



4. Replacement Procedure

Chapter 4. Replacement Procedure

DANGER



Never attempt to check or repair the inside of the equipment.
Checking or repair by an unqualified person may cause a fire or an electric shock.
Contact our head office, or a nearby branch or local office to request servicing.



Never remove the cover of this equipment.
Touching the high-voltage section inside will cause an electric shock.



Do not attempt to disassemble or tamper with this equipment.
Otherwise, a fire, an electric shock, or a malfunction may occur.



When conducting maintenance, make sure to turn the main power Off.
Failure may result in electric shock.



Turn Off all the main powers before cleaning the equipment. Make sure to turn it off since voltage is still outputted from the rectifier even after the indicator and the radar are turned Off. Failure may result in equipment failure, or death or serious injury due to electric shock.



When conducting maintenance work on the Scanner unit, make sure to turn all the main powers Off.
Failure may result in electric shock or injuries.



Make sure to turn Off the Scanner unit safety switch. Failure may result in injuries caused by physical contact with the rotating radiator.

4.1 Replacement Procedures for Scanner Unit

Precautions

WARNING



To turn Off the power, do not keep the Power button depressed long. Otherwise, a trouble may occur due to termination failure.



Never directly touch the internal components of the Scanner unit or Display unit. Direct contact with these high-voltage components may cause electric shock. For maintenance, inspection, or adjustment of equipment components, consult with our branch office, branch shop, sales office, or our distributor in your district.



Do not get close to the radiator of the Scanner unit. It is a rotating part, and it may cause injuries if it suddenly starts rotating and consequently hits the body. It is recommended that the radiator be installed at a high place such as on the roof of the wheelhouse, on the flying bridge, on the trestle, or on the radar mast so that no one can get close to it.



Microwave radiation level of the Scanner unit:
Keep away from the Scanner unit during transmission.
Microwaves are generated from the front center of the radiant section of the Scanner unit at the levels indicated in the table below. Exposure to microwaves at close range can result in injury (especially damage to eyes).

Microwave radiation level of the Scanner unit

System	50 W/m ²	20 W/m ²	2.5 W/m ²
NKE-2103	n/a	26 cm	123 cm
NKE-1125/1129/2254	5 cm	81 cm	162 cm
NKE-1130/1139	11 cm	76 cm	181cm
NKE-2632	1.38cm	3.1cm	209.76cm
NKE-1632	1.45cm	3.25cm	128.37cm



Make sure to install the Scanner unit at a place higher than human height.
Direct exposure to electromagnetic wave at close range will have adverse effects on the human body.



When it is necessary to get close to the Scanner unit for maintenance or inspection purposes, make sure to turn the power switch of the display unit to "OFF" or "STBY".
Direct exposure to electromagnetic waves at close range will have adverse effects on the human body.



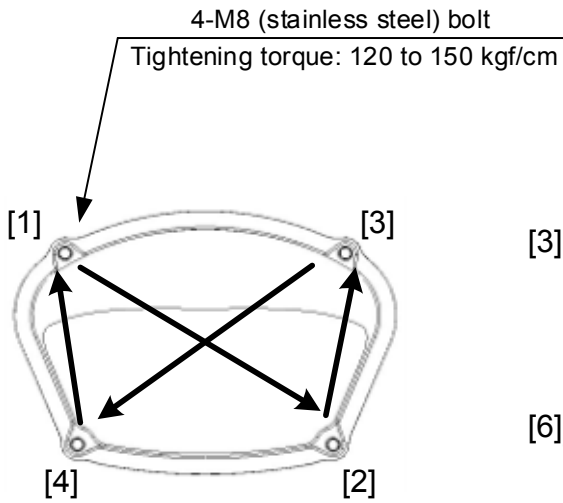
When conducting maintenance work, make sure to turn Off the power so that the power supply to the equipment is completely cut off.
Some equipment components can carry electrical current even after the power switch is turned off, and conducting maintenance work may result in electric shock, equipment failure, or accidents.

