION BOX

EQUIPMENT LISTS

Standard supply

No.	Name	Type	Code No.	Qty	Remarks
1	GPS Receiver	GP-310B	—	1	With 10m cable

Optional equipment

No.	Name	Type	Code No.	Qty	Remarks
1	Cable Assembly	MJ-A7SPF/SRMD-100	000-144-534	1	10m
2	Mast mounting kit	CP20-0111	004-365-780	1	

1. MOUNTING

Mounting considerations

When selecting a mounting location for the antenna unit keeps in mind the following points.

- The antenna may be mounted 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 the post or pipe, it is recommended to use stays to prevent damage to the GPS receiver.
- Select a location out of the radar beam. The radar beam will obstruct or prevent reception of the GPS satellite signal.
- The location should be well away from a VHF antenna. A GPS receiver is interfered by a harmonic wave of a VHF antenna.
- The location should be well away from an Inmarsat-B antenna. Transmission of Inmarsat-B will obstruct or prevent reception of the GPS satellite signal.
- 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. Mounting the antenna unit as high as possible keeps it free of interfering objects and water spray, which can interrupt reception of GPS satellite signal if the water freezes.
- If the antenna cable is to be passed through a hole which is not large enough to pass the connector, you may cut the cable with cutting pliers. Re-connect it after running the cable through the hole. Wrap cable with vulcanizing tape and then vinyl tape. Bind the tape end with cable-tie.

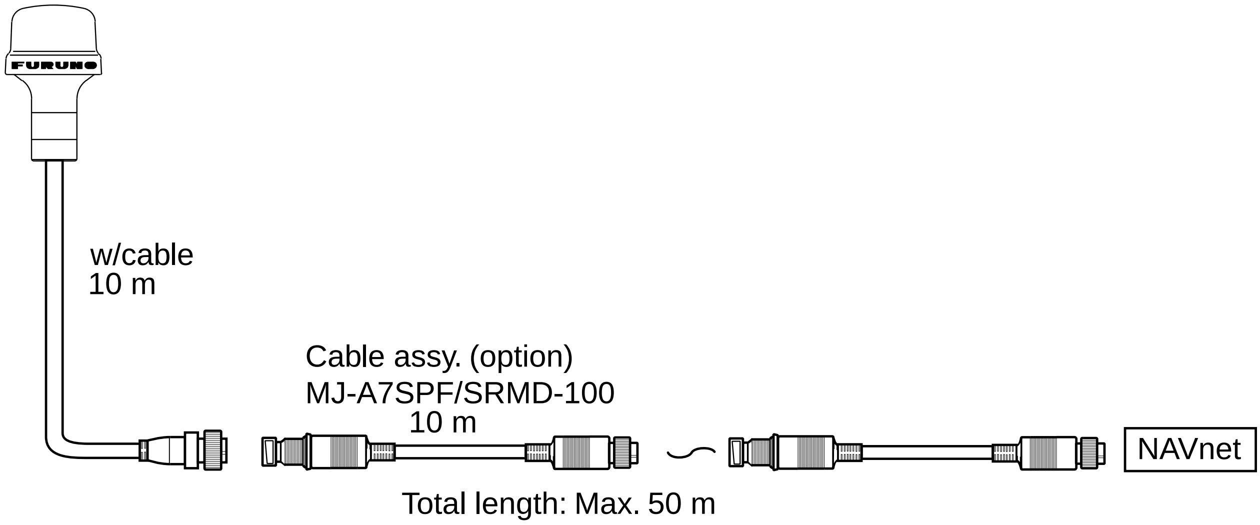
Mounting

Install the antenna unit by referring to installation diagram of page D-1.

2. WIRING

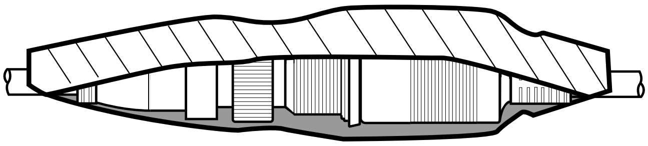
This unit outputs position and speed to external equipment, mainly to NAVnet equipment. To connect to NAVnet equipment, connect waterproof connector directly to NAVnet equipment. For connection to other equipment, use a junction box (local supply), which provides seven terminals. A ten meter cable is attached to this unit. If the distance between this unit and monitor more than 10 m, use optional extension cable (10 m). Up to four extension cables can be connected serially.

