

Installation Manual

CHART RADAR

Model FAR-3210(-BB)/3220(-BB)/ 3310/3320

(Product Name: Marine Radar)

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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, 50 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.

Model	Transceiver	Antenna*	100 W/m ²	50 W/m ²	10 W/m ²
FAR-3210(-BB) FAR-3310	RTR-105 (12 kW)	XN12CF	0.6 m	1.4 m	4.4 m
		XN20CF	0.4 m	0.9 m	3.0 m
		XN24CF	0.3 m	0.6 m	2.5 m
FAR-3220(-BB) FAR-3320	RTR-106 (25 kW)	XN12CF	1.3 m	2.7 m	9.5 m
		XN20CF	1.0 m	1.7 m	6.8 m
		XN24CF	0.7 m	1.3 m	5.5 m

* XN12CF: 4 ft, XN20CF: 6.5 ft, XN24CF: 8 ft



WARNING



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


Only qualified personnel are allowed to work inside the equipment.

ELECTRICAL SHOCK HAZARD




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 monitor unit, processor unit, power supply unit or 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 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 deviation of a magnetic compass:

	Standard compass	Steering compass
Antenna Unit (12 kW)	2.15 m	1.40 m
Antenna Unit (25 kW)	2.45 m	1.60 m
Processor Unit (EC-3000)	2.40 m	1.55 m
Monitor Unit (MU-190)	1.65 m	1.05 m
Monitor Unit (MU-231)	0.85 m	0.55 m
Radar Control Unit (RCU-025)	0.30 m	0.30 m
Trackball Control Unit (RCU-026)	0.30 m	0.30 m
Intelligent HUB (HUB-3000)	1.20 m	0.75 m
Sensor Adapter (MC-3000S)	2.05 m	1.35 m
Sensor Adapter (MC-3010A)	0.75 m	0.50 m
Sensor Adapter (MC-3020D)	1.05 m	0.70 m
Sensor Adapter (MC-3030D)	0.90 m	0.60 m
Switching HUB (HUB-100)	1.00 m	0.60 m
Power Supply Unit (PSU-014)	2.20 m	1.40 m
Junction Box (RJB-001)	1.10 m	0.70 m

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

SYSTEM CONFIGURATION

NOTICE

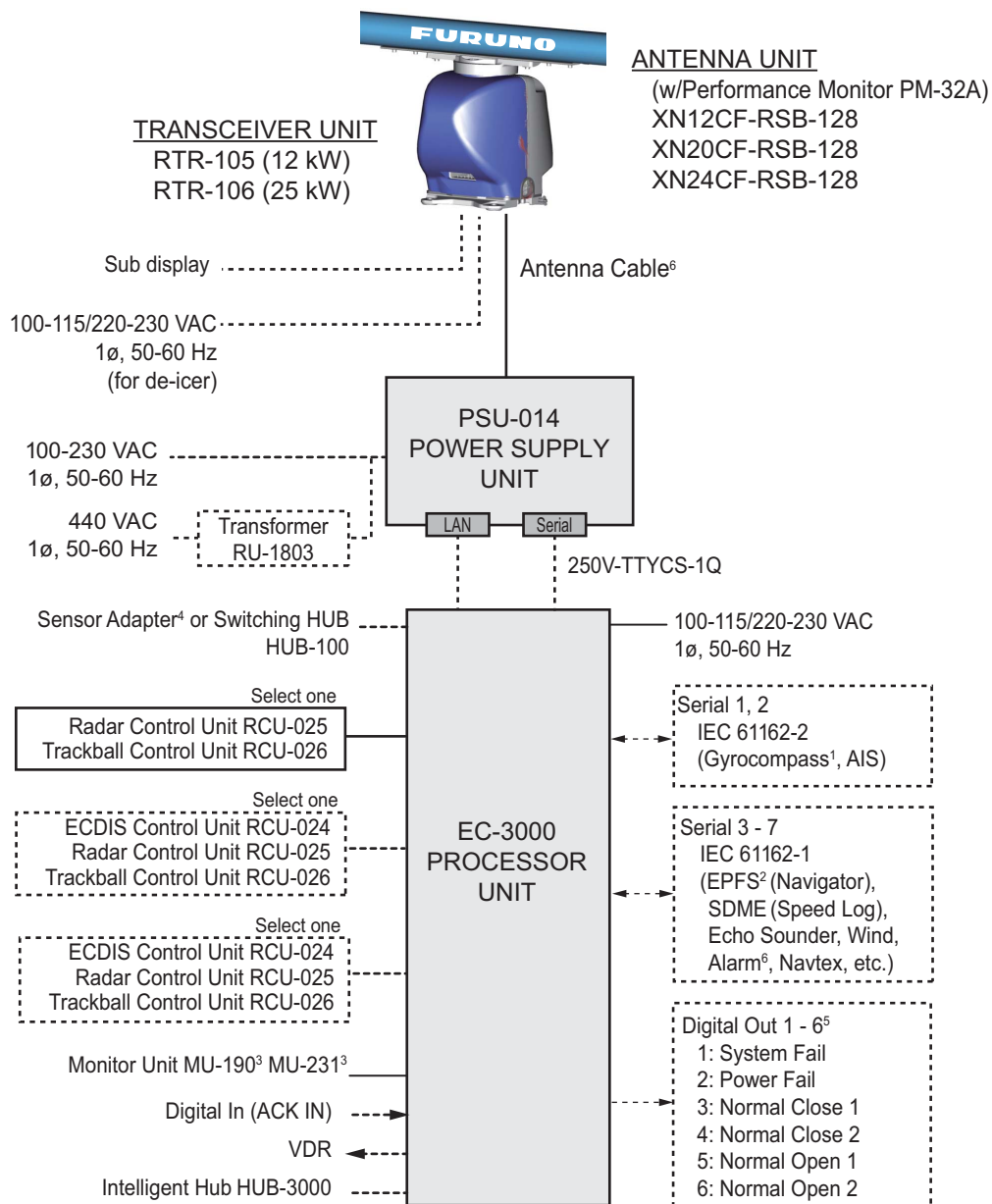
The radar(s) must be interconnected to the following type approved sensors:

- EPFS meeting the requirements of the IMO resolution MSC.112(73).
- Gyrocompass meeting the requirements of the IMO resolution A.424(XI).
- SDME meeting the requirements of IMO resolution MSC.96(72).

The radar may be interconnected via HUB-3000 to other FURUNO processing units having approved LAN ports.

Standard connection

Basic configuration is shown with solid line.



See the next page for footnotes.

