

Installation Manual **RADAR SENSOR** **DRS4A/DRS6A/DRS2D/DRS4D**

SAFETY INSTRUCTIONS	i
SYSTEM CONGFIGURATION	ii
EQUIPMENT LISTS.....	iii
1. MOUNTING	1
1.1 Mounting Considerations.....	1
1.2 Mounting Procedure for DRS4A/6A.....	2
1.3 Mounting Procedure for DRS2D/4D	7
2. WIRING	8
2.1 Wiring of DRS4A/6A	9
2.2 Wiring of DRS2D/4D.....	11
3. ADJUSTMENT	9
3.1 Selecting Radar Source.....	9
3.2 Heading Alignment	9
3.3 Setting the Antenna Height.....	9
OUTLINE DRAWINGS.....	D-1
INTERCONNECTION DIAGRAM	S-1





SAFETY INSTRUCTIONS

WARNING



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

Only qualified personnel should work inside the equipment.



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

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



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

Serious injury or death can result if the power is left on or is applied while the equipment is being installed.



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.

CAUTION



Ground the equipment to prevent electrical shock and mutual interference.

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

Model	Standard	Steering
DRS4A	0.80 m	0.50 m
DRS6A	0.85 m	0.55 m
DRS2D	1.35 m	0.80 m
DRS4D	1.40 m	0.85 m

WARNING

Radio Frequency Radiation Hazard



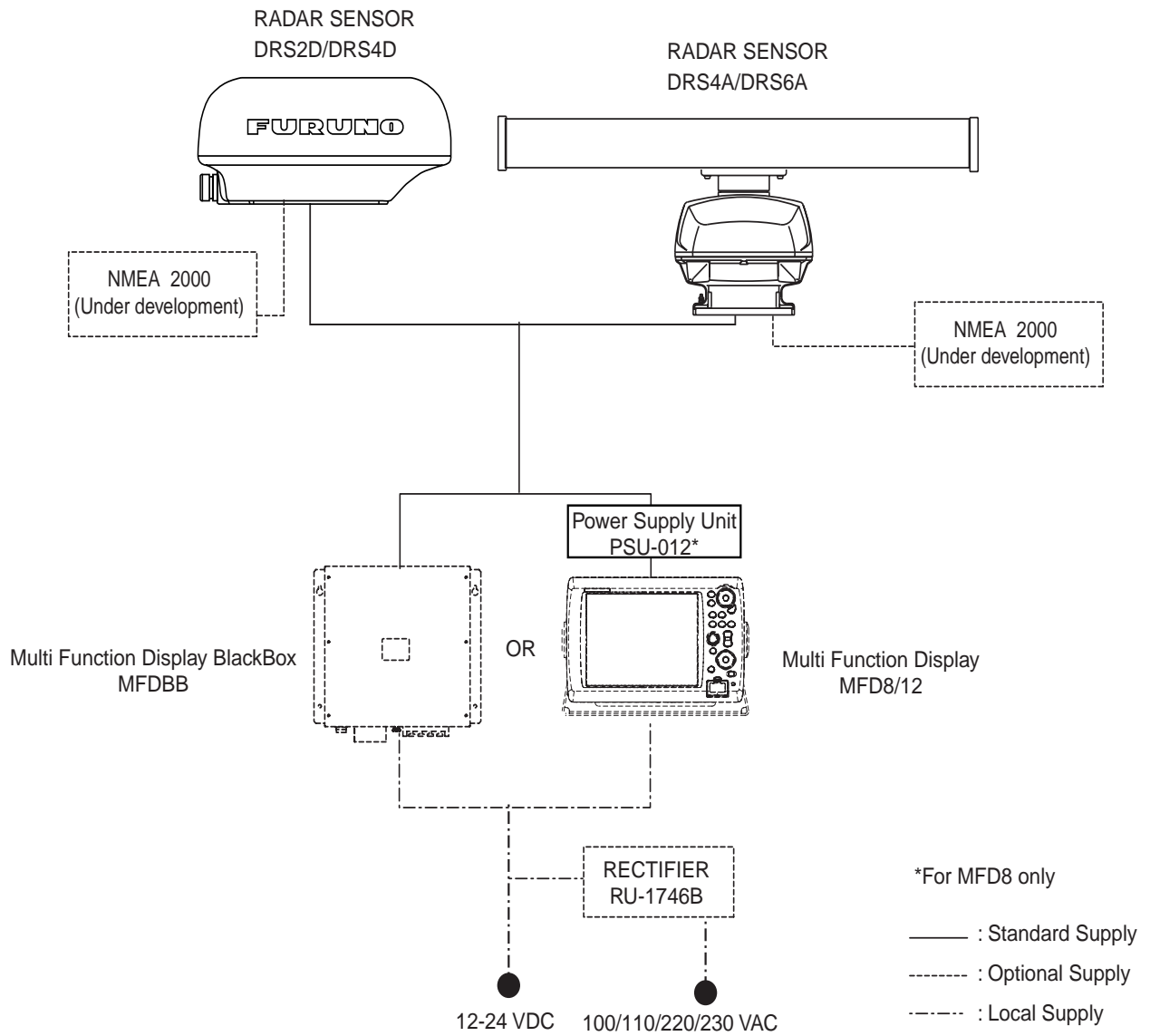
The radar antenna emits electromagnetic radio frequency (RF) energy which can be harmful, particularly to your eyes. Never look directly into the antenna aperture from a close distance while the radar is in operation or expose yourself to the transmitting antenna at a close distance.

