

FURUNO

INSTALLATION MANUAL

MARINE RADAR

MODEL 1932 MARK-2/1942 MARK-2



FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

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•Your Local Agent/Dealer

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MODEL-1932/1942 MARK-2



* 00080835500 *



SAFETY INSTRUCTIONS



WARNING

Radio Frequency Radiation Hazard

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

Distances at which RF radiation levels of 100 and 10 W/m² exist are given in the table below.

Note: If the scanner 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 scanner revolution. This is possible. Ask your FURUNO representative or dealer to provide this feature.

MODEL	Radiator type	Distance to 100 W/m ² point	Distance to 10 W/m ² point
1932 MK-2	XN10A	Worst case 0.2 m	Worst case 3.0 m
1942 MK-2	XN12A	Nil	Worst case 2.5 m

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 scanner unit.

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

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

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

Turn off the power at the mains switch-board 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.

Do not install the display unit where it may get wet from rain or water splash.

Water in the display unit can result in fire, electrical shock or equipment damage.

WARNING

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

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

Use only the specified power cable.

Fire or equipment damage can result if a different cable is used.

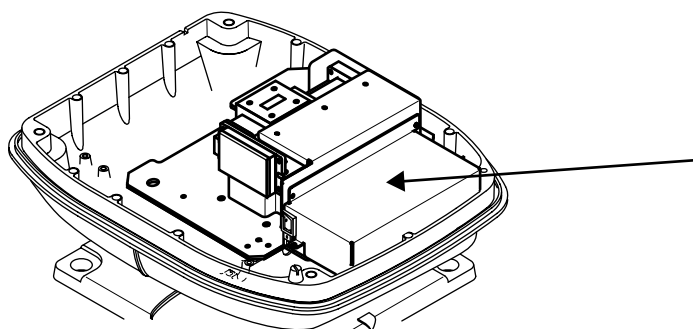
CAUTION

Ground the equipment to prevent electrical shock and mutual interference.

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

	Standard compass	Steering compass
Display unit	0.75 m	0.60 m
Scanner unit	1.00 m	0.80 m

HIGH TENSION WARNING



DANGER

Electrical shock hazard. Do not touch parts inside this cover.

危険

感電の恐れあり。カバーの内部には、絶対に触れないで下さい。

Name: Danger Label
Type: 14-055-4202-0
Code No.: 100-245-220

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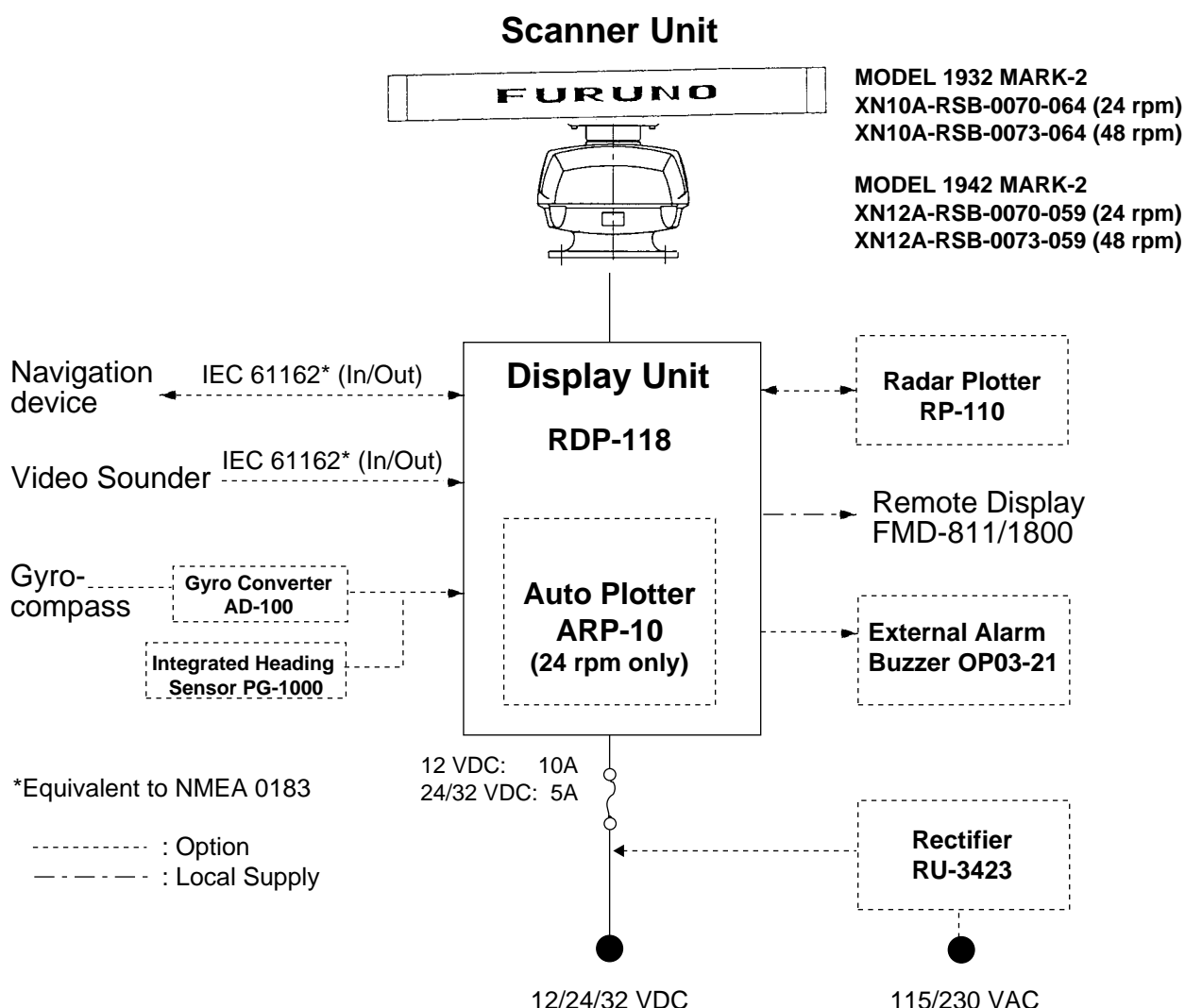
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SYSTEM CONFIGURATION



Note: Even though the display unit meets waterproof standard IPX-5, the connection of external buzzer, radar plotter and/or remote display can affect waterproofness. Watertight integrity cannot be guaranteed. When these modification has been done, the display unit should not be mounted where exposed.

Input data

Own ship's position: GGA>RMC>RMA>GLL (GLL is available Ver.1.5 only)

Speed: RMC>RMA>VTG>VHW

Heading (True): HDT>HDG *1>HDM *1 >VHW>VHW*1

Heading (Magnetic): HDM>HDG *1>HDT *1>VHW>VHW *1

Course (True): RMC>RMA>VTG

Course (Magnetic): VTG>RMC>RMA

Waypoint (Range, Bearing): RMB>BWC>BWR

Loran time difference: RMA>GLC>GTD

Water depth: DPT>DBT>DBK>DBS

Water temperature: MTW>MDA

Time: ZDA

XTE: RMB>XTE>APB

*1: calculate by magnetic drift.

Output data

NMEA0183 (Ver.1.5/2.0), RS-422

TLL(target data) and RSD

EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks
Scanner Unit	XN10A-RSB-0070-064	—	Select one	For 1932M2, 24 rpm
	XN10A-RSB-0073-064	—		For 1932M2, 48 rpm
	XN12A-RSB-0070-059	—	Select one	For 1942M2, 24 rpm
	XN12A-RSB-0073-059	—		For 1942M2, 48 rpm
Display Unit	RDP-118	—	1	
Installation Materials	CP03-19300	000-086-914	Select one	CP03-18401, power cable, 10 m signal cable
	CP03-19310	000-086-915		CP03-18401, power cable, 15 m signal cable
	CP03-19320	000-086-916		CP03-18401, power cable, 20 m signal cable
	CP03-19330	000-086-917		CP03-18401, power cable, 30 m signal cable
Accessories	FP03-06400	000-086-872	1 set	FP03-06410, FP03-04810
Spare Parts	SP03-12200	000-086-965	1 set	

Optional Supply

Name	Type	Code No.	Remarks
External Buzzer *	OP03-21	000-030-097	
Rectifier	RU-3423	000-030-443	
Cable Assy.	MJ-A6SPF0007-100	000-125-237	For heading sensor, 10 m w/6P connector at both ends, straight
	MJ-A6SPF0012-050	000-134-424	For navaid, video sounder, 5 m w/6P connector at both ends, cross
	MJ-A6SPF0012-100	000-133-817	For navaid, video sounder, 10 m w/6P connector at both ends, cross
	MJ-A6SPF0009-100	000-125-236	For navaid, video sounder, heading sensor, 10 m w/6P connector at one side
Signal Cable	MJ-A6SPF0003-050	000-117-603	5 m, w/6P connector at one end
Flush Mount Kit	OP03-145	008-476-060	For display unit
Auto Plotter	ARP-10	000-086-852	Available with 24 rpm scanner.
Radar Plotter *	RP-110	-	
Cable Assy.	MJ-B24LPF0006-005	000-140-438	Cable converter connector

*: Even though the display unit meets waterproof standard IPX-5, the connection of external buzzer, radar plotter and/or remote display can affect waterproofness. Watertight integrity cannot be guaranteed. When these modification has been done, the display unit should not be mounted where exposed.