Connecting to FURUNO NAVnet equipment

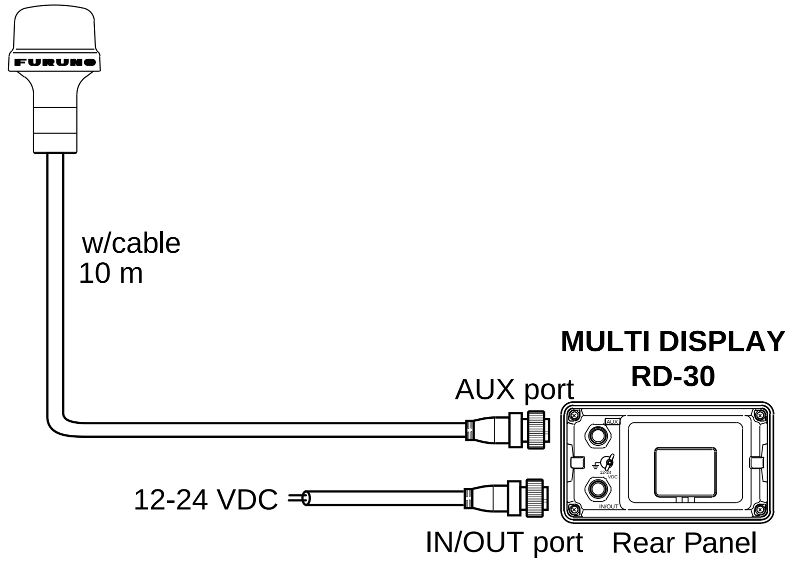

FURUNO
w/cable
10 m
Cable assy. (option)
MJ-A7SPF/SRMD-100
10 m
NAVnet
Total length: Max. 50 m

Waterproofing connector

If you use the optional extension cable(s), wrap connector(s) with vulcanizing tape and then vinyl tape for waterproofing. Bind the tape end with cable-tie.

