FURUNO

INSTALLATION MANUAL

MARINE RADAR

MODEL MODEL1833/1933/1943

NAVnet

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

PRINTED IN JAPAN

© FURUNO ELECTRIC CO., LTD.

9-52 Ashihara-cho,
Nishinomiya, Japan

Telephone : 0798-65-2111
Telefax : 0798-65-4200

All rights reserved. Printed in Japan

PUB.No. IME-35020-E

(HIMA) MODEL1833/1933/1943

Your Local Agent/Dealer

FIRST EDITION : APR. 2001
E : APR. 22,2002

00080918701

IME35020E00

⚠ SAFETY INSTRUCTIONS

⚠ WARNING

ELECTRICAL SHOCK HAZARD

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

Only qualified personnel should work inside the equipment.

Wear a safety belt and hard hat when working on the antenna unit.

Serious injury or death can result if someone falls from the radar mast.

Construct a suitable service platform from which to install the antenna unit.

Serious injury or death can result if someone falls from the radar mast.

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

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

⚠ CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

Observe the following compass safe distances to prevent deviation of a magnetic compass.

	Standard	Steering
Display unit	0.85 m	0.55 m
1833 antenna unit	0.90 m	0.70 m
1933 antenna unit	1.00 m	0.80 m
1943 antenna unit	1.00 m	0.80 m

⚠ WARNING

Radio Frequency Radiation Hazard

The radar antenna emits electromagnetic radio frequency (RF) energy which can be harmful, particularly to your eyes. Never look directly into the antenna aperture from a close distance while the radar is in operation or expose yourself to the transmitting antenna at a close distance.

Distances at which RF radiation levels of 100 and 10 W/m^2 exist are given in the table below.

Note: If the antenna unit is installed at a close distance in front of the wheel house, your administration may require halt of transmission within a certain sector of antenna revolution. This is possible - Ask your FURUNO representative or dealer to provide this feature.

MODEL	Distance to 100 W/m^2 point	Distance to 10 W/m^2 point
1833	Nil	Worst case 0.50 m
1933	Worst case 0.20 m	Worst case 3.00 m
1943	Nil	Worst case 2.50 m

TABLE OF CONTENTS

SAFETY INSTRUCTIONS i

EQUIPMENT LISTS iii

SYSTEM CONFIGURATIONS v

1. MOUNTING 1-1
1.1 Installation of Display Unit 1-1
1.2 Mounting of Antenna Unit for MODEL 1833 1-4
1.3 Mounting of Antenna Unit for MODEL 1933/1943 1-11

2. WIRING 2-1
2.1 Standard Wiring 2-1
2.2 External Buzzer (OP03-136, option) Connection 2-3
2.3 How to Connect with PC.. 2-4

3. ADJUSTMENT 3-1
3.1 How to Access to Installation Menu 3-1
3.2 NETWORK SETUP Menu 3-2
3.3 RADAR SETUP Menu 3-4
3.4 Checking Magnetron Heater Voltage 3-10
3.5 Navigation Data Source 3-11
3.6 Setting up Data Ports 3-15
3.7 Remote Controller Setting 3-17

4. OPTIONS 4-1
4.1 ARP Kit ARP-11 4-1
4.2 Connection of External Monitor/Remote Display 4-3

PACKING LISTS A-1

OUTLINE DRAWINGS D-1

SCHEMATIC DIAGRAMS S-1

EQUIPMENT LISTS

Standard supply

Name	Type	Code No.	Qty	Remarks
Display unit	RDP-127	-	1	
Antenna unit	RSB-0071-057	-	1	MODEL 1833
	XN10A-RSB-0070-064	-		MODEL1933, 24 rpm
	XN10A-RSB-0073-064	-		MODEL1933, 48 rpm
	XN12A-RSB-0070-059	-		MODEL1943, 24 rpm
	XN12A-RSB-0073-059	-		MODEL1943, 48 rpm
Remote controller set	RMC-100	000-089-885	1	Remote controller, vinyl case, battery, labels
Installation materials	CP03-21900	000-080-019	1set	For display unit, MJ-A3SPF0018-050Z cable, CP03-21901
	CP03-16901	008-478-750	1set	For MODEL1833 antenna unit
	CP03-21800	000-080-014	1	For MODEL1833 10 m signal cable
	CP03-21810	000-080-015		For MODEL1833 15 m signal cable
	CP03-21820	000-080-016		For MODEL1833 20 m signal cable
	CP03-21830	000-080-017		For MODEL1833 30 m signal cable
	CP03-18401	008-503-360	1set	For MODEL1933/1943 antenna unit
	CP03-22901	008-523-690	1set	For MODEL1933/1943 antenna radiator XN10A/XN12A
	CP03-22000	000-080-021	1	For MODEL1933/1943 10 m signal cable
	CP03-22010	000-080-022		For MODEL1933/1943 15 m signal cable
	CP03-22020	000-080-023		For MODEL1933/1943 20 m signal cable
	CP03-22030	000-080-024		For MODEL1933/1943 30 m signal cable
Accessories	FP03-09200	000-080-020	1set	FP03-09301, FP03-09202, FP03-09203, FP03-09204
Spare parts	SP03-14001	000-080-018	1set	Fuses

Optional supply

Name	Type	Code No.	Qty	Remarks
Rectifier	PR-62	000-013-484	1	For MODEL1833, 100 VAC
		000-013-485		For MODEL1833, 110 VAC
		000-013-486		For MODEL1833, 220 VAC
		000-013-487		For MODEL1833, 230 VAC
	RU-3423	000-030-443	1	For MODEL1933/1943
External buzzer	OP03-136	000-086-443	1	
Cable assy.	MJ-A6SPF0014-010	000-144-421	1	For NavNet, 1 m
	MJ-A6SPF0014-050	000-144-422	1	For NavNet, 5 m
	MJ-A6SPF0014-100	000-144-423	1	For NavNet, 10 m
	MJ-A6SPF0014-200	000-144-424	1	For NavNet, 20 m
	MJ-A6SPF0014-300	000-144-425	1	For NavNet, 30 m
	MJ-A6SPF0012-050	000-134-424	1	For navaid, 5 m
	MJ-A6SPF0012-100	000-133-817	1	For navaid, 10 m
	MJ-A6SPF0003-050	000-117-603	1	w/6P connector, 5 m
	MJ-A6SPF0009-100	000-125-236	1	w/6P connector, 10 m
	MJ-A6SPF0007-100	000-125-237	1	For compass, 10 m
	MJ-A7SPF0007-050	000-144-418	1	For external buzzer, PC, w/7P connector, 5 m
	MJ-A6SRMD/TM11AP8-005	000-144-463	1	Adapter cable for HUB
RGB output cable kit	OP03-176	008-526-360	1	For external display
Filter	FP03-09101	008-523-060	1	
ARP kit	ARP-11	008-523-050	1	ARP Board
Mounting bracket (1)	OP03-92	008-445-070	1	For MODEL1833
Chart card	-	-	-	Specified when ordering.
RAM card	00RAM02MC-004	004-371-790	1	2 MB
Remote controller set	RMC-100	000-089-885	1	
Modification kit for C-map	MODEL 17*2/C-MAP	008-525-200	1	See modification instruction E42-0005-x
Cable set for remote display	OP03-174-5	008-523-000	1	5 m
	OP03-174-10	008-523-010		10 m
	OP03-174-15	008-523-020		15 m
	OP03-174-20	008-523-030		20 m
	OP03-174-30	008-523-040		30 m

SYSTEM CONFIGURATIONS

The MARINE RADAR MODEL 1833/1933/1943 has IP address to communicate with the "NavNet" products located within the network, based on the TCP/IP protocol through Ethernet 10Base-T. A NavNet system may consist of one, two, three or four display unit and one ETR. For a system incorporating three or more products a "hub" is required to process data. Simple system such as Figure1 below, or integrated systems Figure 2 are explained.

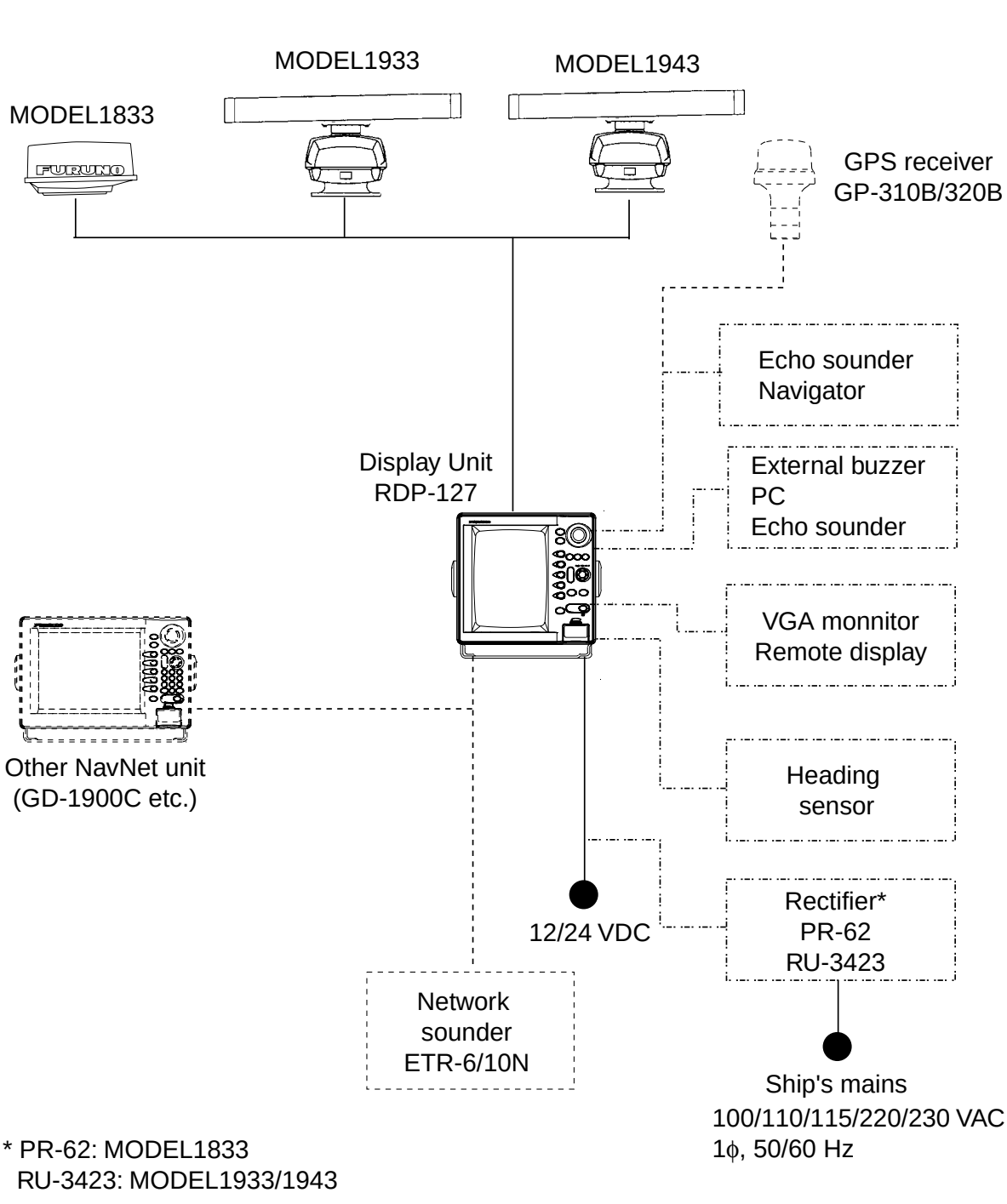


Figure 1 Single unit NavNet system

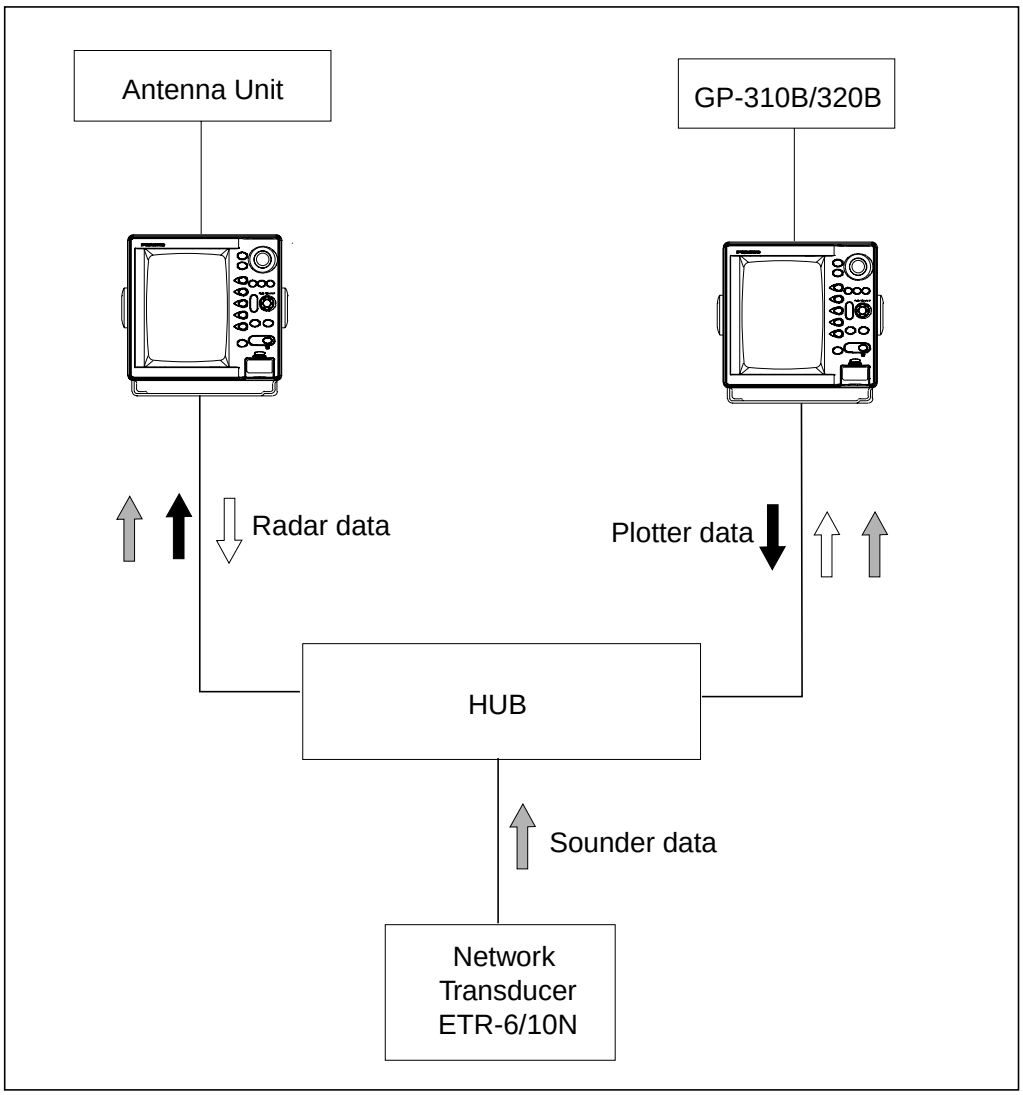


Figure 2 (a) NavNet system, three-unit connection

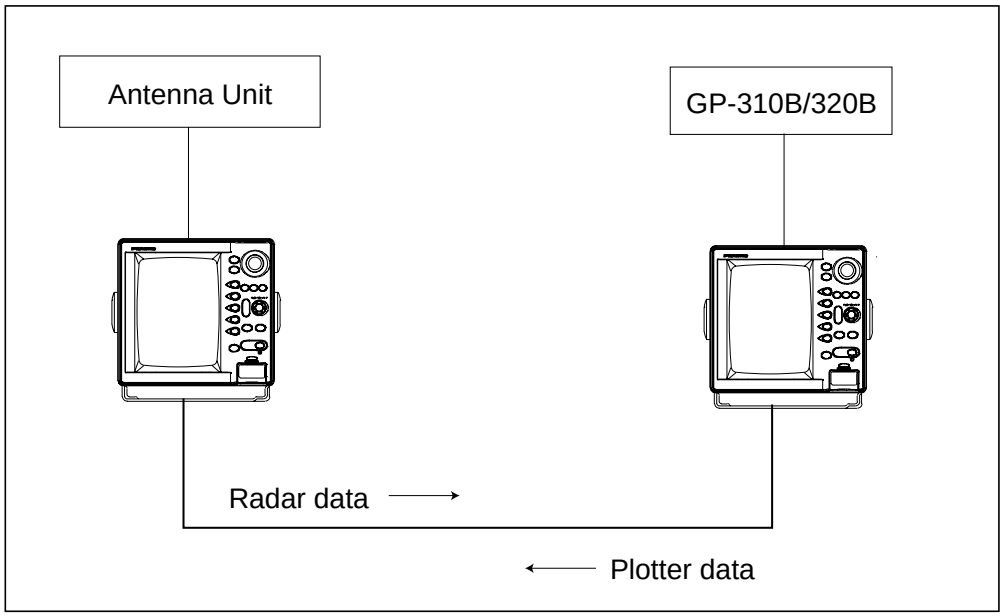
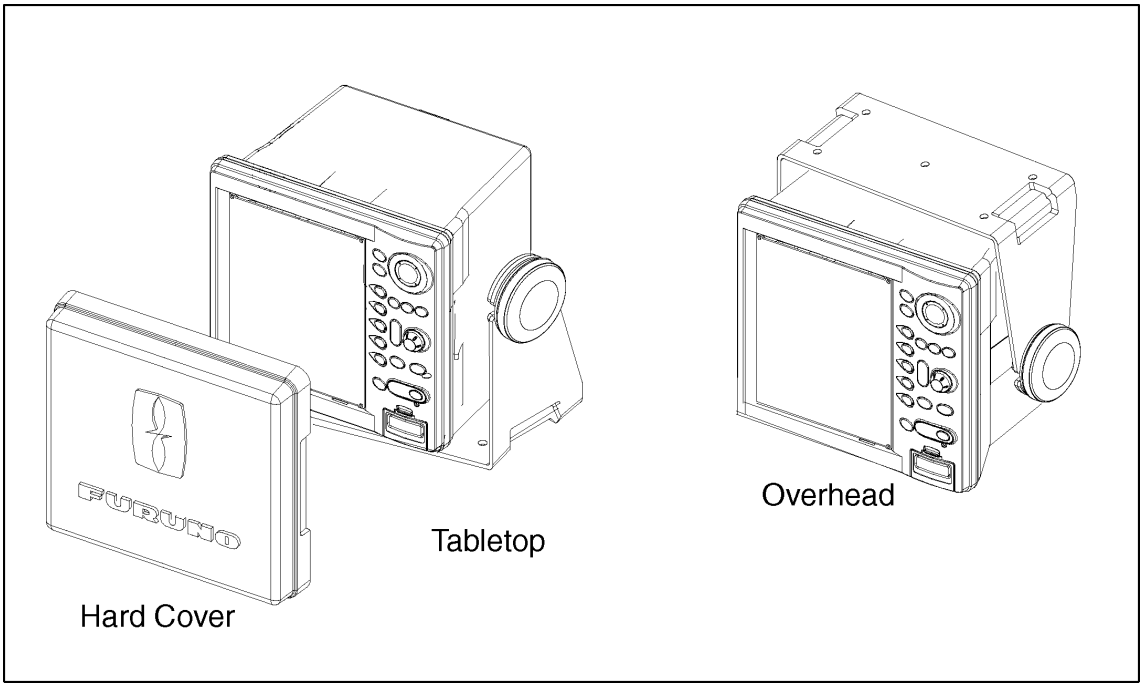


Figure 2 (b) NavNet system, two-unit connection

1. MOUNTING

1.1 Installation of Display Unit

The display unit can be installed on a tabletop, on the overhead or flush mounted in a console or panel.



Tabletop, overhead mounting method

When selecting a mounting location for the display unit keep the following in mind:

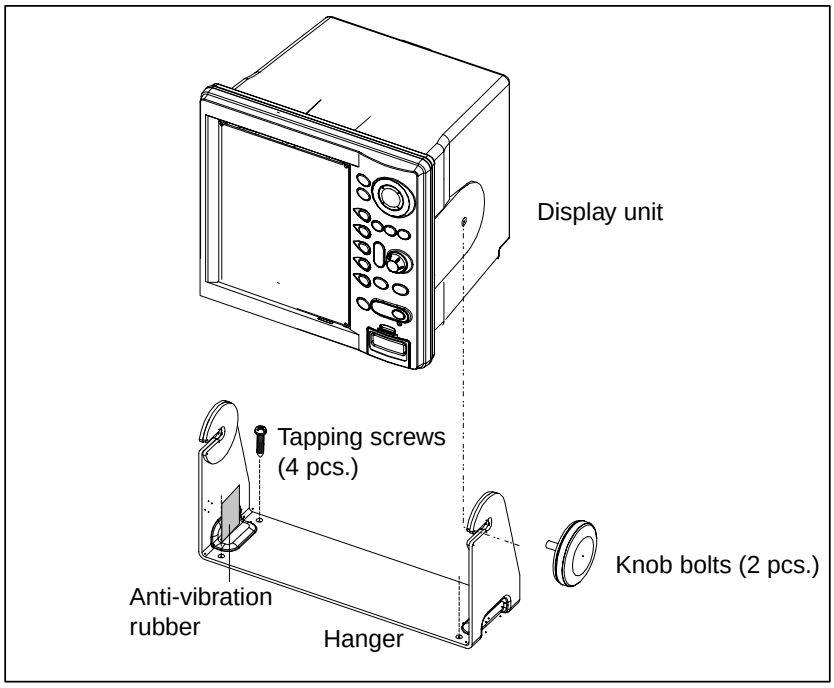
- Even though the display unit is waterproof, it is recommended that the display unit must be mounted inside an enclosed cabinet.
- Keep the display unit out of direct sunlight.
- The temperature and humidity should be moderate and stable.
- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal. If the mounting location is subject to heavy vibration, fix the display unit to the hanger perpendicular.
- Keep the unit away electromagnetic field generating equipment such as motor, generator.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the unit and leave slack in cables.
- A magnetic compass will be affected if the display units placed too close to the magnet compass. Observe the following compass safe distances to prevent disturbance to the magnetic compass; standard compass: 0.85 m, steering compass: 0.55 m.

1.1.1 Mounting procedure

Tabletop, overhead mounting

Follow the procedure below to mount the display unit on a tabletop or the overhead.

1. Fix the hanger by four tapping screw.
2. Screw knob bolts in display unit, set it to hanger, and tighten knob bolts.
3. Attach hard cover to protect CRT.

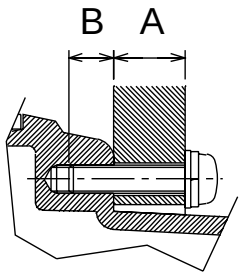


Tabletop, overhead mounting of display unit

Note: For overhead mounting, reinforce the mounting location and secure the hanger will bolts, nuts and washers (local supply).

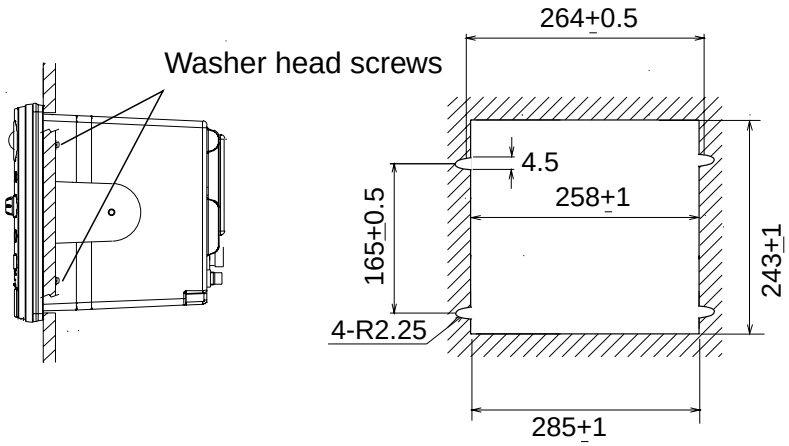
Flush mounting

Note: Use supplied six pan head screws when the thickness of the bulkhead is from 11 to 14 mm. For bulkhead which exceeds 14 mm in thickness the length of the pan head screws should be bulkhead thickness (A) plus 7.8 ±2 mm. Also the length of B should be max. 8 mm.