1. MOUNTING

1.1 Mounting Methods for Scanner Unit

- The scanner unit is generally installed either on top of the wheelhouse or on the radar mast on a suitable platform. Locate the scanner 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 scanner unit would be a much more serious obstruction; you would need to place the scanner unit well above or below it.
- It is rarely possible to place the scanner 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 scanner 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 placed too close to the scanner unit. Observe the following compass safe distances to prevent deviation of a magnetic compass: Standard compass, 1.00 m, Steering compass, 0.75 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 scanner and the display comes in lengths of 10 m (standard), 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 scanner unit must not be mounted where the temperature is more than 70 C.

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

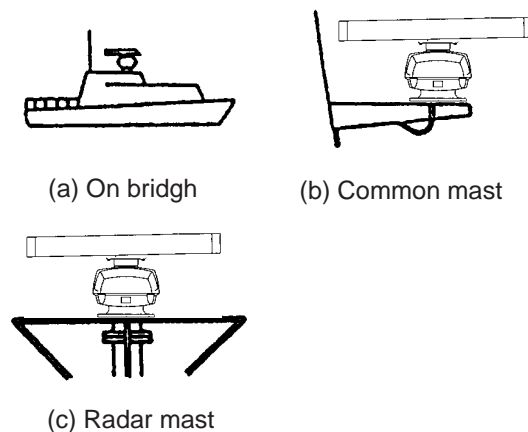


Figure 1-1 Scanner unit mounting methods

1.2 Fixing Holes in Mounting Platform

Referring to the outline drawing on page D-1, drill five holes in the mounting platform: four holes of 15 mm diameter for fixing the scanner unit and one hole of 25-30 mm diameter for the signal cable.

1.3 Fastening the Radiator to the Radiator Bracket

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

1. Remove the radiator cap from the radiator bracket.
2. Coat contacting surface between scanner radiator and radiator bracket with anticorrosive sealant as shown in Figure 1-2 (scanner unit XN10A) or Figure 1-3 (scanner unit XN12A).

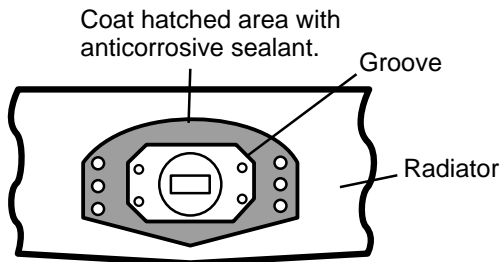


Figure 1-2 Coating the bottom of scanner radiator for XN10A with anticorrosive sealant

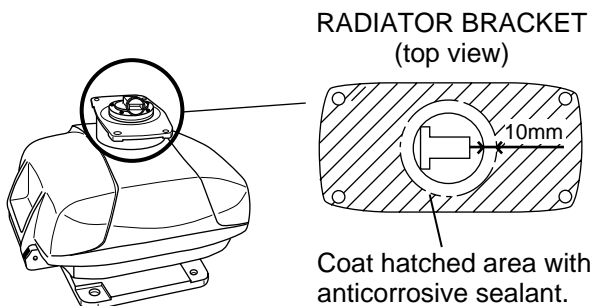


Figure 1-3 Coating scanner bracket for XN12A with anticorrosive sealant

3. Coat threaded holes on the scanner radiator with anticorrosive sealant.
4. Grease the O-ring and set it to the radiator bracket.
5. Lay the scanner radiator on the radiator bracket.
6. Coat the radiator fixing bolts (4 pcs.) with

anticorrosive sealant. Fasten the scanner radiator to the radiator bracket with the radiator fixing bolts, flat washers and spring washers.

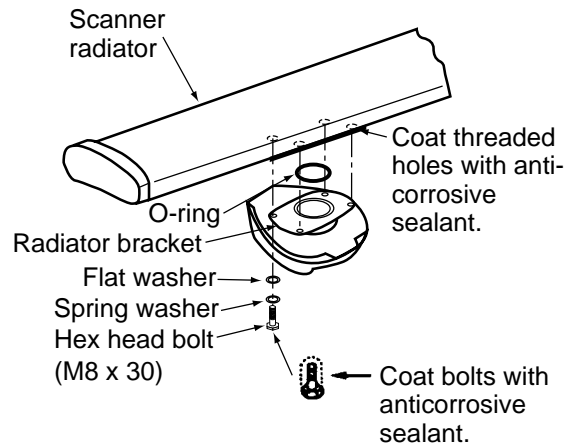


Figure 1-4 Fastening the radiator bracket to the scanner unit chassis (shown: XN12A)

1.4 Mounting the Scanner Unit

The scanner unit can be mounted using the fixing holes on the outside (240 x 240 nm) or inside (140 x 150 nm) the scanner unit.

Outside fixing holes

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

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

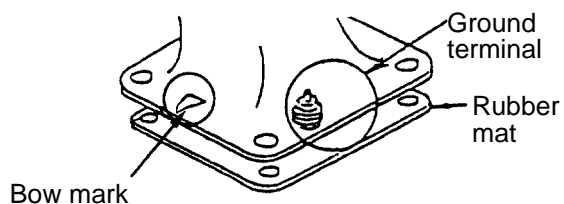


Figure 1-5 Location of rubber mat

2. Lay the scanner unit on the mounting platform, orienting it as shown in Figure 1-6.

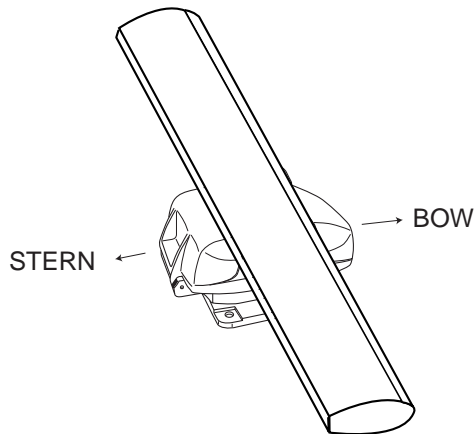


Figure 1-6 Scanner unit (Shown: XN12A)

⚠ CAUTION

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

The radiator may be damaged.

3. Insert four hex bolts and seal washers from the top of the scanner 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.

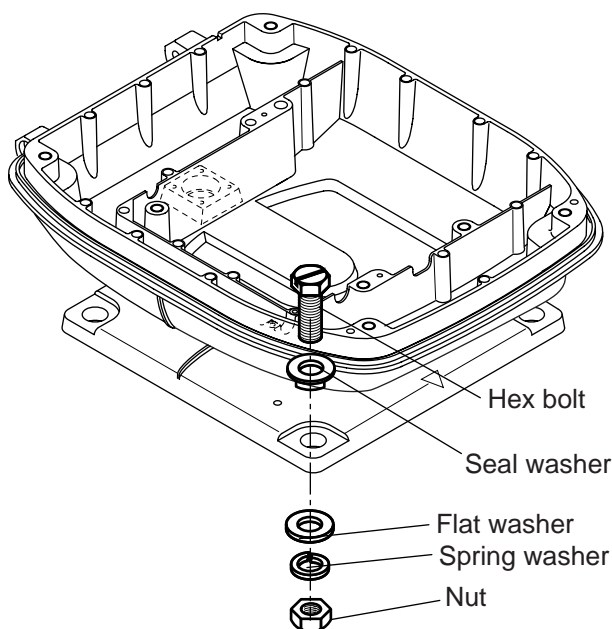


Figure 1-7 Fixing the scanner unit chassis

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

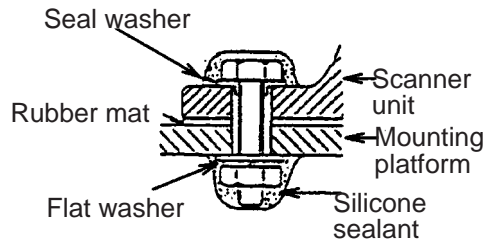


Figure 1-8 How to fasten scanner unit to mounting platform

5. Coat flat washers, spring washers, nuts and exposed parts of bolts with anticorrosive sealant.
6. Prepare ground point in mounting platform (within 300 mm of ground terminal on scanner unit) using M6 x 25 bolt, nut and flat washer.
7. Run the ground wire (RW-4747, 370 mm) between the ground terminal and ground point.
8. Coat ground terminal and ground point with silicone sealant as shown in Figure 1-9.

