CE 0191

KODEN

KODEN

INSTALLATION MANUAL

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RADAR SENSOR

MDS-50R/51R/52R/61R/62R/63R

PRINTED IN JAPAN

TÜV PRODUCT SERVICE Quality System certified to ISO 9001

92642122-03

Declaration of Conformity

(As required by Article 6.3 of Directive 1999/5/EC-RTTE Directive)

Declares under his sole responsibility that the produced Marine Radar System manufactured by

Koden Electronics Co., Ltd.
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Uenohara-Machi, Kitatsuru-Gun
Yamanashi-Ken
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Japan

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Intended for Worldwide use as a Radar Sensor for use aboard non-SOLAS vessels and identified by the type number MDS-50R/MDS-51R/MDS-52R to which this declaration refers has been tested to the essential radio test suites required by the notified body and is in conformity with the standards

EN60945
and
IEC 60936-1 Annex D
and complies with the essential requirements of Directive 1999/5/EC

Conformity procedure under Annex IV of 1999/5/EC (Technical Construction file) has been undertaken by
QinetiQ (0191) Fort Cumberland Road, Eastney, Portsmouth, England.

The Technical Construction File is held by Mr Saburo Suzuki at

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QA Manager.
Koden Electronics Co., Ltd.
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AMENDMENT HISTORY

MDS-50R/51R/52R/61R/62R/63R INSTALLATION MANUAL
Doc No: 92642122

No.	Document No & Rev No.	Date (D/M/Y)	Amendments
0	92642122-00	10/02/04	First issue
1	92642122-01	27/02/04	Chapter 2: Deleted color code designations in 2.10.2.
2	92642122-02	31/03/04	Revised Chapter 1,2,3 and 4
3	92642122-03	25/06/04	KODEN Address
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Amendment policy

When any change is applied in the document, only the document number of the relevant sheet(s) and cover sheet are modified and the rest of the sheets are not changed. The document number is shown in the footer area, right or left bottom of each sheet.

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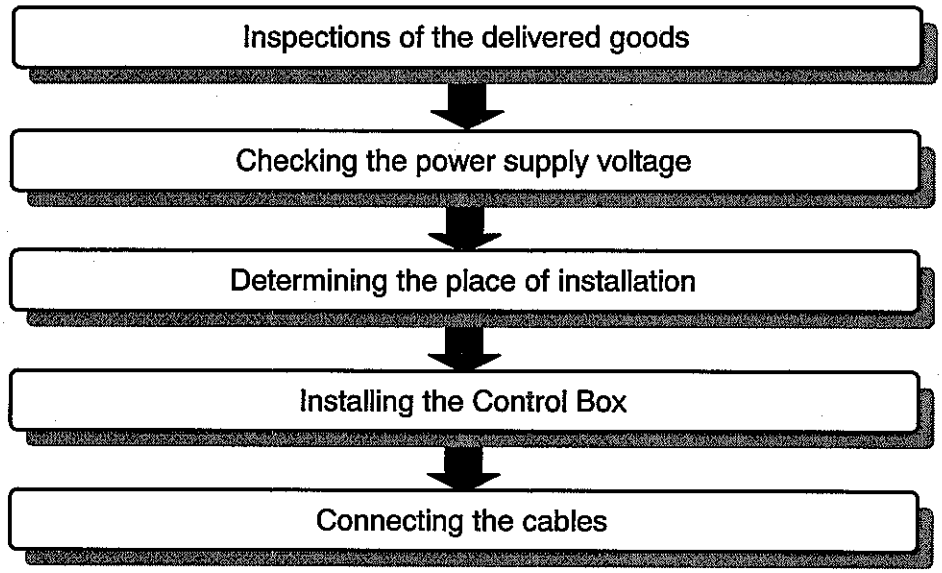
Chapter 1

General Descriptions

Contents

Chapter 1 General Descriptions

This chapter describes the procedures of the installation for the MDS-50R/51R/52R/61R/62R/63R Real Time Radar Sensor in your ship and necessary precautions to be observed. The following diagram explains the order of the installations of this system.



1.1 Inspections of the delivered goods

Unpack your package and check if all of the following items are included in good order.

Radar Sensor MDS-50R

Component Unit	Sub-unit	Type name
Antenna (Radome type)		RB714A (2kW)
	Transceiver	None
Radar Sensor Control Box	None	MDS-5R

Radar Sensor MDS-51R

Component Unit	Sub-unit	Type name
Antenna (Radome type)		RB715A (4kW)
	Transceiver	None
Radar Sensor Control Box	None	MDS-5R

Radar Sensor MDS-52R

Component Unit	Sub-unit	Type name
Antenna		RB716A (4kW)
	Transceiver	None
	Aerial, 3-foot	RW701A-03
	Aerial, 4-foot	RW701A-04
Radar Sensor Control Box	None	MDS-5R

Radar Sensor MDS-61R

Component Unit	Sub-unit	Type name
Antenna		RB717A (6kW)
	Transceiver	None
	Aerial, 4-foot	RW701A-04
	Aerial, 6-foot	RW701A-06
Radar Sensor Control Box	None	MDS-6R

Radar Sensor MDS-62R

Component Unit	Sub-unit	Type name
Antenna		RB718A (12kW)
	Transceiver	None
	Aerial, 4-foot	RW701A-04
	Aerial, 6-foot	RW701A-06
Radar Sensor Control Box	None	MDS-6R

Radar Sensor MDS-63R

Component Unit	Sub-unit	Type name
Antenna		RB719A (25kW)
	Transceiver	None
	Aerial, 4-foot	RW701A-04
	Aerial, 6-foot	RW701A-06
	Aerial, 9-foot	RW701B-09
Radar Sensor Control Box	None	MDS-6R

Table 1.1 Standard Equipment List

Model Name	MDS-50R	MDS-51R	MDS-52R	MDS-61R	MDS-62R	MDS-63R
Items	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty	Q'ty
Antenna unit (RB714A)	1	NA	NA	NA	NA	NA
Antenna unit (RB715A)	NA	1	NA	NA	NA	NA
Antenna unit (RB716A)	NA	NA	1	NA	NA	NA
Antenna unit (RB717A)	NA	NA	NA	1	NA	NA
Antenna unit (RB718A)	NA	NA	NA	NA	1	NA
Antenna unit (RB719A)	NA	NA	NA	NA	NA	1
Interconnecting cable	1 (10m)	1 (10m)	1 (10m)	1 (10m)	1 (10m)	1 (10m)
M10 hexagonal bolt	4sets	0	0	0	0	0
M12 hexagonal bolt	0	4 sets	4 sets	4 sets	4 sets	4 sets
Control box (MDS-5R)	1			NA		
Control box (MDS-6R)	NA			1		
Power supply cable (2m)	1					
Tapping screw	4					
Fuse	4					
LAN data cable (crossover) (2m)	1					
Switch	1					

Table 1.2 Optional cable list

Cable length	MDS-50R	MDS-51R	MDS-52R	MDS-61R/62R/63R
10m	242J160680	242J158055A	242J159098A	242J159098A
15m	242J160680B	242J158055B	242J159098B	242J159098B
20m	242J160680C	242J158055C	242J159098C	242J159098C
30m	242J160680D	242J158055D	242J159098D	242J159098D

1.2 Checking the Power Supply Voltage

To allow proper operation of the MDS-50R/51R/52R/61R/62R/63R radar sensor, the ship's power supply capacity must satisfy the requirements detailed in Table 1.3. Keep the battery properly charged anytime to prevent the mains voltage from discharging.

Table 1.3 Power Supply Requirements

Supply voltage used	Maximum current drain	Allowable voltage range
12 VDC	4A (MDS-50R) 5A (MDS-51R)/ 6A(MDS-52R) 7A (MDS-61R)/ 8A(MDS-62R)	10.2 to 41.6V
24 VDC	2.5A (MDS-51R)/ 3A(MDS-52R) 3.5A (MDS-61R)/ 4A(MDS-62R) 5.4A (MDS-63R)	10.2 to 41.6V 18.6 to 41.6V

CAUTION: AC power supply cannot be used

1.3 Fuse Replacement

Properly rated fuses must be used for a safe and proper operation of the MDS-50R/51R/52R/61R/62R/63R series radar sensor unit. Refer to the following tables for correct ratings of the fuses used in the respective models.

Table 1.4 Supply Voltage to Fuse Table for MDS-50R/51R

Supply voltage used	Main Fuse	Motor Fuse
12 VDC	10A/250V or 125V *(6.3Ø x 32mm)	T3.15A/250V or 125V *(5Ø x 20mm)
24 VDC	10A/250V or 125V (6.3 Ø x 32mm)	T3.15A/250V or 125V (5Ø x 20mm)

Note: Marked * fuses are in the set as standard.

Table 1.5 Supply Voltage to Fuse Table for MDS-52R

Supply voltage used	Main Fuse	Motor Fuse
12 VDC	10A/250V or 125V (6.3Ø x 32mm)	5A/250V or 125V (5Ø x 20mm)
24 VDC	10A/250V or 125V * (6.3 Ø x 32mm)	T3.15A/250V or 125V *(5Ø x 20mm)

Note: Marked * fuses are in the set as standard.

Table 1.6 Supply Voltage to Fuse Table for MDS-61R

Supply voltage used	Main Fuse	Motor Fuse
12 VDC	10A/250V or 125V (6.3Ø x 32mm)	5A/250V or 125V (5Ø x 20mm)
24 VDC	10A/250V or 125V * (6.3 Ø x 32mm)	T3.15A/250V or 125V *(5Ø x 20mm)

Note: Marked * fuses are in the set as standard.

Table 1.7 Supply Voltage to Fuse Table for MDS-62R

Supply voltage used	Main Fuse	Motor Fuse
12 VDC	10A/250V or 125V (6.3Ø x 32mm)	5A/250V or 125V (5Ø x 20mm)
24 VDC	10A/250V or 125V * (6.3 Ø x 32mm)	T3.15A/250V or 125V *(5Ø x 20mm)

Note: Marked * fuses are in the set as standard.

Table 1.8 Supply Voltage to Fuse Table for MDS-63R

Supply voltage used	Main Fuse	Motor Fuse
24 VDC	10A/250V or 125V * (6.3 Ø x 32mm)	5A/250V or 125V (5Ø x 20mm)
		T3.15A/250V or 125V *(5Ø x 20mm)

Note: Marked * fuses are in the set as standard.

Chapter 2

Installation

Contents

Chapter 2 Installation

2.1 Scanner unit

A radar's target detection capacity varies greatly depending on the fitted position of the scanner. An ideal fitting position is a location high above the ship's keel line where there is no obstacle all around the scanner. In an actual ship, such an ideal location is limited by various factors. Therefore, consider the following suggestions when you determine the place to install the scanner:

(a) Install scanner at a position as high as possible.

The higher the installation position, the longer the radio ranging distance. Install the scanner at a position as high as possible after considering the ship's hull structure and radar maintainability.

(b) Install scanner away from smoke-stack and mast

If the scanner is installed at the same height as the smoke-stack or mast, radar waves may be blocked, creating shadow zones or generating false echoes. Therefore, do not install the scanner at such a position.

(c) Install scanner forward away from obstacle.

To avoid creating shadow zones or generating false echoes, install the scanner at a position nearer to the ship's bow away from obstacles. When installing the scanner on a mast, position it in front of the mast. (If obstacles cannot be avoided for the ship's structural reasons, refer to "Shifting away from obstacles" described below.)

(d) Do not install the scanner near hot or heat-generating items.

Do not install the scanner at a position where it may be subjected to smoke or hot air from smokestacks or heat from lamps.

(e) Install the scanner away from antennas of other equipment.

Install the scanner as far away from antennas of a direction finder, radio transceiver, etc. as possible.

> ⚠ CAUTION
> To eliminate the interference, install the scanner away from the antenna of radio transceivers.