Fixing screw, side view

1. Prepare a cutout in the mounting location by using the template sheet supplied as the installation material.
2. Fix the display unit by four washer head screws M4x20. Refer to the outline drawing at back of this manual.

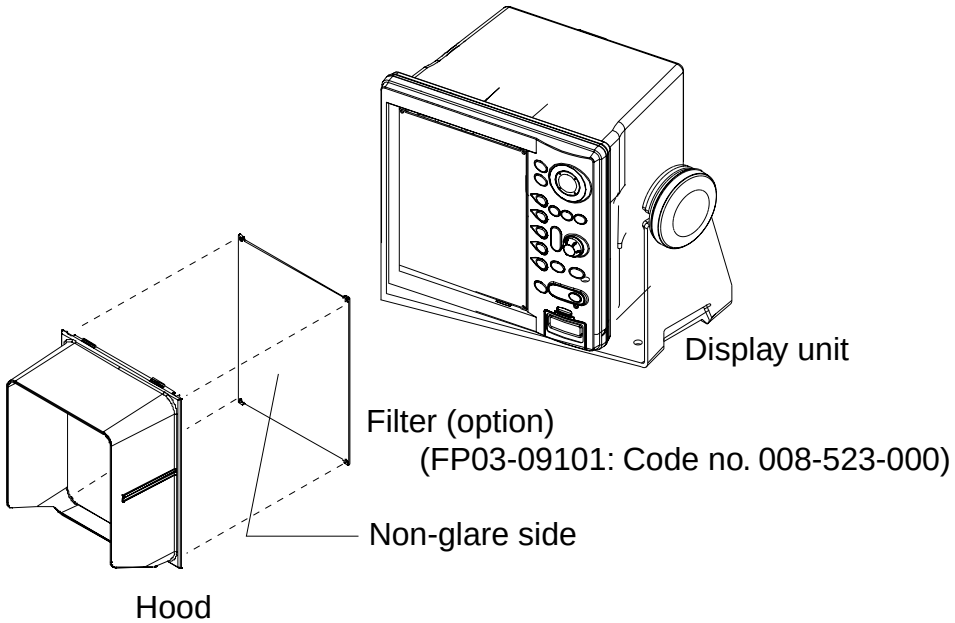


Flush mounting of display unit

Note: When installing the display unit in a panel, attach the vinyl tube (Φ6, local supplied) to the drain hole at the back of the display unit to allow moisture to escape. Then fasten the tube to the drain hole with a cable tie.

Attachment of hood and filter (option)

Set four notches of hood to grooves on the display unit. When using the optional filter, attach the filter to the hood with non-glare side outward, and then set the hood to the display unit.



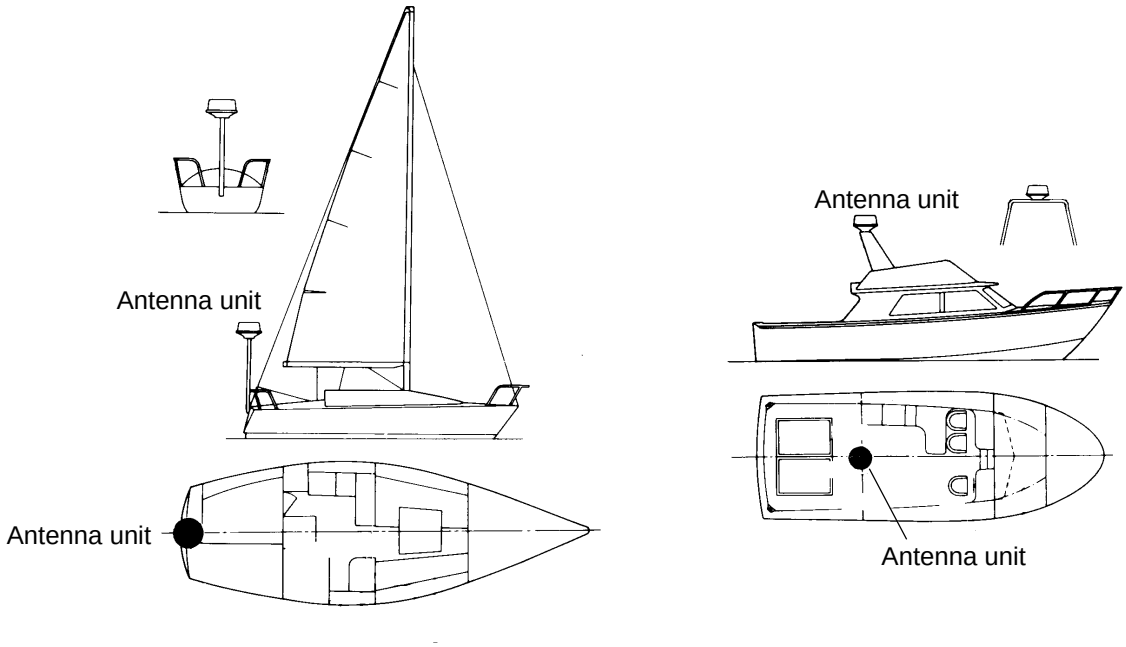
Attaching of hood and filter (option)

1.2 Mounting of Antenna Unit for MODEL1833

1.2.1 Mounting considerations

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

- Install the antenna unit on the hardtop, radar arch or on a mast on an appropriate platform. (For sailboats, a mounting bracket is optionally available.) It should be placed where there is a good all-round view with, as far as possible, no part of the ship's superstructure or rigging intercepting the scanning beam. Any obstruction will cause shadow and blind sectors. A mast, for instance, with a diameter considerably less than the width of the antenna unit, will cause only a small blind sector. However, a horizontal spreader or crosstrees in the same horizontal plane would be a much more serious obstruction; place the antenna unit well above or below it.

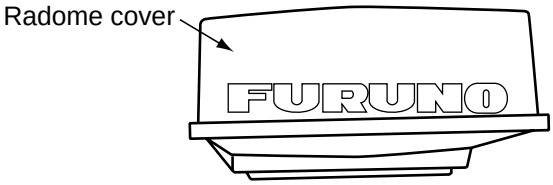


Typical antenna unit placement on sailboat and powerboat

- In order to minimize the chance of picking up electrical interference, avoid where possible routing the antenna cable near other electrical equipment onboard. Also avoid running the cable in parallel with power cables.
- The compass safe distance of 0.90 meters (standard compass) and 0.70 meters (steering compass) should be observed to prevent deviation of the magnetic compass.

1.2.2 Mounting antenna unit of MODEL 1833

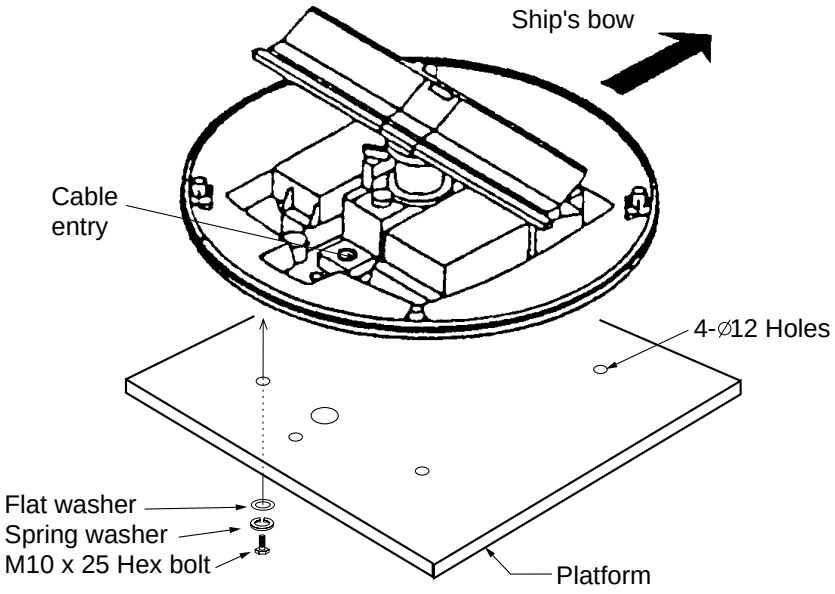
1. Open the antenna unit packing box carefully.
2. Unbolt the four bolts at the base of the radome to remove the radome cover.



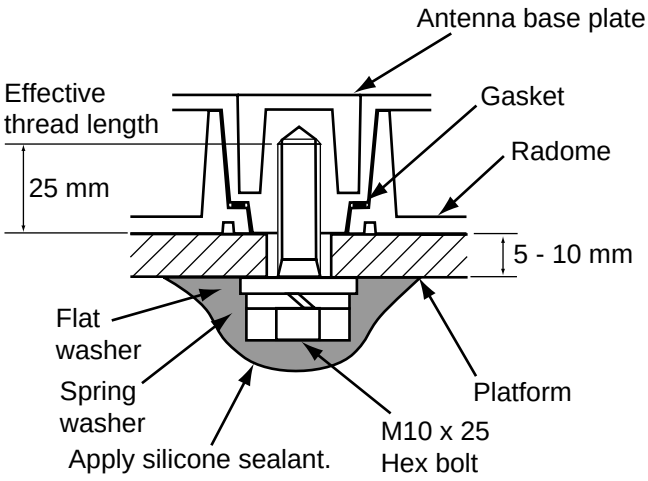
Antenna unit

The mounting surface must be parallel with the waterline and provided with five holes whose dimensions are shown in the outline drawing attached at the end of this manual. The unit is adjusted so a target echo returned from the bow direction will be shown on the zero degree (heading line) position on the screen. When drilling holes, be sure they are parallel with the fore and aft line.

3. Prepare a platform of 5 to 10 millimeters in thickness for the antenna unit.
   A mounting bracket for mounting the antenna unit on a sailboat mast is optionally available. (Refer to page 1-9.) Find the cable entry on the radome base. Next, position the radome base so the cable entry faces the stern direction. This alignment must be as accurate as possible.



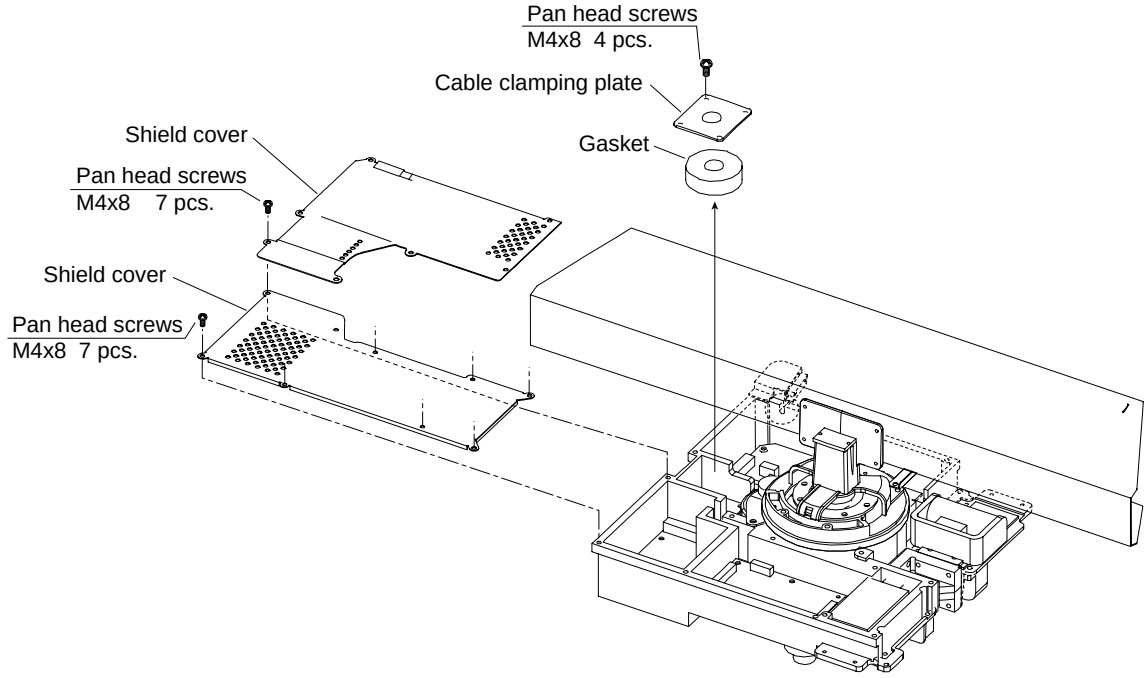
Antenna unit, cover removed



How to fasten the radome base to the mounting platform

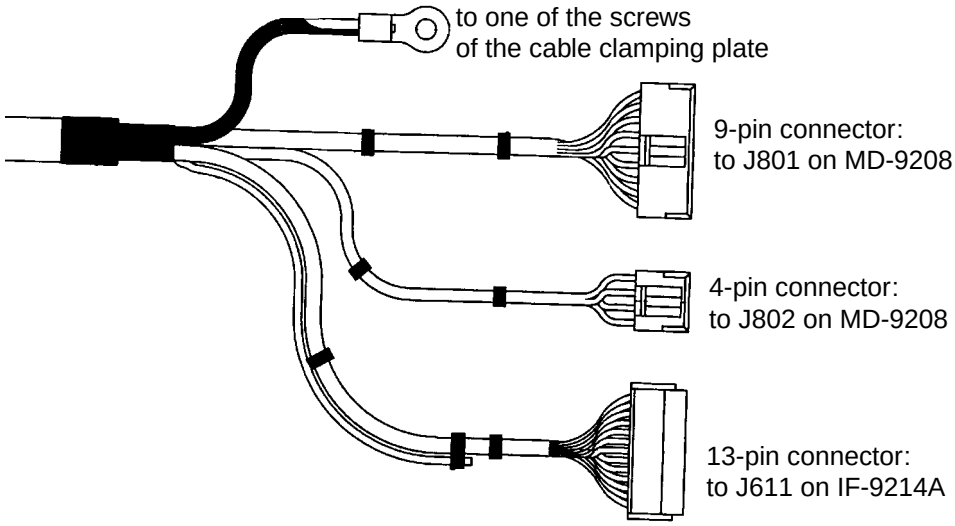
Wiring and final preparation

4. Drill a hole of at least 20 millimeters diameter through the deck or bulkhead to run the signal cable between the antenna unit and the display unit. (To prevent electrical interference avoid running the signal cable near other electrical equipment and in parallel with power cables.) Pass the cable through the hole. Then, seal the hole with sealing compound for waterproofing.
5. Remove two shield covers in the radome.
6. Remove the cable clamping plate by unfastening four screws and removing a gasket.

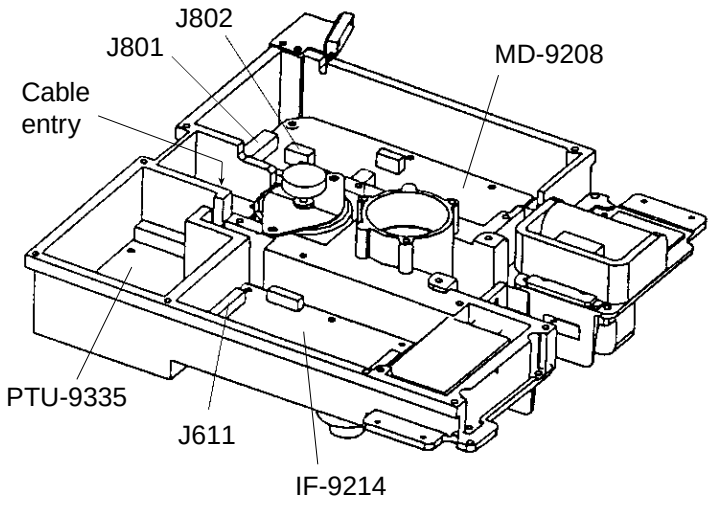


Antenna unit, inside view

7. Pass the cable through the hole at the bottom of the radome base.
8. Secure the cable with the cable clamping plate and gasket. Ground the shield and vinyl wire by one of the screws of the cable clamping plate.
9. Connect the wire to the RF unit.

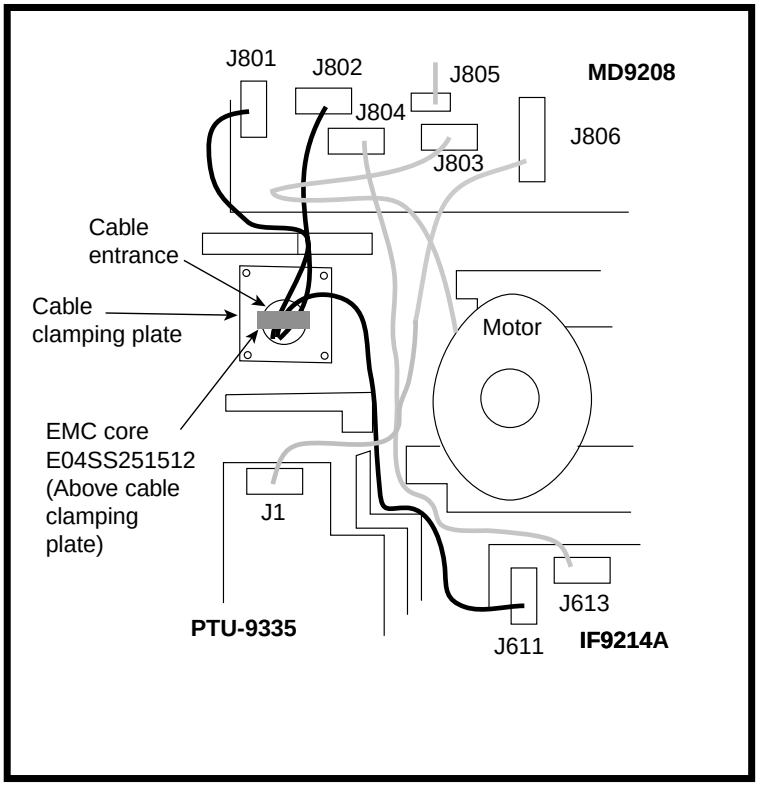


Signal cable, antenna unit side



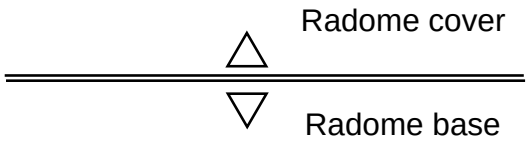
RF unit

10. Attach the EMC core supplied as shown below.



How to attach EMC core

11. Fix the shield cover. Do not pinch the cable.
12. Attach the radome cover, aligning triangle mark on radome cover with that on radome base.



How to position the radome cover

13. Loosely fasten the radome fixing bolts. You will tighten them after confirming magnetron heater voltage.

1.2.3 Mounting the optional mounting bracket

A mounting bracket for fastening the antenna unit for MODEL1833 to a mast on a sailboat is optionally available.

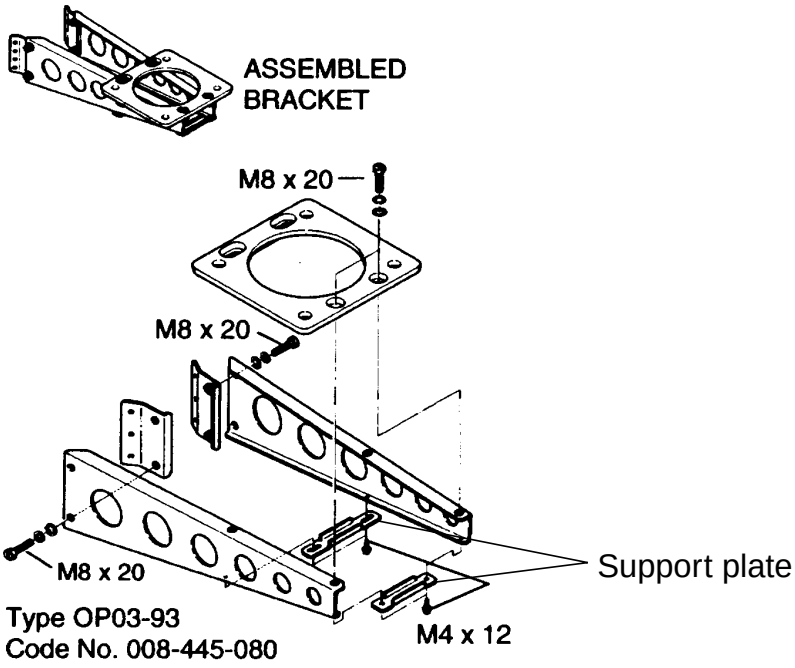
Mounting bracket 1

Type: OP03-92
Code No.: 008-445-070

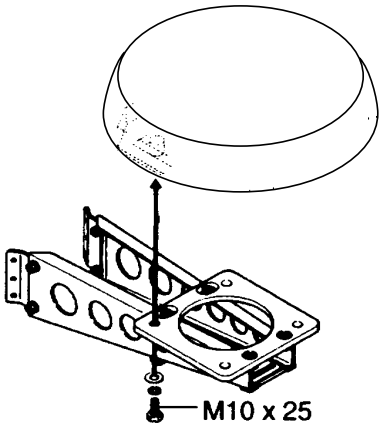
Table 1-1 Mounting bracket contents

	Type	Code No.	Qty
Hex. bolt	M4X12	000-804-725	4
Hex. bolt	M8X20	000-805-707	8
Mounting plate	03-018-9001-0	100-206-740	1
Support plate (1)	03-018-9005-0	100-206-780	1
Support plate (2)	03-018-9006-0	100-206-790	1
Bracket (1)	03-018-9002-1	100-206-751	1
Bracket (2)	03-018-9003-1	100-206-761	1
Fixing plate	03-018-9004-1	100-206-771	2

Assemble the mounting bracket and fasten it to a mast. Fasten the antenna unit to the bracket.



(A) Assembling the mounting bracket



(B) Fastening antenna to mounting bracket

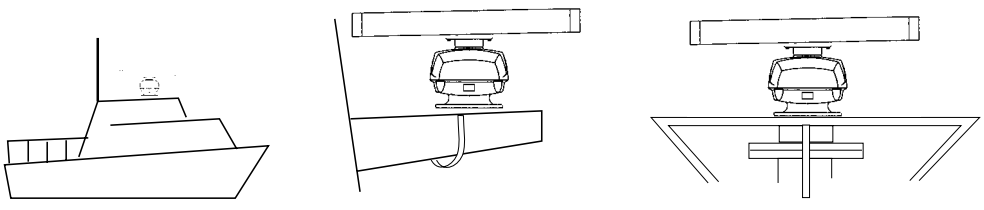
How to assemble and mount the optional mounting bracket

1.3 Mounting of Antenna Unit for MODEL1933/1943

1.3.1 Mounting considerations

- The antenna unit is generally installed either on top of the wheelhouse or on the radar mast on a suitable platform. Locate the antenna unit where there is a good all-round view. Any obstruction will cause shadow and blind sectors.
  A mast for instance, with a diameter considerably less than the width of the radiator, will cause only a small blind sector, but a horizontal spreader or crosstrees in the same horizontal plane as the antenna unit would be a much more serious obstruction; you would need to place the antenna unit well above or below it.
- It is rarely possible to place the antenna unit where a completely clear view in all directions is available. Thus, you should determine the angular width and relative bearing of any shadow sectors for their influence on the radar at the first opportunity after fitting.
- If you have a radio direction finder on your boat, locate its antenna clear of the antenna unit to prevent interference to the direction finder. A separation of more than two meters is recommended.
- To lessen the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment. Also avoid running the cable in parallel with power cables.
- A magnetic compass will be affected if the antenna unit is placed too close to the antenna unit. Observe the following compass safe distances to prevent deviation of a magnetic compass: Standard compass, 1.00 m, Steering compass, 0.80 m.
- Do not paint the radiator aperture, to ensure proper emission of the radar waves.
- When this radar is to be installed on larger vessels, consider the following points:
- The signal cable run between the antenna and the display comes in lengths of 10 m, 15 m, 20 m and 30 m. Whatever length is used it must be unbroken; namely, no splicing allowed.
- Deposits and fumes from a funnel or other exhaust vent can adversely affect the aerial performance and hot gases may distort the radiator portion. The antenna unit must not be mounted where the temperature is more than 70°C.

As shown in the figure below, the antenna unit may be installed on the bridge, on a common mast or on the radar mast.



