

TECHNICAL INFORMATION
FROM
MARINE RADAR GROUP

Subject : Adjustment of the power supply circuit CBD-1682A.
(When replacing magnetron, modulation circuit, and power supply circuit)

Equipment : JMR-7200/9200 series radar
JMA-7100/9100 series radar
JMA-5200MK2/5300MK2 series radar

Date : January 19, 2023

Issue Number : RD22AL1102A



H. Matsuyama
Manager & Group leader
Marine Radar Group
Marine Electronics Engineering Department
Marine Systems Division

- Priority [] A: Carry out immediately
 [X] B: Carry out at periodical inspection
 [] C: Carry out upon client's request
 [] D: Information and news

1 Subject

Adjustment of the power supply circuit CBD-1682A.
 (When replacing magnetron, modulation circuit, and power supply circuit)

2 Objective Equipment

- JMR-7200/9200 series radar
- JMA-7100/9100 series radar
- JMA-5200MK2/5300MK2 series radar

Serial Number :

Radar Antenna Type	Serial number
NKE-1125	LC48306 or earlier
NKE-2254	LC47866 or earlier
NKE-1130	LC48897 or earlier
NTG-3225	LB13433 or earlier
NTG-3230	LB13255 or earlier

Note: The power supply circuit CBD-1682A with later serial number have already been adjusted before shipping from the factory.

3 Outlines

3.1 Information

Magnetron power may be higher than the specified value because of variation in performance between different combinations of Power supply, modulator and magnetron. Resulting in a risk of malfunction.

3.2 Request for work

When adjusting the CBD-1682 Send the photos and relevant information using the attached work report. For details, please refer to the attached adjustment manual " 7ZPRD1044 "

3.3 Check the modulation circuit type

There are two types of modulation circuits: CPA-264 and CPA-264A. The adjustment work is NOT needed on the combination of CPA-264 and CBD-1682A. Refer to chapter 3.5 for details. The combination of unadjusted CBD-1682A and CPA-264A will mean a risk of malfunction and therefore the adjustment work must be carried out. Refer to table 1 in Section 3.4. for details.

3.4 Events list

If magnetron power is higher than the specified value, the events in Table 1 may occur. If

event No 5 occurs, the modulation circuit has been damaged. Please replace the modulation circuit.

Table 1 Events list

No	events
1	TXRX (MHV) alarm is displayed.
2	TXRX (Magnetron Current) alarm is displayed.
3	Returns to preheat state during transmission.
4	Returns to standby state during transmission.
5	TXRX (Communication error) and Power (TXRX, Failed) alarms are displayed at the same time.

3.5 Flowchart of the adjustment and replacement

Refer to Figure 1 when replacing the Magnetron or Modulator Circuit, to see if adjustment of power supply circuit is required. Refer to Section 2 for serial numbers to be adjusted. Refer to Figure 2 when replacing the power supply circuit. If the modulation circuit is CPA-264, replace it with CPA-264A.