(f) Make the cable length as short as possible.

Keep the distance from the scanner to the control box within the standard cable length of 10 m. If you use longer cable for unavoidable reasons, limit the cable length to a maximum of 100 m.

2.2 Shifting away from obstacles

2.2.1 Shifting from keel line

By shifting the scanner position from the keel line to the starboard side of the ship, it is possible to move shadow zones to the port side, which makes it possible to keep clear vision in the bow direction. The distance to be shifted can be obtained by calculation depending on the distance from the scanner to

obstacles using the following equation:

Ls=0.4R+D/2 [m] (when R<15m)

Ls=0.025R+D/2 [m] (when R>=15m)

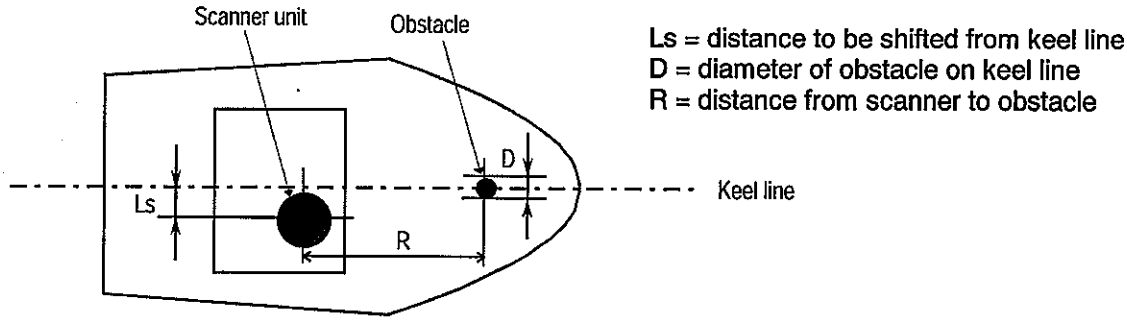


Figure 2.1 Shifting the antenna from keel line

2.2.2 Obtaining sufficient dip angle

Raise the scanner position so that there is a sufficient dip angle (available between the line of sight from the scanner to the obstacle and the horizontal line). By raising the dip angle above 5 degrees, it is possible to prevent mid- and long-distance shadow zones. The radar cannot detect objects below the line of sight

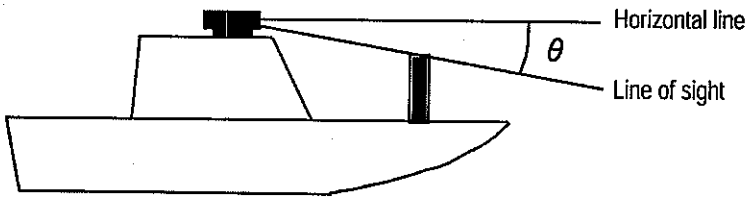


Figure 2.2 Obtaining sufficient dip angle

2.3 Installing the Antenna Unit

When you have decided the place of installation, prepare the mounting bracket or platform as shown in Figure 2.3. If the surface of a platform or mounting base is not even, insert appropriate fairing materials such as spacers, etc. between the antenna pedestal and the mounting surface.

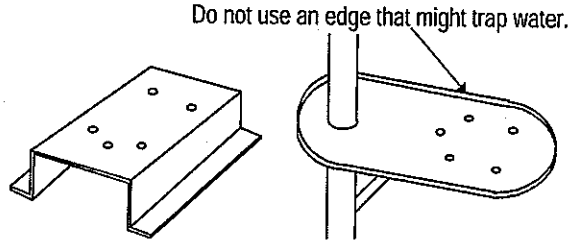
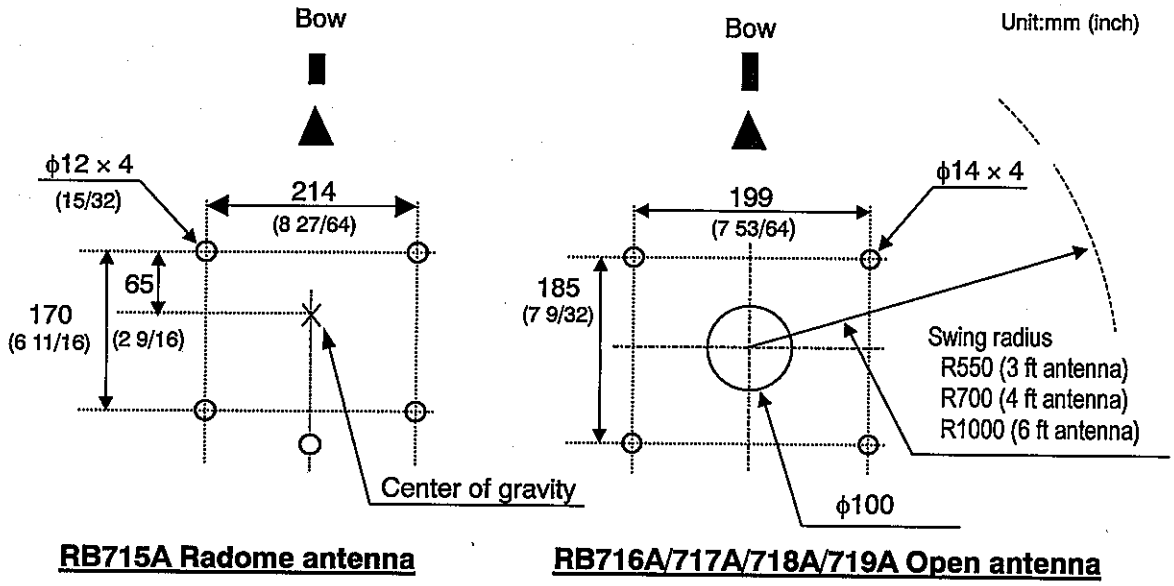


Figure 2.3 Recommended mounting base or platform

Referring to the drawings in Figure 2.4, drill holes of the 12 mm (0.47 in.) diameter at five locations on the mount base and use these holes to fix the scanner unit to the mount base with hexagonal bolts. (Use the template included with this manual.) The bolts included with your radar equipment will suffice for mount base thickness of 9 to 14 mm (0.35 to 0.55 in.). If the mount base is thicker or thinner than this, prepare the bolts listed in the tables 2.1 and 2.2.



NOTE: Access hole for the vertical cable entry only.

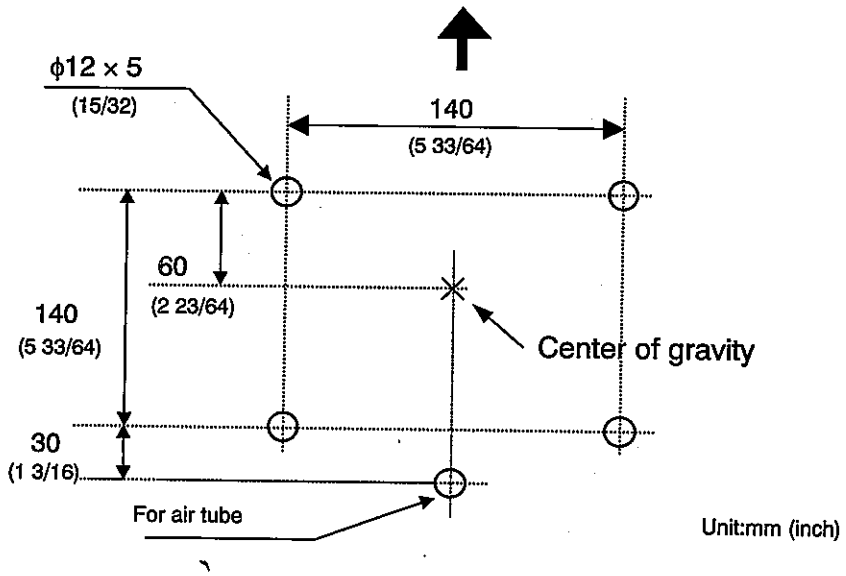


Figure 2.4 Positions of the Antenna fixing holes

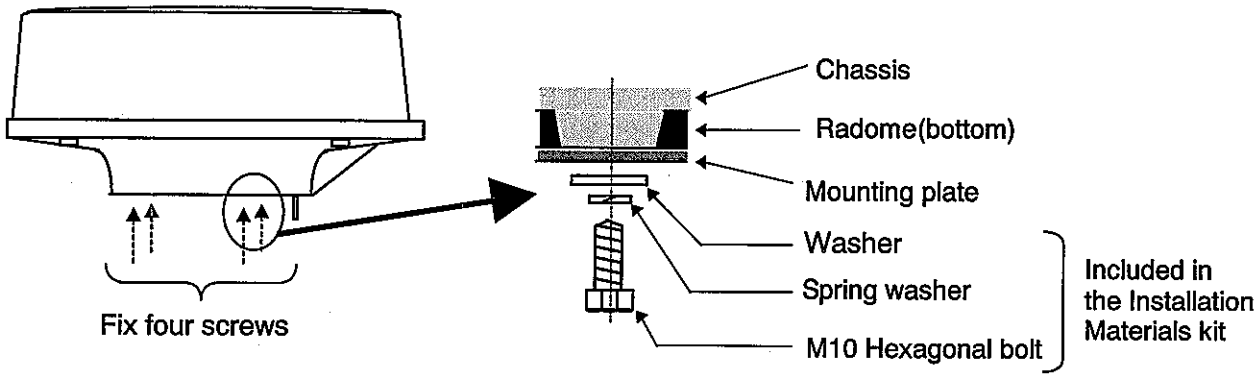


Figure 2.5 Fixing details of the RADOME antenna

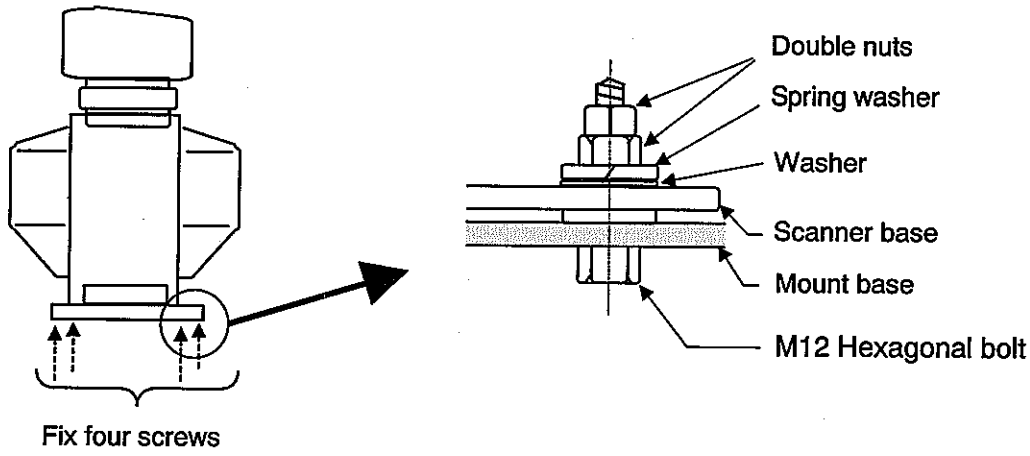


Figure 2.6 Fixing details of the OPEN antenna

Use sealing of silicon to prevent the bolts from becoming loose. Radome may be broken if you use locking putty.