(a) On bridge (b) Common mast (c) Radar mast

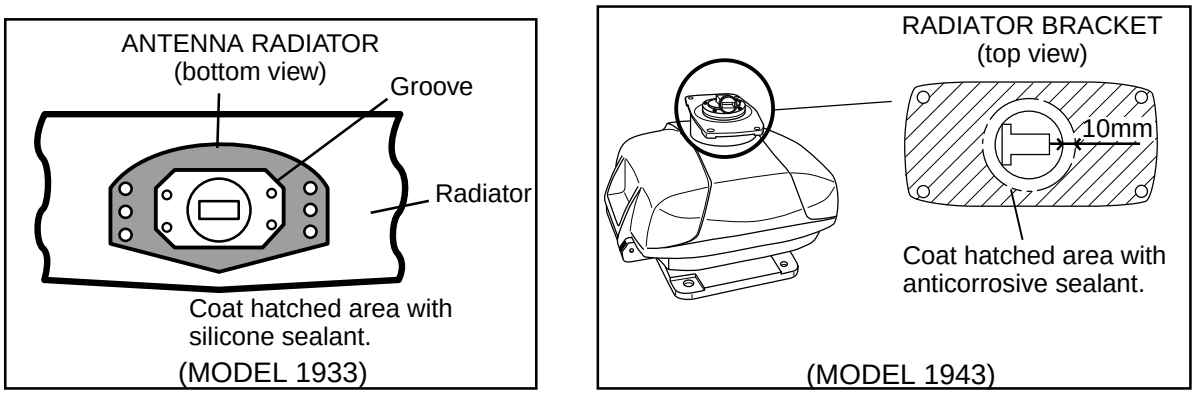
1.3.2 Mounting antenna unit of MODEL 1933/1943

Referring to the outline drawing at the back of this manual, drill five holes in the mounting platform: four holes of 15 mm diameter for fixing the antenna unit and one hole of 25-30 mm diameter for the signal cable.

Fastening the Radiator to the Radiator Bracket

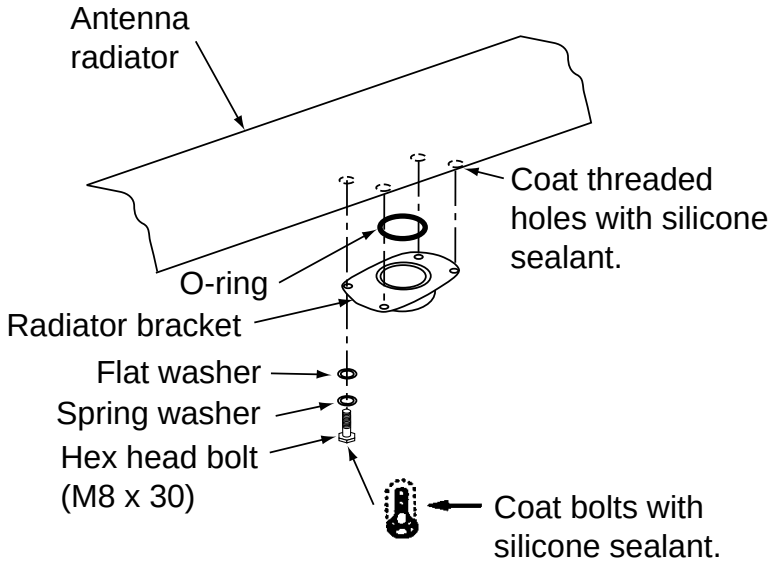
For your reference, antenna installation materials list appears in the packing lists at the back of this manual (see page A-4 to A-6).

1. Remove the radiator cap from the radiator bracket.
2. Coat contacting surface between antenna radiator and radiator bracket with silicone sealant as shown in figure below.



Coating the bottom of antenna radiator with silicone sealant

3. Coat threaded holes on the antenna radiator with silicone sealant.
4. Grease the O-ring and set it to the radiator bracket.
5. Lay the antenna radiator on the radiator bracket.
6. Coat the radiator fixing bolts (4 pcs.) with silicone sealant. Fasten the antenna radiator to the radiator bracket with the radiator fixing bolts, flat washers and spring washers.



Fastening the radiator bracket to the antenna unit chassis

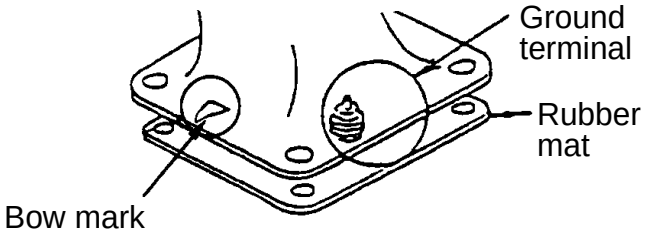
Mounting of antenna unit

The antenna unit can be mounted using the fixing holes on the outside (200 x 200 mm) or inside (140 x 150 mm) the antenna unit.

Outside fixing holes

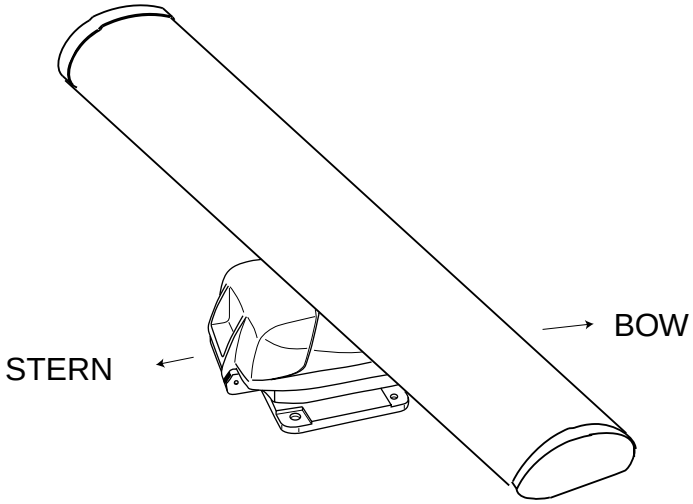
Use the hex head bolt (supplied) to mount the antenna unit as below.

1. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.



Location of rubber mat

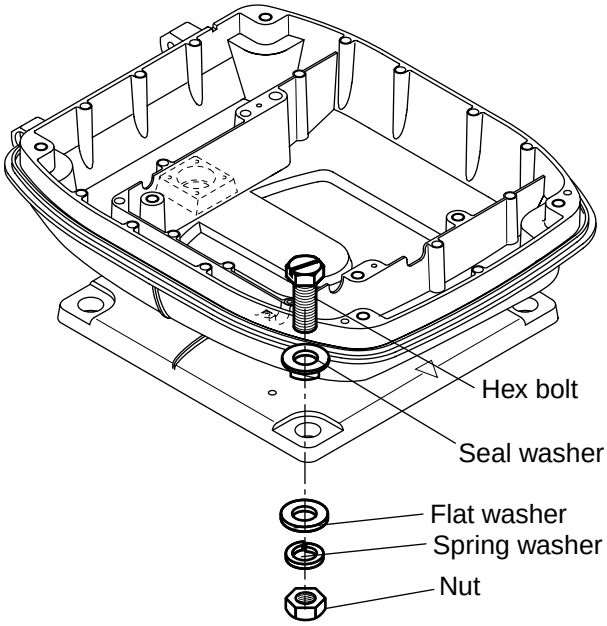
2. Lay the antenna unit on the mounting platform, orienting it as shown in below.



Antenna unit

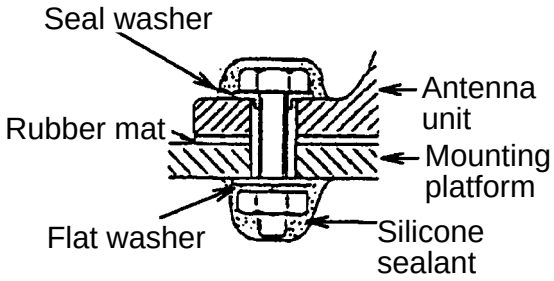
> **⚠ CAUTION**
>
> **Do not lift the Antenna unit by the radiator; lift it by the housing.**
>
> The radiator may be damaged.

3. Insert four hex bolts (M12x60, supplied) and seal washers (Φ30, supplied) from the top of the antenna housing. Insert the seal washers with the larger diameter next to the bolt heads. Be sure the seal washer, not other washers, is next to bolt head.



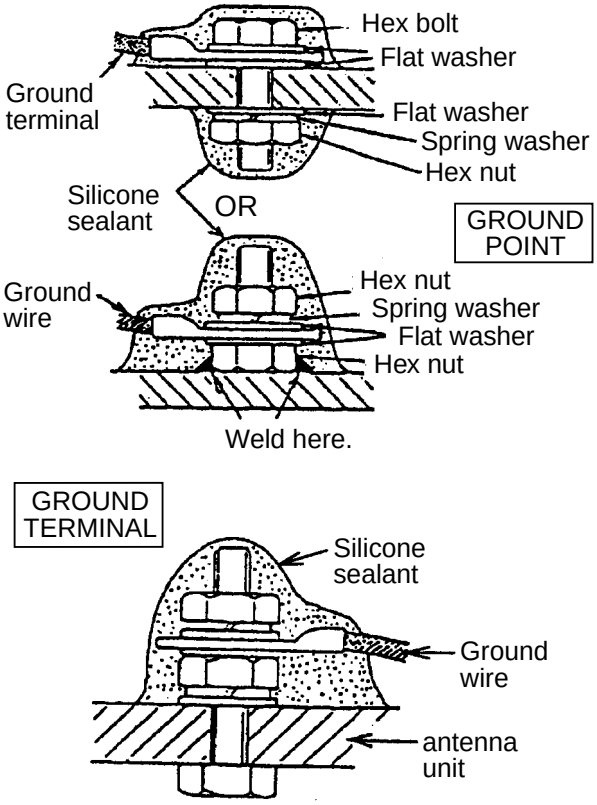
Fixing the antenna unit chassis

4. Pass flat washers (M12, supplied), spring washers (M12, supplied) and nuts (M12, supplied) onto hex bolts. Fasten by tightening nuts. Do not fasten by tightening the hex bolts; seal washers may be damaged.



How to fasten antenna unit to mounting platform

5. Coat flat washers, spring washers, nuts and exposed parts of bolts with silicone sealant.
6. Prepare ground point in mounting platform (within 300 mm of ground terminal on antenna unit) using M6 x 25 bolt, nut and flat washer (supplied).
7. Run the ground wire (RW-4747, 340 mm, supplied) between the ground terminal and ground point.
8. Coat ground terminal and ground point with silicone sealant as shown on the next page.

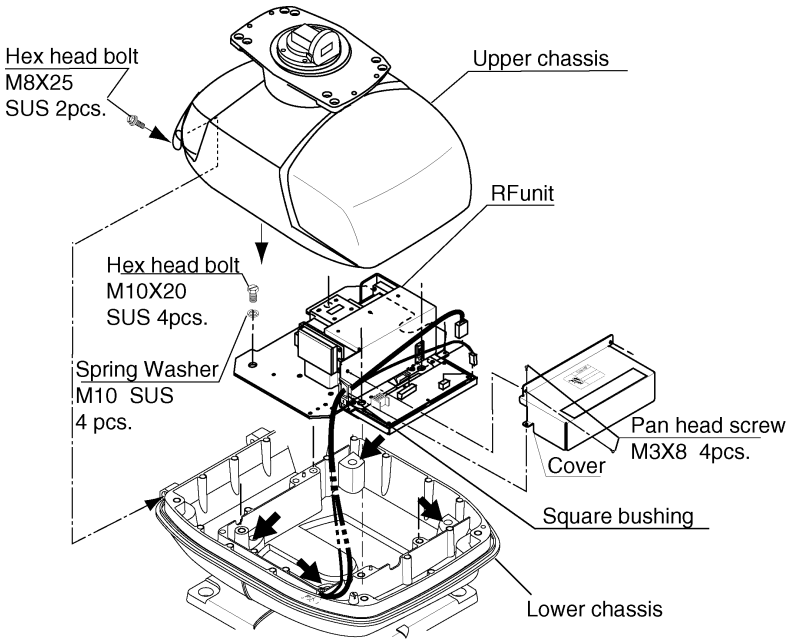


How to coat ground point and ground terminal with silicone sealant

Fixing holes inside antenna unit

This method requires removal of the RF unit in the antenna unit to access inside fixing holes. Use hex head bolts, flat washers, spring washers and nuts (local supply) to mount the antenna unit, confirming length of bolts.

1. Loose four scanner bolts to open the antenna unit. Refer to figure in below for location.



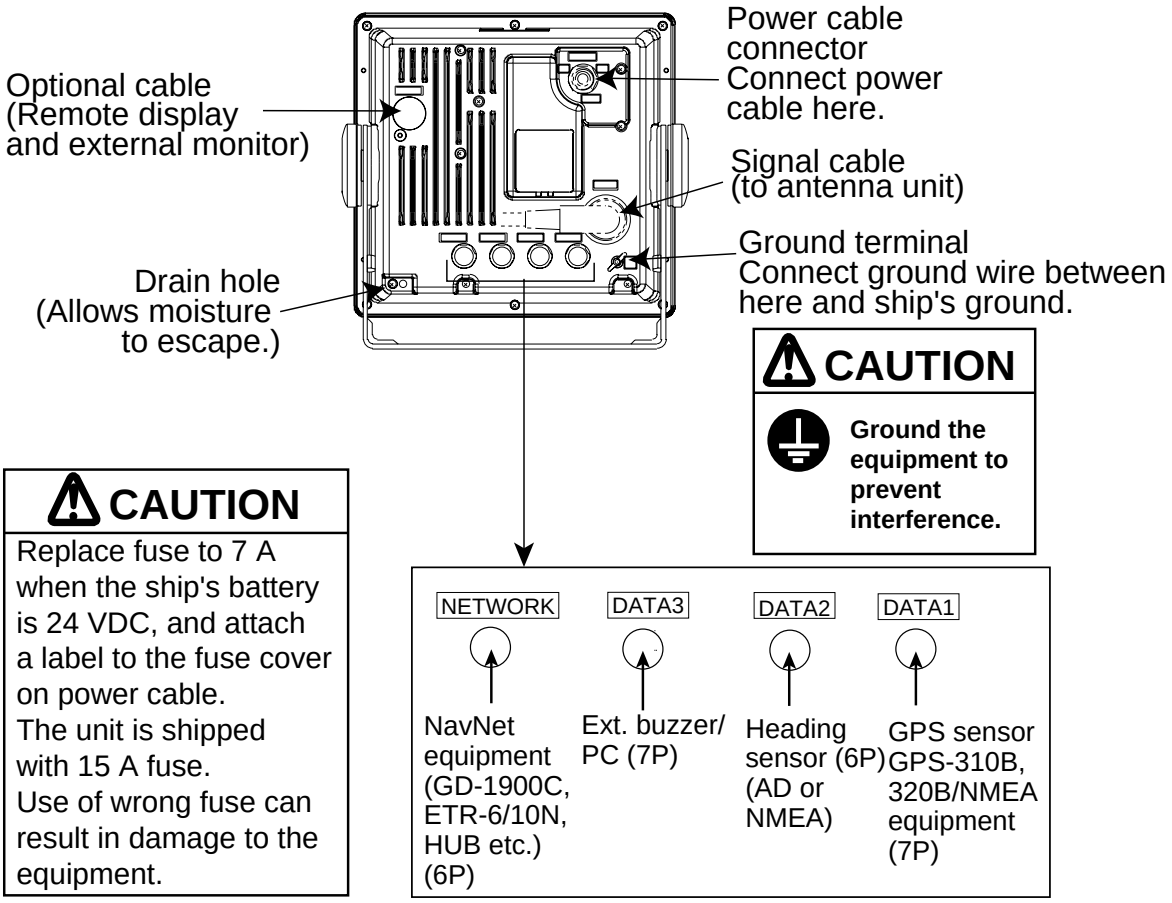
Antenna unit chassis, upper chassis separated

2. Unplug connector connected between upper and lower chassis.
3. Separate upper chassis from lower chassis by removing two hex head bolts (M8x25).
4. Remove cover by unfastening four pan head screws.
5. Remove connector from RF unit.
6. Remove RF unit by unfastening four hex head bolts.
7. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.
8. Fasten the lower chassis to the mounting platform with hex head bolts, spring washers, flat washers and nuts (local supply), and then coat flat washers, nuts and exposed parts of bolts with silicone sealant. Cut a slit in rubber bushing and insert bolt into bushing. Do not use seal washers.
9. Reassemble RF unit, cover and chassis.
10. Set four knob caps (supplied) into outside fixing holes.
11. Do steps 6-8 in “Outside fixing holes”.

2. WIRING

2.1 Standard Wiring

All wiring are terminated at the rear of the display unit.



Display unit, rear view

Power cable

Connect the power cable to the POWER connector.

Signal cable connection (from the antenna unit)

Connect the signal cable to SIGNAL connector.

Ground terminal

Connect the ground wire (local supply, IV-2sq) between the ground terminal and ship's ground.

DATA1 to DATA3

Other equipments can be connected here as shown below.

DATA1 (7P)	DATA2 (6P)	DATA3 (7P)
NMEA (IN/OUT) GPS sensor GPS-310B/320B, Navaid, sounder etc.	Heading sensor (ex. SC-60/120)	NMEA IN, NMEA OUT for PC External buzzer PC

This equipment can receive the following NMEA 0183 format sentence from an other equipment.

- Own ship's position: GGA>RMC>RMA>GLL
- Ship's speed: RMC>RMA>VTG>VHW
- External waypoint: RMB>WPL>BWR>BWC
- Heading (True): HDT>HDG>HDM
- Course: RMC>RMA>VTG
- Depth: DPT>DBT
- Temperature: MTW
- Time: ZDA
- Other ship's information: TTM
- Insight satellite information: GSV
- Target L/L TLL

You will need the optional NMEA cable to connect with other equipment.

NETWORK port

Other NavNet equipment should be connected to this port with the optional NavNet cable. Available equipment are shown below.

Radar	Plotter	Transducer	Other
MODEL1722/1732/ 1742/1762/1722C/ 1732C/1742C/1762C/1752C 1833/1933/1943/ 1833C/1933C/1943C/1953C	GD1700/1700C/1900C	ETR-6/10N	HUB (used when more than two NavNet units are connected.)

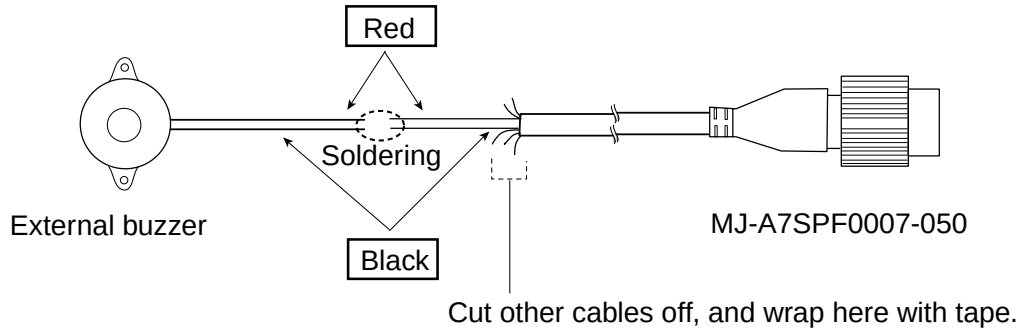
2.2 External Buzzer (OP03-136, option) Connection

The optional external buzzer provides a louder alert when the guard alarm is violated.

External buzzer
Type: OP03-136
Code no.: 000-096-443

Further, you need the optional cable assy MJ-A7SPF0007-050 (w/7P connector, 5 m, code no. 000-144-418).

1. Attach the MJ-A7SPF0007-050 cable assy (option) to the DATA 3 port at the rear of the display unit.
2. Cut the XH connector at the end of the external buzzer cable with appropriate length.
3. Solder the cables made at step 2 with MJ-A7SPF0007-050 cable as shown below.

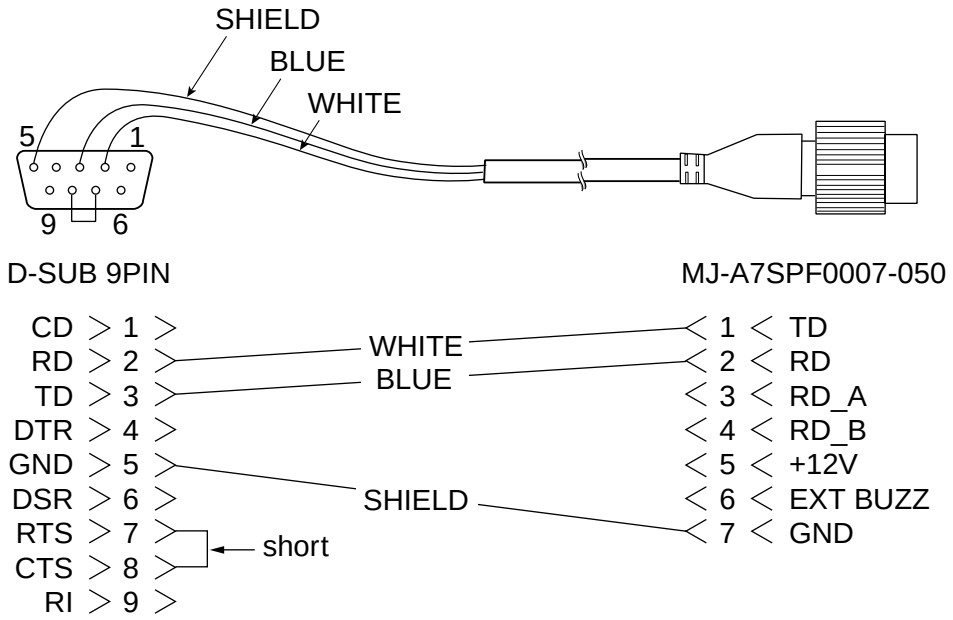


Connection of external buzzer and display unit using cable assy type MJ-A7SPF0007-050 cable

4. Fasten the buzzer with the double-sided tape or two tapping screws (3x15 or 3x20, local supply).

2.3 How to Connect with PC

When connecting with the personal computer, prepare the optional cable assy MJ-A7SPF0007-050 and D-sub 9 pins plug (local supply), and connect them as follows.



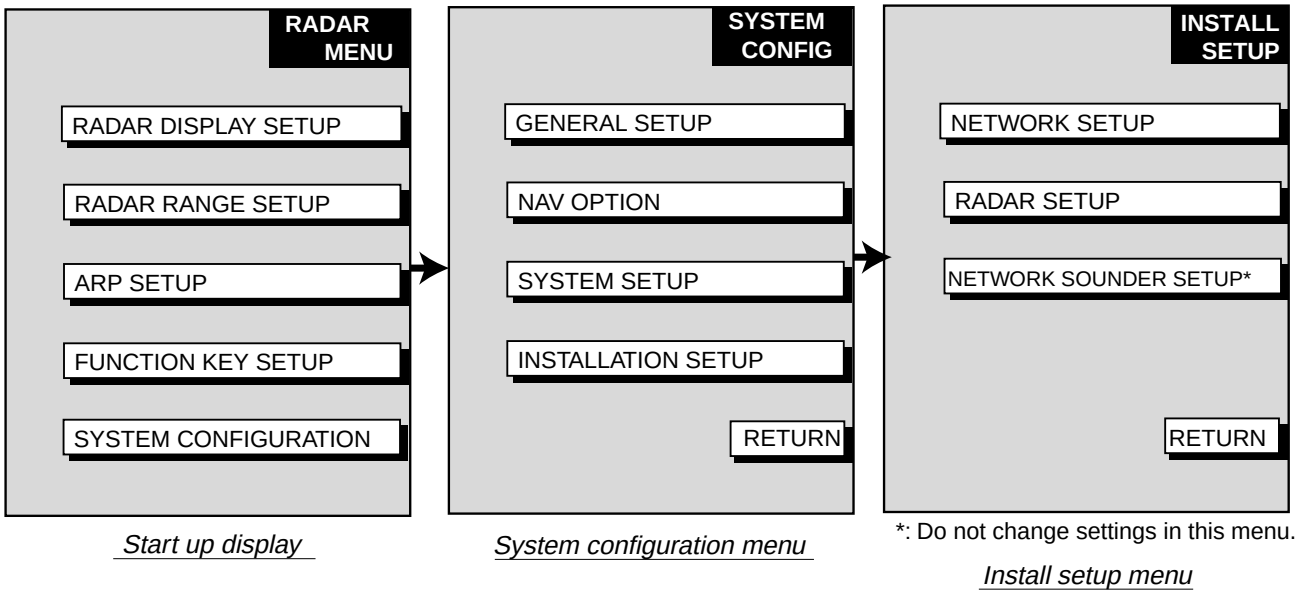
MJ-A7SPF0007-050 cable connection for PC

3. ADJUSTMENT

3.1 How to Access to Installation Menu

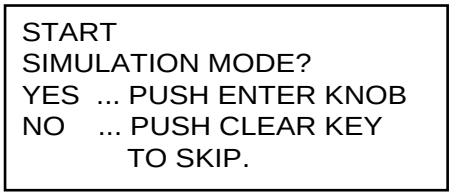
You should do the set up for the equipment through the installation menu when installation has been finished. To access to the installation menu, follow the steps in below.

