FURUNO

Installation Manual

MARINE RADAR FR-8062/8122/8252

SYSTEM CONFIGURATION ii

EQUIPMENT LISTS iv

1. MOUNTING 1-1
    1.1 Antenna Unit 1-1
    1.2 Display Unit 1-12
    1.3 Power Supply Unit 1-15

2. WIRING 2-1
    2.1 Standard Wiring 2-1
    2.2 Wiring the Power Supply Unit 2-2
    2.3 Port for External Devices 2-4

3. SETTING UP THE EQUIPMENT 3-1
    3.1 Setting Language 3-1
    3.2 Opening the Installation Menu 3-2

4. OPTIONAL EQUIPMENT 4-1
    4.1 ARP Kit ARP-11 4-1
    4.2 External Monitor 4-3
    4.3 Remote Display 4-5
    4.4 External Buzzer 4-7

PACKING LIST, INSTALLATION MATERIALS, SPARE PARTS A-1

OUTLINE DRAWINGS D-1

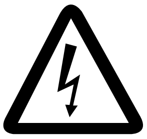
INTERCONNECTION DIAGRAMS S-1

FURUNO ELECTRIC CO., LTD.

All brand and product names are trademarks, registered trademarks or service marks of their respective holders.

⚠ SAFETY INSTRUCTIONS

⚠ WARNING



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

ELECTRICAL SHOCK HAZARD

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

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

	Standard	Steering
Display unit	0.95 m	0.60 m
Antenna unit FR-8062 (24 rpm)	1.95 m	1.25 m
FR-8062 (48 rpm)	1.90 m	1.20 m
FR-8122	1.10 m	0.70 m
FR-8252	1.80 m	1.15 m
Power supply unit	0.80 m	0.50 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.

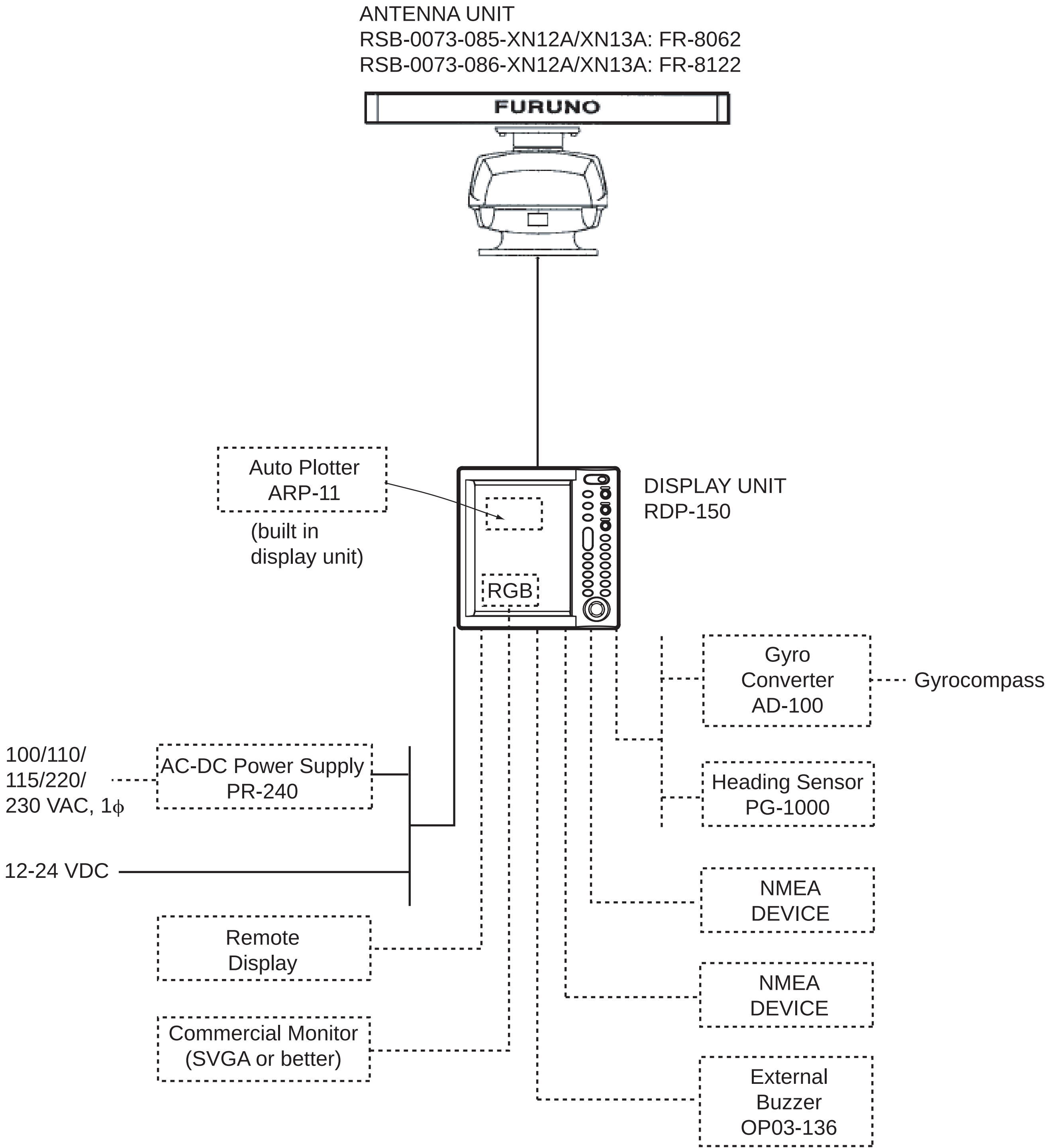
Distances at which RF radiation levels of 100 and 10 W/m^2 exist are given in the table below.

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.

MODEL	Distance to 100 W/m^2 point	Distance to 10 W/m^2 point
FR-8062 XN-12A (4')	—	1.2 m
FR-8062 XN-13A (6')	—	1.1 m
FR-8122 XN-12A	0.2 m	2.3 m
FR-8122 XN-13A	0.2 m	1.6 m
FR-8252 XN-12A	0.4 m	4.6 m
FR-8252 XN-13A	0.4 m	3.1 m

SYSTEM CONFIGURATIONS

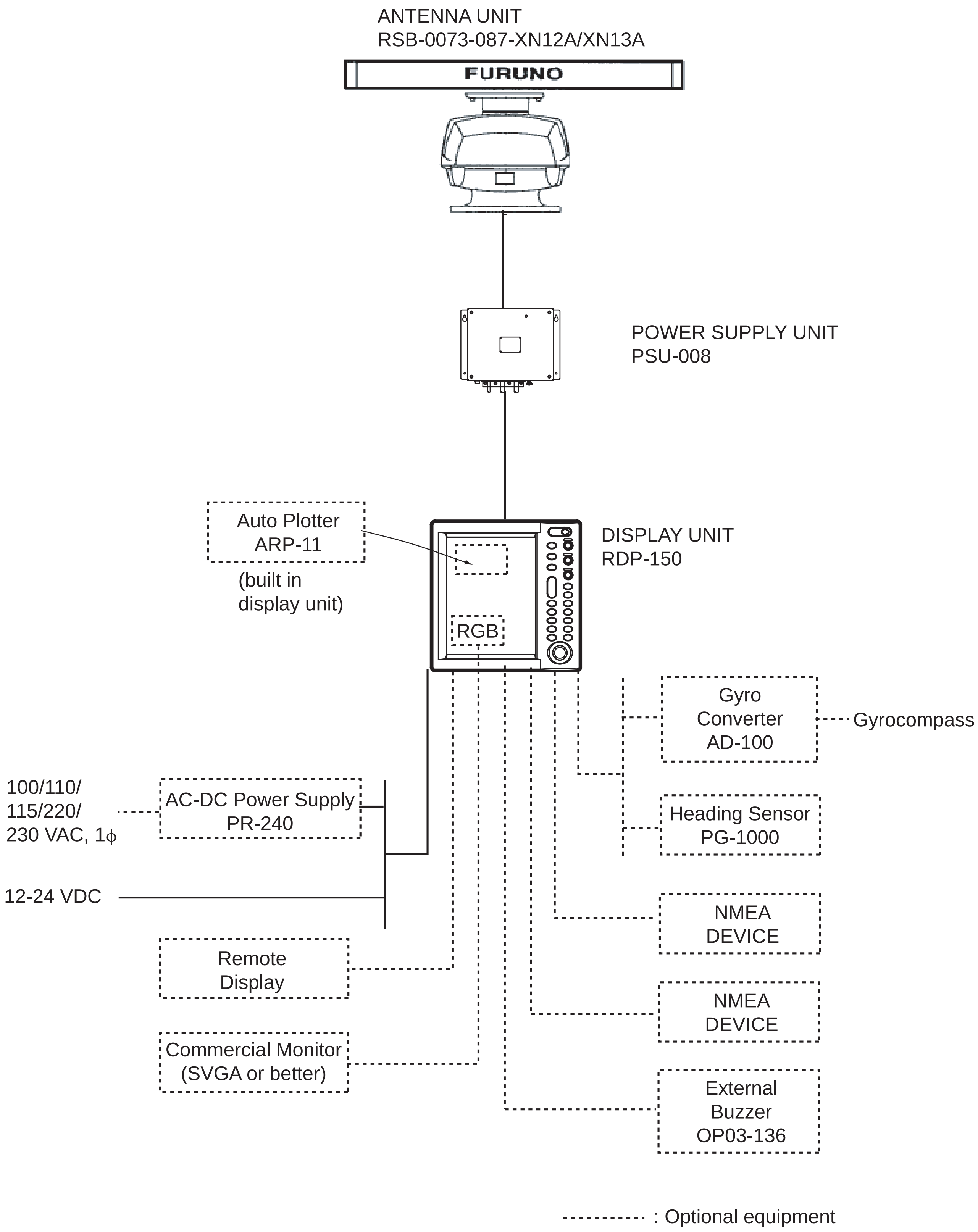
FR-8062/8122


ANTENNA UNIT
RSB-0073-085-XN12A/XN13A: FR-8062
RSB-0073-086-XN12A/XN13A: FR-8122
FURUNO
Auto Plotter
ARP-11
(built in
display unit)
DISPLAY UNIT
RDP-150
RGB
Gyro
Converter
AD-100
Gyrocompass
Heading Sensor
PG-1000
100/110/
115/220/
230 VAC, 1ϕ
AC-DC Power Supply
PR-240
12-24 VDC
NMEA
DEVICE
Remote
Display
NMEA
DEVICE
Commercial Monitor
(SVGA or better)
External
Buzzer
OP03-136

Category of units
Antenna unit: Exposed to weather
All other units: Protected from weather

- - - - - - - - - : Optional equipment

FR-8252


ANTENNA UNIT
RSB-0073-087-XN12A/XN13A
FURUNO
POWER SUPPLY UNIT
PSU-008
Auto Plotter
ARP-11
(built in
display unit)
DISPLAY UNIT
RDP-150
RGB
Gyro
Converter
AD-100
Gyrocompass
100/110/
115/220/
230 VAC, 1ϕ
AC-DC Power Supply
PR-240
Heading Sensor
PG-1000
12-24 VDC
NMEA
DEVICE
Remote
Display
NMEA
DEVICE
Commercial Monitor
(SVGA or better)
External
Buzzer
OP03-136
: Optional equipment

Category of units

Antenna unit: Exposed to weather

All other units: Protected from weather

EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks
Antenna unit	XN12A-RSB-0073-085	-	1	FR-8062, 1255 mm, 24/36/48 rpm
	XN13A-RSB-0073-085	-		FR-8062, 1795 mm, 24/36/48 rpm
	XN12A-RSB-0073-086	-		FR-8122, 1255 mm, 24/36/48 rpm
	XN13A-RSB-0073-086	-		FR-8122, 1795 mm, 24/36/48 rpm
	XN12A-RSB-0073-087	-		FR-8252, 1255 mm, 24/36/48 rpm
	XN13A-RSB-0073-087	-		FR-8252, 1795 mm, 24/36/48 rpm
Display unit	RDP-150	-	1	
Power supply unit	PSU-008	-	1	For FR-8252
Installation materials	CP03-30801	008-552-960	1	For antenna unit
	CP03-30700	000-090-471	1	10 m signal cable for FR-8062/8122
	CP03-30710	000-090-472		15 m signal cable for FR-8062/8122
	CP03-30720	000-090-473		20 m signal cable for FR-8062/8122
	CP03-30730	000-090-474		30 m signal cable for FR-8062/8122
	CP03-30500	000-083-620	1	10 m signal cable for FR-8252
	CP03-30510	000-083-621		15 m signal cable for FR-8252
	CP03-30520	000-083-622		20 m signal cable for FR-8252
	CP03-30530	000-083-623		30 m signal cable for FR-8252
	CP03-30900	000-090-464		CP03-30901 & power cable for display unit
Spare parts	SP03-15401	008-553-040	1	15A fuse, 3pcs and 10A fuse, 3pcs

*: See lists on the back of this manual.

Optional Supply

Name	Type	Code No.	Remarks
External buzzer	OP03-136	000-086-443	See ch. 4.
AC-DC Power Supply	PR-240	-	For AC ship’s mains
Cable assy.	MJ-A7SPF0007-050C	000-144-418-10	w/7P plug at one end, 5m
	MJ-A6SPF0003-050C	000-154-054-10	w/6P plug at one end, 5 m
	MJ-A6SPF0007-100C	000-159-695-10	For compass, 10 m
	MJ-B24LPF0008-100	000-145-125	10 m for remote display
	MJ-B24LPF0008-200	000-145-126	20 m for remote display
	MJ-B24LPF0008-300	000-145-127	30 m for remote display
Auto plotter	ARP-11	008-523-050	See ch. 4.
Installation materials	CP03-31001	008-556-830	Installation materials for remote display, see ch. 4.
RGB kit	OP03-195	008-553-110	See ch. 4.
Remote controller	RCU-019	000-090-945	With 5 m cable

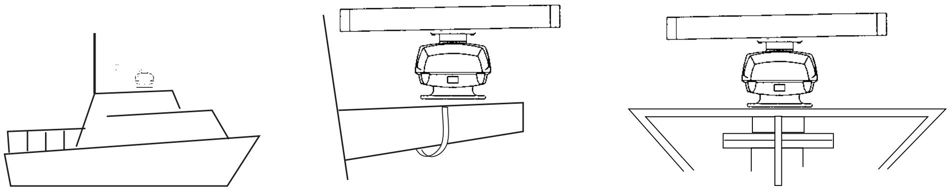
1. MOUNTING

1.1 Antenna Unit

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 horizontal beamwidth 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.
- 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 it. Observe the compass safe distances mentioned in the SAFETY INSTRUCTIONS to prevent interference to a magnetic compass.
- 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 units comes in lengths of 10 m, 15 m, 20 m and 30 m.
    - 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

Mounting methods

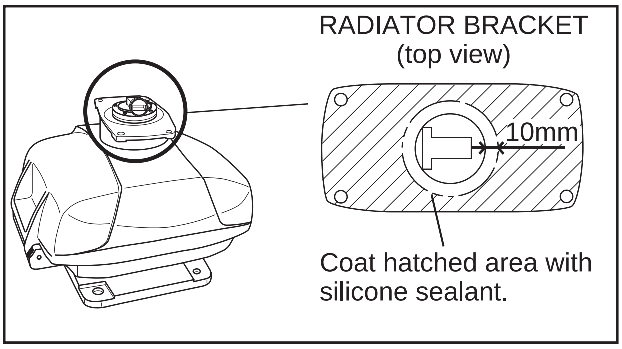
Mounting procedure

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

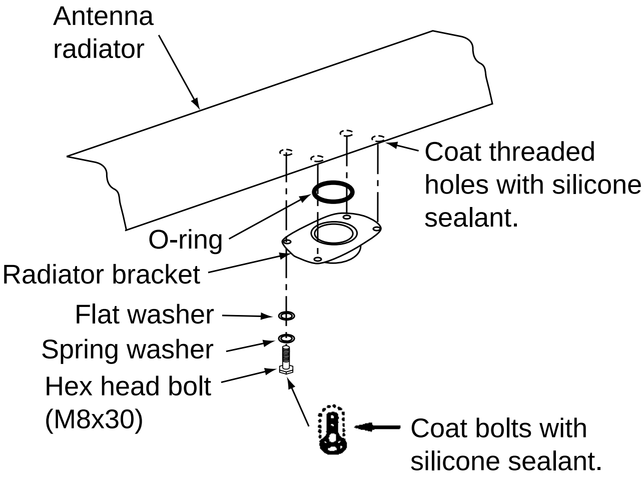
For your reference, the antenna installation materials list appears in the packing list at the back of this manual.

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


RADIATOR BRACKET
(top view)
10mm
Coat hatched area with silicone sealant.

Coating the antenna 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.


Antenna radiator
Coat threaded holes with silicone sealant.
O-ring
Radiator bracket
Flat washer
Spring washer
Hex head bolt (M8x30)
Coat bolts with silicone sealant.

Fastening the radiator bracket to the antenna unit chassis

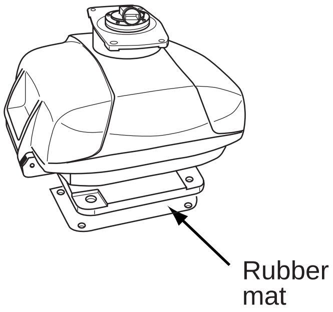
Mounting the antenna unit

The antenna unit can be mounted using the fixing holes on the outside (200x200 mm) or inside (140x150 mm) the antenna unit.

Using outside fixing holes of the antenna housing

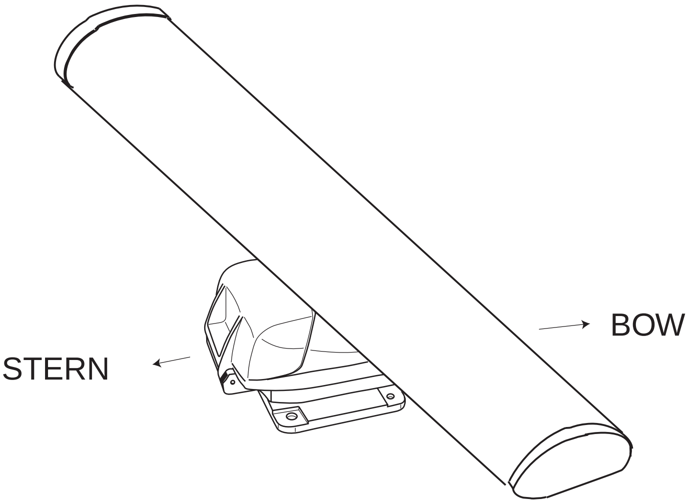
Use the hex head bolts (supplied) to mount the antenna unit as below.

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.



