

FURUNO GP-188/GD-188 Installation Manual

This manual contains the necessary procedures for the installation of both the GP-188 Color GPS Plotter and the GD-188 Color Video Plotter. The basic installation consists of siting and mounting the display unit, and connection of external equipment and power source. For the GP-188, installation of the antenna unit and entering initial settings are required, in addition to the basic installation.

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GD/GP-188

-Your Local Agent/Dealer

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SAFETY INSTRUCTIONS

"**DANGER**", "**WARNING**" and "**CAUTION**" notices appear throughout this manual. It is the responsibility of the installer of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.



DANGER

This notice indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.



WARNING



This equipment uses high voltage electricity which can shock, burn, or cause death.

Only qualified personnel should work inside the equipment.

Serious injury or death can result if the power is applied while the equipment is being installed.

Turn off the power at the ship's mains switchboard before beginning the installation. Post a warning sign near the switch board indicating that the switch should not be turned on while the equipment is being installed.



CAUTION



Ground the equipment to prevent electrical shock or mutual interference.

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. The voltage rating appears on the label at the rear of the equipment.

Equipment Lists

GP-188 Complete Set

No.	Name	Type	Code No.	Qty	Remarks
1	Display Unit	GP-188-E	000-040-687	1	
2	Scanner Unit	GPA-014	000-040-633	1	
		GPA-016	000-040-536		
3	Remote Control Unit	GD-8540	000-042-959	1	
4	Spare Parts	SP14-01900	000-040-683	1 set	see page 5
5	Installation Materials	CP14-03800	000-040-688	1 set	for GPA-014
		CP14-04300	000-040-706		for GPA-016
6	Accessories	FP14-01800	000-040-685	1 set	see page 5

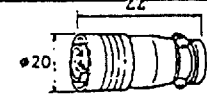
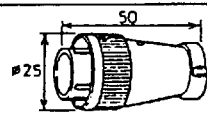

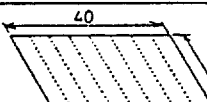
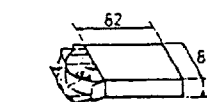
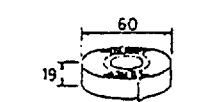
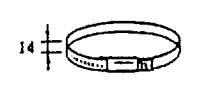
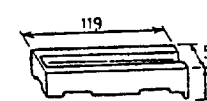
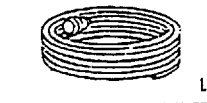
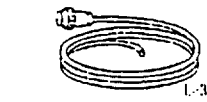

GD-188 Complete Set

No.	Name	Type	Code No.	Qty	Remarks
1	Display Unit	GD-188-E	000-040-682	1	
2	Remote Control Unit	GD-8540	000-042-959	1	
3	Spare Parts	SP14-01900	000-040-683	1 set	see page 5
4	Installation Materials	CP14-04000	000-040-684	1 set	see page 5
5	Accessories	FP14-01800	000-040-685	1 set	see page 5

GP-188/GD-188 Optional Equipment

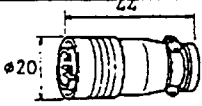
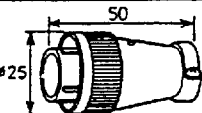

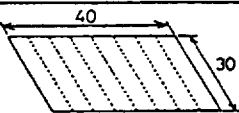

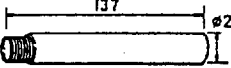
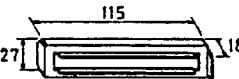



No.	Name	Type	Code No.	Remarks	
1	RAM Card	OP00-002	008-105-140	32KB	
2	RAM Card	00RAM256C-001	004-321-070	256KB	
3	RAM Card	00RAM512C-002	004-322-230	512KB	
4	Floppy Disk	OP14-24	004-321-800		
5	Cleaning Floppy Disk	MCD-2-1K	000-116-420	see Table 9-1 on page 9-1 in Operator's Manual	
6	RAM Disk Kit	OP14-17-1	004-321-080	1MB: See page 14.	
7	RAM Disk Kit	OP14-17-2	004-321-400	2MB: See page 14.	
8	Additional RAM (A) Kit	OP14-18	004-321-090	1MB: See page 16.	
9	Additional RAM (B) Kit	OP14-19	004-321-100	2MB: See page 16.	
10	Filter	FP14-00700	004-308-240	Thick filter	
11	Vinyl Cover	14-034-2085-0	000-801-737	Display unit cover	
12	Hood	OP14-10	004-309-930	for display unit	
13	Keyboard Modification Kit	OP14-21	004-321-110	See page 19.	
14	Chart ROM Card	Chart ROM			
15	Chart Floppy Disk	Chart MFD			
16	Remote Event Switch	GD-8550-88	004-300-010	See page 17.	
17	12Vdc Modification Kit	OP14-28	004-322-890	See page 12.	
18	Antenna Cable Set	CP20-00600	000-040-670	30m	for GPA-014
		CP20-00610	000-040-671	50m	
19	Right Angle Mounting Base	No. 13-QA300	000-803-239	Mounting base for antenna unit of GP-188	
20	L-angle Mounting Base	No. 13-QA310	000-803-240		
21	Ariable Angle Mounting Base	No. 13-QA100	000-803-241		
22	Rctifier	RU-3423		for AC ship's mains	
23	GPS Modification Kit	OP14-26	000-040-689	for GD-188	
24	ntenna Mounting Bracket	CP20-00403	004-365-370	Mounting bracket for antenna unit of GP-188	
25	VAMP	14P0249			
27	Antenna Cable Set	CP14-04400	004-373-070	30m	for GPA-016
		CP14-04410	004-373-080	50m	

GP-188 Installation Materials

工事材料表 INSTALLATION MATERIALS		GP-188 カラーGPSプロッター COLOR GPS PLOTTER		CODE NO	000-040-688	14B0-X-9402
				TYPE	CP14-03800	
番号 No	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 QTY	用途 / 備考 REMARKS	
1	コネクタ CONNECTOR		PRC03-12A10-3AM 10.5 CODE NO 000-110-678	2	データ送受信コネクタ「DATA 3」 「AUTOPILOT」用	
2	コネクタ CONNECTOR		SRCN6A16-10P CODE NO 000-508-663	2	データ送受信コネクタ「DATA 1」 と「DATA 2」用	
3	アース銅板 COPPER STRAP		04S40801 (30X1200X0.3) CODE NO 000-572-187	1	本体接地用	
4	ケーブルハリマーク 1 CABEL MARK LABEL (1)		14-044-2801-2 CODE NO 100-172-362	1	本体背面でケーブルに貼る	
5	絶縁テープ SELF-BONDING TAPE		Uテープ 0.5X19X5M CODE NO 000-800-985	1	空中線部コネクタの防水処理用	
6	ビニールテープ NO.360 VINYL TAPE		0.2X19X10000 黒 IADON BLK CODE NO 000-835-215	1	空中線部コネクタの防水処理用 *1	
7	パーカクランプ HOSE CLAMP		5872 SUS304 CODE NO 000-803-218	2	空中線部取付用 *1	
8	取付補助具 INSTALLING SPACER		20-005-3101-0 CODE NO 100-150-540	1	空中線部取付用 *1	
9	信号ケーブル組品 SIGNAL CABLE ASSY.		S14-8-5(3P) (CO-SPEVV-SB-C 0.2X1P *5M*) CODE NO 004-308-440	1	データ出力用	
10	電源ケーブル組品 POWER CABLE ASSY.		P14-7-3.5(2P) (VCTF 2.0X2C *3.5M*) CODE NO 004-391-180	1	電源用	
11	アンテナケーブル組品 ANTENNA CABLE ASSY.		BBP-3D2V CODE NO 000-134-445	1	空中線部・指示器用 接続用 *1	

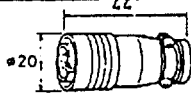
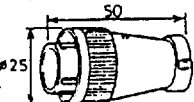

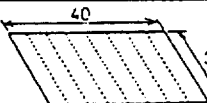


*1: For antenna unit GPA-014

GP-188 Optional Installation Materials

工事材料表 INSTALLATION MATERIALS		GP-188 カラーGPSプロッター COLOR GPS PLOTTER		CODE NO	000-040-706
				TYPE	CP14-04300
番号 No	名称 NAME	略図 OUTLINE	型名 / 規格 DESCRIPTIONS	数量 QTY	用途 / 備考 REMARKS
1	コネクタ CONNECTOR		PRC03-12A10-3AM 10.5	2	
			CODE NO		
2	コネクタ CONNECTOR		SRCN6A16-10P	2	
			CODE NO		
3	アース銅板 COPPER STRAP		04S40801 (30X1200X0.3)	1	
			CODE NO		
4	ケーブルハリマーク 1 CABEL MARK LABEL (1)		14-044-2801-2	1	
			CODE NO		
5	ハーククランプ HOSE CLAMP		N06348 SUS303	2	*1
			CODE NO		
6	パイプ PIPE		20-007-3011	1	*1
			CODE NO		
7	取付補助金具 INSTALLING SPACER		20-007-3012	1	*1
			CODE NO		
8	信号ケーブル組品 SIGNAL CABLE ASSY.		S14-8-5(3P) (CD-SPEVV-SB-C 0.2X1P *5M*)	1	
			CODE NO		
9	電源ケーブル組品 POWER CABLE ASSY.		P14-7-3.5(2P) (VCTF 2.0X2C *3.5M*)	1	
			CODE NO		
10	電源ケーブル組品 POWER CABLE ASSY.		TBP-3D2V	1	
			CODE NO		

*1: For antenna unit GPA-016

GD-188 Installation Materials

工 事 材 料 表 INSTALLATION MATERIALS		GD-188 カラービデオプロッター COLOR VIDEO PLOTTER		CODE NO	000-040-684	14B0-X-9401
				TYPE	CP14-04000	
番号 No	名 称 NAME	略 図 OUTLINE	型 名 / 規 格 DESCRIPTIONS	数量 Qty	用途 / 備考 REMARKS	
1	コネクタ CONNECTOR		PRC03-12A10-3AM 10.5	2	データ送受信コネクタ「DATA 3」 「AUTOPILOT」用	
			CODE NO			
2	コネクタ CONNECTOR		SRCN6A16-10P	2	データ送受信コネクタ「DATA 1」 と「DATA 2」用	
			CODE NO			
3	アース銅板 COPPER STRAP		04S40B01 (30X1200X0.3)	1	本体接地用	
			CODE NO			
4	ケーブルハリマーク 1 CABEL MARK LABEL (1)		14-044-2801-2	1	本体背面でケーブル に貼る	
			CODE NO			
5	信号ケーブル組品 SIGNAL CABLE ASSY.		S14-8-5(3P) (CO-SPEVV-SB-C 0.2X1P *5M*)	1	データ出力用	
			CODE NO			
6	電源ケーブル組品 POWER CABLE ASSY.		P14-7-3.5(2P) (VCTF 2.0X2C *3.5M*)	1	電源用	
			CODE NO			

Accessories (GP-188/GD-188)

No.	Name	Type	Code No.	Qty	Remarks
1	Filter (1)	14-034-2086-0	100-102-890	1	
2	Micro Floppy Disk	MF-2DDF	000-111-708	2	
3	Label (2)	14-044-2701-1	100-172-351	2	

Spear Parts (GP-188/GD-188)

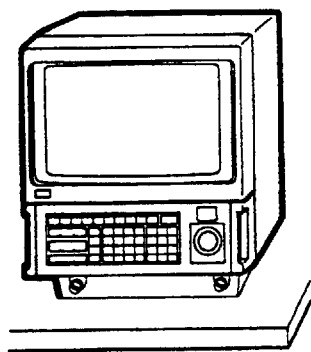
No.	Name	Type	Code No.	Qty	Remarks
1	Glass Tube Fuse	FGBO 7A AC125V	000-549-013	1	

Display Unit Installation

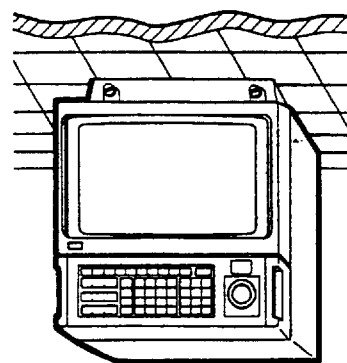
Siting considerations

Install the unit where the CRT can be easily viewed and the keyboard can be easily operated, by referring to the outline drawing on page D-1. When selecting a mounting location keep in mind the following points.

