

Installation Manual

MARINE RADAR

***Model FAR-1513/1513-BB/1523/1523-BB/
FAR-1518/1518-BB/1528/1528-BB***

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SAFETY INSTRUCTIONS

The installer of the equipment must read the applicable safety instructions before attempting to install the equipment.



DANGER

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



WARNING

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



CAUTION

Indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.



Warning, Caution



Prohibitive Action



Mandatory Action



DANGER



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 antenna mast.



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 level of 100 W/m², 50 W/m² and 10 W/m² are given in the table below.

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. See the installation manual for how to manage blind sectors.

Radar model	Transceiver	Magnetron	Antenna	100W/m ²	50W/m ²	10W/m ²
FAR-1513	RTR-086A	MAF1565N	XN12A	N/A		2.1 m
			XN13A	N/A		1.9 m
FAR-1523	RTR-087A	M1458F	XN12A	0.6 m		4.6 m
			XN13A	0.4 m		3.1 m
FAR-1518	RTR-100	MAF1615B	XN12AF	0.3 m	0.7 m	4.1 m
			XN20AF	0.2 m	0.5 m	3.1 m
FAR-1528	RTR-101	MG5436	XN20AF	0.6 m	1.2 m	6.1 m
			XN24AF	0.3 m	0.8 m	4.0 m



WARNING



**ELECTRICAL
SHOCK
HAZARD**

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

Only qualified personnel are allowed to work inside the equipment.



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

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



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 damage the equipment.



Use only the specified power cable.

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



Do not install the processor unit, marine display or a control unit in a dusty environment, or one where the units may get wet from rain or water splash.

Dust or water in the units can result in fire, electrical shock, or damage to the equipment.



Attach protective earth for processor unit securely to the ship's body.

The protective earth (grounding) is required for the AC power supply to prevent electrical shock.



CAUTION

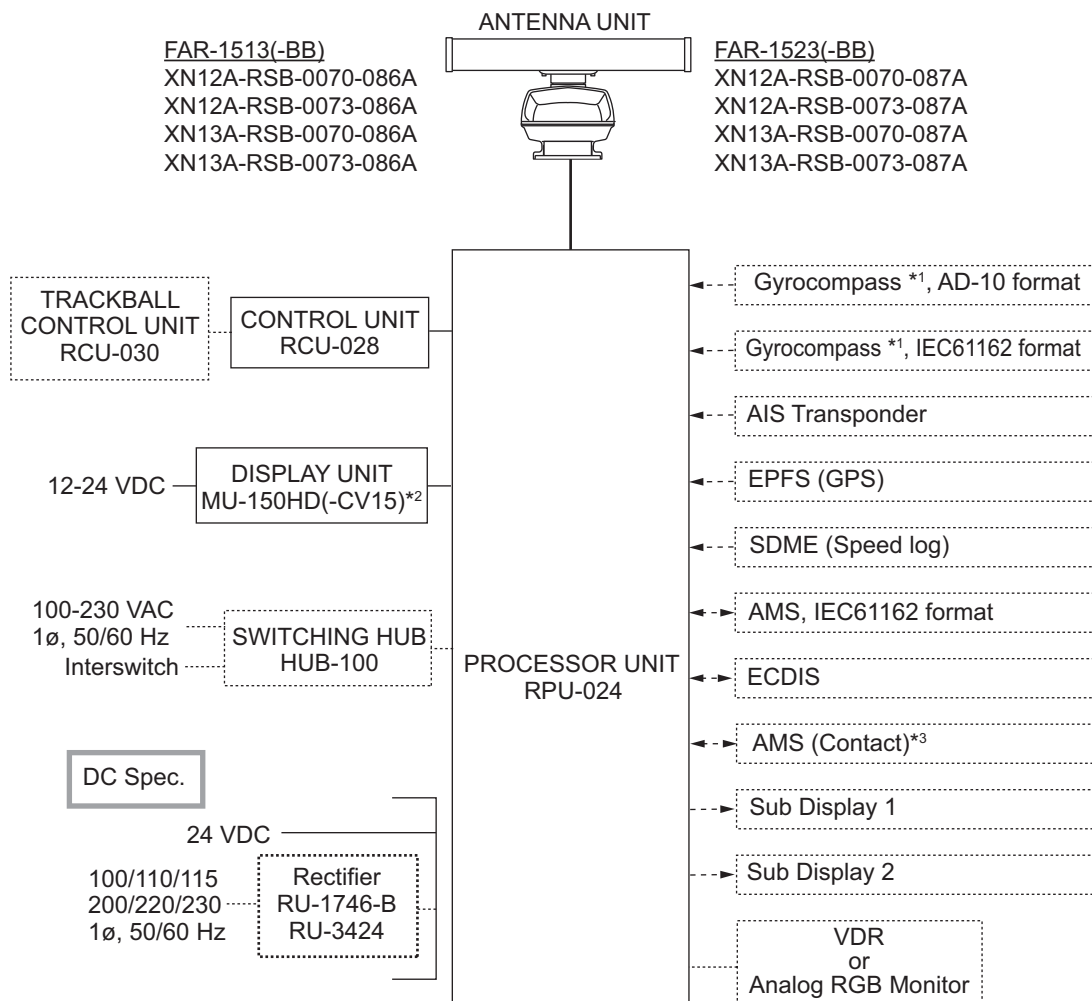
Observe the following compass safe distances to prevent interference to a magnetic compass:

Unit		Standard compass	Steering compass
Antenna Unit for FAR-1513	RSB-0070	1.00 m	0.60 m
	RSB-0073	1.10 m	0.70 m
Antenna Unit for FAR-1523	RSB-0070	1.85 m	1.25 m
	RSB-0073	1.80 m	1.15 m
Antenna Unit for FAR-1518	RSB-120	1.55 m	1.00 m
	RSB-121		
Antenna Unit for FAR-1528	RSB-120	2.05 m	1.30 m
	RSB-121		
Processor Unit (RPU-024)		2.60 m	1.70 m
Control Unit (RCU-028)		0.90 m	0.60 m
Display Unit (MU-150HD(-CV15))		0.65 m	0.45 m
Trackball Control Unit (RCU-030)		0.50 m	0.30 m

Note: For more information, please refer to IMO SN/Circ.271 "Guidelines for the installation of shipborne radar equipment."

SYSTEM CONFIGURATION

FAR-1513(-BB), FAR-1523(-BB)



Equipment category

Unit	Category
Antenna	Exposed to the weather
Other units	Protected from the weather

*1: The gyrocompass must also have an update rate that is adequate for the ship's rate of turn.
 The update rate must be better than 40 Hz (HSC) or 20 Hz (conventional vessel).

*2: This monitor has been approved by the IMO, MU-150HD(-CV15) for CAT 3. If a different monitor is to be used on IMO vessels, its effective diameter must meet the applicable Category requirements (CAT 3: Effective diameter 180 mm or higher). For installation, operation and viewing distance of other monitors, see their respective manuals. For BB types, a monitor is to be prepared by the user.