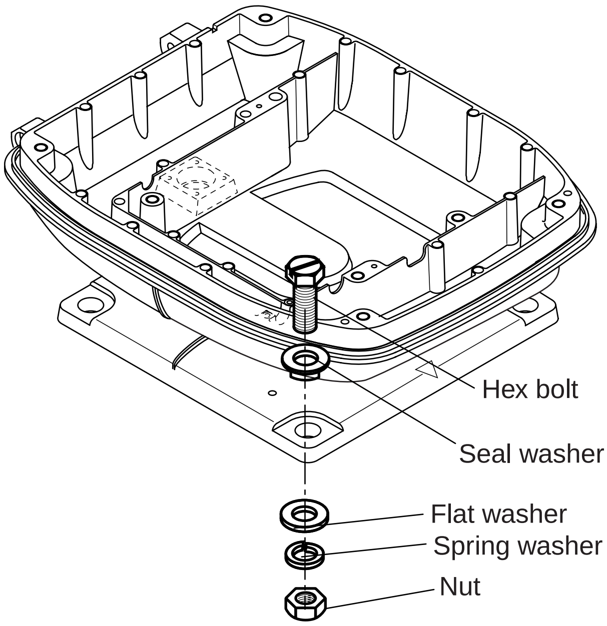
Antenna unit

⚠ CAUTION

Do not lift the Antenna unit by the radiator; lift it by the housing.

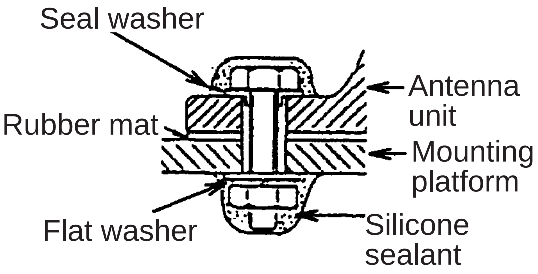
The radiator may be damaged.

3. Insert four hex bolts (M12x60, supplied) and seal washers (Φ30, supplied) from the top of the antenna housing, as shown below.


Hex bolt
Seal washer
Flat washer
Spring washer
Nut

Fixing the antenna unit chassis

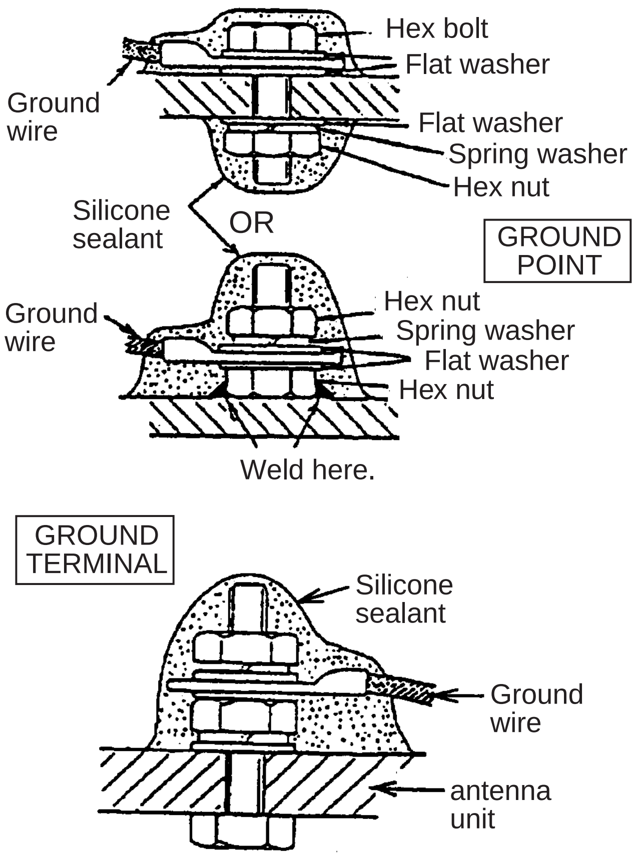
4. Pass flat washers (M12, supplied), spring washers (M12, supplied) and nuts (M12, supplied) onto hex bolts. Fasten by tightening nuts. Do not fasten by tightening the hex bolts; seal washers may be damaged.


Seal washer
Rubber mat
Flat washer
Antenna unit
Mounting platform
Silicone sealant

How to fasten antenna unit to mounting platform

5. Coat flat washers, spring washers, nuts and exposed parts of bolts with anticorrosive sealant.
6. Prepare ground point on mounting platform (within 300 mm of ground terminal on antenna unit) using M6x25 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 below.

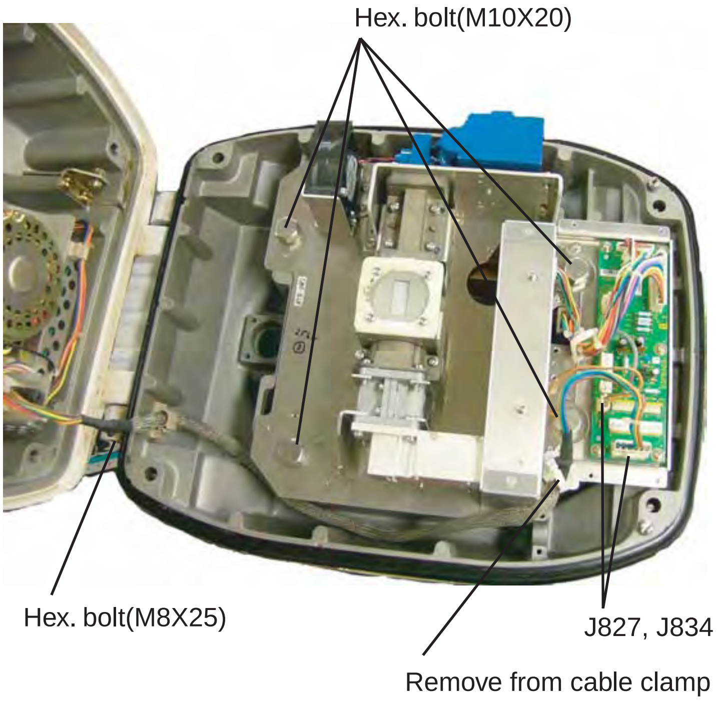

Hex bolt
Flat washer
Ground wire
Flat washer
Spring washer
Hex nut
Silicone sealant
OR
GROUND POINT
Ground wire
Hex nut
Spring washer
Flat washer
Hex nut
Weld here.
GROUND TERMINAL
Silicone sealant
Ground wire
antenna unit

How to coat ground point and ground terminal with silicone sealant

Using inside fixing holes of the antenna housing

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. Unfasten four antenna bolts on the cover to open the antenna unit.
2. Unfasten four screws on the RTB cover to remove it.
3. Unplug connector J827 and J834 on the RTB board.
4. Separate upper chassis from lower chassis by removing two hex head bolts (M8x25).
5. Remove RF unit by unfastening four hex head bolts.



Antenna unit, opened

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 the rubber bushing and insert bolt into the 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”.

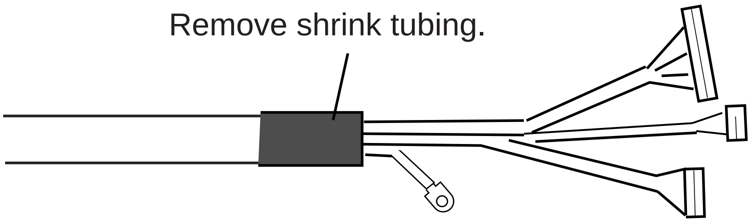
Connecting the signal cable

Only the signal cable runs from the display unit (power supply unit in case of FR-8252) to the antenna unit. In order to minimize 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. Pass the cable through the hole and apply sealing compound around the hole for waterproofing.

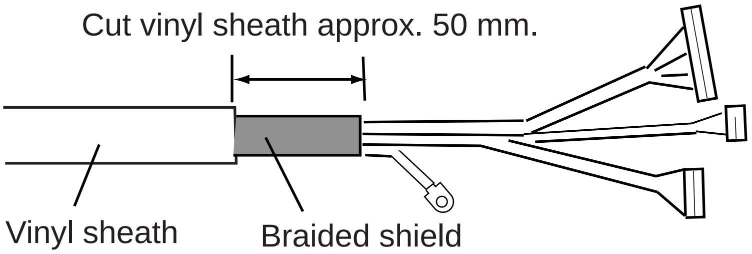
- Fabricating the signal cable

This type of signal cable is used with other models of radar. For this model, the following fabrication is required.

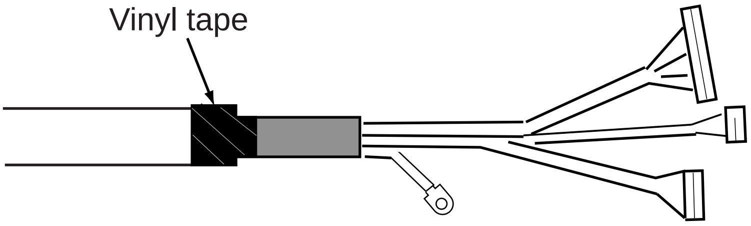
1. Remove shrink tubing from the signal cable.


Remove shrink tubing.

2. Remove vinyl sheath approx. 50 mm.

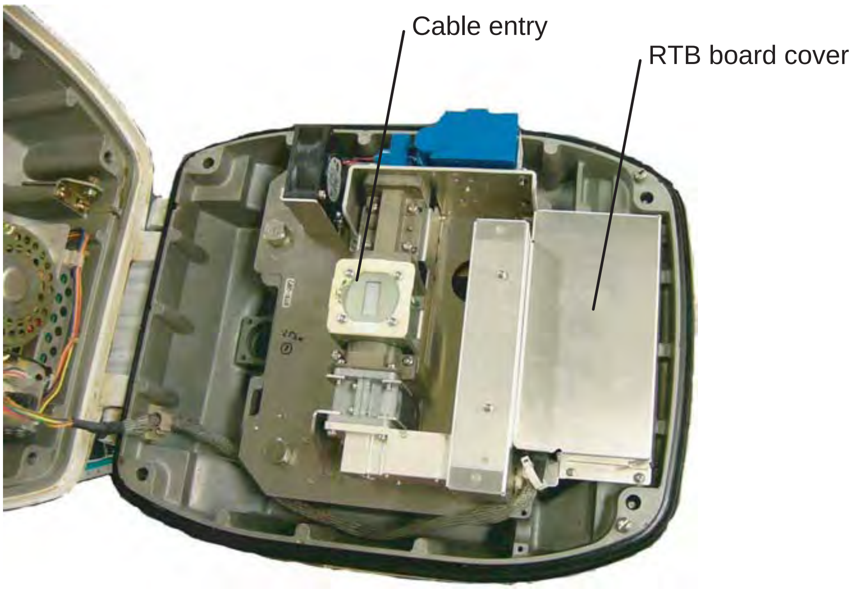

Cut vinyl sheath approx. 50 mm.
Vinyl sheath
Braided shield

3. Wrap vinyl tape at the end of the vinyl sheath.



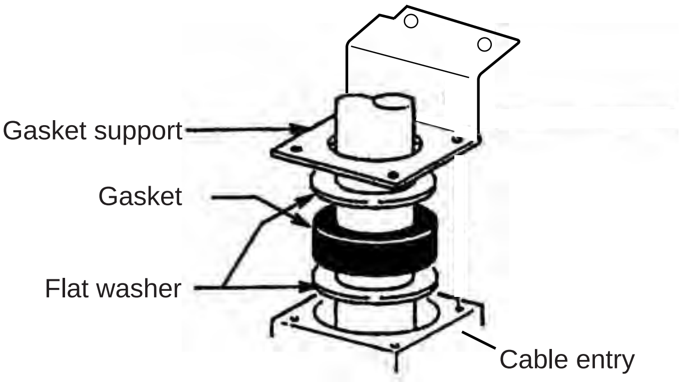
- Connecting the signal cable

1. Open the antenna cover by loosening four bolts, and then fix the stay.


Cable entry
RTB board cover

Antenna unit chassis, cover opened

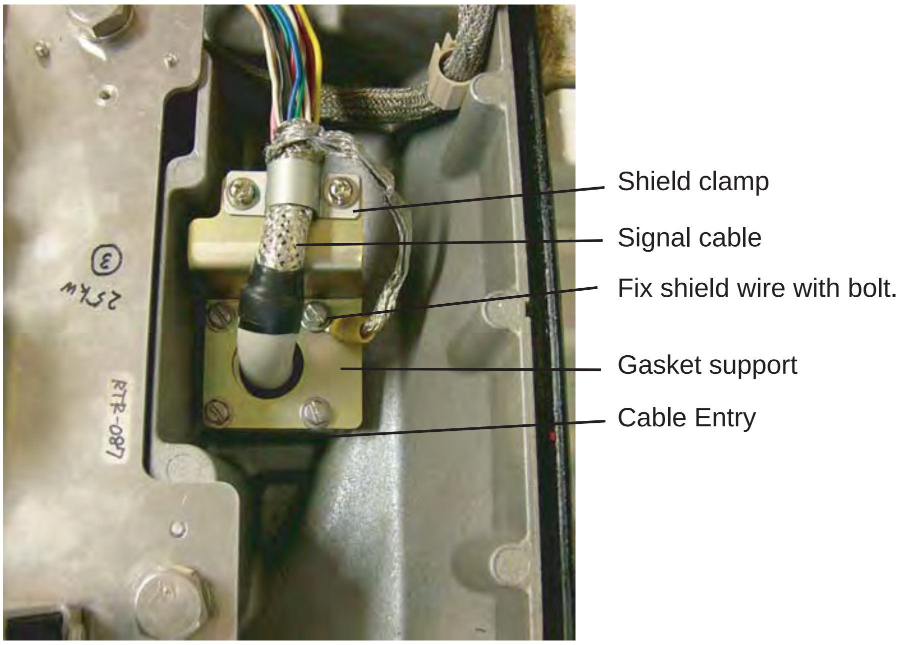
2. Unfasten the cable gland assembly (plate, gasket, flat washer). The plate may be discarded.
3. Pass the signal cable with connector through the bottom of the antenna unit chassis. Pass the cable through the gland assembly as shown below.


Gasket support
Gasket
Flat washer
Cable entry

Passing the signal cable through the cable gland assembly

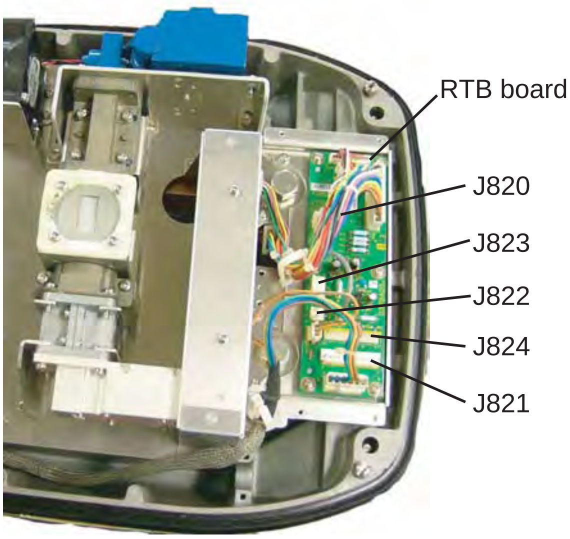
4. Fasten the gasket support with four bolts. Using one of the four bolts, fasten the crimp-on lug to the shield wire.

5. Fasten the shielded part of the signal cable with shield clamp (installation material) as shown below.


Shield clamp
Signal cable
Fix shield wire with bolt.
Gasket support
Cable Entry

How to fix signal cable in cable gland

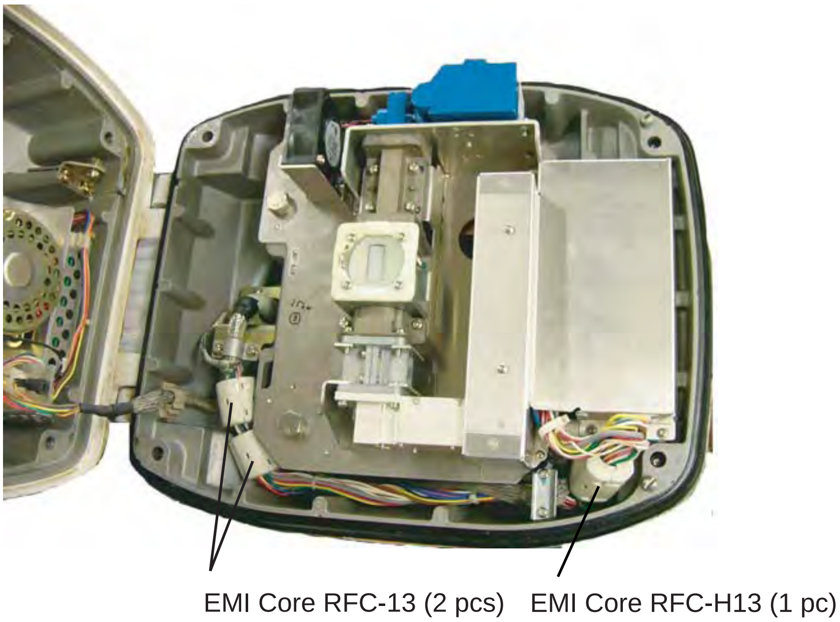
6. Unfasten four screws to remove the RTB board cover.
7. Connect the plugs of the signal cable to the RTB board.
   FR-8062, FR-8122: J821, J823, J824, J822
   FR-8252: J821, J823, J824, J820


RTB board
J820
J823
J822
J824
J821

Connecting to the RTB board

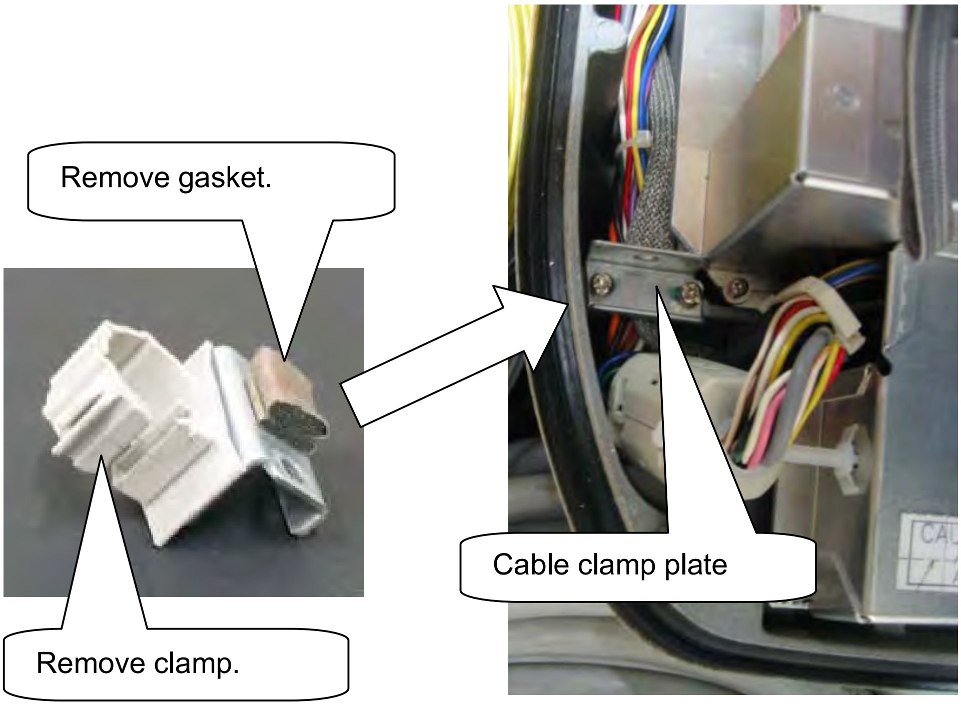
8. Reattach the RTB board cover.