SYSTEM CONFIGURATION

Category of units:

Antenna unit: Exposed to weather

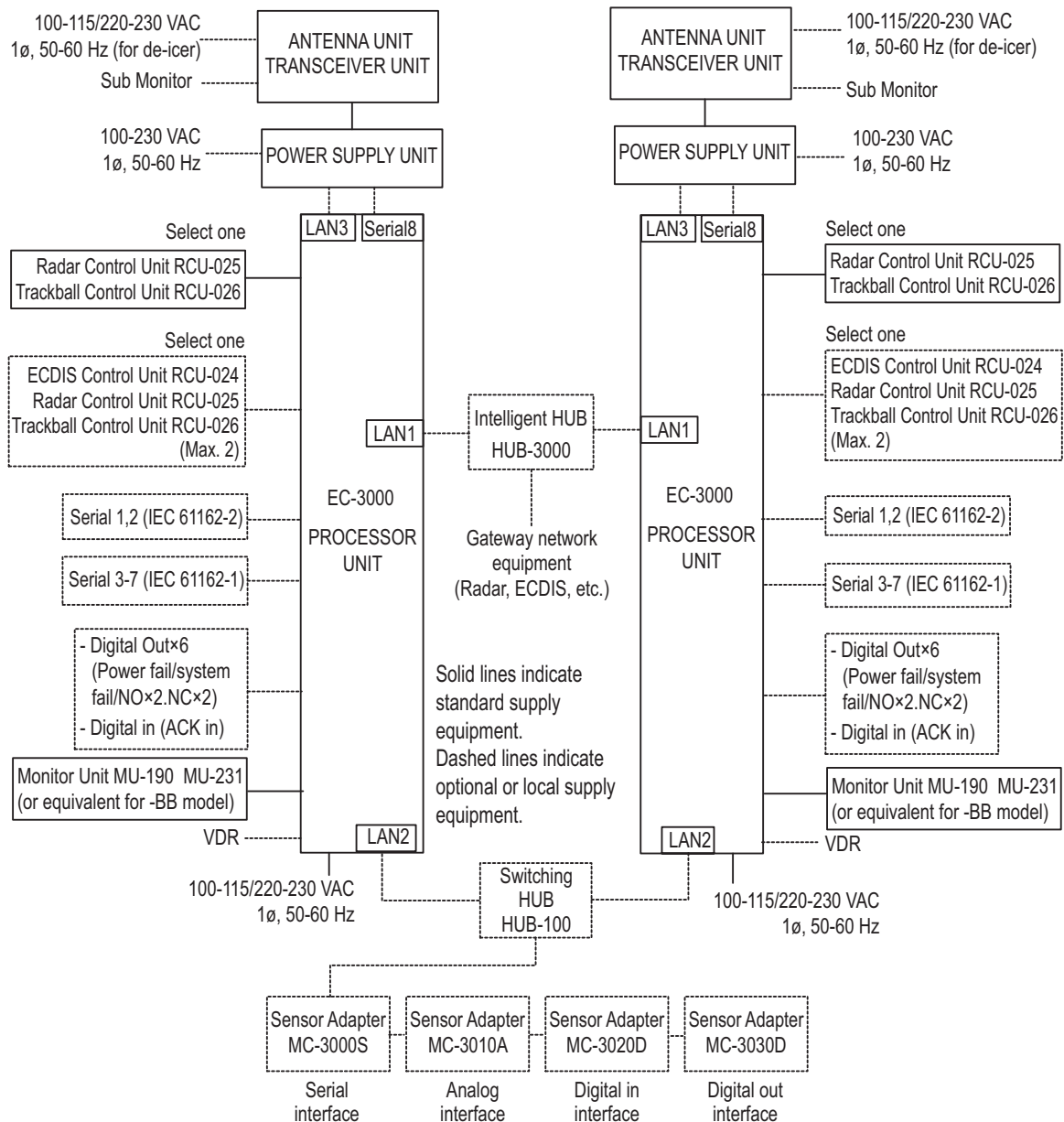
Other units: Protected from the weather

Notes

- 1) The gyrocompass must be type approved for compliance with IMO resolution A.424(XI) (and/or resolution A.821(19) for installation on HSC). 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) The EPFS must be type approved for compliance with IMO resolution MSC.96(72).
- 3) These monitors have been approved by the IMO, MU-190 for CAT 2C and CAT 2HC, MU-231 for CAT 1C and CAT 1HC. If a different monitor is to be used on IMO vessels, its effective diameter must meet the Category requirements mentioned above.
- 4) The sensor adapters are Control Serial MC-3000S, Analog IN MC-3010A, Digital IN MC-3020D and Digital OUT MC-3030D.
- 5) Characteristics of contact output for Alarm:
 - (Load current) 250 mA
 - (Polarity) Normally Open: 2 ports, Normally Close: 2 ports
 - Serial I/O for alarm is also possible, which complies with IEC 61162-1.
- 6) Junction boxes are required for antenna cable length greater than 100 m. Max. cable length is 400 m.

Interswitch connection

When multiple radars are used, connect, to the EC-3000, the HUB-3000 to the LAN1 port, and HUB-100 to the LAN2 port. This configuration lets each radar as a standalone radar in case of HUB malfunction.



Radar Component Combinations

RADAR MODEL	ANTENNA UNIT	TRANSCEIVER UNIT	POWER SUPPLY UNIT
FAR-3x10 FAR-3x20	XN12CF-RSB-128 XN20CF-RSB-128 XN24CF-RSB-128	RTR-105 RTR-106	PSU-014
FAR-3x20W	XN20CF-RSB-130 XN24CF-RSB-130	RTR-108	
FAR-3x30S FAR-3x30SW	SN36CF-RSB-129 SN36CF-RSB-131	RTR-107 RTR-109	PSU-014 PSU-015
FAR-3x30S-SSD	SN36CF-RSB-133	RTR-111	PSU-016 PSU-018

EQUIPMENT LIST

Standard supply

Name	Type	Code No.	Qty	Remarks
Antenna Unit	XN12CF-RSB-128-105	-	Select one	4 ft
	XN12CF-RSB-128-106	-		
	XN20CF-RSB-128-105	-		6.5 ft
	XN20CF-RSB-128-106	-		
	XN24CF-RSB-128-105	-		8 ft
	XN24CF-RSB-128-106	-		
Processor Unit	EC-3000	-	1	
Monitor Unit	MU-190	-	1	For FAR-32x0
	MU-231	-		For FAR-33x0
Control Unit	RCU-024	-	Select one	Standard type
	RCU-026	-		Trackball type
Power Supply Unit	PSU-014	-	1	
Installation Materials	CP03-35201	001-249-860	1	For radiator
	CP03-35401	001-254-980	Select one	For RSB, w/deicer
	CP03-35403	001-270-070		For RSB, no deicer
	CP03-35500[15M]	000-024-096	Select one	For antenna unit, 15 m
	CP03-35510[30M]	000-024-097		For antenna unit, 30 m
	CP03-35520[40M]	000-024-098		For antenna unit, 40 m
	CP03-35530[50M]	000-024-099		For antenna unit, 50 m
	CP03-35301	001-249-770	1	For PSU-014
	CP24-02120	000-024-925	1	For EC-3000
	CP24-02200	000-022-508	1	For RCU-025
	CP24-02300	000-022-509	1	For RCU-026
Accessories	FP24-00603	001-285-760	1	For EC-3000
	FP24-00701	001-170-820	1	For RCU-025
	FP24-00801	001-170-920	1	For RCU-026
Spare Parts	SP24-00601	001-170-660	1	For EC-3000 Fuse: FGMB 125V 10A PBF (000-157-470-10, 3 pcs.)
	SP24-00602	001-170-670	1	For EC-3000 Fuse: FGMB 250V 5A PBF (000-157-570-10, 3 pcs.)
	SP03-17641	001-249-740	1	For PSU-014 Fuse: FGBO 250V 7A PBF (000-178-084-10, 2 pcs.)
Hoist X-Band Antenna Instructions	C32-01302-*		1	

Console type

Name	Type	Code No.	Remarks
Display Unit	RCN-303	-	FAR-3210/3220
	RCN-304	-	FAR-3310/3320