Tab.2-1 Bolts for Mounting Scanner Unit (Radome antenna)

Thickness of mount base	Bolts necessary to fix radome scanner	Material	Remarks
1-4mm(0.04-0.16 in.)	M10 × 15 (1.5mm pitch)	Stainless	
4-9mm(0.16-0.35 in.)	M10 × 20 (1.5mm pitch)	Stainless	
9-14mm(0.35-0.55 in.)	M10 × 25 (1.5mm pitch)	Stainless	Included with radar
14-19mm(0.55-0.75 in.)	M10 × 30 (1.5mm pitch)	Stainless	

Tab. 2-2 Bolts for Mounting Scanner Unit (Open antenna)

Thickness of mount base	Bolts necessary to fix radome scanner	Material	Remarks
1-4mm(0.04-0.16 in.)	M12 × 45 (1.5mm pitch)	Stainless	
4-9mm(0.16-0.35 in.)	M12 × 50 (1.5mm pitch)	Stainless	
9-14mm(0.35-0.55 in.)	M12 × 55 (1.5mm pitch)	Stainless	Included with radar
14-19mm(0.55-0.75 in.)	M12 × 60 (1.5mm pitch)	Stainless	

2.4 Installing the Aerial Unit

Remove the protective cap covering the rotary coupler on the top of the scanner. Match the antenna radiation direction to the direction of the arrow markings on the rotation base and secure the antenna in position using four M8 bolts.

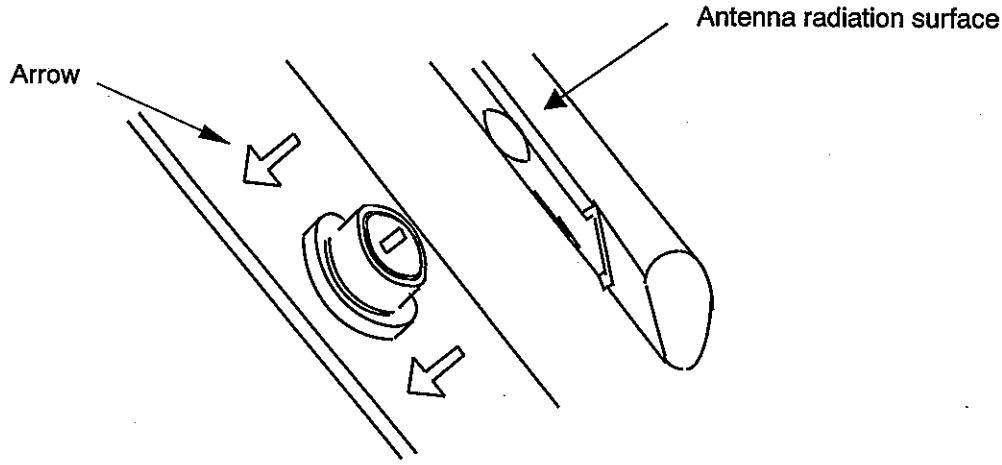


Figure 2.7 Fitting the Aerial Unit

2-5 Installing the Control Box

After you have finished installing the scanner unit, install the Control Box in the same way. Choose a proper bolt length according to the thickness of the surface on which you are going to install the Control Box. The hole diameter is different when using the bolts or the tapping screws. When using tapping screws, drill holes in a matched size. When using bolts and nuts, drill the holes of 6 mm (0.24 in.) diameter. When you have finished, install the pedestal part first and then the control box.

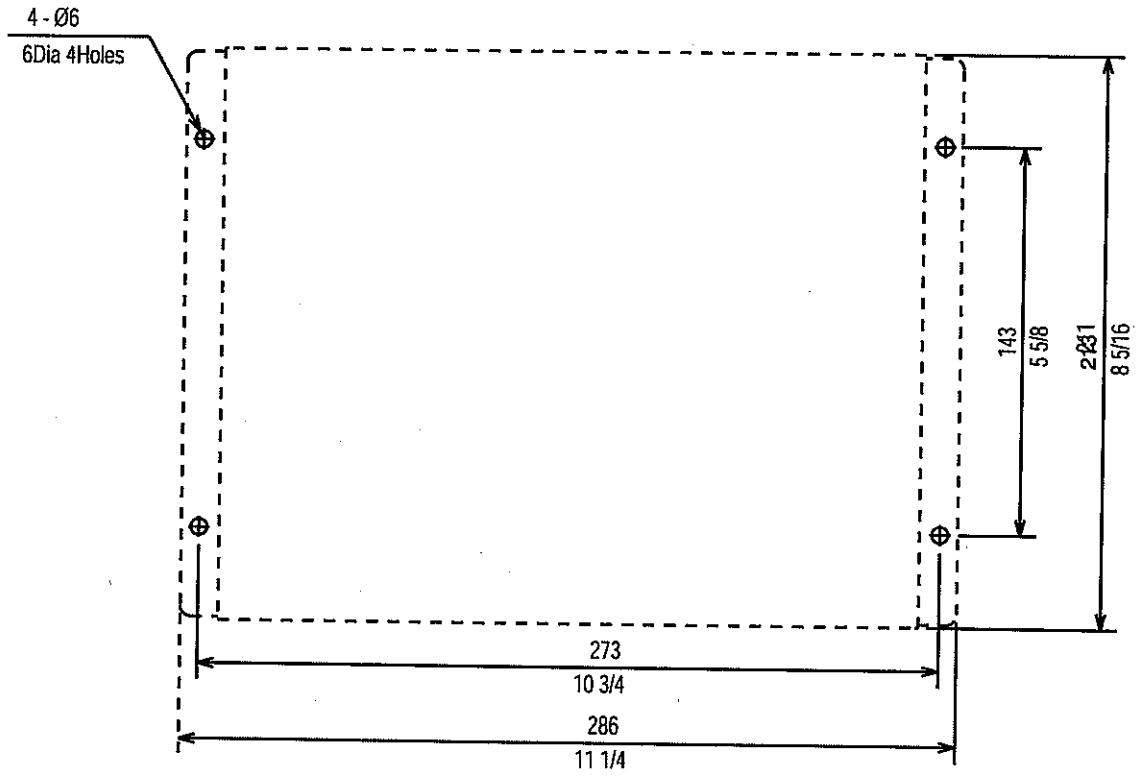


Figure 2.8 Dimensions of the fixing hole positions

2.6 Connecting the cables

2.6.1 General considerations

(1) The cable connecting the Antenna and Control Unit should be run separately away from other cables such as, radio antenna feeders, power cables, etc. Under no circumstances should it be in parallel arrangement with other cables. These precautions are essential to avoid radio interference to/from other equipment installed on the ship. If this is not possible, either cable set should be screened with metal conduit or another form of shielding.

(2) Cable should be run as short as possible but be kept within the standard length to achieve best radar performance.

(3) The copper braids of the cable must be grounded via a grounding stud in the transceiver unit.

2.6.2 Connections with RB714A 2 kW Radome

1) Make sure that the power is off. Connect the cable to the plug labeled "SCANNER" on the rear panel of the display unit. Be sure to secure the rubber boot around the cable connector rim.

2) Remove the radome cover from the Antenna unit by gently lifting upward to avoid bumping against the internal aerial. (There are three screws holding it in place.)

3) Remove the tape securing the antenna.

4) Remove the shield cover located on the backside. (There are three screws.)

5) Remove the cable clamping plate and rubber ring, pass the cable through the opening, replace the rubber ring, and clamp the cable to the scanner unit with screws on the fixing plate. Attach the cable connector to the X1 connector on the printed circuit board.

6) Replace the aluminum cover. Lay the cable shield into the channel machined into the aluminum housing. Be careful that the cable will not get caught between the main unit and cover.

7) Replace the upper part of the radome, being careful not to bump it against the antenna. Make sure that the cover is positioned in the correct direction as shown in Figure 2.9. The upper and lower parts of the radome each have three alignment markings indicating screw positions.

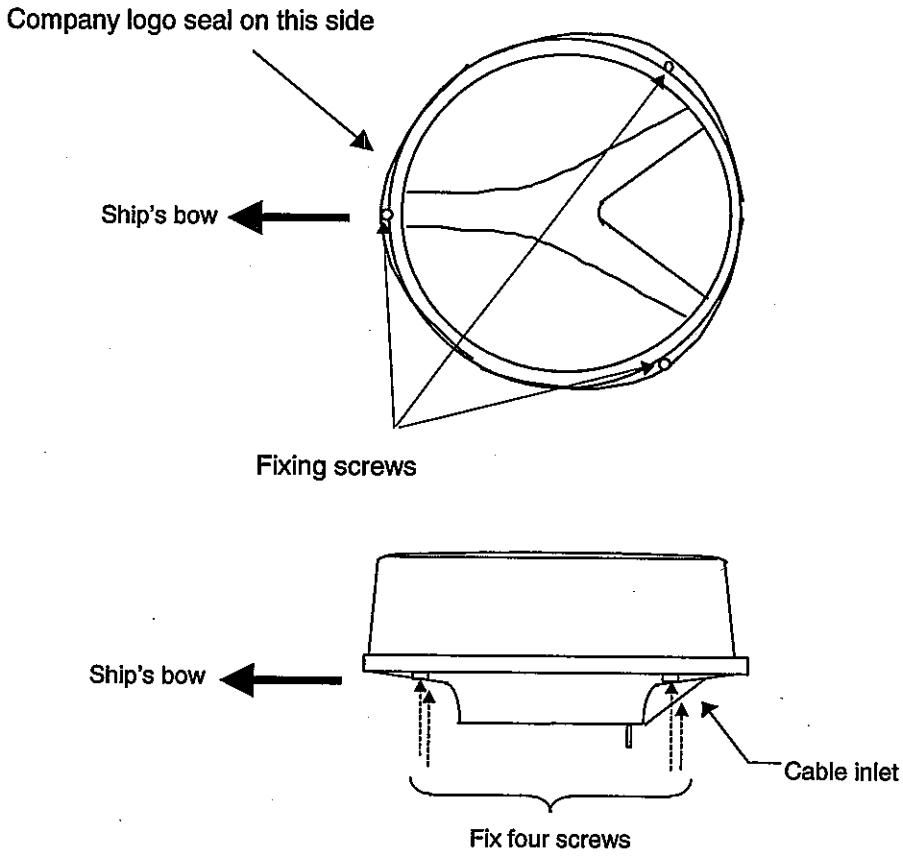


Figure 2.9 Fitting the cover (Radome antenna)