9. Attach three EMI cores to the signal cable as shown below.

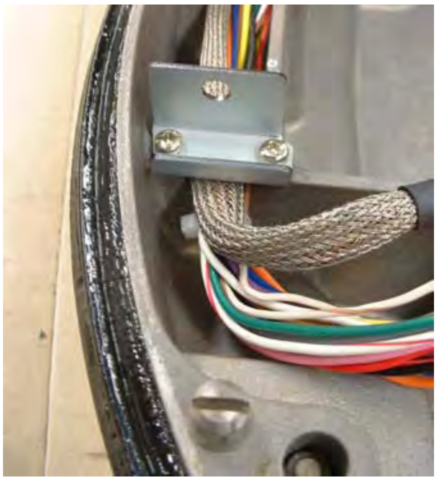

EMI Core RFC-13 (2 pcs)
EMI Core RFC-H13 (1 pc)

Antenna unit chassis, cover opened

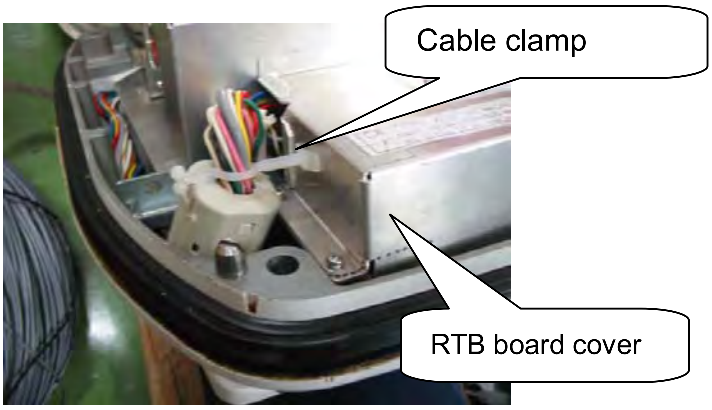
10. Fix the signal cable with the cable clamp as follows.
    a) Dismount the cable clamp plate and remove clamp and gasket.

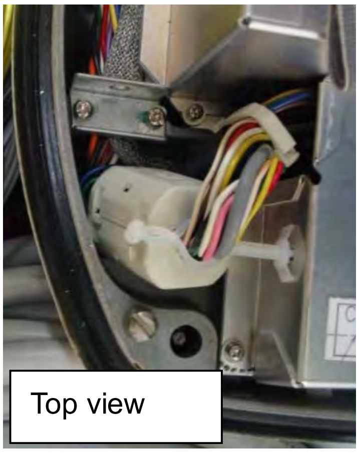

Remove gasket.
Cable clamp plate
Remove clamp.

b) Run the signal cable as shown below.



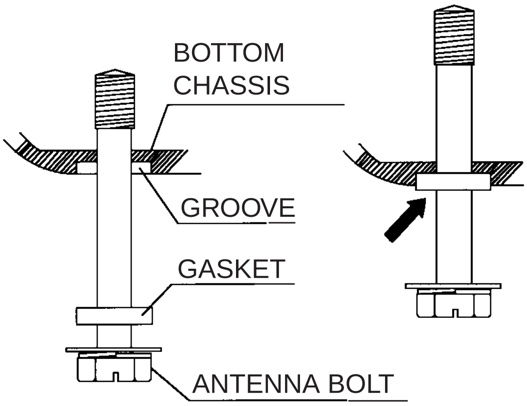
c) Fix the signal cable with cable clamp as shown below.


Cable clamp
RTB board cover



11. Release the stay and close the cover. Loosely fasten the antenna bolts; you will have to make some adjustments inside after completion of wiring.

Note: When closing the cover, set the gaskets to grooves in the bottom chassis, then tighten bolts.


BOTTOM CHASSIS
GROOVE
GASKET
ANTENNA BOLT

Torque : 9.8 ±0.1 N·m

1.2 Display Unit

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

Mounting considerations

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

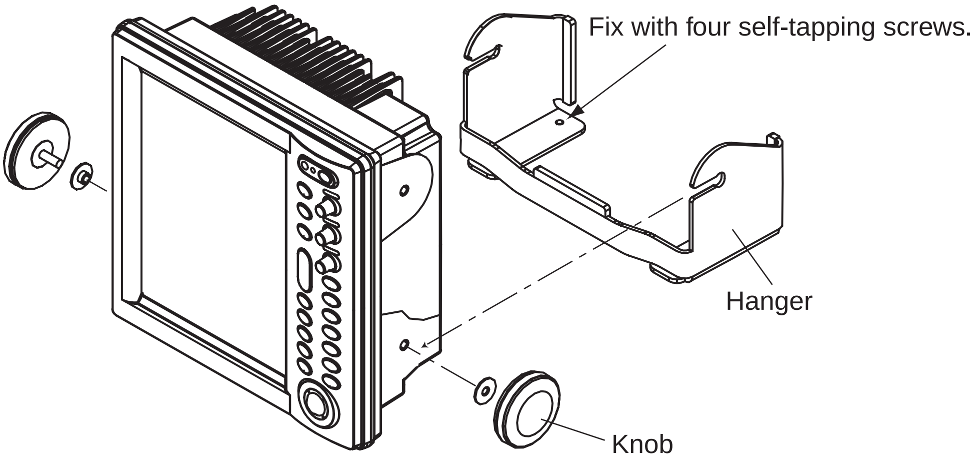
- Keep the display unit out of direct sunlight.
- The temperature and humidity at the mounting location should be moderate and stable.
- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Keep the unit away from electromagnetic field generating equipment such as motors and generators.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the unit and leave slack in cables. Minimum recommended space is shown in the outline drawing for the display unit.
- A magnetic compass will be affected if the display unit is placed too close to it. Observe the compass safe distances shown in the SAFETY INSTRUCTIONS to prevent disturbance to the magnetic compass.

Mounting procedure

Tabletop mounting

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

1. Fix the hanger by using four self-tapping screws (5x20).
2. Screw knob bolts in display unit, set it to the hanger, and tighten the knob bolts.

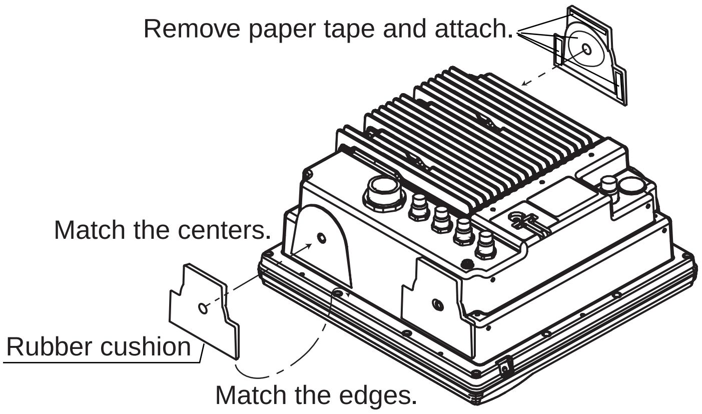

Fix with four self-tapping screws.
Hanger
Knob

Mounting dimensions of display unit

Overhead mounting

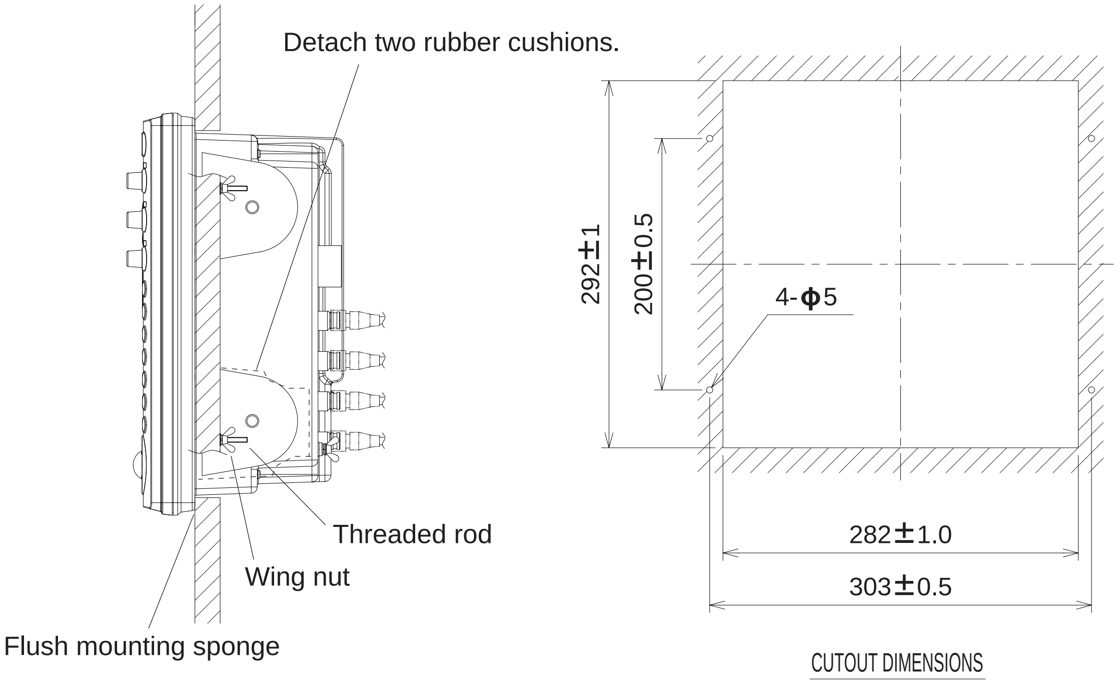
Note: For the overhead mounting, reinforce the mounting location and secure the hanger, with bolts, nuts and washers (local supply).

Attach two rubber cushions to the display unit as shown in the figure below. Then fix the unit with hanger.


Remove paper tape and attach.
Match the centers.
Rubber cushion
Match the edges.

Flush mounting

1. Prepare a cutout in the mounting location whose dimensions are as shown below.
2. Detach two rubber cushions from the display unit.
3. Insert the flush mounting sponge and four threaded rods from the rear side of the display unit, and then set the display unit to the mounting location.
4. Fix the display unit by using four wing nuts from the rear side of the display unit.


Detach two rubber cushions.
Threaded rod
Wing nut
Flush mounting sponge
292±1
200±0.5
4-φ5
282±1.0
303±0.5
CUTOUT DIMENSIONS

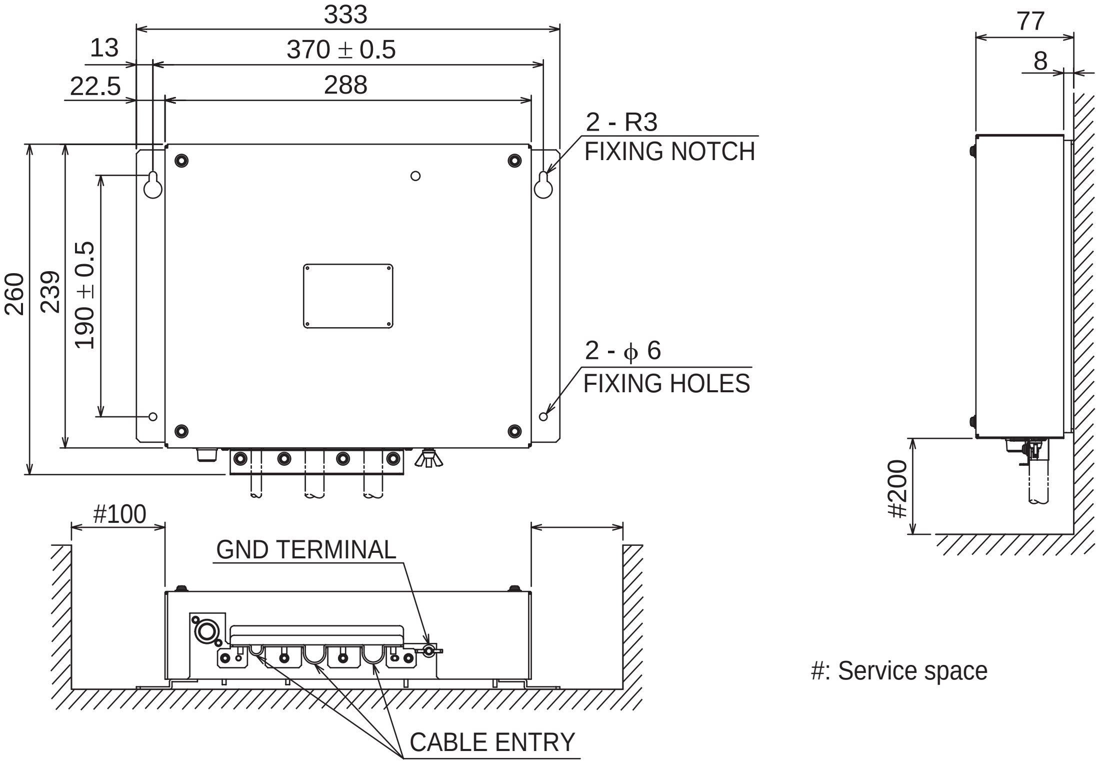
Flush mounting of display unit

1.3 Power Supply Unit

A power supply unit is shipped with the FR-8252, because of its high power consumption.

The power supply unit can be installed almost anywhere provided the location is dry, well-ventilated, sufficient maintenance space is provided and is installed within 5 m (cable length) from the display unit. To fix the unit, use four self-tapping screws (5x20).

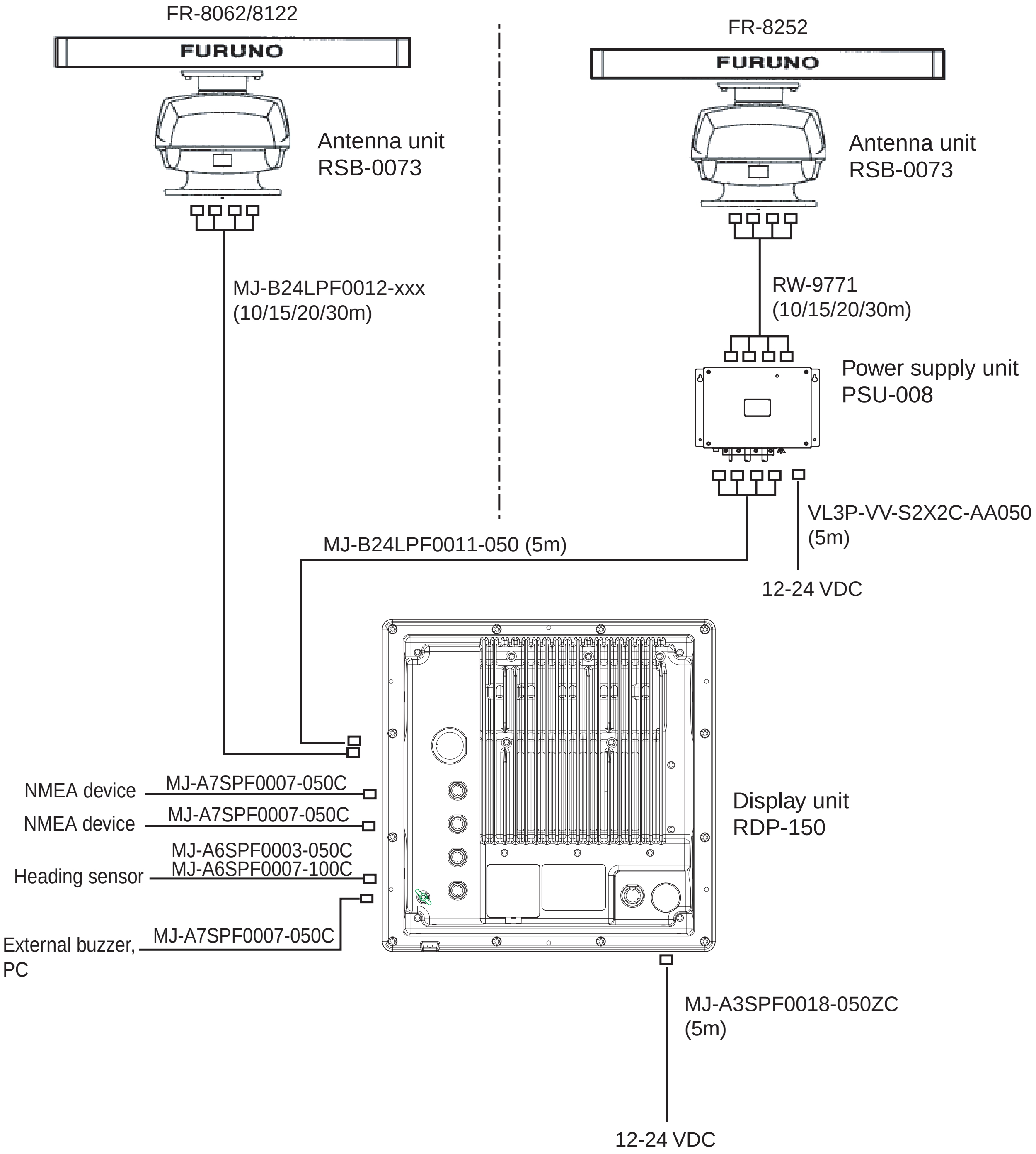
Note: Do not install the power supply unit on the overhead; install it on the deck or bulkhead.