Optional supply

Name	Type	Code No.	Remarks
Sensor Adapter	MC-3000S	-	Serial type
	MC-3010A	-	Analog IN
	MC-3020D	-	Digital IN
	MC-3030D	-	Digital OUT
LAN Signal Conv.	OP03-223-3	001-254-380	
Cable Extension Kit	OP03-224-3	001-254-410	With Junction Box RJB-001, LAN Signal Converter
Prog. Inst. Software	OP03-230	001-285-780	DVD-R
Deicer Kit	OP03-226	001-254-320	
Switching HUB	HUB-100	-	
Intelligent HUB	HUB-3000	-	
Control Unit	RCU-026	-	Trackball type
	RCU-024	-	ECDIS standard type
Monitor Unit	MU-190	-	For FAR-32x0
	MU-231	-	For FAR-33x0
Hanger	OP26-5	000-016-270	For MU-190
	OP26-15	001-116-730	For MU-231
Hood Assembly	OP26-6	001-080-930	For MU-190
	OP26-16	001-116-740	For MU-231
Flush Mount Kit	OP26-12	001-116-280	For MU-190
	OP26-17	001-116-750	For MU-231
Cable	OP24-32	001-188-300	USB cable between processor unit and control unit
Terminal Opener	OP24-33	001-188-850	
Transformer Unit	RU-1803	-	
	RU-3305-0	-	
	RU-5693	-	
	RU-6522	-	
	RU-5466-1	-	
Rectifier	RU-3424	-	AC220V
	RU-1746B-2	-	
Junction Box	RJB-001	000-083-355	
LAN Cable Assy.	MOD-Z072-050+	001-167-890-10	
AC/DC Power Supply Unit	PR-240	000-013-632	
Installation Materials	CP03-28900(10M)	000-082-658	LAN cable for sensor adapter
	CP03-28910(20M)	000-082-659	
	CP03-28920(30M)	000-082-660	
Installation Materials	CP24-02900(10M)	001-208-050	LAN cable for HUB-3000
	CP24-02910(20M)	001-208-060	LAN cable for HUB-3000
	CP24-02920(30M)	001-208-040	LAN cable for HUB-3000
Connector	CP03-28901	008-542-460	

EQUIPMENT LIST

Name	Type	Code No.	Remarks
Crimping Tool	CRIMPFOX 10S	001-206-920	For sensor adapters
Cable Assy.	DVI-D/D S-LINK 5M	001-132-960-10	Between processor unit and control unit, 5 m
	DVI-D/D S-LINK 10M	001-133-980-10	Between processor unit and control unit, 10 m
Cable Assy.	DSUB9P-X2-L5M	001-188-260	Brilliance control cable for MU-231, 5 m
	DSUB9P-X2-L10M	001-188-270	Brilliance control cable for MU-231, 10 m
Cable Assy.	DSUB9P-X2-L5M-WP	001-207-890	Brilliance control cable for MU-190/231, 5 m, IPX2 std.
	DSUB9P-X2-L10M-WP	001-207-900	Brilliance control cable for MU-190/231, 5 m, IPX2 std.
Cable Assy.	DSUB9P-X2-A-L5M	001-252-580	For connection with MU-2x1CE HD monitor
	DSUB9P-X2-A-L10M	001-252-590	For connection with MU-2x1CE HD monitor
Cable Assy.	DVI-BNCX5-L2000	001-204-150	For connecting a VDR
Cable Assy.	6TPSH-XH12X2-L5.0SP1	001-186-260-10	For RCU-025, 5 m
	6TPSH-XH12X2-L10SP1	001-186-270-10	For RCU-025, 10 m
	6TPSH-XH12X2-L20SP1	001-186-280-10	For RCU-025, 20 m
	6TPSH-XH12X2-30SP1	001-186-290-10	For RCU-025, 30 m
	6TPSH-XH12X2-L5.0SP2	001-186-310-10	For RCU-026, 5 m
	6TPSH-XH12X2-L10SP2	001-186-320-10	For RCU-026, 10 m
	6TPSH-XH12X2-L20SP2	001-186-330-10	For RCU-026, 20 m
	6TPSH-XH12X2-L30SP2	001-186-340-10	For RCU-026, 30 m
Cable	MC1.5-W-L600	001-187-470-10	Between sensor adapters, 6 m
	MC1.5-W-L1000	001-187-480-10	Between sensor adapters, 10 m
	MC1.5-W-L2000	001-187-490-10	Between sensor adapters, 20 m
	MC1.5-W-L3000	001-187-500-10	Between sensor adapters, 30 m
Spare Parts	SP24-00801	001-235-520	For HUB-3000
Operator's Manual	OME-36160-*		English
	OMJ-36160-*		Japanese
Magnetron Replacement Instruction Manual	E32-01306-*		English
	J32-01306-*		Japanese

About the category sticker

This radar meets the requirements in IEC62388 (Marine navigation and radiocommunication equipment and systems-Shipborne radar-Performance requirements, method of testing and required test results). Check the appropriate box on the sticker which is pre-attached to the processor unit, according to your radar's specification. Refer to the table shown below to confirm your category.

Comply with MSC.192(79)

<input type="checkbox"/> CAT 1C	<input type="checkbox"/> CAT 1HC
<input type="checkbox"/> CAT 2C	<input type="checkbox"/> CAT 2HC

Sticker for category

Category	Radar type	ANT. rotation speed
CAT 1C	FAR/3310/3320	24 rpm
CAT 1HC	Same models as above	42 rpm
CAT 2C	FAR/3210(-BB)/3220(-BB)	24 rpm
CAT 2HC	Same models as above	42 rpm

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1. INSTALLATION

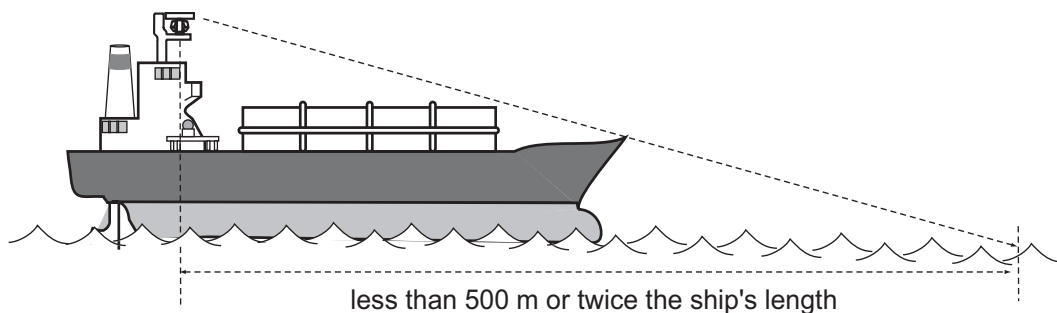
NOTICE

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.

1.1 Antenna Unit

1.1.1 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

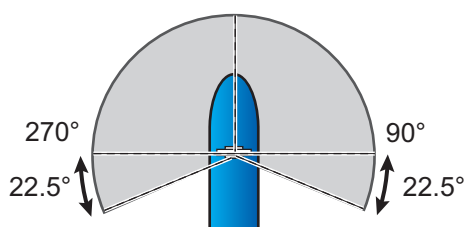
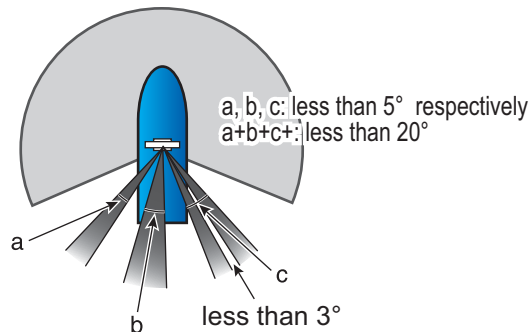