- The unit should be mounted horizontal. If the mounting angle is more than fifteen degrees the floppy disk drive may not operate properly and parts life may be affected.
- Leave at least fifteen centimeters space at the rear of the unit to allow the exhaust fan to discharge air.
- Leave at least five centimeters on the sides of the unit to allow for circulation of cooling air.
- Install the unit at least ten centimeters away from other CRTs. Mutual interference may result if the frequency or phase of the CRT synchronization signal is different from other CRTs.
- Locate the unit out of direct sunlight because of heat which can build up inside the cabinet.
- The temperature and humidity of the mounting location should be stable and moderate.
- Locate the unit away from exhaust pipes and heating and cooling vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Locate the unit well away from magnets.



Tabletop



Overhead

The display unit weighs 23 kg. Be sure the mounting area is strong enough to support the weight of the unit. If necessary, reinforce the mounting area.

Figure 1 Examples of mounting

Antenna Unit Installation (GP-188)

Siting considerations

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

- Mount the unit well away from communications antennas and radar beam to prevent obstruction of GPS satellite signal. See page D-2 or D-3 for recommended minimum separation distances among GPS antenna, communications antennas and radar scanner.
- The mounting location should provide a clean line-of-sight to satellites. Objects within line-of-sight to a satellite, for example, a mast or funnel, may prevent reception.
- Mount the unit as high as possible.

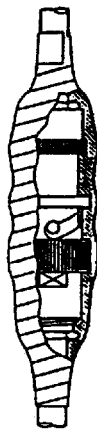
Mounting

There are two types antenna units. Install the antenna unit by referring to the each installation drawings on page D-2 or D-3.

Antenna cable

Waterproofing the antenna connector

After connecting the antenna cable, waterproof the antenna connector as shown in Figure 2.



After connecting the antenna cable, waterproof connector by first wrapping it with self-bonding tape and then vinyl tape. Attach a cable tie to end of vinyl tape.

Figure 2 How to waterproof the antenna connector

Optional Antenna Cable

The standard cable is 15m long. 30m and 50m long extension cable are optionally available. The basic procedure for connecting the antenna cable is 1) cut the cable considering the distance to the display unit; 2) attach connector N-P-8DFB (supplied with antenna cable); and 3) connect the antenna cable to the antenna unit.

The illustration which follows shows how to attach connector N-P-8DFB.

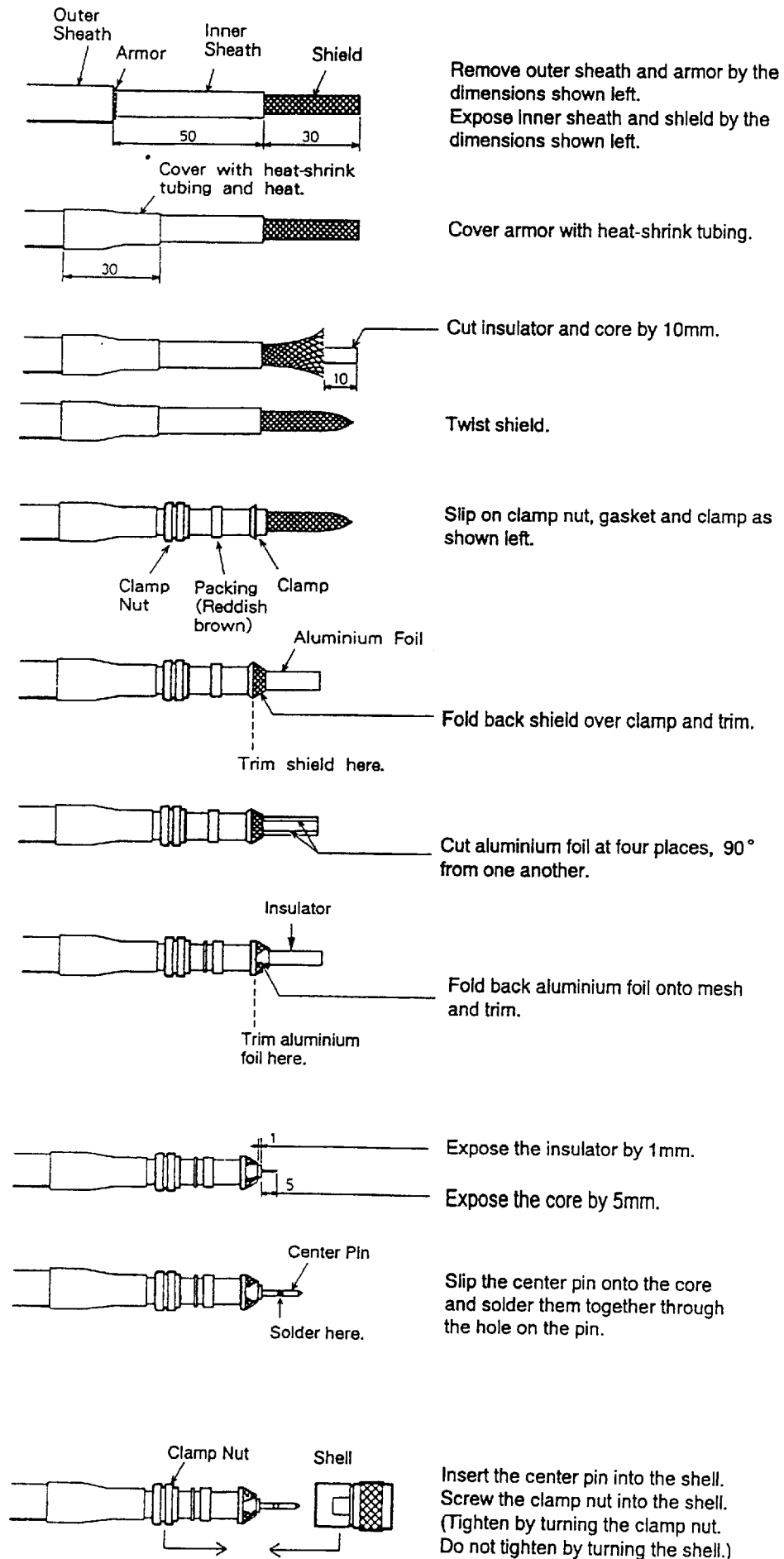


Figure 3 How to attach connector N-P-8DFB

Table 1 Antenna cable and plug compatibility for GPA-014

Cable		Connection Diagram	Necessary Plug			Remarks
Max. Length	Type		Type	Code No.	Qty	
15 m	3D-2V 3D-QEV 3D-XV	A	BNC-P117NI	000-112-144	2	
25 m	5D-2V	A	BNC-P-5	000-500-397	2	
30 m	RG-8/U	B	UG-21D/U	local supply	2	BNC-N Connector Conversion Adaptor (000-123-810) and Conversion Cable Assy. NJBP-3DXV-1 (000-117-602) required.
35 m	8D-2V	B	N-P-8	000-501-512	2	
45 m	5D-FB	B	N-P-5	000-107-861	2	
65 m	8D-FB	B	N-P-8DFB	000-111-549	2	
83 m	10D-FB	B	N-P-10	000-501-517	2	

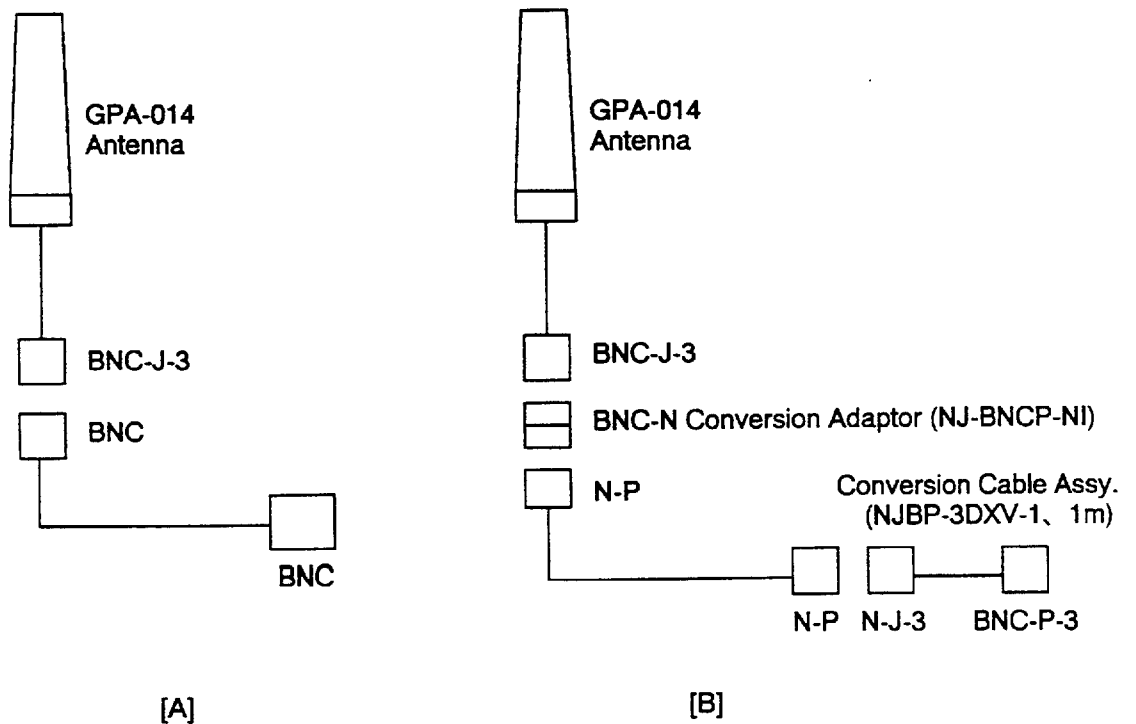


Figure 4 Acceptable antenna cable and plug combinations

Connections

Connect antenna unit, power source and ground strap as shown in Figure 5.