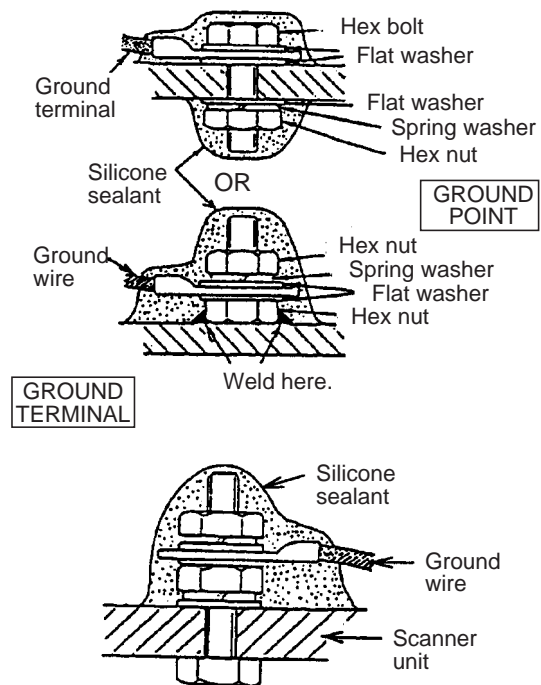


Figure 1-9 How to coat ground point and ground terminal with silicone sealant

Fixing holes inside szcanner unit

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

1. Loose four scanner bolts to open the scanner unit. Refer to Figure 11 for location.

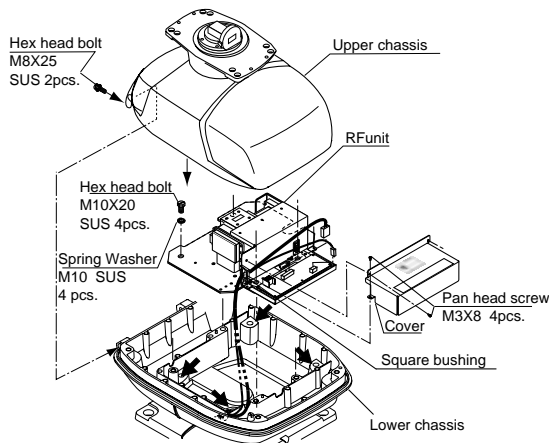


Figure 10 Scanner unit chassis, upper chassis separated

2. Unplug connector connected between upper and lower chassis.
3. Separate upper chassis from lower chassis by removing two hex head bolts.
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 anticorrosive sealant. Cut a slit in rubber bushing and insert bolt into bushing. Do not use seal washers.
9. Reassemble RF unit, cover and upper chassis.
10. Set four knob caps (supplied) into outside fixing holes.
11. Do steps 6-8 in "Outside fixing holes".

1-4

1.5 Display Unit Mounting

Mounting considerations

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

- Provide adequate space behind and around the unit to permit circulation of air and to provide convenient access to the rear connection.
- Even though the picture is quite legible even in bright sunlight, keep the display unit out of direct sunlight or at least shaded because of heat that can build up inside the cabinet.
- Locate the display unit in a position where you can view and operate it conveniently but where there is no danger of salt or fresh water spray or immersion.
- The orientation of the display unit should be so the radar screen is viewed while the operator is facing in the direction of the bow. This makes determination of your position much easier.
- Make sure you allow enough clearance both to get to the connectors behind the unit and to allow you to get your hands in on both sides to loosen or tighten the mounting knobs. Make sure you leave at least a foot or so of "service loop" of cables behind the unit so it can be pulled forward for servicing or easy removal of the connectors.
- The compass safe distance of 0.75 meters (standard compass) and 0.6 meters (steering compass) should be observed to prevent deviation of the magnetic compass.
- Even though the display unit meets waterproof standard IPX-5, the connection of external buzzer, radar plotter and/or remote display can affect waterproofness. Watertight integrity cannot be guaranteed. When these modification has been done, the display unit should not be mounted where exposed.

Mounting

The display unit is designed to be mounted on a tabletop or bulkhead.

1. Using the hanger as a template, mark screw locations in the mounting location.
2. Fix the hanger to the mounting location with five M6 tapping screws (supplied).
3. Fit the knob bolts to the display unit. Install the display unit in the hanger. Tighten the knob bolts securely.

2. CONNECTIONS

2.1 Connecting the Signal Cable

Only the signal cable runs from the display unit to the scanner 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.

1. Open the scanner cover by loosening two screws, and then fix the stay.

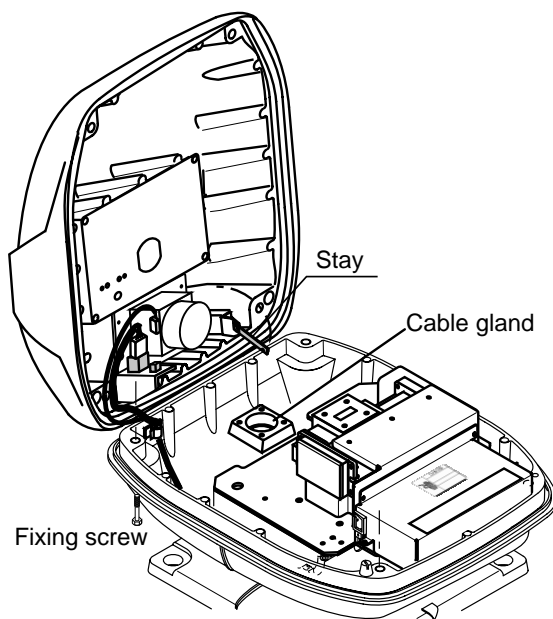


Figure 2-1 Scanner unit chassis, cover opened

2. Fabricate the signal cable as shown below.

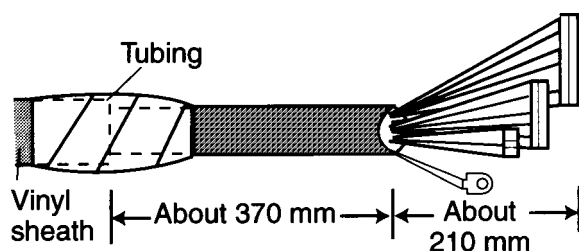


Figure 2-2 Fabrication of signal cable

3. Unfasten the cable gland assembly (plate, gasket, flat washer).
4. Pass the signal cable w/connector through the bottom of the scanner unit chassis. Pass the cable through the gland assembly as shown below.

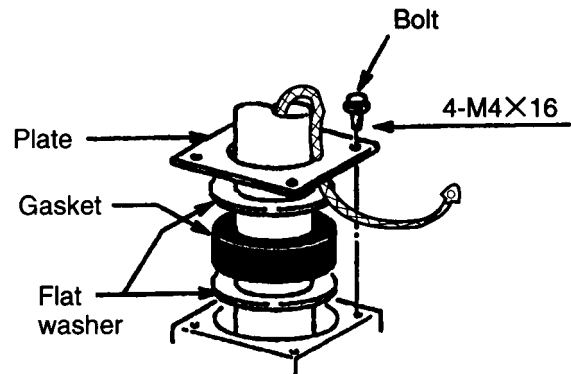


Figure 2-3 Passing the signal cable through the cable gland assembly

5. Fasten the crimp-on lug on the shield to one of the fixing bolts of the cable gland assembly.
6. Position the signal cable so that no more than 4 cm of the sheath is exposed as shown in the figure below. Tighten fixing bolts on the cable gland assembly.

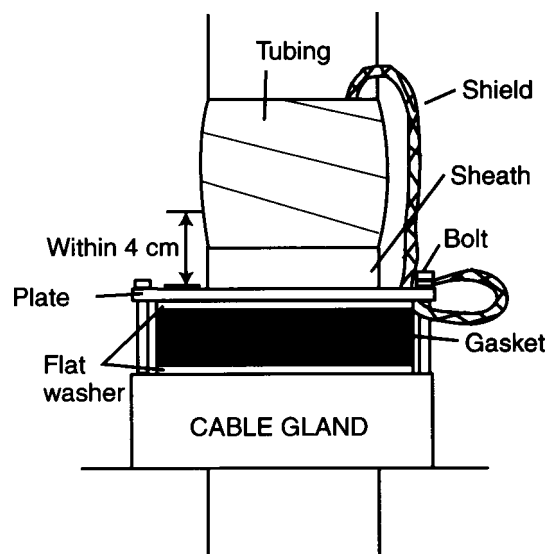


Figure 2-4 How to fix signal cable in cable gland

7. Unfasten four screws shown in the figure below.

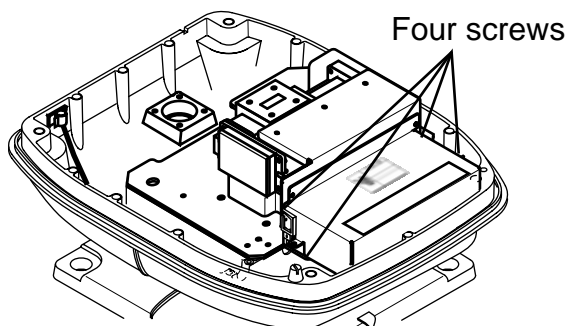


Figure 2-5 Scanner unit chassis, cover opened

8. Pass the signal cable through the cable protector.

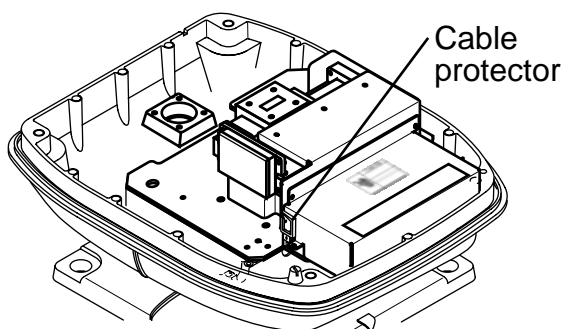


Figure 2-6 Scanner unit chassis, cover opened

9. Connect the signal cable to the RTB Board (03P9249), referring to the inter-connection diagram and the figure below. Note that connector VH2P is not used.

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

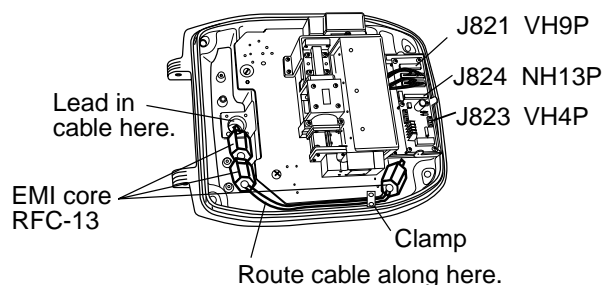


Figure 2-7 Scanner unit chassis, cover opened

11. Fix the signal cable with the cable clamp.

12. Release the stay and close the cover. Loosely fasten the cover fixing screws; you will have to make some adjustments inside after completion of wiring.