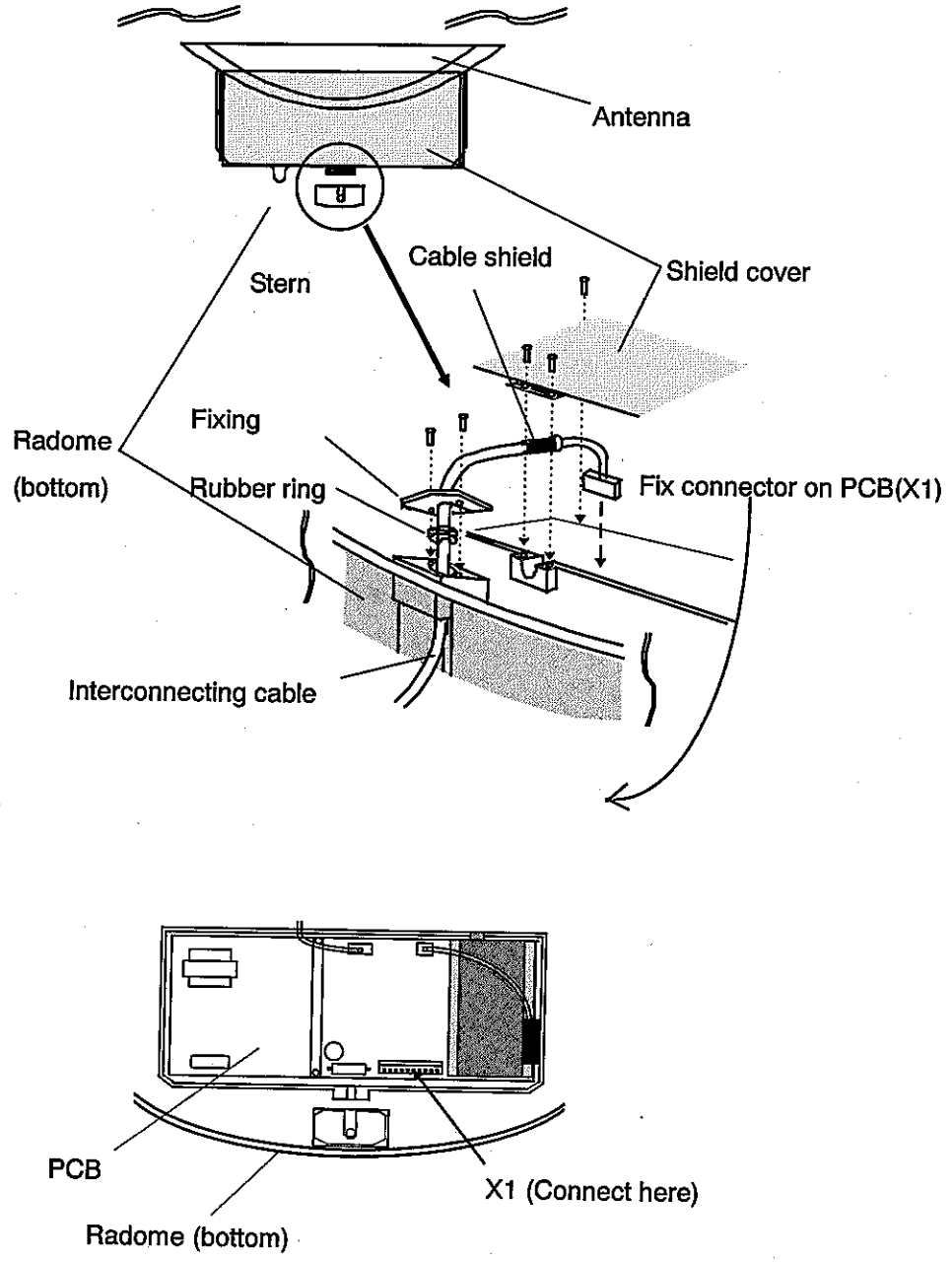


Figure 2.10 Fitting the interconnecting cable (Radome type RB714A)

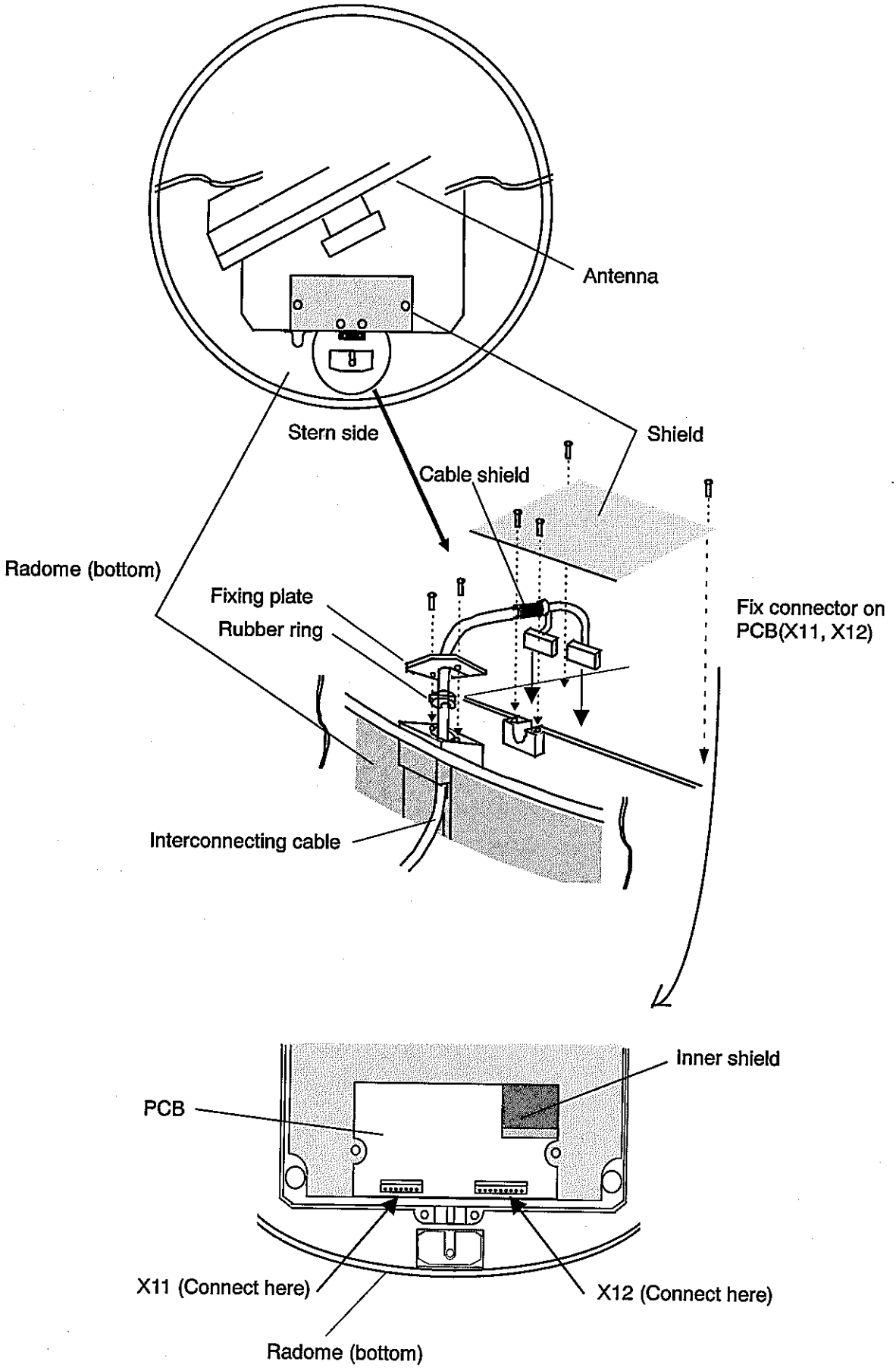


Fig.2.11 Fitting the interconnecting cable (Radome type RB715A)

2.6.3 Cable connections for OPEN scanner

(1) Make sure that the power is off. Connect the cable to the plug labeled "SCANNER" on the rear panel of the display unit. Be sure to secure the rubber boot around the cable connector rim.

(2) Use a socket wrench to remove the back cover of the scanner unit.

(3) Remove the two bolts securing the transceiver.

(4) Remove the connectors to the motor (X1: RB716A, J5:RB717A/718A/719A) and to the heading switch (X2: RB716A, J3: RB717A/718A/719A). Pull out the transceiver.

(5) Remove the four bolts securing the fixing plate at the cable entrance.

(6) Remove the metal fixing plate, rubber seal and the washer that secure the cable. Pass the cable through as shown in the diagram below; replace the above items and tighten the bolts.

(7) Return the transceiver to its original position and secure it with the bolts removed.

(8) Connect the 7-pin connector to X11 (RB716A)/J2 (RB717A/718A/719A) and the 9-pin connector to X12 (RB716A)/J1 (RB717A/718A/719A) of the printed circuit board and connect the two connectors removed in Step 3).

(9) Replace the scanner cover. Make sure the cover does not pinch the cable when reattaching the cover.

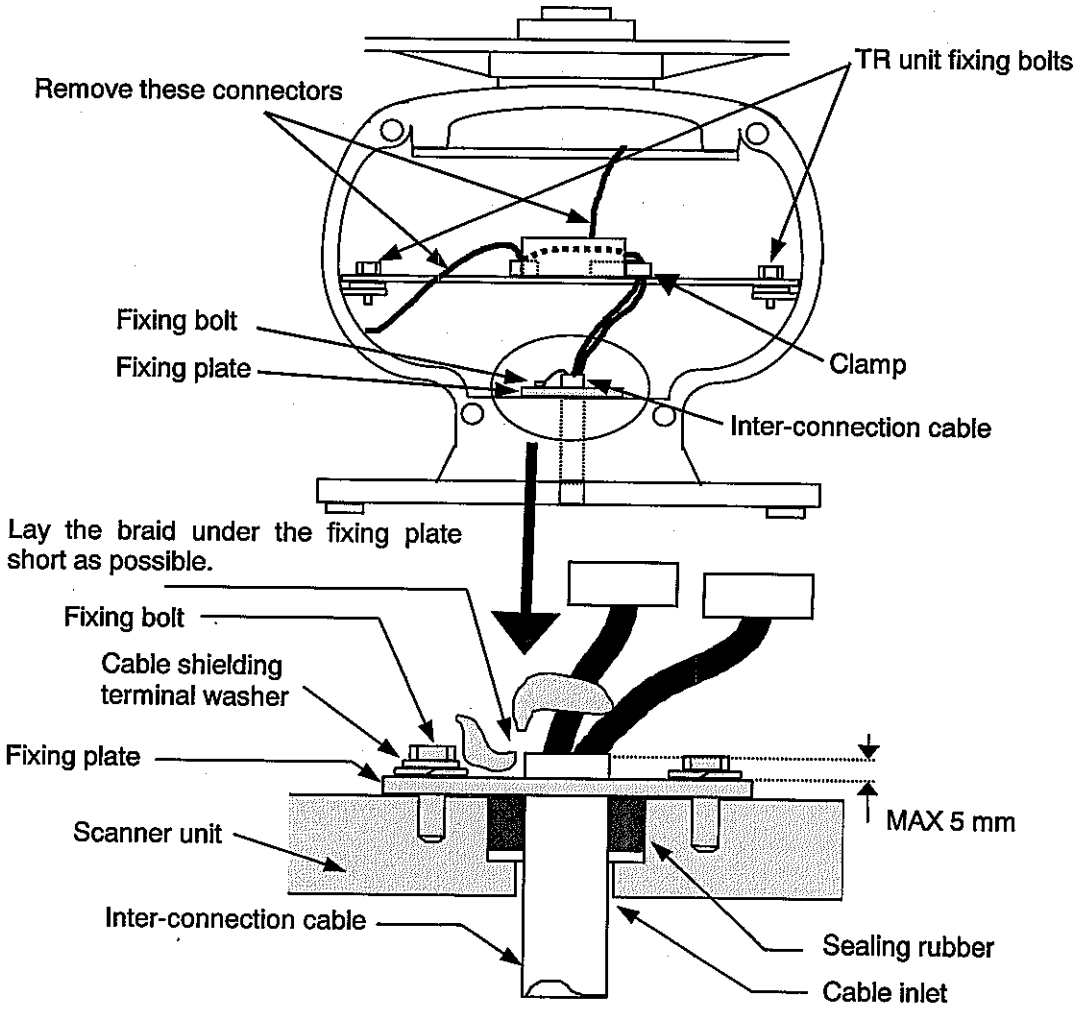


Figure 2.12 Fitting interconnecting cable (Open scanner)

2.7 Grounding wire

2.7.1 Grounding the Antenna Unit

Connect a grounding wire from one of the bolts on the scanner base as shown in Figure 2.13.

(The crimping terminal and grounding wire are user-supplied items.)