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

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

Model	Distance to 100 W/m ² point	Distance to 10 W/m ² point
DRS4A	Nil	1.20 m
DRS6A	Nil	1.20 m
DRS2D	Nil	0.40 m
DRS4D	0.1 m	1.40 m

SYSTEM CONFIGURATION



EQUIPMENT LISTS

Standard supply (for DRS4A/6A)

Name	Type	Code No.	Qty	Remarks
Radar Sensor	XN10A-RSB-118-092	-	1	For DRS4A
	XN12A-RSB-118-093	-	1	For DRS6A
	DRS2D	-	1	Radome
	DRS4D	-	1	Radome
Two-way Cable	MOD-ASW0001-010		1	10 m
	MOD-ASW0001-015			15 m
	MOD-ASW0001-020			20 m
	MOD-ASW0001-030			30 m
Installation Materials			1 set	

Optional supply

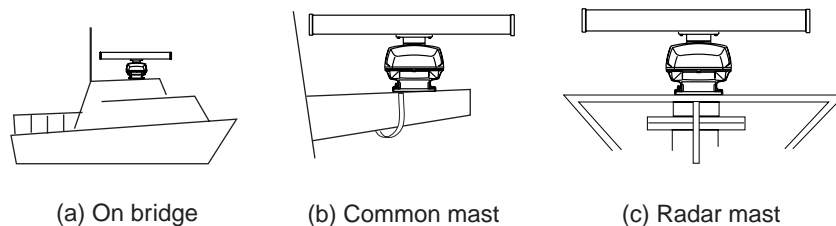
Name	Type	Code No.	Qty	Remarks
Junction Box	J-BOX		1	