Precautions in mounting the cover

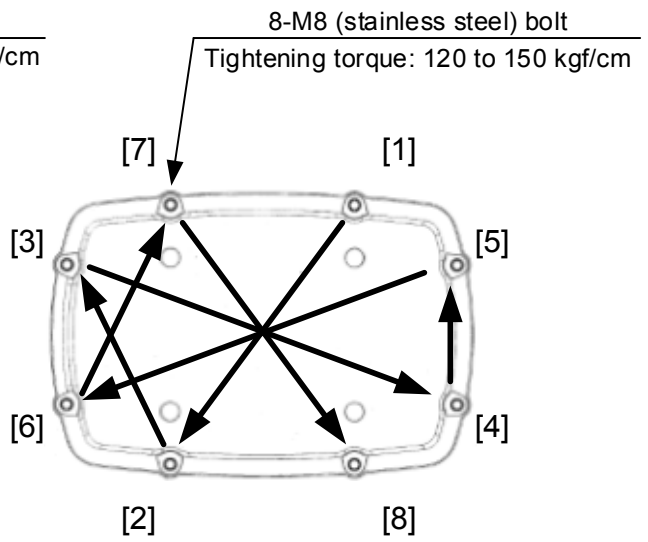
When the cover is removed for regular inspection and replacement of parts and refitted after such work, the procedures of fastening bolts shall be taken with the following precautions:

- (1) The proper fastening torque of the fitting bolts (M8) is 1176 to 1470 N•cm (120 to 150 kgf•cm) (which makes the inside water-tight and protects the packings against permanent compressive strain). The packings start sticking out from the cover at a torque of approximately 1470 N•cm (150 kgf•cm). Do not fasten the bolts with a torque exceeding the specified value. Otherwise, the screws may be broken.
- (2) Use a box wrench of 11 mm × 13 mm or an open-end wrench of 13 mm × 17 mm (not longer than 200 mm).
- (3) Screw all the bolts by hand first to prevent them playing, then fasten them evenly in order not to cause one-sided fastening. (Fasten the bolts with 25% of the required torque at the first step.)

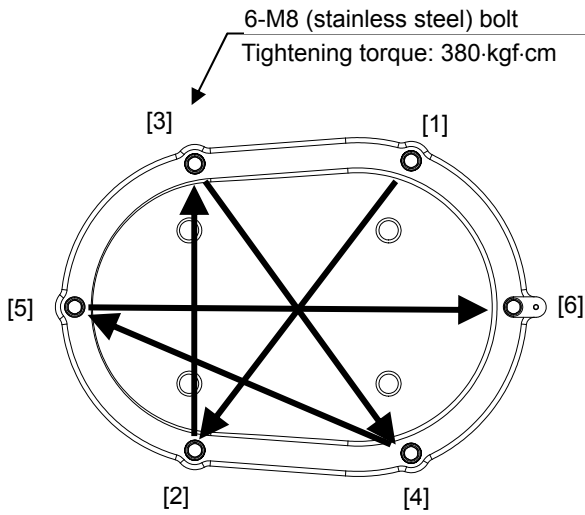
*: Fasten the bolts in the diagonal order.



Bolt Tightening Order of
NKE-1125/1129 Cover



Bolt Tightening Order of
NKE-1130/1139/1632 Cover



Bolt Tightening Order of
NKE-2632/2632-H Cover

Radiator

Perform inspection and cleaning of the radiator.

Note

- If the radiator front face (radiation plane) is soiled with smoke, salt, dust, paint or birds' droppings, wipe it with a piece of soft cloth wetted with alcohol or water and try to keep it clean at all times. Otherwise, radar beam radiation may attenuate or reflect on it, resulting in deterioration of radar performance.
- Never use solvents of gasoline, benzene, trichloroethylene and ketone for cleaning. Otherwise, the radiation plane may deteriorate.

Rotating section

Supply oil seal

For machines without a grease nipple, the replenishment of grease oil is unnecessary.

For machines with a grease nipple, remove the cap on the grease nipple located on the front of the part at which the radiator is supported, and grease with a grease gun. Make the oiling every six months. The oil quantity shall be approximate 100 g, which is as much as the grease comes out of the oil seal. Use the grease of Mobilux2 of Mobil Oil.

Oiling gears

Apply grease evenly to the tooth surfaces of the main shaft drive gear and the encoder drive gear with a spreader or brush. Oiling in short intervals is more effective to prevent the gears from wear and tear and extend their service life, but oil at least every six months.

Use the grease of Mobilux2 of Mobil Oil or equivalent.

Mounting legs

Check the mounting legs and mounting bolts of the Scanner unit chassis for corrosion at intervals and maintain them to prevent danger. Apply paint to them once a half year because painting is the best measure against corrosion.