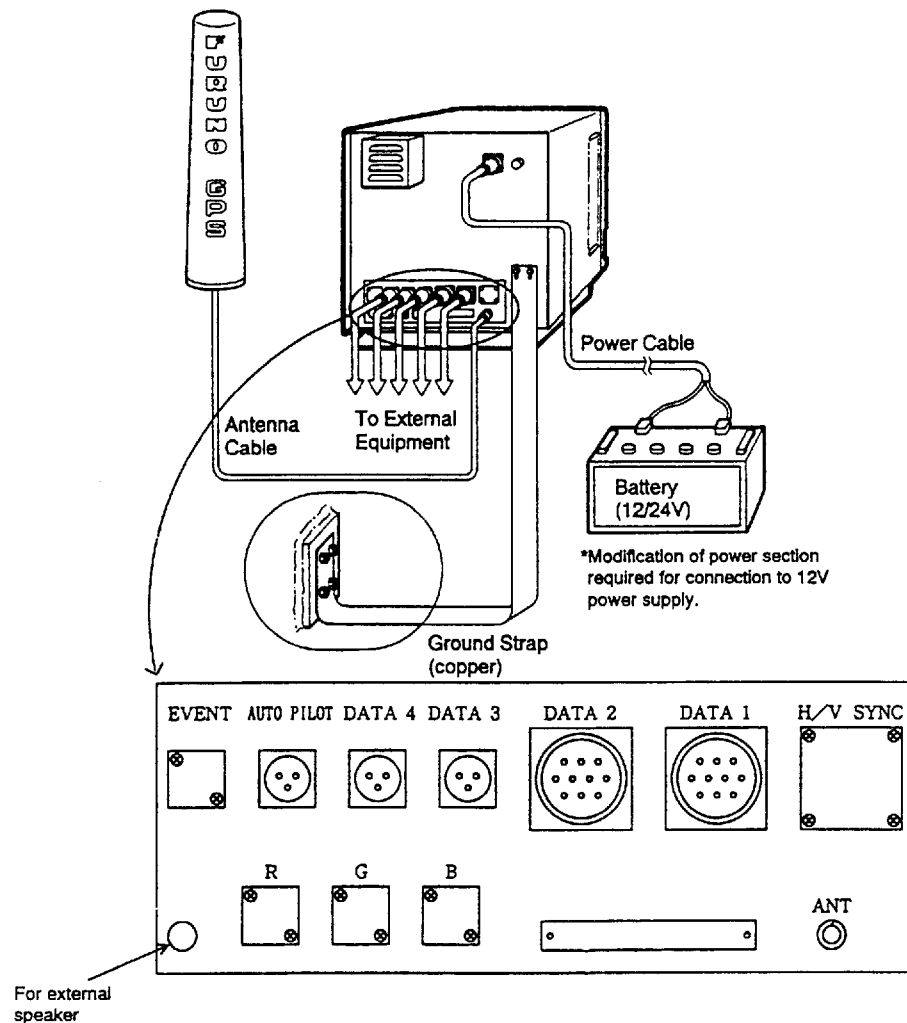


Figure 5 Connections

Ground

Mutual interference may occur with radio equipment such as a direction finder. If there is interference, ground the GP-188/GD-188 as follows.

- Use the ground strap supplied and make its length as short as possible.
- Connect ground strap to ship's ground by silver-alloy brazing.

Connectors for external equipment

Table 2 describes the connectors for external equipment.

Table 2 Connectors for external equipment

Connector	Use	Input/Output	Format
DATA1	Data input	Input	CIF or NMEA 0183. NMEA 0182, or user format (special order).
DATA2	Output data in talker GPS, LC, OM, DC, LA, DR	Input or output	CIF or NMEA 0183
DATA3	Data input	Input	CIF or NMEA 0183. Note that this port shares the same format with DATA4; independent selection of format not possible.
DATA4	Multiple data output. (GPS position, event data, waypoint data, and data output from DATA3 input data)	Output	CIF or NMEA 0183. Note that this port shares the same format with DATA3; independent selection of format not possible.
AUTOPILOT	Output data to an autopilot	Output	NMEA 0183 only
EVENT	Connection of remote event switch (option)	—	
SP	Connection of an external speaker (8 ohms, local supply)	—	

Color Video Sounder

When the fish alarm on the video sounder is released the GP-188/GD-188 can display a fish mark. Connect CIF output of FURUNO color video sounder FCV-271, FCV-360 or FCV-780 to input port (or I/O port) on the GP-188/GD-188. (This function is not available with color video sounders which have no alarm function, nor CIF output terminal.)

Changing Power Specifications

From 24 Vdc to 12 Vdc

The GP-188/GD-188 comes ready for connection to a 24 Vdc power supply. For connection to a 12 Vdc power supply modification of the power section is necessary. A modification kit for converting the GP-188/GD-188 for use with a 12 Vdc power supply is available. Table 3 lists the contents of the kit.

Table 3 Contents of Power Section Modification Kit

12Vdc Modification Kit OP14-28 (Code No. 004-322-890)			
Part	Type	Code No.	Qty
Heat Sink	14S4438-0	000-130-115	1
Fuse	FGBO 20A 125 V AC	000-549-015	1
Silicone Grease	HSC-50 *50G*	000-805-488	1

Procedure

change jumper wire settings

- 1) Remove jumper wires JP2 and JP3 on the POWER Board.
- 2) Short JP1, JP4, JP5, JP6 and JP7 by jumper wires on the POWER Board. (Insert a jumper wire into thru-hole by 2mm and then solder it.)

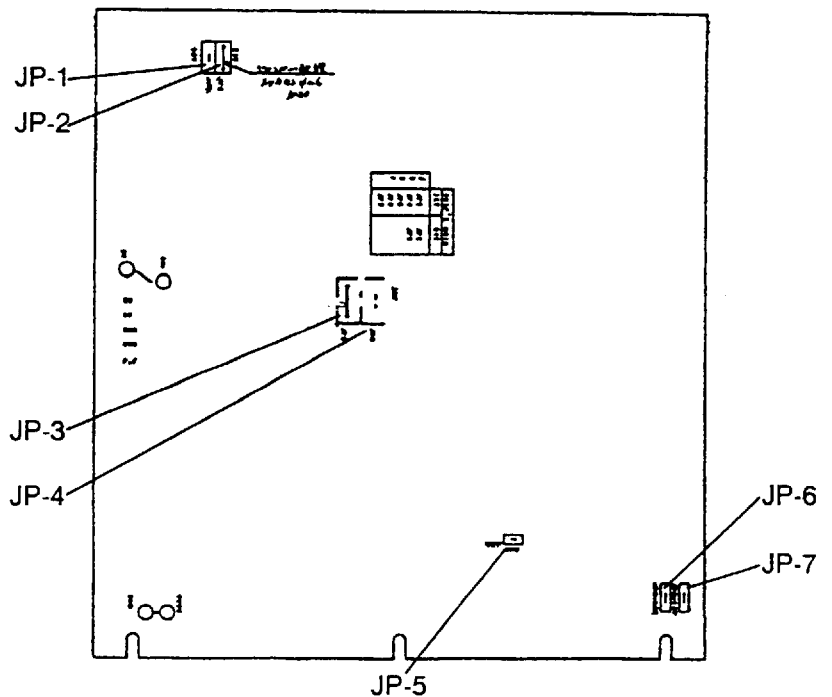


Figure 6 Power Board

replace fuse, attach power specification sticker

- 1) Replace fuse with 20A fuse.
- 2) Attach "12 V SPEC" sticker near POWER connector.

install heat sink

The power section of the 12 V specification set radiates more heat than the 24 V specification set. Install the heat sink to protect the power section against overheating.

- 1) Unfasten the screws marked by the arrows in Figure 16.

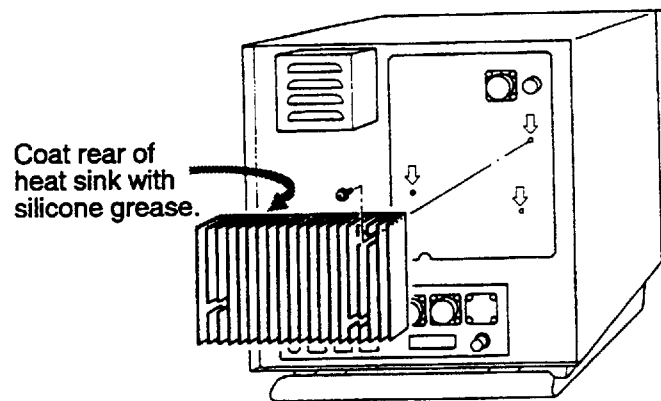


Figure 7 How to install the heat sink

- 2) Apply silicone grease to the back of the heat sink.
- 3) Fasten the heat sink to the display unit with the screws removed at step 1.

■ **CAUTION:** Do not connect a 12 V specification set to a 24 V power supply. The power section will be damaged.

**From 12 Vdc
to 24 Vdc**

Procedure

change jumper wire settings

- 1) Remove jumper wires JP1, JP4, JP5, JP6 and JP7 on the POWER Board.
- 2) Short JP2 and also JP3 by jumper wires on the POWER Board. (Insert a jumper wire into thru-hole by 2mm and then solder it.)

replace fuse, attach power specification sticker

- 1) Replace fuse with 7A fuse.
- 2) Attach "24 V SPEC" sticker near POWER connector.

Removal of the heat sink is not necessary.

Optional Equipment Installation

RAM DISK Board

The GP-188/GD-188 can store up to 10,000 track points. For increased memory capacity install the RAM DISK Kit. The RAM DISK Kit basically consists of a RAM DISK Board and one MEMORY Board whose memory capacity is 1MB or 2MB. The 1MB Board increases the memory capacity to about 55,000 track points. The 2MB Board increases the memory capacity to about 110,000 track points.

Table 4 Contents of RAM DISK Kit

RAM Disk Kit OP14-17-1 (Code No. 004-321-080): 1MB OP14-17-2 (Code No. 004-321-400): 2MB			
Part	Type	Code No.	Qty
Spacer	SQ-14	000-801-900	4
Pan Head Screw	M2 × 4	000-803-232	4
Spacer	2SP-6	000-804-579	2
Hex Head Nut	M3	000-863-204	3
Spring Washer	M3	000-864-204	3
Pan Head Screw B	M3 × 6	000-881-403	3
RAM DISK Board	14P0242	004-322-210	1
MEMORY Board	MY31M1-91AZ00 (1MB)	004-516-670	1
	MY32M1-91AZ00 (2MB)	004-516-680	

Procedure

- 1) Unplug the POWER connector.
- 2) Unfasten four screws on the inner panel to dismount the keyboard panel and inner chassis from the display unit.

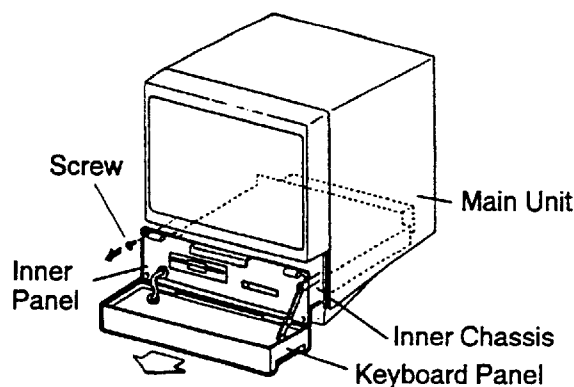


Figure 8 Display unit, front view

- 3) Attach spacers to the MPU Board. Fasten RAM DISK Board (with MEMORY Board) to spacers.

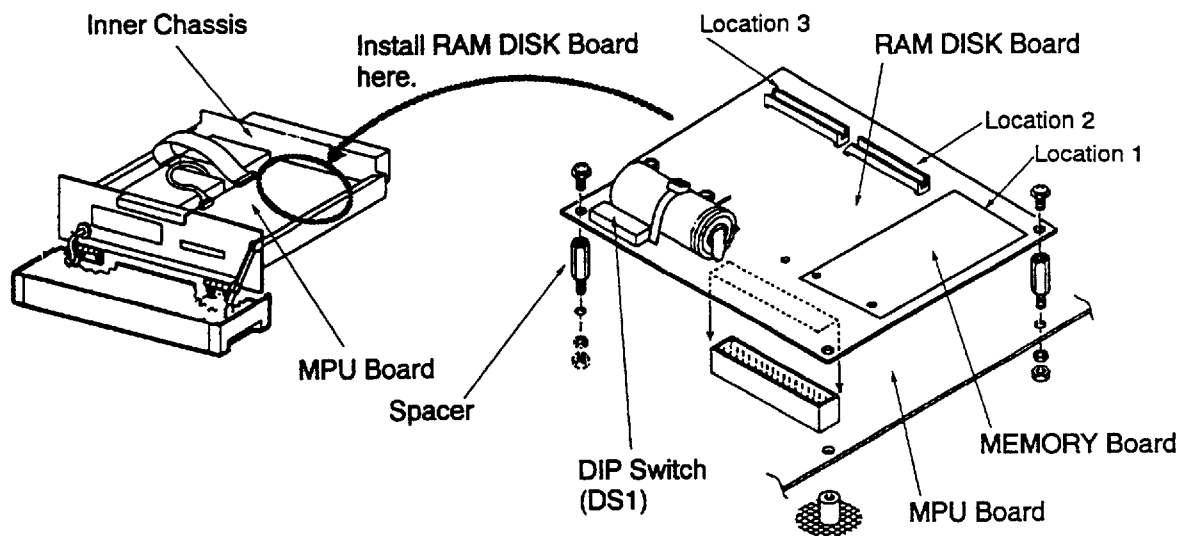


Figure 9 How to install the RAM DISK Board

- 4) Confirm DIP switch DS1 setting on the RAM DISK Board. For 1MB type MEMORY Board (memory chips on top surface of board only), switch #1 is on. For 2MB type MEMORY Board, switch #1 and #2 are on.