333
13
370 ± 0.5
22.5
288
2 - R3
FIXING NOTCH
260
239
190 ± 0.5
2 - ϕ 6
FIXING HOLES
#100
GND TERMINAL
CABLE ENTRY
77
8
#200
#: Service space

Power supply unit

2. WIRING

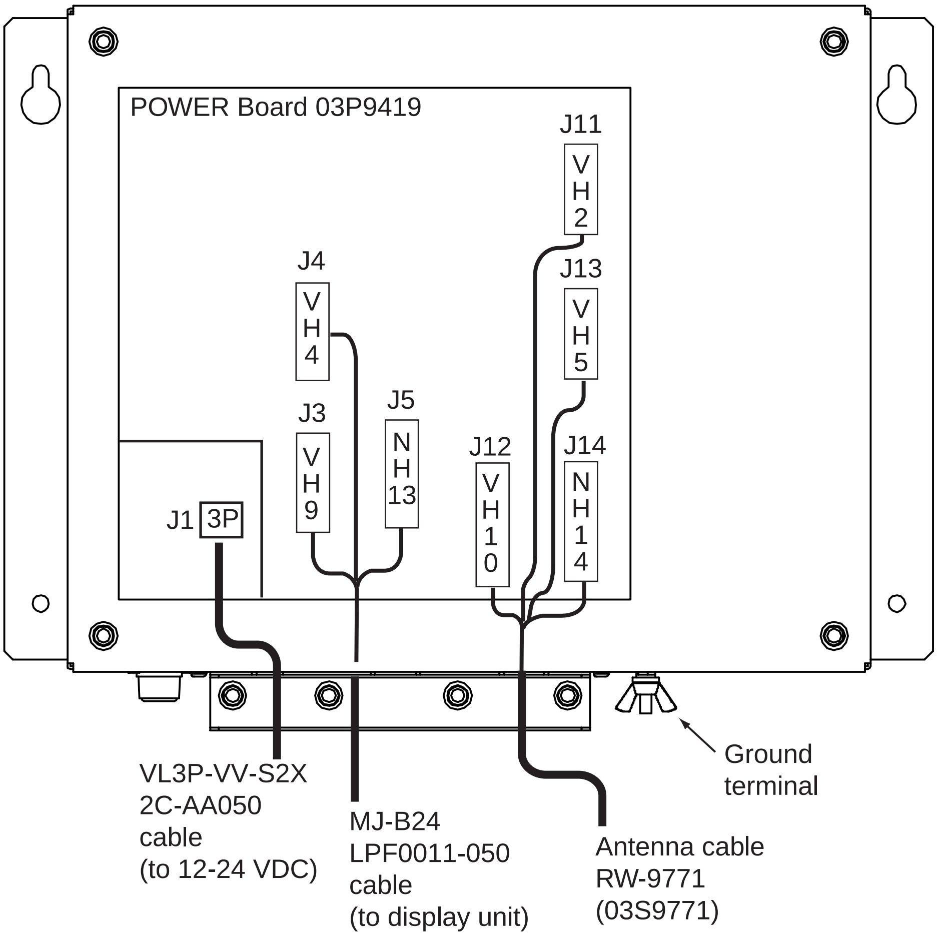
2.1 Standard Wiring


FR-8062/8122
FURUNO
Antenna unit
RSB-0073
MJ-B24LPF0012-xxx
(10/15/20/30m)
FR-8252
FURUNO
Antenna unit
RSB-0073
RW-9771
(10/15/20/30m)
Power supply unit
PSU-008
VL3P-VV-S2X2C-AA050
(5m)
12-24 VDC
MJ-B24LPF0011-050 (5m)
NMEA device
MJ-A7SPF0007-050C
NMEA device
MJ-A7SPF0007-050C
MJ-A6SPF0003-050C
MJ-A6SPF0007-100C
Heading sensor
External buzzer,
PC
MJ-A7SPF0007-050C
Display unit
RDP-150
MJ-A3SPF0018-050ZC
(5m)
12-24 VDC

2.2 Wiring the Power Supply Unit

Cabling

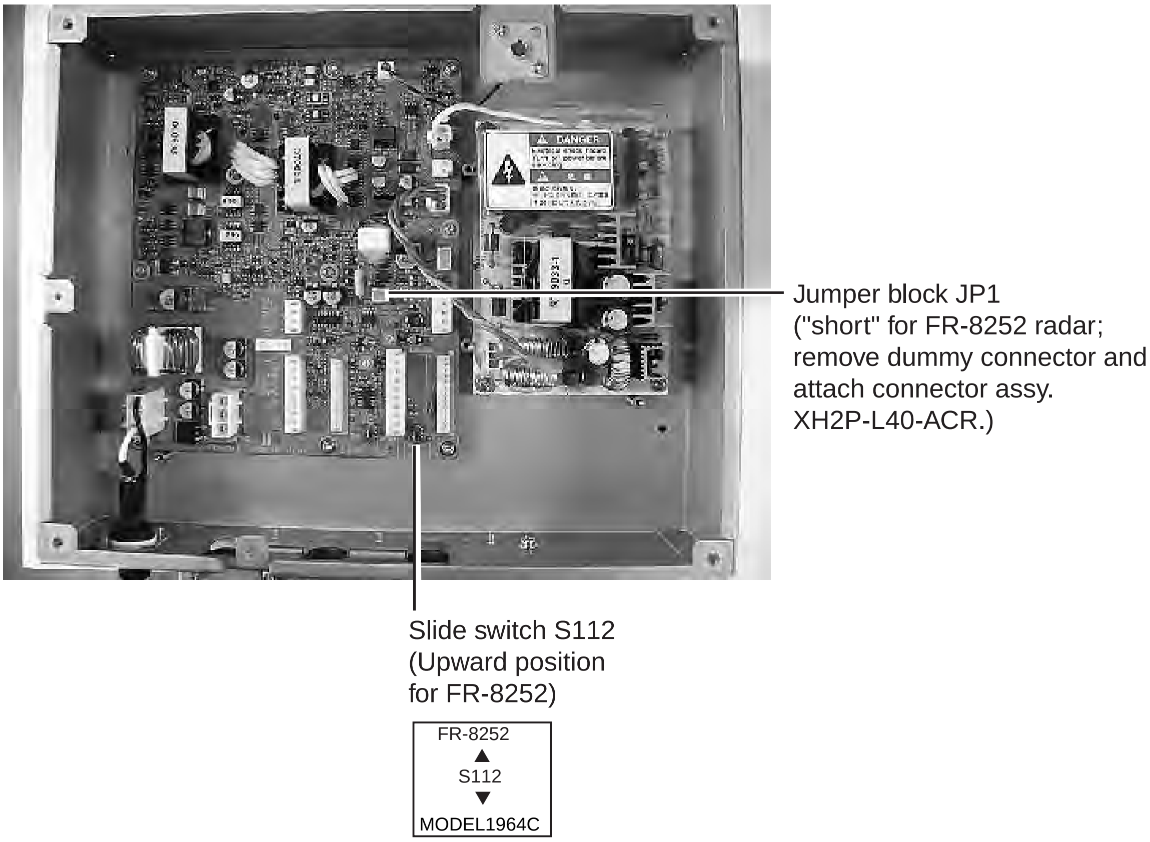
1. Unfasten four screws to remove the cable clamp.
2. Unfasten four screws to remove the cover.
3. Attach the connectors of three cables as shown in the figure below.


POWER Board 03P9419
J11
VH2
J4
VH4
J13
VH5
J3
VH9
J5
NH13
J12
VH10
J14
NH14
J1
3P
Ground terminal
VL3P-VV-S2X 2C-AA050 cable (to 12-24 VDC)
MJ-B24 LPF0011-050 cable (to display unit)
Antenna cable RW-9771 (03S9771)

4. Lay three cables in respective slots referring to the figure above.
5. Reattach the cover and the cable clamp.
6. Connect a ground wire (local supply, IV-2sq) between the ground terminal and ship's ground.

Jumper block, slide switch setting

The jumper block JP1 and slide switch S112 on the PWR board (03P9419) must be set according to radar model. Open the unit, locate JP1 and S112 and set them as below.


Jumper block JP1 ("short" for FR-8252 radar; remove dummy connector and attach connector assy. XH2P-L40-ACR.)

Slide switch S112 (Upward position for FR-8252)

Power supply unit, inside view

Jumper block, slide switch	Function	Setting
JP1	Enables/disables motor slow start circuit.	Short (disable)
S112	TUNE voltage selector (0-12 V, 0-32 V)	Upward position (0-12 V)

Power requirement, replacement of fuses

Power requirement

The power for the power supply unit and display unit must be drawn from the same power switch on the power terminal board.

Replacement of fuses

The power supply unit is shipped with a 15 A fuse(for connection to 12 VDC battery). Replace the fuse with a 7 A (supplied) when the ship's battery is 24 VDC.

2.3 Port for External Devices

External equipments can be connected here as shown below.

NMEA1(7P)	NMEA2(7P)	HDG (6P)	PC/EXT-BUZZER (7P)
NMEA sentence device	NMEA sentence device	Heading sensor	External buzzer, PC, etc.

This equipment can receive the following NMEA 0183 format sentences from other equipment. You will need the optional NMEA cable to connect with external equipment.

- Course: VTG> RMC
- Waypoint Range: BWR> BWC> RMB, Bearing: BWR> BWC (> RMB[*1])
- Heading (True): HDT> VHW> HDG[*2]> HDM[*2]> VHW[*2]
- Heading (Magnetic): HDG> HDM> VHW> HDT[*2]> VHW[*2]
- Ship's speed: Over ground: VTG>RMC> VHW, Through water: VHW
- Date: ZDA
- Time: ZDA
- Own ship's position: GNS>GGA>RMC> GLL
- Depth: DPT>DBT
- Wind speed and angle[*3]: True: MWV>VWT, Relative: MWV>VWR
- Water temperature: MTW

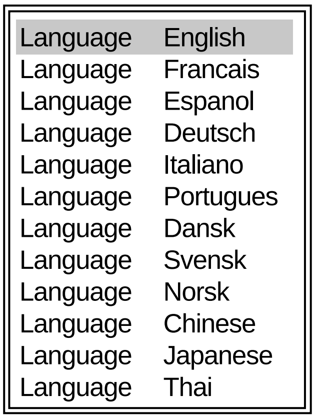
*1: Available when true bearing.
*2: Variation data is required.
*3: True or Relative is changed with menu.

3. SETTING UP THE EQUIPMENT

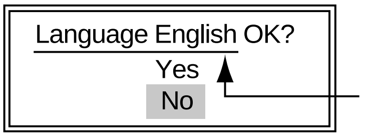
3.1 Setting Language

At the first power application after installation, choose a language as follows.

1. Press **⏻/BRILL** key to turn the power on.
   "Now Initializing…" appears and after a while the window below appears.


Language English
Language Francais
Language Espanol
Language Deutsch
Language Italiano
Language Portugues
Language Dansk
Language Svensk
Language Norsk
Language Chinese
Language Japanese
Language Thai

2. Rotate the trackball to choose language desired and press the **ENTER** key.
   The confirmation window appears.



Language English OK?

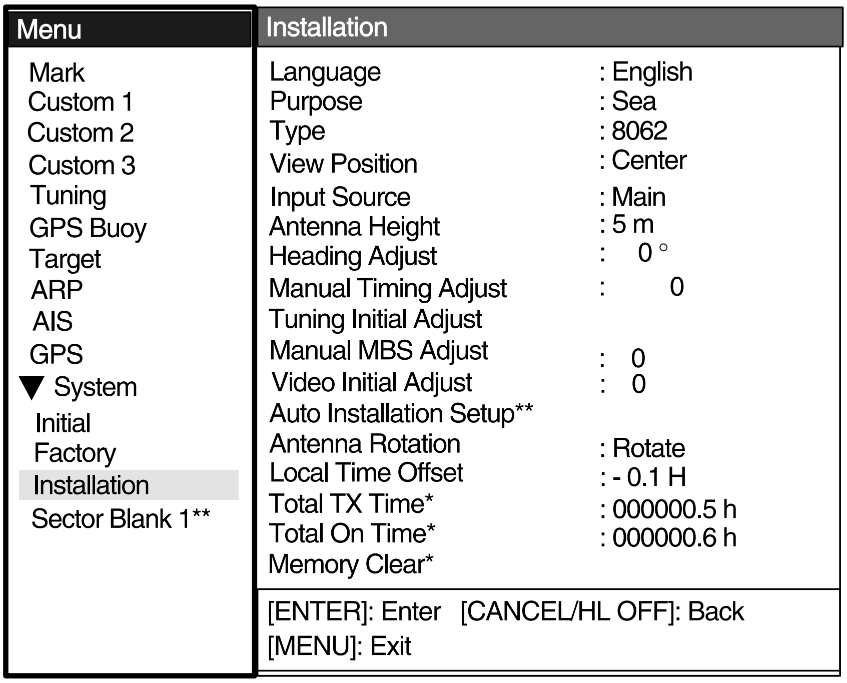
Changes with language chosen.

3. Choose **Yes** and press the **ENTER** key.

3.2 Opening the Installation Menu

After you have installed the equipment, set it up as follows.

1. Press the **MENU** key. The main menu appears on the screen.
2. Rotate the trackball downward to choose **Installation**. The installation menu appears in gray to right side of the screen.
3. While pressing down the **CANCEL/HL OFF** key, press the **MENU** key five times to activate the Installation menu.



Installation

Language : English
Purpose : Sea
Type : 8062
View Position : Center
Input Source : Main
Antenna Height : 5 m
Heading Adjust : 0 °
Manual Timing Adjust : 0
Tuning Initial Adjust
Manual MBS Adjust : 0
Video Initial Adjust : 0
Auto Installation Setup**
Antenna Rotation : Rotate
Local Time Offset : - 0.1 H
Total TX Time* : 000000.5 h
Total On Time* : 000000.6 h
Memory Clear*

[ENTER]: Enter [CANCEL/HL OFF]: Back
[MENU]: Exit

* : Displayed when scrolled.
** : Set the Sector Blank to "Off" in order to execute Auto Installation Setup in the Installation menu.

4. Press the **ENTER** key. The highlighted cursor appears in the Installation menu.
5. Rotate the trackball downward or upward to choose an item in the Installation menu.
6. Press the **ENTER** key to show setting window.
7. Rotate the trackball downward or upward to choose an option.
8. Press the **ENTER** key to confirm setting.
9. Finally, press the **MENU** key to close the main menu.

Basic Settings

Language: Choose an appropriate language.

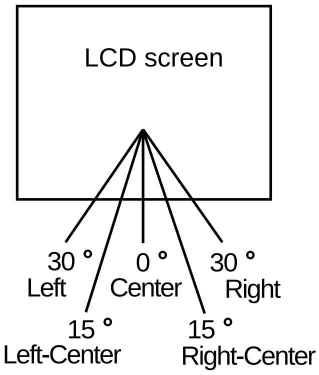
Purpose: Choose the purpose of this radar among River, Sea and IEC. The default setting is Sea.

River: To use this radar on a river.
Sea: To use this radar on high seas.
IEC: To use this radar as the type approved radar.

Type: Choose type of this radar among 8062 (6 kW radar), 8122 (12 kW radar) and 8252 (25 kW radar) to agree with the specifications of the antenna unit. The default setting is 8062. Unsuitable setting may result in malfunction.

View Position: Choose the operating position for this radar among Left, Left-Center, Center, Right-Center and Right to view echo colors correctly. The default setting is Center.

Left: When operating this radar at the left side.
Left-Center: When operating this radar at the left-center side.
Center: When operating this radar at center position.
Right-Center: When operating this radar at the right-center side.
Right: When operating this radar at the right side.
Approx. angle of the view position as follows.



Note: The radar echo and trail echo are adjusted by the View Position. The characters are not adjusted. This setting is also reflected on an external monitor (option).

Input Source: Choose the input source between Main and Sub. The default setting is Main.
Main: When using this display unit as main radar.
Sub: When using this display unit as sub display. For Sub, the “Video Initial Adjust” is required (page 3-6).

Antenna Height: Set the height of the antenna above the water surface among 5, 10, 15, 20, 30, 40 and 50 m. The default setting is 15 m.

Antenna Rotation: “Rotate,” the default setting, stops transmission when the antenna is not rotating. “Stop” transmits radar pulses without rotating the antenna.

Local Time Offset: To display local time on the screen, set the time difference from the UTC.

Memory Clear: Restore the default settings. However, Purpose, Type, View Position and Input Source are not restored.

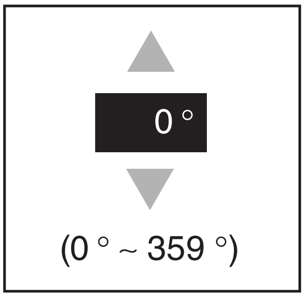
Heading Adjustment

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. Transmit the radar at 0.25 nm range and measure the bearing of that target relative to ship’s heading with an EBL.
3. Open the Installation menu, and choose Heading Adjust.
4. Press the **ENTER** key to show the HEADING ADJUST window.



0 °

(0 ° ~ 359 °)

5. Rotate the trackball upward or downward to set the value measured at the step 2 above. Confirm that the target shows dead ahead on the screen.
6. Press the **ENTER** key to conclude the setting.

Auto Installation Setup

When this item is executed, the tuning, timing, video and MBS are automatically adjusted.

Note: Before executing this procedure, confirm that Sector Blank 1 and Sector Blank 2 are off.

1. Transmit the radar at 48 nm range.
2. Choose Auto Installation Setup from the installation menu and press the **ENTER** key.
3. Rotate the trackball to choose **Yes**, and then press the **ENTER** key.

   Automatically, the tune adjustment begins, indicating “Tuning adjusting….” Then, the timing adjustment, video adjustment and MBS adjustment are executed automatically, indicating “Timing adjusting…”, “Video adjusting…”, and “MBS adjusting…” in that order. After the adjustment is completed, the window disappears.

If you are not satisfied with the result of the Auto Installation Setup, execute Manual Timing Adjust, Tuning Initial Adjust, Manual MBS Adjust and Video Initial Adjust as follows.

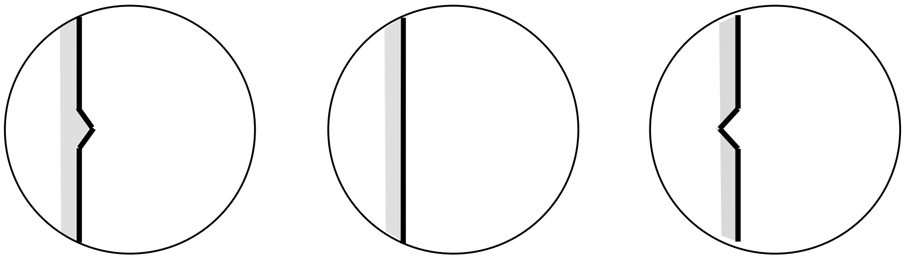
Tuning Initial Adjust

1. Transmit the radar at 48 nm range.
2. Open the Installation menu, and choose Tuning Initial Adjust.
3. Press the **ENTER** key to show the setting window.
4. Rotate the trackball to choose **Yes**, and then press the **ENTER** key. The tune adjustment begins, indicating “Tuning adjusting….” After the adjustment is completed, the window disappears.

Manual 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.


(1) Target pulled
(2) Correct
(3) Target pushed outward

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 a straight line (harbor wall, straight piers).
3. Open the Installation menu and choose Manual Timing Adjust.
4. Press the **ENTER** key to show the setting window.
5. Rotate the trackball to straighten the target selected at step 2, and then press the **ENTER** key to finish.

Manual MBS Adjust

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

1. Transmit the radar on the short range.
2. Open the Installation menu and choose Manual MBS Adjust.
3. Press the **ENTER** key to show the setting window.
4. Rotate the trackball to suppress main bang (between 0 and 255).
5. Press the **ENTER** key to finish.

Video Initial Adjust

After completing Auto Installation Setup, you can fine tune the video signal.

1. Transmit the radar and set as follows.
   Gain: one o'clock A/C Sea: zero A/C Rain: zero
   Echo Average: Off Noise Rejecter: Off Interference Rejecter: Med.
2. Open the Installation menu and choose Video Initial Adjust.
3. Press the **ENTER** key to show the setting window.
4. Rotate the trackball to adjust the video so that the white noise slightly appears. The setting range is 0 to 31. The greater the value, the higher the gain.
5. Press the **ENTER** key to finish.

Note: If the display unit is used as a Sub-display, set the "Input Source" to "Sub" and perform the Video Initial Adjust as mentioned above so that the echo presentation on the sub-display is the same as that on the main display.

4. OPTIONAL EQUIPMENT

4.1 ARP Kit ARP-11

The ARP kit provides automatic radar plotter functions to this radar.