Flexible wave guide (JMR-9225-7X3/9X3, JMR-7225-7X3/9X3)

Note

- Install the flexible wave guide without any clearance.
- Leaving a clearance may cause water leakage or corrosion later.

Coaxial cable (JMR-9230-S3, JMR-7230-S3)

The coaxial tube gland of a coaxial cable terminal is fully waterproofed when installed. To prevent a water leakage accident, periodically inspect the coaxial tube gland. In particular, the coaxial tube gland should be repainted every six months.


 WARNING	
	Do not apply strong shock to the coaxial cable by striking it with a tool or hammering it. Otherwise, an open circuit failure may result.
	Do not place anything heavy on the coaxial cable. Otherwise, an open circuit failure may result.
	Do not twist or pull the coaxial cable. Otherwise, an open circuit failure may result.

For the details, refer to the coaxial cable installation procedure for S-band radars.

Transmitter-receiver (NTG-3225/3230)

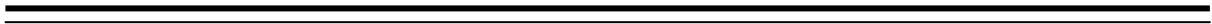
Wipe dust off the transmitter-receiver with a dry cloth or feather duster.

Display unit

 WARNING	
	When cleaning the screen, do not wipe it too strongly with a dry cloth. Also, do not use gasoline or thinner to clean the screen. Otherwise the screen surface may be damaged.

Dust accumulated on the screen will reduce clarity and darken the video.

For cleaning it, wipe it with a piece of soft cloth (flannel or cotton). Do not wipe it strongly with a piece of dry cloth nor use gasoline or thinner.



4.1.1 NKE-1130 Scanner Unit

4.1.1.1 Magnetron Replacement/NKE-1130

CAUTION



When replacing magnetrons, make sure to shut off the main power and let the equipment stand for more than 5 minutes to discharge the high-voltage circuit.

Failure may result in electric shock.



Make sure to take off your watch when your hand must get close to the magnetron.

Failure may result in damage to the watch since the magnetron is a strong magnet.

Cautions on handling the magnetrons that have been stored for a long period of time

Since the magnetrons that have been stored for a long period of time may become unstable at the start of the use due to the occurrence of spark, etc., apply aging by using the following procedure.




- 1 Extend the preheat period. (Standby: **20 to 30 minutes**)
- 2 Start from the short pulse range and shift to the long pulse range sequentially.

If the operation becomes unstable during this period, return to Standby immediately, maintain the status for 5 to 10 minutes and start operation again. Repeat this procedure.

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Non-magnetic 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.



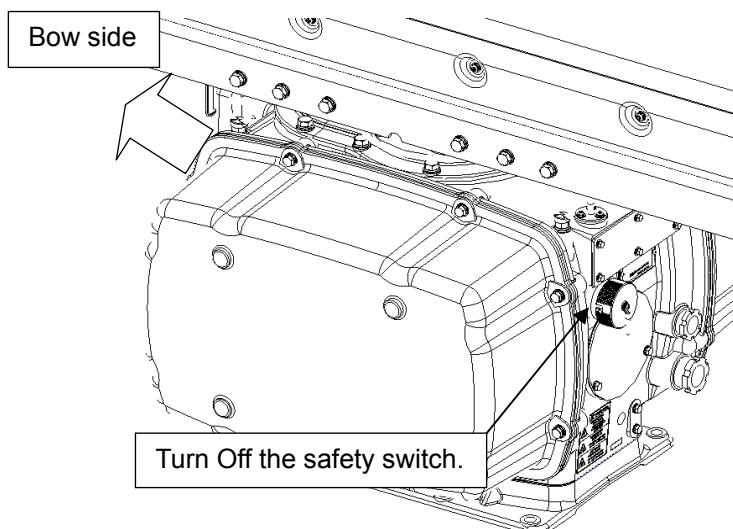
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

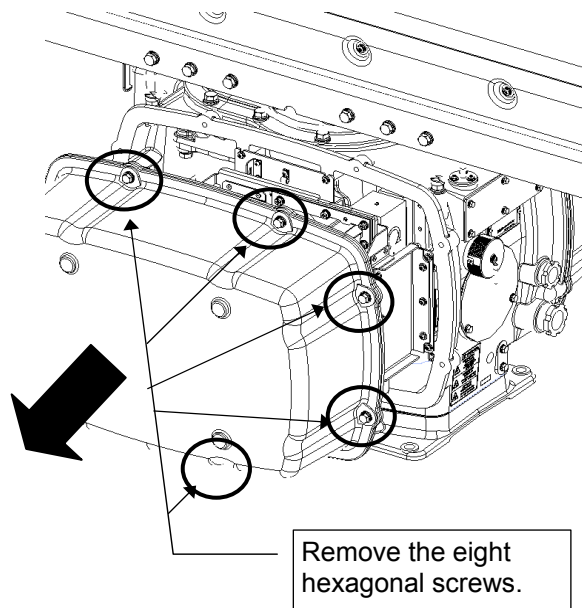


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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.