1. Press the [POWER/BRILL] key with touch-and-release action while pressing the [MENU] key down. You hear a beep sound.
2. Release the [MENU] key when the message of “STARTING INSTALLATION MODE” appears.
3. After the radar display appears, press the [MENU] key followed by SYSTEM CONFIGURATION soft key to display the SYSTEM CONFIG menu.
4. Press the INSTALLATION SETUP soft key to display the INSTALL SETUP menu.



How to access the Installation menu

Note: The very first time the system is powered you are asked if you want to start the simulation mode, which provides simulated operation of the equipment. Press the [CLEAR] key to start normal operation for radar adjustment. For further details about the simulation mode, see the operator’s manual.

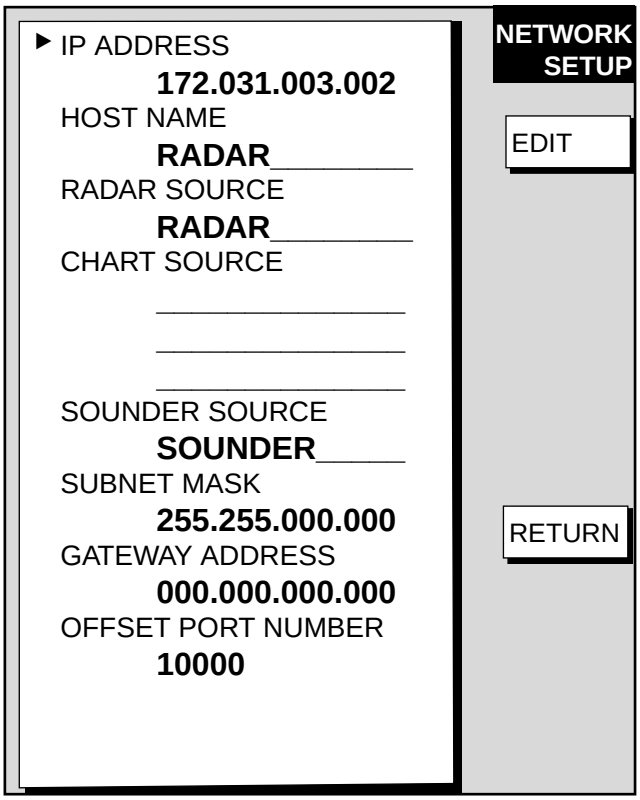


Simulation mode window

3.2 NETWORK SETUP Menu

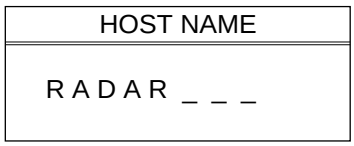
To communicate with other NavNet equipment, this setting should be done.

1. Open the INSTALL SETUP menu.
2. Press the NETWORK SETUP soft key.



NavNet SETUP menu

3. Select menu option and press the [ENTER] knob or EDIT soft key. For example, select HOST NAME.



Host name window

4. Use the trackball or [ENTER] knob to select location and rotate the [ENTER] knob to set character (or value).
5. Press the [ENTER] knob or ENTER soft key to finish.
6. Repeat steps 3-5 for other items.
7. Press the [MENU] key to finish.
8. Continue next setup.

Contents of Network setup menu

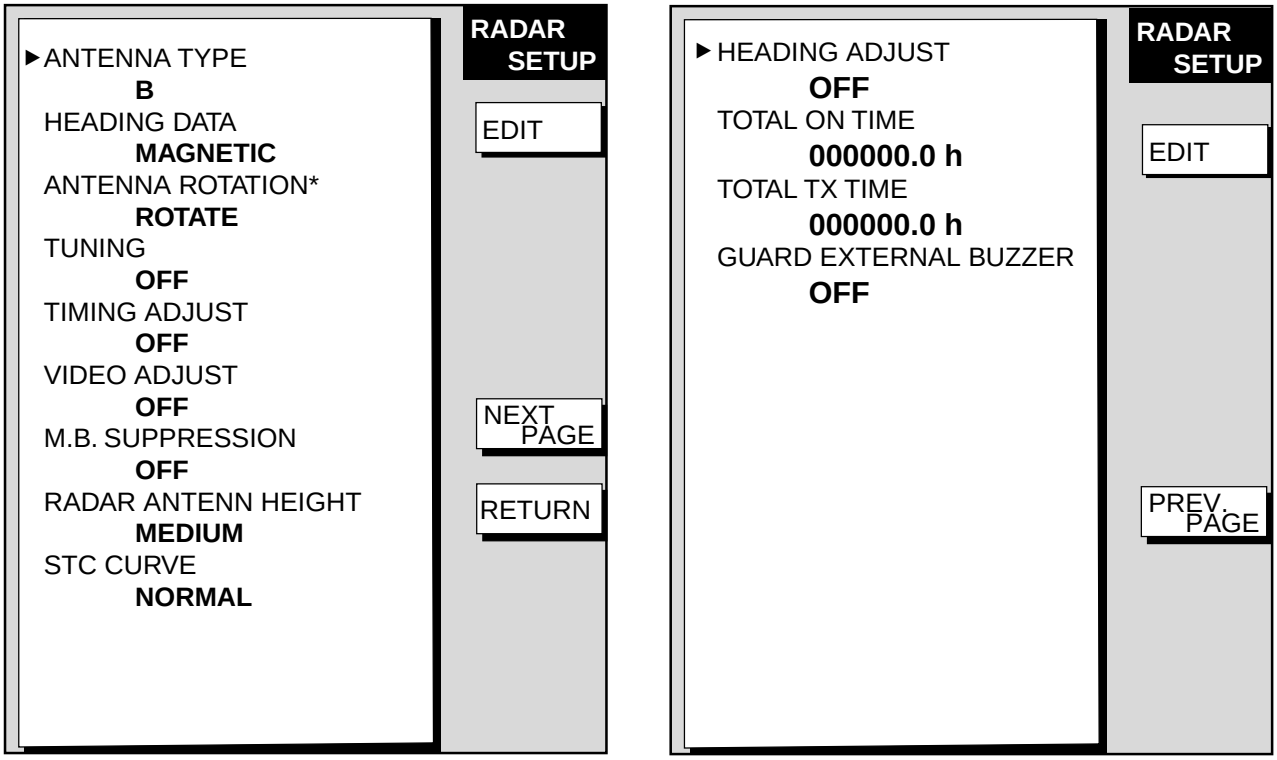
Item	Description	Default Setting
IP ADDRESS	This address is assigned at the factory. Change the address (last three digits; 001 to 254) when like models are connected directly or through the hub. Do this change before connecting the equipment to the other equipment or hub to distinguish. Do not set the same IP address in the network.	172.031.003.002
HOST NAME	Set the name for your display unit to distinguish it from others in the NavNet system. Confirm that two equipment don't have same host names. The host name has been preset depending on the series of NavNet. See the table in below. This host name is used for RADAR SOURCE and CHART SOURCE.	RADAR
RADAR SOURCE	Enter the host name "RADAR (preset)" or the new name set at HOST NAME item setting if the unit has been changed of the network radar to use for the radar display.	RADAR
CHART SOURCE	Enter a host name (set at HOST NAME) of network display unit to select equipment which has chart card in its slot (Max. three units, excluding own) to use.	None
SOUNDER SOURCE	The host name of the network sounder ETR-6/10N is preset (SOUNDER) to use for the video sounder display. Clear the host name when no network sounder is connected.	SOUNDER
SUBNET MASK	Not used. Reserved for future use.	255.255.000.000
GATEWAY ADDRESS		000.000.000.000
OFFSET PORT NUMBER		10000

NavNet equipment default settings

Model	IP ADDRESS	HOST NAME
MODEL1722/1732/1742/1762	172.031.003.004	RADAR
MODEL1722C/1732C/1742C/1762C/1752C	172.031.003.001	RADAR
MODEL1833/1933/1943	172.031.003.002	RADAR
MODEL1833C/1933C/1943C/1953C	172.031.003.003	RADAR
GD-1700/1700C	172.031.014.001	PLOTTER
GD-1900C	172.031.003.003	PLOTTER

3.3 RADAR SETUP Menu

After the network setup, do the following in order to adjust the radar.
Open the INSTALL SETUP menu, and then press the RADAR SETUP soft key to display the RADAR SETUP menu. When the message of “RADAR DOES NOT TRANSMIT. TRANSMIT RADAR?” appears, press the [ENTER] knob to transmit or [CLEAR] key to cancel transmitting.



*: Do not change this item setting.

Radar setup menu

3.3.1 ANTENNA TYPE

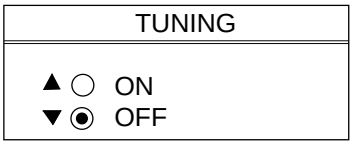
Select the antenna type connecting with your display unit. Default setting is B.
If necessary, reselect the antenna type referring to the table shown below.
After selection, press the [ENTER] knob or ENTER soft key.

Your unit	Setting
MODEL1833	B
MODEL1933	F
MODEL1943	G

3.3.2 TUNING

Initialize the tuning as follows.

1. Transmit the radar
2. Open the RADAR SETUP menu, and then select TUNING by the trackball or [ENTER] knob.
3. Press the EDIT soft key or [ENTER] knob to show the setting window.



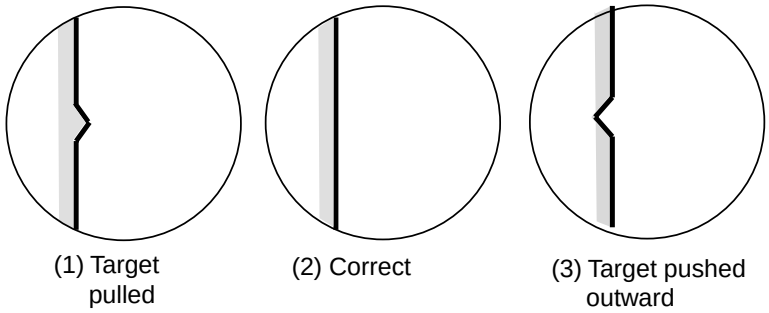
Tuning setup menu

4. Select ON.
5. Press the [ENTER] knob or ENTER soft key to start the auto tuning.
6. After the adjustment is completed, the message of “NOW TUNING” disappears.
7. The equipment returns to the menu display automatically.

3.3.3 TIMING ADJUST

This adjustment ensures proper radar performance, especially on short ranges. The radar measures the time required for a transmitted echo to travel to the target and return to the source. The received echo appears on the display based on this time. Thus, at the instant the transmitter is fired, the sweep should start from the center of the display (sometimes called sweep origin.)

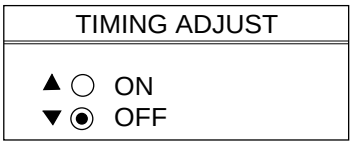
A trigger pulse generated in the display unit goes to the antenna unit through the signal cable to trigger the transmitter (magnetron). The time taken by the signal to travel up to the antenna unit varies, depending largely on the length of signal cable. During this period the display unit should wait before starting the sweep. When the display unit is not adjusted correctly, the echoes from a straight local object (for example, a harbor wall or straight pier) will not appear with straight edges – namely, they will be seen as “pushed out” or “pulled in” near the picture center. The range of objects will also be incorrectly shown.



Examples of improper and correct sweep timing

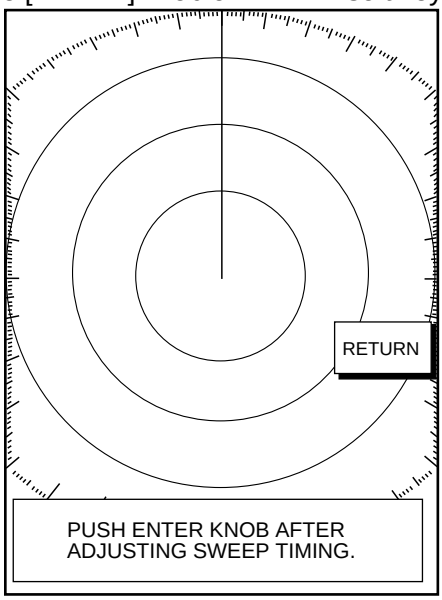
1. Transmit on the shortest range and confirm that gain and A/C SEA are properly adjusted.
2. Visually select a target which forms straight line (harbor wall, straight piers).
3. Open the RADAR SETUP menu and select TIMING ADJUST.

4. Press the EDIT key or [ENTER] key to show the setting window.



Timing adjust setting menu

5. Select ON and press the [ENTER] knob or ENTER soft key to show the radar display.



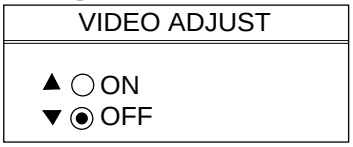
Timing adjustment setting display

6. Rotate the [ENTER] knob to straighten the target selected at step 2, and then press the RETURN soft key to finish.

3.3.4 VIDEO ADJUSTMENT

Adjusts video amplifier input level.

1. Open the RADAR SETUP menu and select VIDEO ADJUST by the trackball or [ENTER] knob.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.



Video adjustment setting window

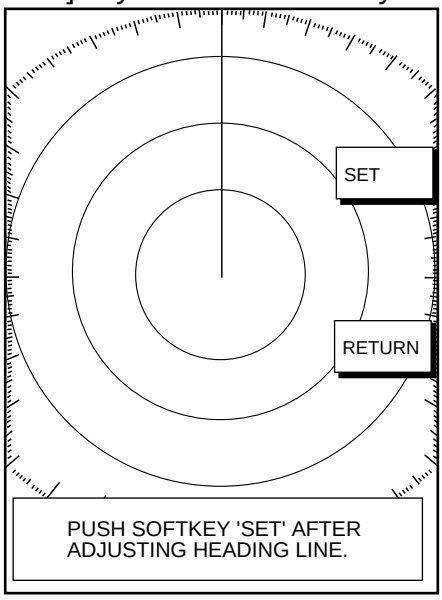
3. Select ON.
4. Press the [ENTER] key or ENTER soft key to start video adjustment.
5. When adjustment is completed, the message of “NOW ADJUSTING VIDEO” disappears, and return to the menu display automatically.

3.3.5 HEADING ADJUST

You have mounted the antenna unit facing straight ahead in the direction of the bow. Therefore, a small but conspicuous target dead ahead visually should appear on the heading line (zero degrees).

In practice, you will probably observe some small error on the display because of the difficulty in achieving accurate initial positioning of the antenna unit. The following adjustment will compensate for this error.

1. Set ship's heading toward a suitable target (for example, ship or buoy) at a range between 0.125 and 0.25 nautical mile.
2. Open the RADAR SETUP menu, and press the NEXT PAGE soft key.
3. Select HEADING ADJUST and press the EDIT soft key or [ENTER] knob to show the HEADING ADJUST window.
4. Select ON followed by [ENTER] key or ENTER soft key to show the radar display.



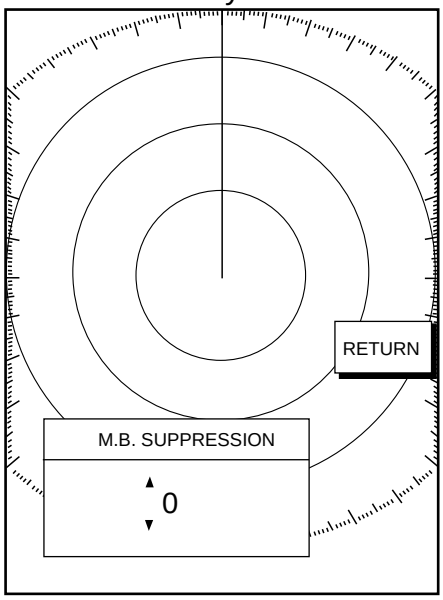
Heading adjustment setting display

5. Rotate the [ENTER] knob to bisect the target with the EBL.
6. Press the SET soft key.
7. As a final test, move the boat towards a small buoy and confirm that the buoy shows up dead ahead on the radar when it is visually dead ahead.

3.3.6 M. B. (Main Bang) SUPPRESSION

Main bang (black hole), which appears at the display center on short ranges, can suppressed as follows.

1. Open the RADAR SETUP menu and select M.B. SUPPRESSION by trackball.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.
3. Select ON.
4. Press the [ENTER] knob or ENTER soft key to start video adjustment.



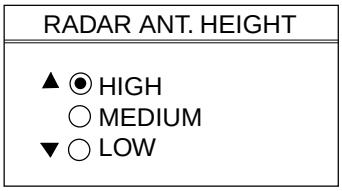
Main bung suppression setting window

5. Rotate the [ENTER] knob to suppress main bang (between 0 and 25).
6. Press the RETURN soft key.

3.3.7 RADAR ANTENNA HEIGHT

The A/C SEA function is affected by the antenna height above the waterline. Enter antenna height above the waterline to optimize the A/C SEA function.

1. Open the RADAR SETUP menu and select RADAR ANTENNA HEIGHT.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.



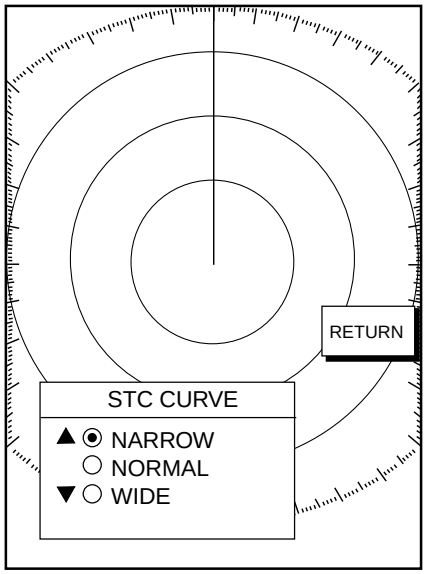
Radar antenna height setting window

3. Select antenna height above the waterline; HIGH (6-10 m), MIDIUM (3-6 m) or LOW (0-3 m). The default setting is MEDIUM.
4. Press the [ENTER] key or ENTER soft key to finish.

3.3.8 STC CURVE

The default STC curve can be maintained in most cases. If necessary the STC curve can be changed as follows:

1. Open the RADAR SETUP menu and select STC CURVE.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.



STC curve setting window

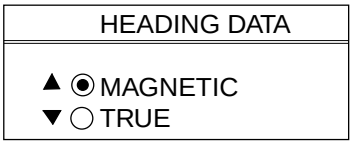
3. Select STC curve;
   - NARROW: The effective range of the [A/C SEA] adjustment is relatively short.
   - NORMAL: Between NARROW and WIDE.
   - WIDE: The effective range of the [A/C SEA] adjustment is relatively long.
4. Press the RETURN soft key to finish.

3.3.9 HEADING DATA

Select the heading reference, MAGNETIC or TRUE. Select MAGNETIC when connecting with the magnetic compass, select TRUE when connecting with the gyrocompass. For your reference, when connecting with Satellite Compass SC-60/120 or Integrated Hading Sensor PG-1000 which Furuno makes, set the heading data as the table shown below.

Model		Setting of HEADING DATA
PG-1000	with L/L data	TRUE
	w/o L/L data	MAGNETIC
SC-60/120		TRUE

1. Open the RADAR SETUP menu and select HEADING DATA.
2. Press the EDIT soft key or [ENTER] knob to show the setting window.



Heading data setting window

3. Select MAGNETIC or TRUE.
4. Press the [ENTER] knob or ENTER soft key.

3.4 Checking Magnetron Heater Voltage

Magnetron heater voltage is formed on the PTU (1833)/MD (1933/1943) Board of the antenna unit, and preadjusted at the factory. Therefore no adjustment is required. However, check magnetron heater voltage for confirmation as follows:

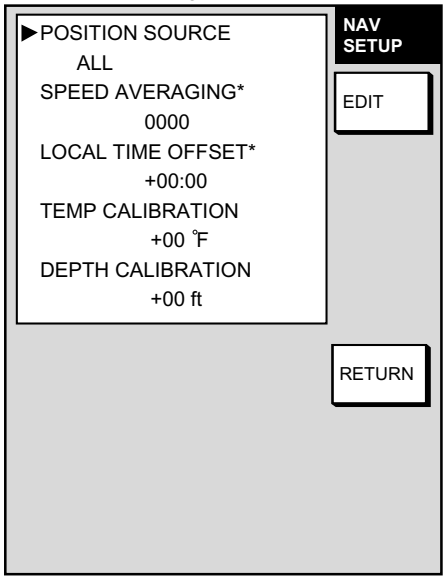
1. Open the antenna unit.
2. Turn on the power. Do not transmit the radar.
3. Connect a multimeter, set to 10VDC range, appropriate position on the PTU (1833) or RTB (1933/1943) Board in the antenna unit. Refer to the table in below.
4. Confirm that the multimeter indication is appropriate.

	MODEL1833	MODEL1933	MODEL1943
Check point	TP802#4 (+) and #6 (-) on PTU Board	J825#4 and #6 (GND) on RTB Board	J825#4 and #6 (GND) on RTB Board
Multimeter indication	7.4 to 7.6 V	7.4 to 7.6 V	7.4 to 7.6 V
Adjustment point	R106 on PTU Board	VR801 on MD Board	VR801 on MD Board

3.5 Navigation Data Source

The NAV SOURCE SETTINGS menu mainly selects the source of nav data. For navigator other than the FURUNO GP-310B/320B, speed averaging and local time offset (to use local time instead of UTC time) are also available from this menu.

1. Press the [MENU] key followed by SYSTEM CONFIGURATION, NAV OPTION and NAV SOURCE SETTINGS soft keys to show the NAV SETUP menu.



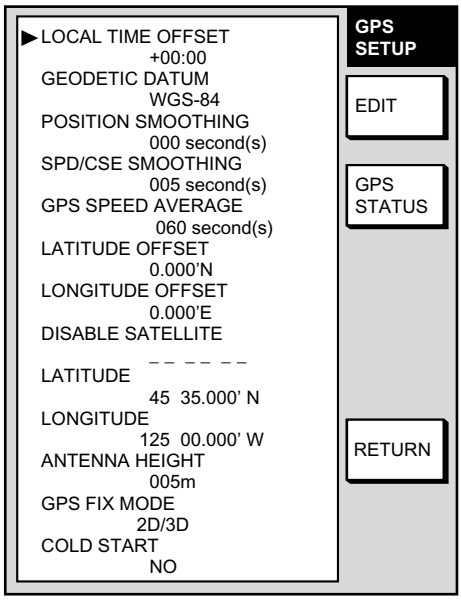
* For GPS receiver other than GP-310B/320B.

Nav setup menu

2. Select POSITION SOURCE and press the [EDIT] key or [ENTER] knob to show the position source window.
3. Select FURUNO BB GPS, GP, LC or ALL as appropriate and press the [ENTER] knob or ENTER soft key.
   FURUNO BB GPS: GPS Receiver GP-310B/320B
   GP: GPS navigator (via NETWORK or DATA 1 connector)
   LC: Loran C (via NETWORK or DATA 1)
   ALL: Multiple navaid connection (via NETWORK or DATA 1 connector)
4. **For GPS receiver other than the GP-310B/320B**, you may adjust speed averaging and use local time.
   a) Choose desired item and press the EDIT soft key.
   b) Use the trackball to select location and rotate the [ENTER] knob to set value. For time, use the +< - -> - soft key to switch from plus to minus and vice versa.
   c) Press the RETURN soft key.