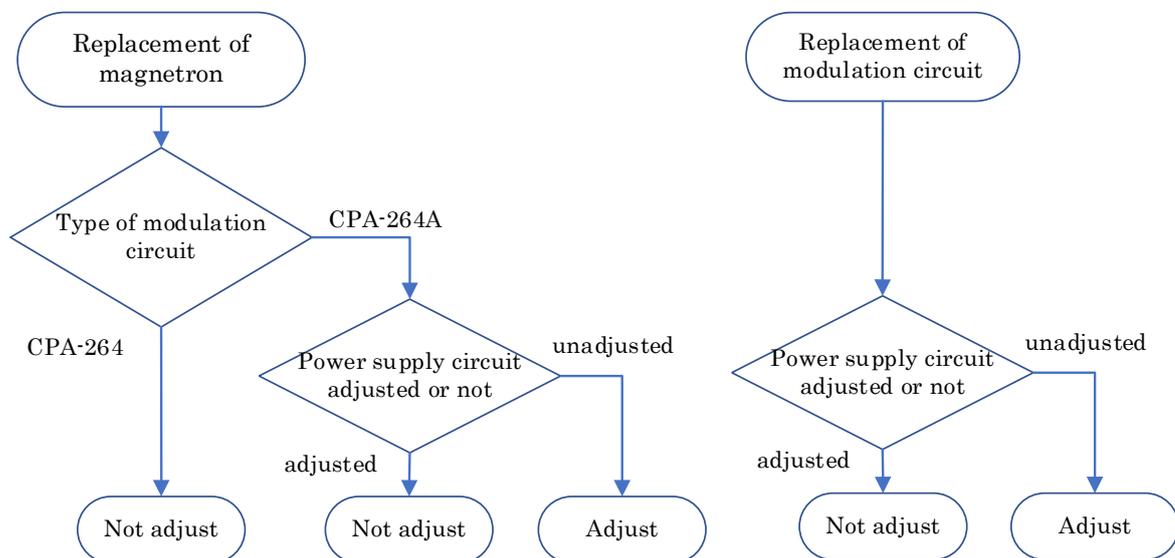


Figure 1 Adjustment of power supply circuit required or not

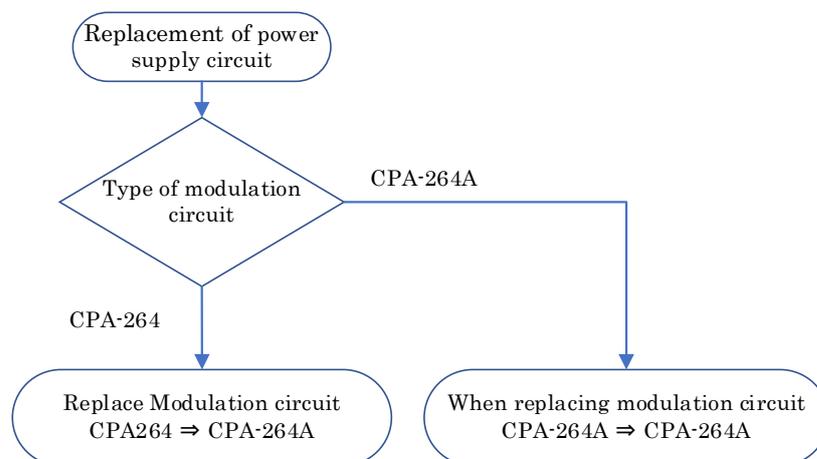


Figure 2 Replacement of modulation circuit required or not

4 Attached document

Adjustment manual 7ZPRD1044

CBD-1682A_service manual

Power supply circuit CBD-1682A adjustment manual



CAUTION

Electric shock

DO NOT conduct adjustment work by turning on the power.

Before adjustment work, remove CBD-1682A from the scanner and remove all cables from CBD-1682A.

- To Access CBD-1682A, refer the attached service manual excerption.

1. PROCEDURE

1. Take a photo of RV1.
2. Turn the RV1 counterclockwise to two ticks (Fig.1).
3. Verify that RV1 is NOT adjusted to regions showing less than 40% (Fig.2). If the adjustment falls in this range, set the knob of RV1 back to scale 4.
4. Take a photo of RV1.
5. Fix the knob of RV1 by the silicone rubber (Fig.3).
6. Carry out the operation check after assembling all parts/cables/circuits.

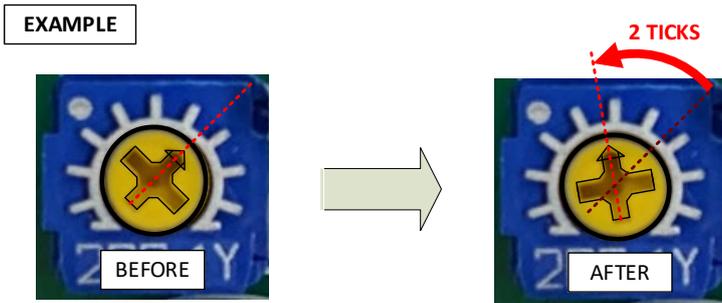


Fig. 1. RV1 adjustment



Fig. 2. Forbidden area



Fig. 3. Silicone rubber bonding

2. OPERATION CHECK

Turn on the safety switch and follow the procedure below to check the operation.

1. Turn On the Display unit. After the preheat countdown is completed, start transmission and check that the radar image appears without error. If the magnetron is replaced, allow sufficient time for the radar to be preheated (about 20 to 30 minutes / bring the radar unit to STBY mode).
2. When set to the 48 NM range, the Magnetron Current bar, indicating the magnetron current, should read the value as shown in the table below.

- JMR-9200 series and JMR-7200 series: 6-10 scale marks.
- JMA-9100 series and JMA-7100 series: 6-9 scale marks.
- JMA-5200Mk2 series and JMA-5300Mk2 series: 6-9 scale marks.

3. WORK REPORT

Report the following information using the attached work report.

- Serial number of the scanner unit
- Ship's name
- Photos before and after adjustment

Refer to Figure 4 for how to check the modulation circuit type.

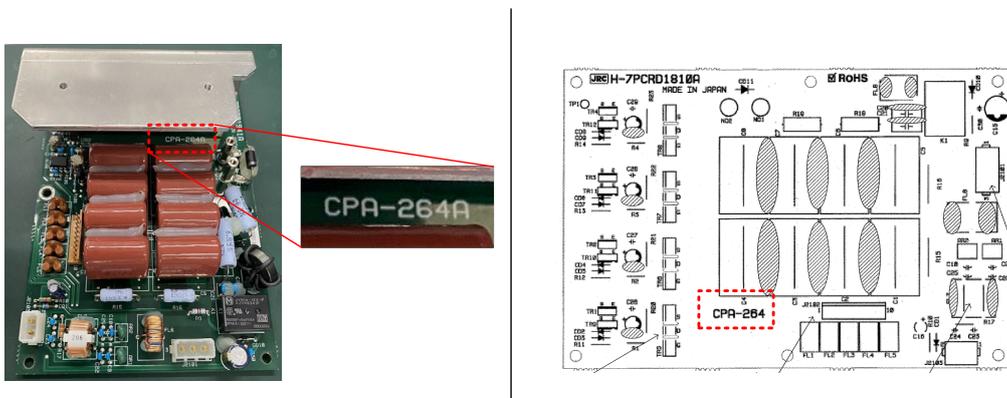


Fig. 4. Modulation circuit type

In case RV1 of CBD-1682A has not fixed by the silicone bonding, it is subject to this adjustment. The silicone bonding means it has already been adjusted.