*3: Characteristics of contact output for AMS (Alert Management System):

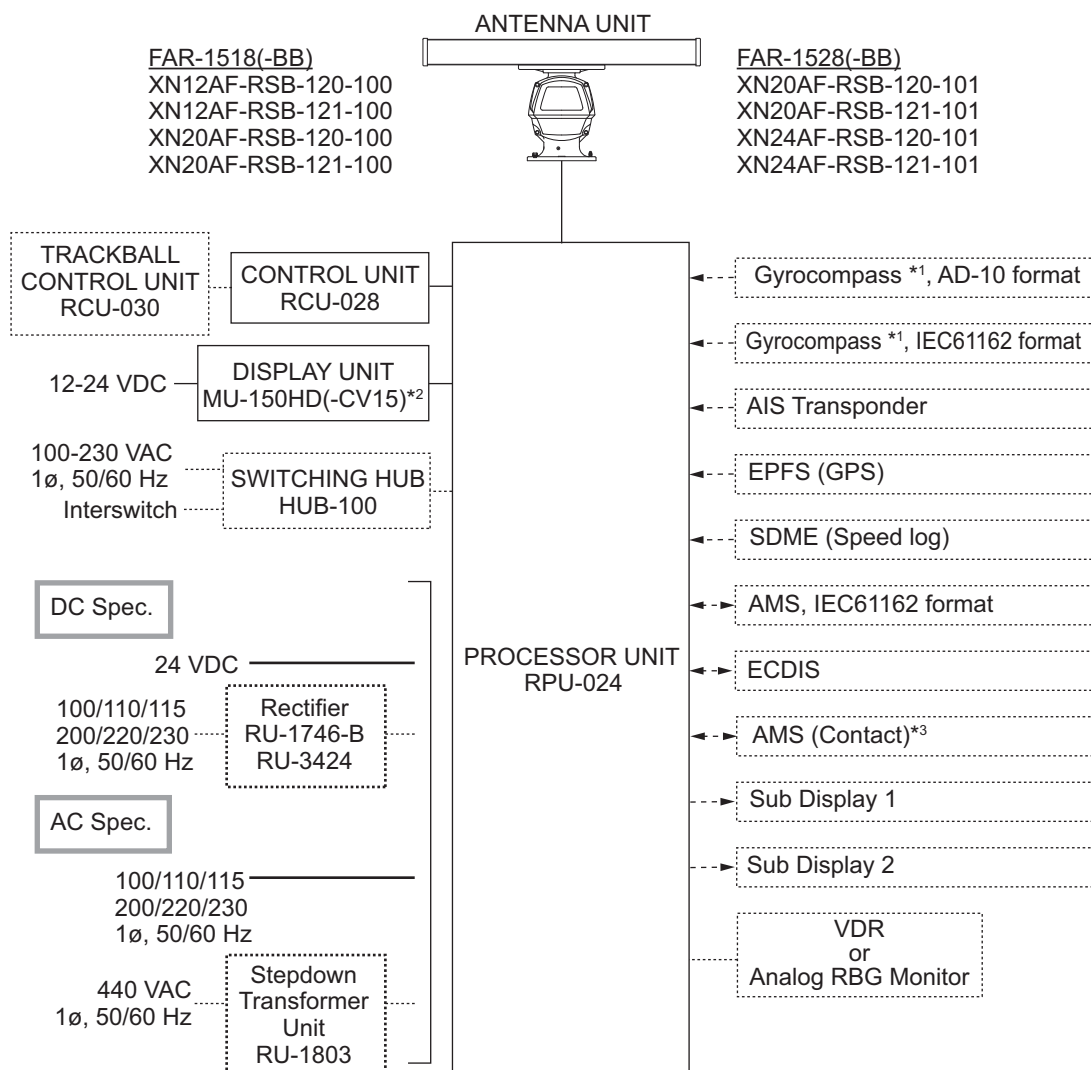
- (Load current) 250 mA
- (Polarity) Normally Open: 2 ports, Normally Close: 2 ports

FAR-1518(-BB), FAR-1528(-BB)**NOTICE FOR FAR-1518(-BB)/FAR-1528(-BB)**

The radar(s) must be interconnected to the following type approved sensors:

- Gyrocompass meeting requirements of the IMO resolution A.424(XI).
- EPFS meeting the requirements of the IMO resolution MSC.112(73).
- SDME meeting the requirements of the IMO resolution MSC.86(72).

The radar may be interconnected via HUB-100 to other FURUNO processing units having approved LAN ports.

**Equipment category**

Unit	Category
Antenna	Exposed to the weather
Other units	Protected from the weather

***1:** The gyrocompass must also have an update rate that is adequate for the ship's rate of turn. The update rate must be better than 40 Hz (HSC) or 20 Hz (conventional vessel).

***2:** This monitor has been approved by the IMO, MU-150HD(-CV15) for CAT 3. If a different monitor is to be used on IMO vessels, its effective diameter must meet the applicable Category requirements (CAT 3: Effective diameter 180 mm or higher). For installation, operation and viewing distance of other monitors, see their respective manuals. For BB types, a monitor is to be prepared by the user.

***3:** Characteristics of contact output for AMS (Alert Management System):

- (Load current) 250 mA
- (Polarity) Normally Open: 2 ports, Normally Close: 2 ports

EQUIPMENT LIST

Standard supply

Name	Type	Code No.	Qty	Remarks
Processor Unit	RPU-024	-	1	
Control Unit	RCU-028	-	1	
Display Unit	MU-150HD-CV15	-	1	
Antenna Unit (FAR-1513)	XN12A-RSB-0070-086A	-	Select one	24 rpm, 1200 mm
	XN12A-RSB-0073-086A	-		48 rpm, 1200 mm
	XN13A-RSB-0070-086A	-		24 rpm, 1800 mm
	XN13A-RSB-0073-086A	-		48 rpm, 1800 mm
Antenna Unit (FAR-1523)	XN12A-RSB-0070-087A	-	Select one	24 rpm, 1200 mm
	XN12A-RSB-0073-087A	-		48 rpm, 1200 mm
	XN13A-RSB-0070-087A	-		24 rpm, 1800 mm
	XN13A-RSB-0073-087A	-		48 rpm, 1800 mm
Antenna Unit FAR-1518)	XN12AF-RSB-120-100	-	Select one	26 rpm, 1200 mm
	XN12AF-RSB-121-100	-		48 rpm, 1200 mm
	XN20AF-RSB-120-100	-		26 rpm, 2000 mm
	XN20AF-RSB-121-100	-		48 rpm, 2000 mm
Antenna Unit (FAR-1528)	XN20AF-RSB-120-101	-	Select one	26 rpm, 2000 mm
	XN20AF-RSB-121-101	-		48 rpm, 2000 mm
	XN24AF-RSB-120-101	-		26 rpm, 2400 mm
	XN24AF-RSB-121-101	-		48 rpm, 2400 mm
Installation Materials (FAR-1513)	CP03-36700	001-421-520	Select one	10 m signal cable
	CP03-36710	001-421-530		15 m signal cable
	CP03-30720	001-421-540		20 m signal cable
	CP03-36730	001-421-550		30 m signal cable
Installation Materials (FAR-1523)	CP03-36800	001-423-400	Select one	10 m signal cable
	CP03-36810	001-423-410		15 m signal cable
	CP03-36820	001-423-420		20 m signal cable
	CP03-36830	001-423-430		30 m signal cable
Installation Materials (FAR-1518, FAR-1528)	CP03-36900	001-423-440	Select one	15 m signal cable
	CP03-36910	001-423-450		20 m signal cable
	CP03-36920	001-423-460		30 m signal cable
Installation Materials	CP03-36501	001-419-860	1	
	CP03-36601	001-419-600	1	
Cable Assy.	DVI-D/D S-LINK 5M	001-132-960-10	1	
Spare Parts	SP03-18001	001-419-820	1	Fuses (2), for DC power processor unit
Spare Parts	SP03-18002	001-419-830	1	Fuses (2), for AC power processor unit

Optional supply

Name	Type	Code No.	Remarks
Trackball Control Unit	RCU-030	-	
Performance Monitor	PM-32A	001-419-490	
Processor Unit IPX2 Kit	OP03-238	001-419-560	
Stepdown Transformer Unit	RU-1803	-	440 V→100 V
Rectifier	RU-3423	-	For display unit, current capacity max. 7A
	PR-240	-	For display unit, current capacity max. 8A
	RU-1746B-2	-	Current capacity max. 13A
	RU-3424	-	Current capacity max. 20A
	PR-850A	-	100/110/120/220/240 VAC→24 VDC. Current capacity max. 30A
Cable Assy.	RW-4864 1M	001-103-620-10	Radar signal cable, 1 m
	RW-4864 5M	001-103-630-10	Radar signal cable, 5 m
	RW-4864 10M	001-103-640-10	Radar signal cable, 10 m
	RW-4864 15M	001-103-650-10	Radar signal cable, 15 m
Cable Assy.	DVI-D/D S-LINK 10M	001-133-980-10	For Display Unit, DVI cable, 10 m
Switching Hub	HUB-100	-	
Installation Materials	CP03-28900	000-082-658	10 m
Installation Materials	CP03-28910	000-082-659	20 m
Installation Materials	CP03-28920	000-082-660	30 m
Flush Mount Kit	OP26-4	001-080-850	
Hood Assy.	OP26-3	001-080-840	
Bracket Assy.	OP26-2	000-016-268	
LAN Cable	MOD-Z072-020+	001-167-880-10	
	MOD-Z072-050+	001-167-890-10	
	MOD-Z072-100+	001-167-900-10	
Cable Assy.	3COX-2P-6C 5M	001-077-230-10	
	3COX-2P-6C 10M	001-077-220-10	

1. INSTALLATION

1.1 Before Beginning the Installation...

Please read the instructions below before beginning the installation.