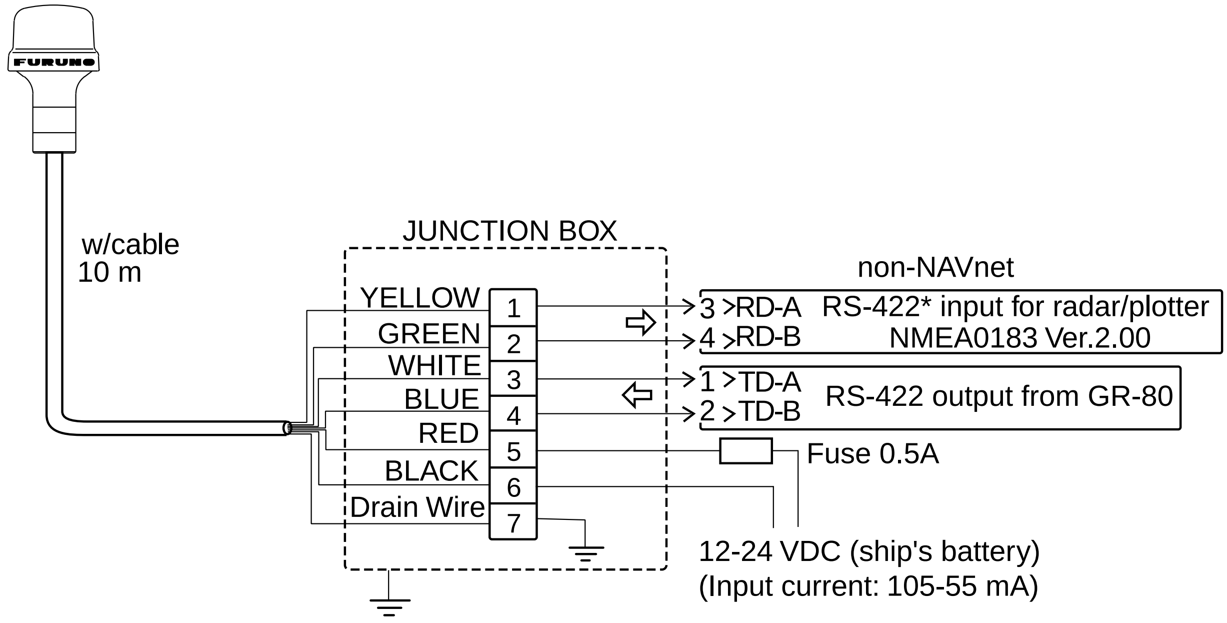


Connecting to FURUNO Multi Display RD-30


w/cable
10 m
MULTI DISPLAY
RD-30
AUX port
12-24 VDC
IN/OUT port
Rear Panel

Connecting to other type of equipment

Cut the connector and fabricate the cable end, using a crimp-on lug similar terminal. Prepare a junction box locally.


w/cable
10 m
JUNCTION BOX
YELLOW
GREEN
WHITE
BLUE
RED
BLACK
Drain Wire
1
2
3
4
5
6
7
non-NAVnet
3 RD-A
4 RD-B
RS-422* input for radar/plotter
NMEA0183 Ver.2.00
1 TD-A
2 TD-B
RS-422 output from GR-80
Fuse 0.5A
12-24 VDC (ship's battery)
(Input current: 105-55 mA)

*: RS-422 output can be received by current loop.

Note1) Maximum input voltage is 31.2 VDC. Voltage higher than that will damage the antenna. To connect battery of over 31.2 VDC, contact your dealer to request connection of external circuit.

Note2) When connecting a FURUNO external DGPS beacon receiver (such as the GR-80) to this unit, set the external DGPS beacon receiver as follows:
Byte Format, 8-6; First Bit, LSB; Parity Bit, None; Stop Bit, 1; Bit Rate, 8.

Note3) 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.

Output/Input data format

Priority	Input data		Output data		Setting of Output Cycle	Default
High ↑			GPDTM	Geometric datum	Yes	Yes
	XXGGA	Position	GPGGA	GPS fix data	Yes	Yes
	XXZDA	UTC date	GPZDA	UTC time and date	Yes	Yes
	XXGLL	Position	GPGLL	Geographic position	Yes	
			GPGSA	Fixing state, DOP	Yes	
			GPGSV	Satellite information	Yes	Yes
			GPVTG	Course over ground and ground speed	Yes	Yes
↓ Low	XXRMC	Position, UTC date	GPRMC	Recommended minimum specific GPS/TRANSIT data	Yes	

Note1) Data output in order from high to low priority.

Note2) GPDTM data is attached in front of GPGGA, GPGLL and GPRMC when each of those sentences is output.

Note3) XX means talker not specified.

3. DEFAULT SETTINGS

	Setting	Default setting
GPS data	Initial Latitude/Longitude	North=34’44.0000, East=135’21.0000
	UTC Time	1997/1/1 0:0:12
	Antenna Height	0 m
	Almanac Data	—
	Almanac Date	1980/1/6 0:0:0
	Ephemeris Data	—
Receiver parameter	Local Zone Time	+0
	PDOP	6
	Geometric Datum	1(WGS84)
	MASK Elevation	5°
	Disable satellite	00000000(none)
	Smoothing	2 (Standard)
	Dynamic	2 (Standard)
	Data Output Cycle	DTM, GGA, ZDA, GSV, VTG (1s)
	DGPS Setting Parameter	1 (LSB first)

Note) For connecting to equipment other than a NAVnet product, the monitor displays the latitude and longitude of Nishinomiya, Japan as initial position for about 90 seconds after the power is turned on. This is because no back up is provided when connecting to non-NAVnet equipment.

SPECIFICATIONS OF THE BLACKBOX GPS SENSOR
GP-310B

1 GENERAL

1.1	Receiving Channels	12 channels parallel, 12 satellite tracking
1.2	Rx Frequency	1575.42 MHz
1.3	Rx Code	C/A code
1.4	Position Fixing System	All in view, 8-state Kalman filter
1.5	Position Accuracy	
	GPS:	10 m approx., 95% of the time (HDOP 4)
	DGPS:	5 m approx., 95% of the time
1.6	Tracking Velocity	999 kt
1.7	Position-fixing Time	Warm start: 12 s, Cold start: 90 s
1.8	Position Update Interval	1 s