2.2 Display Unit Connections

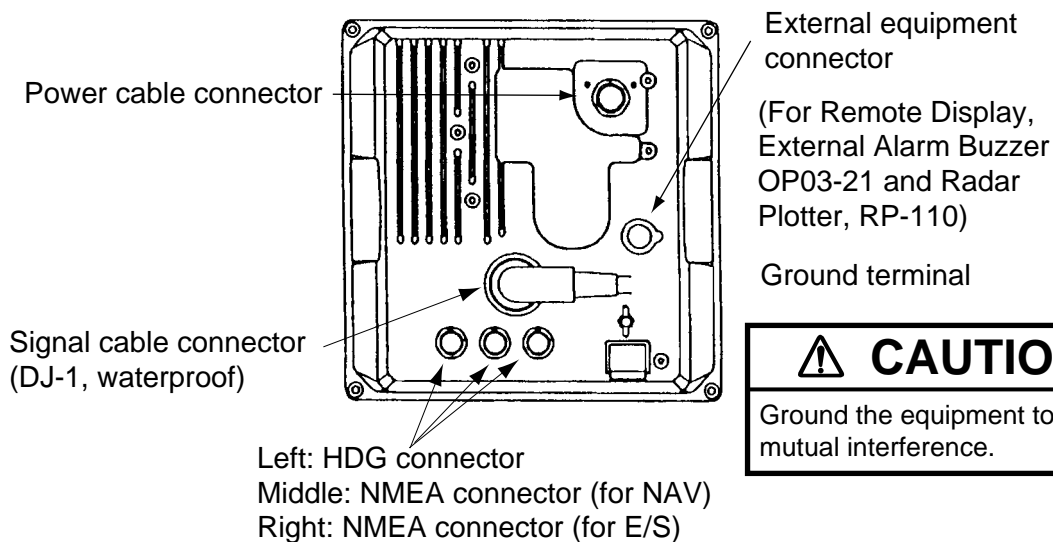


Figure 2-8 Connection on the display unit



CAUTION

Ground the equipment to prevent mutual interference.

Connection procedure

1. Connect the power cable to the power cable connector on the rear of the display unit.
2. Connect the signal cable to connector DJ-1 on the rear of the display unit.
3. Run a ground wire (local supply) between the ground terminal on the rear of the display unit and the ship's superstructure.

2.3 Connection of External Equipment

Navigation aid, video sounder connection

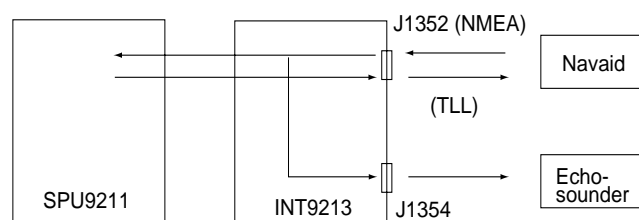
If your navigation aid can output data in IEC 61162 (NMEA 0183) format, your vessel's position in latitude and longitude, the range and bearing to waypoint, speed and course may be input to this radar, and be seen on the screen.

Further if your video sounder can output depth data in IEC61162 (NMEA 0183) format, depth can be displayed on the radar screen.

You will need an NMEA cable. The following cables are optionally available.

Type	Code no.	Remarks
MJ-A6SPF0012-050	000-134-424	6P-6P (5m)
MJ-A6SPF0012-100	000-133-817	6P-6P (10m)
MJ-A6SPF0003-050	000-117-603	w/connector (5m)
MJ-A6SPF0009-100	000-125-236	w/connector (10m)

This radar can output NAV data received from a navaid to an echosounder.



1932 MARK2/42 MARK2

Figure 2-9 Data flow

Heading sensor connection

Heading signal can be connected to the "HDG" connector. You will need a heading sensor cable. The following cables are optionally available.

Type	Code no.	Remarks
MJ-A6SPF0007-100	000-125-237	6P-6P (10m)
MJ-A6SPF0009-100	000-125-236	w/connector (10m)
MJ-A6SPF0003-050	000-117-603	w/connector (5m)

Input/Output Data List

Model	Connector Name	Data	Pin	In/Out
FCV561M2	J1	183 (1.5)	4	In/Out
FCV581L	NMEA	183 (1.5/2.0)	6	In/Out
FCV582L	NMEA	183 (1.5/2.0)	6	In/Out
FCV291	NMEA	183 (1.5/2.0)	6	In/Out
FCV292	NMEA	183 (1.5/2.0)	6	In/Out
FCV668	NMEA	183 (1.5)	4	In/Out
FCV600L	NMEA	183 (1.5/2.0)	6	In/Out
GP1810	IN/OUT	183 (1.5/2.0)	6	In/Out
GP3100M2	IN/OUT	183 (1.5)	6	In/Out
GP8000M2	NMEA	183 (1.5/2.0)	4	In/Out
PS8000M2	NMEA	183 (1.5/2.0)	4	In/Out
GP80	DATA1	183 (1.5/2.0)	6	In/Out
GP80	DATA2	183 (1.5/2.0)	6	In/Out
GP1610C	NMEA	183 (1.5/2.0)	6	In/Out
GP1610CF	NMEA	183 (1.5/2.0)	6	In/Out

Note: All plotters listed in the table above can receive TLL data (radar target position).

2.4 Exchange of Fuse for 24/32V Power Supply

The power cable comes with a 10A fuse in its the fuse its holder. This fuse is for use with a 12V DC power supply. For 24V/32V DC power supply, replace the fuse with the 5A fuse (supplied) and attach 5A label (supplied) to fuse holder.



CAUTION

Use the proper fuse.

Use of an improper fuse can damage the equipment and void the warranty.

2.5 Checking the Installation

After completing the installation, it is a good idea to recheck it to be sure all steps were correctly done. Use the table below to check the installation.

- ☐ The signal cable is securely retained against the mast or mounting platform and is free of interference from running rigging.
- ☐ The cable gland or entry on the deck, if provided, is waterproofed.
- ☐ The power connections to the battery are of correct polarity.
- ☐ The plugs at the rear of the display unit are tightly fastened.
- ☐ The fuse in the power cable is 10A (12V) or 5A (24V/32V DC).

3. ADJUSTMENT

This section covers adjustment of the radar after installation. You will need to

- adjust tune/video amplifier level
- enter antenna height
- align heading
- adjust sweep timing
- adjust main bang suppression
- select STC curve
- set a dead sector, and
- confirm magnetron heater voltage.

These adjustments are done through the installation setup menu.

3.1 Preparation

Most adjustments and initial settings may be completed on the Installation Setup menu, and you can display this menu as follows:

1. Turn off the radar. While pressing and holding down the [GAIN] control (at least three seconds), press the [POWER] key.
2. Press the [MENU] key, select "OTHERS" by using the omnipad, and press [ACQ/ENTER] key.
3. Select "24. Installation Setup".
4. Press the [ACQ/ENTER] key to open the Installation Setup menu.

[Installation Setup]			
Select item by omnipad and press ENTER key.			
1. Nav Talker	All	GPS	LC
2. Depth Unit	m	fa	ft
3. Temp Unit	°C	°F	
4. Hdg Sensor	Magnet	Gyro	
5. Key Beep	Off	On	
6. Ant on Tx	Rotate	Stop	
7. Dead Sector	180°-180°		
8. Tuning/Video Auto Adjustment			
9. Heading Alignment			
10. Sweep Timing Adjustment			
11. MBS Adjustment			
12. Ant Height	Low	Mid	High
13. STC Curve	Sharp	Std	Gntl
14. Ope Mode	Master	Slave	
15. Hours in Use	000001.5H		
16. Tx Hours	000000.0H		

Figure 3-1 Installation Setup menu

3.2 Adjusting Tuning/Video

Do the following to automatically adjust tuning and video amplifier level input.

1. Press the [STBY/TX] key to transmit.

WARNING

Before transmitting the radar make sure no one is near the scanner unit, to prevent the potential risk of being struck by the rotating scanner and exposure to RF radiation hazard.

2. On the Installation Setup menu, select "8. Tune/Video Adjustment" and press the [ACQ/ENTER] key.
3. The unit automatically adjusts tuning and video, displaying the following message.

[Tune/Video Auto Adjustment]
Now under correction.
Return to installation setup menu after the correction.

Figure 3-2 Tune/video auto adjustment message

4. When adjustment is completed, the message disappears.

3.3 Entering Antenna Height

The STC curve changes with respect to antenna height above the waterline. Enter antenna height above the waterline to optimize the STC curve.

1. Select "12. Ant Height" from the Installation Setup menu and press the [ACQ/ENTER] key.
2. Operate the omnipad to select antenna height above the waterline; Low (3 m or less), Mid (3 to 6 m) or High (6 to 10 m).
3. Press the [ACQ/ENTER] key.

3.4 Aligning Heading

(Adjustment sector: 0~359.90)

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

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

1. Identify a suitable target (for example, ship or buoy) at a range between 0.125 to 0.25 nautical miles, preferably near the heading marker. To lessen error, keep echoes in the outer half of the picture by changing the range. Also, be sure the zoom and off center functions are off.
2. Select "9. Heading Alignment" from the Installation Setup menu and press the [ACQ/ENTER] key. The following message appears:

[Heading Alignment]
Set EBL1 to center of target
dead ahead and press ENTER.