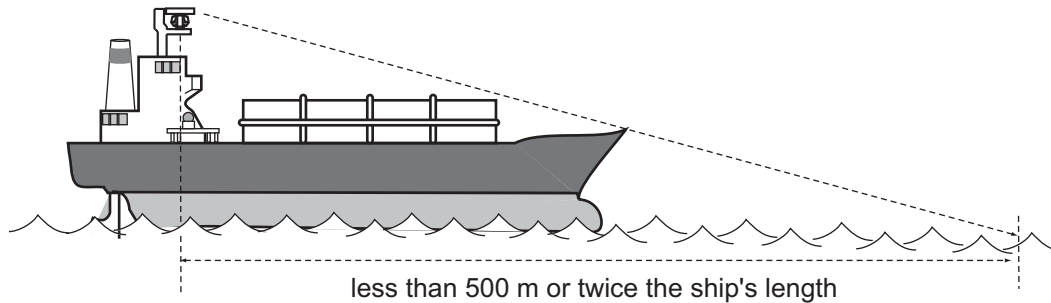
- Do the installation following the instructions contained in this manual.
- Be sure to do the installation setup (tuning, timing, heading alignment, etc.) in chapter 3 after installing the equipment.
- The cable names mentioned throughout this manual are JIS (Japan Industrial Standard) cables. If not available locally, see Appendix 1 for the equivalent cables.
- The control unit cannot be mounted in a console - it is designed to be mounted on a desktop.
- See the table below for retrofit possibility. For use of the existing antenna cable of FR-8125 or FR-8255, attachment of a connector (NH and VH) to the cable is necessary. However, replacement of the cable is recommended.

	Retrofit possibility		
	FAR-1513/1523	FAR-1518/1528 (no Performance Monitor)	FAR-1518/1528 (w/Performance Monitor)
FR-8002 series	Yes	No	No
FR-1500 MK3 series	Yes	Yes	No

- The antenna cable for the FAR-1513/FAR-1523 has connectors at both its ends. If the cable is to be passed through a bulkhead, do not remove the connectors (to make it easier to pass the cable through the bulkhead). Make an opening in the bulkhead large enough to pass the connectors.
- Use only the specified power cable and fuse.
- Connect the DC power specification processor unit to the ship's mains via a breaker.
- Ground the AC power specification processor unit.
- If the processor unit is to be installed near where water or rain splash may occur, install the optional waterproofing kit, which provides waterproofing standard IPX2. Do not install the unit in an area where water or rain splash exceeds the conditions of IPX2.
- Do not connect the radar to the ship's onboard LAN.
- Connect the drain wires of external equipment to the specified locations in the processor unit to prevent noise.
- Do not disassemble the equipment, to prevent electrical shock.
- Do not apply paint, anti-corrosive sealant or contact spray to coating or plastic parts of the equipment. Those items contain organic solvents that can damage coating and plastic parts, especially plastic connectors.
- In case of trouble consult with a FURUNO dealer.
- This series of radars are supplied with or without (BB type) a monitor. The configuration is identical otherwise.

1.2 Antenna Unit Installation 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 in an elevated position to permit maximum target visibility.
- A line of sight from the antenna unit to the bow of the ship must hit the surface of the sea in not more than 500 m or twice the ship's length, depending whichever value is smaller, for all load and trim conditions.



- Install the antenna unit so that any blind sectors caused by objects (mast, etc.) are kept to a minimum. A blind sector must not exist in arc of the horizon from right ahead to 22.5° aft of the beam to either side (see the figure below). Also, individual blind sectors of more than 5° or the total arc of both blind sectors of more than 20° , must not occur in the remaining arc (Figure 2). Note that any two blind sectors separated by 3° or less are regarded as one sector.

Figure 1

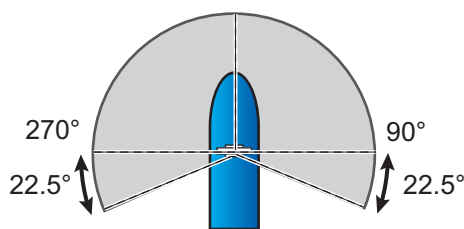
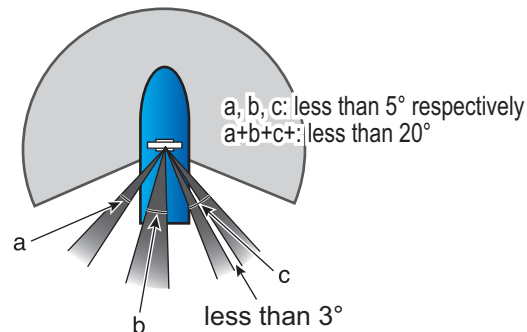
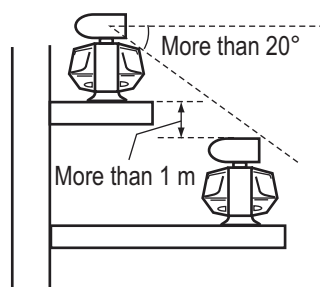


Figure 2



- Do not install the antenna where extreme winds may strike the port and starboard sides of the antenna.
- Install the antenna unit away from interfering high-power energy sources and TX radio antennas.
- Keep the following distance and angle between another radar antenna.



- Keep the lower edge of the antenna unit above the safety rail by at least 500 mm.

- No funnel, mast or derrick shall be within the vertical beamwidth of the antenna unit in the bow direction, especially zero degree $\pm 5^\circ$ to prevent blind sectors and false echoes on the radar picture.
- It is rarely possible to place the antenna unit where a completely clear view in all directions is available. Therefore, determine the angular width and relative bearing of any shadow sectors for their influence on the radar at the first opportunity after fitting.
- Locate the antenna of an EPFS clear of the radar antenna to prevent interference to the EPFS. A separation of more than two meters is recommended.
- A magnetic compass will be affected if the antenna unit is placed too close to the compass. Observe the compass safe distances on page ii to prevent interference to a magnetic compass.
- Do not paint the radiator aperture, to ensure proper emission of the radar waves.
- Ground the antenna unit with the supplied ground wire.
- Deposits and fumes from a funnel or other exhaust vent can affect the aerial performance and hot gases may distort the radiator portion. Do not install the antenna unit where the temperature is more than 55° .
- Leave sufficient space around the unit for maintenance and servicing. See the antenna unit outline drawing for recommended maintenance space.

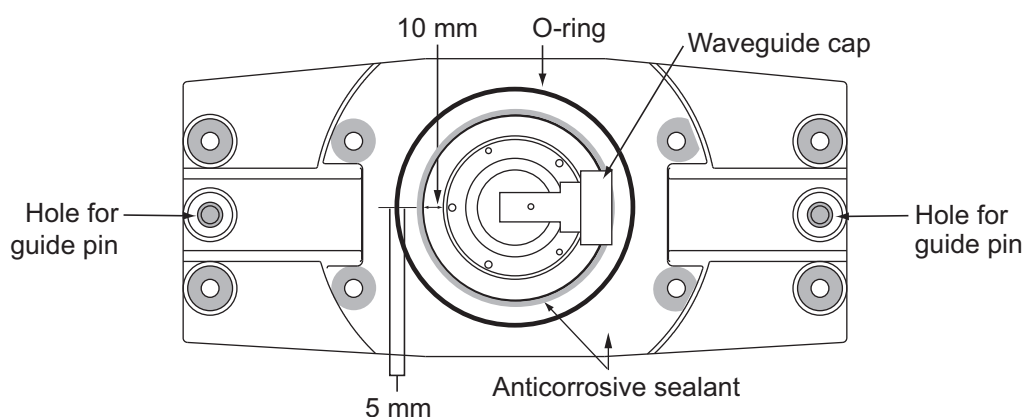
Note: For the IMO radar, please refer to IMO SN/Circ.271 "Guidelines for the installation of shipborne radar equipment".