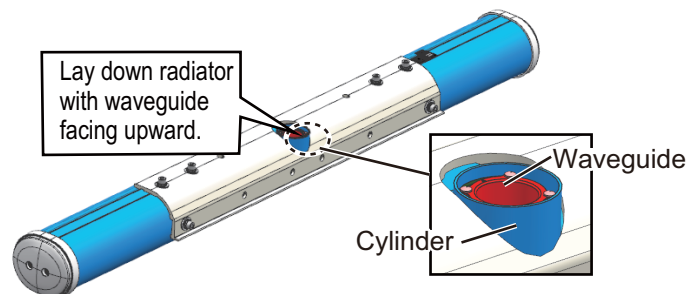
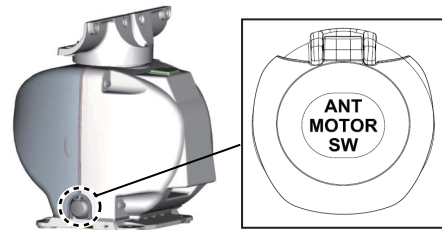
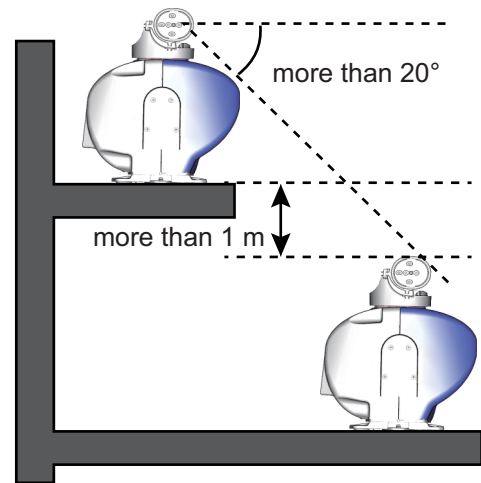
Figure 2



- Do not install the antenna where extreme winds may strike the port and starboard sides of the antenna.

1. INSTALLATION

- Install the antenna unit away from interfering high-power energy sources and TX radio antennas.
- Keep the lower edge of the antenna unit above the safety rail by at least 500 mm.
- Install two antenna units as shown in the right figure.
- 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 unit with the ground wire (supplied).
- An antenna switch is provided on the chassis to stop the antenna. Make sure the mounting location provides easy access to the switch.
- 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°C .
- Leave sufficient space around the unit for maintenance and servicing. See the antenna unit outline drawing for recommended maintenance space.
- If it is necessary to lay down the radiator before you fasten it to the antenna unit, lay it down with the waveguide up, to prevent damage to the cylinder that surrounds the waveguide.



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

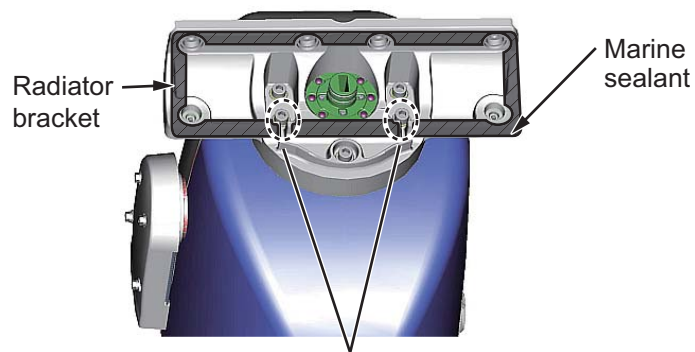
1.1.2 How to assemble the antenna unit

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 follows:

1. Remove the protective waveguide cap from the waveguide on the radiator bracket.

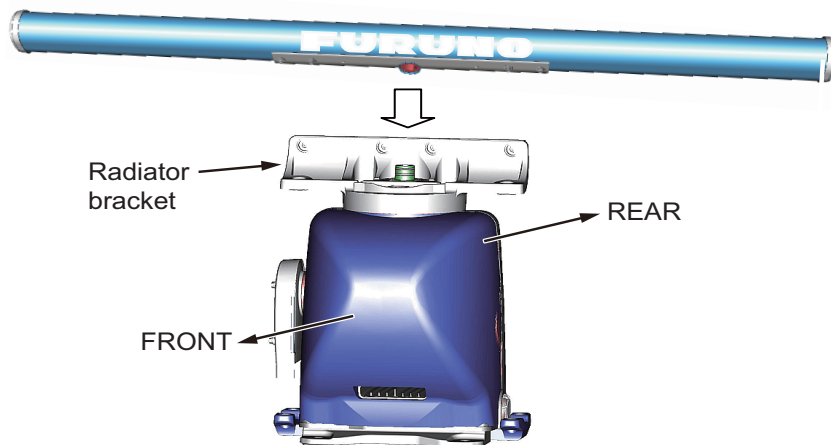


2. Coat the hatched area shown below with the supplied marine sealant.



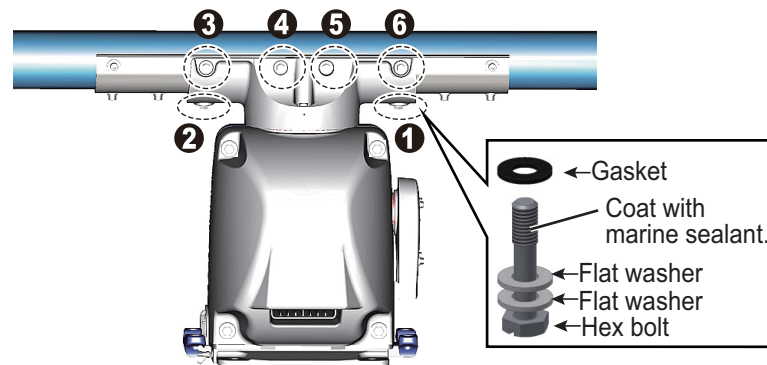
Do not apply the sealant to these locations.

3. Coat the threads of six hex bolts (M8×50, supplied) with the supplied marine sealant. Set the radiator to the radiator bracket.

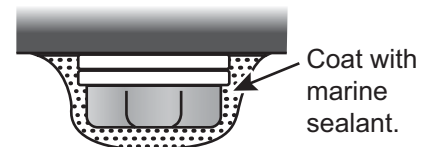


1. INSTALLATION

4. Fasten the antenna radiator to the radiator bracket with the six sets of hex bolts, flat washers (2 pcs.) and gaskets. **Fasten the bolts in the order shown below.** The torque must 15.0 N•m.



5. Coat the screws fixed at step 4 with marine sealant (supplied) as shown in the right figure.



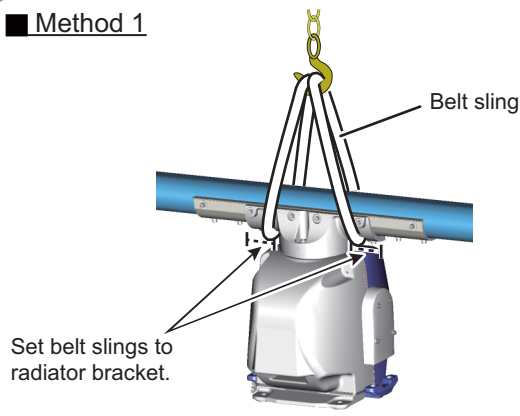
1.1.3 How to fasten the antenna unit to the mounting platform

The antenna unit may be assembled before hoisting it to the mounting platform. Hoist the antenna referring to the illustration below and "FAR-3xx0 Series X-band Antenna Unit Installation Notices," issued separately.