1. MOUNTING

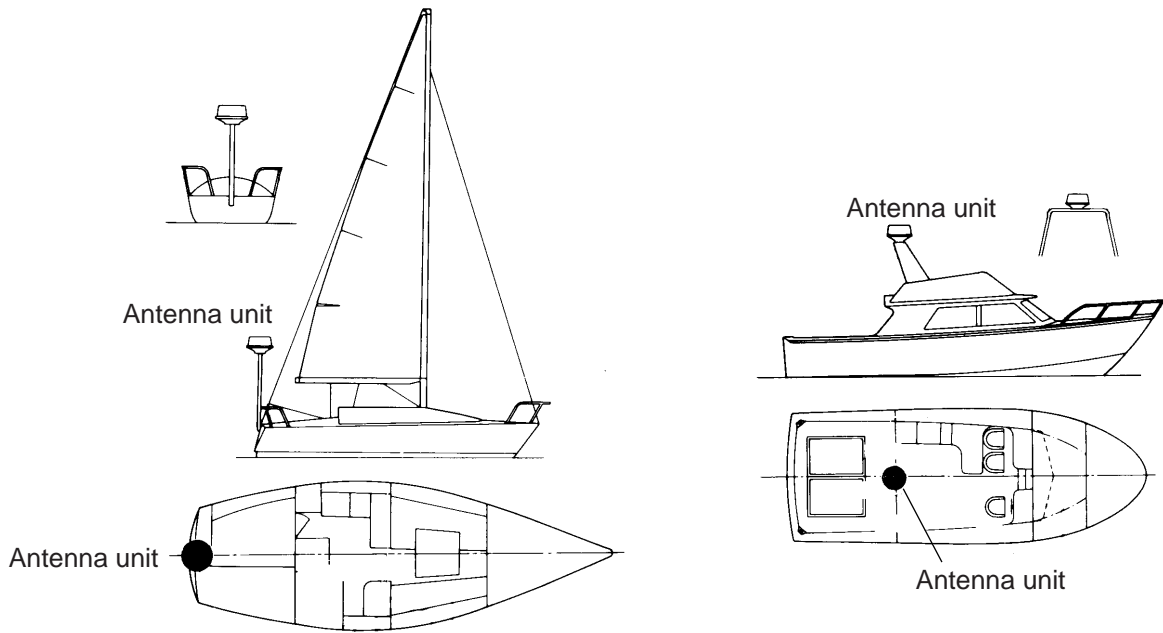
1.1 Mounting Considerations

- The radar sensor is generally installed either on top of the wheelhouse or on the radar mast on a suitable platform. Locate the radar sensor where there is a good all-round view. Any obstruction will cause shadow and blind sectors. A mast for instance, with a diameter considerably less than the horizontal beamwidth of the radiator, will cause only a small blind sector, but a horizontal spreader or crosstrees in the same horizontal plane as the radar sensor would be a much more serious obstruction; you would need to place the radar sensor well above or below it.
- It is rarely possible to place the radar sensor 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.
- A magnetic compass will be affected if the radar sensor is placed too close to it. Observe the compass safe distances mentioned in the SAFETY INSTRUCTIONS to prevent interference to a magnetic compass.
- Do not paint the radiator aperture, to ensure proper emission of the radar waves.
- When this radar sensor is to be installed on large vessels, consider the following points:
 - The signal cable run between the radar sensor and MFDBB, MFD8 or MFD12 comes in lengths of 10 m, 15 m, 20 m and 30 m.
 - Deposits and fumes from a funnel or other exhaust vent can adversely affect the aerial performance and hot gases may distort the radiator portion. The radar sensor must not be mounted where the temperature is more than 70°C.

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



For DRS4A/6A



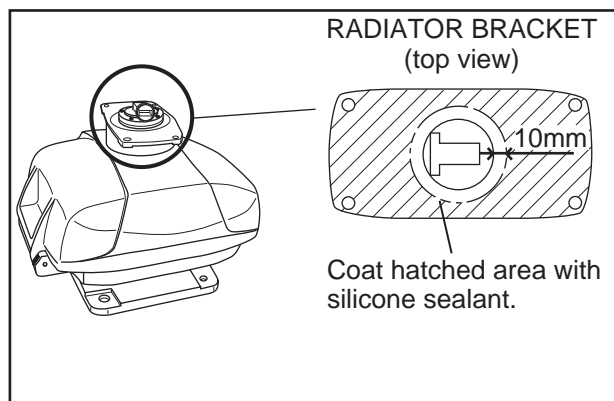
For DRS2D/4D

1.2 Mounting Procedure for DRS4A/6A

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

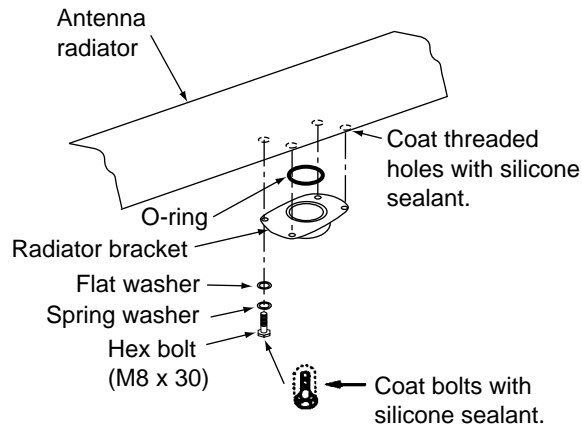
1.2.1 Fastening the radiator to the radiator bracket

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



3. Coat threaded holes on the antenna radiator with silicone sealant.
4. Grease the O-ring and set it to the radiator bracket.

- Coat the hex bolts (4 pcs.) with silicone sealant. Fasten the antenna radiator to the radiator bracket with the hex bolts, flat washers and spring washers.