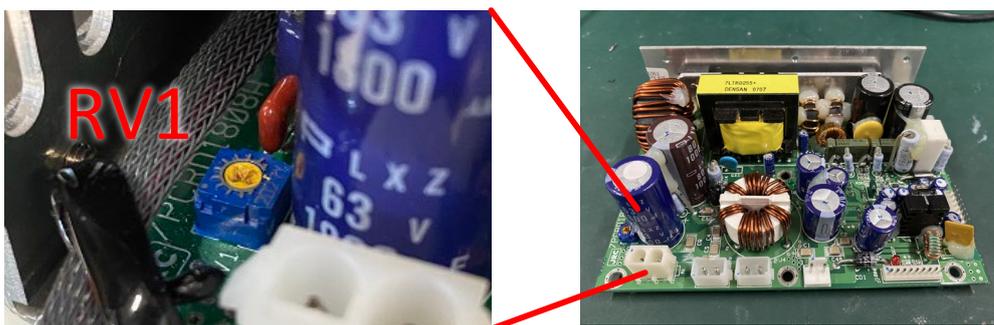


Fig. 5. RV1 and CBD-1682A

CBD-1682A Work report

After the adjustment is completed, please report the following information.

Date	
Working hours	hours
General Type	JMR- /JMA-
Radar Antenna Type	NKE- /NTG-
Serial number	SERIAL NO.
Ship's name	
A photo before adjustment	
A photo after adjustment	
events (Put a check mark)	<input type="checkbox"/> Magnetron Replacement.
	<input type="checkbox"/> Modulation Circuit Board Replacement.
	<input type="checkbox"/> Power Supply Circuit board Replacement.
Details (Put a check mark)	<input type="checkbox"/> TXRX(MHV) alert is displayed.
	<input type="checkbox"/> TXRX(Magnetron Current) alert is displayed.
	<input type="checkbox"/> Returns to preheat state during transmission.
	<input type="checkbox"/> Returns to standby state during transmission.
	<input type="checkbox"/> TXRX(Communication error) & Power(TXRX, Failed) alerts are displayed at the same time.
	<input type="checkbox"/> Other reasons.

4.1.1.8 Power Supply Circuit board (CBD-1682A) Replacement/NKE-1130

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws)	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)



Before beginning work, turn Off the safety switch of the Scanner unit.



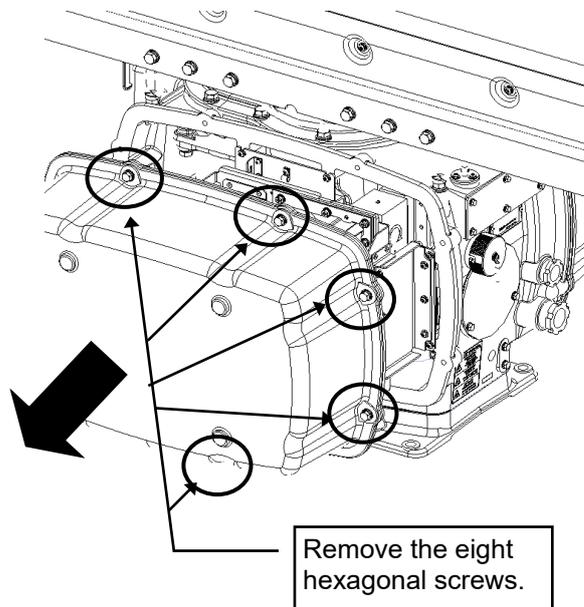
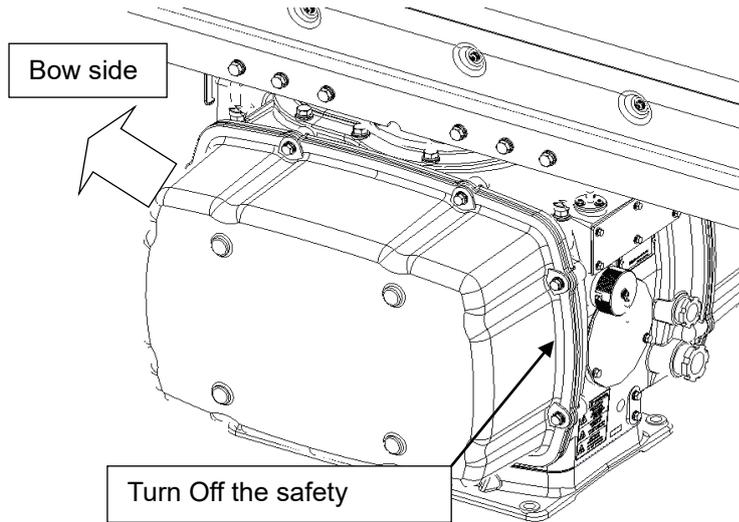
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

Step 1 Turn Off the safety switch (to the lower side) and remove the cover on the left (port) side.