How to Hoist the Antenna Unit

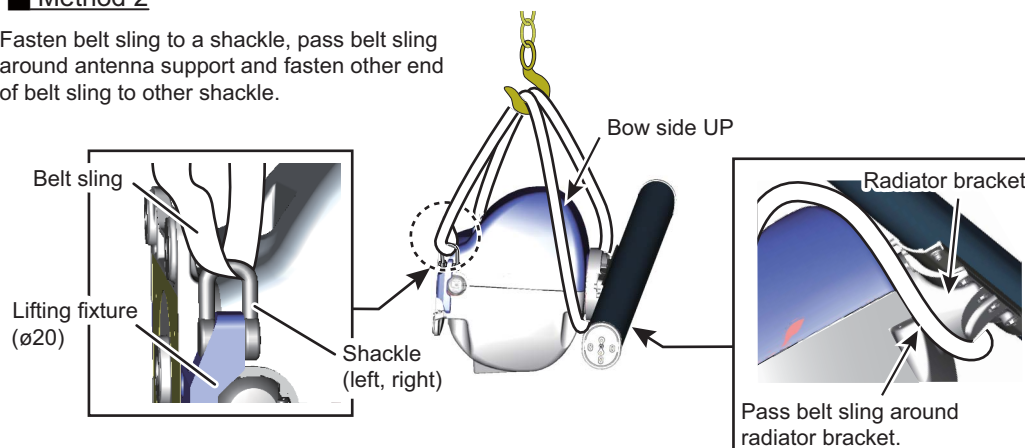
Do one of the following to hoist the antenna unit.

■ Method 1

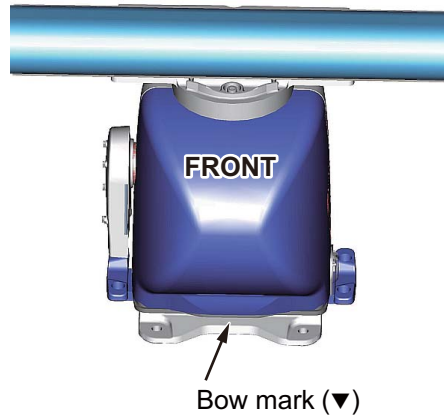


■ Method 2

Fasten belt sling to a shackle, pass belt sling around antenna support and fasten other end of belt sling to other shackle.

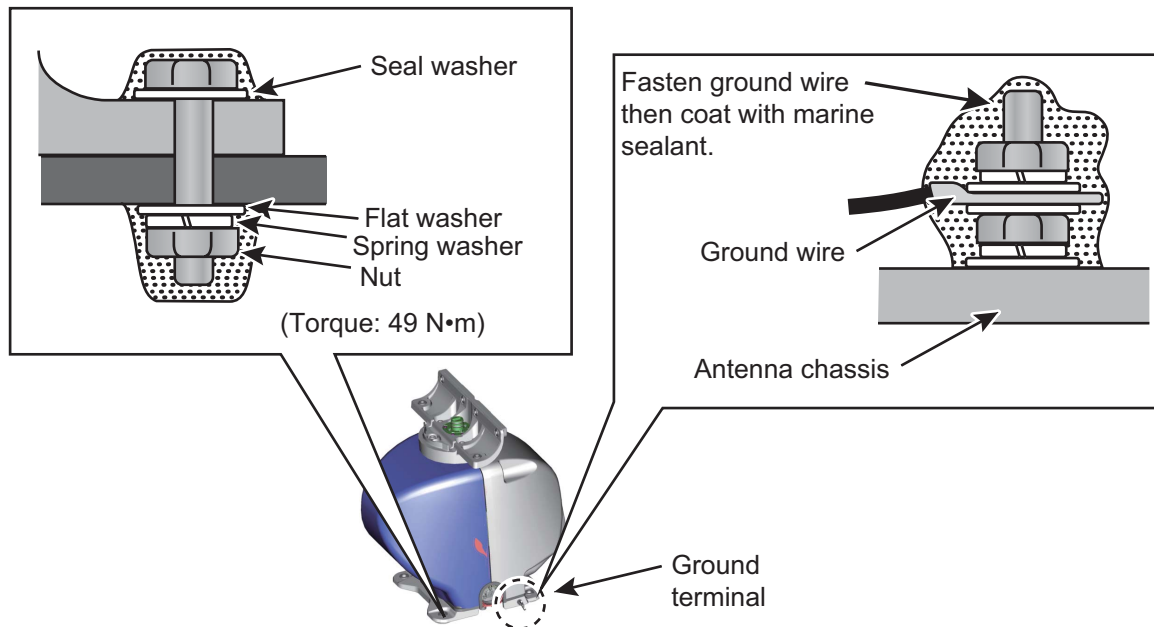


1. Construct a suitable mounting platform referring to the outline drawing at the end of this manual.
2. Referring to the outline drawing, drill four mounting holes in the mounting platform.
3. Place the antenna unit on the platform, then orient the unit so the bow mark on its base is facing the ship's bow.

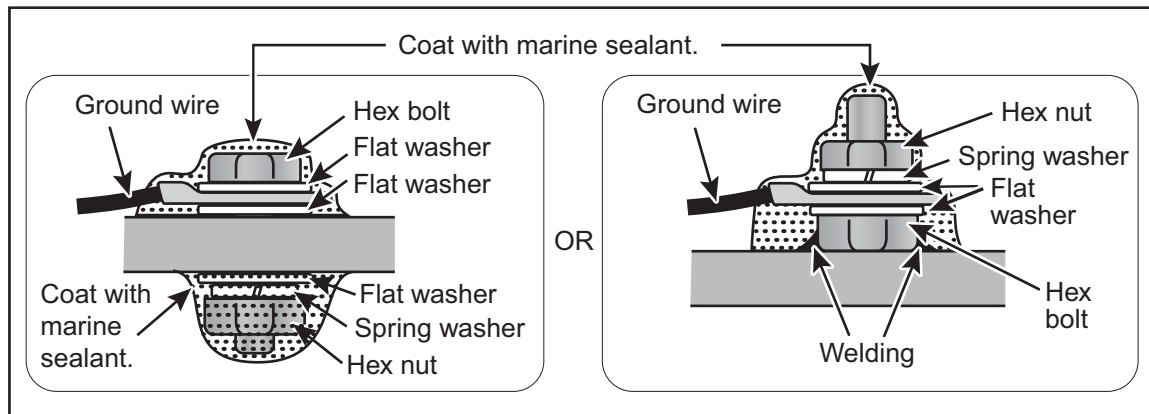


4. Fasten the antenna unit to the mounting platform with four sets of M12×60 hex bolts, nuts, flat washers, seal washers and spring washers. Insert the bolts from the topside of the platform. The torque must be 49 N•m. **DO NOT insert the bolts from the underside of the platform. The cover cannot be opened.**
5. Using a hex bolt (M6×25), nut (M6) and flat washer (M6), establish the ground system on the mounting platform as shown in the figure on the next page. The location must 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 ground terminal on the antenna unit. Coat the hardware of the ground system with marine sealant (supplied).

1. INSTALLATION



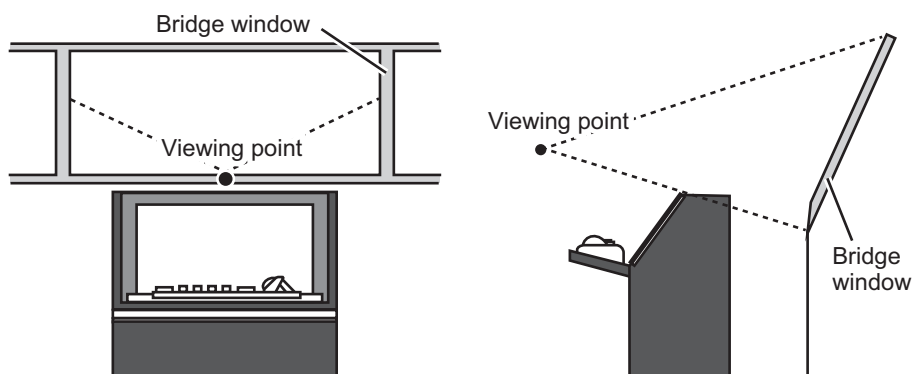
Arrange grounding point as close as possible to antenna unit.