Necessary parts

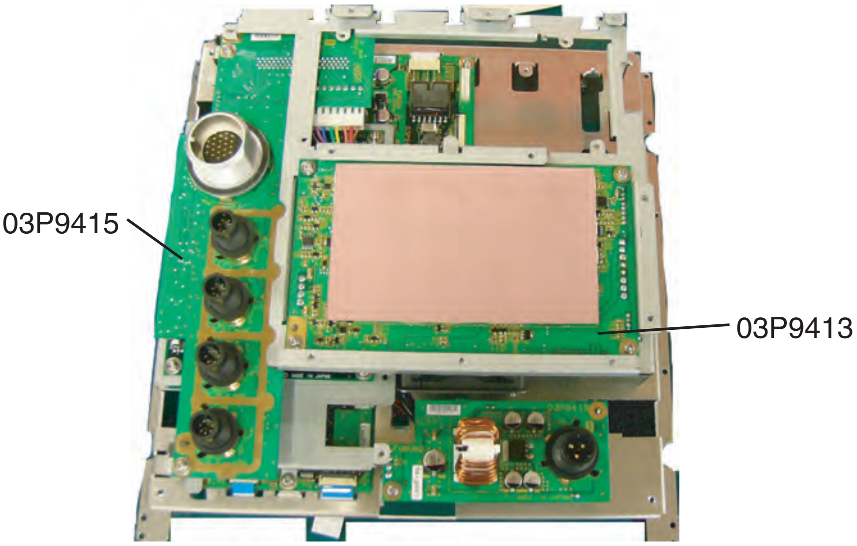
Name: ARP kit
Type: ARP-11
Code no.: 008-523-050

Contents of ARP kit

Name	Type	Code No.	Qty
ARP Board	18P9014B	001-068-900	1
Pan head screw	M3x6 C2700W	000-163-189-10	4
Spacer*	SQ-9	000-159-320-10	1
	SQ-15	000-159-299-10	3
Spring washer*	M3 C5191W	000-168-187-10	3

*Not used

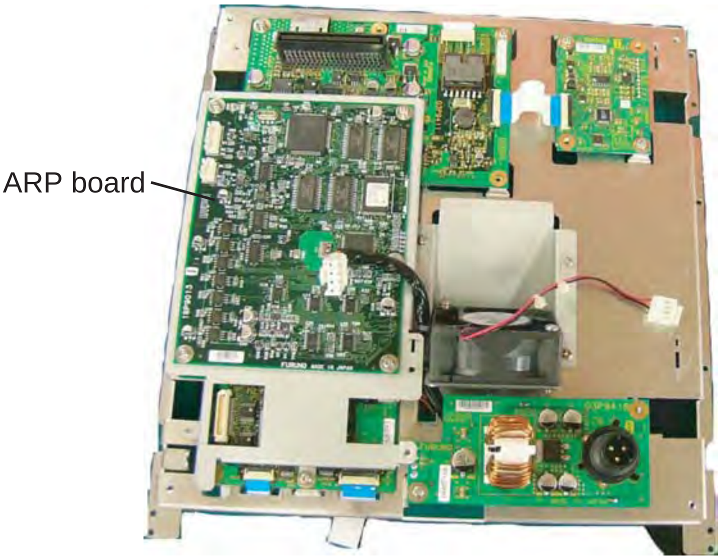
1. Unscrew all connector nuts at the rear of the display unit.
2. Unfasten all screws to remove the display cover.



Removing the display unit cover

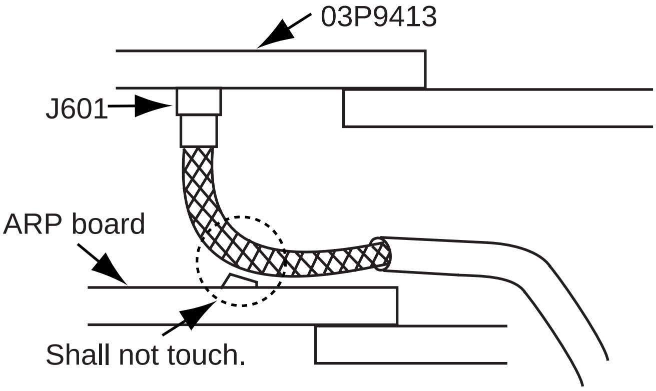
3. Disconnect the printed circuit board 03P9415 and 03P9413.
   Before disconnecting the 03P9413, disconnect J601 and J604 at the back of the board.

4. Mount the ARP board, mating with connectors and fixing it with four screws at the location as shown in the figure below.



5. Remount 03P9415 and 03P9413 at original position and display cover.

Note: After connecting the harness to J601 on 03P9413, bend the harness so that it does not touch the parts on ARP board.


03P9413
J601
ARP board
Shall not touch.

4.2 External Monitor

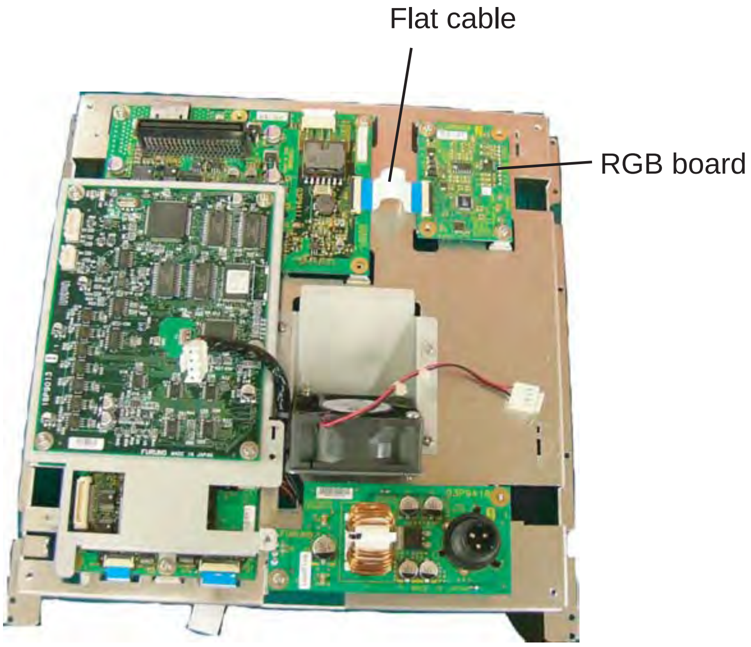
You can display the radar image on an external monitor which accepts industrial standard VGA input using the optional RGB kit OP03-195. Supply monitor and interconnection cable (with HD-15P connectors of male, three rows of 15 pins) locally.

Necessary parts for external monitor

Name:	RGB kit
Type:	OP03-195
Code No.:	008-553-110

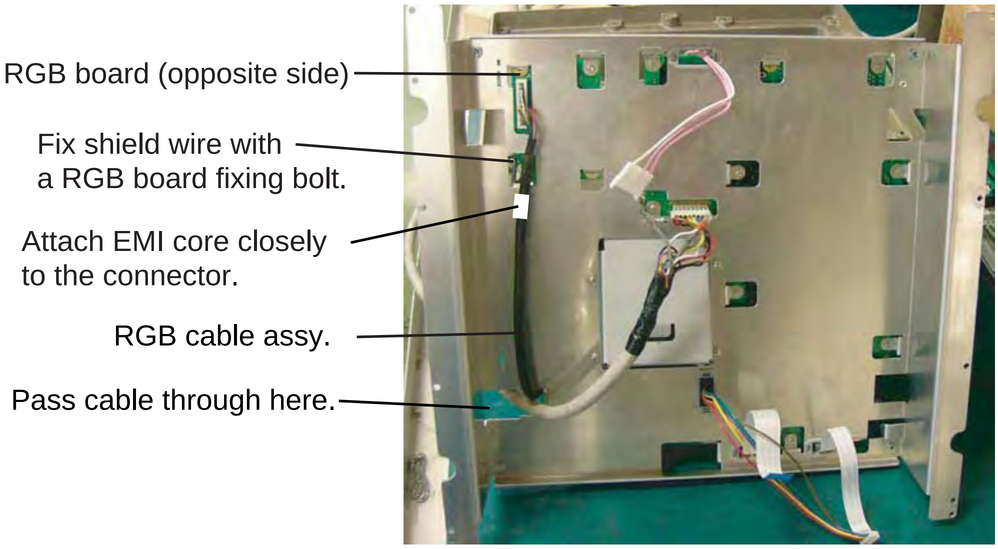
Name	Type	Code No.	Qty
RGB board	03P9492	008-553-680	1
Flat cable	SML2SC34-4X50BDP.5S4	000-155-457	1
Cable assy	15SDS/XHP10-005	000-144-511	1
EMI core	RFC-6	000-144-132-10	1

1. Unscrew all connector nuts at the rear of the display unit.
2. Unfasten all screws to remove the display cover.
3. Disconnect the printed circuit board 03P9415 and 03P9413.
   Before disconnecting the 03P9413, disconnect J601 and J604 at the back of the board.
4. Mount the RGB board with two screws and connect the flat cable at the location shown in the figure below.



5. Remount 03P9415 and 03P9413 at their original locations and display cover.

6. Detach LCD panel from the above assembly. Be sure to disconnect the connector and flat cables.
7. Connect the cable assy. 15SDS/XHP10-005 to the rear side of the RGB board.
8. Fix the shield wire of the cable assy. with a screw used to fix the RGB board.
9. Attach the EMI core RFC-1 to the cable assy. closely to the connector.
10. Pass the signal cable through the hole shown below and then pass it through the “OPTION” port at the rear of the display unit..


RGB board (opposite side)
Fix shield wire with a RGB board fixing bolt.
Attach EMI core closely to the connector.
RGB cable assy.
Pass cable through here.

11. Reassemble the display unit and cover the hole with soft putty to seal.
12. Fix the EMI core RFC-6 to the cable closely to the display unit.

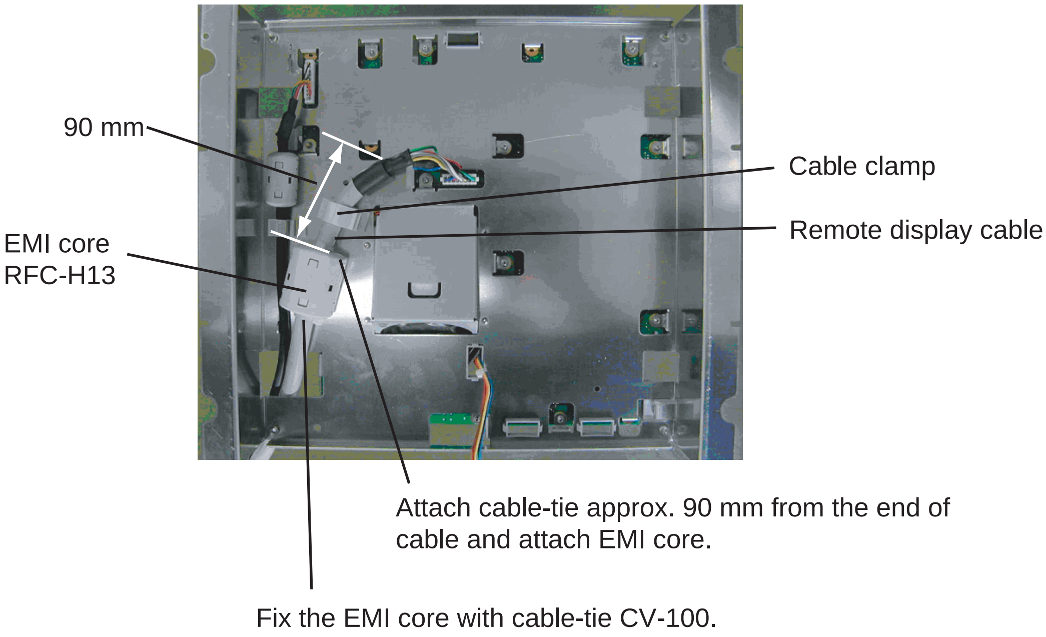
4.3 Remote Display

The FURUNO Display Unit FMD-811, MODEL1832 or GD-280/380, etc. can be connected to this radar as a sub display. The display unit RDP-150 also can be used as a sub display. To interconnect them, use optional cable MJ-B24LPF0008-100/200/300 (see page iv). Also, the EMI core (option) should be attached to the remote display cable to prevent noise.

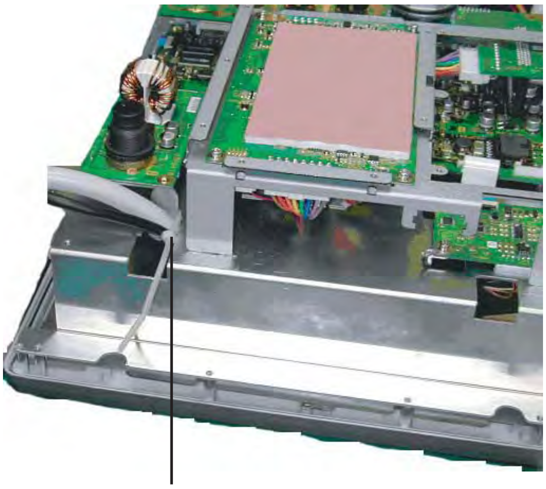
Installation materials for remote display (Type: CP03-31001、Code number: 008-556-830)

	Name	Type	Code no.	Qty
1	EMI core	RFC-H13	000-146-570-10	1
2	Cable clamp	CK-13H	000-102-947-10	1
3	Cable-tie	CV-100N	000-162-167-10	2
4	Cable-tie	CV-150N	000-162-186-10	1

1. Unscrew all connector nuts at the rear of the main display unit.
2. Unfasten all screws to remove the display cover.
3. Pass the signal cable from the “OPTION” port at the rear of the display unit through the hole shown in the figure below and then connect it to the SPU board.
4. Fix the shield wire with a screw used to fixed the SPU board.
5. Attach the EMI core RFC-H13 on the signal cable.
6. Attach cable clamp and fix the cable as shown below.


90 mm
Cable clamp
Remote display cable
EMI core
RFC-H13
Attach cable-tie approx. 90 mm from the end of cable and attach EMI core.
Fix the EMI core with cable-tie CV-100.

7. Fix the signal cable to the spacer of the FIL board with a cable tie CV-150N.



Fix the cable to the spacer of FIL board with cable-tie.

8. Reassemble the display unit.

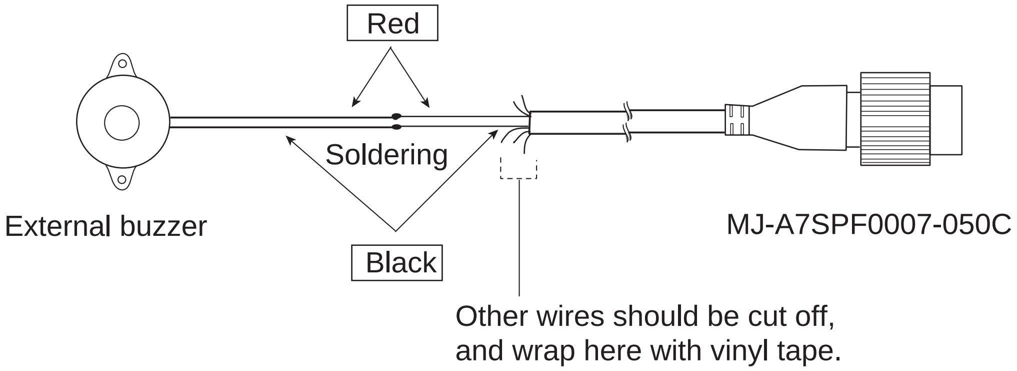
4.4 External Buzzer

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

External buzzer
Type: OP03-136
Code no.: 000-086-443

Further, you need the optional cable assy. MJ-A7SPF0007-050C (w/7P connector, 5 m, code no. 000-154-028-10).

1. Attach the MJ-A7SPF0007-050C cable assy. (option) to the PC/EXT-BUZZER port at the rear of the display unit.
2. Cut off the XH connector and cable itself (as necessary) at the end of the external buzzer cable.
3. Solder the cables made at step 2 to the MJ-A7SPF0007-050C cable as shown below.

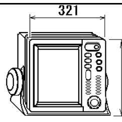
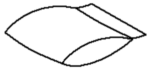
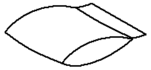
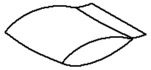
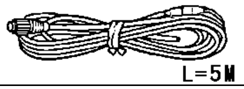
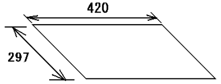
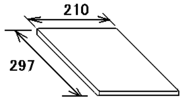

Red
Soldering
External buzzer
Black
MJ-A7SPF0007-050C
Other wires should be cut off,
and wrap here with vinyl tape.

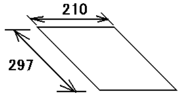
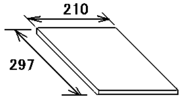
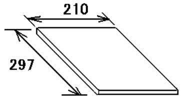
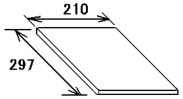
Connection of external buzzer and display unit using cable assy. type MJ-A7SPF0007-050C cable

4. Attach the buzzer to the mounting location with double-sided tape or two self-tapping screws (3x15 or 3x20, local supply).

PACKING LIST RDP-150-J/E

03GT-X-9851-4 1/1

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
UNIT			
DISPLAY UNIT		RDP-150-J/E 000-090-462-00 **	1
SPARE PARTS			
SPARE PARTS		SP03-15401 008-553-040-00	1
INSTALLATION MATERIALS		**CP03-30900**	
INSTALLATION MATERIALS		CP03-30901 008-553-050-00	1
INSTALLATION MATERIALS		CP03-30902 008-554-600-00	1
CABLE ASSY.		MJ-A3SPF0018-050ZC 000-154-025-10	1
FLUSH MOUNTING TEMPLATE		C32-00601-* 000-160-283-1*	1
APPLICATION GUIDE		J32-00501-* 000-160-319-1*	1 (*1)

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
NOTICE FOR FUSE REPLACEMENT		C32-00504-* 000-160-282-1*	1
OPERATOR'S MANUAL		OM*-35390-* 000-160-017-1* **	1
OPERATOR'S GUIDE		OS*-35390-* 000-160-281-1* **	1
INSTALLATION MANUAL		IM*-35390-* 000-160-275-1* **	1

CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

(*1) MARKED DOCUMENTS ARE FOR JAPANESE SET ONLY.