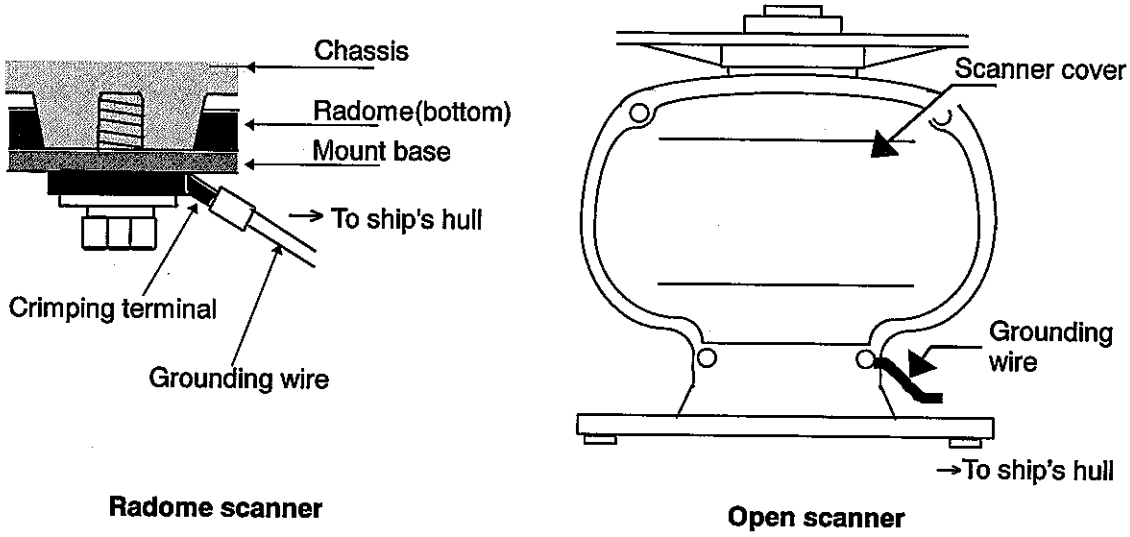


Figure 2.13 Grounding the Antenna Unit

2.8 Cable connections for Radar Control Box Unit

2.8.1 Antenna Unit connectors pinouts

The following diagrams show the pinouts of available scanner units connectors. The other end of the cable is connected to the SCANNER connector in the Control Box unit as shown.

Scanner Unit connectors pinouts

RB715A : SCAN-RMD PCB (X11): RB716A/717A/718A: SCAN-OPN PCB (X11)		
No	Color	Function
1	17 VIOLET	+250V
2		NC
3	17 YELLOW	GND
4	34 RED	SHIP'S+
5	34 YELLOW	SHIP'S+
6	34 GREEN	SHIP'S-
7	34 BLUE	SHIP'S-

RB715A : SCAN-RMD PCB (X12) RB716A/717A/718A/719A: SCAN-OPN PCB (X12)		
No	Color	Function
1	17 BLUE	+24V
2		NC
3	34 ORANGE	+12V
4	Braid of RED	DAT-R
5	RED	DAT
6	Braid of BROWN	BP/SHF-R
7	BROWN	BP/HG
8	Braid of GRAY	V/TRG-R
9	GRAY	V/TRG

RB714A : SCAN-RMD PCB (X1)		
No.	Color	Function
1	17 VIOLET	+250V
2	17 BLUE	+24V
3	43 ORANGE	+12V
4	17 YELLOW	GND
5	RED	DAT
6	Braid of RED	DAT_R
7	BROWN	BP/SHF
8	Braid of BROWN	BP/HSF_R
9	GRAY	V/TRG
10	Braid of GRAY	V/TRG_R

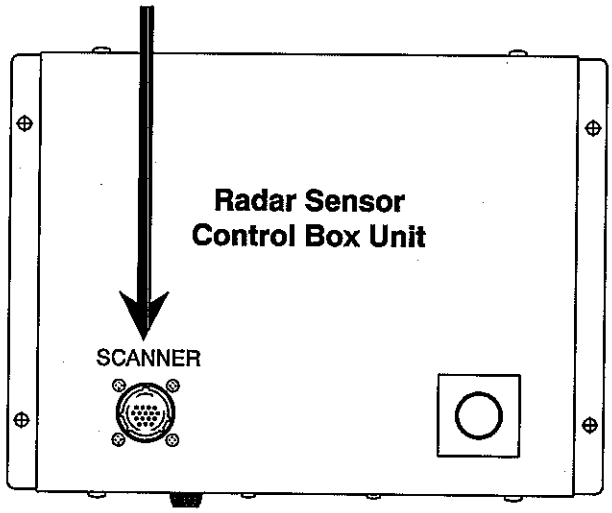
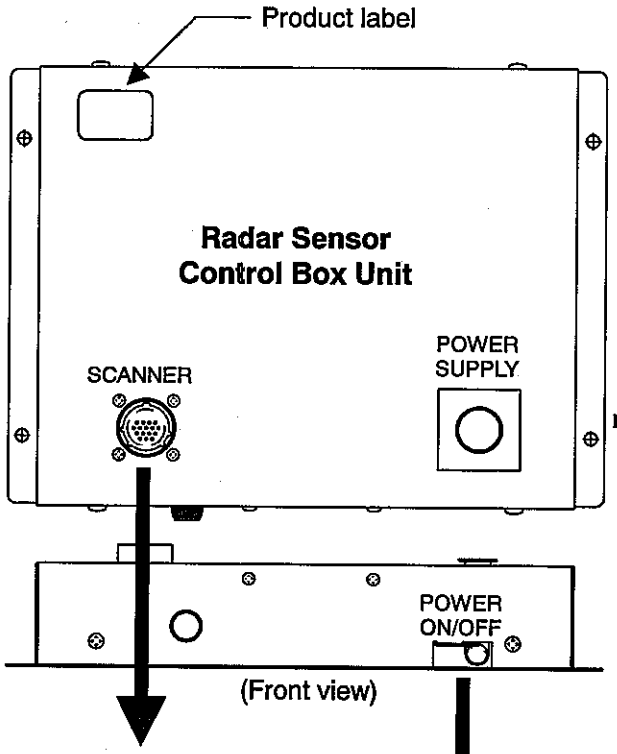


Figure 2.14 Scanner unit – Connector pinouts

2.8.2 Control Box connectors pinouts



Power connector pinouts

No.	Function
1	DC-
2	DC+
3	N.C.
4	N.C.
5	GND

NOTE:
Mains supply voltage range varies according to the scanner type used as follows:

RB714A/715A/716A/717A/718A : 10.8 to 41.6 VDC

RB719A: 18.0 to 41.6 VDC

Scanner connector pinouts

No.	Function
1	+250V
2	+24V
3	+12V
4	GND
5	DAT-R
6	DAT
7	N.C.
8	BP/SHF
9	BP/SHF-R
10	V/TRG
11	N.C.
12	SHIP'S+
13	SHIP'S+
14	V/TRG-R
15	SHIP'S-
16	SHIP'S-

Power switch connector pinouts

No.	Function
1	Power+
2	N.C.
3	N.C.
4	Power-

Figure 2.15 Control Box unit – Connector pinouts (1)

Ethernet connector pinouts

No.	Function
1	RD+
2	RD-
3	TD+
4	Termination
5	Termination
6	TD-
7	Termination
8	Termination
9	GND1
10	GND1

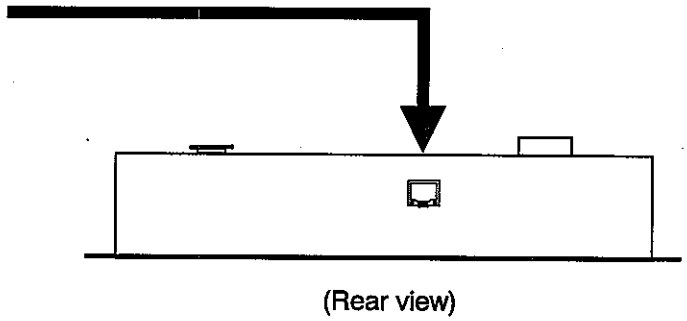


Figure 2.16 Control Box unit – Connector pinouts (2)

2.9 Power supply cable

2.9.1 On/Off Control Switch

You may use the On/Off control switch provided or another style of switch if desired. If you choose to use a different style, it must be rated for 30 VDC or more and have a current carrying capacity of 0.1 A or higher.

The On/Off control switch does not carry the main power for operating the RADARpc scanner unit.

1) Route the green and blue wires to the location for the On/Off control switch.
2) If you choose to use the switch provided, refer to the diagram below to layout and cut a rectangular hole for the switch.
3) Pass the green and blue wires through the hole from behind the panel and connect the wires to the switch.
4) Press the switch into the mounting hole.
5) Place the On/Off control switch in the Off position.

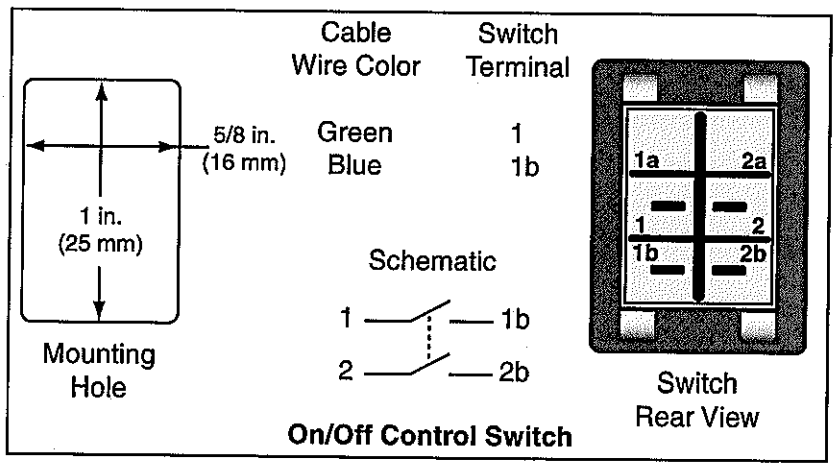


Figure 2.17 On/Off switch - Fixing hole and connector pinouts

2.9.2 Power supply wiring

Power should be fed through a switch and protective fuses (or circuit breakers), as shown below.

⚠ CAUTION
Do not apply over 41.6V to Radar or Radar may be broken.

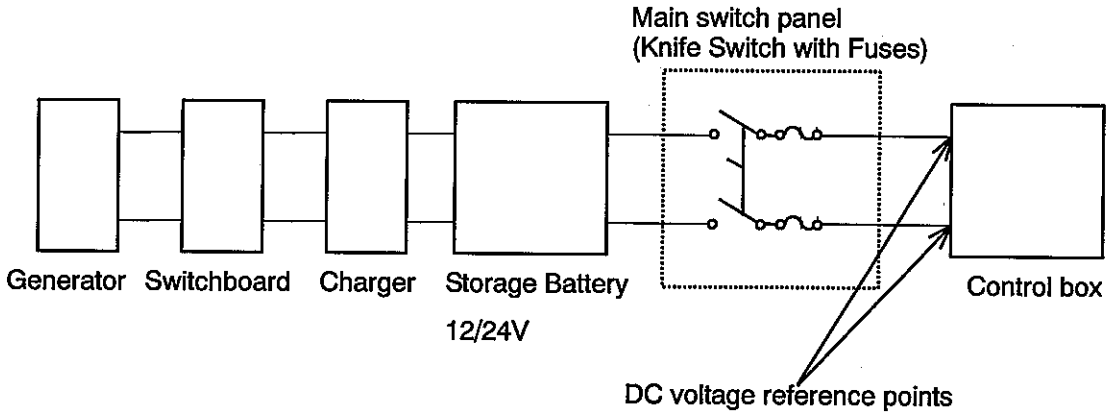


Figure 2.18 Typical power supply switch wiring

Fit the power supply cable (included with your radar) to the receptacle labeled "POWER" on the rear panel of the control box and connect to power supply as followings. (When you do not connect external equipment, put tape on red and green wire.)

Place the fuse and connection part in a dry area where there is no water splash.

When extending the power supply cable, use a suitable cable as below.

Boat Power Voltage	Cable conductor	Cable max. length
12 VDC	3.5mm²	3m
	3.5mm²	5m
24 VDC	3.5mm²	6m
	3.5mm²	10m

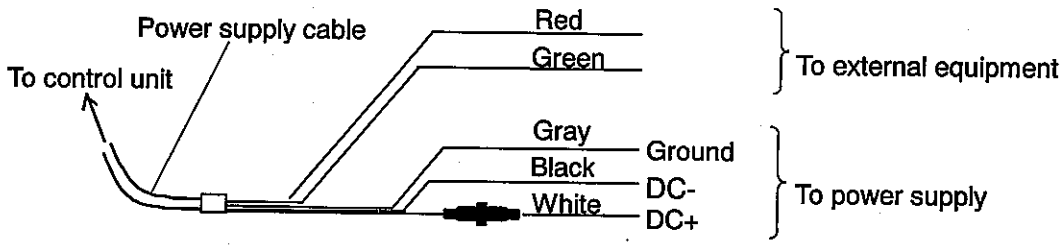


Figure 2.19 Details of the Power Supply cable connections

2.10 Connecting the PC

The connections of the Radar Sensor can be made straight to the PC or via an Ethernet Hub. Use the following instructions for connections.