Correction 0.0°

<Press MENU for inst setup>

Figure 3-3 Heading alignment message

3. Operate the omnipad to bisect target selected at step 1 with the heading marker.
4. Press the [ACQ/ENTER] key.
5. 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.

3.5 Adjusting Sweep Timing

(Adjustment range: 0.000~4.266 nm)

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 scanner unit through the signal cable to trigger the transmitter (magnetron). The time taken by the signal to travel up to the scanner unit varies, depending largely on the length of the 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 – they will be seen as "pushed out" or "pulled in" near the picture center. The range of objects will also be incorrectly shown.

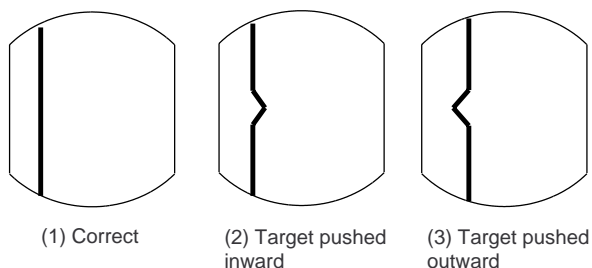


Figure 3-4 Examples of improper and correct sweep timing

1. Transmit on the shortest range and confirm that the [GAIN] and [A/C SEA] controls are properly adjusted.
2. Visually select a target which forms a straight line (for example, harbor wall, straight pier).
3. Select "10. Sweep Timing Adjustment" from the Installation Setup menu and press the [ACQ/ENTER] key. The following message appears:

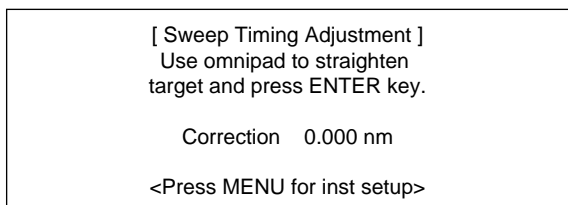


Figure 3-5 Sweep timing adjustment message

4. Operate the trackball to straighten the target selected at step 2, and then press the [ACQ/ENTER] key.

3.6 Adjusting MBS

(Adjustment range: 0.00~0.25)

Main bang, a large filled circle which appears at the display center on short ranges, can be suppressed as follows:

1. Transmit on long range about 10 minutes.
2. Adjust the gain to show a small amount of noise on the display.
3. Change to the 0.125 nautical mile range and adjust the [A/C SEA] control.
4. Select "11. MBS Adjustment" from the Installation Setup menu and press the [ACQ/ENTER] key. The following message appears:

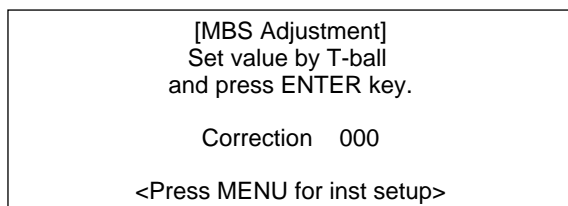


Figure 3-6 MBS adjustment message

5. Operate the trackball to suppress main bang (adjustment range: 000 to 025).
6. Press the [ACQ/ENTER] key.

3.7 Selecting STC Curve

The STC curve changes with respect to the antenna height above the waterline. The default STC curve can be maintained in most cases. If necessary the STC curve can be changed as follows:

1. Select "13. STC Curve" from the Installation Setup menu and press the [ACQ/ENTER] key.
2. Select STC curve desired;
Sharp: The effective range of the [A/C SEA] control is relatively short.
Std: Between Sharp and Gentle.
Gntl (Gentle): The effective range of the [A/C SEA] control is relatively long.
3. Press the [ACQ/ENTER] key.

3.8 Setting a Dead Sector

When the scanner is installed at a close distance in front of the wheelhouse, the radar should be set not to transmit within that area, to prevent microwave hazard. The dead sector area graphic can be turned on/off on the OTHERS menu.

1. Select "7. Dead Sector" from the Installation Setup menu and press the [ACQ/ENTER] key.
2. Operate the omnipad to enter starting point of sector (in figures).
3. Press the [ACQ/ENTER] key.
4. Operate the omnipad to enter ending point of sector (in figures, Max: 270°).
5. Press the [ACQ/ENTER] key.

Note: This setting should be done after other adjustment are finished.

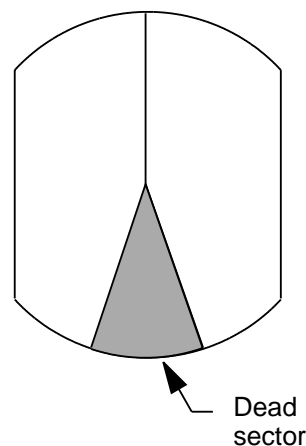


Figure 3-7 Dead sector

3.9 Checking Magnetron Heater Voltage

Magnetron heater voltage is formed on the MD Board of the scanner unit, and is preadjusted at the factory for use with any length of signal cable. Therefore no adjustment is required. However, check magnetron heater voltage as follows:

1. Turn on the radar and leave it in stand-by.
2. Open the scanner cover.
3. Unfasten two screws to remove the RF section cover.

5. Confirm that the meter reads $7.5\text{ V} \pm 0.1\text{ V}$.
6. Close the scanner cover and tighten the cover fixing screws.

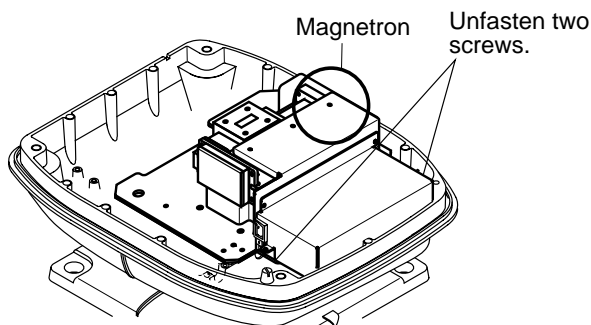
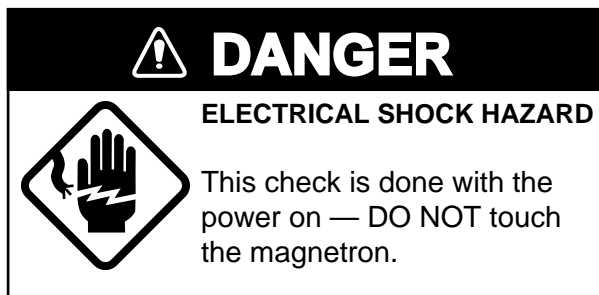


Figure 3-8 Scanner unit, cover opened

4. Connect a multimeter, set to 10 VDC range, between test point J825#4 and J825#6(GND) on the RTB Board (03P9249).

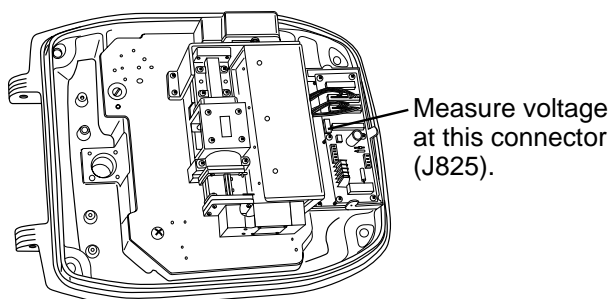


Figure 3-9 Scanner unit, cover removed

4. INSTALLATION OF ARP-10 (OPTION)

NOTICE

This option is not available with 48 rpm scanner unit.

4.1 Necessary Parts

Name	Type	Code No.	Qty
ARP-10 Board	18P9007	008-476-930	1
Spacer	SQ-20	000-801-650	4
Spring Washer	M3 C5191W	000-864-204	4
Pan Head Screw	M3x8 C2700W	000-881-404	6
Pan Head Screw w/washer*	M3x8 SWRM10	000-805-774	3

*Not used.

4.2 Mounting

- Turn off the power. Remove the cover from the display unit as follows:
 - Unfasten four binding screws (M4 x 10).
 - Unfasten six binding screws (M3 x 10).
 - Remove three rubber covers to unfasten three hex nuts.
 - Loosen two hex nuts.

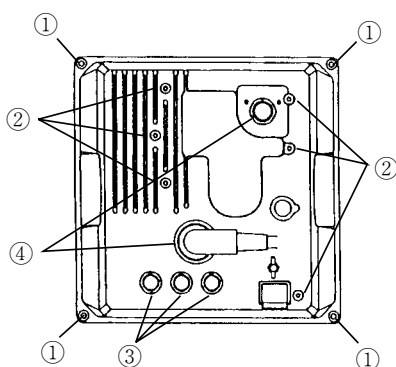
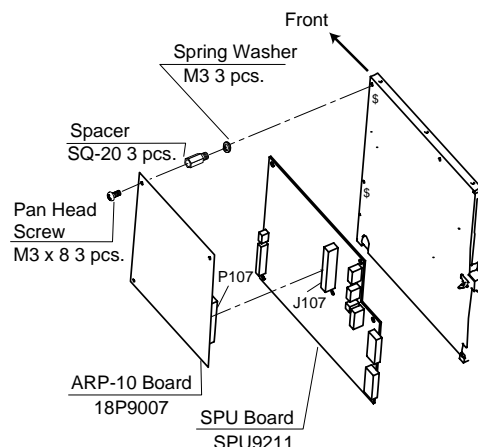


Figure 4-1 Display unit, rear view

- Fasten the ARP-10 Board to the right-hand chassis of the display unit, using the pan head spacers, screws, and washers (supplied) as follows.
 - Attach three spacers.
 - Attach the P107 connector from the ARP-10 Board to J107 connector on the SPU Board.