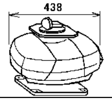
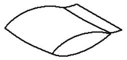
(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

C3539-Z03-E

PACKING LIST

RSB-0070-085/RSB-0073-085/RSB-0073-086/RSB-0073-087

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
UNIT			
SCANNER UNIT		RSB-0070-085/-0073-08* 008-552-970-00 **	1
INSTALLATION MATERIALS			
ANTENNA INSTALLATION MATERIALS		CP03-30801 008-552-960-00	1

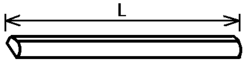
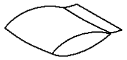
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

XN10A, XN12A, XN13A, XN12A-N-CKD, XN13A-N-CKD

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
UNIT			
ANTENNA	 L=1036(XN10A), 1255(XN12A), 1795(XN13A)	XN10A/12A/13A 008-390-960-00 **	1
ANTENNA INSTALLATION MATERIALS			
INSTALLATION MATERIALS		CP03-22901 008-523-690-00	1

CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

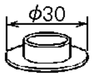
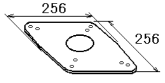
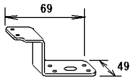
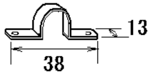
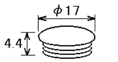
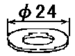
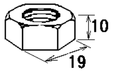
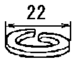
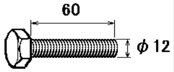
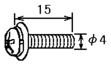
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-552-960-00	03GT-X-9401 -12
TYPE	CP03-30801	1/2

INSTALLATION MATERIALS

NO.	NAME	OUTLINE	DESCRIPTIONS	Q'TY	REMARKS
1	SEAL WASHER		03-001-3002-0 ROHS CODE NO. 300-130-020-10	4	
2	CORROSION-PROOF RUBBER MAT		03-142-3001-0 ROHS CODE NO. 100-275-580-10	1	
3	PACKING FIXTURE		03-167-2017-0 ROHS CODE NO. 100-327-760-10	1	
4	SHIELD CLAMP		03-167-2018-1 ROHS CODE NO. 100-327-771-10	1	
5	KNOB CAP		040-4010 CODE NO. 000-164-929-10	4	
6	FLAT WASHER		M12 SUS304 CODE NO. 000-167-446-10	4	
7	HEXAGONAL NUT		M12 SUS304 CODE NO. 000-167-491-10	4	
8	SPRING WASHER		M12 SUS304 CODE NO. 000-167-397-10	4	
9	HEXAGON HEAD SCREW		M12X60 SUS304 CODE NO. 000-162-813-10	4	
10	WASHER HEAD SCREW *B*		M4X15 C2700W MBNI2 CODE NO. 000-163-193-10	2	

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

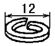
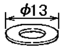
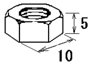
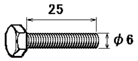
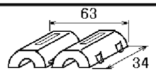
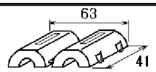
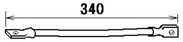
FURUNO ELECTRIC CO., LTD.

C3539-M01-N(1)

FURUNO

CODE NO.	008-552-960-00	03GT-X-9401 -12
TYPE	CP03-30801	2/2

INSTALLATION MATERIALS

NO.	NAME	OUTLINE	DESCRIPTIONS	Q'TY	REMARKS
11	SPRING WASHER		M6 SUS304 CODE NO. 000-158-855-10	1	
12	FLAT WASHER		M6 SUS304 CODE NO. 000-158-854-10	3	
13	HEXAGONAL NUT		M6 SUS304 CODE NO. 000-158-856-10	1	
14	HEXAGONAL HEAD BOLT		M6X25 SUS304 CODE NO. 000-162-871-10	1	
15	EMI CORE		RFC-13 CODE NO. 000-141-084-11	2	
16	EMI CORE		RFC-H13 CODE NO. 000-146-570-10	1	
17	CABLE ASSY.		RW-4747 RW-4747-1 CODE NO. 000-566-000-12 000-566-000-01	1	

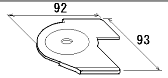
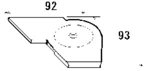
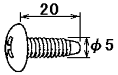
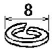
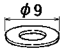
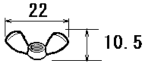
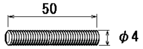
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT.
QUALITY IS THE SAME.
(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD. C3539-M01-N(2)

FURUNO

CODE NO.	008-553-050-00	03GT-X-9402 -5
TYPE	CP03-30901	1/1

INSTALLATION MATERIALS

NO.	NAME	OUTLINE	DESCRIPTIONS	Q'TY	REMARKS
1	RUBBER CUSHION		03-167-1403-3 CODE NO. 100-329-823-10	1	
2	RUBBER CUSHION(2)		03-167-1404-1 CODE NO. 100-337-751-10	1	
3	SELF-TAPPING SCREW		5X20 SUS304 CODE NO. 000-162-608-10	4	
4	SPRING WASHER		M4 SUS304 CODE NO. 000-167-405-10	4	
5	FLAT WASHER		M4 SUS304 CODE NO. 000-167-455-10	4	
6	WING NUT		M4 SUS304 CODE NO. 000-167-545-10	4	
7	THREADED ROD		M4X50 SUS304 CODE NO. 000-162-679-10	4	

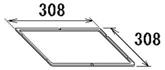
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

FURUNO

CODE NO.	008-554-600-00	03GT-X-9405 -3
TYPE	CP03-30902	1/1

INSTALLATION MATERIALS

NO.	NAME	OUTLINE	DESCRIPTIONS	Q'TY	REMARKS
1	Fﾏｳﾝﾄﾖｳｽﾎﾟﾝｼﾞ FLUSH MOUNTING SPONGE		03-167-1601-0 ROHS CODE NO. 100-328-390-10	1	

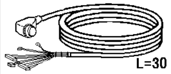
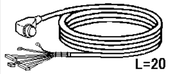
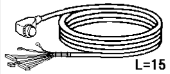
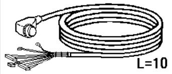
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.
(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO ELECTRIC CO., LTD.

FURUNO

CODE NO.		03GT-X-9403 -0
TYPE		1/1

INSTALLATION MATERIALS	FR-8062/8122	

NO.	NAME	OUTLINE	DESCRIPTIONS	Q'TY	REMARKS
1	CABLE ASSY.		MJ-B24LPF0012-300 CODE NO. 000-153-622	1	選択 TO BE SELECT
2	CABLE ASSY.		MJ-B24LPF0012-200 CODE NO. 000-153-621	1	選択 TO BE SELECT
3	CABLE ASSY.		MJ-B24LPF0012-150 CODE NO. 000-153-620	1	選択 TO BE SELECT
4	CABLE ASSY.		MJ-B24LPF0012-100 CODE NO. 000-153-619	1	選択 TO BE SELECT

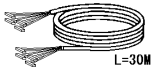
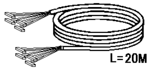
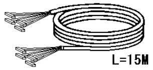
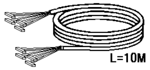
FURUNO ELECTRIC CO., LTD.

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

FURUNO

CODE NO.		19AV-X-9402 -0
TYPE		1/1

INSTALLATION MATERIALS		

NO.	NAME	OUTLINE	DESCRIPTIONS	Q'TY	REMARKS
1	CABLE ASSY.		RW-9771 *30M* CODE NO. 000-152-869	1	選択
2	CABLE ASSY.		RW-9771 *20M* CODE NO. 000-152-868	1	TO BE SELECTED
3	CABLE ASSY.		RW-9771 *15M* CODE NO. 000-152-867	1	TO BE SELECTED
4	CABLE ASSY.		RW-9771 *10M* CODE NO. 000-152-866	1	TO BE SELECTED

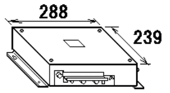
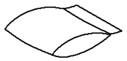
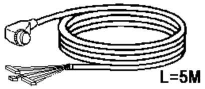
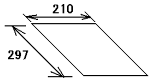
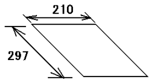
FURUNO ELECTRIC CO., LTD.

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

PACKING LIST

19AV-X-9855 -3 1/1

PSU-008

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
UNIT			
POWER SUPPLY UNIT		PSU-008 000-083-617-00	1
SPARE PARTS			
SPARE PARTS		SP03-14501 008-444-420-00	1
INSTALLATION MATERIALS		**CP03-30600**	
CABLE ASSEMBLY		VL3P-VV-S2X2C-AA050 000-152-217-11	1
SIGNAL CABLE ASSEMBLY		MJ-B24LPF0011-050+R 000-152-939-12	1
INSTALLATION MATERIALS		CP03-30601 008-550-740-00	1
DOCUMENT			
NOTIFICATION DOCUMENT		C32-00502-* 000-152-940-1*	1
INTERNAL SETTING(JR/EN)		C32-00505-* 000-153-867-1*	1

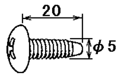
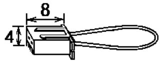
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

(DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-550-740-00	19AV-X-9401 -2
TYPE	CP03-30601	1/1

INSTALLATION MATERIALS

NO.	NAME	OUTLINE	DESCRIPTIONS	Q'TY	REMARKS
1	SELF-TAPPING SCREW		5X20 SUS304 CODE NO. 000-162-608-10	4	
2	CONNECTOR ASSY.		XH2P-L40-ACR CODE NO. 000-153-879-10	1	

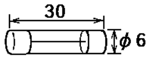
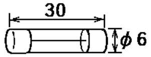
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

FURUNO ELECTRIC CO ., LTD.

FURUNO

CODE NO.	008-553-040-00	03GT-X-9301 -1 1/1
TYPE	SP03-15401	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

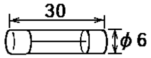
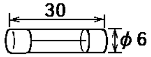
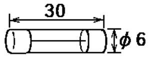
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.
				WORKING		SPARE	
				PER SET	PER VES		
1	ﾋｭｰｽﾞ FUSE		FGBO 125V 10A PBF FGBO 10A AC125V			3	000-155-826-10 000-549-065-00
2	ﾋｭｰｽﾞ FUSE		FGBO 125V 15A PBF FGBO 15A AC125V			3	000-155-827-10 000-549-014-00

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C3539-P01-B	1/1

FURUNO

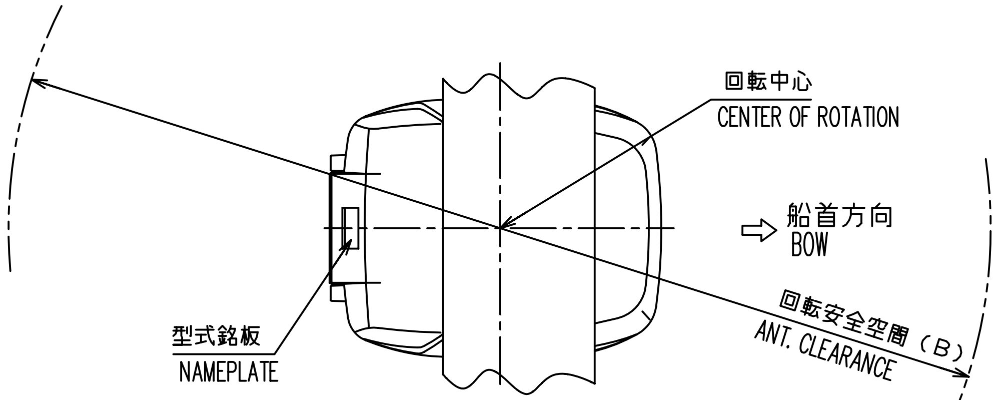
CODE NO.	008-444-420	19AQ-X-9301 -2 1/1
TYPE	SP03-14501	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.
				WORKING		SPARE	
				PER SET	PER VES		
1	ﾋｭｰｽﾞ FUSE		FGBO 125V 15A PBF FGBO 15A AC125V			3	000-155-827-10 000-549-014-00
2	ﾋｭｰｽﾞ FUSE		FGBO 125V 7A PBF FGBO 7A AC125V			3	000-155-831-10 000-549-013-00
3	ｶﾝｲﾘﾋｭｰｽﾞ FUSE		FGBO 125V 3A PBF FGBO 3A AC125V			3	000-155-830-10 000-131-845-00

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	C4428-P01-C	1/1

FURUNO


回転中心
CENTER OF ROTATION
船首方向
BOW
回転安全空間（B）
ANT. CLEARANCE
型式銘板
NAMEPLATE

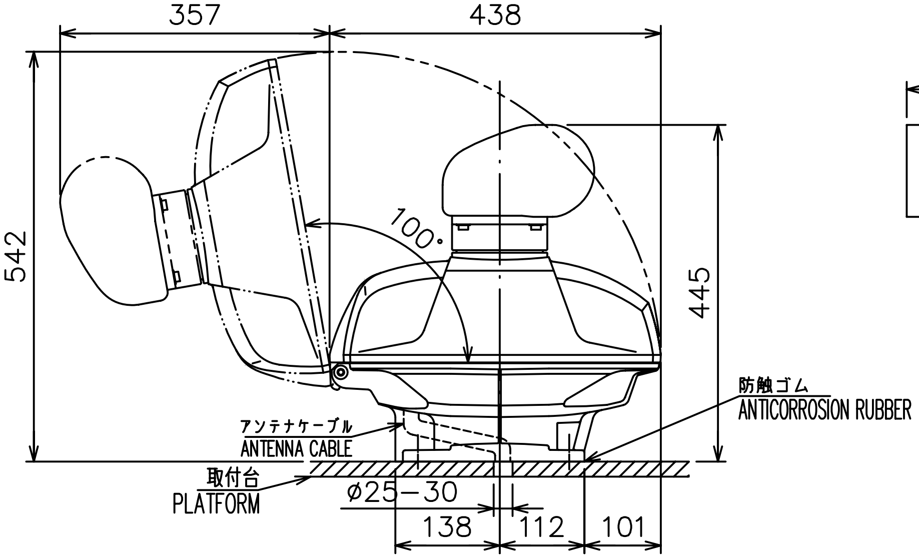
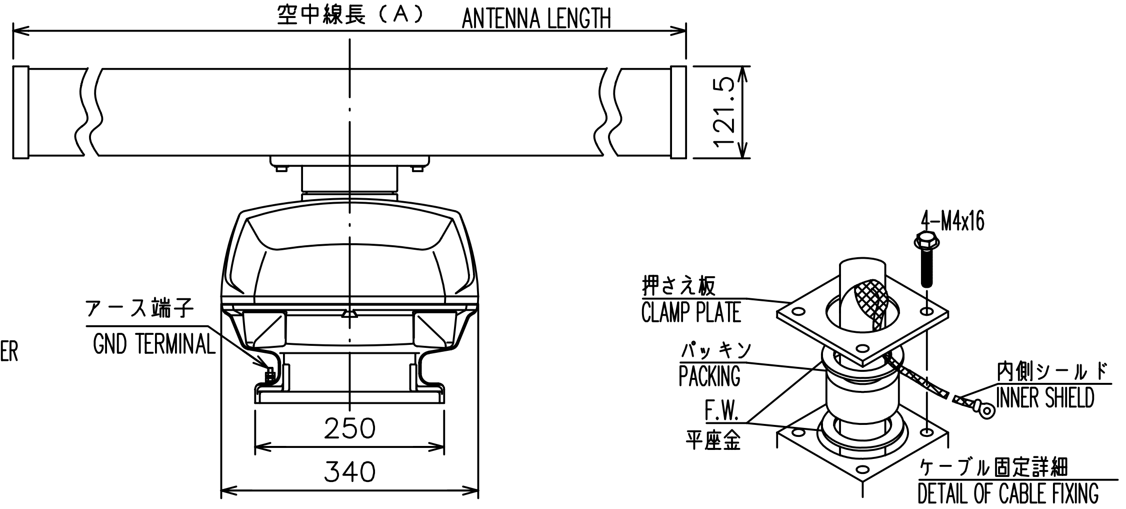

357
438
542
100°
445
防触ゴム
ANTICORROSION RUBBER
アンテナケーブル
ANTENNA CABLE
取付台
PLATFORM
ø25−30
138
112
101

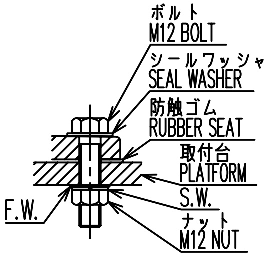
表２ TABLE 2

種類 TYPE	XN10A	XN12A	XN13A
空中線長（A） ANT. LENGTH (mm)	1036±10	1255±10	1795±10
回転安全空間（B） ANT. CLEARANCE (mm)	1200	1400	1940
質量（kg） MASS	22	25	27

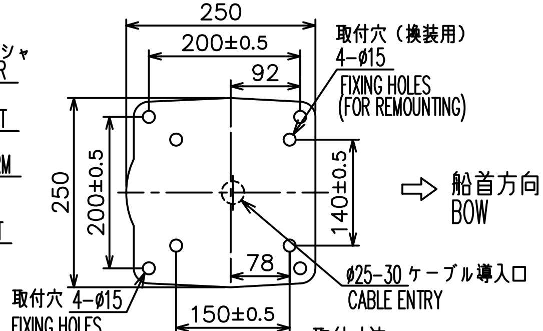
表１ TABLE 1

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


空中線長（A） ANTENNA LENGTH
121.5
アース端子
GND TERMINAL
250
340
4-M4x16
押さえ板
CLAMP PLATE
パッキン
PACKING
F.W.
平座金
内側シールド
INNER SHIELD
ケーブル固定詳細
DETAIL OF CABLE FIXING


ボルト
M12 BOLT
シールワッシャ
SEAL WASHER
防触ゴム
RUBBER SEAT
取付台
PLATFORM
S.W.
ナット
M12 NUT
F.W.

取付部詳細
DETAIL FOR FIXING


250
200±0.5
92
取付穴（換装用）
4-ø15
FIXING HOLES
(FOR REMOUNTING)
250
200±0.5
140±0.5
船首方向
BOW
78
ø25-30 ケーブル導入口
CABLE ENTRY
取付穴 4-ø15
FIXING HOLES
150±0.5

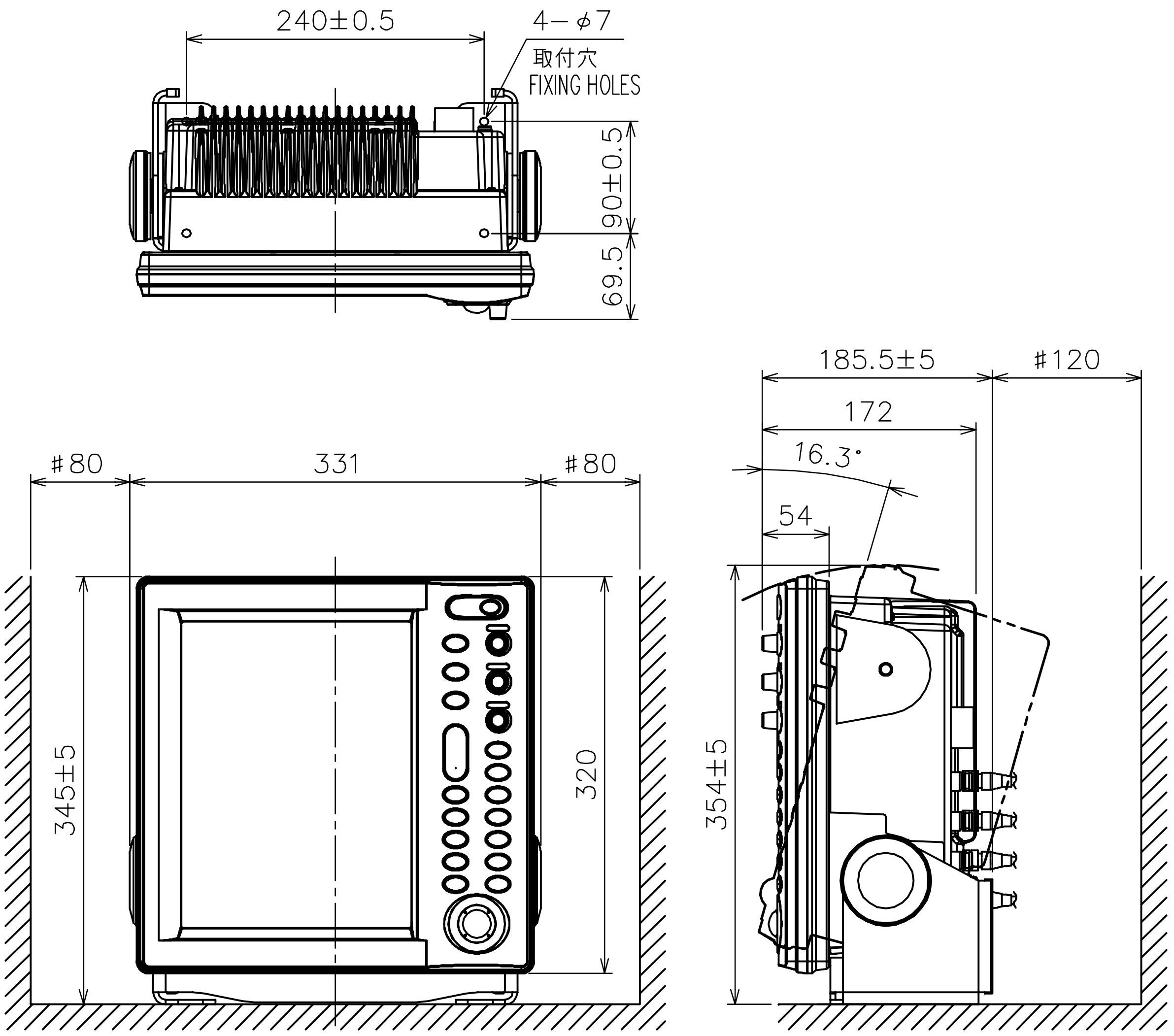
取付寸法
FIXING DIMENSIONS

注記
1） 指定なき寸法公差は表１による。
2） 取付にはM12ボルトを使用のこと。
3） 空中線部の取付台にø25−30のケーブル導入口を開ける。

NOTE
1. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
2. USE M12 BOLTS FOR FIXING THE UNIT.
3. MAKE A CABLE ENTRY HOLE ø25-30 ON PLATFORM.