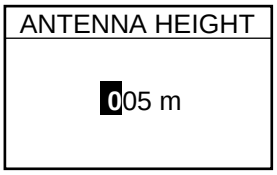
   Speed Averaging: Calculation of ETA is based on average ship's speed over a given period. If the period is too long or too short calculation error will result. Change this setting if calculation error occurs. The default setting, 60 seconds, is suitable for most conditions. The range of adjustment is 0-9999 (sec).
   Local Time Offset: GPS uses UTC time. If you would rather use local time enter the time difference between it and UTC. The range of offset is –13:30 to + 13:30 and the default setting is zero (no offset).
   Temp Calibration: Offsets NMEA water temperature (-40ºF to +40ºF)
   Depth Calibration: Offsets NMEA depth data (-15 ft to +90 ft)

5. **For GP-310B/320B,** press the RETURN soft key twice to show SYSTEM CONFIG menu.
6. Press the SYSTEM SETUP soft key followed by PORT SETUP and GPS/NMEA PORT soft keys.
7. Select FURUNO GPS SENSOR, and press the [ENTER] knob or EDIT soft key to show FURUNO GPS SENSOR window.
8. Select YES and press the [ENTER] knob or ENTER soft key.
9. Press the RETURN soft key three times followed by NAV OPTIONS, GPS SENSOR SETTINGS soft keys to show the GPS SETUP menu.



GPS SETUP menu

10. Select LOCAL TIME OFFSET and press the EDIT soft key.
11. Enter time difference between local time and UTC time. Use the + <- - > - soft key to switch from plus to minus and vice versa. And then press the [ENTER] knob or ENTER soft key.
12. Select ANTENNA HEIGHT and press the EDIT soft key.



Antenna height window

13. Enter the height of the GP-310B/320B antenna unit above sea surface. Use the trackball to select digit and rotate the [ENTER] knob to set value. The default height is 5 m.
14. Press the [ENTER] knob or ENTER soft key.
15. Choose and set other items as appropriate, referring to the table on the next page.

Contents of GPS sensor settings menu

Item	Description	Settings	Default Setting
Local Time Offset	Allows the user to use local time (instead of UTC time). Enter time difference between local time and UTC time. Use the + < - - > - soft key to switch from plus to minus and vice versa.	-13:30 to +13:30 hr	0 hr (no offset)
Geodetic Datum	Your equipment is preprogrammed with most of the major chart systems of the world. Although the WGS-84 system, the GPS standard, is now widely used other categories of charts still exist. Select the chart system used, not the area where your boat is sailing.	Use the trackball or [ENTER] knob to select appropriate chart.	WGS-84
Position Smoothing	When the DOP or receiving condition is unfavorable, the GPS fix may change, even if the vessel is dead in water. This change can be reduced by smoothing the raw GPS fixes. A setting between 000 to 999 is available. The higher setting the more smoothed the raw data, however too high a setting shows response time to change in latitude and longitude. This is especially noticeable at high ship' speeds. Increase the setting if the GPS fix changes.	0-999 sec	0 sec (no position smoothing)
Spd/Cse Smoothing	During position fixing, ship's velocity (speed and course) is directly measured by receiving GPS satellite signals. The raw velocity data may change randomly depending on receiving conditions and other factors. You can reduce this random variation by increasing the smoothing. Like with latitude and longitude smoothing, the higher the speed and course smoothing the more smoothed the raw data. If the setting is too high, however, the response to speed and course change slows. For no smoothing, enter all zeros.	0-9999 sec	5 sec
GPS Speed Average	Calculation of ETA is based on average ship's speed over a given period. If the period is too long or too short calculation error will result. Change this setting if calculation error occurs. The default setting is 60 seconds, which is suitable for most conditions.	0-9999 sec	60 sec
Latitude Offset	Offsets latitude position to further refine position accuracy. Use the N <- - > S soft key to switch coordinate.	9.999'S – 9.999'N	0.0' (no offset)

(Continued on next page)

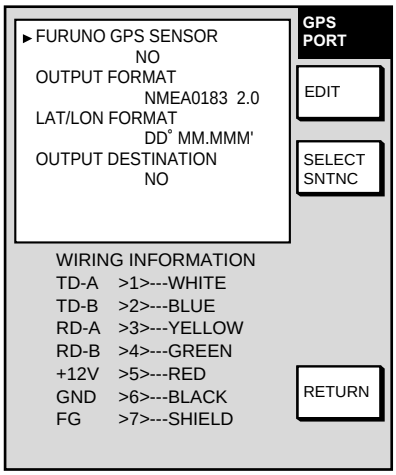
Contents of GPS sensor settings menu (con't.)

Item	Description	Settings	Default Setting
Longitude Offset	As above but for longitude. Use the W < - - > E soft key to switch coordinate.	9.999'E – 9.999'W	0.0' (no offset)
Disable Satellite	Every GPS satellite is broadcasting abnormal satellite number (s) in its Almanac, which contains general orbital data about all GPS satellites, including those which are malfunctioning. Using this information, the GPS receiver automatically eliminates any malfunctioning satellite from the GPS satellite schedule. However, the Almanac sometimes may not contain this information. If you hear about a malfunctioning satellite from another source, you can disable it manually. Enter satellite number (max. 3 satellites) in two digits and press the ENTER soft key.		None
Latitude	Set initial latitude position after cold start. Use the N < - -> S soft key to switch coordinate.	90°S - 90°N	45°35.000'N
Longitude	Set initial longitude position after cold start. Use the W <- - > E soft key to switch coordinate.	180°E – 180°W	125°00.000''W
Fix Mode	Choose position fixing method: 2D (three satellites in view), 2D/3D (three or four satellites in view whichever is greater).	2D, 2D/3D	2D/3D
Antenna Height	Enter the height of the GPS antenna unit above sea surface.	0-99 m	5 m
Cold Start	Clears the Almanac to receive the latest Almanac.	No, Yes	No
GPS STATUS (soft key)	Displays GPS satellite status display.		

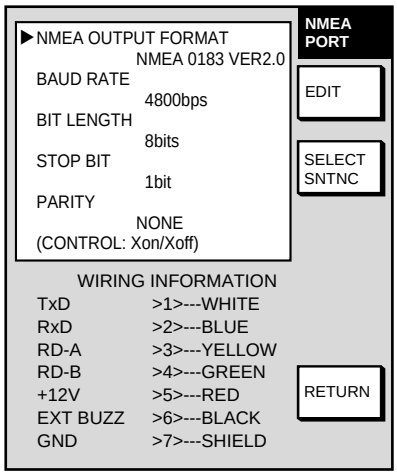
3.6 Setting up Data Ports

Setup the data ports according to the equipment connected to them as follows.

1. Press the [MENU] key to open the menu.
2. Press the SYSTEM CONFIGURATION, SYSTEM SETUP and PORT SETUP soft keys.
3. Press the GPS/NMEA PORT for DATA1 port or PC/NMEA EXT, BUZZ PORT for DATA3 port soft key as appropriate. One of the following displays appear depending on your selection.

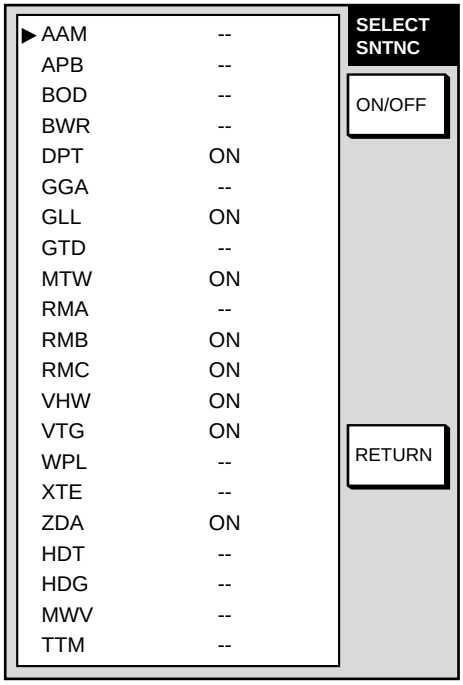


DATA 1 port

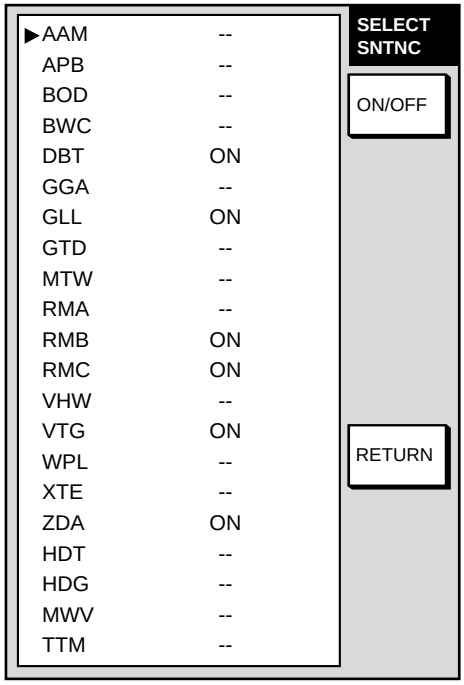


DATA 3 port

3. Select item and press the EDIT soft key.
4. Set option referring to the tables on the next page.
5. To select NMEA data sentences to output, press the SELECT SNTNC soft key. OUTPUT THROUGH NETWORK port for DATA4 port, select the sentence to output to the network equipment.



NMEA Version 2.0
Range and bearing mode: Rhumb line



NMEA Version 1.5 (w/ARP)
Range and bearing mode: Great circle

7. Select sentence and press the ON/OFF soft key to show ON (output) or OFF (no output) as appropriate.
8. Press the RETURN soft key.
9. Press the [MENU] key to quit.

Contents of DATA 1 PORT menus

Item	Description	Settings	Default Setting
FURUNO GPS Sensor	Selects whether the GPS Receiver **GP-310B/320B** is connected to the DATA1 port or not.	Yes, No	No
Output Format	Selects NMEA output version of the equipment connected.	NMEA0183 Ver. 1.5, NMEA0183 Ver. 2.0	NMEA0183 Ver. 2.0
Lat/Lon Format	Selects latitude/longitude format to output.	DD°MM.MM', DD°MM.MMM, DD°MM.MMMM'	DD°MM.MMM'
Output Destination	Selects whether to output route (data sentence RTE) and waypoint data (data sentence WPL) when destination is set.	Yes, No	No
SELECT SNTNC (soft key)	Selects data sentence(s) to output. Select sentence with the trackball and press the ON/OFF soft key to show ON or "- -" (OFF) as appropriate. See the figure above for sentence and default settings.		

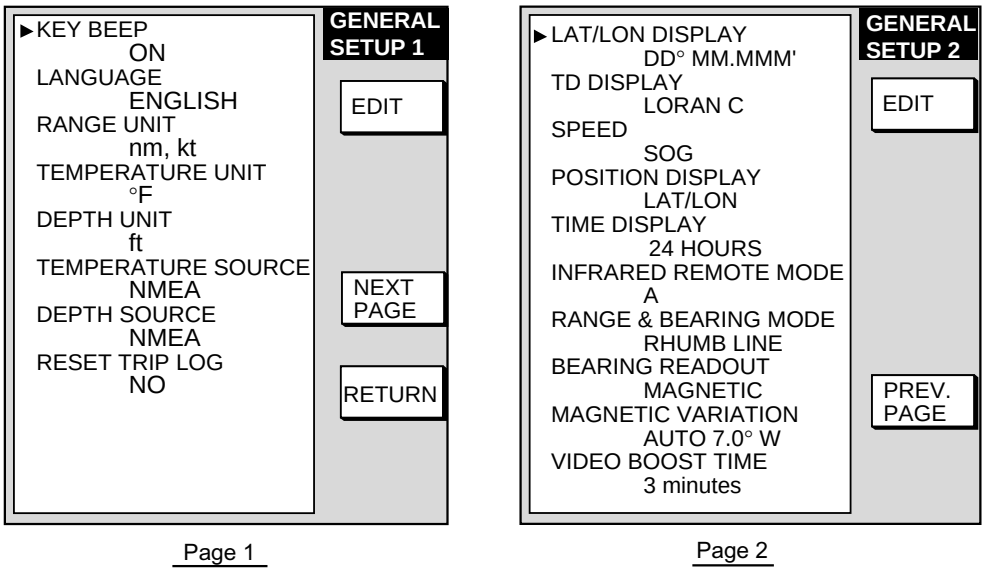
Contents of DATA 3 PORT menu

Item	Description	Settings	Default Setting
NMEA Output Format	Selects NMEA output format.	NMEA Ver. 1.5, NMEA Ver. 2.0	NMEA Ver. 2.0
Baud Rate	Sets baud rate.	4800, 9600, 19200 (bps)	4800(bps)
Bit Length	Sets character length.	8 bit, 7 bit	8 bit
Stop Bit	Sets number of stop bits.	1 bit, 2 bit	1 bit
Parity	Sets parity bit.	Even, Odd, None	None
SELECT SNTNC (soft key)	Chooses data sentences to output. For further details see the illustration "NMEA data sentences" on page 3-15.		

3.7 Remote Controller Setting

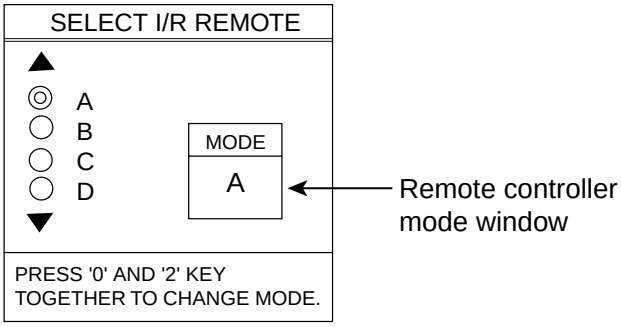
A remote controller can be set exclusively for use with a specific display unit, in the case of multiple NavNet display units. Set the remote controller mode desired on the menu and attach appropriate label (supplied with accessories) to the remote controller and display unit.

1. Press the [MENU] key, SYSTEM CONFIGURATION soft key, GENERAL SETUP soft key in order to show the GENERAL SETUP menu.



GENERAL SETUP menu

2. Press the NEXT PAGE soft key to show Page 2.
3. Select INFRARED REMOTE MODE, and press the EDIT soft key.
   The SELECT I/R REMOTE window appears.
4. Point the remote controller toward the display unit, and press any key (except [ENTER] key) on the remote controller. The remote controller mode window appears.



Select I/R REMOTE window

5. After confirming the remote controller mode on the window, press the [0] and [2] key together on the remote controller to change the controller mode setting among A, B, C and D.
6. Operate the trackball or [ENTER] knob so that the display mode should be the same as the controller mode setting.
7. Press the [MENU] key to close the menu.

This page is intentionally left blank.

4. OPTIONS

4.1 ARP Kit ARP-11

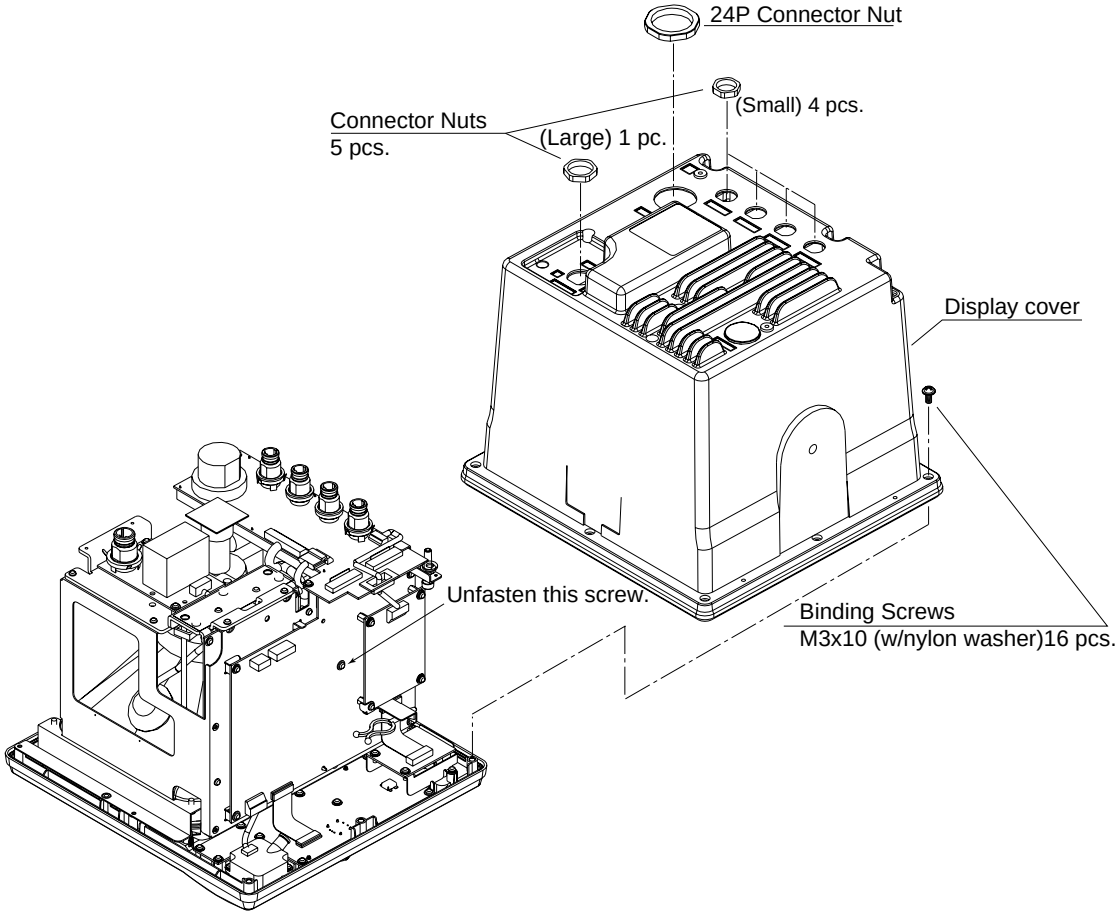
Necessary parts

Name: ARP kit
Type: ARP-11
Code no.: 008-523-050

Table 4-1 ARP-11 contents

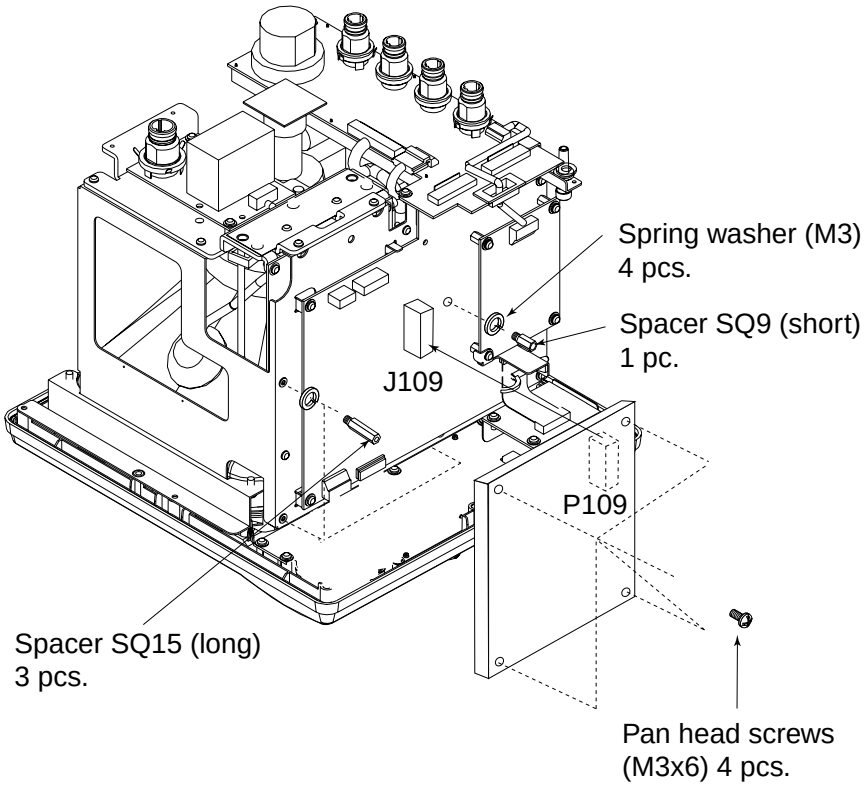
Name	Type	Code No.	Qty
ARP Board	18P9013	008-521-830	1
Pan head screw	M3x6 C2700W	000-881-403	4
Spacer	SQ9	000-801-850	1
	SQ15	000-801-779	3
Spring washer	M3 C5191W	000-864-204	3

1. Unscrew six connecter nuts at the rear of the display unit.
2. Unfasten 16 binding screws (M3x10) to remove the display cover.
3. Remove the pan head screw (M3x8) on the SPU Board shown in the figure below.



Display unit, cover removed

4. Fasten four spacers and washers (supplied with option kit) to the locations shown below.
5. Mate P109 on the ARP Board (option) to J109 on the SPU Board.
6. Fix the ARP Board and SPU Board with four pan head screws and spring washers (supplied with option kit).

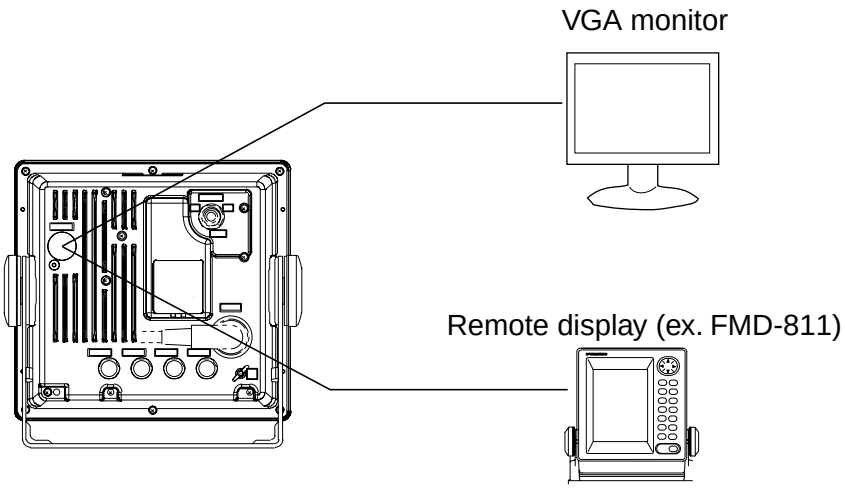


ARP Board attachment

7. Reassemble the display unit.

4.2 Connection of External Monitor/Remote Display

The above units can be connected to the MODEL1833/1933/1943 by using the hole at the rear of the display unit. Remove the connector cover to use this hole. After connecting, cover the hole with soft putty to seal the hole.



⚠ CAUTION

Even though the display unit meets waterproof standard IPX-5, this modification can affect waterproofness. Watertight integrity cannot be guaranteed.