1.3 How to Install the Antenna Unit for FAR-1518, FAR-1528

1.3.1 How to fasten the radiator to the radiator bracket

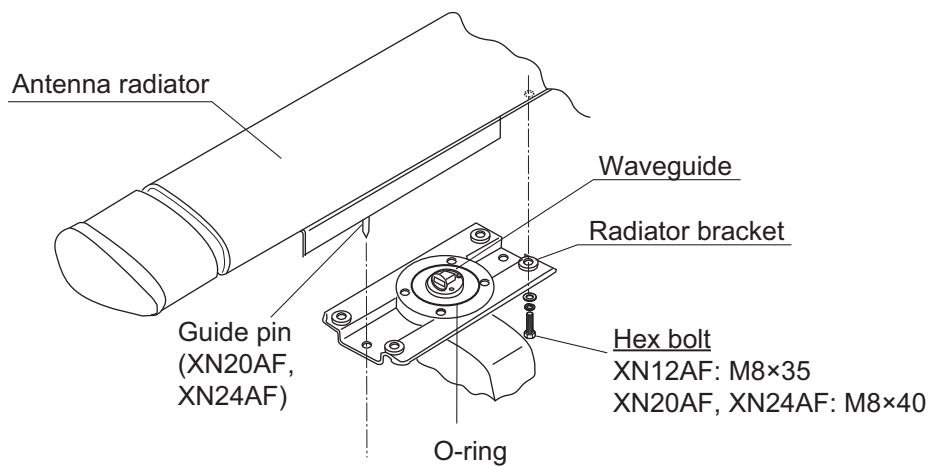
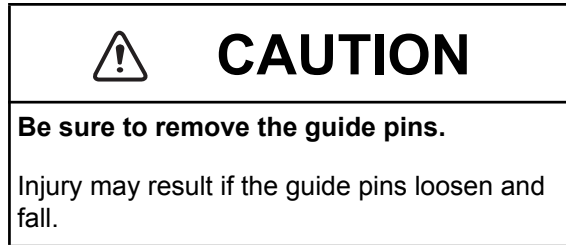
The antenna unit consists of the antenna radiator and the antenna unit chassis, and they are packed separately. Fasten the antenna radiator to the antenna unit chassis as shown below.

1. **For the XN20AF, XN24AF**, Attach two guide pins to the underside of the antenna radiator.
2. Remove the waveguide cap from the radiator bracket. The cap may be discarded.
3. Coat the waveguide flange with anticorrosive sealant as shown below.



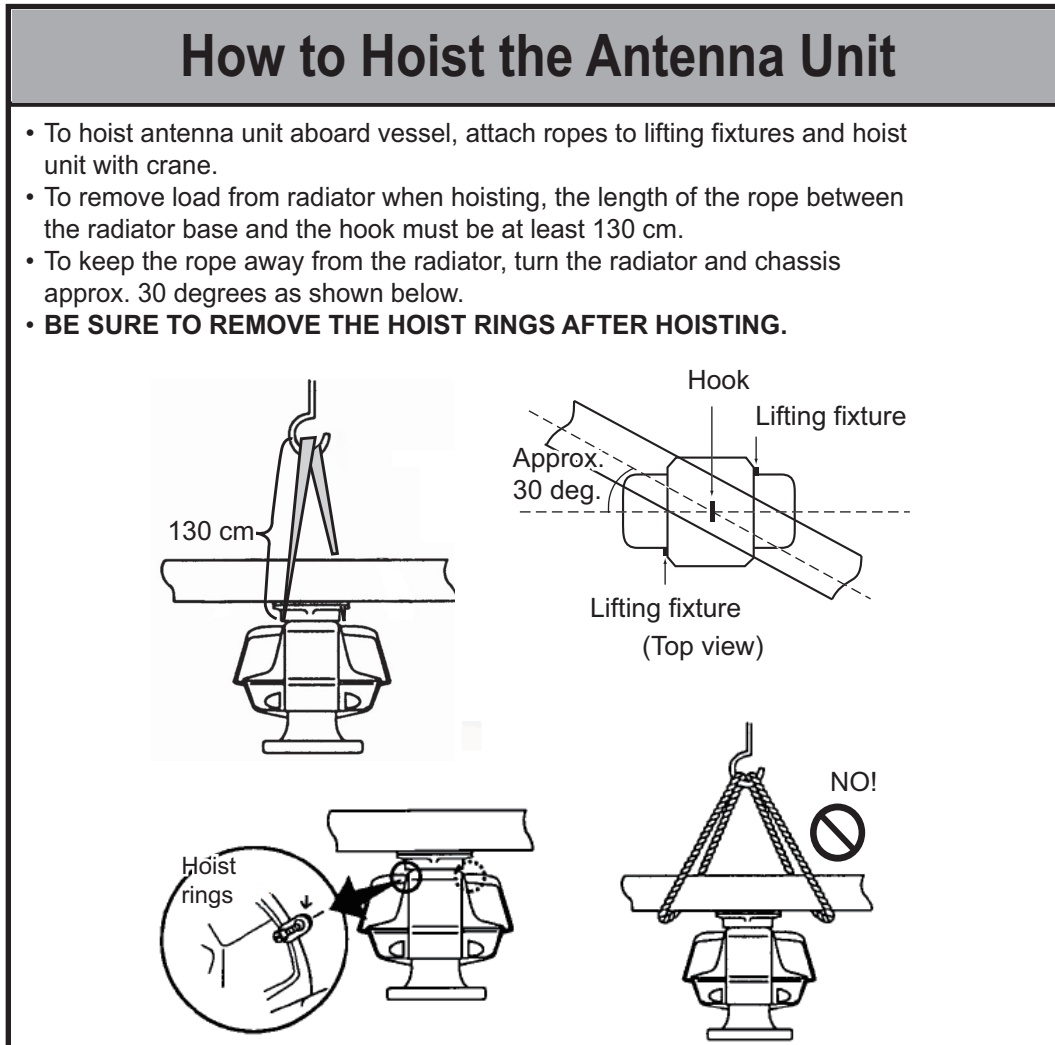
1. INSTALLATION

4. Coat fixing holes for the antenna radiator with anticorrosive sealant.
5. Grease the O-ring and set it to the O-ring groove of the radiator flange.
6. Set the antenna radiator to the radiator bracket.
7. Coat hex bolts M8×40 with anticorrosive sealant and use them to loosely fasten the antenna radiator to the antenna unit chassis.
8. **For the XN20AF, XN24AF**, remove two guide pins (inserted at step 1), and then tighten fixing bolts.

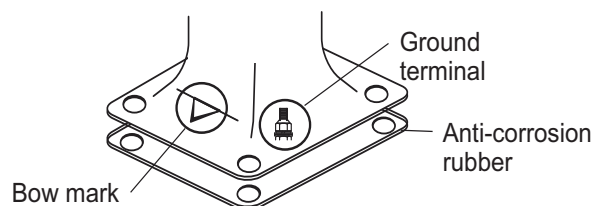


1.3.2 How to mount the antenna unit

The antenna unit may be assembled before hoisting it to the mounting platform. However, do not lift the antenna unit by the radiator. Always lift the unit by its housing. When using a crane or hoist, use the hoist rings which should be fastened to the bolt fixing covers of the antenna housing.

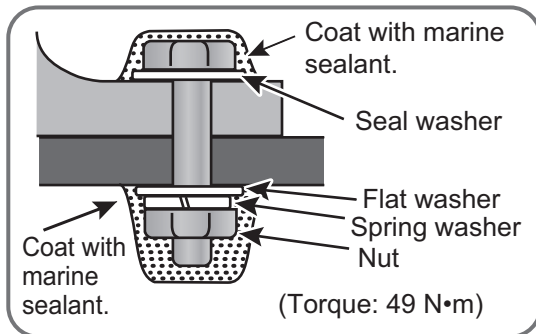


1. Construct a suitable mounting platform referring to the outline drawing at the end of this manual.
2. Drill four mounting holes of 15 mm diameter and one cable entry hole of about 50 mm diameter in the mounting platform.
3. Lay the rubber mat (supplied) on the mounting platform.
4. Place the antenna unit on the rubber mat, orienting the unit so the bow mark on its base faces the ship's bow.