DRAWN 1/Jul/09 T.YAMASAKI		TITLE	RSB-0070/0072/0073
CHECKED 1/Jul/09 T.TAKENO	OTHERS	名称	空中線部
APPROVED 8/Jul/09 R. Esumi	MODEL1942M2,MODEL1954Cser. FR-7062ser, FR-8062ser.		外寸図
SCALE 1/10 MASS 表２参照 SEE TABLE 2		NAME	ANTENNA UNIT
DWG.No. C3539-G03- B	REF.No. 03-142-300G-5		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.


240±0.5
4−φ7
取付穴
FIXING HOLES
90±0.5
69.5
185.5±5
#120
172
16.3°
54
#80
331
#80
345±5
320
354±5

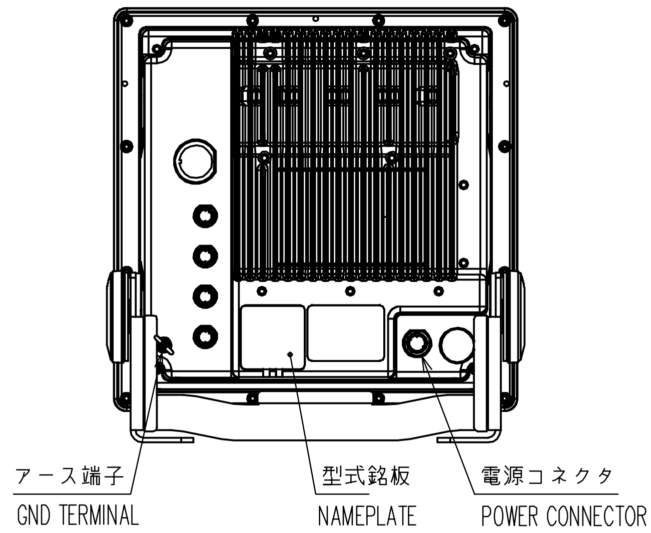

アース端子
GND TERMINAL
型式銘板
NAMEPLATE
電源コネクタ
POWER CONNECTOR

表 1 TABLE 1

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

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５×２０を使用のこと。

NOTE

1) #: MINIMUM SERVICE CLEARANCE.

2) TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.

3. USE SELF-TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

DRAWN	Jan. 10, '06 E. MIYOSHI			TITLE	RDP-150
CHECKED	TAKAHASHI. T			名称	指示部（卓上装備）
APPROVED	Y. Hatai	FR-8062/8122/8252			外寸図
SCALE 1/6	MASS 6.9 ±10% kg	質量にハードカバー、ケーブルは含まない MASS DOES NOT INCLUDE HARD COVER NOR CABLE.		NAME	DISPLAY UNIT (TABLETOP MOUNT)
DWG.No. C3539-G02- B	REF.No. 03-167-110G-2				OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

FURUNO

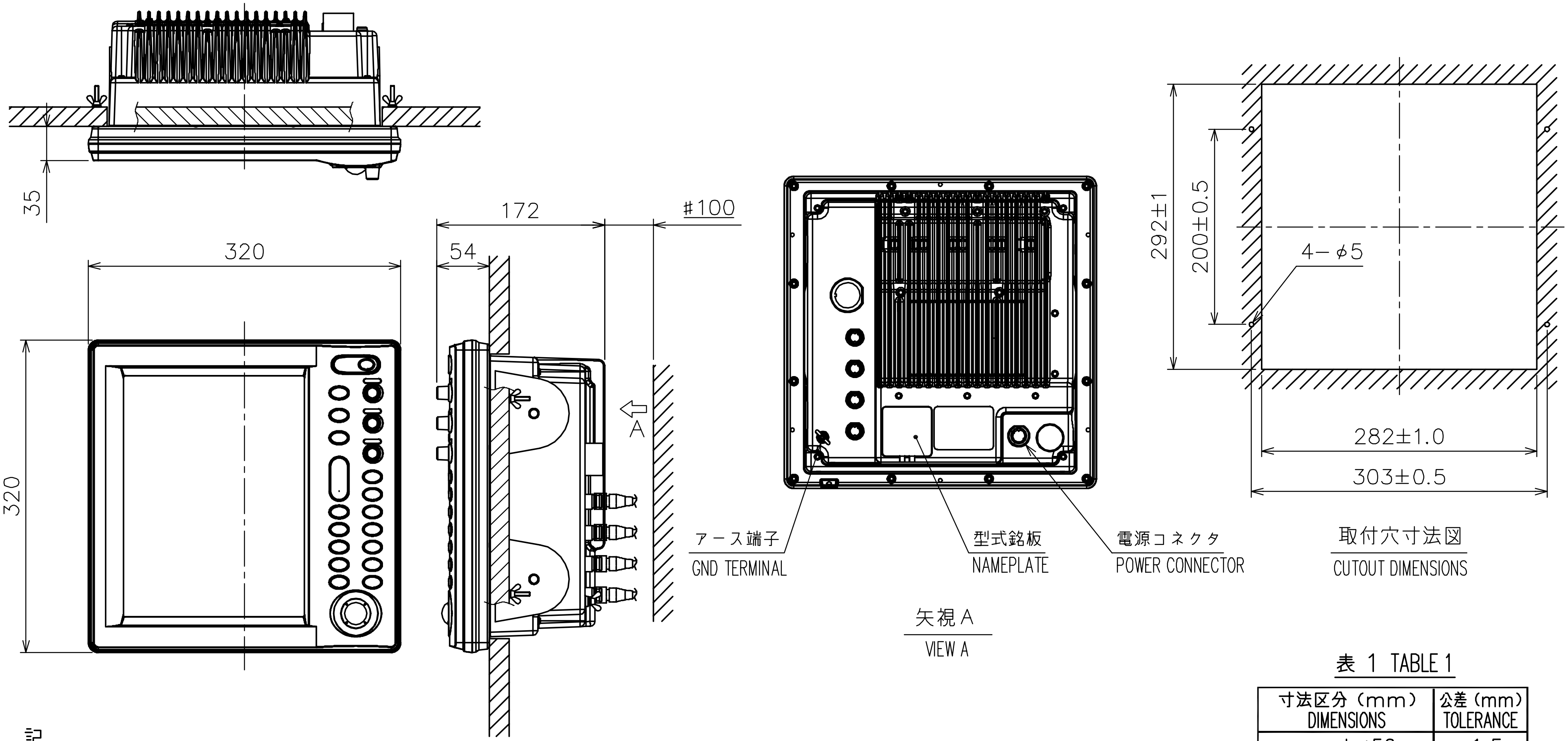

35
320
320
172
54
#100
A
アース端子
GND TERMINAL
型式銘板
NAMEPLATE
電源コネクタ
POWER CONNECTOR
矢視A
VIEW A
292±1
200±0.5
4−φ5
282±1.0
303±0.5
取付穴寸法図
CUTOUT DIMENSIONS

表 1 TABLE 1

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

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。

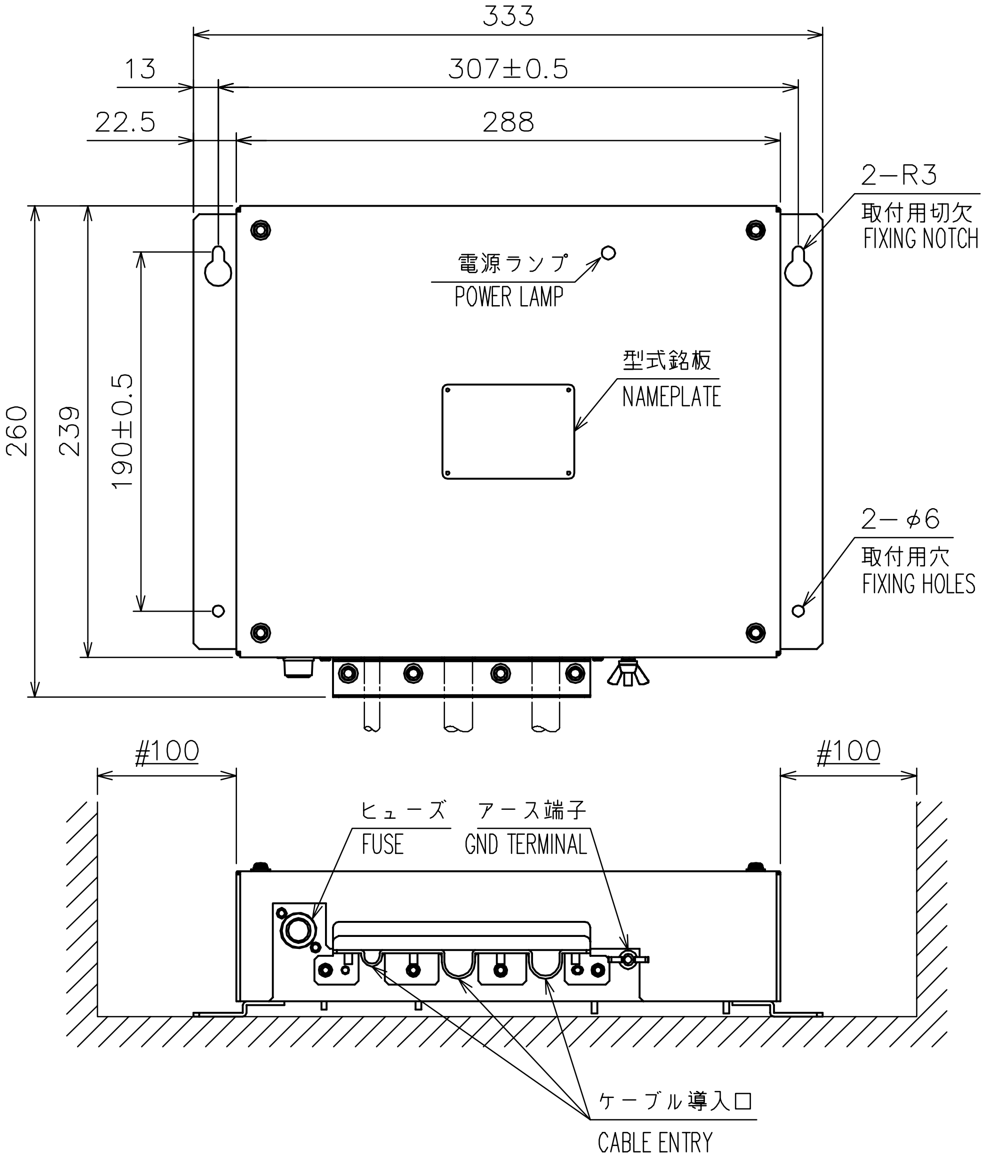
3）取付はＭ４Ｘ５０寸切りボルト、Ｍ４平座金、Ｍ４バネ座金、Ｍ４蝶ナット使用のこと。

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M4X50 BOLTS, M4 FLAT WASHERS, M4 SPRING WASHERS AND M4 WING NUTS FOR FIXING THE UNIT.

DRAWN	Dec. 6, '05 E. MIYOSHI	TITLE	RDP-150
CHECKED	TAKAHASHI. T	名称	指示部（埋込装備） 外寸図
APPROVED	Y. Hatai		FR-8062/8112/8252
SCALE 1/6	MASS 6.1 ±10% kg	質量にハードカバー、ケーブルは含まない MASS DOES NOT INCLUDE HARD COVER NOR CABLE.	NAME DISPLAY UNIT (FLUSH MOUNT) OUTLINE DRAWING
DWG.No. C3539-G01- B	REF.No. 03-167-100G-1		

FURUNO ELECTRIC CO., LTD.


333
307±0.5
13
288
22.5
2−R3
取付用切欠
FIXING NOTCH
電源ランプ
POWER LAMP
型式銘板
NAMEPLATE
260
239
190±0.5
2−φ6
取付用穴
FIXING HOLES
#100
#100
ヒューズ
FUSE
アース端子
GND TERMINAL
ケーブル導入口
CABLE ENTRY

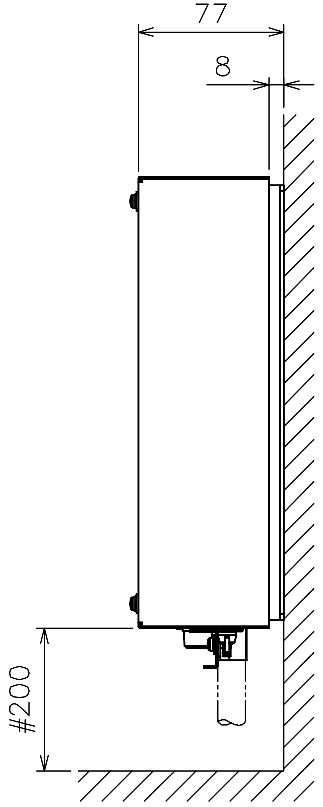


表 1　TABLE 1

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

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グネジ呼び径5×20を使用のこと。

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 5x20 FOR FIXING THE UNIT.

DRAWN	Apr. 8, '05 E. MIYOSHI		TITLE	PSU-008
CHECKED	TAKAHASHI. T		名称	空中線電源部
APPROVED	Y. Hatai	MODEL 1964C		外寸図
SCALE 1/4	MASS 2.7 ±10% kg		NAME	POWER SUPPLY UNIT
DWG.No.	C3548-G01- A	19-025-400G-0		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.

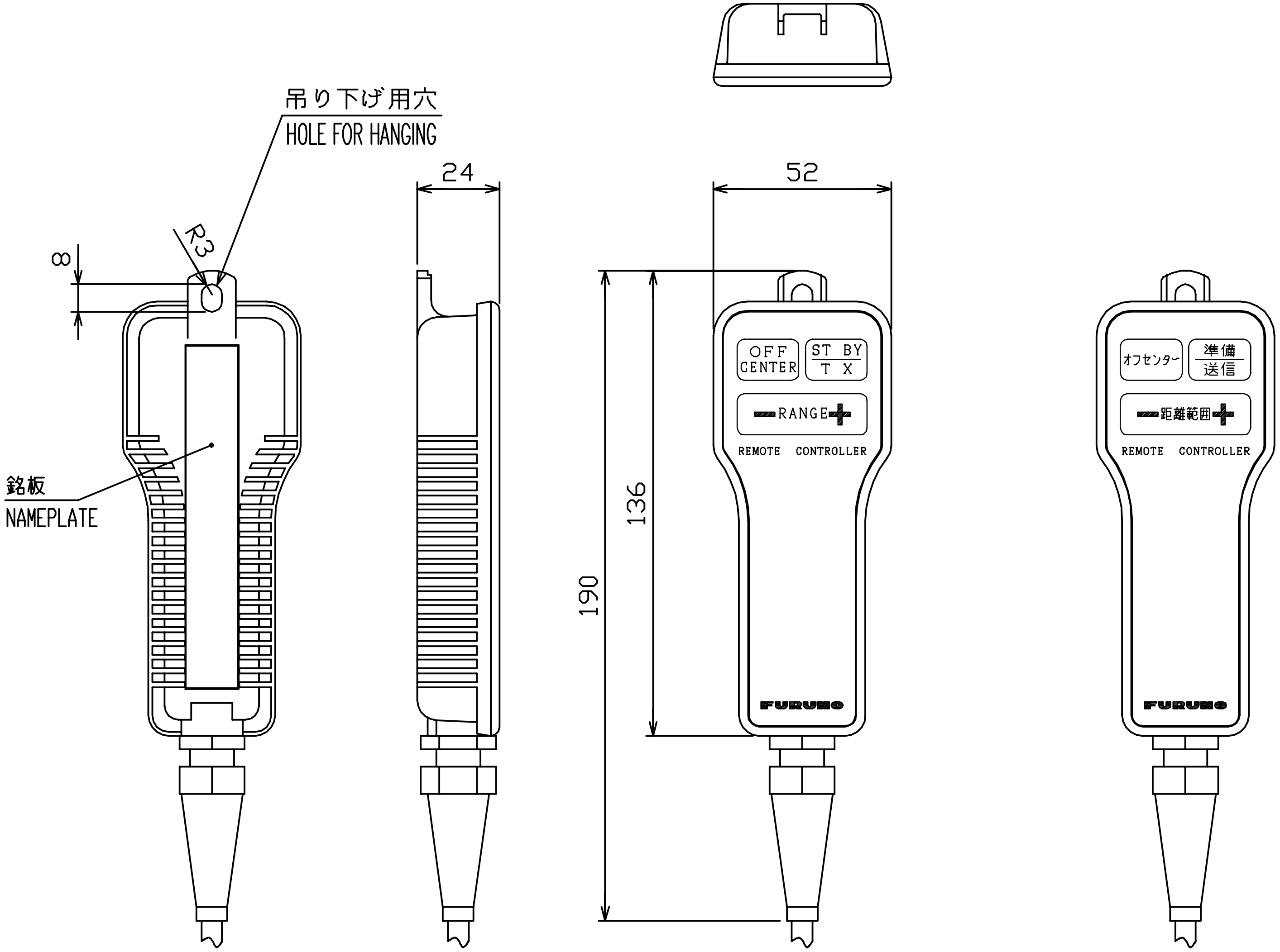

吊り下げ用穴
HOLE FOR HANGING
R3
8
24
52
136
190
銘板
NAMEPLATE
OFF CENTER
ST BY
T X
RANGE
REMOTE CONTROLLER
FURUNO
オフセンター
準備
送信
距離範囲