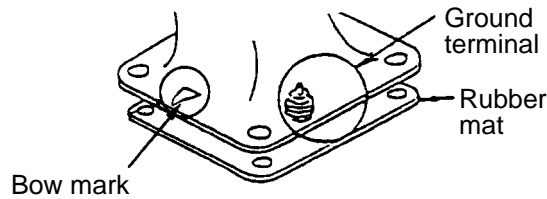
1.2.2 Mounting the radar sensor

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

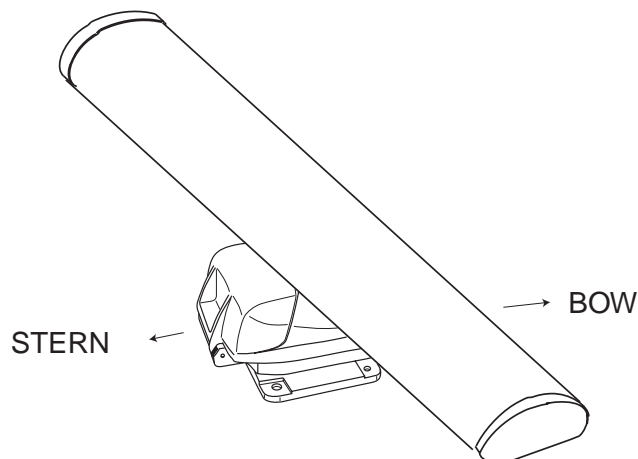
Using outside fixing holes of radar sensor

Use the hex bolts (supplied) to mount the radar sensor as below.

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



- Lay the radar sensor on the mounting platform, orienting it as shown below.



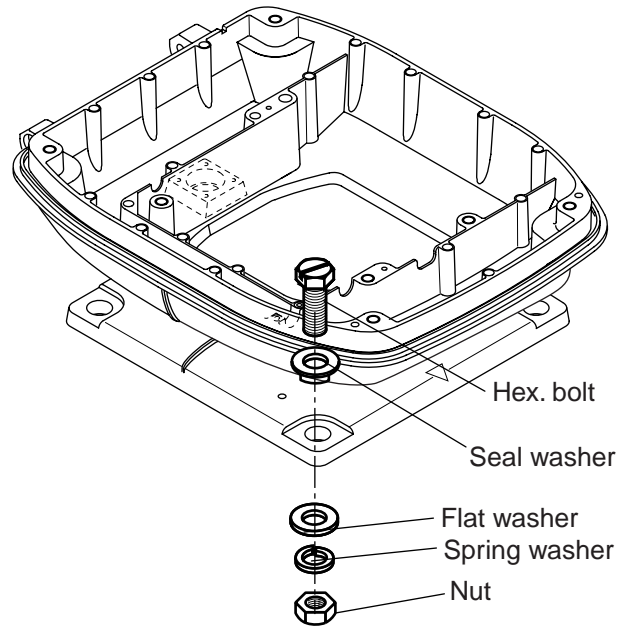


CAUTION

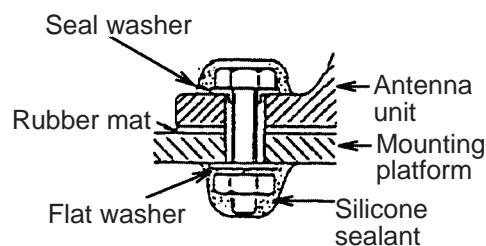
Do not lift the radar sensor by the radiator; lift it by the housing.

The radiator may be damaged.

3. Insert four hex bolts (M12 x 60, supplied) and seal washers ($\phi 30$, supplied) from the top of the housing, as shown below.

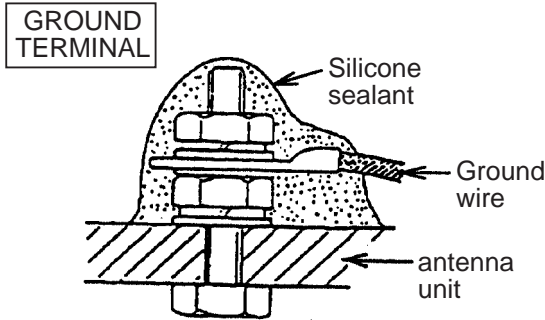
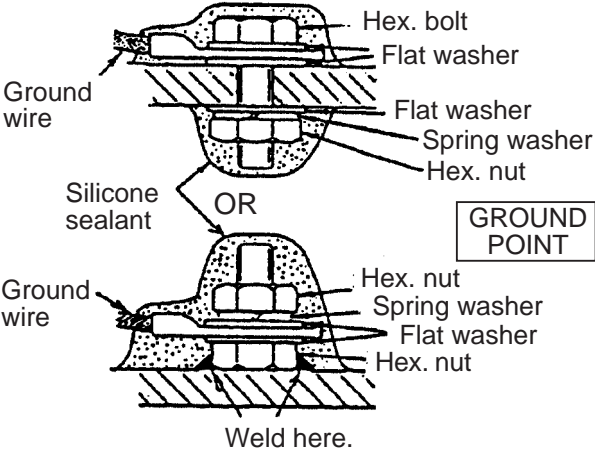