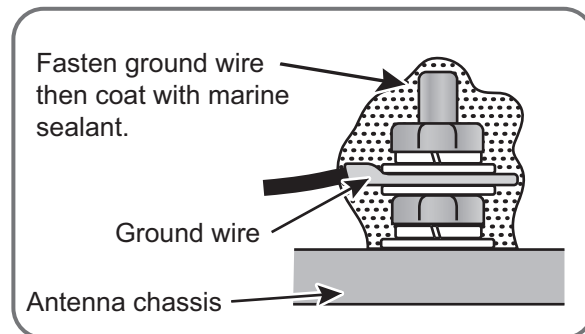


1. INSTALLATION

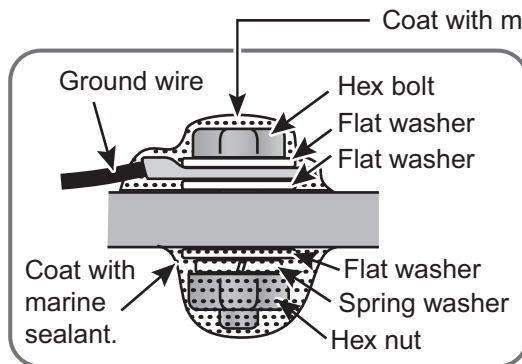
5. Fasten the antenna unit to the mounting platform with M12×60 hex. bolts, nuts, flat washers and seal washers.
6. Use hex. bolt (M6×25), nut (M6) and flat washers (M6) to establish the ground system on the mounting platform as shown below. The location of the grounding point should be within 340 mm of the ground terminal on the antenna unit. Connect the ground wire (RW-4747, 340 mm, supplied) between the grounding point and the ground terminal on the antenna unit. Coat the entire ground system with silicone sealant (supplied).



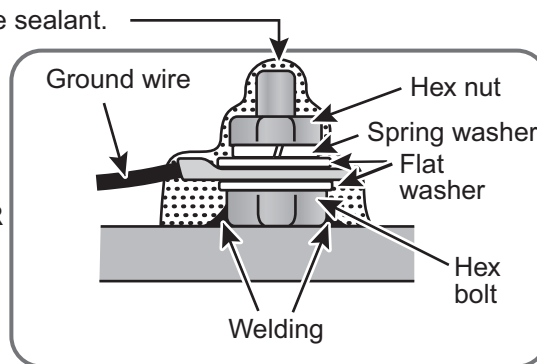
Fixing bolt



Antenna base



OR



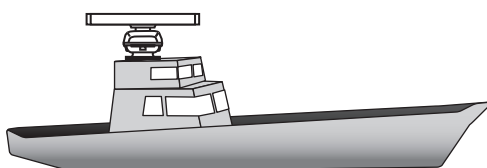
Grounding

7. Confirm that the hoist rings are removed.

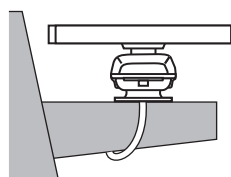
1.4 How to Install the Antenna Unit for FAR-1513, FAR-1523

1.4.1 Installation guidelines

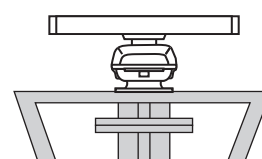
Below are common mounting locations. See the guidelines in section 1.1 for siting considerations.



(a) Bridge



(b) Common mast



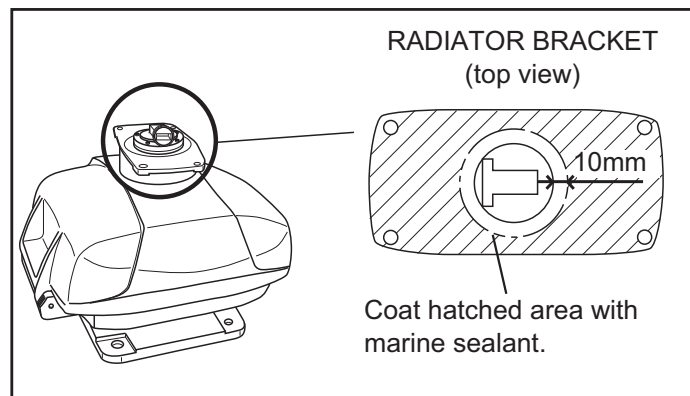
(c) Radar mast

1.4.2 How to fasten the radiator to the radiator bracket

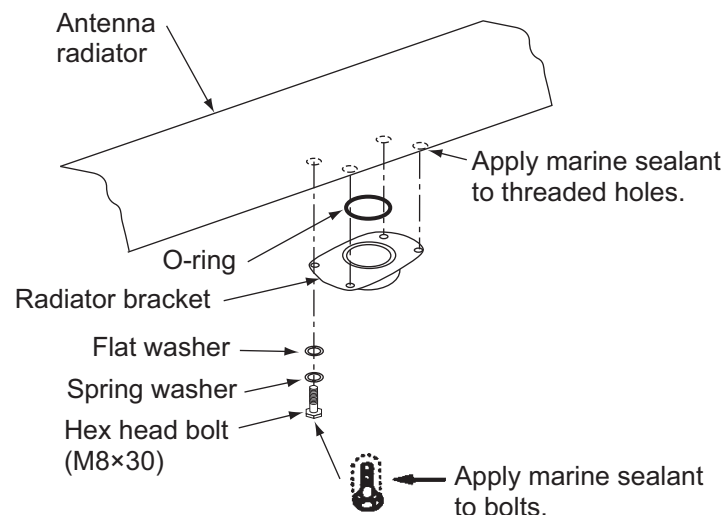
Make five holes in the platform - four holes to fasten the antenna unit and one hole for the signal cable, referring to the outline drawing at the back of this manual for the dimensions.

See the packing list at the back of this manual for the installation materials.

1. Remove the radiator cap from the radiator bracket.
2. Apply marine sealant to the surface of the antenna radiator and the radiator bracket. See the figure below for the location.



3. Apply the marine sealant to the threads in the four holes on the antenna radiator.
4. Apply the grease to the O-ring and set the O-ring to the radiator bracket.
5. Set the antenna radiator on the radiator bracket.
6. Fasten the antenna radiator to the radiator bracket with the radiator bolts, flat washers and spring washers. Apply the marine sealant to the radiator bolts (4 pieces).

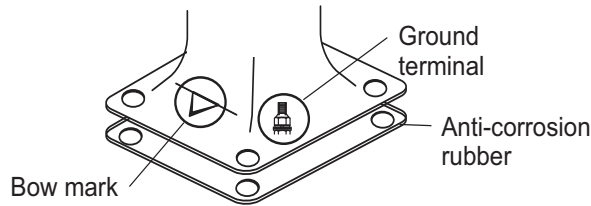


1.4.3 How to mount the antenna unit

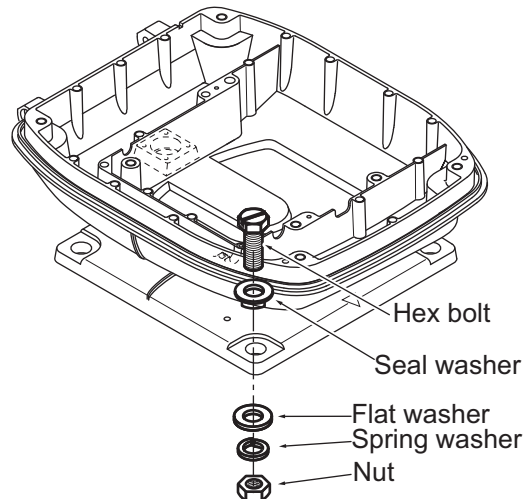
The antenna unit can be mounted using the holes on the outside or inside of the chassis. Choose the mounting method and follow the applicable procedure below.