表1 TABLE 1

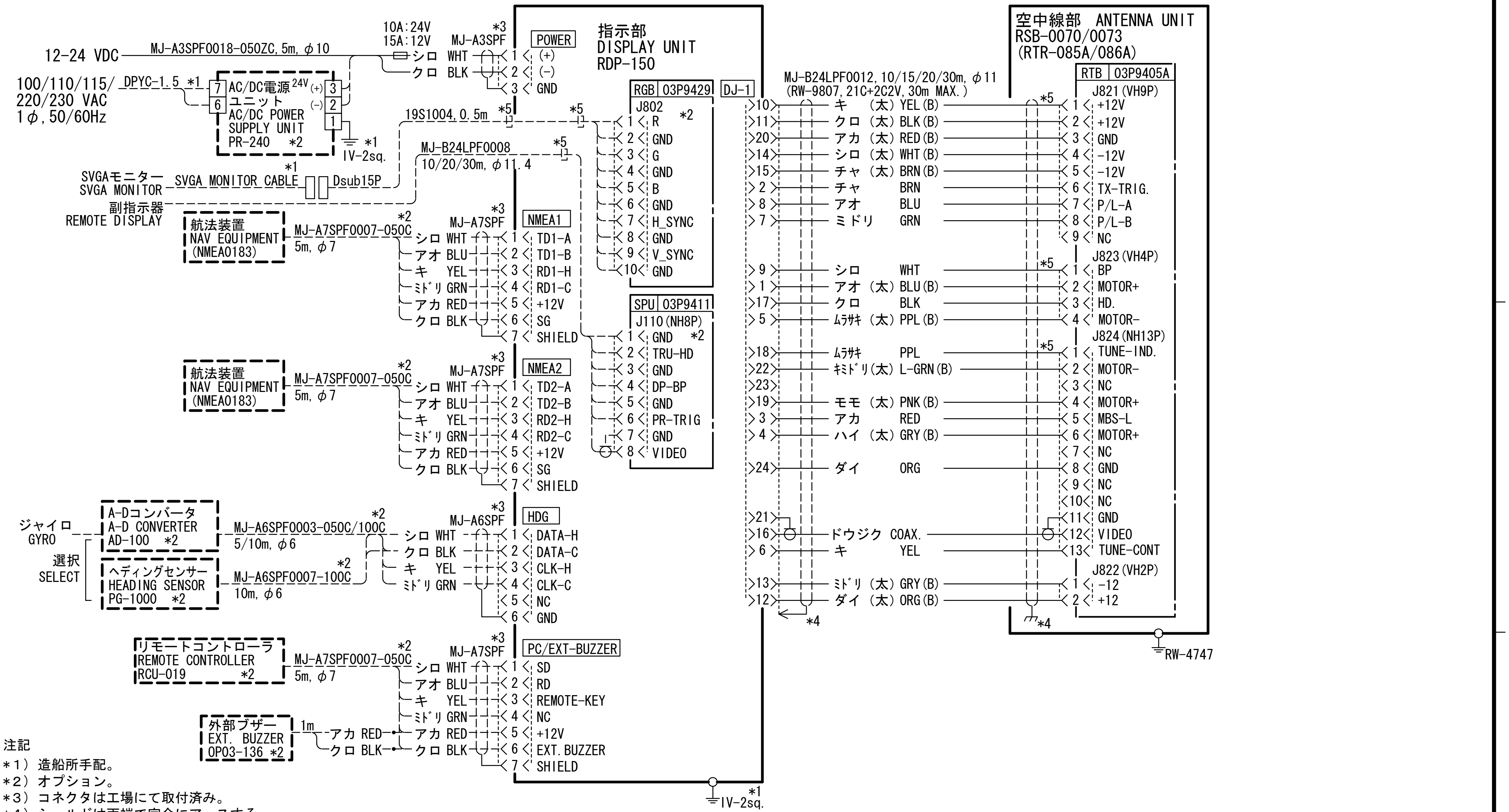
寸法区分(mm) DIMENSIONS	公差(mm) TOLERANCE
0 < L ≦ 50	±1.5
50 < L ≦ 100	±2.5
100 < L ≦ 500	±3

注記
寸法公差は表1による。

NOTE
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.

DRAWN	Apr. 22, '05 E. MIYOSHI		TITLE RCU-009/019
CHECKED	TAKAHASHI. T	MODEL 1933CR	名称 リモートコントローラ
APPROVED	Y.Hatai	MODEL 1941R M2 FR-7041R M2	外寸図
SCALE	1/2 MASS 0.35 ±10% kg	質量はケーブル重さを含む MASS W/ CABLE	NAME REMOTE CONTROLLER
DWG No.	C3492-G01- F	03-142-130G-1	OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.


12-24 VDC
MJ-A3SPF0018-050ZC, 5m, φ10
100/110/115/220/230 VAC 1φ, 50/60Hz
DPYC-1.5 *1
AC/DC電源ユニット AC/DC POWER SUPPLY UNIT PR-240 *2
24V (+) (-)
IV-2sq. *1
10A:24V 15A:12V
シロ WHT
クロ BLK
MJ-A3SPF *3
POWER
1 (+)
2 (-)
3 GND
指示部 DISPLAY UNIT RDP-150
19S1004, 0.5m *5
*5
MJ-B24LPF0008 10/20/30m, φ11.4 *5
SVGAモニター SVGA MONITOR
SVGA MONITOR CABLE *1
Dsub15P
副指示器 REMOTE DISPLAY
RGB 03P9429 J802 *2
1 R
2 GND
3 G
4 GND
5 B
6 GND
7 H_SYNC
8 GND
9 V_SYNC
10 GND
航法装置 NAV EQUIPMENT (NMEA0183)
MJ-A7SPF0007-050C 5m, φ7 *2
MJ-A7SPF *3
NMEA1
シロ WHT 1 TD1-A
アオ BLU 2 TD1-B
キ YEL 3 RD1-H
ミドリ GRN 4 RD1-C
アカ RED 5 +12V
クロ BLK 6 SG
7 SHIELD
SPU 03P9411 J110 (NH8P) *2
1 GND
2 TRU-HD
3 GND
4 DP-BP
5 GND
6 PR-TRIG
7 GND
8 VIDEO
航法装置 NAV EQUIPMENT (NMEA0183)
MJ-A7SPF0007-050C 5m, φ7 *2
MJ-A7SPF *3
NMEA2
シロ WHT 1 TD2-A
アオ BLU 2 TD2-B
キ YEL 3 RD2-H
ミドリ GRN 4 RD2-C
アカ RED 5 +12V
クロ BLK 6 SG
7 SHIELD
ジャイロ GYRO
選択 SELECT
A-Dコンバータ A-D CONVERTER AD-100 *2
MJ-A6SPF0003-050C/100C 5/10m, φ6 *2
ヘディングセンサー HEADING SENSOR PG-1000 *2
MJ-A6SPF0007-100C 10m, φ6 *2
MJ-A6SPF *3
HDG
シロ WHT 1 DATA-H
クロ BLK 2 DATA-C
キ YEL 3 CLK-H
ミドリ GRN 4 CLK-C
5 NC
6 GND
リモートコントローラ REMOTE CONTROLLER RCU-019 *2
MJ-A7SPF0007-050C 5m, φ7 *2
MJ-A7SPF *3
PC/EXT-BUZZER
シロ WHT 1 SD
アオ BLU 2 RD
キ YEL 3 REMOTE-KEY
ミドリ GRN 4 NC
アカ RED 5 +12V
クロ BLK 6 EXT.BUZZER
7 SHIELD
外部ブザー EXT. BUZZER OP03-136 *2
1m
アカ RED
クロ BLK
IV-2sq. *1
DJ-1
MJ-B24LPF0012, 10/15/20/30m, φ11 (RW-9807, 21C+2C2V, 30m MAX.)
空中線部 ANTENNA UNIT RSB-0070/0073 (RTR-085A/086A)
RTB 03P9405A
J821 (VH9P) *5
10 キ (太) YEL(B) 1 +12V
11 クロ (太) BLK(B) 2 +12V
20 アカ (太) RED(B) 3 GND
14 シロ (太) WHT(B) 4 -12V
15 チャ (太) BRN(B) 5 -12V
2 チャ BRN 6 TX-TRIG.
8 アオ BLU 7 P/L-A
7 ミドリ GRN 8 P/L-B
9 NC
J823 (VH4P) *5
9 シロ WHT 1 BP
1 アオ (太) BLU(B) 2 MOTOR+
17 クロ BLK 3 HD.
5 ムラサキ (太) PPL(B) 4 MOTOR-
J824 (NH13P) *5
18 ムラサキ PPL 1 TUNE-IND.
22 キミドリ (太) L-GRN(B) 2 MOTOR-
23 3 NC
19 モモ (太) PNK(B) 4 MOTOR+
3 アカ RED 5 MBS-L
4 ハイ (太) GRY(B) 6 MOTOR+
7 NC
24 ダイ ORG 8 GND
9 NC
10 NC
21 11 GND
16 ドウジク COAX. 12 VIDEO
6 キ YEL 13 TUNE-CONT
J822 (VH2P)
13 ミドリ (太) GRY(B) 1 -12
12 ダイ (太) ORG(B) 2 +12
*4
*4
RW-4747

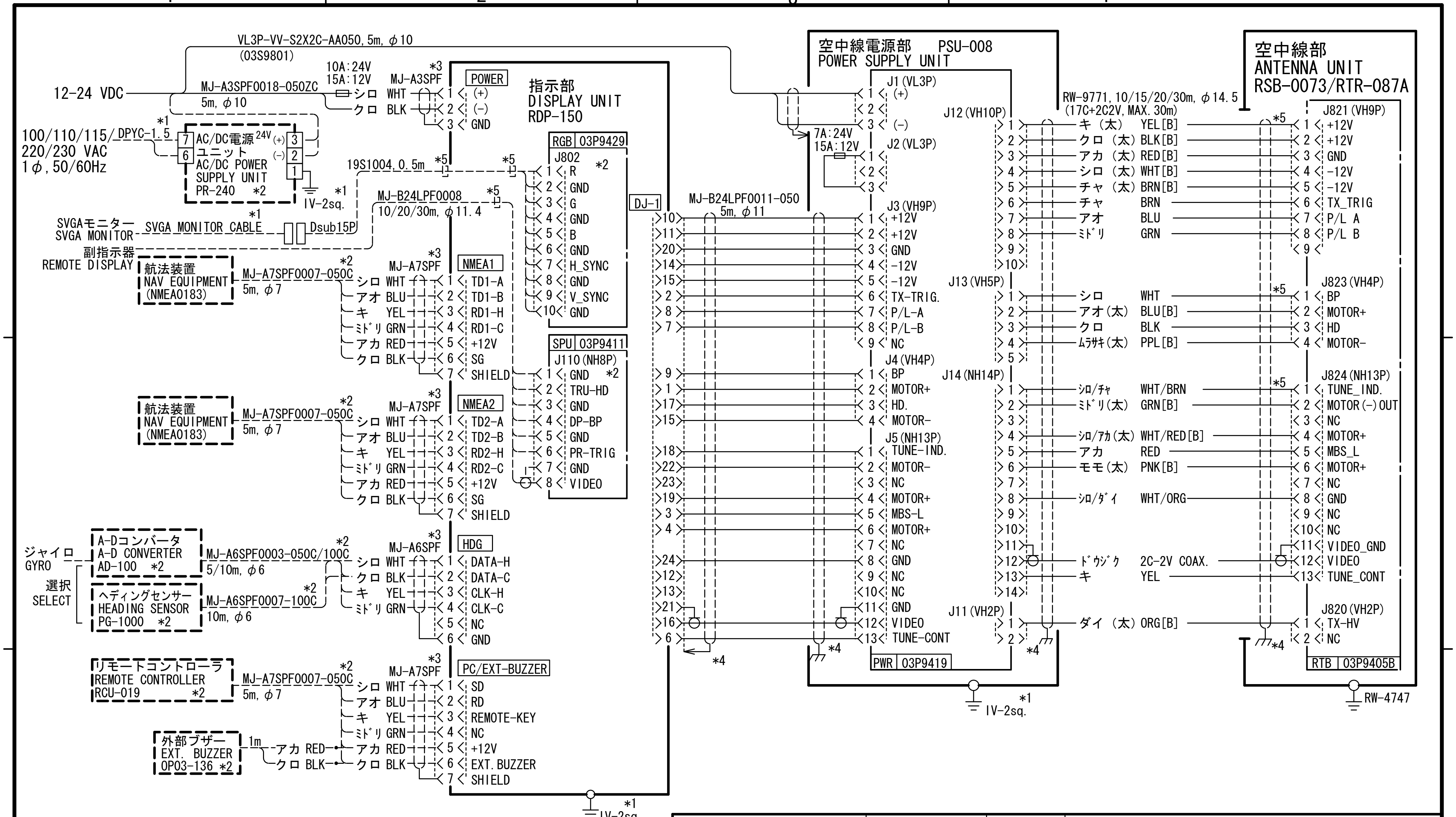
注記
＊1） 造船所手配。
＊2） オプション。
＊3） コネクタは工場にて取付済み。
＊4） シールドは両端で完全にアースする。
＊5） ＥＭＩコアを取り付ける。

NOTES
*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: FITTED AT FACTORY.
*4: GROUND SHIELD EFFECTIVELY AT BOTH ENDS.
*5: ATTACH EMI CORES.

DRAWN 14/Dec/2011 T.YAMASAKI		TITLE	FR-8062/8122
CHECKED 14/Dec/2011 H.MAKI		名 称	船舶用レーダー
APPROVED 14/Dec/2011 Y.NISHIYAMA			相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG. No. C3539-C01- H	REF. No. 03-167-6003-4		INTERCONNECTION DIAGRAM

FURUNO ELECTRIC CO., LTD.

FURUNO



1
2
3
4
A
B
C
VL3P-VV-S2X2C-AA050,5m,φ10
(03S9801)
12-24 VDC
MJ-A3SPF0018-050ZC
5m,φ10
10A:24V
15A:12V
シロ WHT
クロ BLK
*3
MJ-A3SPF
POWER
1 (+)
2 (-)
3 GND
指示部
DISPLAY UNIT
RDP-150
100/110/115/
220/230 VAC
1φ,50/60Hz
DPYC-1.5
*1
AC/DC電源ユニット
AC/DC POWER SUPPLY UNIT
PR-240 *2
24V
IV-2sq.
19S1004,0.5m
*5
RGB 03P9429
J802 *2
1 R
2 GND
3 G
4 GND
5 B
6 GND
7 H_SYNC
8 GND
9 V_SYNC
10 GND
MJ-B24LPF0008
10/20/30m,φ11.4
SVGAモニター
SVGA MONITOR
SVGA MONITOR CABLE
Dsub15P
副指示器
REMOTE DISPLAY
航法装置
NAV EQUIPMENT
(NMEA0183)
MJ-A7SPF0007-050C
5m,φ7
MJ-A7SPF
NMEA1
シロ WHT 1 TD1-A
アオ BLU 2 TD1-B
キ YEL 3 RD1-H
ミドリ GRN 4 RD1-C
アカ RED 5 +12V
クロ BLK 6 SG
7 SHIELD
NMEA2
シロ WHT 1 TD2-A
アオ BLU 2 TD2-B
キ YEL 3 RD2-H
ミドリ GRN 4 RD2-C
アカ RED 5 +12V
クロ BLK 6 SG
7 SHIELD
SPU 03P9411
J110(NH8P) *2
1 GND
2 TRU-HD
3 GND
4 DP-BP
5 GND
6 PR-TRIG
7 GND
8 VIDEO
ジャイロ
GYRO
選択
SELECT
A-Dコンバータ
A-D CONVERTER
AD-100 *2
MJ-A6SPF0003-050C/100C
5/10m,φ6
ヘディングセンサー
HEADING SENSOR
PG-1000 *2
MJ-A6SPF0007-100C
10m,φ6
MJ-A6SPF
HDG
シロ WHT 1 DATA-H
クロ BLK 2 DATA-C
キ YEL 3 CLK-H
ミドリ GRN 4 CLK-C
5 NC
6 GND
リモートコントローラ
REMOTE CONTROLLER
RCU-019 *2
PC/EXT-BUZZER
シロ WHT 1 SD
アオ BLU 2 RD
キ YEL 3 REMOTE-KEY
ミドリ GRN 4 NC
アカ RED 5 +12V
クロ BLK 6 EXT.BUZZER
7 SHIELD
外部ブザー
EXT. BUZZER
OP03-136 *2
1m
アカ RED
クロ BLK
DJ-1
MJ-B24LPF0011-050
5m,φ11
空中線電源部 PSU-008
POWER SUPPLY UNIT
J1(VL3P)
1 (+)
2
3 (-)
7A:24V
15A:12V
J2(VL3P)
J3(VH9P)
1 +12V
2 +12V
3 GND
4 -12V
5 -12V
6 TX-TRIG.
7 P/L-A
8 P/L-B
9 NC
J4(VH4P)
1 BP
2 MOTOR+
3 HD.
4 MOTOR-
J5(NH13P)
1 TUNE-IND.
2 MOTOR-
3 NC
4 MOTOR+
5 MBS-L
6 MOTOR+
7 NC
8 GND
9 NC
10 NC
11 GND
12 VIDEO
13 TUNE-CONT
PWR 03P9419
J12(VH10P)
J13(VH5P)
J14(NH14P)
J11(VH2P)
*4
RW-9771,10/15/20/30m,φ14.5
(17C+2C2V,MAX.30m)
キ (太) YEL[B]
クロ (太) BLK[B]
アカ (太) RED[B]
シロ (太) WHT[B]
チャ (太) BRN[B]
チャ BRN
アオ BLU
ミドリ GRN
シロ WHT
アオ(太) BLU[B]
クロ BLK
ムラサキ(太) PPL[B]
シロ/チャ WHT/BRN
ミドリ(太) GRN[B]
シロ/アカ(太) WHT/RED[B]
アカ RED
モモ(太) PNK[B]
シロ/ダイ WHT/ORG
ドウジク 2C-2V COAX.
キ YEL
ダイ (太) ORG[B]
空中線部
ANTENNA UNIT
RSB-0073/RTR-087A
J821(VH9P)
1 +12V
2 +12V
3 GND
4 -12V
5 -12V
6 TX_TRIG
7 P/L A
8 P/L B
9
J823(VH4P)
1 BP
2 MOTOR+
3 HD
4 MOTOR-
J824(NH13P)
1 TUNE_IND.
2 MOTOR(-)OUT
3 NC
4 MOTOR+
5 MBS_L
6 MOTOR+
7 NC
8 GND
9 NC
10 NC
11 VIDEO_GND
12 VIDEO
13 TUNE_CONT
J820(VH2P)
1 TX-HV
2 NC
RTB 03P9405B
RW-4747

注記

*1）造船所手配。
*2）オプション。
*3）コネクタは工場にて取付済み。
*4）シールドは両端で完全にアースする。
*5）ＥＭＩコアを取り付ける。

NOTE

*1: SHIPYARD SUPPLY.
*2: OPTION.
*3: FITTED AT FACTORY.
*4: GROUND SHIELD EFFECTIVELY AT BOTH ENDS.
*5: ATTACH EMI CORES.

DRAWN 25/Mar/2011 T.YAMASAKI		TYPE	FR-8252
CHECKED 25/Mar/2011 H.MAKI		名 称	船舶用レーダー
APPROVED 28/Mar/2011 Y.NISHIYAMA			相互結線図
SCALE	MASS kg	NAME	MARINE RADAR
DWG.No. C3541-C01- H	REF.No. 03-167-6005-3		INTERCONNECTION DIAGRAM

S-2

FURUNO ELECTRIC CO., LTD.