2.10.1 Ethernet (LAN) interface cable connection

Connection via the Ethernet Hub:

Connect the Control Box to the Ethernet Hub unit with optional LAN cable (straight type, 2 m length). From the Hub unit to the PC, use a commercially available LAN cable (straight type) for connection.

Connection without the Ethernet Hub:

Use the standard LAN cable (cross type, 2 m length) to connect the Radar Sensor to the PC.

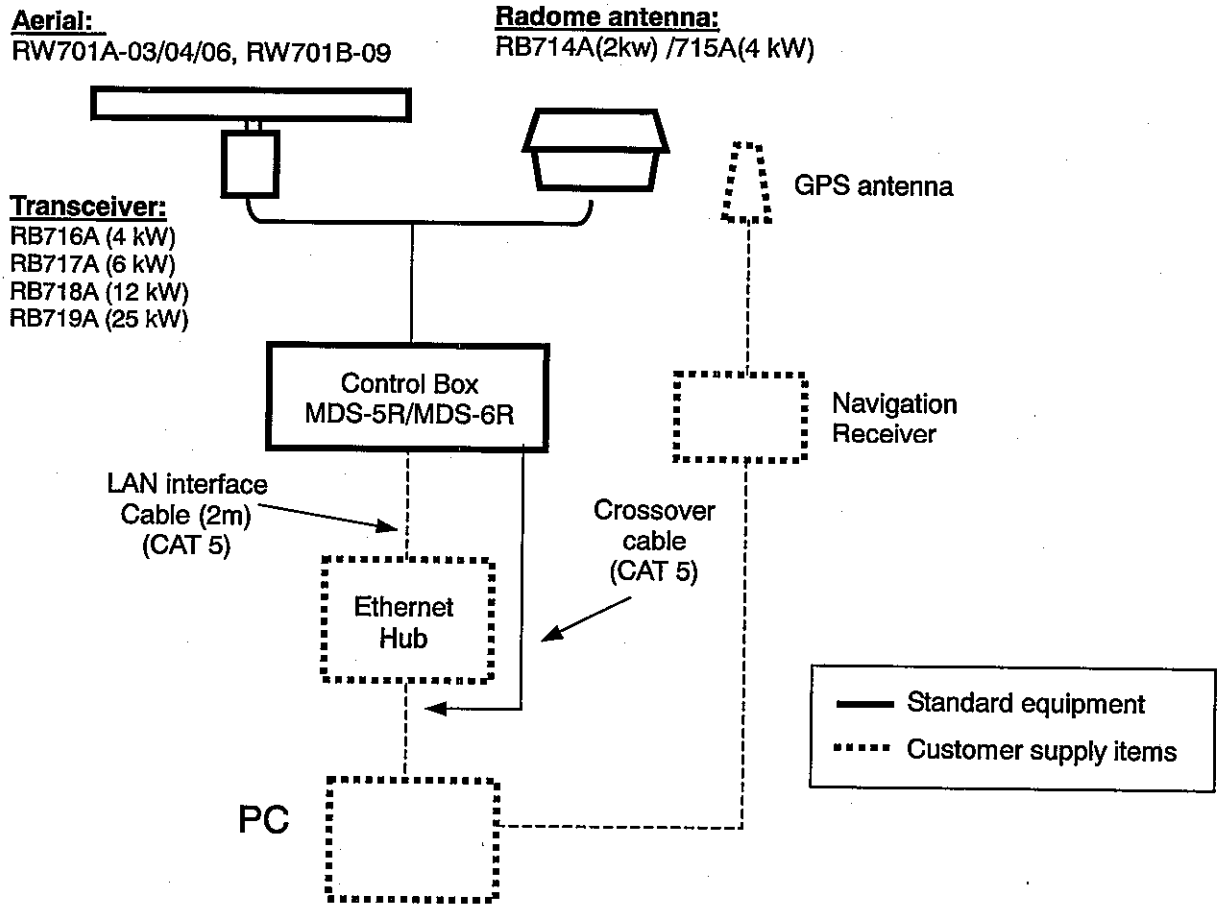
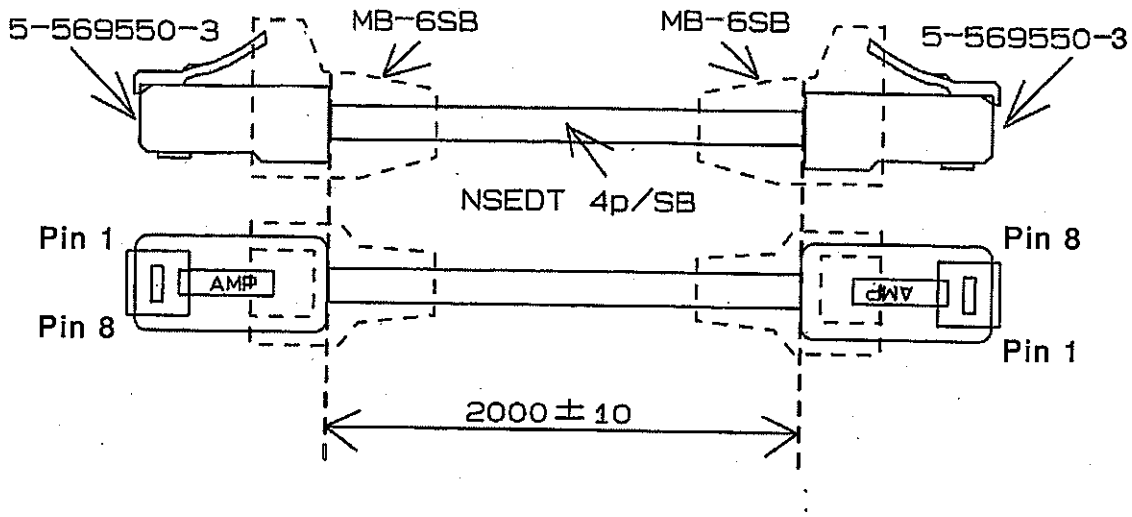


Figure 2.20 Ethernet (LAN) Interface Cable Connection

2.10.2 Details of LAN cable

(1) Cable configuration



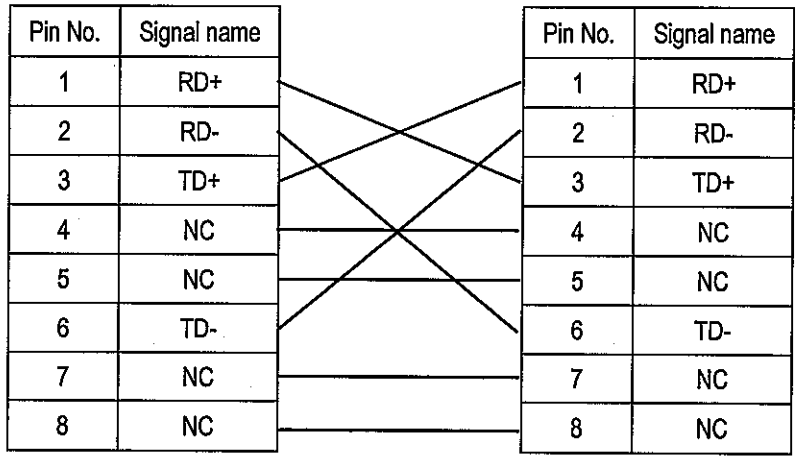
(2) Connector pinouts

Standard cable (Straight wiring)

Pin No.	Signal name	Pin No.	Signal name
1	RD+	1	RD+
2	RD-	2	RD-
3	TD+	3	TD+
4	NC	4	NC
5	NC	5	NC
6	TD-	6	TD-
7	NC	7	NC
8	NC	8	NC

NOTE: Spiral wound color code designation: Spiral color/Background color

Standard cable (Crossover wiring)



Pin No.	Signal name
1	RD+
2	RD-
3	TD+
4	NC
5	NC
6	TD-
7	NC
8	NC

Pin No.	Signal name
1	RD+
2	RD-
3	TD+
4	NC
5	NC
6	TD-
7	NC
8	NC

Chapter 3

Specifications

Contents

Chapter 3 Specifications

3.1 Radar Sensor Unit

3.1.1 Antenna Specification

		MDS-50R	MDS-51R	MDS-52R	MDS-61R	MDS-62R	MDS-63R
Aerial		1.2feet Radome	2.0feet Radome	3/4feet Open Array	4/6feet Open Array	4/6feet Open Array	4/6/9feet Open Array
Peak power output		2 kW	4 kW		6 kW	12 kW	25 kW
Transmit frequency		9410 ± 30 MHz					
Beam width	Horizontal	6.0°	3.9°	2.5/1.8°	1.8/1.2		1.8/1.2/0.8
	Vertical	25°		22°			22°/22°/25°
Rotation		24 rpm	24/48 rpm				
Pulse length/PRF	Short	0.12/2000 Hz	0.08 sec/2000 Hz				
	Medium	0.3/1000	0.25/1000	0.25/1000	0.3/1500	0.3/1500	0.3/1300
	Medium1						
	Medium2	0.8/500	0.8/500	0.8/500	0.6/1000	0.6/1000	0.6/800
	Long				1.0/500	1.0/500	1.2/500
	Long2						1.2/400
IF center frequency		60 MHz					
IF bandwidth	Wide	20 MHz					
	Narrow	3 MHz					
Noise figure		6.5 dB nominal					
Operating temperature		-25° to +55 °C (-13° to 131 °F)					
Wind force		100 knots relative					
Water resistance		IPX6(IEC60945)					
Presentation Modes		Heading up, North up, Course up					
Range scales (nm)		1/8, 1/4, 1/2, 3/4, 1, 1.5, 2, 3, 4, 8, 12, 16, 24	1/8, 1/4, 1/2, 3/4, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 36	1/8, 1/4, 1/2, 3/4, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 36, 48	1/8, 1/4, 1/2, 3/4, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 36, 48, 64,	1/8, 1/4, 1/2, 3/4, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 36, 48, 64, 72	1/8, 1/4, 1/2, 3/4, 1, 1.5, 2, 3, 4, 6, 8, 12, 16, 24, 36, 48, 64, 72, 96

Echo trail interval	Continuous, 15, 30 sec, 1, 3, 6 min., Off
Minimum range	Better than 25 m (82 feet) on 1/8 nm range
Range discrimination	Better than 25 m (82 feet)
Range accuracy	Better than 8 m (26 feet) or 0.9% of maximum range of the scale in use
Bearing accuracy	Better than 1°
Other functions	Gain, STC, FTC, interference rejection, target expansion

3.1.2 Interface Specification (MDS-5R/6R to PC)

Communication mode	10BASE-T/100BASE-TX (Ethernet)
Data rate	10Mbps/100Mbps
Output	Radar image video by proprietary protocol
Input	Radar control by proprietary protocol
Cable length	2m standard

3.1.3 Power Supply Specification

	MDS-50R	MDS-51R	MDS-52R	MDS-61R	MDS-62R	MDS-63R
Voltage supply	10.8 to 41.6 VDC					18.0 to 41.6 VDC
Power consumption	45 Watts or the less	55 Watts or the less	70 Watts or the less	80 Watts or the less	90 Watts or the less	130 Watts or the less
Preheat time	120 seconds					180 seconds