1.2 Monitor Unit

See the operator's manual for MU-190 (OMC-44670) or MU-231 (OMC-44690) for the installation procedure. Keep in mind the following points when selecting a location.

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



1.3 Radar Control Unit, Trackball Control Unit

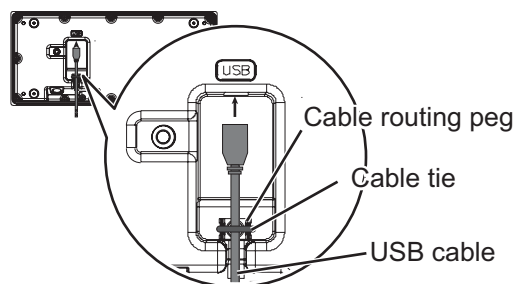
The control units can be installed on a desktop or flush mounted in a console. For the desktop installation the unit can be laid flat or tilted.

Installation considerations

Keep in mind the following points when selecting a location.

- Select a location where the control unit can be operated easily.
- Locate the unit 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.
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- Determine the location considering the length of the signal cable between the control unit and the processor unit.
- A magnetic compass will be affected if the control unit is placed too close to the magnetic compass. Observe the compass safe distances in the SAFETY INSTRUCTIONS to prevent interference to the compass.
- Be sure to connect the ground wire (between the earth terminal on the chassis and the ship's earth).

Ex. Radar control unit, bottom view RCU-025



- Fasten the USB cable with the cable tie.

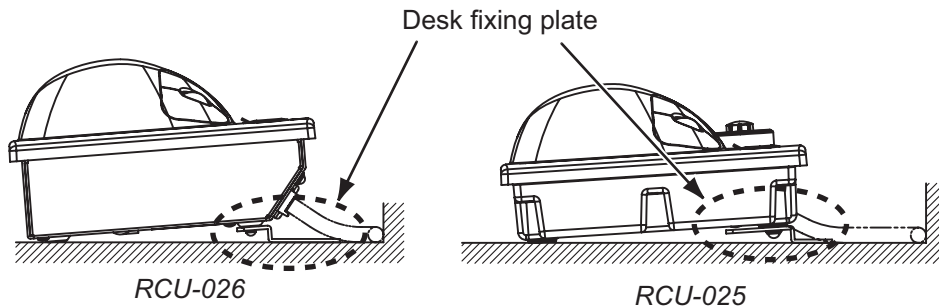
1. INSTALLATION

1.3.1 Desktop installation

How to mount the unit tilted

Use the desk fixing plate to mount the unit tilted.

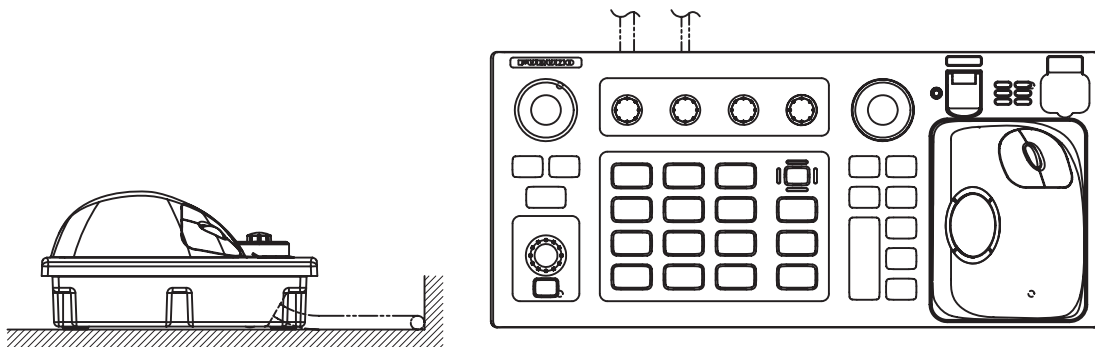
1. Fix the desk fixing plate to the bottom of the control unit.
2. Fix the control unit with self-tapping screws (local supply).



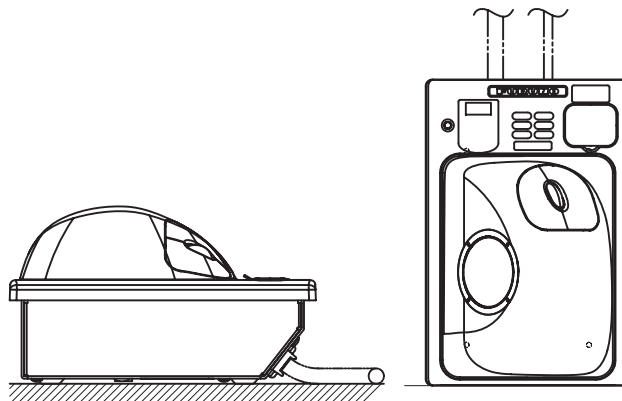
Side view of control units

How to mount the unit flush with mounting surface

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 screws (M4, local supply) from the underside of the desktop.



Control Unit RCU-025

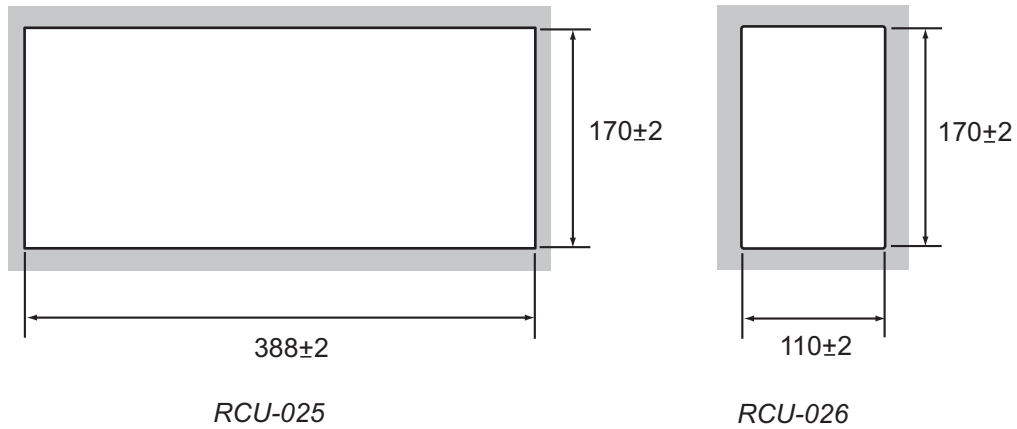


Control Unit RCU-026

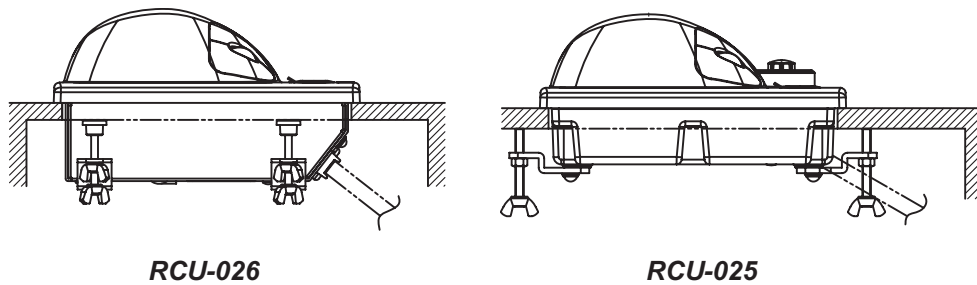
1.3.2 Installation in a console

Use the applicable optional flush mount kit to install the control unit in a console.