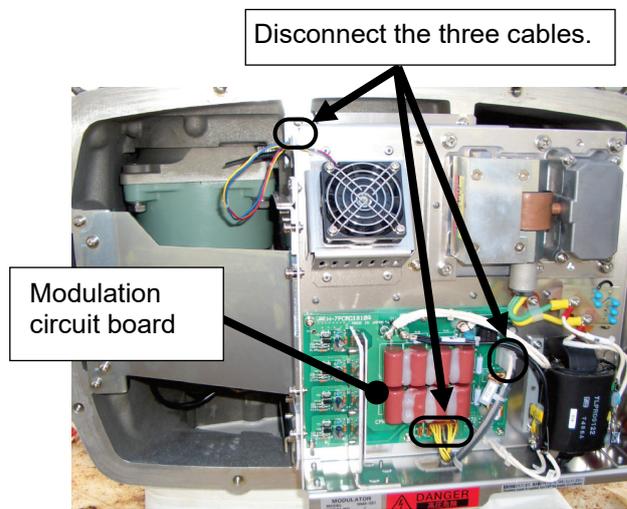
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the cover on the left (port) side.



Example: Port side cover removal

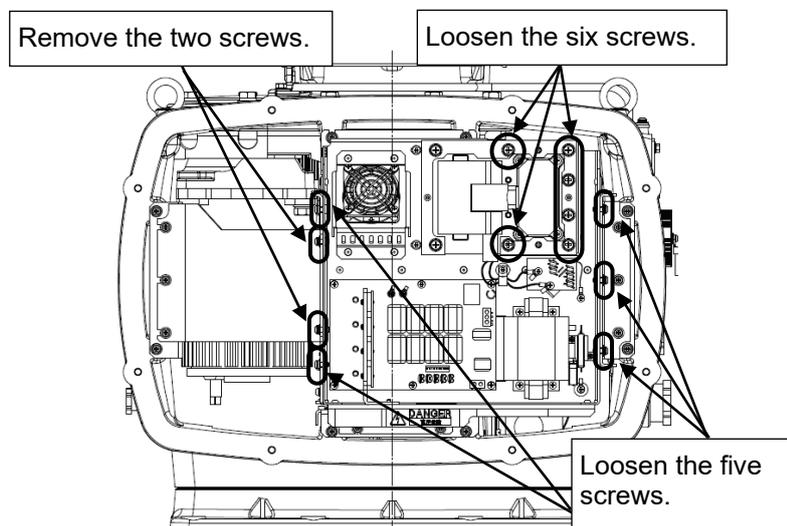
Step 2 Remove the modulation circuit board cables.

Remove the cover on the left (port) side. Remove the cables connected to the modulation circuit board (connectors P2101 and P2102) and the fan cable (P1112).



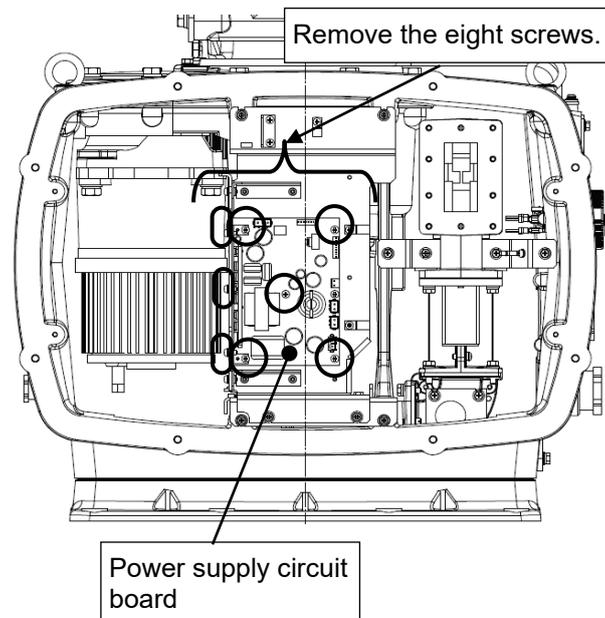
Step 3 Remove the modulation circuit board.

Remove the two screws (M5) from the fixture. Loosen the six screws (M6) holding the magnetron and the five screws (M5) holding the modulation unit, to remove it.