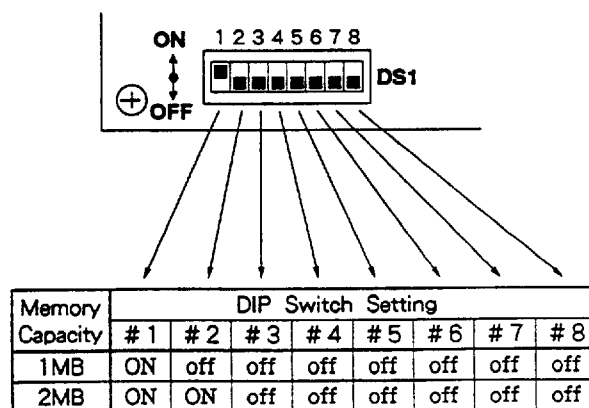


Figure 10 DIP switch DS1 setting

- 5) Reassemble inner chassis and attach the POWER connector.
- 6) Turn on the power. Press **MENU**, **9**, **1** and **7**. Confirm that the memory capacity display is correct.

Additional MEMORY Boards

Additional MEMORY Boards can be installed to further increase memory capacity.

Table 5 Contents of Additional RAM B Kit

Additional RAM A Kit OP14-18 (Code No. 004-321-090): 1MB Additional RAM B Kit OP14-19 (Code No. 004-321-100): 2MB			
Part	Type	Code No.	Qty
Pan Head Screw pacer	M2 × 4	000-803-232	4
	2SP-6	000-804-579	2
MEMORY Board	MY32M1-91AZ00 (2MB)	004-516-680	1
	MY31M1-91AZ00 (1MB)	004-516-670	

Procedure

- 1) Unplug the POWER connector.
- 2) Unfasten four screws on the inner panel to dismount the keyboard panel and inner chassis from the display unit.
- 3) Attach spacers to the RAM DISK Board. Set MEMORY Board(s) to spacers.
 1. Detach 1MB MEMORY Board from location 1 if it attached.
 2. Attach an additional 2MB MEMORY Board to location 1. (When two 2MB MEMORY Boards are attached, attach them to location 1 and 2).
 3. Attach the 1MB MEMORY Board to location 2. (When two 2MB MEMORY Boards are attached to location 1 and 2, attach 1MB Board to location 3).

■ **NOTE:** *Just one 1MB MEMORY Board can be used.*

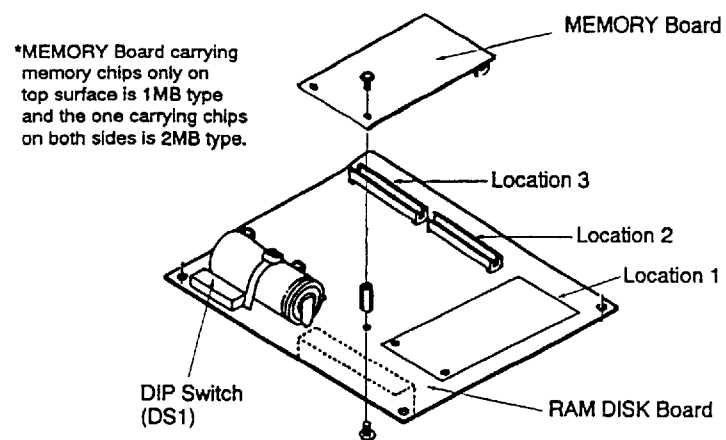


Figure 11 Installing additional MEMORY Boards

- 4) Set DIP switch DS1 on the RAM DISK Board according to memory capacity. For example, three MEMORY Boards are installed and the total memory capacity is 5MB (2MB + 2MB + 1MB). In this case turn on switches 1 through 5.

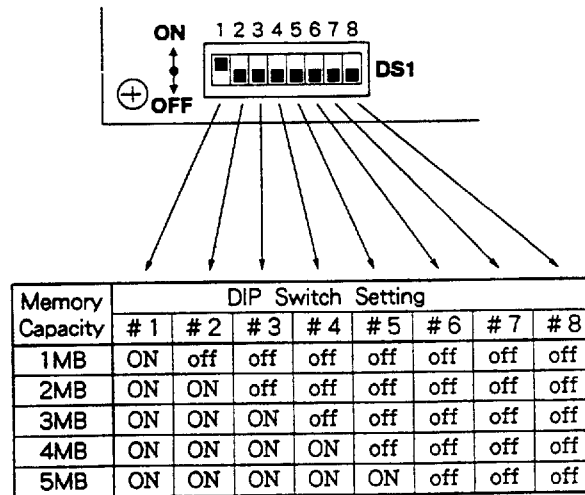


Figure 12 DIP switch DS1 setting and memory capacity

- 5) Reassemble inner chassis and attach the POWER connector.
 6) Turn on the power. Press **MENU**, **9**, **1** and **7**. Confirm that the memory capacity display is correct.

Additional Memory	Track Points (Nominal)
None	10, 000
1MB	65, 000
2MB	120, 000
3MB	175, 000
4MB	200, 000
5MB	200, 000

Remote event switch

The remote event switch provides remote entry of an event mark. Its function is the same as the **EVENT (MOB)** key on the keyboard; simply press the switch to inscribe an event mark on the display. The switch comes with a seven meter cable.

Table 6 Contents of Remote Event Switch Kit

Remote Event Switch Kit GD-8550-88 (Code No. 004-300-010)			
Part	Type	Code No.	Qty
PH-PRC Connector	80-0325	004-300-020	1
Remote Event Switch	GD-8550	004-313-560	1
Flat Washer	M4	000-864-126	2
Tapping Screw	M4 × 16	000-867-554	2
Pan Head Screw	M2.6 × 10	000-801-844	4
Hex Head Nut	M2.6	000-863-203	1
Toothed Washer	M2.6	000-864-503	1

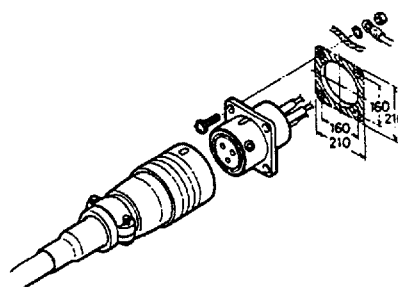


Figure 13 Installing the remote event switch connector (PH-PRC)

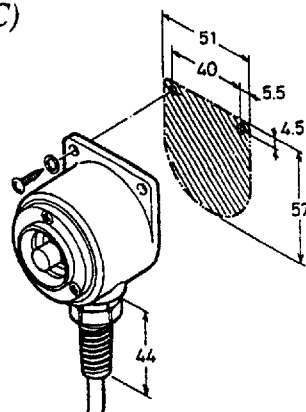


Figure 14 Mounting the remote event switch

Filter

Both the standard filter and the optional filter provide excellent protection against electromagnetic interference. The only difference between them is their thickness. If the user requires a darker picture install the optional filter. The optional filter provides a darker picture but the contrast is higher. Conversely, the standard filter provides lower contrast but the picture is not as bright as with the optional filter. Some installations may require both filters, switching filters according to lighting.

Table 7 Type and code no. of optional filter

Part	Type	Code No.	Qty
Filter	FP14-00700	004-308-240	1

Keyboard modification kit (separating keyboard from display unit)

The keyboard can be separated from the display unit and located where it is convenient for operation, up to twenty centimeters away, by installing the Keyboard Modification Kit.

Table 8 Contents of Keyboard Modification Kit

Keyboard Modification Kit OP14-21 (Code No. 004-321-110)			
Part	Type	Code No.	Qty
Keyboard Modification Kit-M	SQ-14	004-321-620	1 set
Mounting Base B	14-044-2602	100-172-331	1
Keyboard Modification Parts-M	OP14-21	004-322-690	1 set
Dummy Keyboard Panel	14-044-2001	100-172-091	1
Hinge Nut Plate	14-044-2004	100-172-121	2
Tapping Screw	M4 × 16	000-802-080	4
Binding Screw	M4 × 6	000-868-326	4
Grommet	G-42	000-871-302	2
Pan Head Screw B	M3 × 8	000-881-404	4
Signal Cable	S14-14-1.0 (8-8P)	004-322-700	1

Procedure

- 1) Unfasten four screws on the inner panel to separate inner chassis and keyboard panel from display unit.
- 2) Disassemble the keyboard panel.
 - a) Unfasten four M4 × 8 binding screws (black).
 - b) Unfasten four M3 × 8 pan head screws.
 - c) Disconnect signal cable.

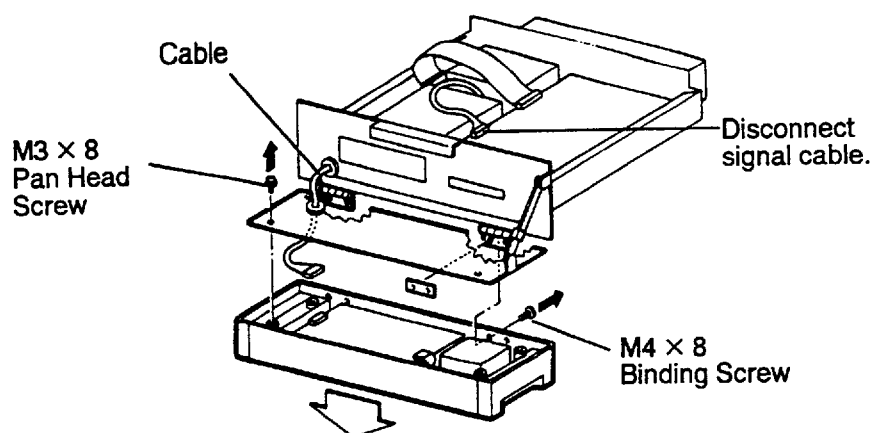


Figure 15 How to detach the keyboard panel

- 3) Fasten dummy keyboard panel to the inner chassis.
 - a) Pass signal cable through lid.
 - b) Pass signal cable through inner panel.
 - c) Connect signal cable.
 - d) Attach hinge nut plate.
 - e) Attach lid to dummy keyboard panel.

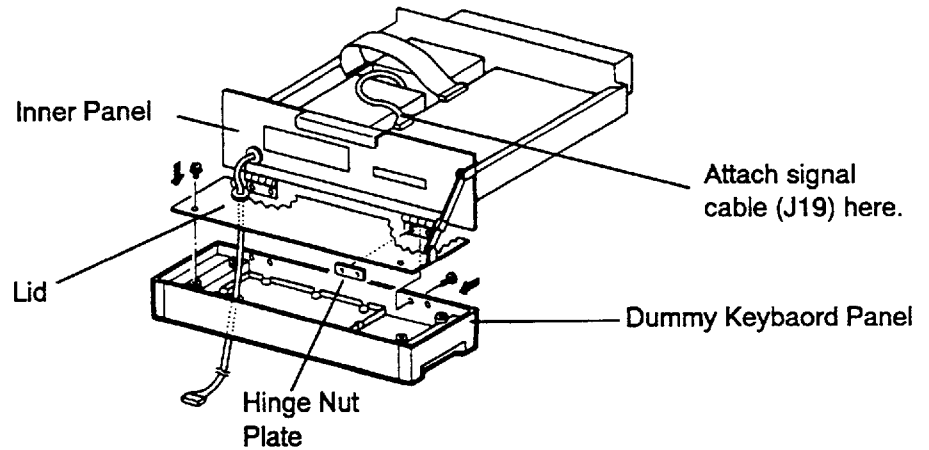


Figure 16 Fastening dummy keyboard panel to inner chassis

- 4) Fasten the keyboard panel to mounting base B.
 - a) Attach grommets to mounting base.
 - b) Pass signal cable through mounting base.
 - c) Attach hinge nut plate.
 - d) Connect signal cable.
 - e) Fasten mounting base to keyboard panel.