4. Past flat washers (M12, supplied), spring washers (M12, supplied) and nuts (M12, supplied) onto hex. bolts. Fasten by tightening nuts. Do not fasten by tightening the hex. bolts; seal washers may be damaged.



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 radar sensor) using M6 x 25 bolt, nut and flat washer (supplied).
7. Run the ground wire (RW-4747, 340 mm, supplied) between the ground terminal and ground point.

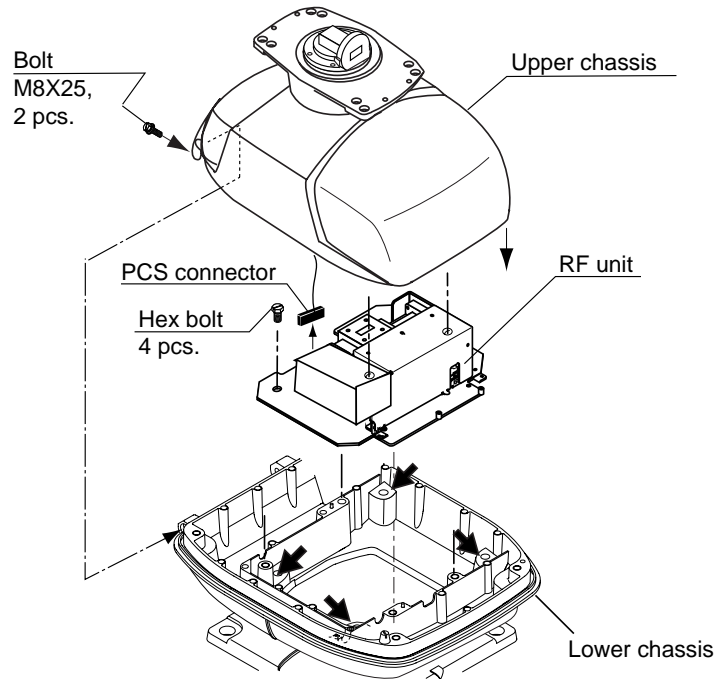
8. Coat ground terminal and ground point with silicone sealant as shown below.



Using inside fixing holes of the sensor housing

This method requires removal of the RF unit from the radar sensor to access inside fixing holes. Use hex bolts, flat washers, spring washers and nuts (local supply) to mount the radar sensor.

1. Unfasten four bolts from the cover to open the radar sensor.
2. Unplug the PCS connector from RF unit.
3. Separate upper chassis from lower chassis by removing two bolts (M8x25).
4. Remove RF unit by unfastening four hex bolts.

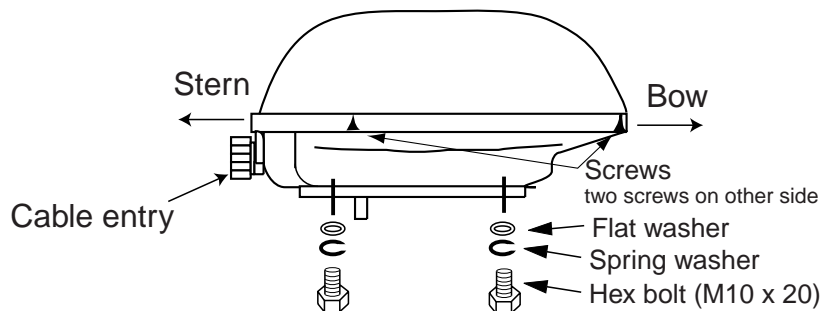


5. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.
6. Fasten the lower chassis to the mounting platform with hex bolts, spring washers, flat washers and nuts (local supply), and then coat flat washers, nuts and exposed parts of bolts with silicone sealant. Cut a slit in the rubber bushing and insert bolt into the bushing. Do not use seal washers.
7. Remount RF unit.
8. Apply silicone sealant into four outside fixing holes.
9. Do steps 6-8 in "Using outside fixing holes of radar sensor".