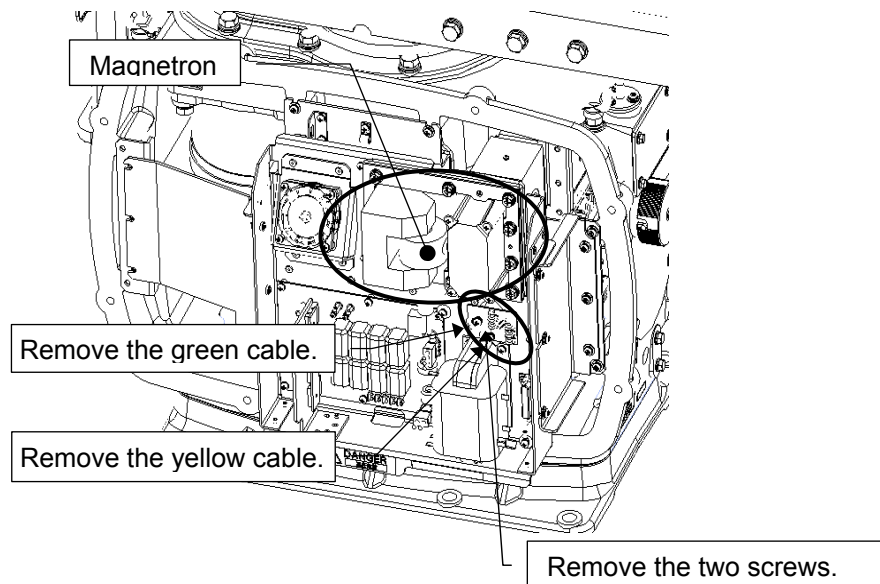




Example: Port side cover removal

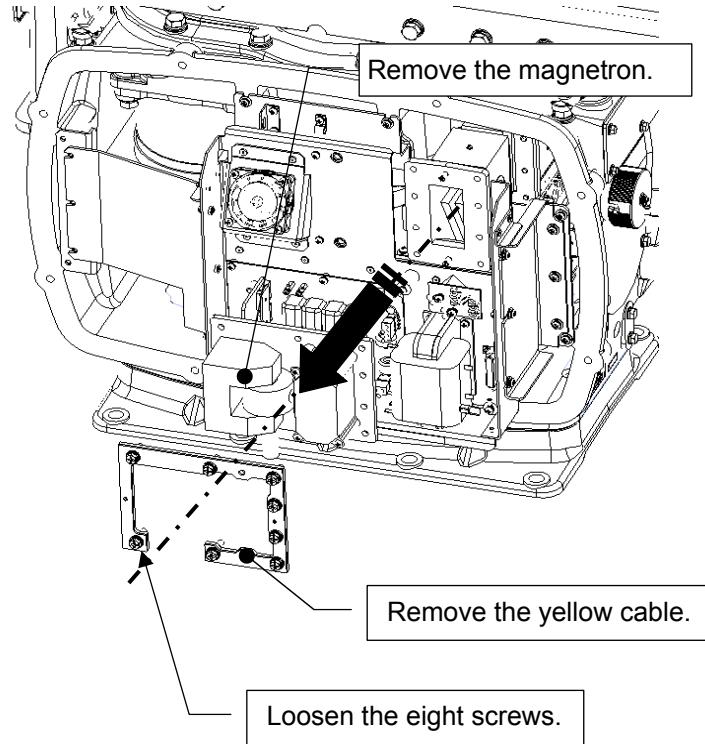
Step 2 Remove the screws holding the magnetron cables.

Measure the voltage between pin 1 and pin 3 of CPA-264 (modulation circuit) J2101 by using a multimeter (1000 V DC or more), check that there is no remaining electric charge in the modulation high-voltage circuit board. Remove the two screws (M4) holding the magnetron cables (both yellow and green).