3.1.4 Compass Safe Distance

Component Unit	Type Name	Standard	Steering
Antenna unit	RB714A	2.0 m	1.4 m
	RB715A	2.0 m	1.4 m
	RB716A/RW701A-03	2.0 m	**1.4 m**
	RB716A/RW701A-04	2.0 m	1.4 m
	RB717A/RW701A-06	2.0 m	1.4 m
	RB718A/RW701A-04	2.0 m	**1.4 m**
	RB718A/RW701A-06	2.0 m	1.4 m

Component Unit	Type Name	Standard	Steering
	RB719A/RW701A-06	2.0 m	1.4 m
	RB719A/RW701B-09	2.0 m	1.4 m
Radar Sensor unit	MDS-5R	0.4 m	0.3 m
	MDS-6R	0.4 m	0.3 m

3.1.5 Environmental Specification

To the requirements of IEC 60945 3rd Edition. The major environmental specifications are as follows:

(1) Temperature and humidity

	Operating temperature	Storage temperature	Humidity
Antenna unit	-25°C - +55°C	+77°C	93%+/-3% at +40°C
Radar Sensor unit	-15°C - +55°C	+55°C	93%+/-3% at +40°C

(2) Vibration

2-5 Hz up to 13.2 Hz: Amplitude +/-1mm +/-10% (Maximum acceleration 7m/s^2 at 13.2 Hz)

13.2 Hz up to 100 Hz: Maximum acceleration 7 m/s^2 constant

Chapter 4

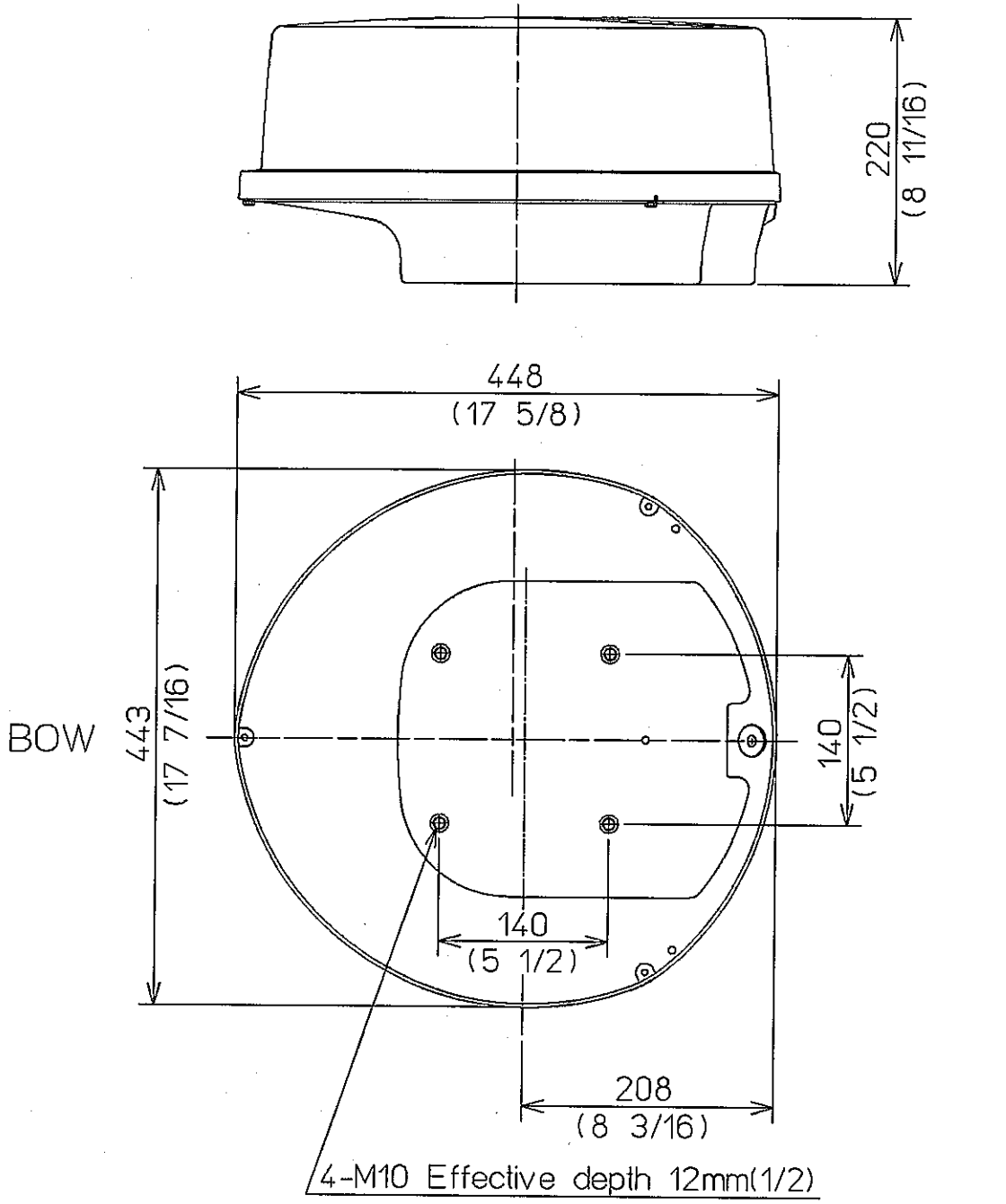
Technical References

Contents

Chapter 4 Technical References

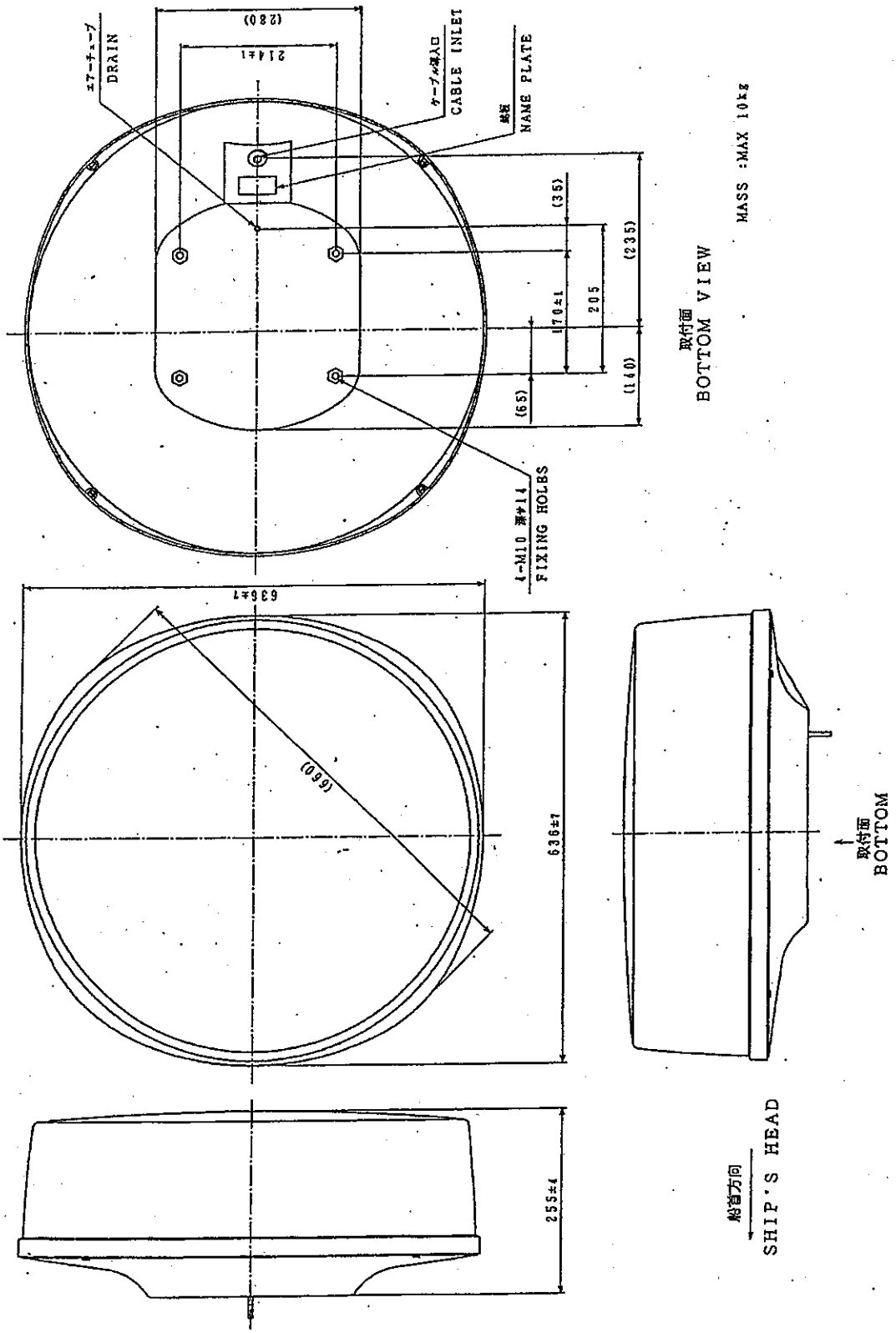
4.1 Dimensions and weight

RB714A Radome Antenna Unit

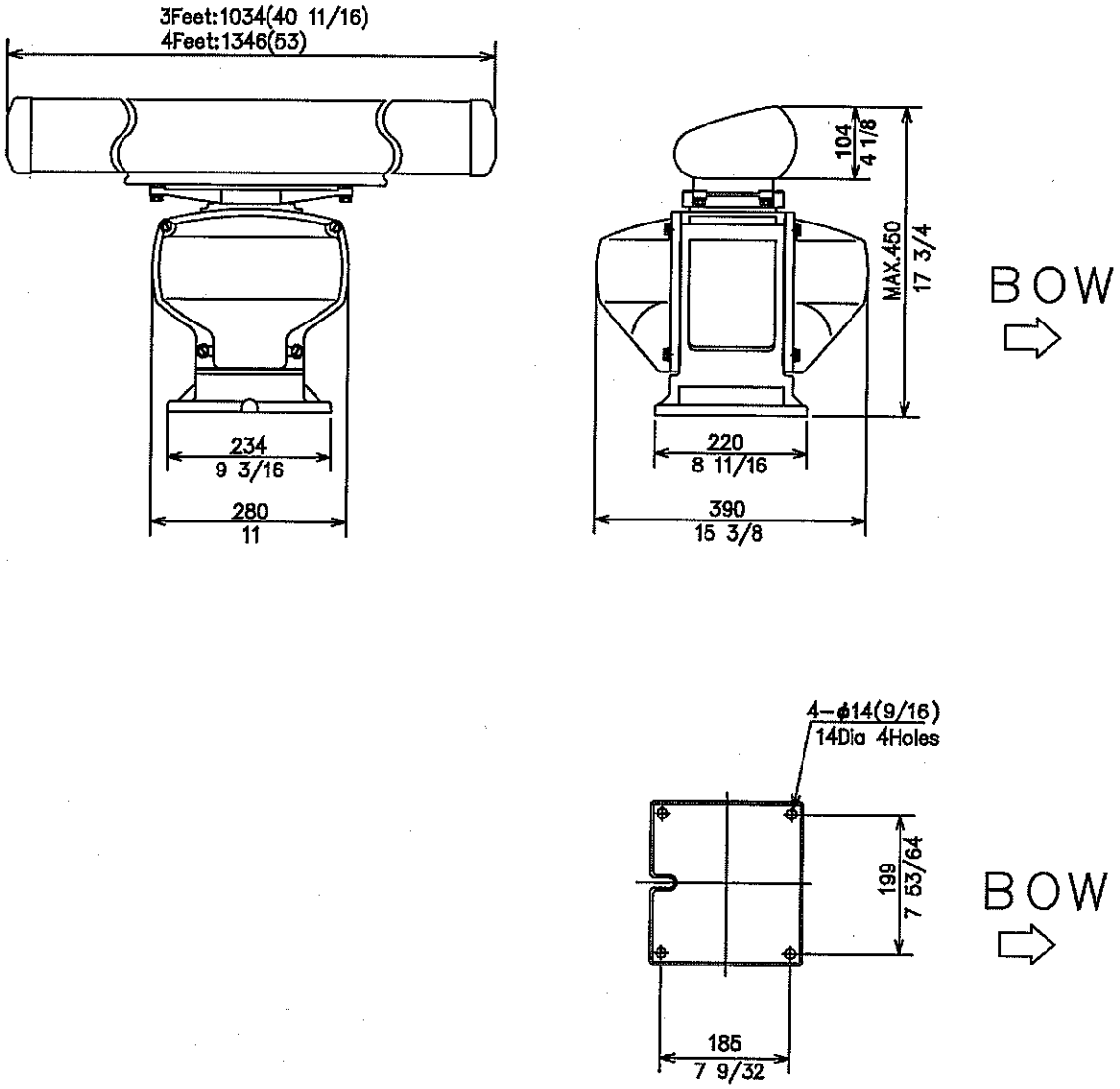


Weight:6kg(13.5lb)