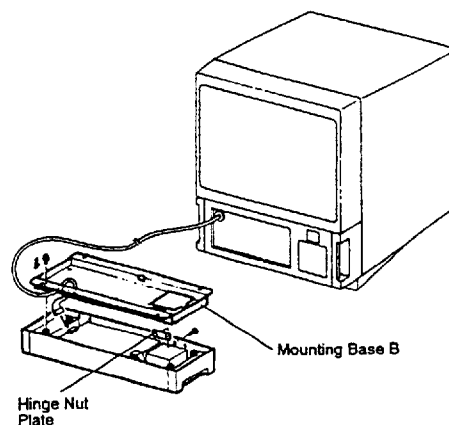


Figure 17 How to fasten keyboard panel to mounting base B

- 5) Fasten keyboard panel to mounting location with tapping screws.

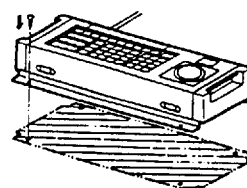


Figure 18 Fastening keyboard panel to mounting location

Initial Settings (GP-188)

Entering estimated position

After installing the unit, the first thing to do is turn on the power to fix GPS position. The GPS receiver then starts looking for a satellite to receive the almanac. It takes about 15–45 minutes to receive the almanac and find GPS position. If the position shown on the GPS monitor display is not within ten degrees of actual position it may take more than 45 minutes. (Press **MENU**, **1**, **1** and **3** to display the GPS monitor display.) In this case enter estimated position (within ten degrees) as follows.

- 1) Turn on the power. Press **MENU**, **9**, **0**, **1**, **1** and **3**. The display prompts you to enter latitude.
- 2) If your latitude is 47 degrees, 38.7 minutes North, for example, press

4 **7** **3** **8** **7** **ENT**

■ **NOTE:** *The key with two curved arrows (hereafter called the **CHG** key) changes North latitude to South latitude, West longitude to East longitude, and vice versa.*

- 3) Enter estimated longitude. To enter 122 degrees 18.4 minutes West, for example, press

CHG **1** **2** **2** **1** **8** **4** **ENT**

Entering time difference (using local time)

If the user desires local time rather than UTC time (default setting), enter time difference between local time and UTC time.

- 1) Press **MENU**, **9**, **0**, **1**, **1** and **2**.
- 2) Enter time difference. If the local time is later than UTC time enter time difference with a minus sign by pressing the **CHG** key. For example, if the time difference is -8 hours, press the following keys:

CHG **0** **8** **ENT**

Entering antenna height

Enter antenna height above the waterline, for accurate determination of GPS position.

- 1) Press **MENU**, **9**, **0**, **1**, **1** and **6**.

- 2) Select unit of measurement. For example, press **2** for feet.
- 3) Enter antenna height above the waterline in four digits. If the height is 12 feet, for example, press **0, 0, 1, 2** and **ENT**.

■ **NOTE:** *For areas where the antenna height is below the water line, for example, Holland, enter height with a minus sign by pressing the **CHG** key, before entering height.*

Selecting geodetic chart system

The default geodetic chart setting is WGS-84, the standard GPS chart system. The GP-188 can use other chart systems if you tell it what chart system to use. The chart systems it recognizes appear in the Operator's Manual.

To select a chart other than WGS-84, do the following.

- 1) Press **MENU, 9, 0, 1, 1** and **5**.
- 2) Enter chart number. If the chart you are using is North America, for example, press **4**.

For charts not displayed in the bottom window, first press **7**. Then enter three digit geodetic chart code by referring to the geodetic chart list in the Operator's Manual.

Navigation Data Input/Output

GP-188 I/O data

Input

- The GP-188 can paint a secondary trackline by receiving position data from an external navigator, for example, a Loran C receiver. This permits comparison of GPS position against another source of position data.
- By water temperature and water depth input, the color of the trackline can be set to change with water depth and water temperature.

Output

- Position data can be output to a radar or echo sounder for display on its display screen.
- Cross track error and range and bearing to waypoint can be output to an autopilot to aid automatic steering.
- A Loran Plotter can be converted to a GPS Plotter with position data from the GP-188.

Data output interval is about 2 to 5 seconds, depending on CPU status.

Format

The GP-188 can output data in CIF or NMEA 0183 format. (NMEA 0182 also is available.)

Talker

All data transmitted by marine electronics equipment are prefixed with a two character code called a talker. The talker tells receiving-end equipment what equipment is transmitting data. The GP-188 transmits data in the GPS talker.

Because GPS is a relatively new system some early model equipment do not recognize the GPS talker. In this case transmit data in a talker the receiving-end equipment recognizes. The GP-188 can transmit data in the following talkers:

- Loran C
- Loran A
- Decca
- Integrated instruments (gyrocompass, speed log), and
- Omega.

The DATA2 port converts GPS talker to talker selected.

Port and data availability

Table 9 shows the ports of the GP-188 and what type of data they can handle.

Table 9 Port and data availability for GP-188

		DATA1	DATA2	DATA3	DATA4	AUTOPILOT
FURUNO CIF	O U T	None	system time, GPS position, waypoint data, event position, ship's speed/course	None	event position, and DATA3 input data	None
	I N	system time, position (L/L), waypoint data, speed, course, LOP, water temperature, water depth, event position, tide speed, and tide course, wind direction, wind speed			None	None
NMEA 0183	O U T	None	ZDA, GLL, VTG, WPL, RMC, GGA	None	GGA, AAM, APB, BOD, GLL, RMB, VTG, XTE	AAM, BOD, VTG, XTE, BWC, APB, RMB
	I N	AAM, GGA, GLL, TLL, VTG, DBT, MTW	GGA, GLL, TLL, VTG, DBT, MTW		None	None

GD-188 I/O data

Input

- With water temperature and water depth data, the color of the trackline can be set to change with water depth and water temperature.
- By receiving position data from two navigators, both a main and a secondary trackline can be painted. This permits verification of position.

Output

- Cross track error and range and bearing to waypoint can be output to an autopilot to aid automatic steering.

Data output interval is about 2 to 5 seconds, depending on CPU status.

Format

The GD-188 can output data in CIF or NMEA 0183 format.

Table 10 Port and data availability for GD-188

		DATA1	DATA2	DATA3	DATA4	AUTOPILOT
FURUNO CIF	O U T	None	waypoint data, event position	None	event position, and DATA3 input data	None
	I N	system time, position (L/L), waypoint data, speed, course, LOP, water temperature, water depth, event position, tide speed, tide course, wind direction, wind speed			None	None
NMEA 0183	O U T	None	None	None	GGA, AAM, APB, BOD, GLL, RMB, VTG, XTE	AAM, BOD, VTG, XTE, BWC, APB, RMB
	I N	AAM, GGA, GLL, TLL, VTG, DBT, MTW	GGA, GLL, TLL, VTG, DBT, MTW		None	None

Selecting data format

Set data format for each port as follows.

DATA1 (input only)

- 1) Press **MENU, 9, 0, 8** and **1**.
- 2) Select data format from choices in bottom window.

For special format, select 4 and then enter baud rate, data bit, parity, stop bit, handshake and Rx trial.

DATA2 (input/output)

- 1) Press **MENU, 9, 0, 8** and **2**.
- 2) Select data format.
- 3) If necessary select output device name by pressing **3**. Otherwise, press the **ENT** key.

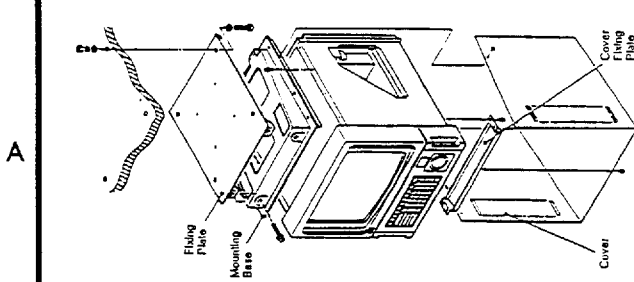
DATA 3 (input only) and DATA4 (output only)

These ports share the same format. (Individual selection of format is not possible.)

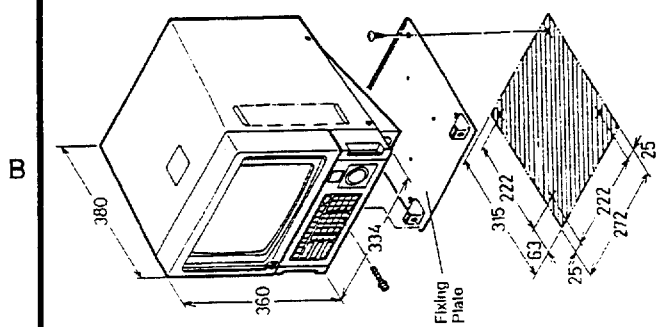
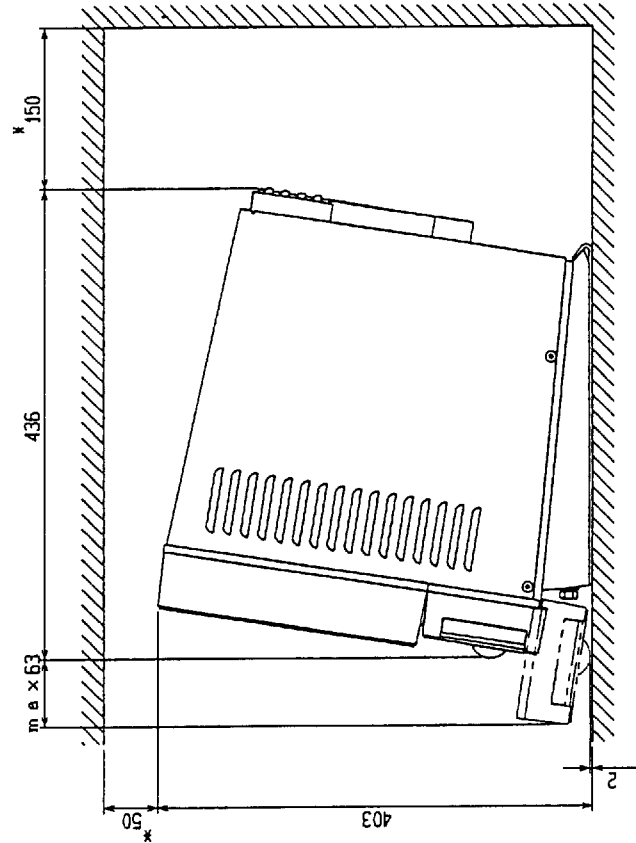
- 1) Press **MENU, 9, 0, 8** and **3**.
- 2) Select data format; 1 for FURUNO CIF, 2 for NMEA 0183.