Step 3 **Remove the fixture holding the magnetron.**

Remove the eight screws (M6) to remove the fixture holding the magnetron. The screws cannot be removed from the fixture, so loosen the all eight screws and remove the magnetron together with the fixture.



The magnetron is held by a hook, but be careful not to let it fall.



Use a non-magnetic screwdriver. If the magnetron comes into contact with any metal (tool), its performance may deteriorate.

Step 4 **Install the new magnetron.**

Install the new magnetron together with the fixture and tighten the screws to hold the cables. Follow the removal 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 you have completed the replacement work, turn On the safety switch and follow the procedure below to check the operation.

1. Turn On the Display unit for the radar. Allow sufficient time for the radar to be preheated (about 20 to 30 minutes/bring the radar unit to STBY mode).
2. Start transmission from the short pulse range and gradually change it to the long pulse range. Open the service engineer menu to perform tuning adjustment.



Check the magnetron current on the test menu during the time and if operation becomes unstable, bring the radar unit back to STBY mode and restart transmission after allowing for an interval of 5 to 10 minutes.

3. Transmit radio waves in long pulse range mode for about 15 minutes and reopen the service engineer menu to perform tuning adjustment.
Adjust the setting in the service engineer menu until the tuning indication bar on the display unit reaches the 8th calibration marking. Check in the test menu that the magnetron current is between the 6th and 9th calibration markings.
4. Finally, initialize the transmission time in the service engineer menu.




This completes magnetron replacement.

4.1.1.2 Motor 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), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 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.



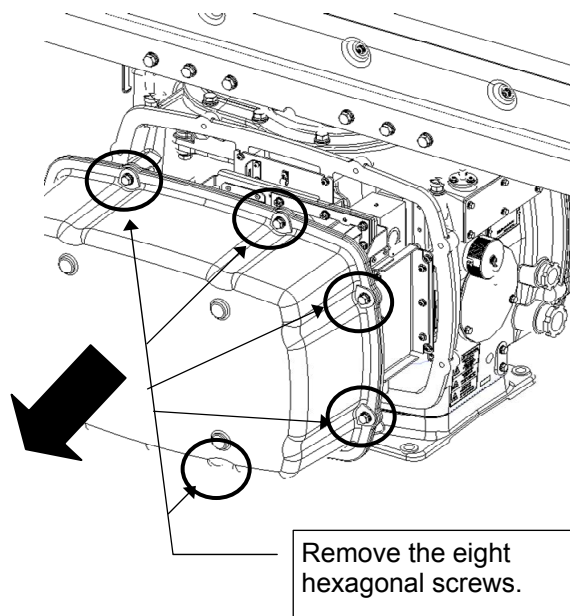
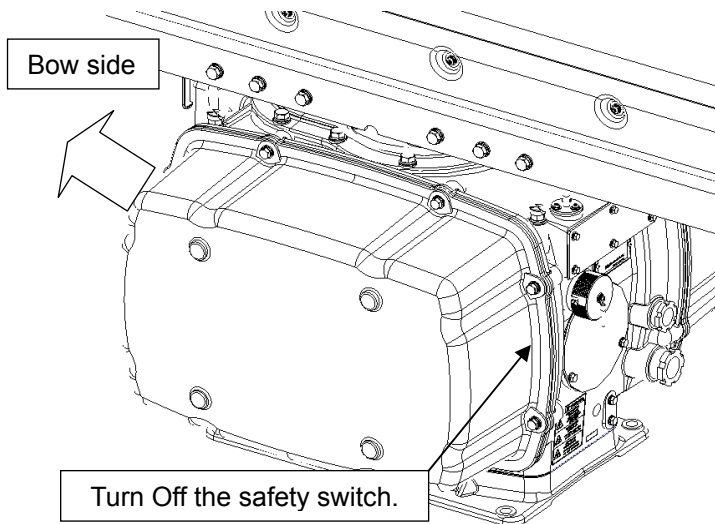
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 Set the safety switch to Off (down side) and remove the covers on both sides.