Step 4 **Replace the power supply circuit board**

Remove the cable connected to the power supply circuit board and the eight screws (M4) to replace it. If the thermal conductive pad on the casing on the back of the power supply circuit board (the soldered side) is damaged, affix a new one to the replacement power supply circuit board. After replacing the power supply circuit board, assemble the unit in the reverse order of the disassembly procedure. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 **Operation check**

After completing the replacement work, turn On the safety switch and check operation by following the procedure below.

- (1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error.

This completes power supply circuit board replacement.

4.1.3.8 Power Supply Circuit Board (CBD-1682A) Replacement/NKE-1125

[Required Tools]

The tools shown in the following table are required for replacement work.

Table Required Tools

No	Name	Size	Appearance
1	Phillips screwdriver	Size #2, Size #3	
2	Open-end wrench*1	Width across flats 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws)	

*1 Either the wrench (adjustable wrench) or socket wrench is mandatory. (mounting/removing the cover, etc.)



Before beginning work, turn Off the safety switch of the Scanner unit.



Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

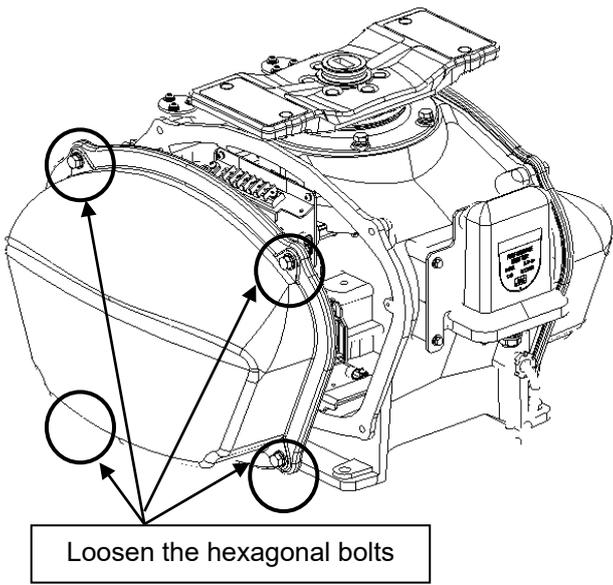
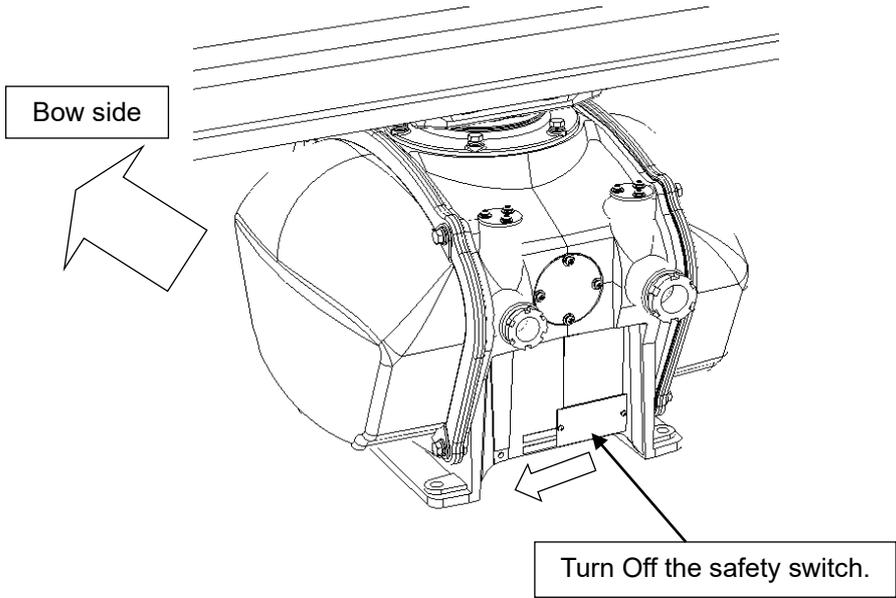


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

Step 1 Turn Off the safety switch and remove the cover.

Before beginning work, turn Off the safety switch located on the bottom of the stern side of the scanner unit.