**NMEA 0183 data
format and meaning**

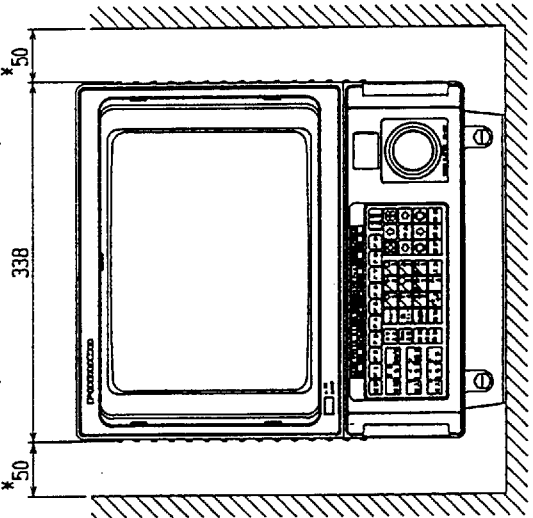
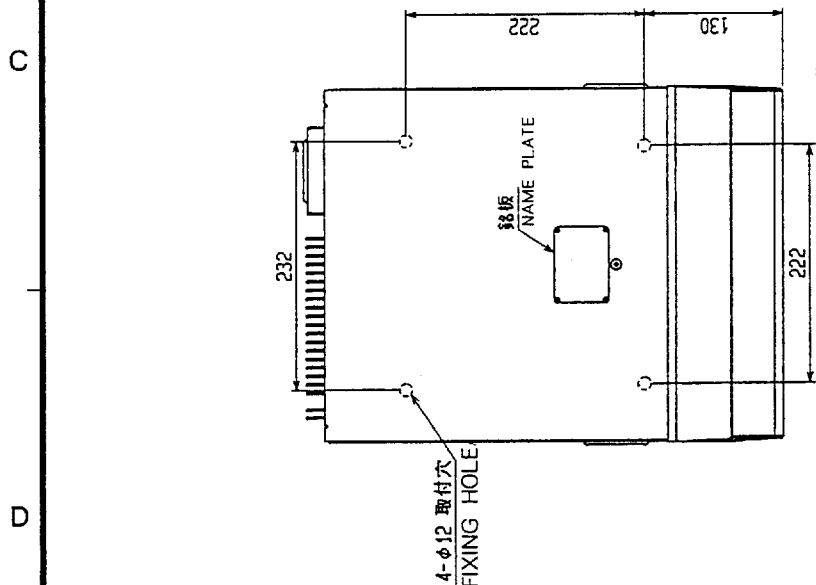
AAM:	Arrival alarm
APB:	Autopilot data (range and bearing to waypoint, cross-track error)
BOD:	Bearing from origin to destination
BWC:	Range and bearing to waypoint (great circle navigation)
DBT:	Water depth
GLL:	Latitude and longitude
MTW:	Water temperature
RMB:	Generic navigational information (cross 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:	Speed relative to the ground
WPL:	Waypoint position in latitude and longitude, waypoint no.
XTE:	Course error amount and direction to steer
ZDA:	UTC time
GGA:	GPS fix data
TLL:	Target latitude and longitude



Overhead mounting

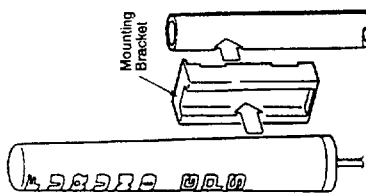


Tabletop mounting

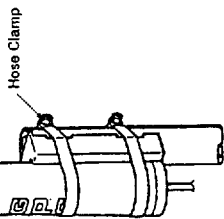


承 認 APPROVED	品 番 ITEM	品 名 NAME	材 質 MATERIAL	数 量 Q'TY	図 番 DWG. NO.	備 考 REMARKS
MAR. 8 · 193 M. IKEDA		三 角 法 THIRD ANGLE				名 称 TITLE 指示器 DISPLAY UNIT
検 査 CHECKED	MAR. 8 · 193 TAKAHASHI	尺 度 SCALE				GD/GP-188
製 図 DRAWN	MAR. 8 · 193 S. NISHI	重 量 WEIGHT		23 kg	図 番 DWG. NO.	C4352-G01-B

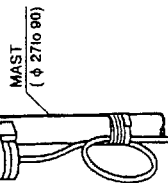
1) FIXED TO MAST



MOUNTING BRACKET



HOSE CLAMP



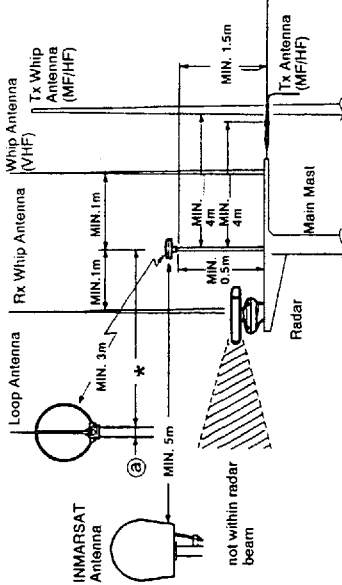
MAST
(φ 271 to 90)

After connecting antenna cable, waterproof the connector by wrapping it with self-bonding tape and then vinyl tape.

Tape antenna cable to mast as shown above.

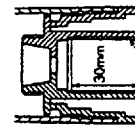
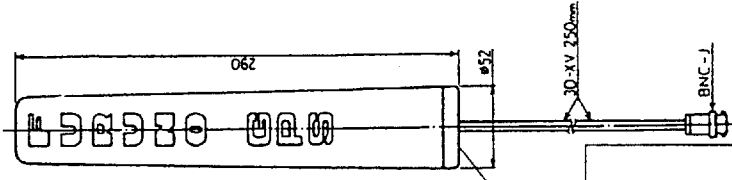
Mounting location

The figure below shows the recommended separation distances from other antennas to avoid mutual interference.



* Distance depends on mast diameter of ③
 ① mast diameter 10cm : minimum 1.5m
 ② mast diameter 30cm : minimum 3m

ANTENNA UNIT
GPA-014

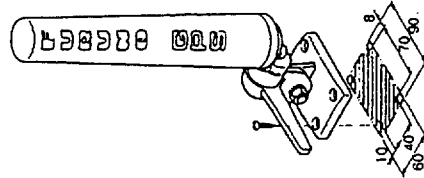


WHITWORTH FINE
THREAD W25 x 14

NOTE:
Substitutable with UNIFY THREAD
(1-14 UNS).

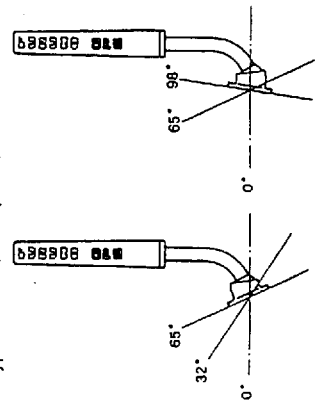
5) VARIABLE ANGLE MOUNTING BASE

Type No. 13-QA100, Code No. 000-803-241



4) L-ANGLE MOUNTING BASE (Option)

Type No. 13-QA310, Code No. 000-803-240



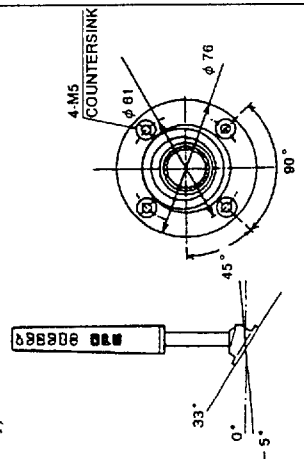
2) SCREWED INTO THREADED PIPE

Thread Type	Threads per 25.4 mm (1 inch)	Pitch	Pitch Diameter
1 x 14 UNS	14	1.8143	24.15

After connecting antenna cable, waterproof the connector by wrapping it with self-bonding tape and then vinyl tape.

3) RIGHT ANGLE MOUNTING BASE (Option)

Type No. 13-QA300, Code No. 000-803-239



REMARKS	APPROVED	MASS	SCALE
	E.M.	kg	

GP188	GP3100	GP500MK2	GP700MARK2
APPLICABLE TO:			
(MODEL)			

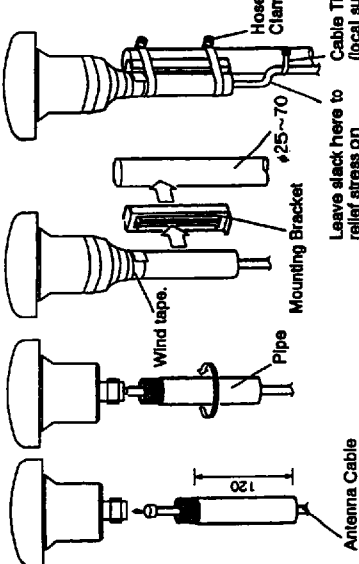
TYPE	GPA014
名称	
NAME	
DWG. NO.	
BLOCK NO.	

INSTALLATION DIAGRAM

F4352-Y01-A

A) Mast mounting

Use mast mounting kit CP20-01111.



NOTES

- 1) Fasten pipe to antenna first then fix them to mast.
- 2) When fixing antenna to pipe, turn pipe; not the antenna. Turning the antenna may twist the cable and place stress on connector.

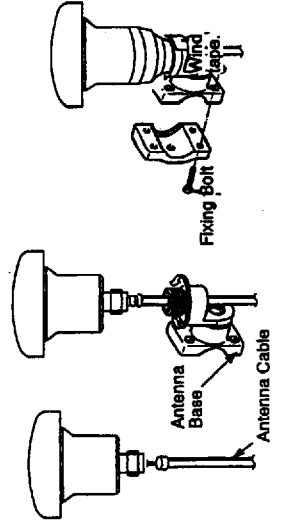
Leave slack here to relieve stress on connector.

B) Antenna base mounting

Use optional antenna base No.13-QA300 or No.13-QA310.

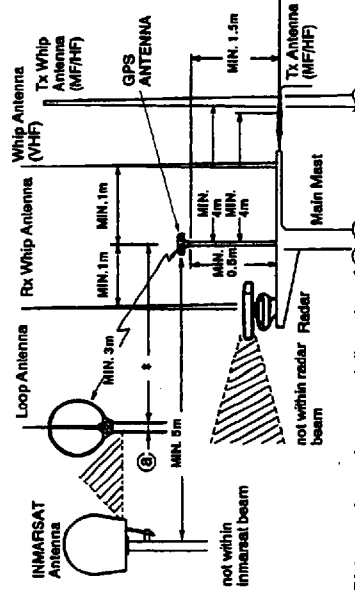
Inclination	5° to 33°	32° to 65°	65° to 98°
Right angle antenna base No.13-QA300 (code No. 000-803-239)			
L-type antenna base No.13-QA310 (code No. 000-803-240)			

C) Handrail mounting



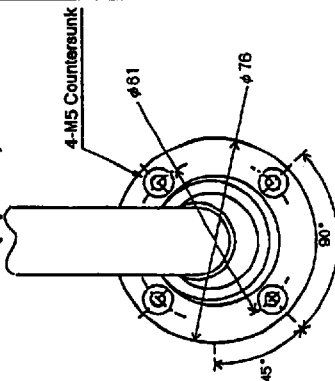
Mounting location

The figure below shows the recommended separation distances from other antennas to avoid mutual interference.



* Distance depends on mast diameter of
 ① mast diameter 10cm : minimum 1.5m
 ② mast diameter 30cm : minimum 3m

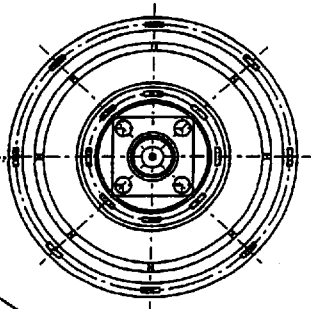
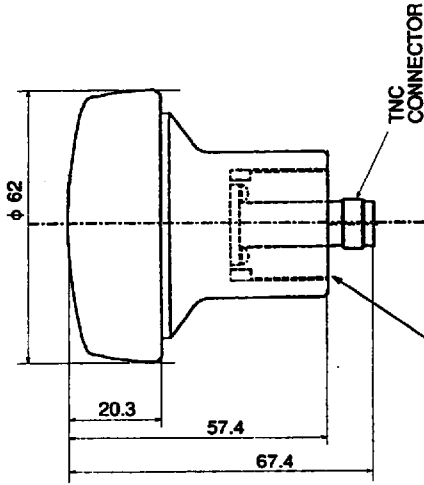
Mounting dimensions of antenna base (option)



Use handrail mounting base No.13-RC5160 (Code No. 000-861-114, option). The diameter of the handrail may be from $\phi 19$ mm to $\phi 32$ mm.