Mounting using the outside holes on the chassis

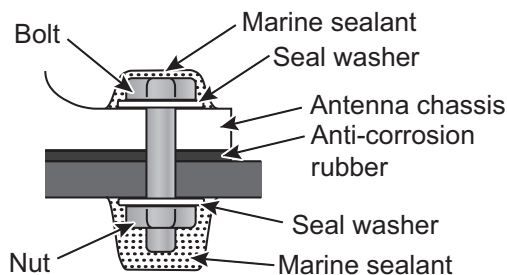
1. Put the rubber mat (supplied) on the mounting location.
2. Referring to paragraph 1.3.2, hoist the antenna unit to the mounting location.
3. Place the antenna unit on the anti-corrosion rubber, orienting the unit so the bow mark on its base faces the ship's bow.



4. Set four hex head bolts (M12×60, supplied) and seal washers (supplied) from the top of the antenna housing, as shown below.

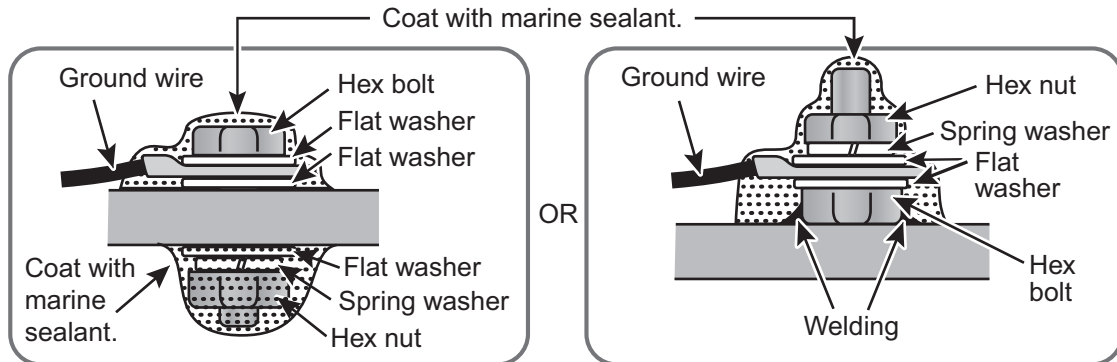


5. Set the flat washers (M12, supplied), spring washers (supplied) and nuts (supplied) to the hex head bolts. Tighten by turning the nuts. Do not tighten by turning the hex head bolts, to prevent damage to the seal washers.
6. Apply anticorrosive sealant to the flat washers, spring washers, nuts and visible parts of bolts.



7. Prepare the ground point on the mounting platform. Use an M6×25 bolt, nut and flat washer (supplied). The ground point must be within 300 mm from the ground terminal on the antenna unit.

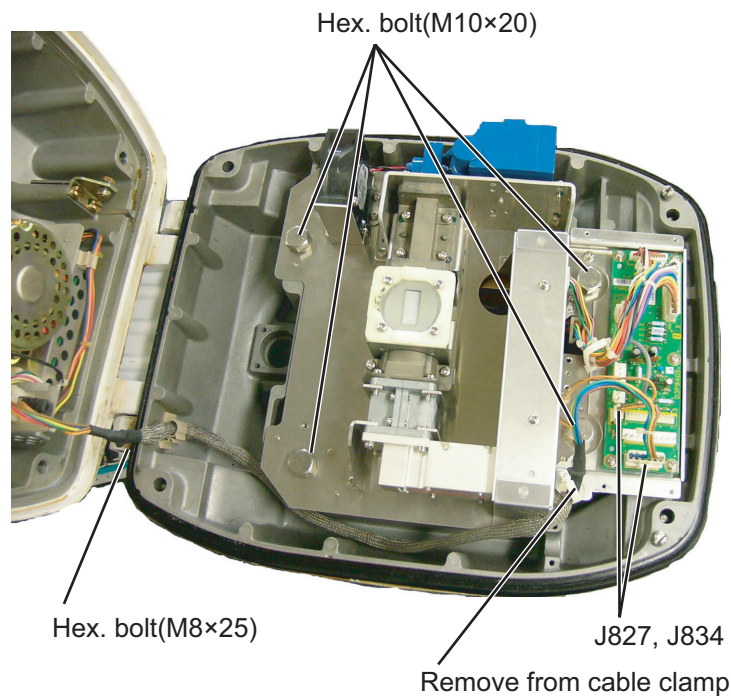
8. Fasten the ground wire (RW-4747, 340 mm, supplied) between the ground terminal and the ground point.
9. Apply marine sealant to the ground terminal and ground point as shown below.



Mounting using the inside holes

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 (M8×25).
5. Remove RF unit by unfastening four hex head bolts.



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

1. INSTALLATION

7. 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 marine sealant. Cut a slit in the rubber bushing and insert bolt into the bushing. Do not use seal washers.
8. Reassemble the RF unit, cover and chassis.
9. Set four knob caps (supplied) into outside fixing holes.

1.5 Processor Unit

1.5.1 Mounting considerations

The processor unit can be mounted on a desktop or bulkhead. When selecting a mounting location, keep in mind the following points.

- Locate the unit out of direct sunlight and away from heat sources because of heat that can build up inside the cabinet.
- Locate the equipment away from places subject to water splash and rain.
- Select a mounting location considering the length of the cables connected.
- Leave sufficient space on the sides and rear of the unit to facilitate maintenance. (See the outline drawing at the back of this manual.)
- A magnetic compass will be affected if placed too close to the processor unit. Observe the compass safe distances shown on page ii to prevent interference to a magnetic compass.

1.5.2 How to mount the processor unit

Desktop installation

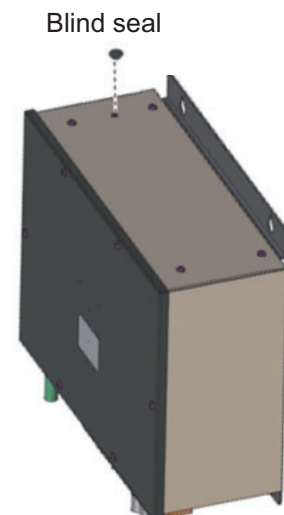
Fasten the unit with four bolts (M5, supplied) or self-tapping screws (5×20, local supply).

Note: If the installation must meet the waterproofing standard IPX2, use the processor unit IPX2 kit. See paragraph 2.4.4 for details.

Bulkhead installation

Mark locations for four self-tapping screws if screws will be used. Insert four M5 bolts (or self-tapping screws), leaving approx. 5 mm of the bolts (screws) exposed. Hang the processor unit on the four bolts (screws) inserted at step 2. Tighten all bolts (screws).

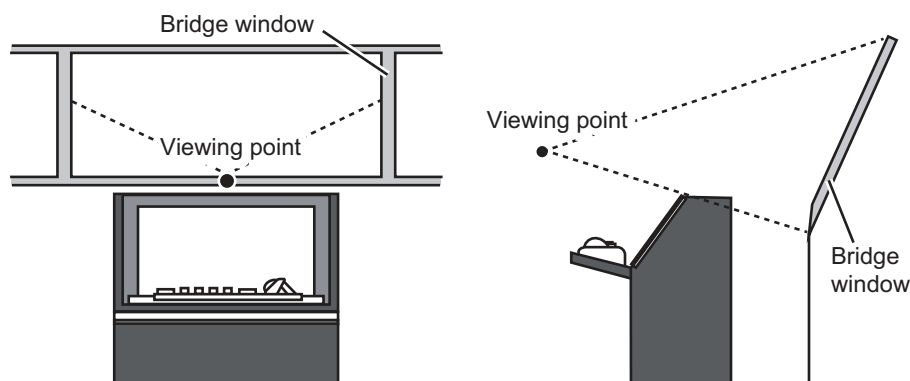
Note: If the installation must meet the waterproofing standard IPX2, set the blind seal supplied with the processor unit installation materials (CP03-36501) to the unit as shown in the right figure.



1.6 Display Unit

See the operator's manual for MU-150HD (OMC-44560) for the installation procedure. Keep in mind the following points when selecting a location.