- Fasten the ARP-10 Board to the chassis with three pan head screws and springs washers.



Note: Remaining hardware may be discarded.

Figure 4-2 How to mount the ARP-10 Board

4.3 Adjustments

Input signal

- Connect the gyrocompass. Turn on the radar and transmit.
- Press the [MENU] key and select the OTHERS menu
- Select "23. Self Test" and press the [ACQ/ENTER] key. Confirm that the ARP-10 test results show OK for SPEED, COURSE, TRIGGER< BP and HP.

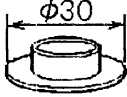

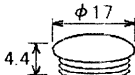
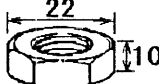


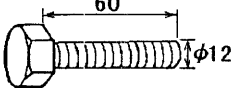
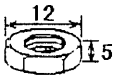


Video signal

Confirm the following on the ARP-10 test display:

- Video is "OK."
- Adjust the GAIN, A/C and A/C RAIN controls so FE-DATA1 and FE-DATA2 indications on the ARP-10 TEST show less than 1,000. Also, raise/lower the gain while watching the FE-DATA1 and FE-DATA2 indications. Confirm that the FE-DATA1 and FE-DATA2 indications rise/lower according to GAIN control adjustment.

FURUNO

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

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	4	
			CODE NO. 300-130-020		
2	防蝕ゴム CORROSION-PROOF RUBBER MAT		03-142-3001-0	1	
			CODE NO. 100-275-580		
3	キャップ CAP		040-4010	4	
			CODE NO. 000-515-332		
4	六角ナット 1種 HEX. NUT		M12 SUS304	4	
			CODE NO. 000-863-112		
5	ミガキ平座金 FLAT WASHER		M12 SUS304	4	
			CODE NO. 000-864-132		
6	ハネ座金 SPRING WASHER		M12 SUS304	4	
			CODE NO. 000-864-263		
7	六角ボルト (全ネジ) HEX. BOLT		M12X60 SUS304	4	
			CODE NO. 000-862-191		
8	六角ナット 1種 HEX. NUT		M6 SUS304	1	
			CODE NO. 000-863-109		
9	ミガキ平座金 FLAT WASHER		M6 SUS304	3	
			CODE NO. 000-864-129		
10	ハネ座金 SPRING WASHER		M6 SUS304	1	
			CODE NO. 000-864-260		

DWG NO.

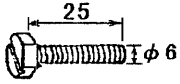
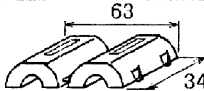
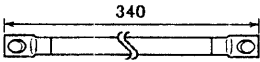
C3459-M02-G

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 2/2
TYPE	CP03-18401	

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	1	
			CODE NO. 000-862-180		
12	EMIコア EMI CORE		RFC-13	3	
			CODE NO. 000-141-084		
13	アース線 GROUNDING WIRE		RW-4747-1 03S4747	1	
			CODE NO. 000-566-000		

DWG NO.

C3459-M04- G

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FURUNO

FURUNO

CODE NO.
TYPE

03FV-X-9401 -1

1/1





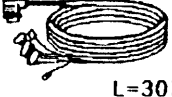
工事材料表

MODEL 1932MARK-2
MODEL 1942MARK-2

船舶用レーダー

MARINE RADAR

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	ケーブル組品 CABLE ASSY.	 L=5M	03S9332 *5M*	1	
			CODE NO. 000-138-928		
2	ケーブル組品 CABLE ASSY.	 L=10M	MJ-B24LPF0005-100	1	選択 TO BE SELECTED
			CODE NO. 000-140-434		
3	ケーブル組品 CABLE ASSY.	 L=15M	MJ-B24LPF0005-150	1	選択 TO BE SELECTED
			CODE NO. 000-140-435		
4	ケーブル組品 CABLE ASSY.	 L=20M	MJ-B24LPF0005-200	1	選択 TO BE SELECTED
			CODE NO. 000-140-436		
5	ケーブル組品 CABLE ASSY.	 L=30M	MJ-B24LPF0005-300	1	選択 TO BE SELECTED
			CODE NO. 000-140-437		

DWG NO.

C3462-M01- B

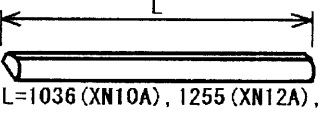
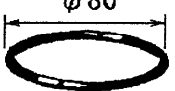
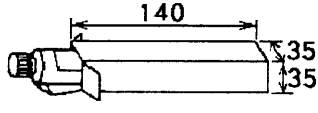
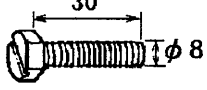


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P A C K I N G L I S T

19AK-X-9856 -2 1/1

XN10A, XN12A

N A M E	O U T L I N E	DESCRIPTION/CODE No.	Q' T Y
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		
Oリング O-RING	 φ 80	JISB2401-1A-G80 000-851-313	1
スリーボント SEALANT	 140 35	1211 50G 000-854-118	1
六角ボルト スリワ HEX. BOLT	 30 φ 8	M8X30 SUS304 000-862-151	4
ミカキ平座金 FLAT WASHER	 φ 17	M8 SUS304 000-864-130	4
バネ座金 SPRING WASHER	 15	M8 SUS304 000-864-262	4

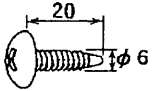
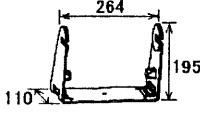
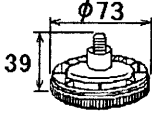
DWG NO. C3500-Z01- B

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

19AK-X-9856

FURUNO

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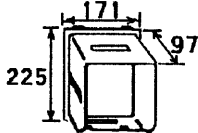
付属品表 ACCESSORIES					
番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	+トラスタップ・ソネジ +TAPPING SCREW		6X20 SUS304 1種	5	
			CODE NO. 000-802-084		
2	ハンガ-組品 HANGER ASSY.		FP03-06401	1	
			CODE NO. 008-479-310		
3	ノブ組品 KNOB ASSY.		FP03-06402	2	
			CODE NO. 008-479-320		

DWG NO. C3441-F03- C

FURUNO ELECTRIC CO., LTD.

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

FURUNO

		CODE NO.		008-441-400	03EL-X-9503 -0 1/1	
		TYPE		FP03-04810		
付属品表 ACCESSORIES		MODEL1831 ショース / 1832 船舶用レーダ MODEL1931 ショース MODEL1932 ショース MODEL1941/1942 ショース MARINE RADAR				
番号 NO.	名称 NAME	略 図 OUTLINE	型名 / 規格 DESCRIPTIONS		数量 Q' TY	用途 / 備考 REMARKS
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			CODE NO.	008-441-400		

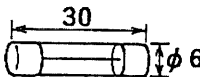
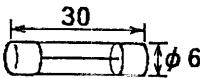
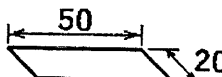
C3379-F02-A

FURUNO ELECTRIC CO., LTD

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

FURUNO

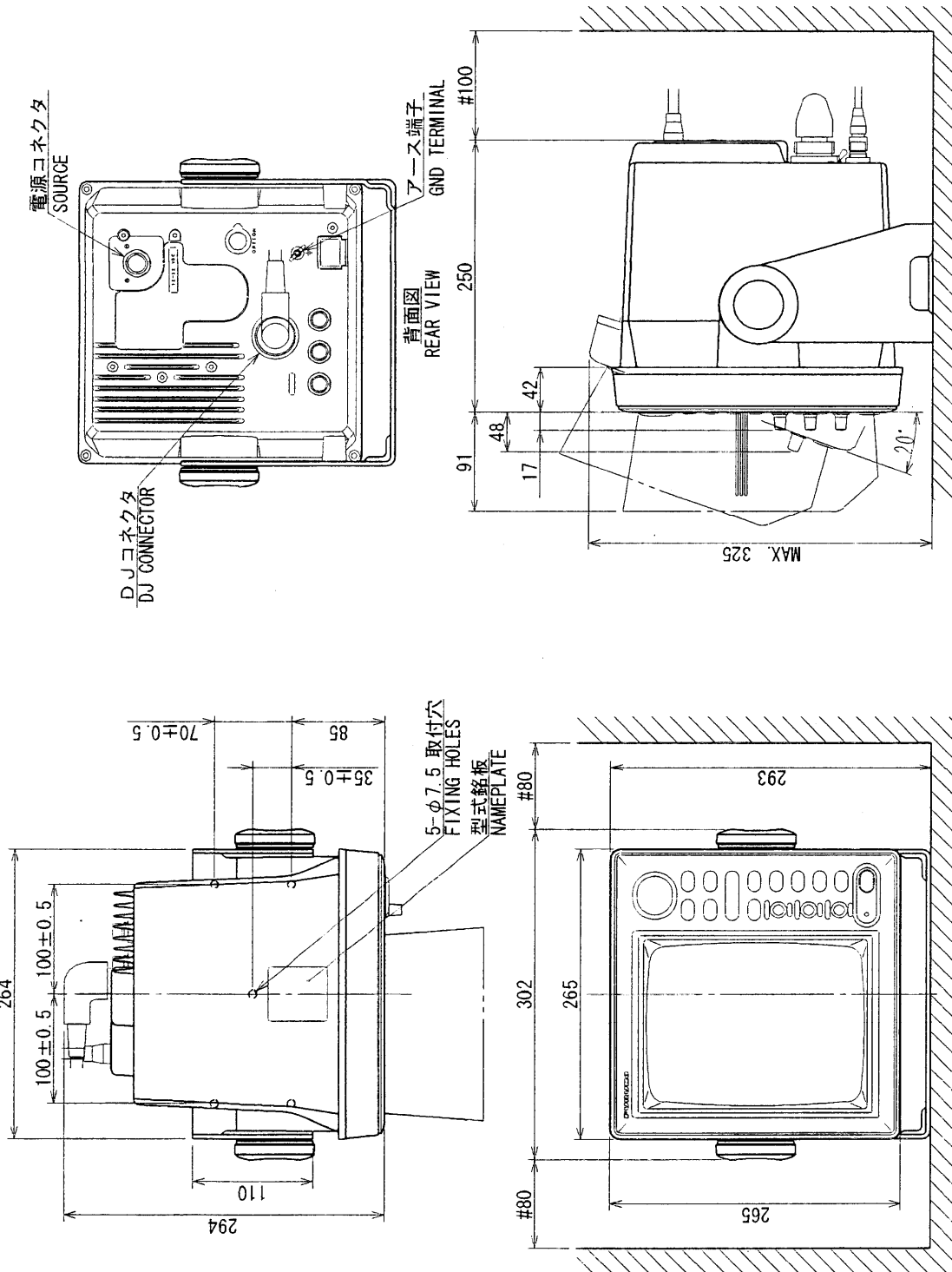
CODE NO.	000-086-965	03FN-X-9301 -2
TYPE	SP03-12200	BOX NO. P