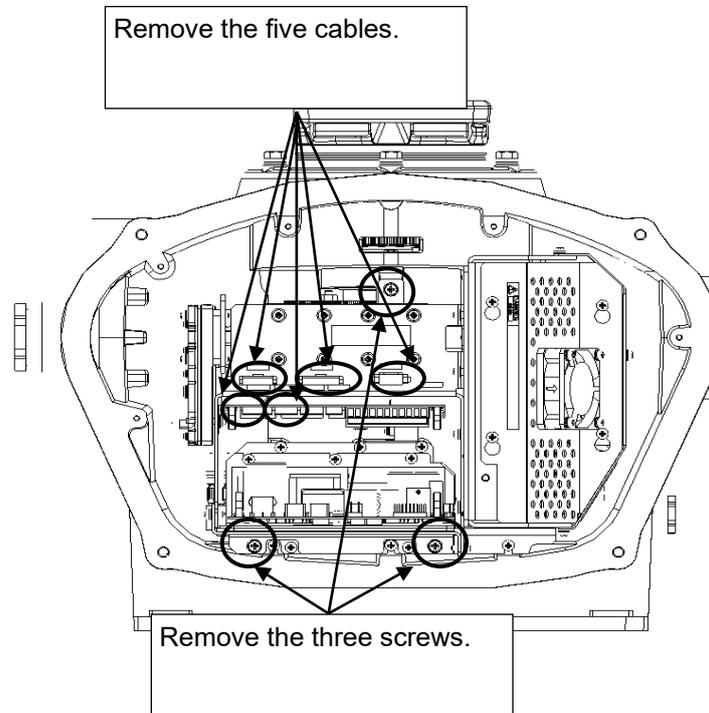
Loosen the hexagonal bolts (four bolts) and remove the pedestal cover.



Example: Starboard side cover removal

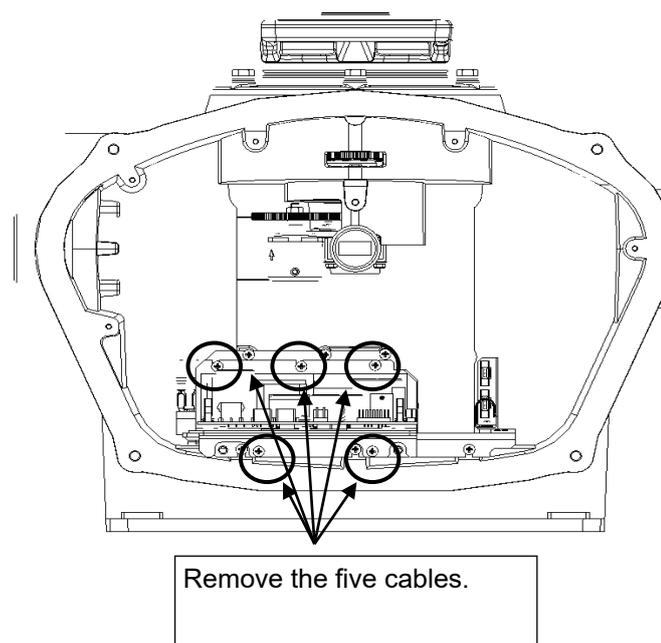
Step 2 Remove the transmitter-receiver unit.

Remove the cover on the right (starboard) side. Remove the cables connected to the transmitter-receiver unit and the screws (three M5 screws) holding it in place, and then remove it.



Step 3 Remove the metal fitting holding the power supply circuit board.

Remove the cables connected to the power supply circuit board and the screws (five M4 screws) holding it in place. Remove it together with the metal fitting holding it in place.

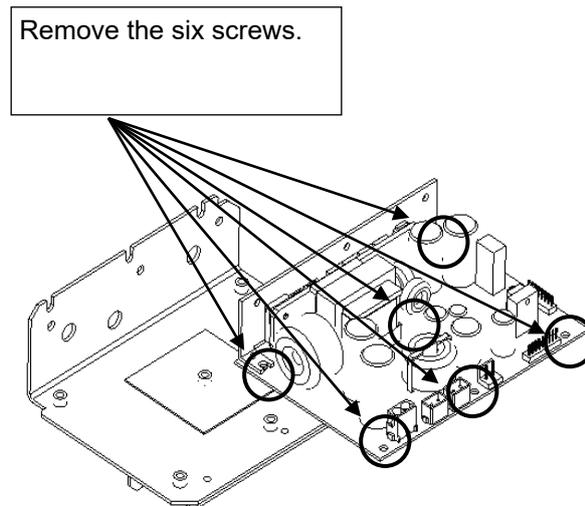


Step 4 **Replace the power supply circuit board**

Remove the screws (six M4 screws) holding the power supply circuit board in place and then replace it.

If the thermal conductive pad on the casing on the back of the power supply circuit board (the soldered side) is damaged, affix a new one to the replacement power supply circuit board.

After having replaced the power supply circuit board, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Step 5 **Operation check**

After having completed the replacement, turn On the safety switch and check operation by following the procedure below.

- (1) Turn On the radar and emit radar waves once the countdown is finished, and check that the radar image is correctly displayed.

This completes power supply circuit board replacement.

- 1) *Turn on the radar power supply. After the countdown is completed, start emission and check that the radar image appears without error. Check that you do not hear any unusual sound when the motor starts, rotates, and stops.*

4.1.6.5 Modulator circuit board (CPA-264) replacement / NKE-2254

See the Section 4.1.4.6 Modulator circuit board (CPA-264) replacement / NKE-1125 (page 4-43) .

4.1.6.6 Modulator unit (NMA-550-1) replacement / NKE-2254

See the Section 4.1.4.7 Modulator unit (NMA-550-1) replacement / NKE-1125 (page 4-45) .