NOTES

- 1) Fasten antenna base to antenna first then fix them to handrail.
- 2) When fixing antenna to antenna base, turn antenna base; not the antenna. Turning the antenna may twist the cable and place stress on connector.



Thread Type	Threads per 25.4 mm (1 inch)	Pitch	Thread Length	Pitch Diameter
1 X 14UNS1B	14	1.8143 mm	15.17 mm	24.17 mm

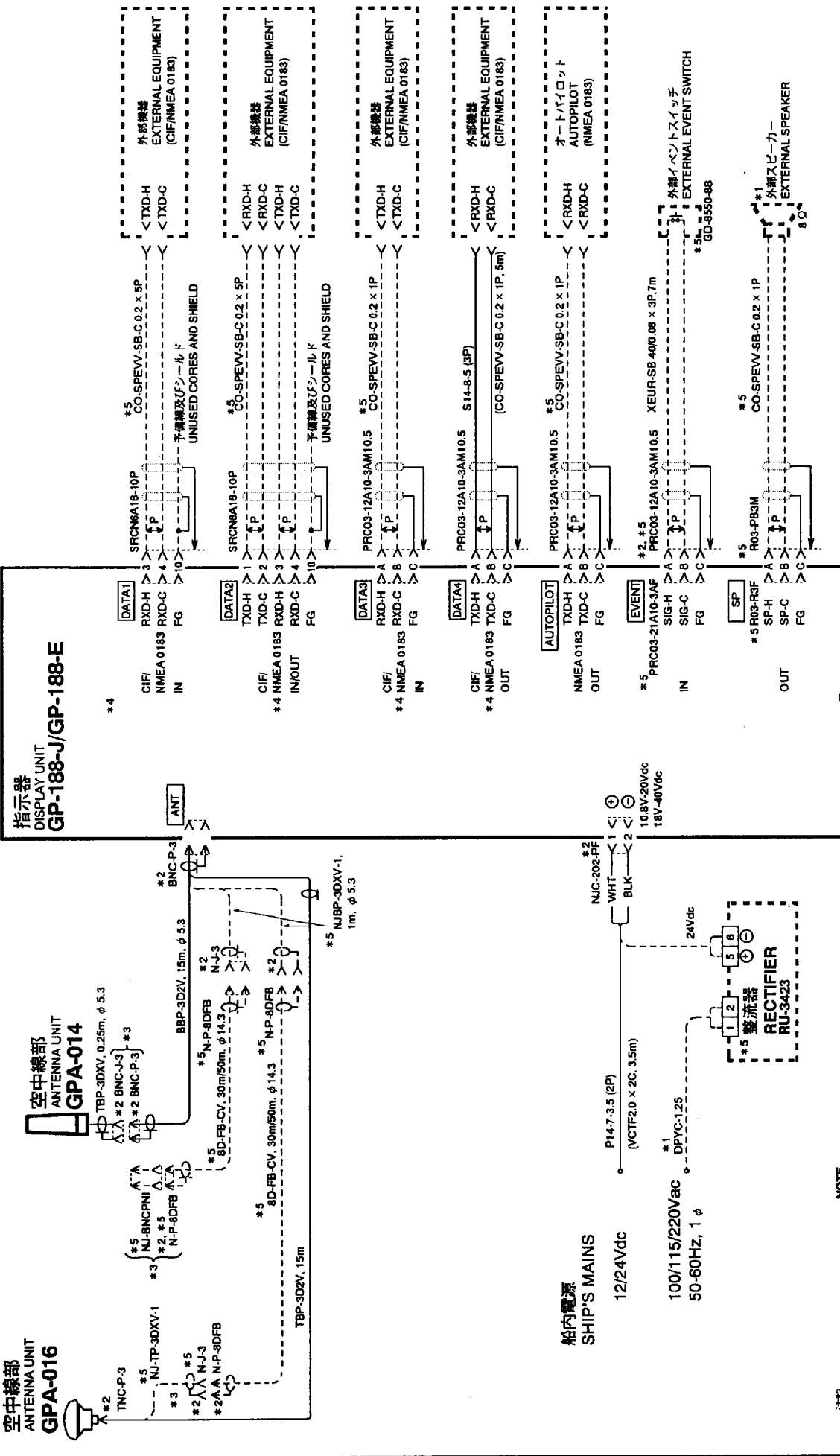
ITEM NO.	QTY	NAME	UNIT
GP-50MK3		TYPE	GPA016
GP-5000M2		名称	変圧機部
GP-1600/F			外寸図
GP-8000M2		MODEL	ANTENNA_UNIT
GP-3100M2		BLOCK NO.	
GP-80		APPLICABLE TO:	
		SCALE	1/1
		DATE	0.1kg
		FIG. NO.	EA374-G04-D

カラーGPSプロッター
COLOR GPS PLOTTER

空中線部
ANTENNA UNIT
GPA-016

空中線部
ANTENNA UNIT
GPA-014

指示器
DISPLAY UNIT
GP-188-J/GP-188-E



- 注記
- *1: 造船所立給
 - *2: 工場取付済
 - *3: 防水のためテーピング処理をする事
 - *4: MENUにて選択
 - *5: オプション
- ⊕: 銅板にて接地

- NOTE
- *1: SHIPYARD SUPPLY.
 - *2: FACTORY WIRED.
 - *3: TAPE FOR WATERPROOFNESS.
 - *4: SELECT ON MENU.
 - *5: OPTIONAL SUPPLY
- ⊕: GROUND WITH COPPER STRAP.

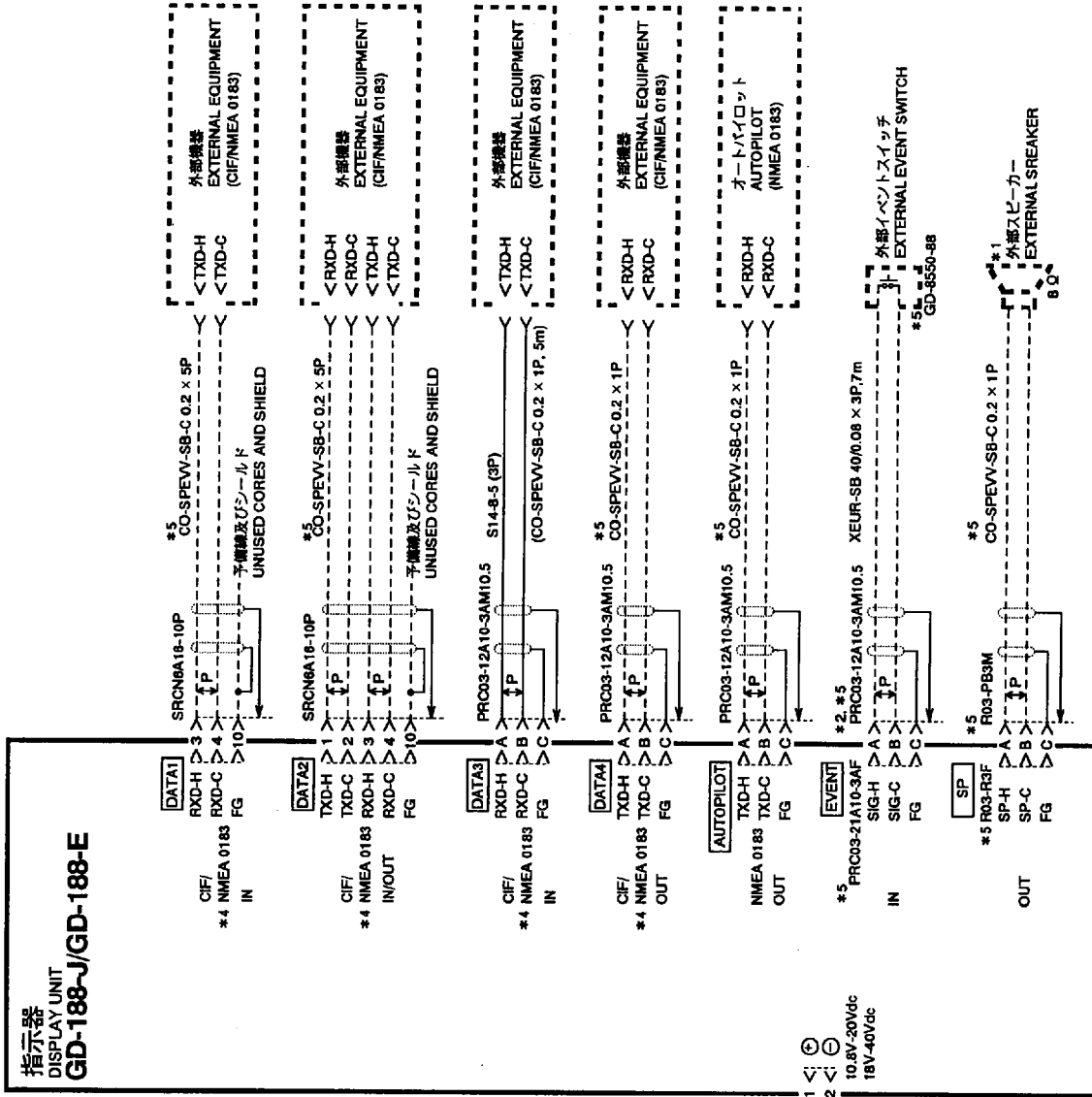
承認 APPROVED	MAK 8・193 M. Ikeda	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS
検閲 CHECKED	MAK 8・73 TAKAHASHI	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS
製図 DRAWN	MAK 8・74 S. A. S. S.	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS

相互結線図
INTERCONNECTION DIAGRAM

図番 C4352-C01-C

カラービデオプロッター COLOR VIDEO PLOTTER

指示器 DISPLAY UNIT GD-188-J/GD-188-E



注記
 * 1: 造船所支給
 * 2: 工場取付済
 * 3: 防水のためテープビニング処理をする事
 * 4: メニューにて選択
 * 5: オプション
 註: 銅板にて接地

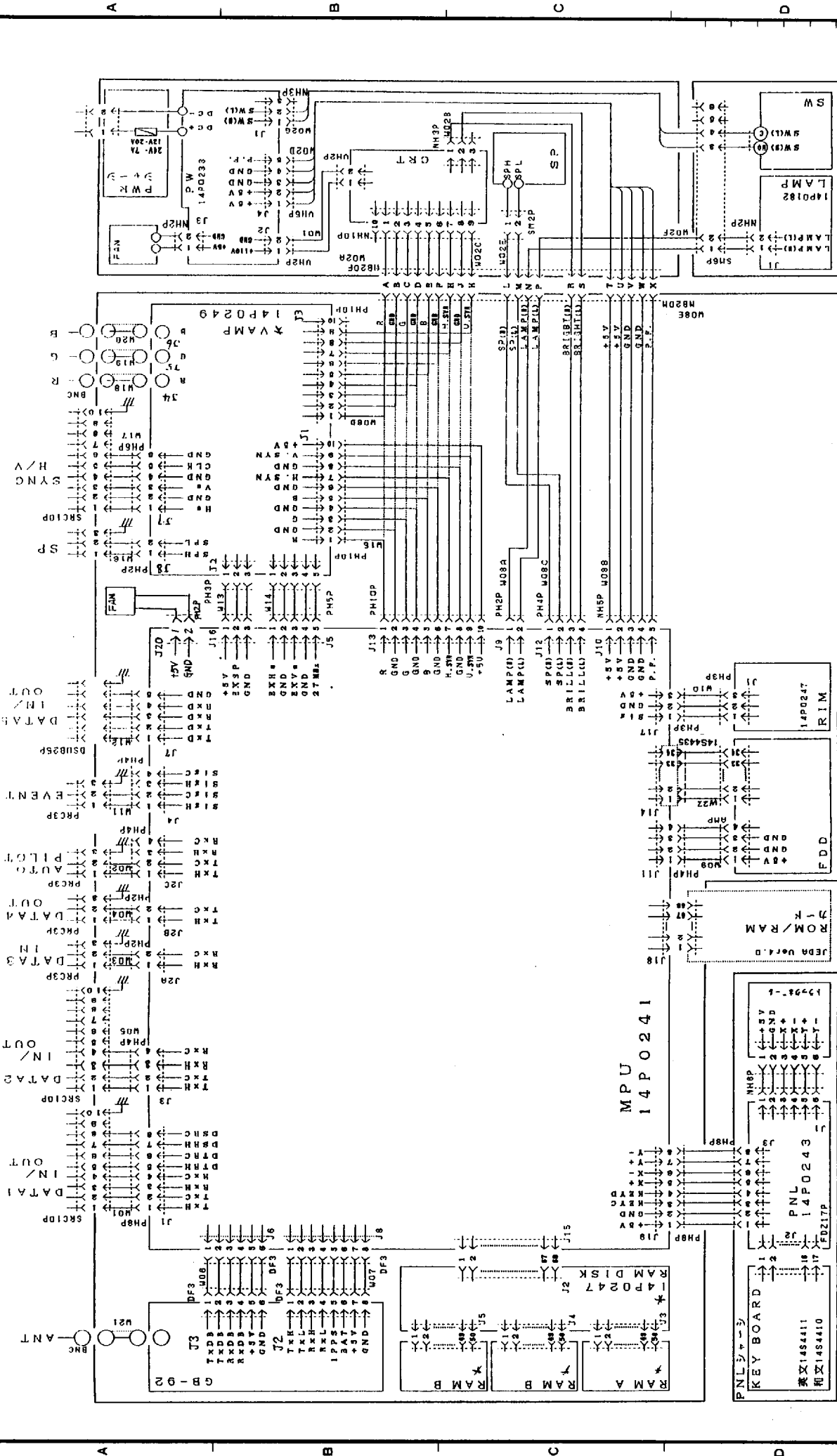
NOTE
 * 1: SHIPYARD SUPPLY.
 * 2: FACTORY-WIRED.
 * 3: TAPE FOR WATERPROOFNESS.
 * 4: SELECT ON MENU.
 * 5: OPTIONAL SUPPLY
 註: GROUND WITH COPPER STRAP.