SHIP NO.		SPARE PARTS LIST FOR		U S E			SETS PER VESSEL	
		MODEL 1832/1932 船船用レーダー MODEL 1942 MODEL 1932MARK-2 MODEL 1942MARK-2 MODEL 1941R-MARK-2 MARINE RADAR						
ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY			REMARKS/CODE NO.	
				WORKING		SPARE		
				PER SET	PER VES			
1	ヒューズ FUSE		FGBO-A 5A AC125V	1		2		
							000-549-064	
2	ヒューズ FUSE		FGBO 10A AC125V	1		2		
							000-549-065	
3	ヒューズ 貼りマーク FUSE LABEL		03-129-1512-0			1		
							100-248-780	
MFR'S NAME		FURUNO ELECTRIC CO., LTD.		DWG NO.		C3441-P02- B		
						1/1		

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

表 1 TABLE 1

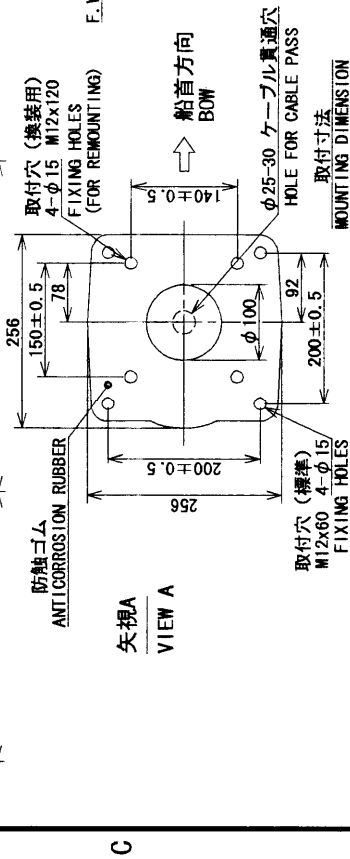
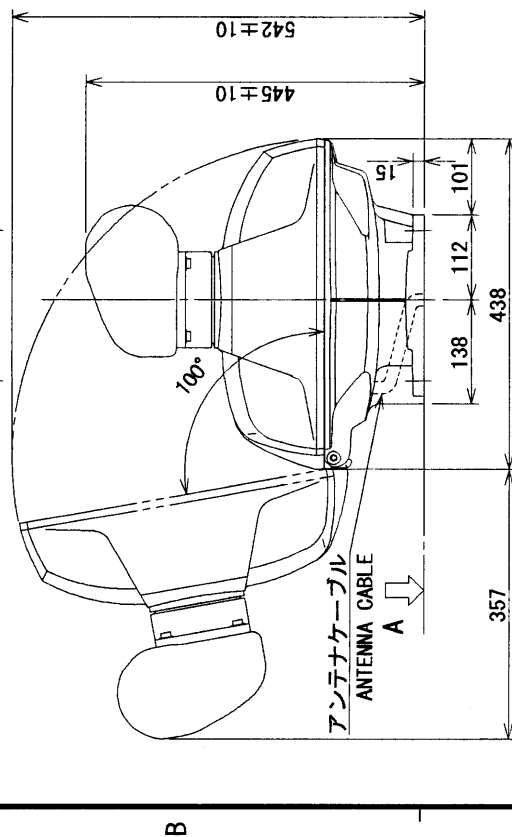
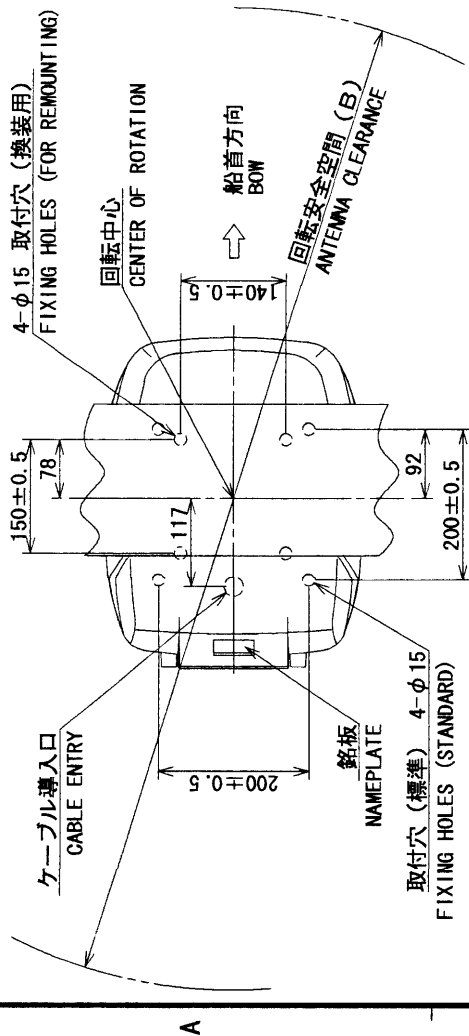
寸法区分 (mm) DIMENSION	公差 (mm) TOLERANCE
0 < L ≤ 50	±1.5
50 < L ≤ 100	±2.5
100 < L ≤ 500	±3



- 注 記
- 1) #印寸法は最小サービスペース寸法とする。
 - 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 6 × 2.0 を使用のこと。

- NOTE
1. #: RECOMMENDED SERVICE CLEARANCE.
 2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
 3. USE TAPPING SCREWS 6x2.0 FOR FIXING THE UNIT.

DRAWN	CHECKED	APPROVED	SCALE	DWG. No.	TITLE
Y. H. K.	Y. H. K.	Y. H. K.	1/6	C3441-604- F	RDP-118/135
MODEL 1941R M2	MODEL 1932M2/1942M2	MODEL 1832/1932/1942	MASS ±10% 7.7 kg	03-136-1006- 4	名称 指示部
					外寸図
					NAME DISPLAY UNIT
					OUTLINE DRAWING



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.