4.1.6.7 Power supply circuit board (CBD-1682A) replacement / NKE-2254

See the Section 4.1.4.8 Power supply circuit board (CBD-1682A) replacement / NKE-1125 (page 4-48) .

4.1.6.8 T/R control circuit board (CMC-1205R) replacement / NKE-2254

See the Section 4.1.4.9 T/R control circuit board (CMC-1205R) replacement / NKE-1125 (page 4-49) .

4.1.6.9 Receiver (NRG-162A) replacement / NKE-2254

See the Section 4.1.4.10 Receiver (NRG-162A) replacement / NKE-1125 (page 4-51) .

4.1.6.10 Encoder replacement / NKE-2254

See the Section 4.1.4.11 Encoder replacement / NKE-1125 (page 4-52) .

4.1.6.11 Magnetron fan replacement / NKE-2254

See the Section 4.1.4.12 Magnetron fan replacement / NKE-1125 (page 4-53) .

4.1.6.12 Modulator fan replacement / NKE-2254

See the Section 4.1.4.13 Modulator fan replacement / NKE-1125 (page 4-55) .

- 3) *After replacing the Modulator circuit board, assemble the unit in the reverse order of the disassembly procedure.*

Do not forget to tighten the screws and connect the cables.

[Operation check]

After you have completed the replacement work, follow the procedure below to check the operation.

- 1) *Turn on the radar power supply. After the countdown is completed, start emission and check that the radar image appears without error.*

Transmit radar signals on a long range and with the test menu open, also make sure the magnetron current is shown between the 6th and 9th calibration markings.

4

4.2.2.3 Modulator unit (NMA-552-1) replacement / NTG-3230

See the Section 4.2.2.1 Magnetron replacement / NTG-3225 (page 4-87) .

4.2.2.4 Power supply circuit board (CBD-1682A) replacement / NTG-3225

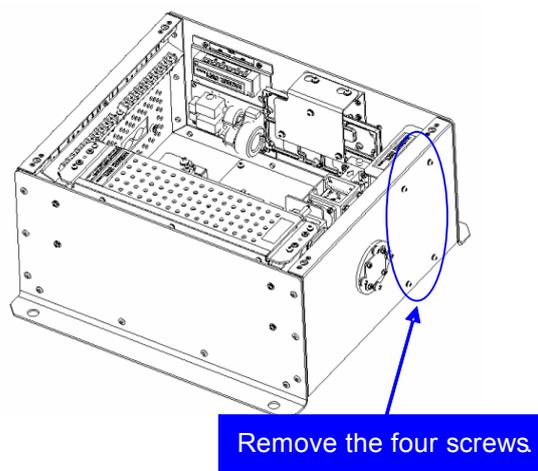
[Required tools]

- A Phillips screwdriver for 4 mm screws

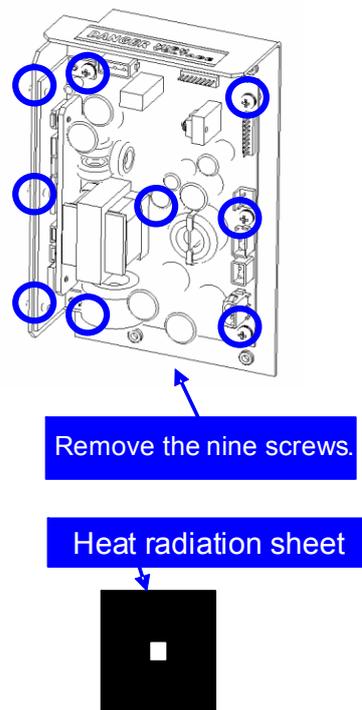


[Replacement procedure]

- 1) *After having removed all the cables connected to the power supply circuit board, remove the fixing screws (four M4 screws) and remove the power supply circuit board with the attached heat radiation plate.*



- 2) *Remove the fixing screws (nine M4 screws) and remove the power supply circuit board from the heat radiation plate.*



- 3) *If the heat radiation sheet on the heat radiation plate is torn, replace it with the sheet that comes with the replacement power supply circuit board.*
- 4) *After replacing the power supply circuit board, assemble the unit in the reverse order of the disassembly procedure.*

Do not forget to tighten the screws and connect the cables.

[Operation check]

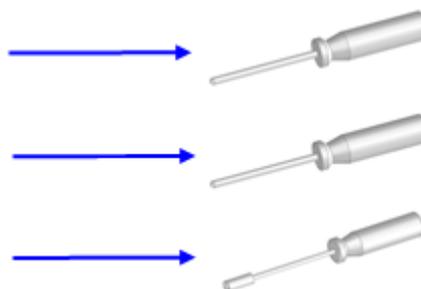
After you have completed the replacement work, follow the procedure below to check the operation.