Connection of External monitor/remote display

4.2.1 Connecting external monitor

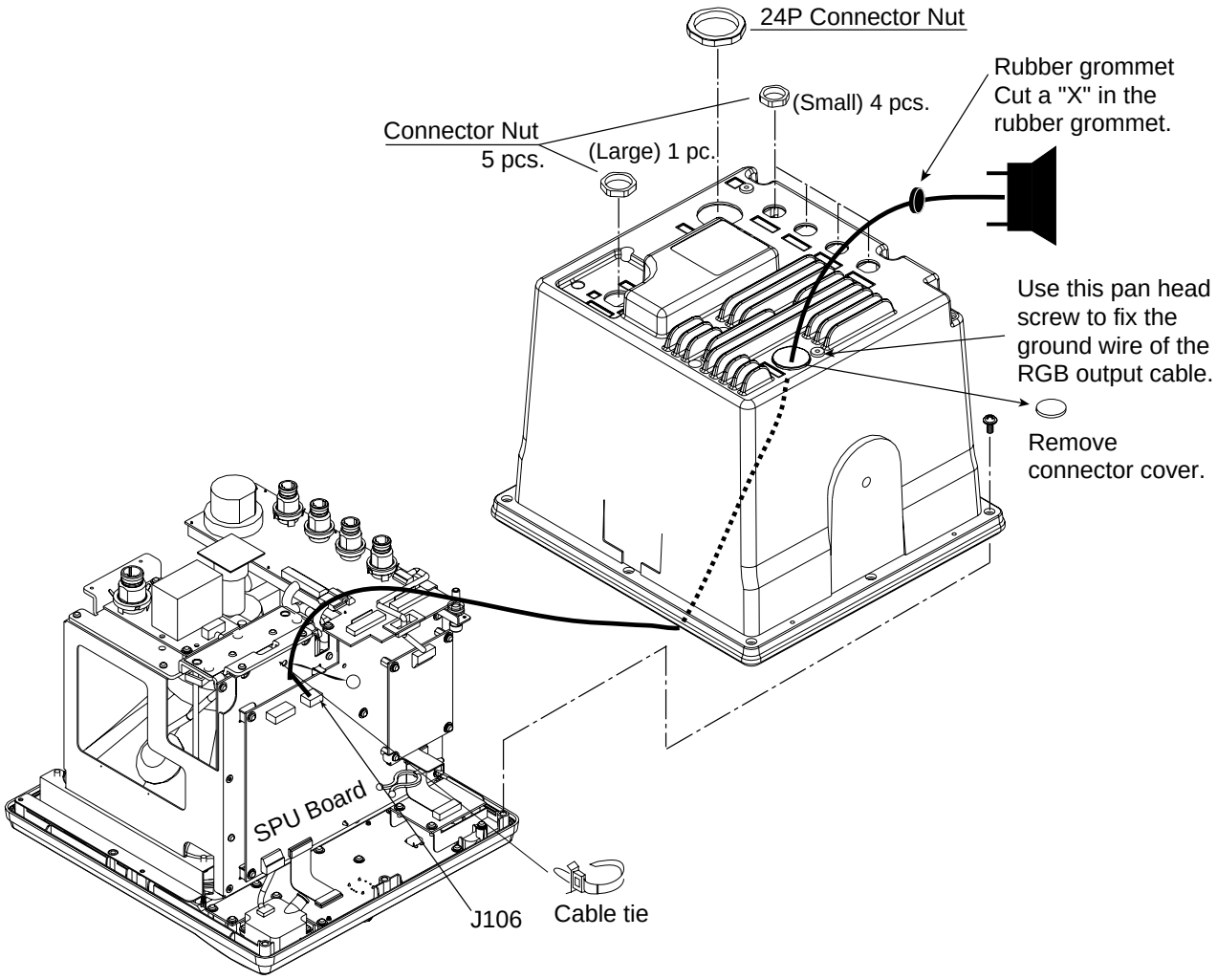
You can display the MODEL1833/1933/1943 screen on the external monitor, which accepts industrial standard VGA input by using the optional RGB output cable kit OP03-176. Supply monitor and interconnection cable (with HD-15P connectors of male, three rows of 15 pins) locally.

Necessary parts for connecting of external monitor

Name: RGB output cable kit
Type: OP03-176
Code No.: 008-526-360

Name	Type	Code No.	Qty
Cable assy.	15SDS/XHP10-005	000-144-511	1
Grommet	MG-4	000-871-378	1

1. Unscrew six connecter nuts at the rear of the display unit.
2. Unfasten 16 binding screws (M3x10) to remove the display cover.
3. Remove the connector cover at the rear of the display cover.
4. Cut a “x” in the rubber grommet to pass the cable.
5. Pass the RGB output cable through the rubber grommet (supplied with option) hole and then connect the XH connector (10P) of the RGB output cable to J106 on the SPU Board.
   Put the ground wire of the RGB output cable outside of the display cover.



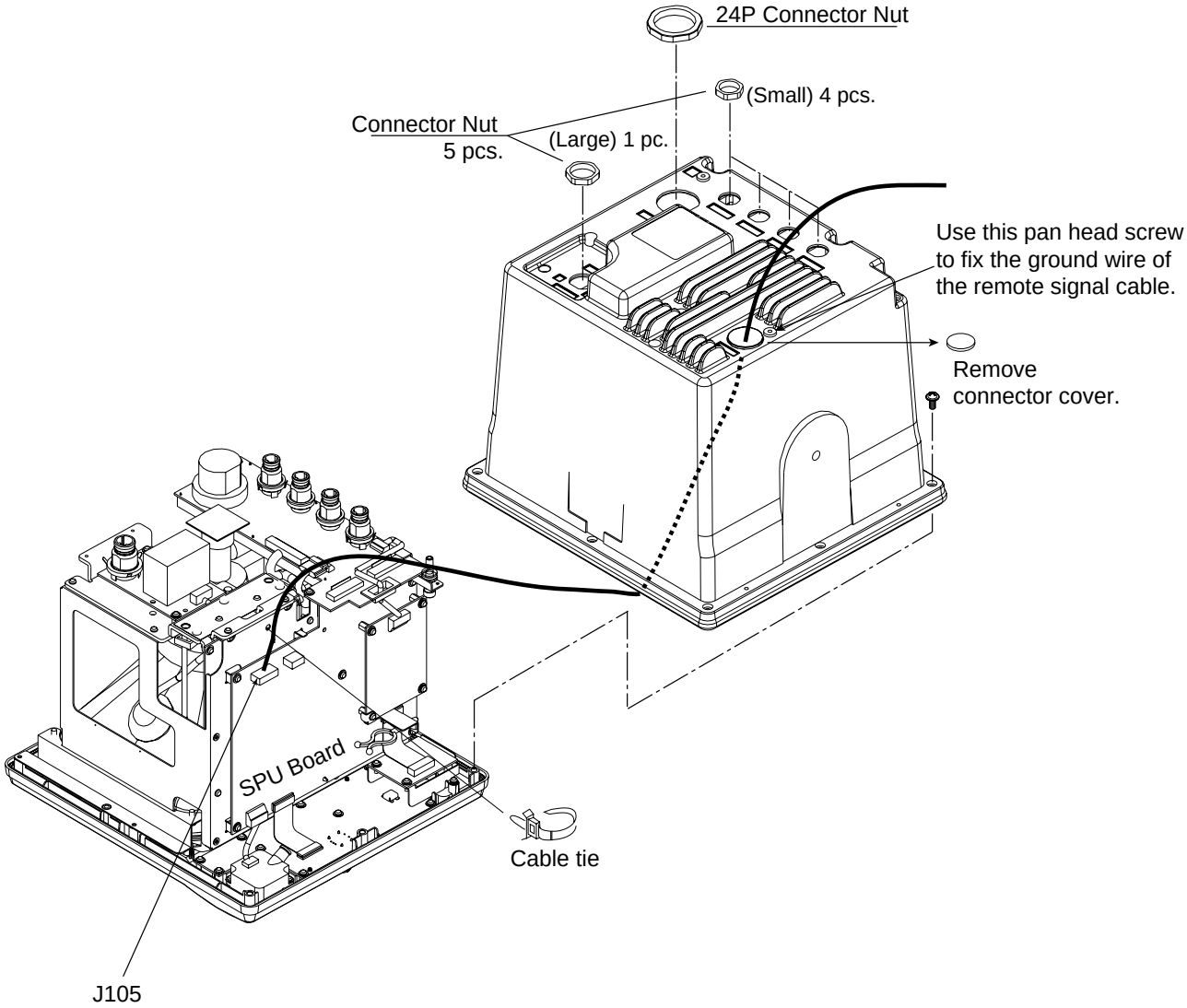
How to connect the RGB output cable

5. Attach the cable tie supplied as installation material to the position shown above, and then tie the cable with it.
6. Reassemble the display unit. Fix the ground wire of the RGB output cable with the pan head screw shown above.
7 Attach the rubber grommet to the hole at the rear of the display unit.

4.2.2 Connecting remote display

The FURUNO Display unit FMD-811, MODEL1832 or GD-280/380, etc. can be connected to the NavNet display as remote display. To interconnect them, use a cable attached with or set as option for the remote display.

1. Unscrew six connecter nuts at the rear of the display unit.
2. Unfasten 16 binding screws (M3x10) to remove the display cover.
3. Remove the connector cover at the rear of the display cover.
4. Pass the signal cable for remote displaying through the hole, and then connect the XH connector (8P) of the signal cable to J105 on the SPU Board. If your remote signal cable has the ground wire, put it outside of the display cover and fix it with the pan head screw shown below.

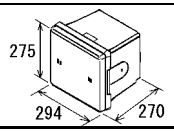
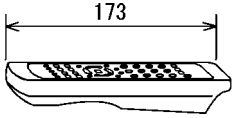
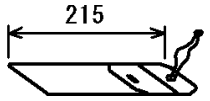
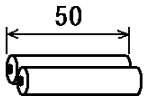
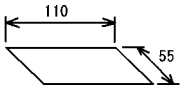
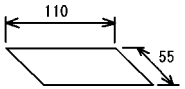
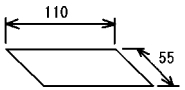
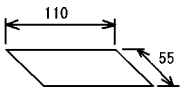


How to connect remote signal cable

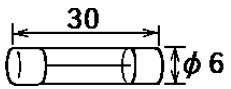
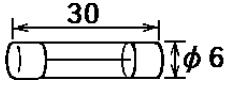
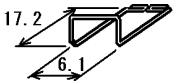
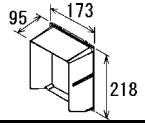
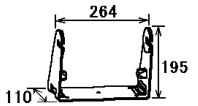
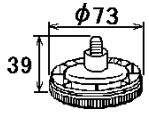
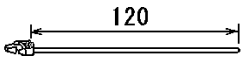
5. Attach the cable tie supplied as installation material to the position shown above, and then tie the cable with it.
6. Reassemble the display unit.
7. Apply soft putty to seal the hole at the rear of the display unit.

This page is intentionally left blank.

PACKING LIST RDP-127

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ユニット UNIT			
指示部 DISPLAY UNIT		RDP-127-E-N 000-080-012**	1
ﾘﾓｺﾝｾｯﾄ REMOTE CONTROLLER SET			
ﾘﾓｺﾝｷｰﾕﾆｯﾄ REMOTE CONTROLLER		RMC-100 000-144-471	1
ﾘﾓｺﾝﾋﾞﾆｰﾙｹｰｽ VINYL CASE FOR REMOTE CONTROLLER		14-034-2075-1 100-292-801	1
BATT(MN) SIZE AA BATTERY		R6PKRCP-2 000-142-527	1
ﾘﾓｺﾝｼｰﾙ(1) LABEL FOR REMOTE CONTROLLER		03-153-1314-2 100-292-792	1
ﾘﾓｺﾝｼｰﾙ(2) LABEL FOR REMOTE CONTROLLER		03-153-1315-2 100-292-822	1
ﾘﾓｺﾝｼｰﾙ(3) LABEL FOR REMOTE CONTROLLER		03-153-1316-2 100-292-832	1
ﾘﾓｺﾝｼｰﾙ(4) LABEL FOR REMOTE CONTROLLER		03-153-1317-2 100-292-842	1
予備品 SPARE PARTS		**SP03-14001**	

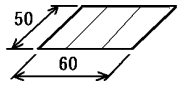
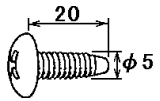
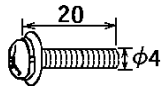
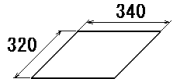
注記）ｺｰﾄﾞ末尾に[**]の付いたﾕﾆｯﾄは代表の型式/ｺｰﾄﾞを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ﾋｭｰｽﾞ FUSE		FGBO 7A AC125V 000-549-013	3
ﾋｭｰｽﾞ FUSE		FGBO 15A AC125V 000-549-014	3
付属品 ACCESSORIES		**FP03-09301**	
ｶｰﾄﾞ用ﾋﾟﾝ CARD REMOVER		03-153-1311-0 100-292-130	1
付属品 ACCESSORIES		**FP03-09202**	
ﾌｰﾄﾞ HOOD		03-156-1053-1 100-291-991	1
付属品 ACCESSORIES		**FP03-09203**	
ﾊﾝｶﾞｰ組品 HANGER ASSY.		FP03-09203 008-523-640	1
付属品 ACCESSORIES		**FP03-09204**	
ﾉﾌﾞ組品 KNOB ASSY.		FP03-09204 008-523-650	2
工事材料 INSTALLATION MATERIALS		**CP03-21901**	
ｽﾅｯﾌﾟﾊﾞﾝﾄﾞ CABLE TIE		SG-130 000-809-171	1

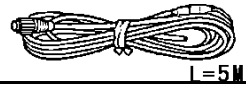
A-1

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

PACKING LIST RDP-127

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ﾋｭｰｽﾞﾊﾘﾏｰｸ FUSE LABEL		03-153-1312-0 100-292-140	1
+ﾄﾗｽﾀｯﾋﾟﾝﾈｼﾞ +TAPPING SCREW		5X20 SUS304 1ｼｭ 000-802-081	4
+ﾅﾍﾞｾﾑｽﾈｼﾞB WASHER HEAD SCREW		M4X20 SUS304 000-804-742	4
型紙 TEMPLATE SHEET		03-156-1055-0 100-292-760	1

その他工材 OTHER INSTALLATION MATERIALS

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.		MJ-A3SPF0018-050Z *5M* 000-139-872	1

NAME	OUTLINE	DESCRIPTION/CODE №	Q'TY

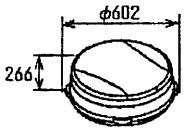
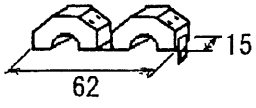
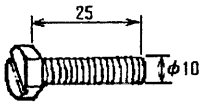
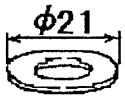
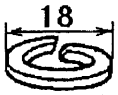
注記）ｺｰﾄﾞ末尾に[**]の付いたﾕﾆｯﾄは代表の型式/ｺｰﾄﾞを表示しています。
DOUBLE ASTERISK DENOTES COMMONLY USED EQUIPMENT.

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

PACKING LIST

19AL-X-9852 -1　1/1

RSB-0071-057

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット　UNIT			
(完) 空中線部 ANTENNA UNIT		RSB-0071-057 000-086-830	1
空中線部工材　ANTENNA UNIT INSTALLATION MATERIALS		CP03-16901	
EMCコア EMC CORE		E04SS251512 000-144-673	1
六角ボルト　スリ割 HEX.BOLT (SLOTTED HEAD)		M10X25 SUS304 000-862-308	4
ミガキ平座金 FLAT WASHER		M10 SUS304 000-864-131	4
バネ座金 SPRING WASHER		M10 SUS304 000-864-261	4

注記)

DWG NO.
C3502-Z02- B

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

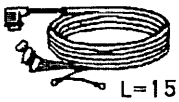
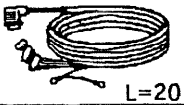
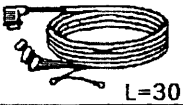
FURUNO

CODE NO.		19AL-X-9401-1
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

MODEL1833/1833C

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
1	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=10M	MJ-B24LPF0002-100		1	選択 TO BE SELECTED
			CODE NO.	000-138-972		
2	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=15M	MJ-B24LPF0002-150		1	選択 TO BE SELECTED
			CODE NO.	000-138-970		
3	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=20M	MJ-B24LPF0002-200		1	選択 TO BE SELECTED
			CODE NO.	000-138-974		
4	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=30M	MJ-B24LPF0002-300		1	選択 TO BE SELECTED
			CODE NO.	000-138-973		

DWG NO.
C3502-M01- B

FURUNO ELECTRIC CO ., LTD.

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

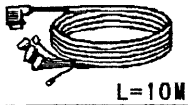
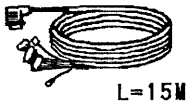
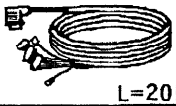
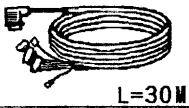
FURUNO

CODE NO.		19AL-X-9402 -1
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

MODEL1933/1933C
MODEL1943/1943C

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=10M	MJ-B24LPF0005-100 CODE NO. 000-140-434	1	選択 TO BE SELECTED
2	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=15M	MJ-B24LPF0005-150 CODE NO. 000-140-435	1	選択 TO BE SELECTED
3	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=20M	MJ-B24LPF0005-200 CODE NO. 000-140-436	1	選択 TO BE SELECTED
4	ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	 L=30M	MJ-B24LPF0005-300 CODE NO. 000-140-437	1	選択 TO BE SELECTED

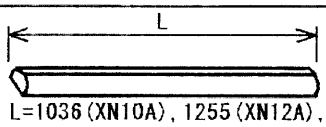
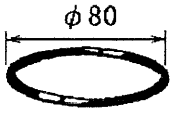
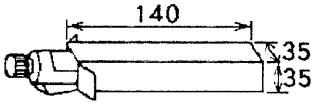
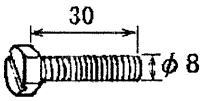
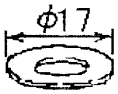
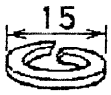
DWG NO.
C3504-M01- B

FURUNO ELECTRIC CO ., LTD.

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

PACKING LIST

XN10A, XN12A

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ｱﾝﾃﾅ ANTENNA	 L=1036(XN10A), 1255(XN12A),	XN10A, 12A 008-523-***	1
ｱﾝﾃﾅ工材 ANTENNA INSTALLATION MATERIALS		CP03-22901	
Oﾘﾝｸﾞ O-RING		JISB2401-1A-G80 000-851-313	1
ｽﾘｰﾎﾞﾝﾄﾞ SEALANT		1211 50G 000-854-118	1
六角ﾎﾞﾙﾄ ｽﾘﾜﾘ HEX. BOLT		M8X30 SUS304 000-862-151	4
ﾐｶﾞｷ平座金 FLAT WASHER		M8 SUS304 000-864-130	4
バネ座金 SPRING WASHER		M8 SUS304 000-864-262	4

DWG NO.
C3500-Z01- C

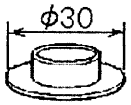
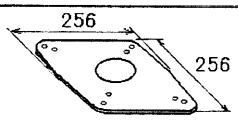
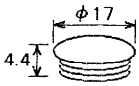
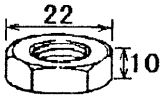
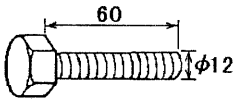
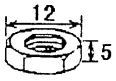
(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-503-360	03FR-X-9401 -7
TYPE	CP03-18401	1/2

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｼｰﾙﾜｯｼｬ SEAL WASHER		03-001-3002-0 CODE NO. 300-130-020	4	
2	防蝕ゴム CORROSION-PROOF RUBBER MAT		03-142-3001-0 CODE NO. 100-275-580	1	
3	ｷｬｯﾌﾟ CAP		040-4010 CODE NO. 000-515-332	4	
4	六角ﾅｯﾄ 1種 HEX.NUT		M12 SUS304 CODE NO. 000-863-112	4	
5	ﾐｶﾞｷ平座金 FLAT WASHER		M12 SUS304 CODE NO. 000-864-132	4	
6	ﾊﾞﾈ座金 SPRING WASHER		M12 SUS304 CODE NO. 000-864-263	4	
7	六角ﾎﾞﾙﾄ（全ﾈｼﾞ） HEX. BOLT		M12X60 SUS304 CODE NO. 000-862-191	4	
8	六角ﾅｯﾄ 1種 HEX.NUT		M6 SUS304 CODE NO. 000-863-109	1	
9	ﾐｶﾞｷ平座金 FLAT WASHER		M6 SUS304 CODE NO. 000-864-129	3	
10	ﾊﾞﾈ座金 SPRING WASHER		M6 SUS304 CODE NO. 000-864-260	1	

DWG NO.
C3459-M02- G

FURUNO ELECTRIC CO., LTD.

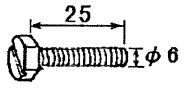
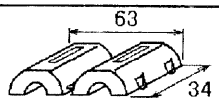
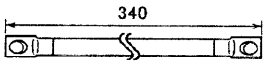
（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	008-503-360	03FR-X-9401-7
TYPE	CP03-18401	2/2

工事材料表

INSTALLATION MATERIALS

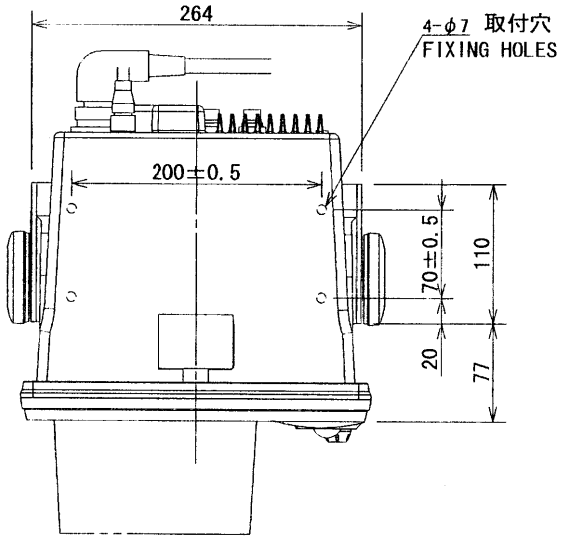
番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
11	六角ボルト HEX. BOLT		M6X25 SUS304 CODE NO. 000-862-180	1	
12	EMIコア EMI CORE		RFC-13 CODE NO. 000-141-084	3	
13	アース線 GROUNDING WIRE		RW-4747-1 03S4747 CODE NO. 000-566-000	1	

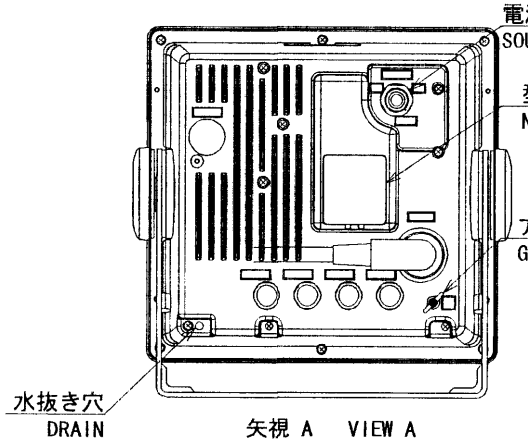
DWG NO.
C3459-M04- G

FURUNO ELECTRIC CO., LTD.