承認 APPROVED	MAR. 8 '93 M. IKEDA	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS
検図 CHECKED	MAR. 8 '93 TAKAYASHI	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS
製図 DRAWN	MAR. 8 '93 S. NISHI	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS

承認 APPROVED	MAR. 8 '93 M. IKEDA	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS
検図 CHECKED	MAR. 8 '93 TAKAYASHI	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS
製図 DRAWN	MAR. 8 '93 S. NISHI	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS

承認 APPROVED	MAR. 8 '93 M. IKEDA	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS
検図 CHECKED	MAR. 8 '93 TAKAYASHI	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS
製図 DRAWN	MAR. 8 '93 S. NISHI	品名 ITEM	品名 NAME	数量 QTY	図番 DWG. NO.	備考 REMARKS

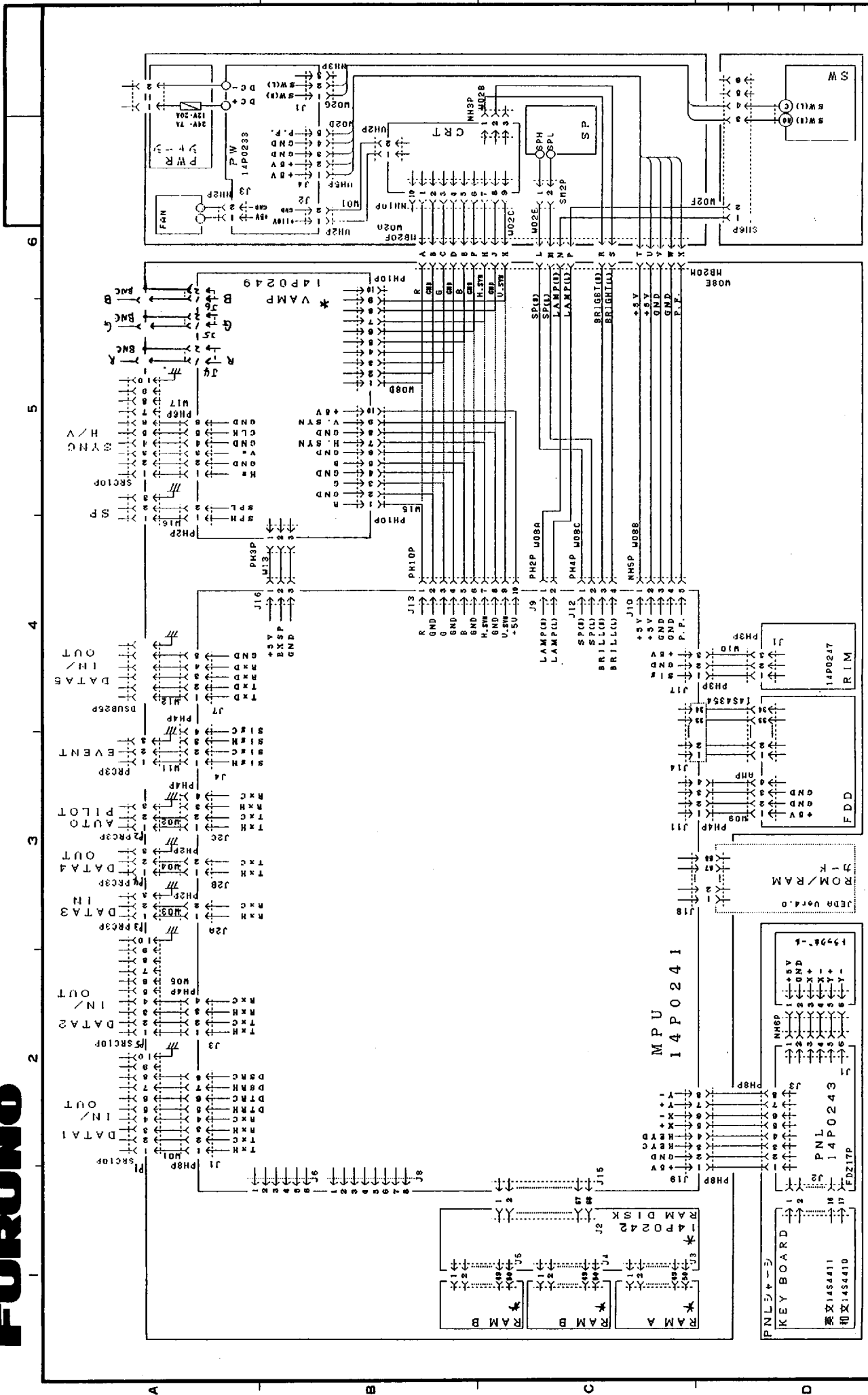
GD-188 相互接続図
 INTERCONNECTION DIAGRAM
 図番 C4351-C01-A
 DWG. NO



TYPE 名称	GP-188
名称	綜合
APPLICABLE TO: (MODEL)	回路図
BLOCK NO.	
SCALE	kg
DWG NO.	C4352-K01-E 14-056-1001-1

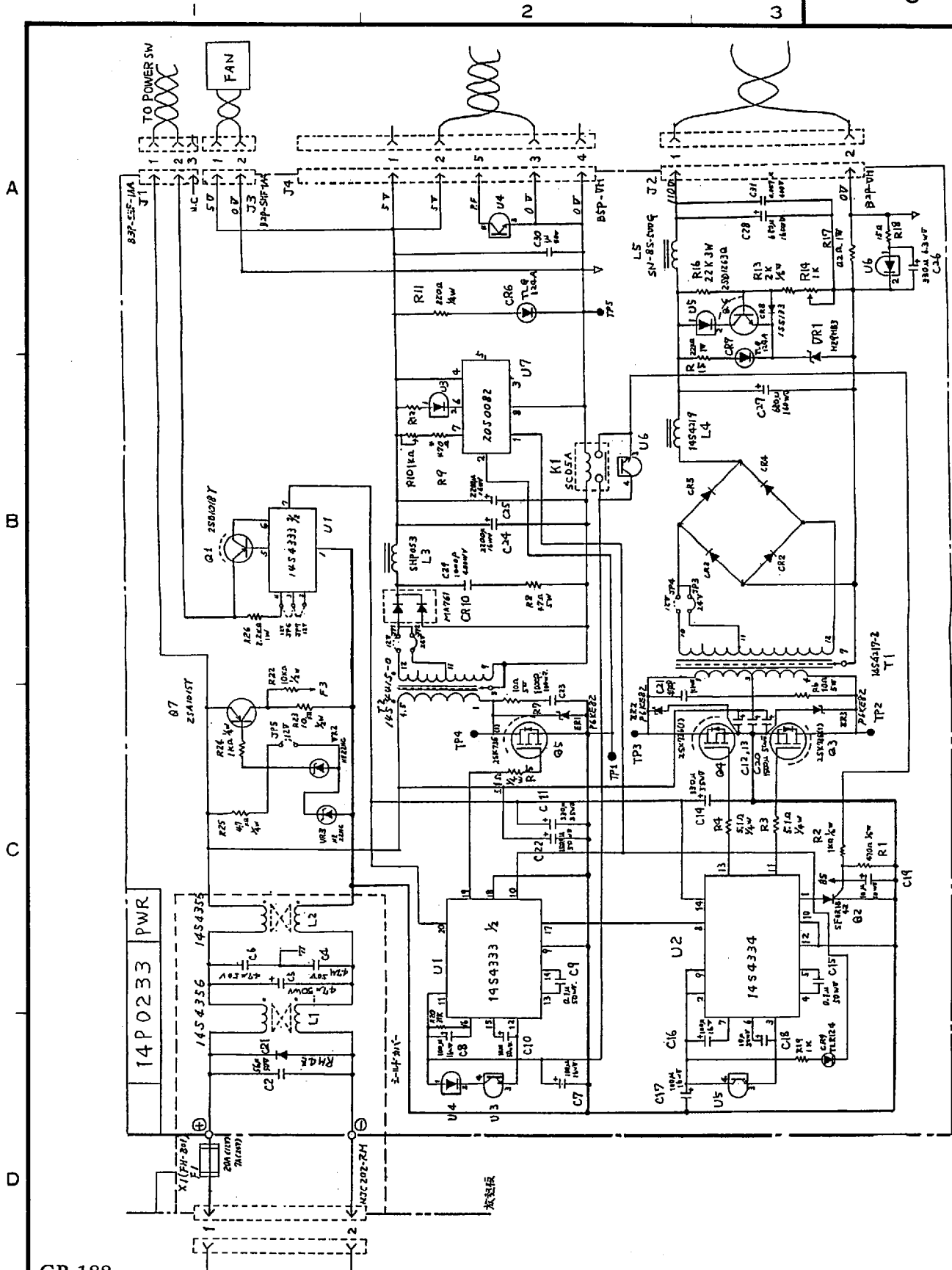
* オプション・オプション

SCHEMATIC DIAGRAM



承認 APPROVED	MAK-8-93	名称 TITLE	綜合回路図 GENERAL SCHEMATIC DIAGRAM
検閲 CHECKED	M. I. KEDA	図番 DWG. NO.	C4351-K01-D
製図 DRAWN	MAR-8-75	製図者 DRAWN BY	TAKAHASHI
	MAR-8-93	製図者 DRAWN BY	S. M. I. S. I. C.

※: 対応オプション



GP-188

GD-188

品番 ITEM	品名 NAME	材質 MATERIAL	数量 Q'TY	図番 DWG. NO.	摘要 REMARKS
承認 APPROVED	MAR. 8. '93 M. IKEDA	三角法 THIRD ANGLE PROJECTION	名稱 TITLE	電源基板 PWR BOARD	
検図 CHECKED	MAR. 8. '93 TAKAMASHI	尺度 SCALE	14P0233		
製図 DRAWN	MAR. 8. '93 S. VISHU	重量 WEIGHT	kg	図番 DWG. NO.	C4352-K02-A

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