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

1.3 Mounting Procedure for DRS2D4D

1. Remove mounting hardware at the bottom of the radar sensor, four each of hex bolts (M10x20), spring washers and flat washers. Save the spring washers and flat washers to use them to fix the radome base to the platform, at step 3. If the thickness of the mounting platform is 5 mm or less also save the bolts.

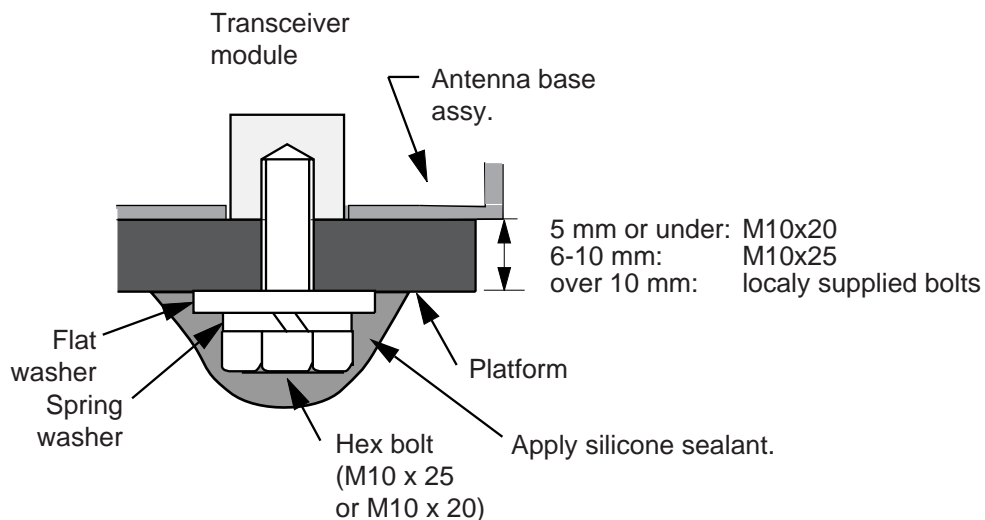


2. Construct a platform (wood, steel or aluminum) 6-10 mm in thickness referring to the outline drawing at the back of this manual. (A mounting bracket for mounting the radar sensor on a sailboat mast is optionally available.) Fasten the platform to the mounting location. Next, position the base so the cable entrance faces the stern direction.

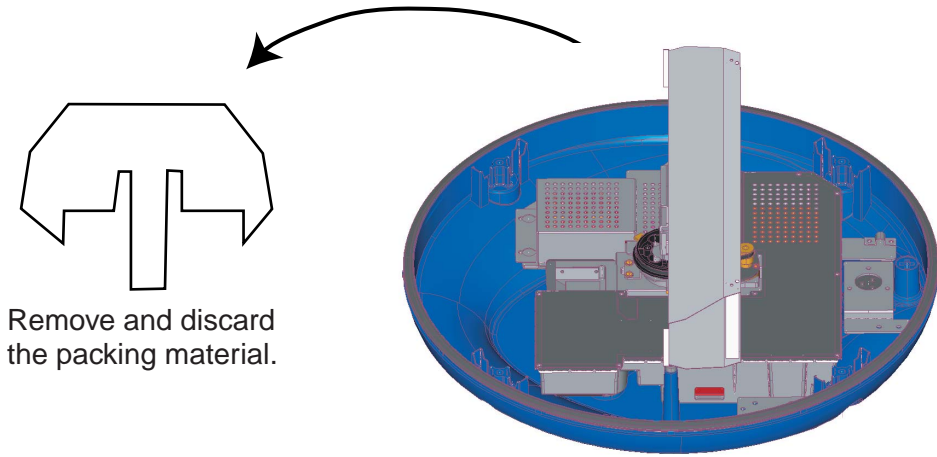
Note: When drilling holes in the platform, be sure they are parallel with the fore and aft line.

3. Using the hex bolts*, flat washers and spring washers removed at step 1, fasten the radome base to the platform. The torque should be between 19.6-24.5N•m.