RB715A Radome Antenna Unit



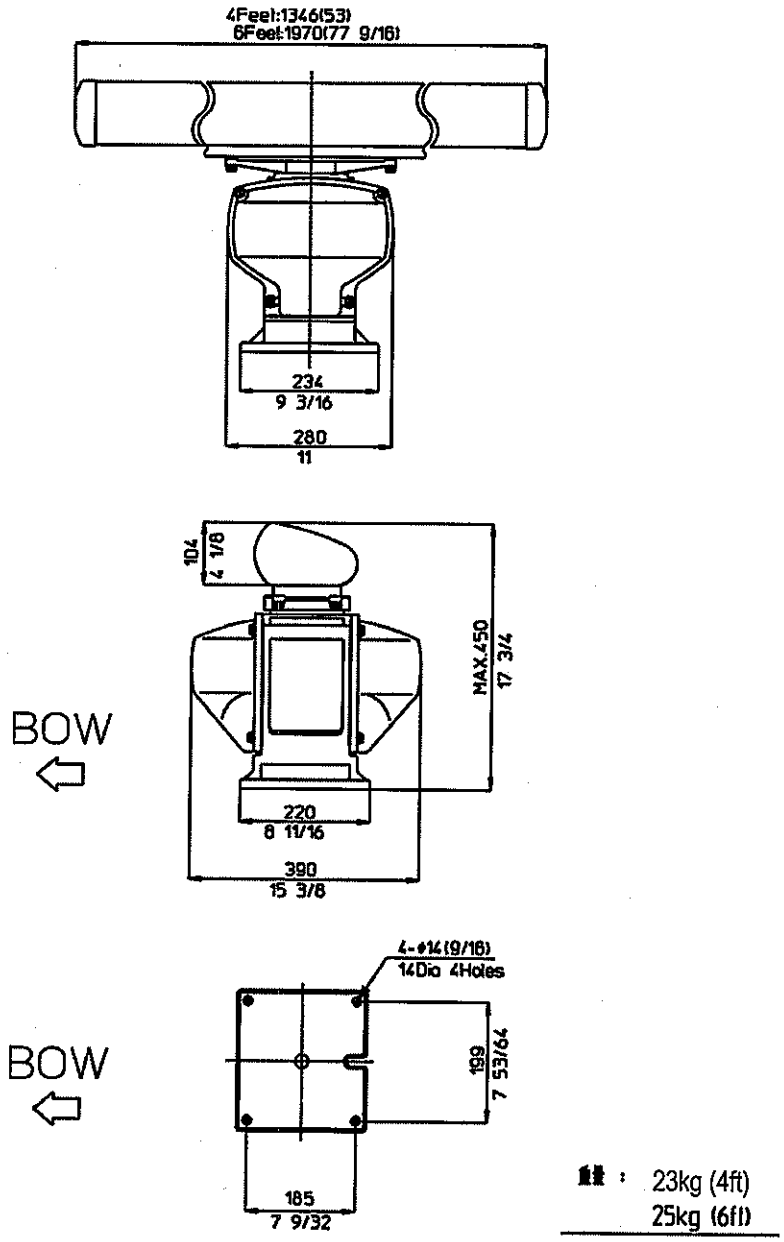
RB716A Open Antenna Unit



重量 : 21kg (3ft)
22kg (4ft)

Weight: 46 lb (3ft)
49 lb (4ft)

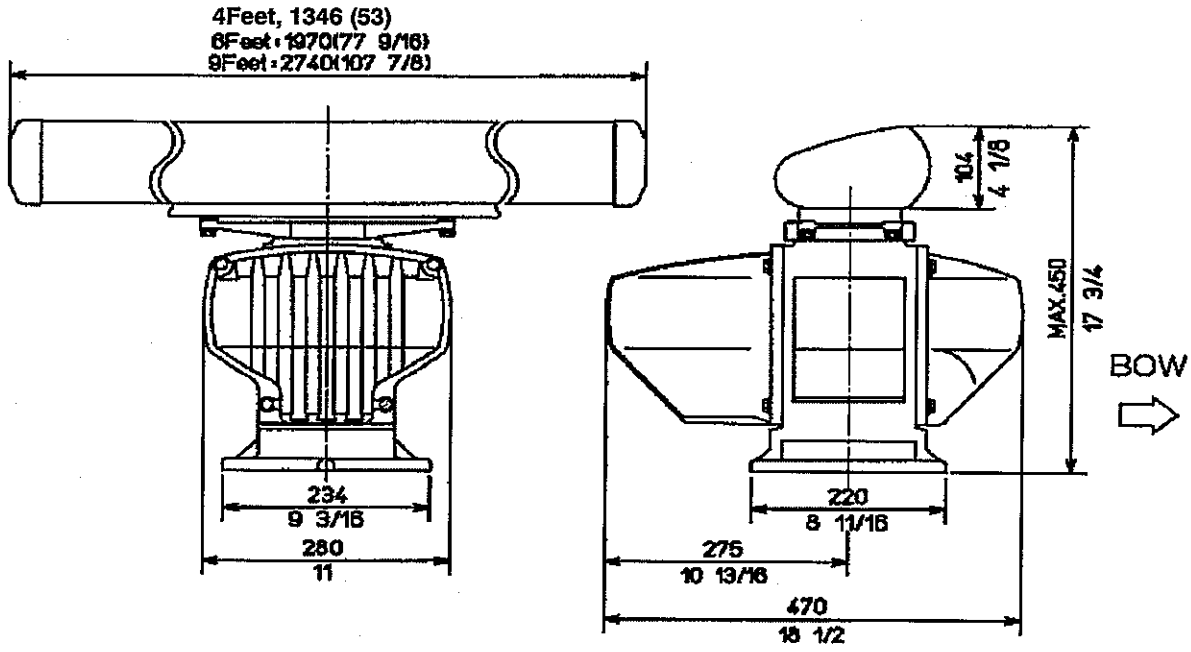
RB717A/718A Outline Drawing Scanner Unit

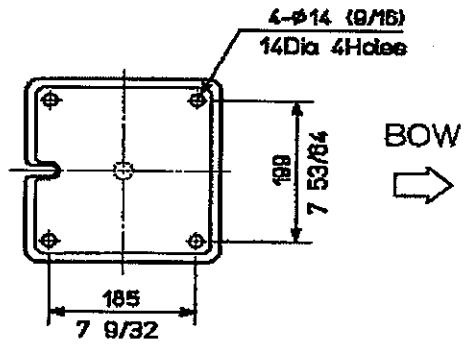


重量 : 23kg (4ft)
25kg (6ft)

Weight : 51 lb (4ft)
56 lb (6ft)

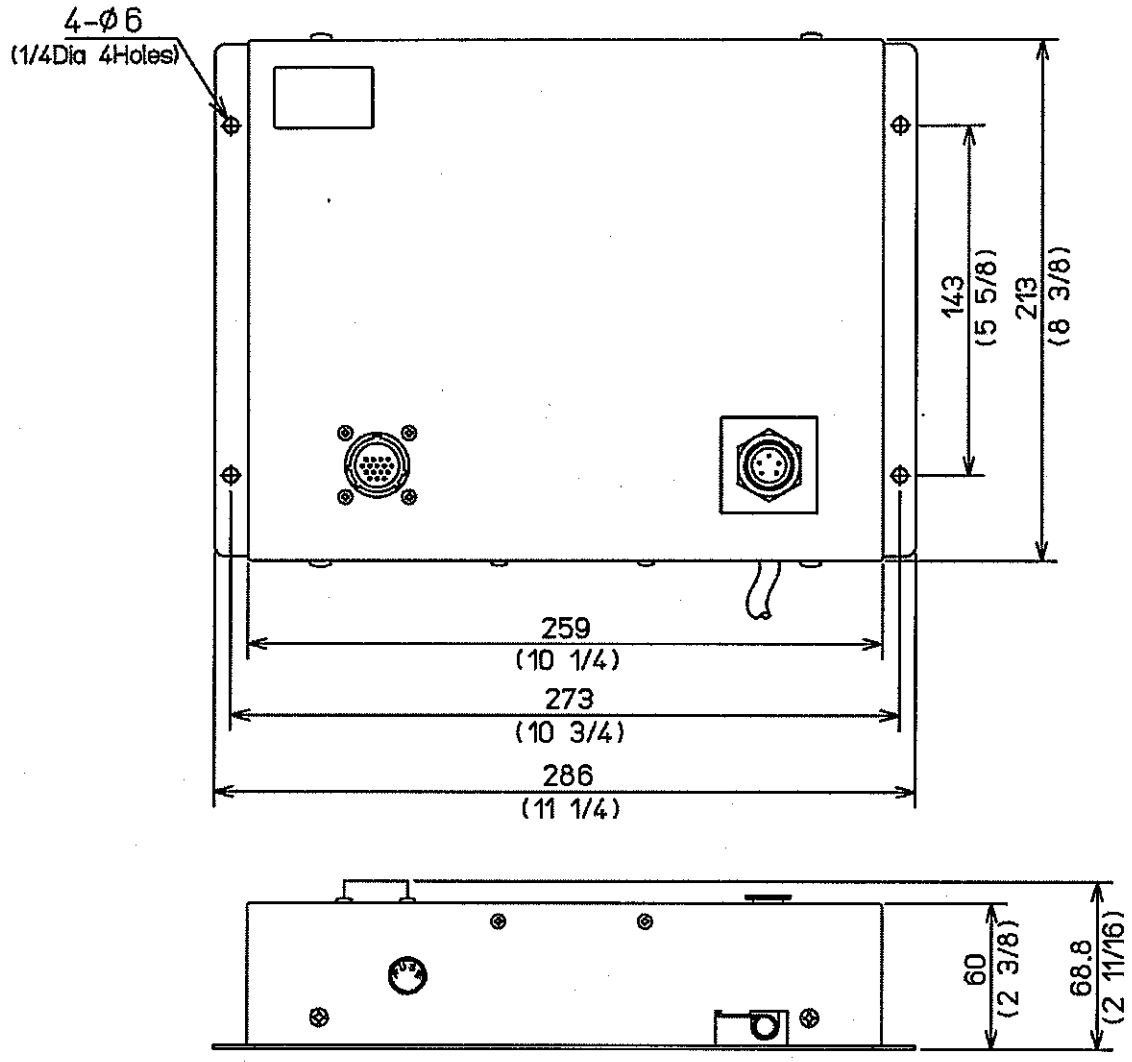
RB719A Open Antenna Unit





Weight: 27kg (60 lb) for RW701-04
29kg (64 lb) for RW701-06
33kg (73 lb) for RW701-09
Unit in mm/inch

MDS-5R/6R Radar Sensor Control Box



Weight:
MDS-5R: 1.5 kg (3.3 lb)
MDS-6R: 1.9 kg (4.2 lb)