2 I/O INTERFACE

2.1	Data format	IEC 61162-1 (NMEA 0183 Ver.2.30)
2.2	Output data	GGA, ZDA, GSV, VTG
2.3	Input data	DGPS: RTCM SC-104 Control command

3 POWER SUPPLY

3.1	Antenna Unit	12-24 VDC: 70-40 mA

4 ENVIRONMENTAL CONDITION

4.1	Ambient Temperature	-25°C to +70°C
4.2	Relative Humidity	95% at 40°C
4.3	Water proofing	IPX6
4.4	Vibration	IEC 60945

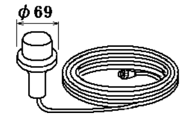
5 COATING COLOR

5.1	Antenna Unit	N9.5

20AU-X-9851 -1　1/1

PACKING LIST

GP-310B (E)

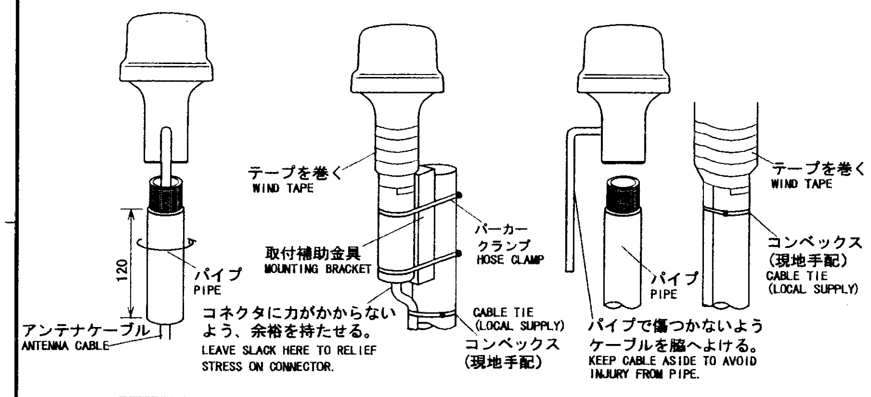
NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット　UNIT			
GPS受信機 GPS RECEIVER		GP-310B-E 000-144-512	1

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

A) マストへの取付け　MAST MOUNTING

a) マスト取付金具CP20-01111（オプション）でマストに固定する。
USE MAST MOUNTING KIT CP20-01111 (OPTION).

b) パイプのみを使うとき
USE A PIPE ONLY.


120
パイプ
PIPE
アンテナケーブル
ANTENNA CABLE
テープを巻く
WIND TAPE
取付補助金具
MOUNTING BRACKET
パーカークランプ
HOSE CLAMP
CABLE TIE
(LOCAL SUPPLY)
コンベックス
（現地手配）
パイプ
PIPE
テープを巻く
WIND TAPE
コンベックス
（現地手配）
CABLE TIE
(LOCAL SUPPLY)

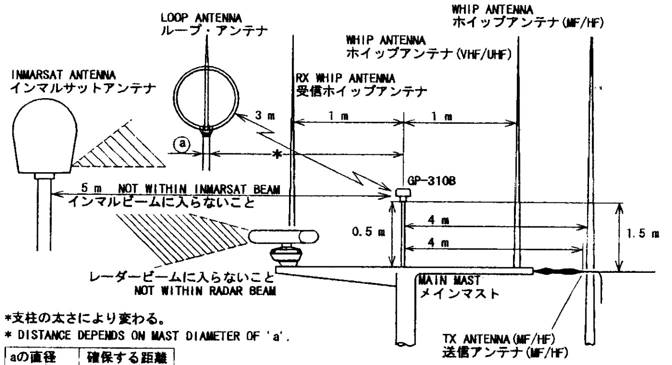
コネクタに力がかからないよう、余裕を持たせる。
LEAVE SLACK HERE TO RELIEF STRESS ON CONNECTOR.

パイプで傷つかないようケーブルを脇へよける。
KEEP CABLE ASIDE TO AVOID INJURY FROM PIPE.

取付場所　MOUNTING LOCATION

THE FIGURE BELOW SHOWS THE RECOMMENDED SEPARATION DISTANCES FROM OTHER ANTENNAS TO AVOID MUTUAL INTERFERENCE.