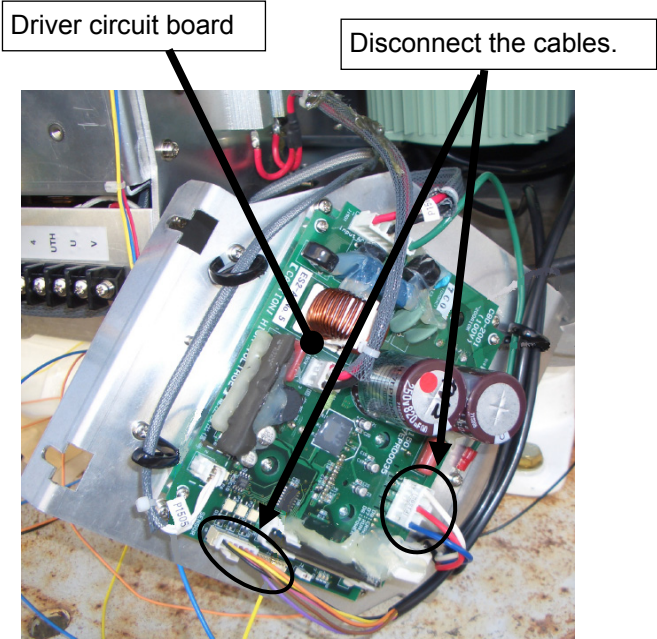
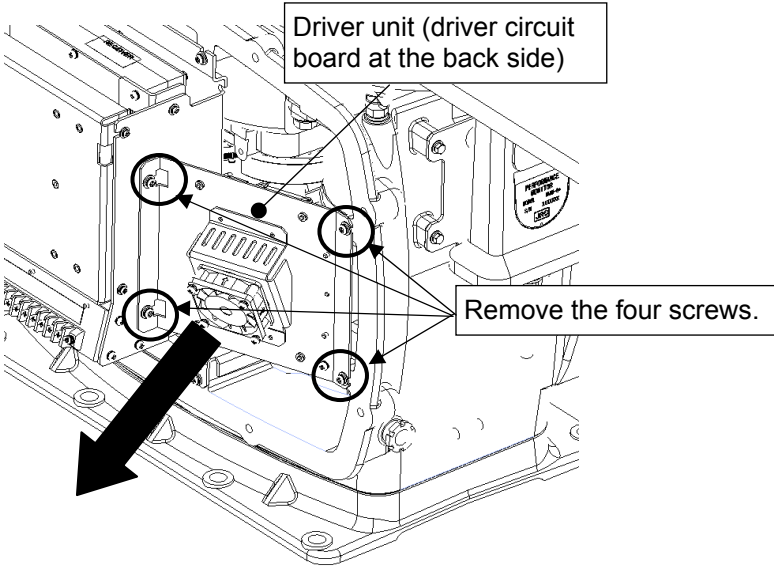
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the covers on the left (port) and right (starboard) sides.



Example: Port side cover removal

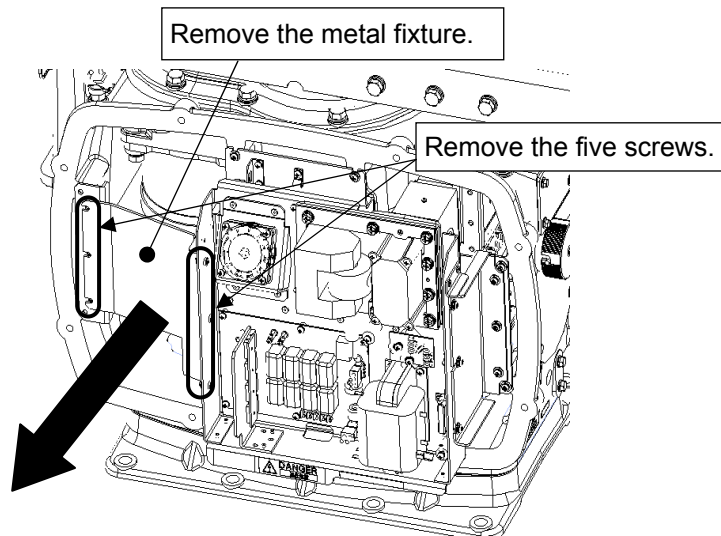
Step 2 Remove the motor driver circuit board.

Loosen the four screws (M4) to remove the driver unit, which has the motor driver circuit board on its back side. Disconnect the cables connecting the motor to the motor driver circuit board.