1. Prepare a cutout in the location as shown in the figure as below.



2. Set the control unit to the cutout.
3. Attach the mounting plate to the control unit with four screws from the rear side.
4. Screw the wing screw to each mounting plate and then insert hex. bolt to each wing screw.
5. Fasten each wing screw and then fasten the hex. nuts as shown in figure below.



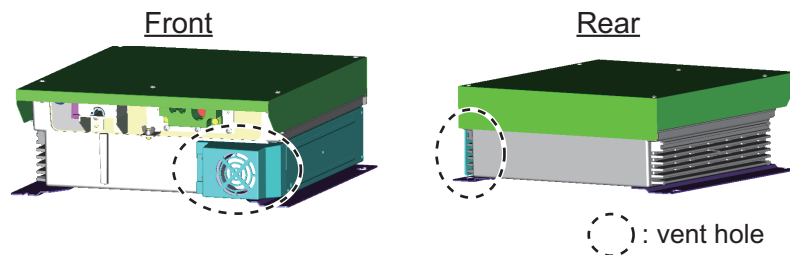
Side view of control units

1.4 Power Supply Unit

1.4.1 Installation considerations

The Power Supply Unit can be mounted on a bulkhead or deck. Keep in mind the following points when selecting a location.

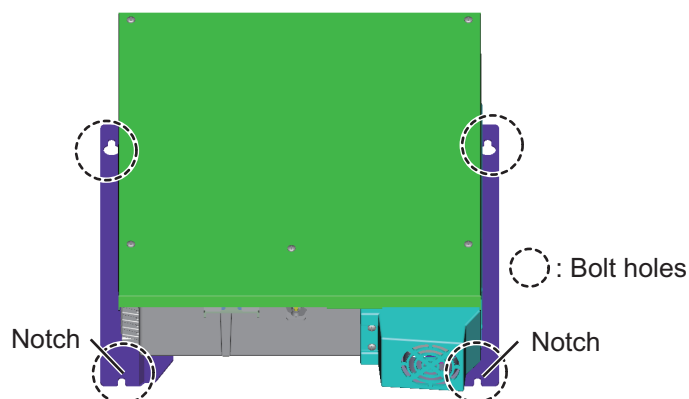
- Locate the unit away from heat sources because of heat that can build up inside the cabinet.
- Select a location where the vibration is minimal.
- Locate the equipment away from places subject to water splash and rain.
- Make the service clearance of 100 mm in front of the vent hole (front and rear sides).



- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- Connect the ground wire between the earth terminal on the chassis and the ship's earth.
- A magnetic compass will be affected if the unit is placed too close to the magnetic compass. Observe the compass safe distances on page ii to prevent disturbance to the compass.

1.4.2 How to install the power supply unit

Use four bolts (M6, local supply) to fix the power supply unit.



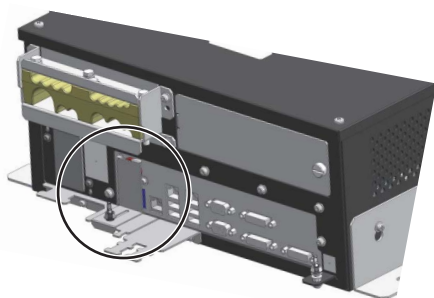
Note: For bulkhead mounting, the open notches on the unit must face the deck.

1.5 Processor Unit

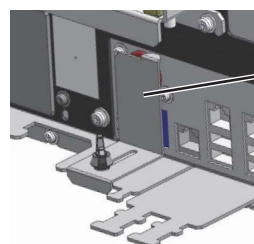
1.5.1 Installation considerations

Keep in mind the following points when selecting a location.

- Locate the processor unit away from heat sources because of heat that can build up inside the cabinet.
- Select a location where the vibration is minimal.
- Locate the equipment away from places subject to water splash and rain.
- Make the service clearance of 100 mm in front of the vent hole (left side).
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- Be sure to connect the ground wire (between the earth terminal on the chassis and the ship's earth).
- A magnetic compass will be affected if the processor unit is placed too close to the magnetic compass. Observe the compass safe distances in the SAFETY INSTRUCTIONS to prevent interference to a magnetic compass.
- Leave the dummy plate fastened, to prevent the wrong operation of the power switch. The items behind the plate are for use by the serviceman.

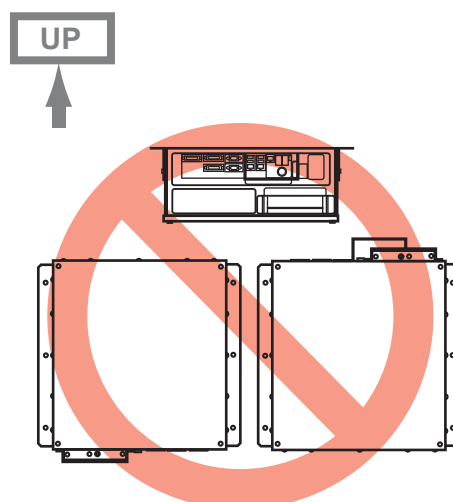
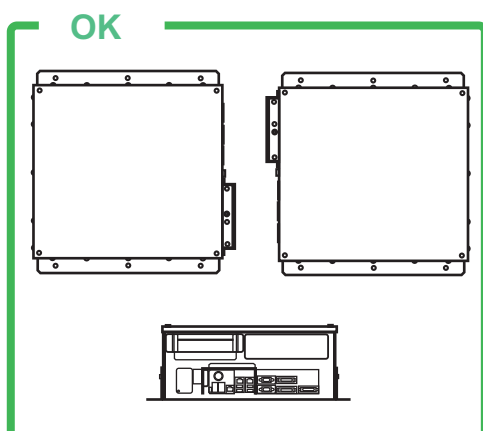


Processor unit, front view



Keep the dummy plate in this position.

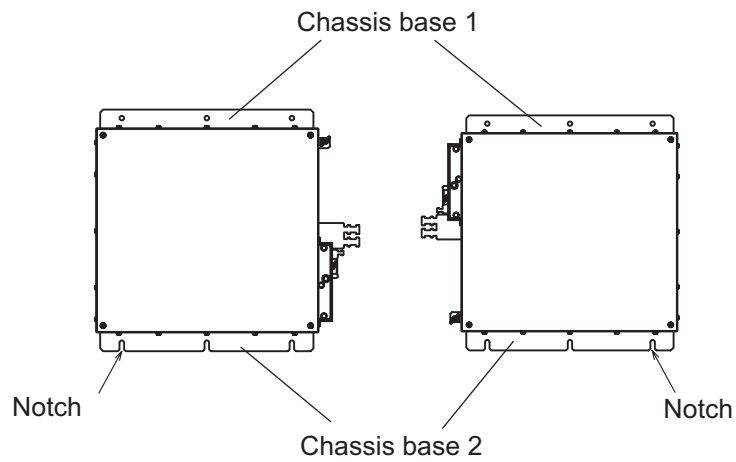
- Install the processor unit on the floor, or on a bulkhead with the following direction (horizontal), because of the DVD drive unit.