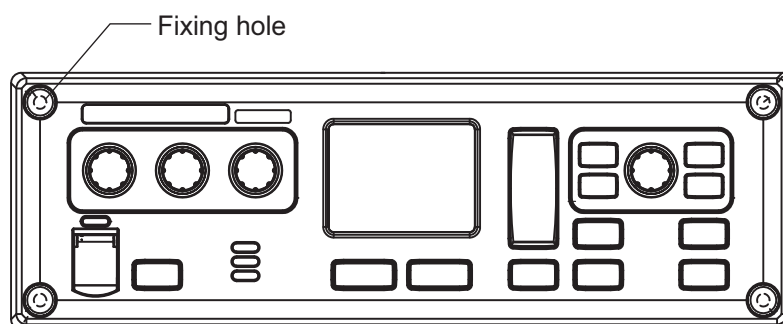
- Locate the display unit where no framing is installed immediately forward of the display unit.
- Locate the display unit where it is easy to view the display in all ambient lighting conditions.



1.7 Control Unit

The control unit is designed to be fixed to a desktop. Install the control unit within five meters from the processor unit since the length of the cable connecting them is five meters.

1. Drill four mounting holes of 5 mm diameter referring to the outline drawing at the back of this manual.
2. Fix the control unit with four self-tapping screws ($\phi 4$, local supply) from the top of the control unit. Make the screws are long enough.
3. Attach four cosmetic caps to the fixing holes on the control unit.

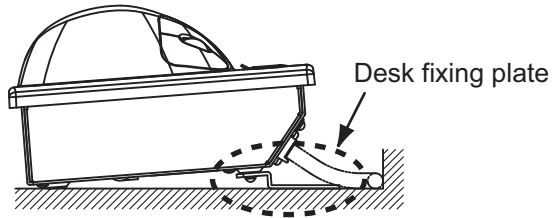


Note: A plastic bag is attached to the end of the USB cable at the factory to fulfill the requirements for waterproofing standard IPX2. If the waterproofing standard is required, do not remove the plastic bag.

1.8 Trackball Control Unit (option)

How to mount the unit tilted

Use the desk fixing plate to mount the unit tilted. Fasten the desk fixing plate to the bottom of the control unit. Fasten the control unit with self-tapping screws (local supply).

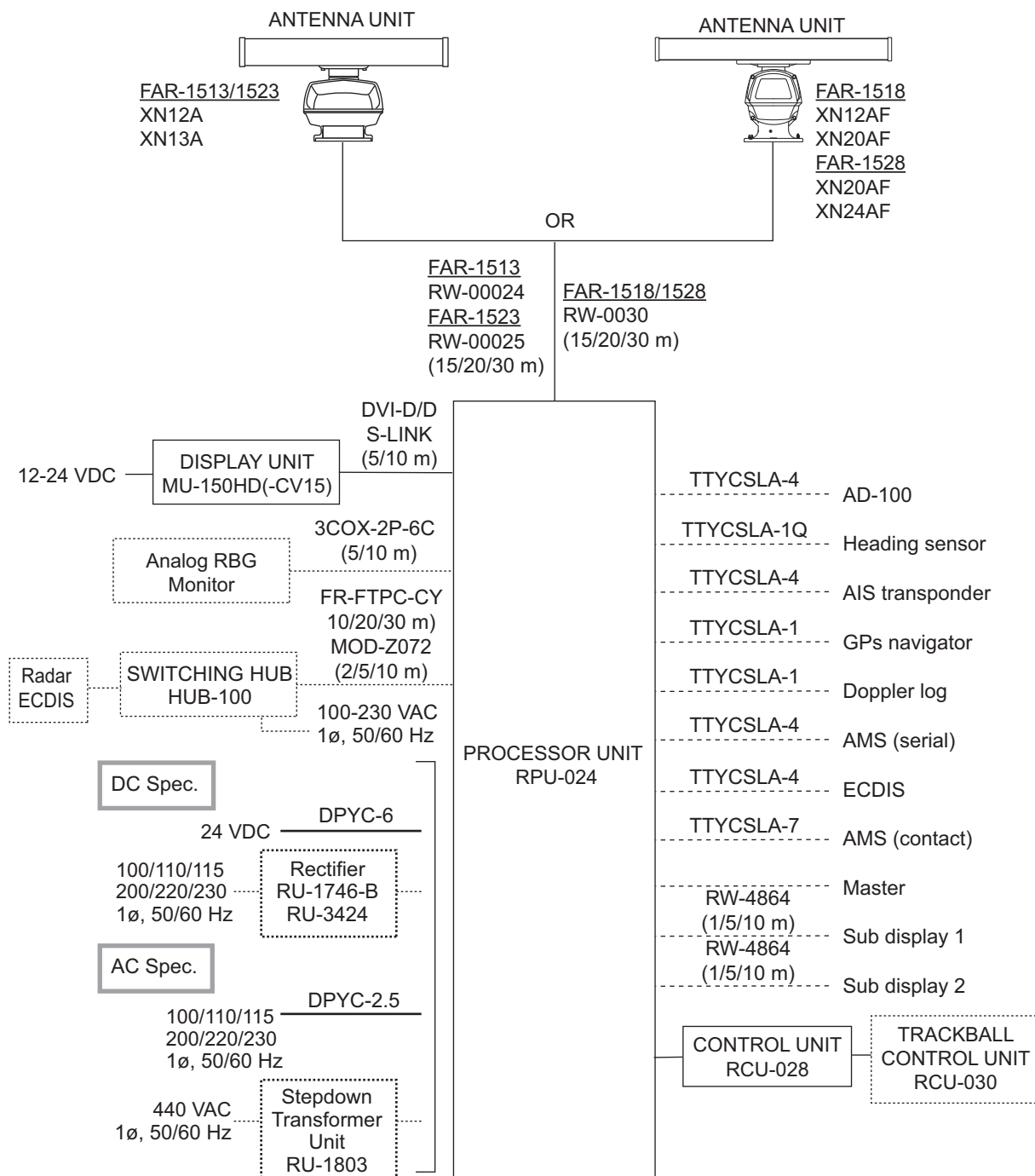


How to mount the unit flush with mounting surface

Drill four mounting holes of 5 mm in diameter referring to the outline drawing at the back of this manual. Fasten the control unit with four M4 screws (local supply) from the underside of the desktop.

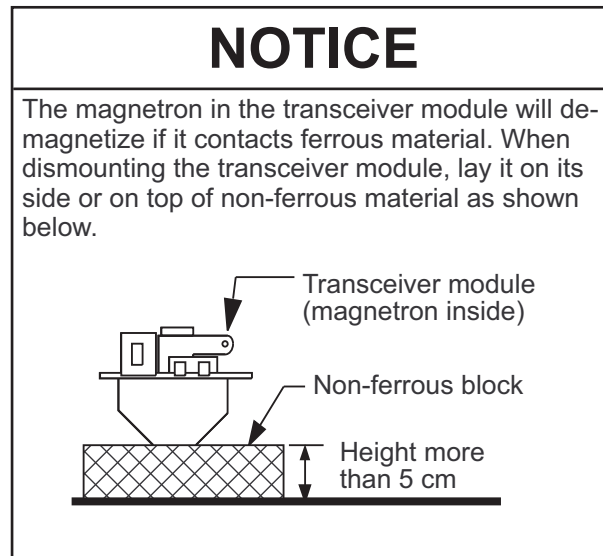
2. WIRING

2.1 Wiring Outline

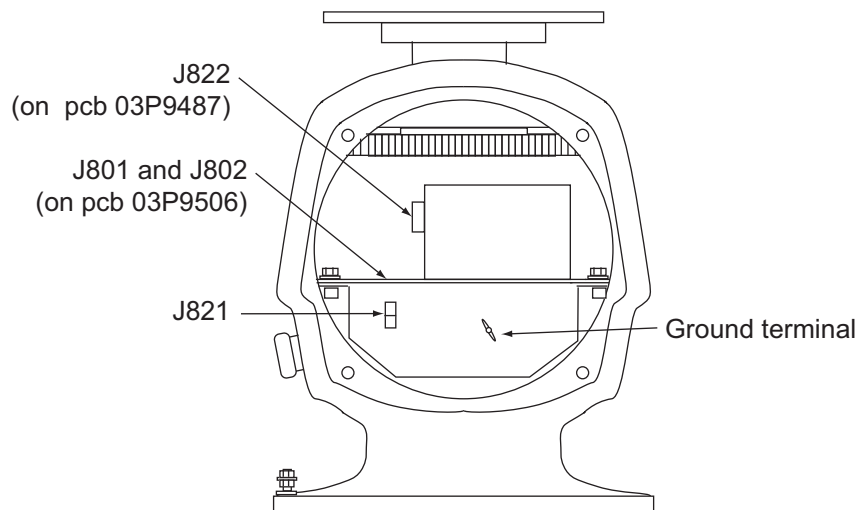


2.2 How to Connect the Signal Cable for FAR-1518, FAR-1528

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.