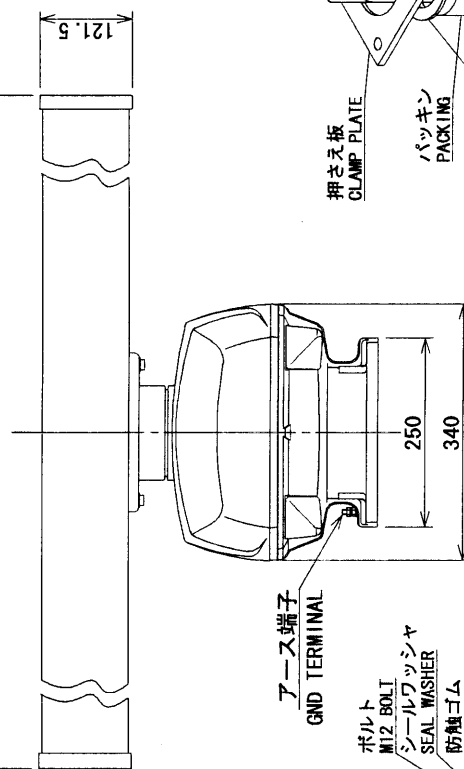
表 2 TABLE 2

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 1 TABLE 1

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

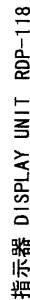
空中線長 (A) ANTENNA LENGTH



取付け部詳細

DETAIL OF UNIT FIXING

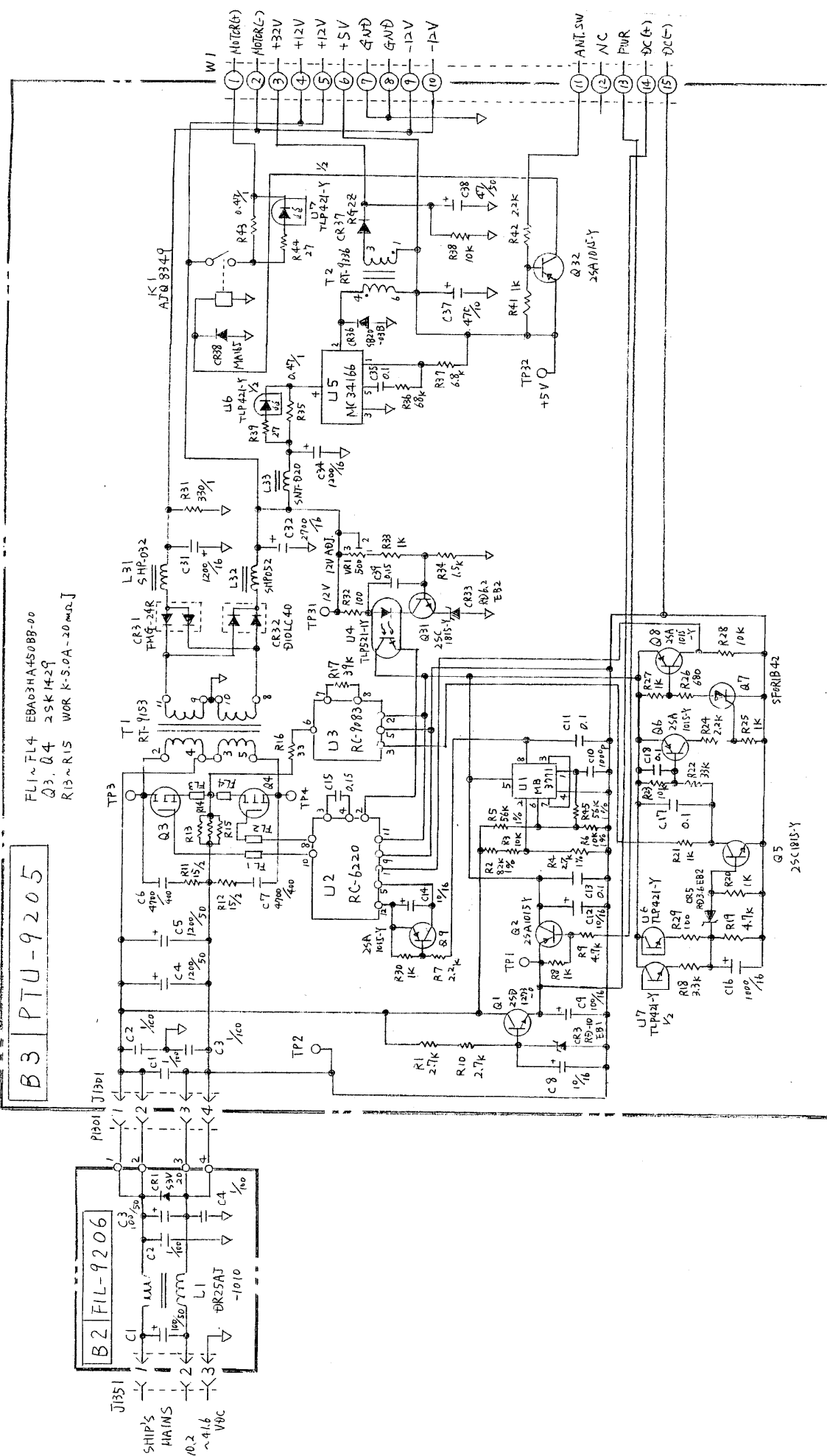
DRAWN Feb. 1 '01 T. YAMASAKI	CHECKED Feb. 2 '01 S. K.	APPROVED Feb. 5 '01 S. Takimura	MODEL 1933 MODEL 1762/C	TITLE RSB-0070/0073
SCALE 1/10	SEE TABLE 2	MASS 表2参照	NAME ANTENNA UNIT	名称 空中線部
DWG. No. C3500-G01-A	03-153-300G-0	OUTLINE DRAWING		



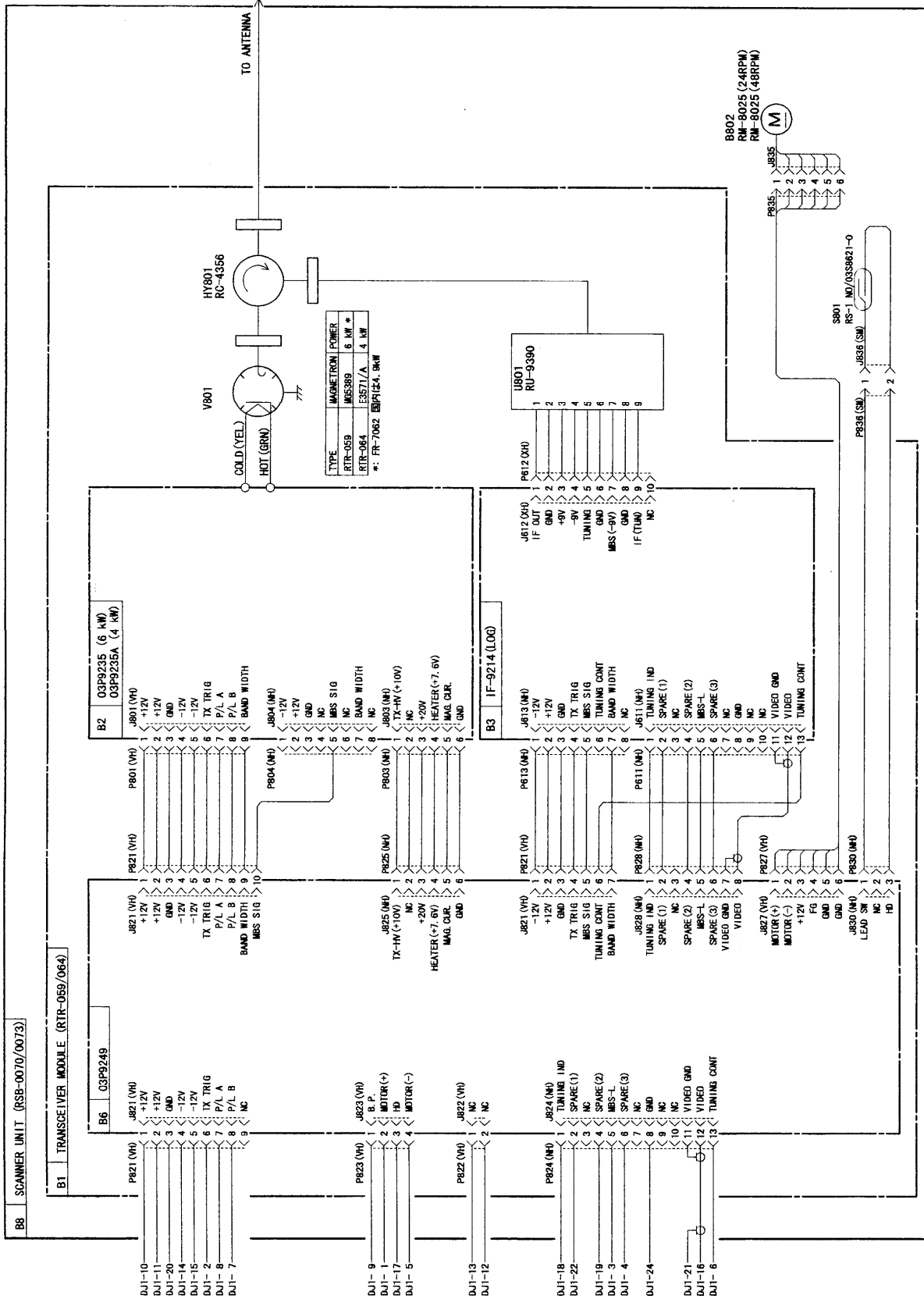
NOTE

- NOTE
1. FITTED AT FACTORY.
 2. GROUND THRU CONNECTOR CLAMP.
 3. GROUND EFFECTIVELY AT SCANNER UNIT.
 4. SHIPYARD SUPPLY.
 5. ATTACH EMI CORES(3PCS) TO SIGNAL CABLES.

DRAWN May 17 '01	I. YAMASAKI			TITLE	MODEL 1932/1942 MARK-2
CHECKED <i>M. J. R. G. L. K.</i>				名称	船舶用レーダー
APPROVED <i>M. J. P. G. L. Y. E.</i>					相互結線図
SCALE	MASS	KG		NAME	MARINE RADAR
UNIT NO. C3462-C01-D			03-136-6002-2		INTERCONNECT ION DIAGRAM



DRAWN	DES. 20.00. E. Kadhim	M1942M2	TYPE	PTU9205
CHECKED	DEC 20.00 K. Kadhim	M1932M2	名称	電源基板
APPROVED	DEC 20.00 K. Kadhim	M1941RM2	回路図	
SCALE	1/1	MODEL 1932	NAME	POWER BOARD
	MASS	MODEL 1932		
	kg	APPLICABLE TO:		
		(MODEL)		
DWG NO.	03-441-K04-1	BLOCK NO.		



DRAWN May 17 '01	T. YAMASAKI	TITLE RSB-0070/0073-059/064
CHECKED May 17 '01	Y. K.	名称 空中線部 (総合)
APPROVED May 17 '01	Y. K.	回路図
SCALE	kg	NAME SCANNER UNIT (GENERAL)
FIG. No.	C3459-K02-F	03-142-6009-3
		SCHEMATIC DIAGRAM