*If the thickness of the platform is 6-10 mm, use M10x25 bolts (supplied). For thicker platform, use locally supplied bolts.



4. Unfasten four screws to remove the cover. Discard the packing material in the radome.



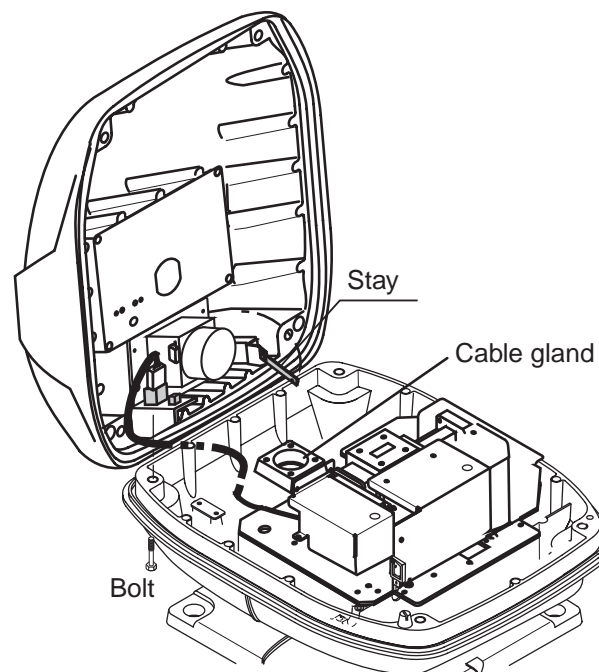
5. Mount the cover tentatively. Wiring requires the removing the cover at Chapter 2.

2. WIRING

Only the two-way cable MOD-ASW0001 runs from the MFDBB, MFD8, MFD12 or PSU-12 to the radar sensor. In order to minimize the chance of picking up electrical interference, avoid where possible routing the two-way cable near other onboard electrical equipment. Pass the cable through the hole in the radar sensor and apply sealing compound around the hole for waterproofing.

2.1 Wiring of DRS4A/6A

1. Open the radar sensor cover by loosening four bolts, and fix the stay.

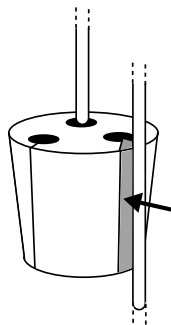


2. Unfasten the cable gland assembly (plate and gasket).
3. Pass the two-way cable MOD-ASW0001 through the bottom.
4. Fasten the shield of the cable with the cable clamp in the radar sensor, and then connect the connector of power cable to the power terminal (white: +, black: -).

5. Attach the RJ-45 connector of the two-way cable to the LAN terminal in the radar sensor.



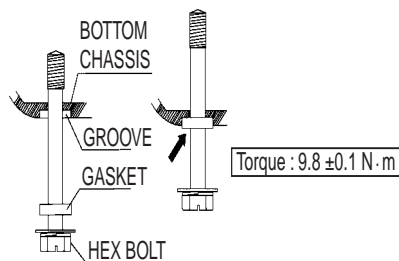
6. Push cables of the two-way LAN cable into the slits of the gasket inside the radar sensor as below.



7. Push the gasket into the hole at the bottom of the radar sensor, then fasten four pan head screws to fix the plate to the sensor.

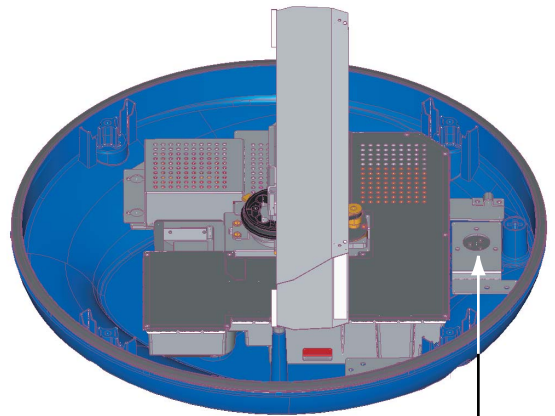
8. Release the stay and close the cover.