- 1) *Turn on the radar power supply. After the countdown is completed, start emission and check that the radar image appears without error.*

4.2.2.5 T/R control circuit board (CMC-1205R) replacement / NTG-3225

[Required tools]

- A Phillips screwdriver for 4 mm screws
- A flatblade screwdriver for 6 mm screws
- A socket wrench for 7 mm bolts

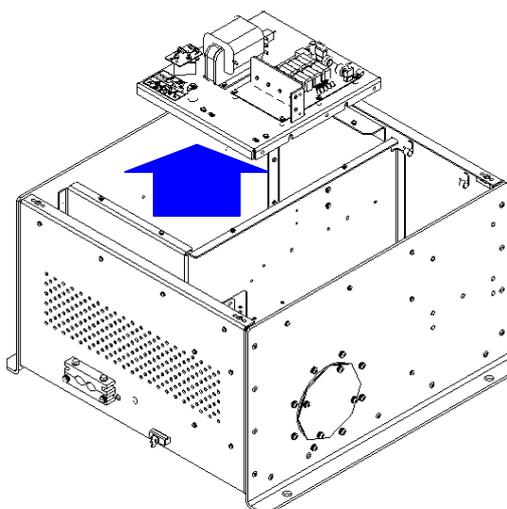


[Replacement procedure]

- 1) *Before starting replacement work, open the service engineer menu on the display unit and back up the scanner unit data (emission time and motor rotation time).*

- 6) *Remove the Modulator unit with metal fixture to replace it.*
- 7) *Assemble the Modulator unit in the reverse order of the disassembly procedure.*
- 8) *After replacing the Modulator unit, assemble the magnetron (see Section 4.2.3.1).*

Do not forget to tighten the bolts and screws, and do not forget to reconnect the cables.



[Operation check]

After you have completed the replacement work, follow the procedure below to check the operation.

- 1) *Turn on the radar power supply. After the countdown is completed, start emission and check that the radar image appears without error.*

Transmit radar signals on a long range and with the test menu open, also make sure the magnetron current is shown between the 6th and 9th calibration markings.

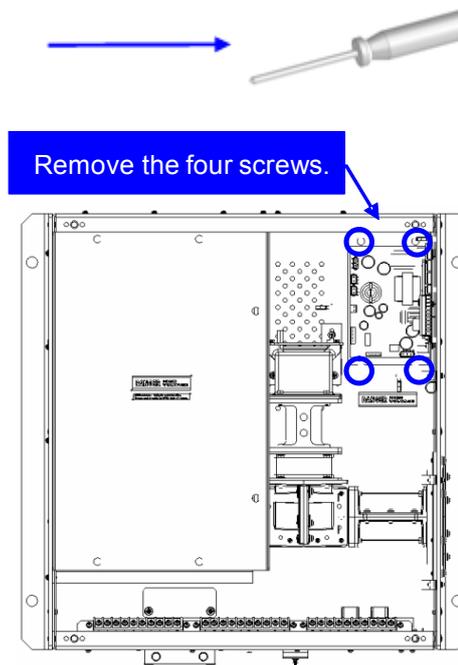
4.2.3.4 Power supply circuit board (CBD-1682A) replacement / NTG-3230

[Required tools]

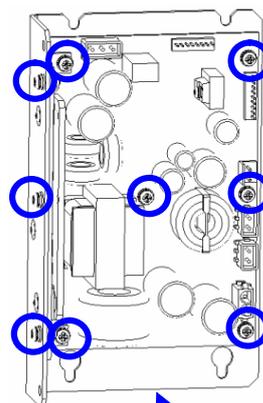
- A Phillips screwdriver for 4 mm screws

[Replacement procedure]

- 1) *After having removed all the cables connected to the power supply circuit board, remove the fixing screws (four M4 screws) and remove the power supply circuit board with the attached heat radiation plate.*



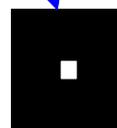
- 2) *Remove the fixing screws (nine M4 screws) and remove the power supply circuit board from the heat radiation plate.*



Remove the nine screws.

- 3) *If the heat radiation sheet on the heat radiation plate is torn, replace it with the sheet that comes with the replacement power supply circuit board.*
- 4) *After having replaced the power supply circuit board, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the screws and connect the cables.*

Heat radiation sheet



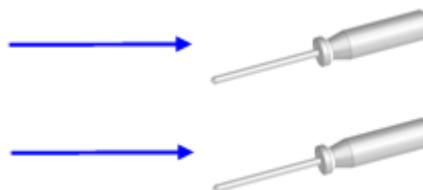
[Operation check]

- 1) *Turn on the radar power supply. After the countdown is completed, start emission and check that the radar image appears without error.*

4.2.3.5 T/R control circuit board (CMC-1205R) replacement / NTG-3230

[Required tools]

- A Phillips screwdriver for 4 mm screws
- A flatblade screwdriver for 6 mm screws



[Replacement procedure]

- 1) *Before starting replacement work, open the service engineer menu on the display unit and back up the scanner unit data (emission time and motor rotation time).*



CAUTION

If you do not back up the data, you will lose all data related to the scanner, such as magnetron usage time.