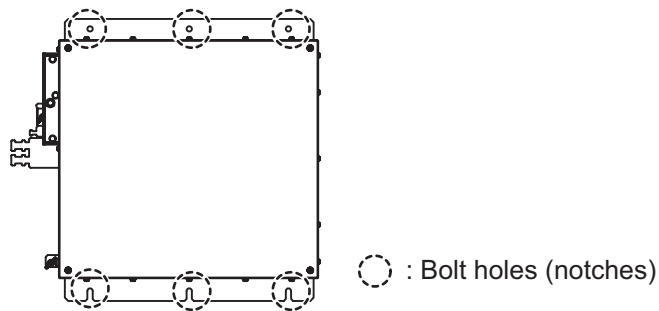
1.5.2 How to install the processor unit

1. Use 10 binding head screws (M4×8, supplied) to attach the chassis bases 1 and 2 to the processor unit.

Note: For bulkhead mounting, attach the chassis base 2 so that the notches on it are facing the deck.



2. Use six bolts (M6, local supply) to fasten the processor unit.



1.6 Sensor Adapters (option)

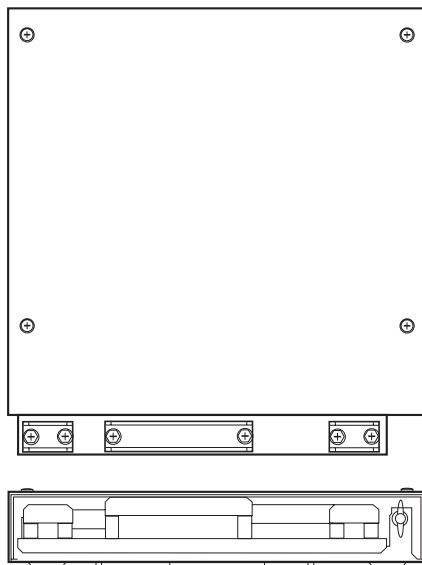
Installation considerations

When you select a mounting location, keep in mind the following points:

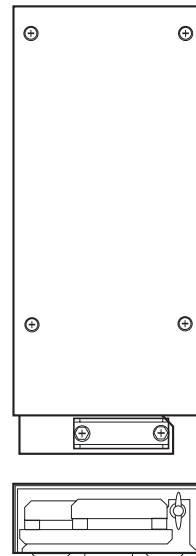
- Locate the adapter away from heat sources because of heat that can build up inside the cabinet.
- Select a location where the vibration is minimal.
- Locate the equipment away from places subject to water splash and rain.
- Be sure to connect the ground wire (between the earth terminal on chassis and the ship's earth).
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the adapter is placed too close to the magnetic compass. Observe the compass safe distances in the SAFETY INSTRUCTIONS to prevent interference to a magnetic compass.
- Select the location considering the number of sensor adapters connected.
A maximum of eight MC-3000S can be connected to a sensor network.
A maximum of 10 sensor adapters (MC-3010A/3020D/3030D) can be connected to a MC-3000S. However, note that five MC-3010A can be connected.
- For the MC-3000S, use a Cat5 cable.
- Select the location so that the length of the cables among the sensor adapters (MC-3000S, 3010A, 3020D and 3030D) is less than 6 m. If the length is more than 6 m, the adapters may not work properly.

How to install the sensor adapter

1. Unfasten four pan head screws to remove the cover from the sensor adapter.
2. Fasten four self-tapping screws ($\phi 4 \times 20$, supplied) to fix the sensor adapter.
3. Reattach the cover.



MC-3000S



MC-3010A/3020D/3030D

1.7 Intelligent Hub (option)

Use the optional Intelligent Hub HUB-3000 to connect gateway network equipment. Do not connect this network to the shipborne LAN network. Further, do not connect a PC to this network, other than for maintenance.

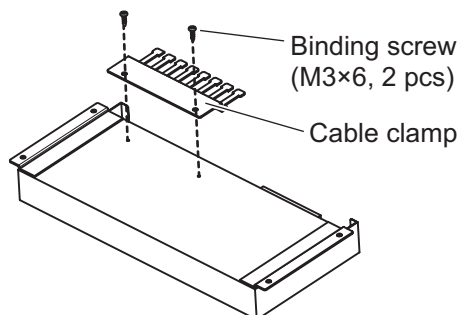
Installation considerations

Keep in mind the following considerations when selecting a location.

- Locate the hub away from heat sources because of heat that can build up inside the cabinet.
- Select a location where the vibration is minimal.
- Locate the hub away from places subject to water splash and rain.
- Be sure to connect a ground (between the earth terminal on the hub and the ship's earth).
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the hub is placed too close to the magnetic compass. Observe the compass safe distances in the SAFETY INSTRUCTIONS to prevent interference to a magnetic compass.

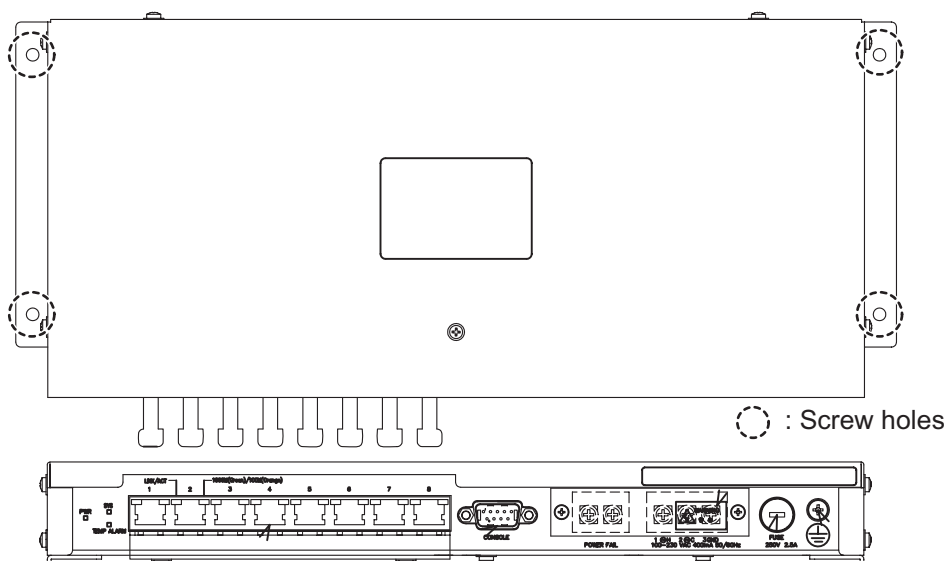
How to install the Intelligent Hub

1. Use two binding screws (M3×6, supplied) to attach the cable clamp (supplied) to the bottom of the HUB-3000.



HUB-3000, bottom view

2. Fasten four self-tapping screws (φ4×20, supplied) to fix the unit.



1.8 Switching Hub (option)

Use the HUB-100 to connect sensor networks. This network cannot be connected to the shipborne LAN network. Further do not connect a commercial PC to this network, other than for the maintenance.

For the installation procedures, see the operator's manual for HUB-100 (Pub. No.OMC-35191).

Installation considerations

Keep in mind the following points when selecting a location.

- Locate the hub away from heat sources because of heat that can build up inside the cabinet.
- Select a location where the vibration is minimal.
- Locate the equipment away from places subject to water splash and rain.
- Make sure that the ground wire is connected between the earth terminal on the hub and the ship's earth.
- Leave sufficient space at the sides and rear of the unit to facilitate maintenance.
- A magnetic compass will be affected if the hub is placed too close to the compass. Observe the compass safe distances in the SAFETY INSTRUCTIONS to prevent compass malfunction.

1.9 Junction Box (option)

If the length of the antenna cable is more than 100 m, junction boxes are required. Install the boxes in a location protected from the weather, because their waterproofing standard is IPX3.

Fasten the junction boxes to the mounting location with four sets of M8 bolts and nuts. See the outline drawing for mounting dimensions.

1. INSTALLATION

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