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

FURUNO

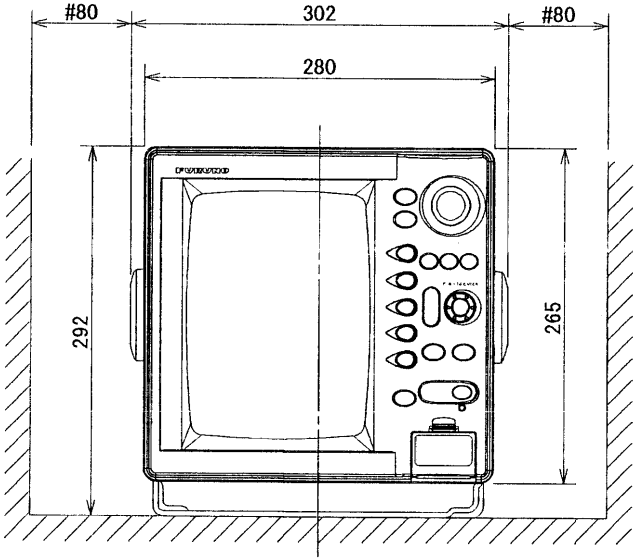


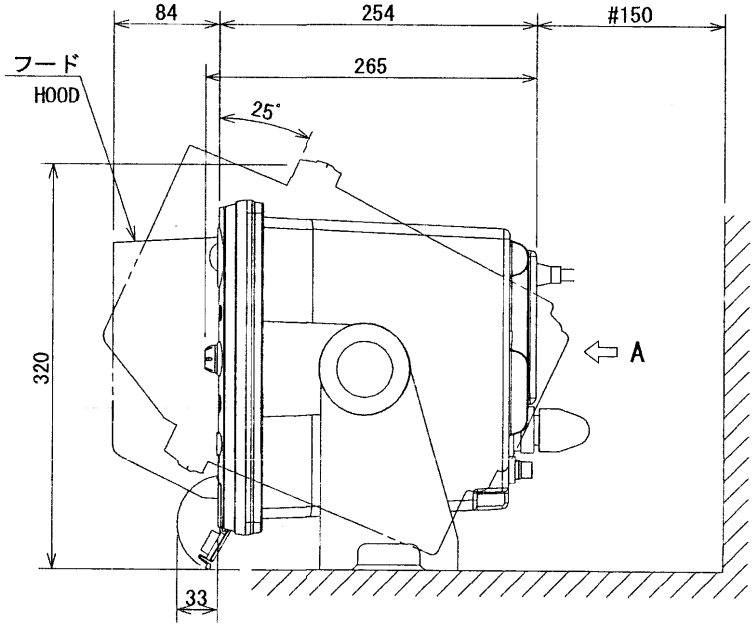


矢視 A　VIEW A

寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0＜L≦50	±1．5
50＜L≦100	±2．5
100＜L≦500	±3

表1　TABLE 1





注　記　1）#印寸法は最小サービス空間寸法とする。
　　2）指定外の寸法公差は表1による。
　　3）取付用ネジは＋トラスタッピンネジ呼び径5×20を使用のこと。

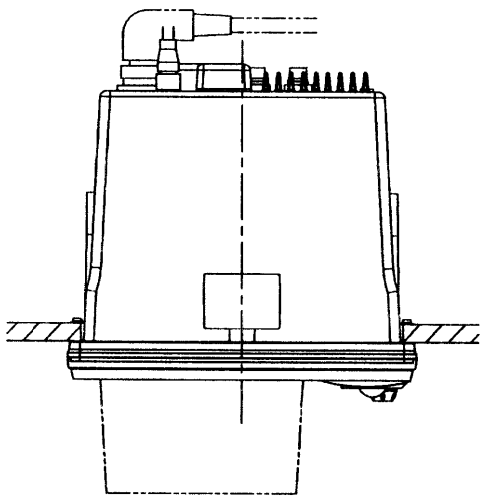
NOTE　1. #: RECOMMENDED SERVICE CLEARANCE.
　　2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
　　3. USE TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

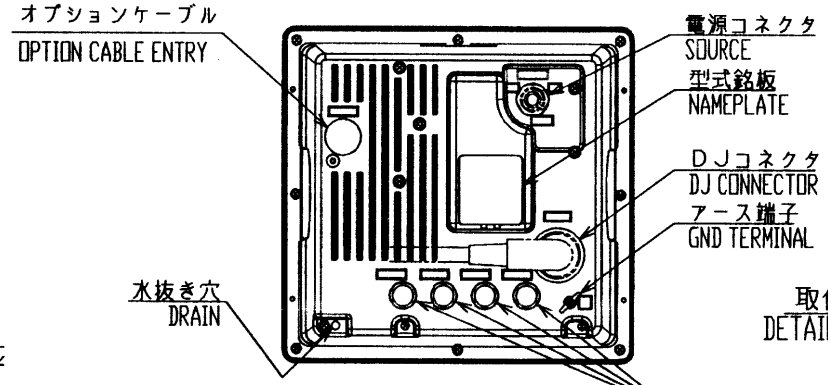
DRAWN Feb.13 '01 T. YAMASAKI			TITLE RDP-127
CHECKED Feb.13 '01 Y. Kuno	MODEL 1943		名称 指示部（卓上装備）
APPROVED Feb.14'01 S. Yoshino	MODEL 1933 MODEL 1833		外寸図
SCALE 1/6	MASS ±10% 8.0 kg		NAME DISPLAY UNIT (DESKTOP MOUNT)
DWG. No. C3502-G01-- A	03-156-100G- 1		OUTLINE DRAWING

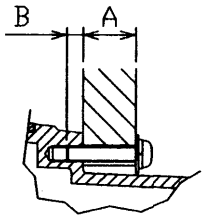
FURUNO ELECTRIC CO., LTD.

D-1

FURUNO



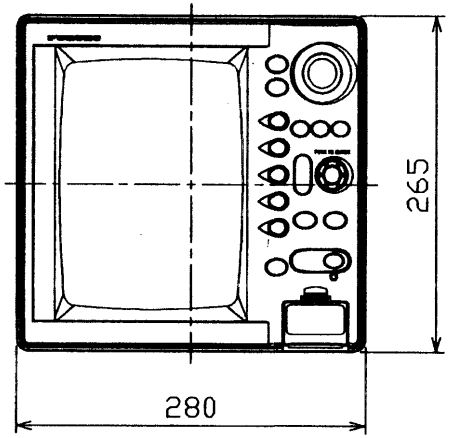


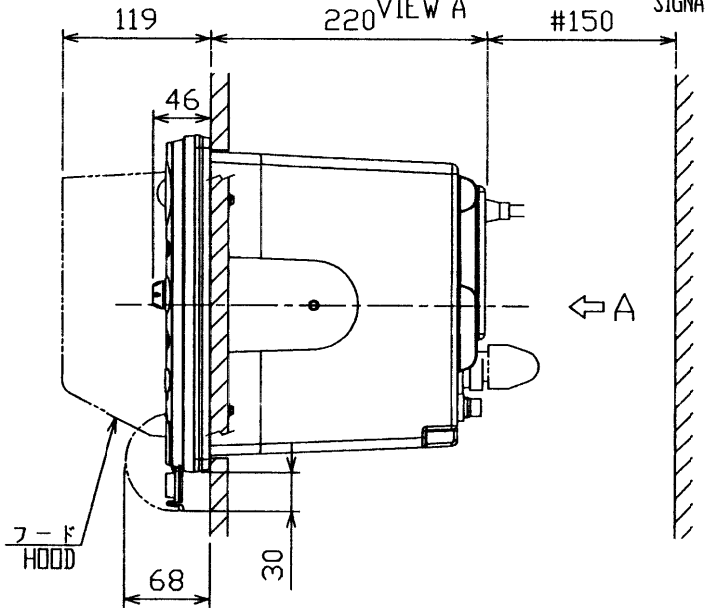


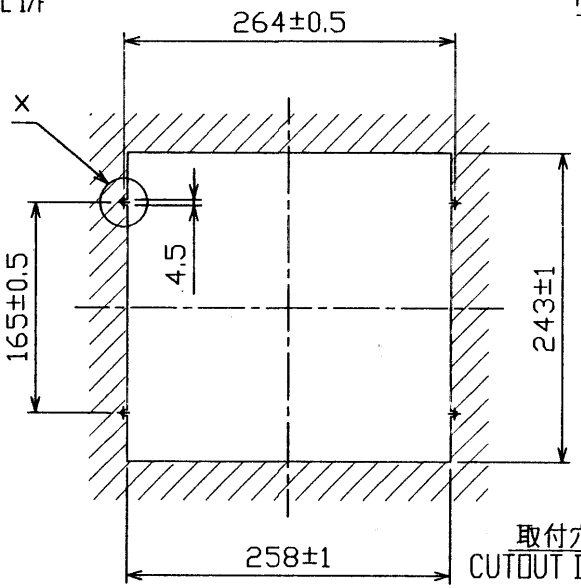
取付ネジ部断面 尺度 1/2
DETAIL FOR FASTENING (SCALE: 1/2)

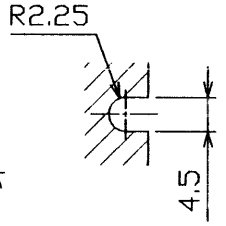
寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1.5
50<L≦100	±2.5
100<L≦500	±3

表 1 TABLE 1









X部詳細（尺度1/1）
DETAIL X (SCALE: 1/1)

取付穴寸法図
CUTOUT DIMENSIONS

注 記
1）#印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表1による。
3）取付用ネジは、セムスネジB M4×20を使用のこと。
壁の厚さ（A）は11≦A≦14とする。それ以外の壁に装備する場合
使用するネジの長さは(A+7.8)±2とする。（セムスネジBを使用）
筐体にはネジ部を8mm以上入れないこと。

NOTE
1. #: RECOMMENDED SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. USE M4x20 SCREWS FOR FIXING THE UNIT.
THICKNESS A: 11≦A≦14 OR SCREW LENGTH: (A+7.8)±2.
DO NOT FASTEN SCREWS INTO UNIT MORE THAN 8 mm (B≦8).

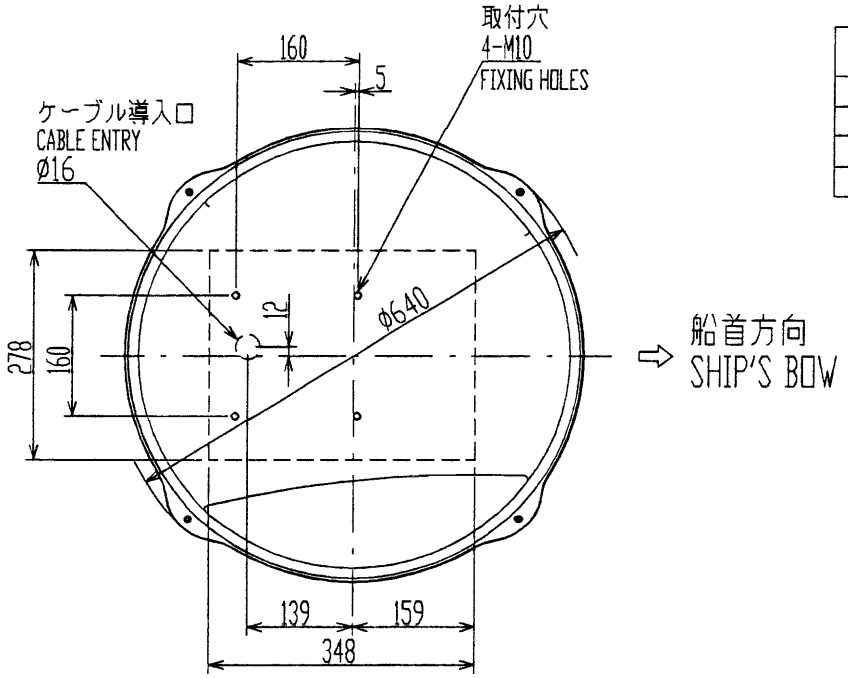
DRAWN May 23 '01 T.YAMASAKI		TITLE RDP-127
CHECKED May 23 '01 K.K	MODEL 1943	名称 指示部（埋込装備）
APPROVED May 23 '01 Y.K	MODEL 1933 MODEL 1833	外寸図
SCALE 1/6 MASS 7.3 kg		NAME DISPLAY UNIT (FLUSH MOUNT)
DWG No. C3502-G02-B		OUTLINE DRAWING

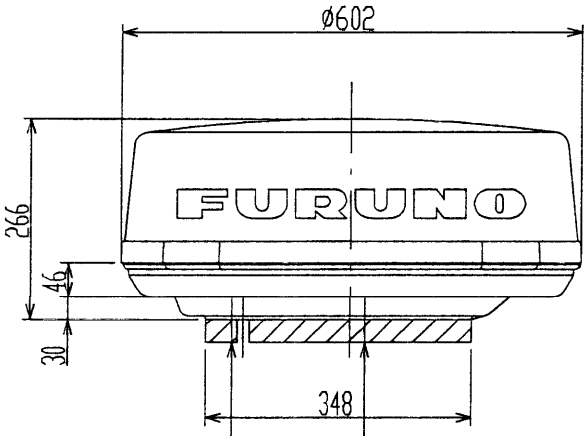
FURUNO ELECTRIC CO., LTD.

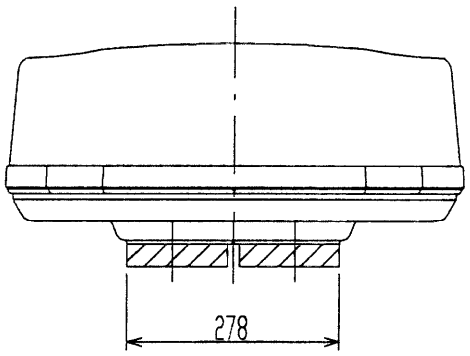
FURUNO

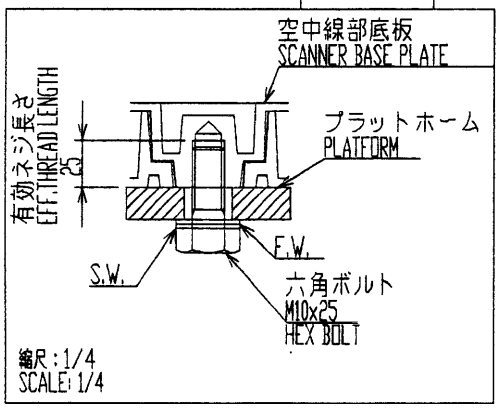
表1 TABLE 1

寸法区分(mm) DIMENSION	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3
500 < L ≦ 1000	±4









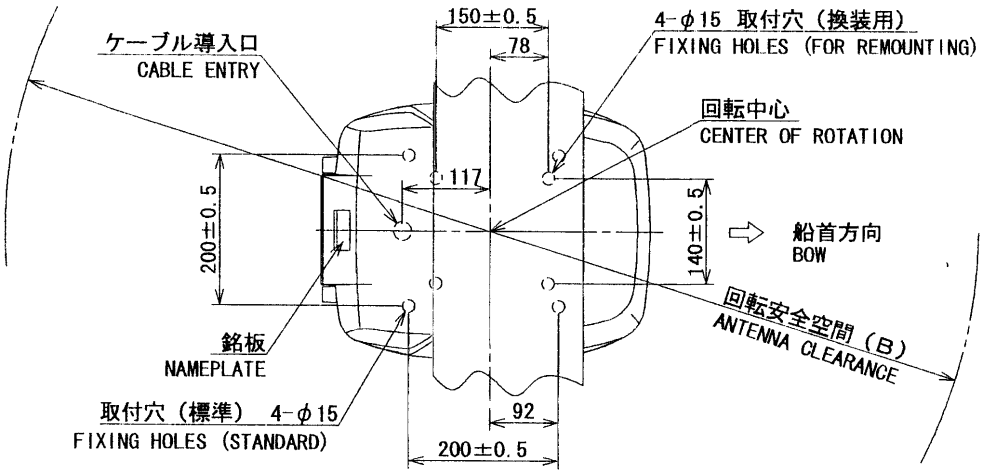
注記
1）指定外の寸法公差は表1による。
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
2）コンパス安全距離
COMPASS SAFE DISTANCE.

スタンダード STANDARD	1.4 m
ステアリング STEERING	1.1 m

DRAWN Sep. 21 '01 T.YAMASAKI			TITLE RSB-0071
CHECKED Sep.21'01 Y.K!	MODEL 1833/1833C MODEL 1732/1732C		名称 空中線部
APPROVED Sep.'01 Y.K!	RS-1000 MODEL 1832		外寸図
SCALE 1/10	MASS 8 ±10% kg		NAME SCANNER UNIT
DWG.No. C3441-G01-E	03-136-6001-G2		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



注 記

1） 取付はM12ボルトを使用のこと。
2） 指定外寸法公差は表２による。
3） 本機取付台にφ25-30のケーブル貫通穴を開ける。

NOTE

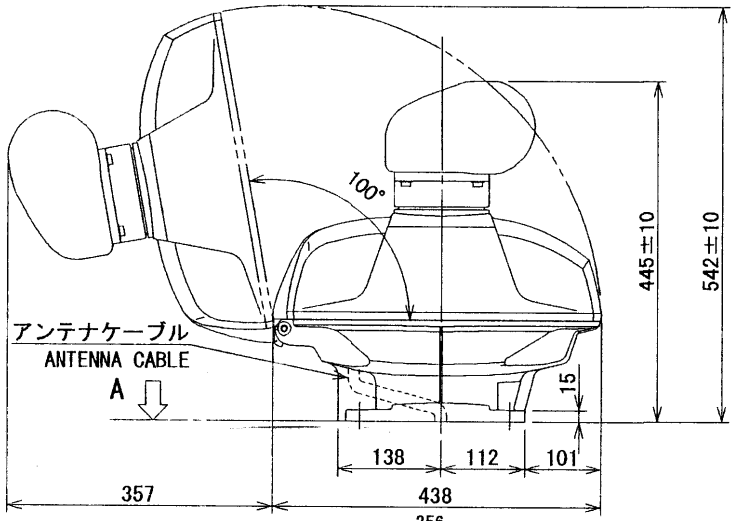
1. USE M12 BOLTS FOR FIXING THE UNIT.
2. TABLE 2 INDICATES TOLERANCE OF DIMENSIONS.
3. MAKE A HOLE φ25-30 ON MOUNTING MAST FOR CABLE PASS.

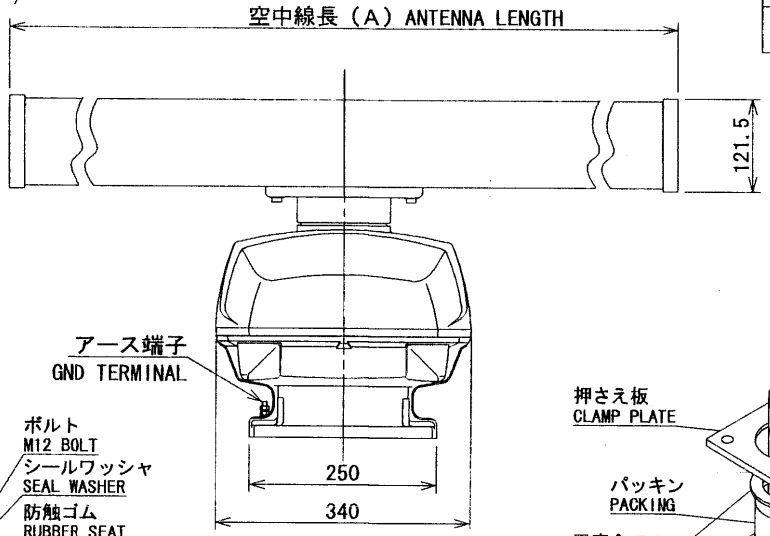
寸法区分（mm） DIMENSION	公差（mm） TOLERANCE
L≦50	±1．5
50<L≦100	±2．5
100<L≦500	±3
500<L≦1000	±4
1000<L≦2000	±5

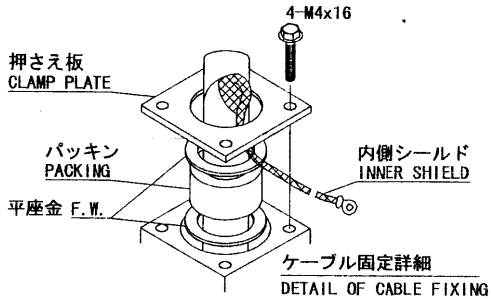
表 2 TABLE 2

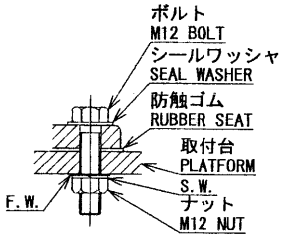
種 類 TYPE	XN10A	XN12A
空中線長(A) LENGTH (mm)	1036±10	1255±10
回転安全空間(B) CLEARANCE (mm)	1200	1400
質 量 (kg) MASS (±10%)	22	23

表 1 TABLE 1

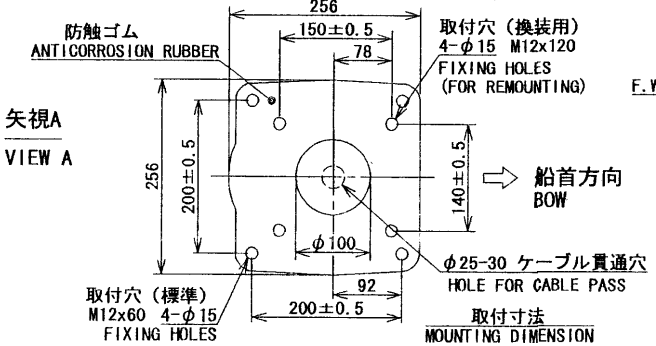








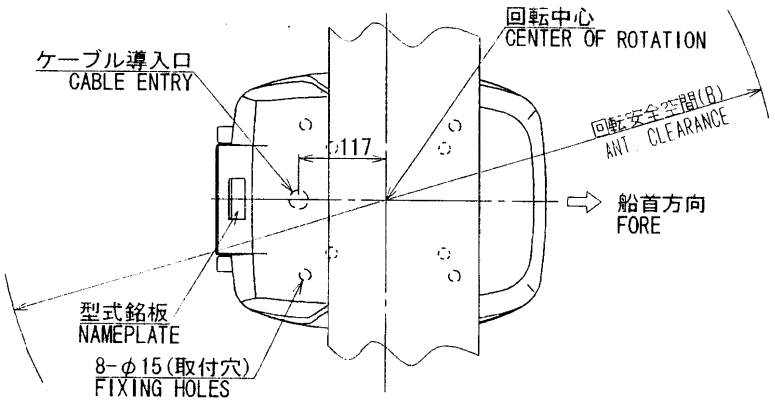
取付け部詳細
DETAIL OF UNIT FIXING



DRAWN Feb. 1 '01 T. YAMASAKI		TITLE	RSB-0070/0073
CHECKED Feb 2 '01 S. K		名称	空中線部
APPROVED Feb 5 '01 S. Fukimura	MODEL 1933 MODEL 1762/C		外寸図
SCALE 1/10	MASS 表２参照 SEE TABLE 2	NAME	ANTENNA UNIT
DWG. No. C3500-G01- A	03-153-300G-0		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



注記
1) 取付はM12ボルトを使用のこと。
2) 指定外寸法公差は表1による。
3) 空中線部の取付台にφ25-30のケーブル貫通穴を開ける。
4) 初期製造分は取付穴寸法240x240で出荷しております。
換装時に注意してください。

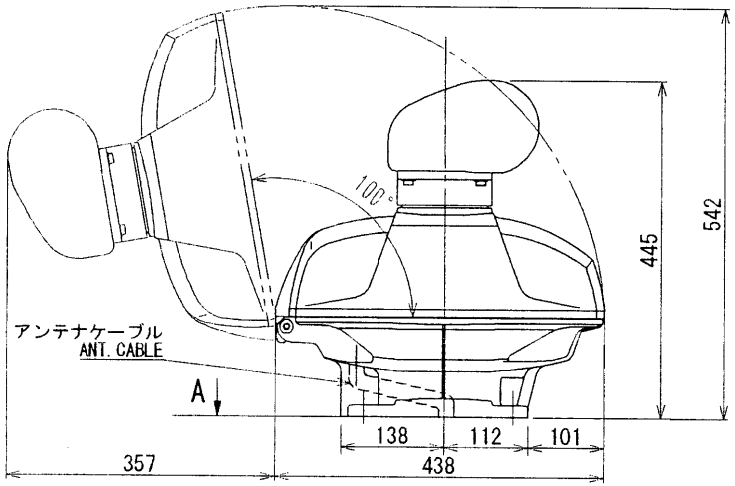
NOTE
1. USE M12 BOLTS FOR FIXING UNIT.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
3. MAKE A HOLE φ25-30 ON MOUNTING MAST FOR CABLE ENTRY.
4. NOTE FOR REPLACEMENT: FIXING HOLE DIMENSIONS ARE CHANGED FROM 240x240 OF PREVIOUS SETS TO 200x200.