他の機器のアンテナから下の図の距離以上離す。


LOOP ANTENNA
ループ・アンテナ
WHIP ANTENNA
ホイップアンテナ(MF/HF)
WHIP ANTENNA
ホイップアンテナ(VHF/UHF)
INMARSAT ANTENNA
インマルサットアンテナ
RX WHIP ANTENNA
受信ホイップアンテナ
3 m
1 m
1 m
ⓐ
＊
GP-310B
5 m NOT WITHIN INMARSAT BEAM
インマルビームに入らないこと
0.5 m
4 m
4 m
1.5 m
レーダービームに入らないこと
NOT WITHIN RADAR BEAM
MAIN MAST
メインマスト
TX ANTENNA (MF/HF)
送信アンテナ(MF/HF)

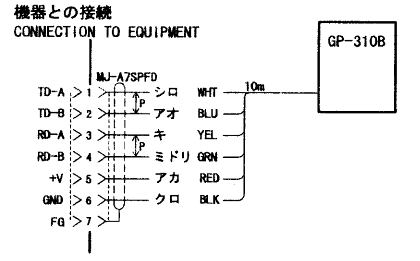
＊支柱の太さにより変わる。
＊ DISTANCE DEPENDS ON MAST DIAMETER OF 'a'.

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

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

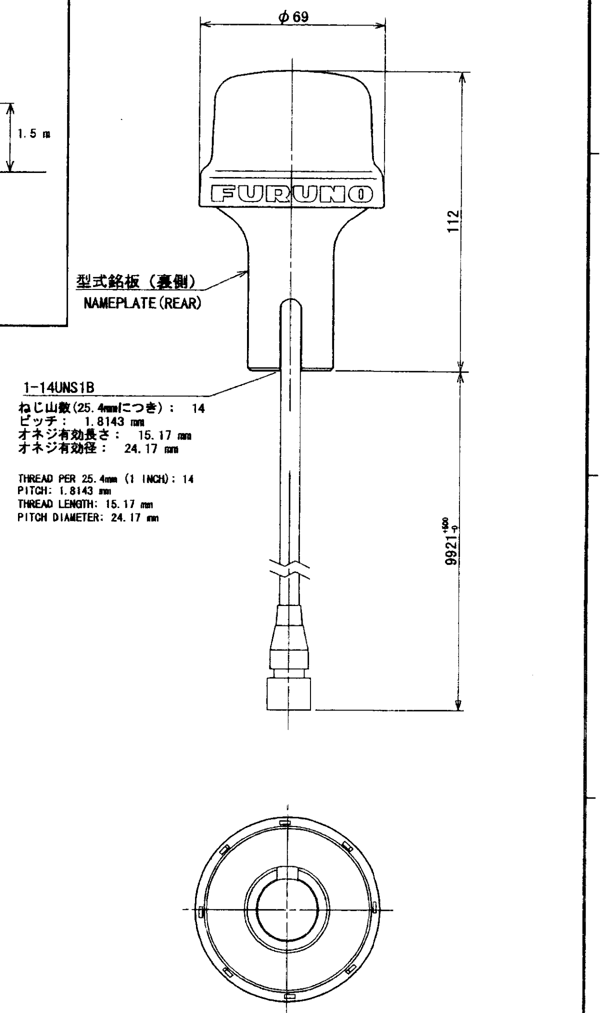
表 1　TABLE 1

機器との接続
CONNECTION TO EQUIPMENT


GP-310B
MJ-A7SPFD
TD-A 1
TD-B 2
RD-A 3
RD-B 4
+V 5
GND 6
FG 7
P
P
シロ WHT
アオ BLU
キ YEL
ミドリ GRN
アカ RED
クロ BLK
10m

注記：　指定外の寸法公差は表1による

NOTE:　TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.


φ69
FURUNO
112
9921 +500 -0
型式銘板（裏側）
NAMEPLATE (REAR)

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：　15.17 mm
オネジ有効径：　24.17 mm

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

DRAWN	Feb. 23 '01　T. YAMASAKI	TITLE	GP-310B
CHECKED	Feb. 23 '01　T. K	名称	GPS受信機
APPROVED	Feb. 26 '01　S. Yoshino		外寸図
SCALE 1/2	MASS 0.65 kg ±10%	NAME	GPS RECEIVER
DWG. No. C4412-G01- B	20-021-200G- 1		OUTLINE DRAWING

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