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



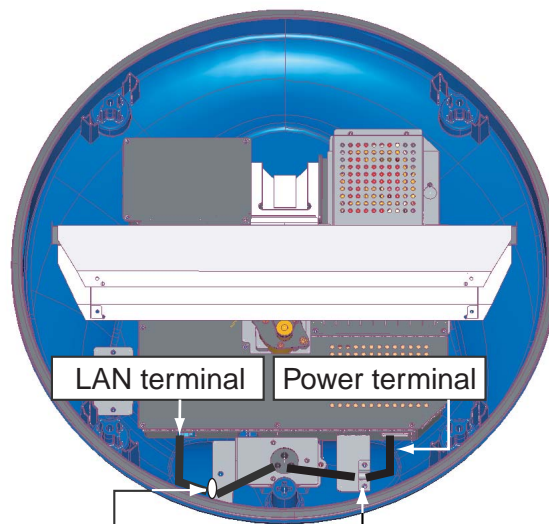
2.2 Wiring of DRS2D/4D

1. Unfasten three screws to remove the fixing plate for the gasket at the bottom of the radar sensor.



Fixing plate
(for gasket)

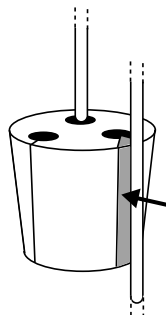
2. Remove the gasket, and then pass the two-way cable MOD-ASW0001 through the bottom.
3. Fasten the shield of the cable with the cable clamp in the radar sensor, and then connect the connector of power cable to the power terminal (white: +, black: -).
4. Attach the RJ-45 connector of the two-way cable to the LAN terminal in the radar sensor.



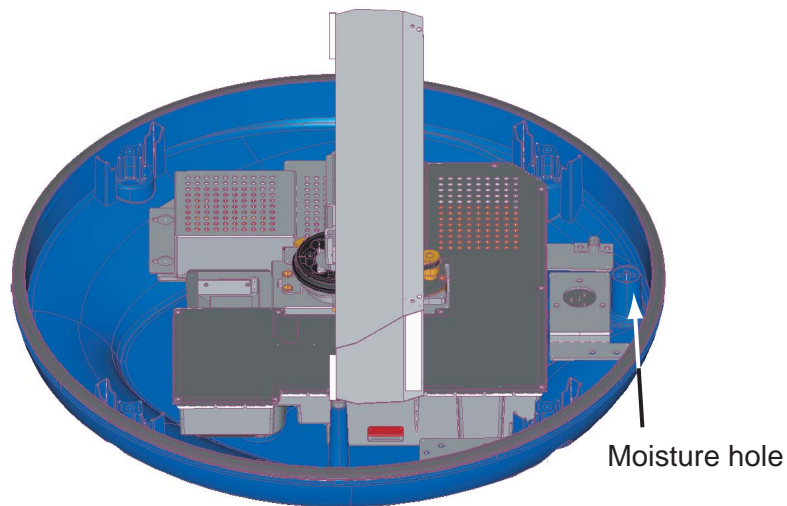
Fix the cable with
this grommet.

Fix the cable
with this clamp.

5. Push cables of the two-way cable into the slits of the gasket inside the radar sensor as below.



Note 1: Bend cables of the two way cable at the height lower than moisture hole so that the antenna radiator does not hit these cables.



Note 2: If the two-way cable meets to the platform near the radar sensor base, wind vinyl tape around cable at the bending location.

6. Confirm that the rubber gasket is properly positioned and that the triangle mark on the cover is aligned with the triangle mark on the mounting base, then tighten the fixing screws for the cover.

3. ADJUSTMENT

This section provides the information necessary for setting and adjusting the radar sensor, which is carried out from the menu.

3.1 Selecting Radar Source

1. Open the Radar Installation menu.
2. Choose "Radar Source" to show the menu options window.
3. Choose "DRS4A" or "DRS6A" as applicable.
4. Close the Radar Source options window.

3.2 Heading Alignment

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

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

1. Choose "Heading Alignment" from the menu.
2. Select a stationary target echo at a range between 0.125 and 0.25 nm, preferably near the heading line.
3. Place the cursor on the indication "EBL 1" or "EBL 2" at the bottom left corner, and then press the left-button key at the center of the cursorpad to show the EBL.
4. Rotate the RotoKey to bisect the target echo with the EBL.
5. Press the left-button key.
6. As a final test, move the boat towards a small buoy and confirm that the buoy shows up dead ahead on the radar when it is visually dead ahead.

3.3 Setting the Antenna Height

1. Select "ANTENNA HEIGHT" from the menu.
2. Select the height of the radar sensor above the water surface.