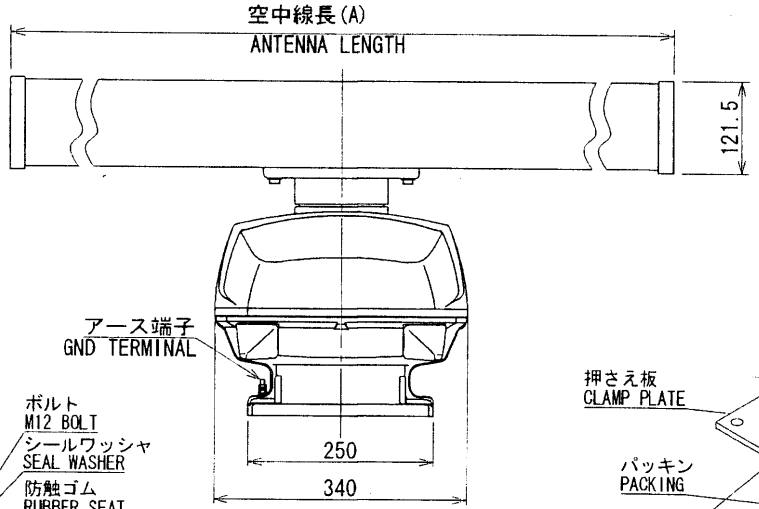
寸法範囲 (mm) DIMENSION	公差 (mm) TOLERANCE
0<L≦50	±1.5mm
50<L≦100	±2.5mm
100<L≦500	±3mm
500<L≦1000	±4mm
1000<L≦2000	±5mm

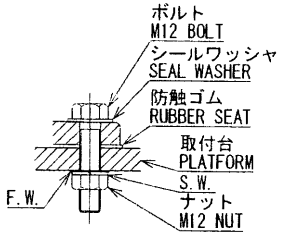
表1 TABLE 1

種類 TYPE	XN12A	XN13A
空中線長(A) LENGTH (mm)	1255±10	1795±10
安全空間(B) CLEARANCE (mm)	1400	1940
質量 (kg) MASS	23	25

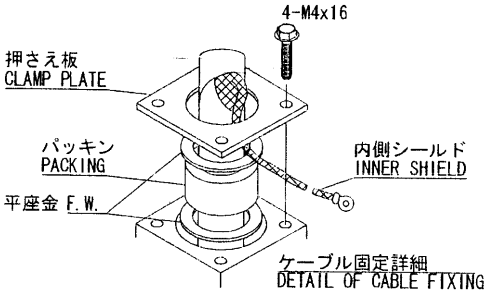
表2 TABLE 2



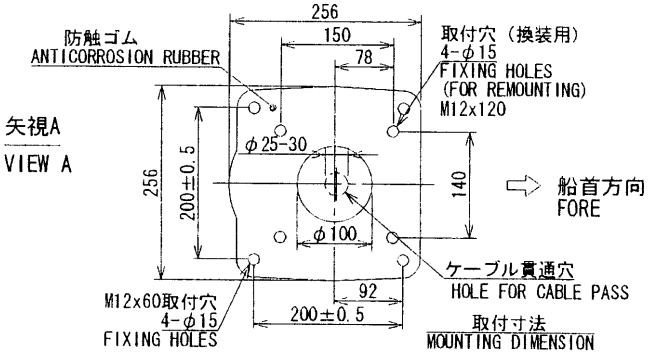




取付け部詳細
DETAIL OF UNIT FIXING



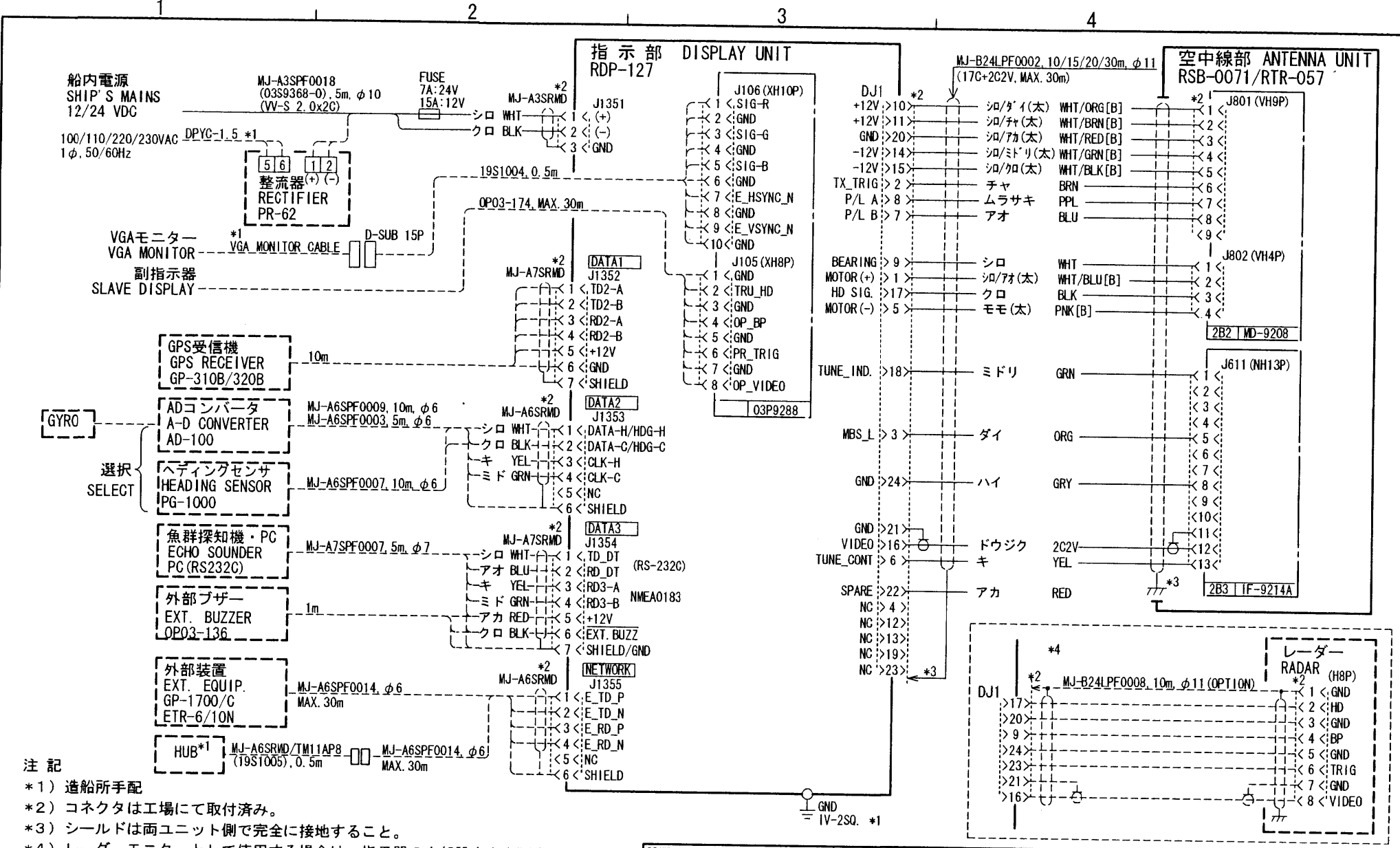
ケーブル固定詳細
DETAIL OF CABLE FIXING



DRAWN			TITLE RSB-0070/0072/0073 (XN12A/13A)
CHECKED	FR-7041R M2 FRS/RS-1000C		名称 空中線部
APPROVED	MODEL1942M2 FR-7062/7112/7252		外寸図
SCALE 1/10	MASS表2に記載 SEE TABLE 2		NAME ANTENNA UNIT
DWG. No. C3459-G03- C	03-142-3000-G3		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO



注 記

*1）造船所手配

*2）コネクタは工場にて取付済み。

*3）シールドは両ユニット側で完全に接地すること。

*4）レーダーモニターとして使用する場合は、指示器の内部設定を変更する。

NOTE

*1. SHIPYARD SUPPLY

*2. CONNECTOR PLUG FITTED AT FACTORY.

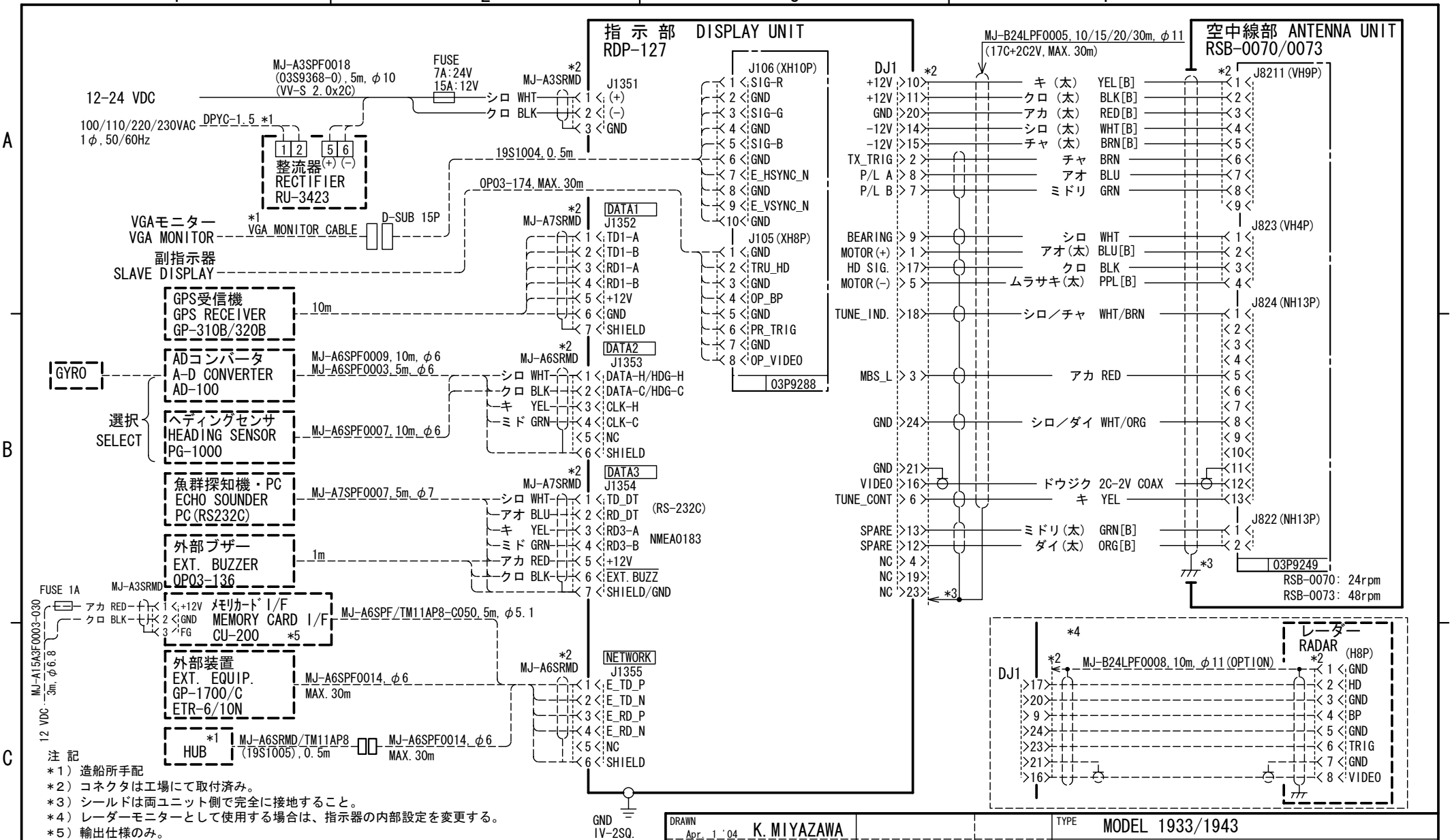
*3. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.

*4. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A RADAR MONITOR.

DRAWN Apr. 18 '02 T. YAMASAKI		TYPE	MODEL 1833
CHECKED Apr. 18 '02 Y.K.		名称	船舶用レーダー
APPROVED Apr. 18 '02 Y.K.			相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG. No. C3502-C01- D	03-155-6001-2		INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO

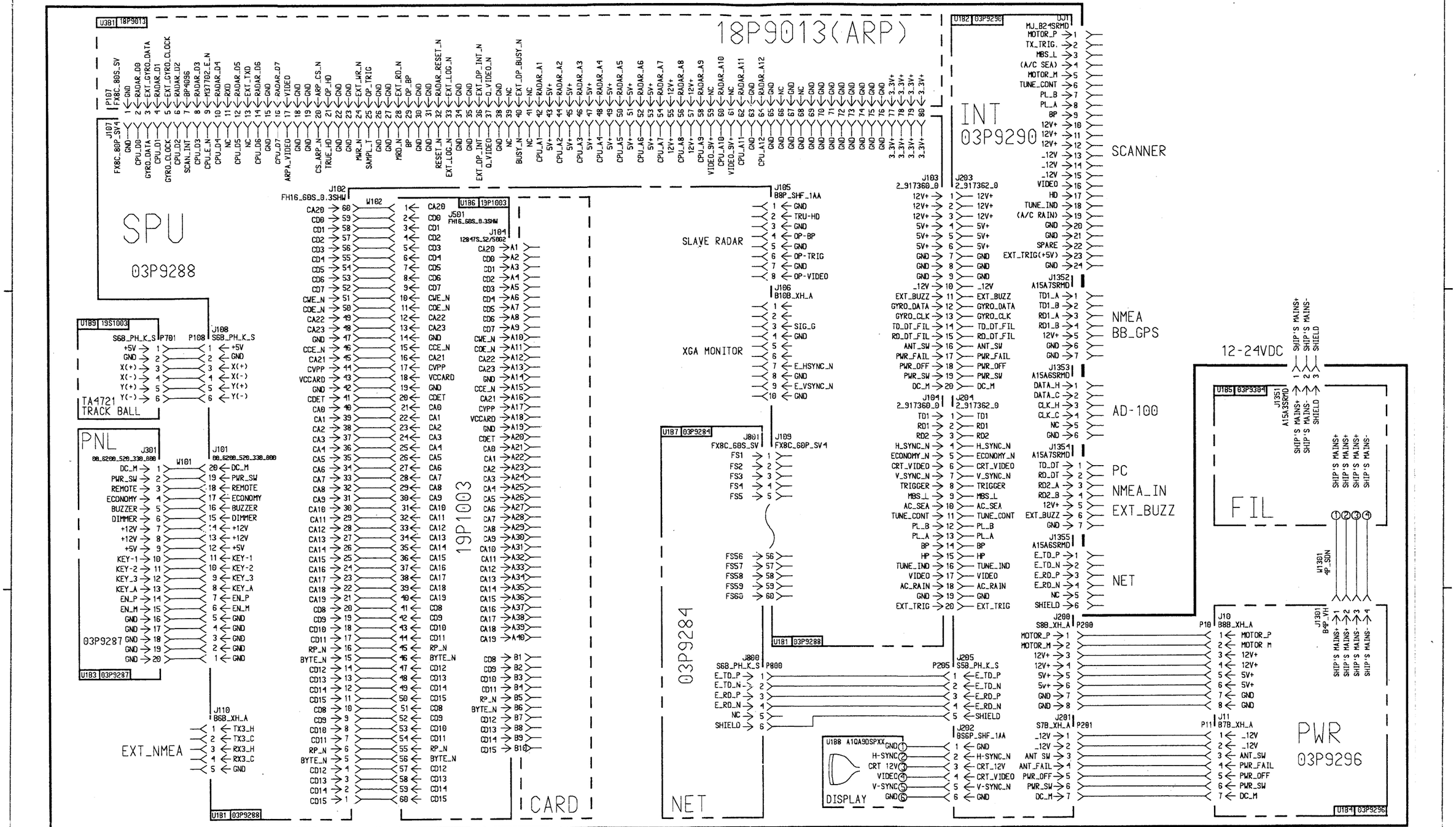


注記
*1）造船所手配
*2）コネクタは工場にて取付済み。
*3）シールドは両ユニット側で完全に接地すること。
*4）レーダーモニターとして使用する場合は、指示器の内部設定を変更する。
*5）輸出仕様のみ。

NOTE
*1. SHIPYARD SUPPLY
*2. CONNECTOR PLUG FITTED AT FACTORY.
*3. SHIELD SHOULD BE EFFECTIVELY GROUNDED AT BOTH UNIT ENDS.
*4. CHANGE SETTING IN THE DISPLAY UNIT FOR USING AS A RADAR MONITOR.
*5. OVERSEAS SPECIFICATION ONLY.

DRAWN Apr. 1 '04 K.MIYAZAWA		TYPE	MODEL 1933/1943
CHECKED TAKAHASHI.T		名称	船舶用レーダー
APPROVED			相互結線図
SCALE / MASS kg		NAME	MARINE RADAR
DWG.No. C3504-C01- D	03-155-6002-2		INTERCONNECTION DIAGRAM

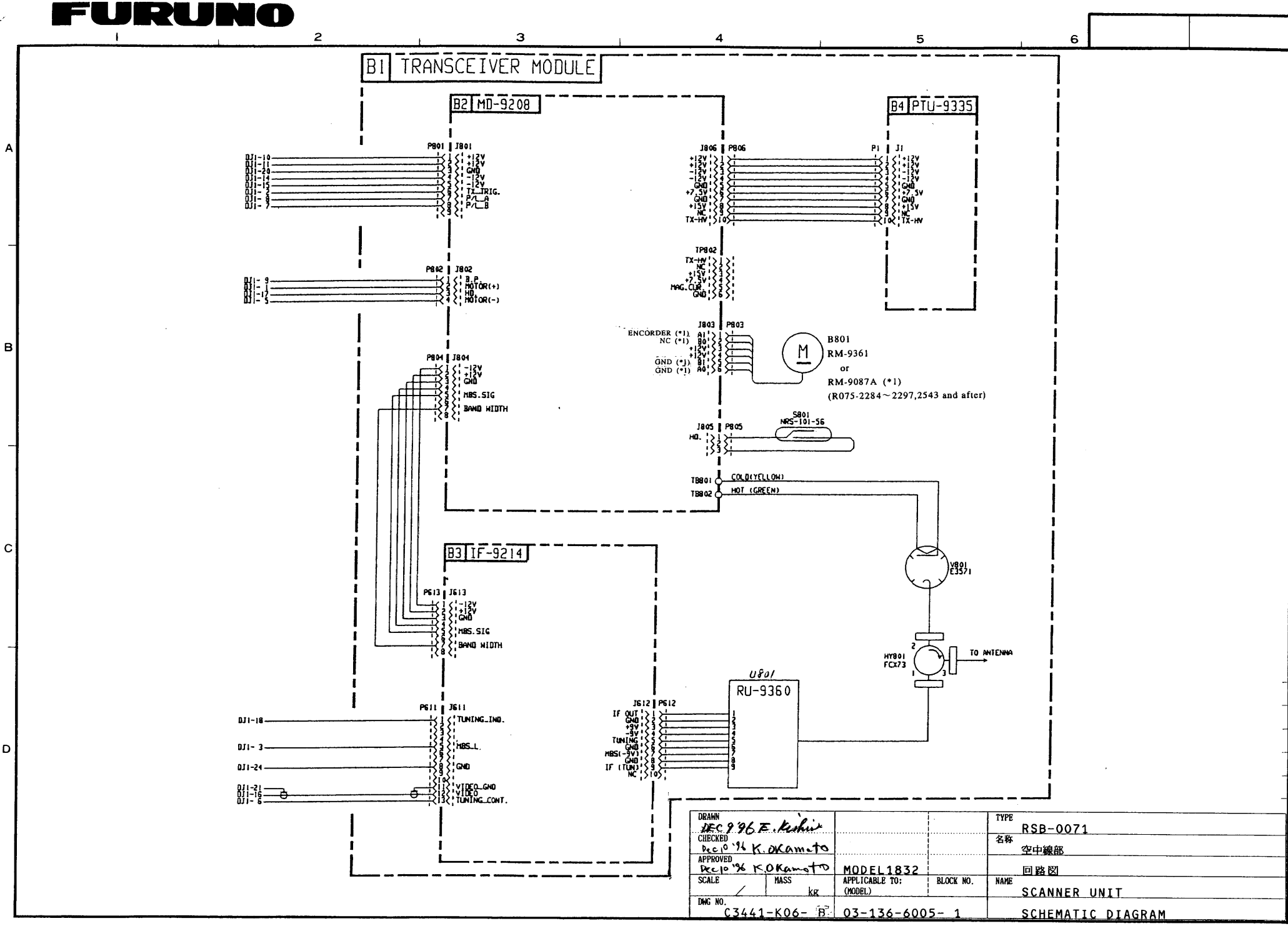
FURUNO ELECTRIC CO., LTD.



DRAWN Sep. 20'01 T.YAMASAKI			TYPE RDP-127
CHECKED Sep.20 '01 Y.K.	MODEL1943 MODEL1933 MODEL1833		名称 指示部
APPROVED Sep.20 '01 Y.K.			回路図
SCALE / MASS kg	APPLICABLE TO; (MODEL)	BLOCK NO.	NAME DISPLAY UNIT
DWG NO. C3502-K01- B	03-155-6004-		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.

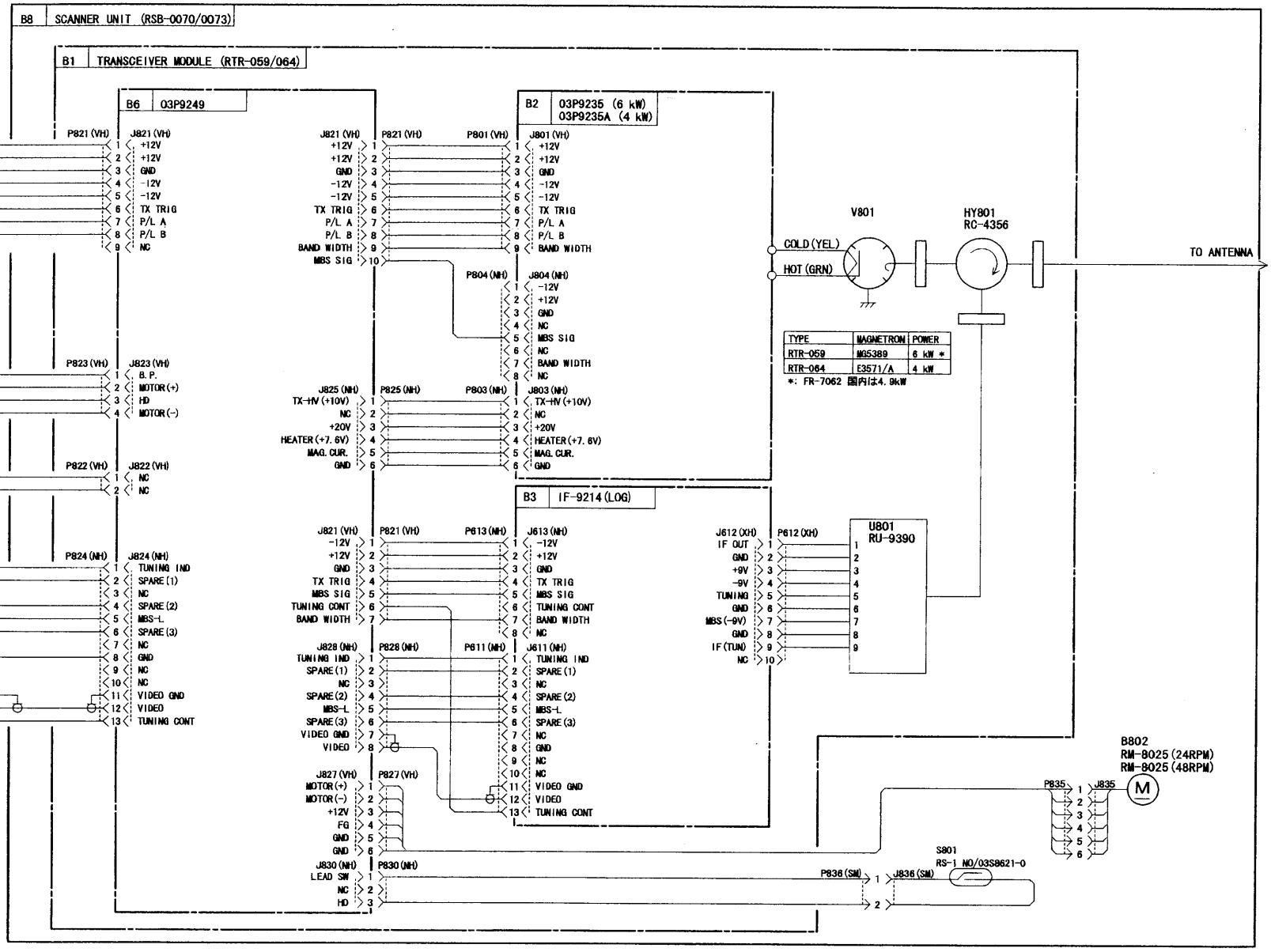
FURUNO



DRAWN Dec 9 '96 E. Kishi			TYPE RSB-0071
CHECKED Dec 10 '96 K. Okamoto			名称 空中線部
APPROVED Dec 10 '96 K. Okamoto	MODEL 1832		回路図
SCALE /	MASS kg	APPLICABLE TO: (MODEL) / BLOCK NO.	NAME SCANNER UNIT
DWG NO. C3441-K06- B	03-136-6005- 1		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO



DRAWN May 17 '01 T. YAMASAKI		TITLE	RSB-0070/0073-059/064
CHECKED May 18 '01 Y.K	FRS-1000B/C, RS-1000C MODEL1933/1933C	名称	空中線部（総合）
APPROVED May 18 '01 Y.K	MODEL1932M2/1942M2 FR-7062		回路図
SCALE	MASS kg	NAME	SCANNER UNIT (GENERAL)
DWG No. C3459-K02- F	03-142-6009-3		SCHEMATIC DIAGRAM

FURUNO ELECTRIC CO., LTD.