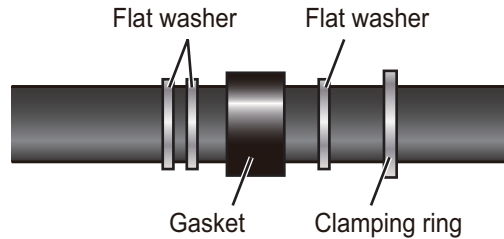


1. Open the antenna cover.
2. Disconnect plugs P821, P822, P801 and P802.



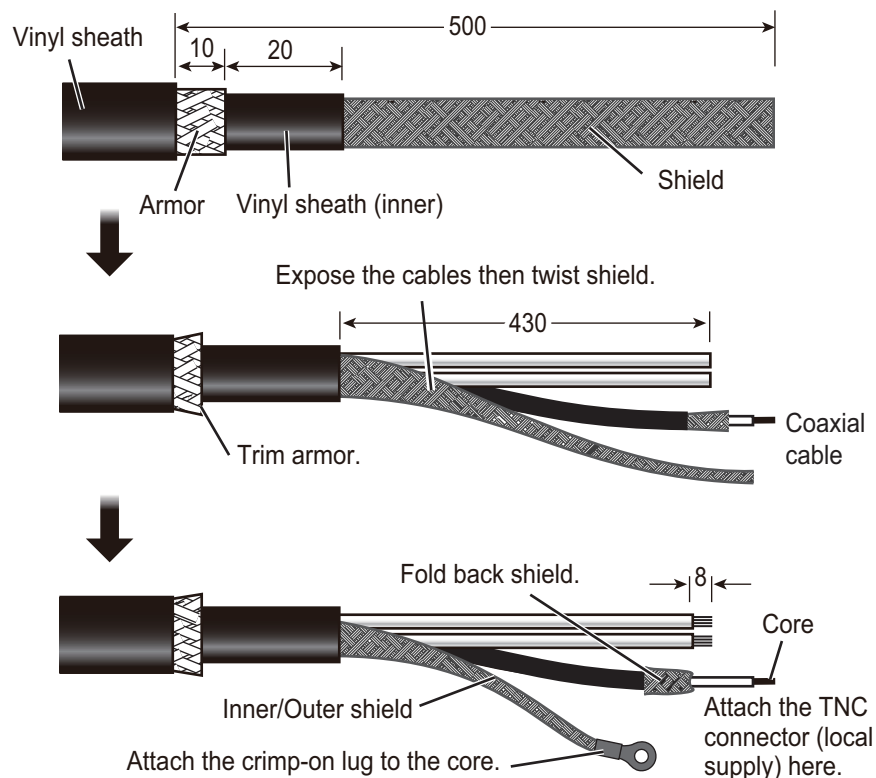
3. Unfasten the transceiver module (two bolts). Remove the transceiver module.
4. Unfasten four fixing bolts on the cable gland at the base of the antenna unit. Remove clamping ring, rubber gasket and washers.
5. Pass the signal cable through the cable entry hole in the antenna unit mounting platform. Trim the cable to 500 mm length from the cable gland.

6. Slide two washers, rubber gasket, washer and clamping ring onto the cable in that order.



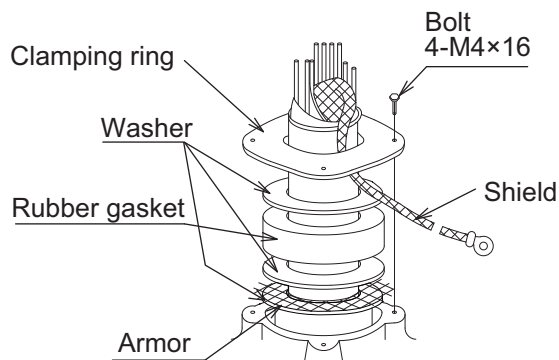
7. Fabricate the signal cable as shown below.

- 1) Remove the vinyl sheaths 500 mm.
- 2) Unravel the outer shield to expose the cores in the outer layer. Then, expose the cores in the inner layer. Label all inner cores to aid in identification.
- 3) Trim each core (except coaxial wire) considering its location on the terminal board.
- 4) Trim the inner and outer shields leaving 510 mm each. Twist shields together and attach crimp-on lug FV5.5-4 (blue, $\phi 4$).
- 5) Remove insulation of each core approx. 8 mm.
- 6) Fabricate the coaxial cable.

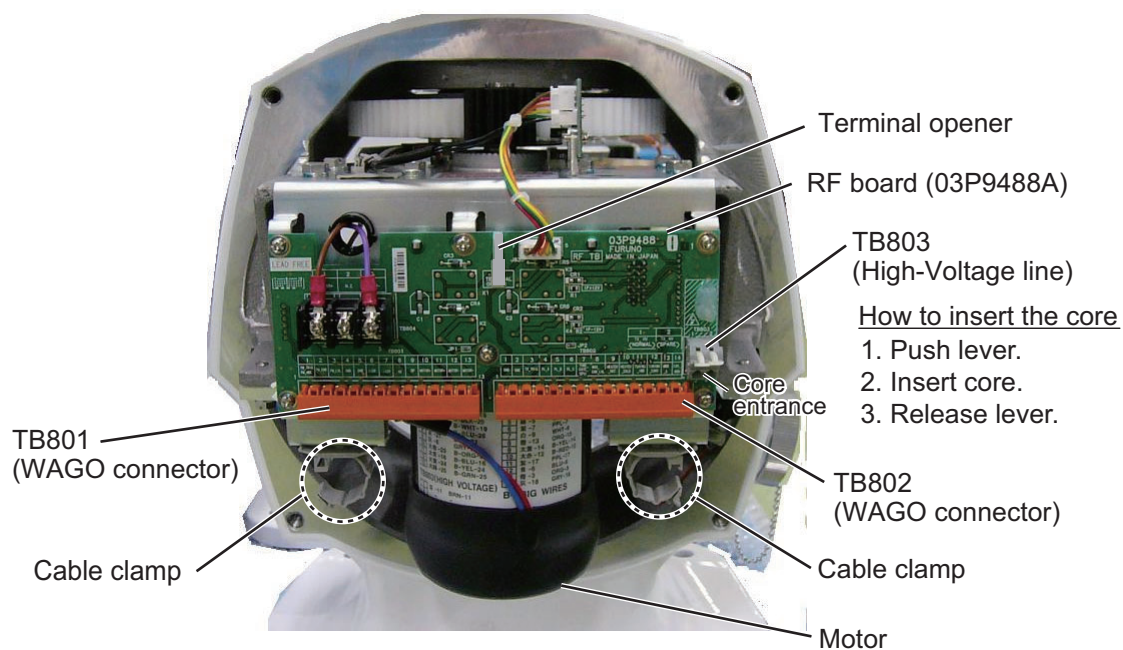


2. WIRING

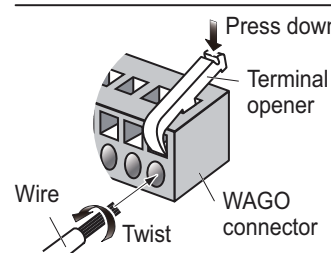
8. Pass the shield between the clamping ring and the washer as shown below. Fasten the clamping ring with the screws.



9. Connect the signal cable to the terminal board TB801, TB802 and TB803 on the RF board (03P9488), referring to the interconnection diagram.



How to connect wires to WAGO connector



<Procedure>

1. Twist the cores.
2. Press the terminal opener downward.
3. Insert the wire to hole.
4. Remove the terminal opener.
5. Pull the wire to confirm that it is secure.