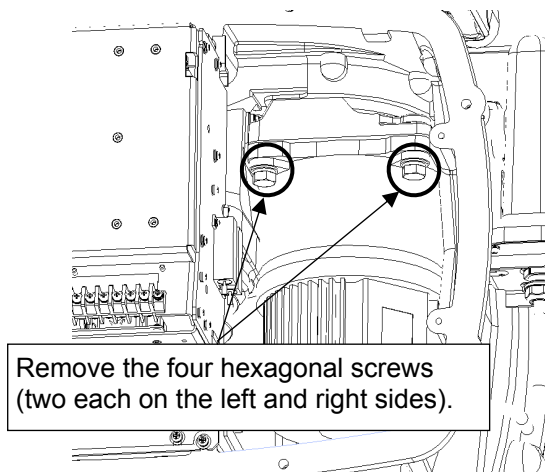
Step 3 **Remove the motor fixture.**

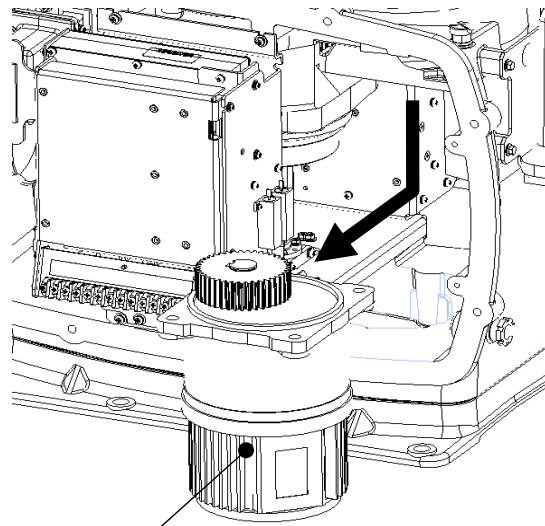
Remove the cover on the left (port) side and remove the five screws (M5) to remove the fixture.



Step 4 **Remove the motor.**

Remove the four hexagonal screws (M10x40, SW10, and W10) that hold the motor from both the right and left sides to remove the motor.

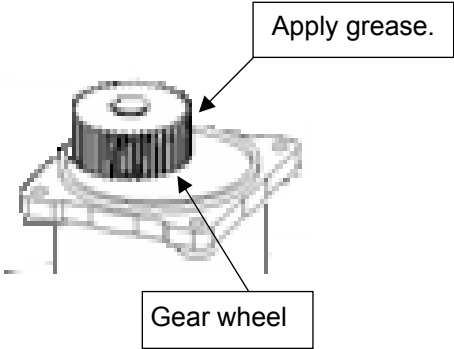




Remove the motor.

Step 5 Apply grease to the new motor.

Apply grease to the gear wheel of the new motor.



Step 6 Install the new motor.

Install the new motor in the scanner unit and secure it using the hexagonal screws. Tighten the screws with the specified torque (380 kgf-cm). After replacing the motor, 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 7 Operation check

After completing the replacement work, turn On the safety switch and follow the steps 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. Check that you do not hear any unusual sound when the motor starts, rotates, and stops.
2. Open the service engineer menu to initialize the motor rotation time.




This completes motor replacement.

4.1.1.3 Motor Driver Circuit 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	
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.



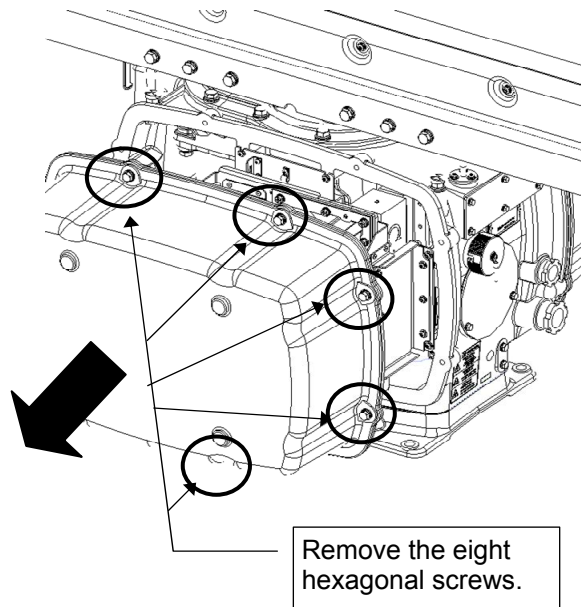
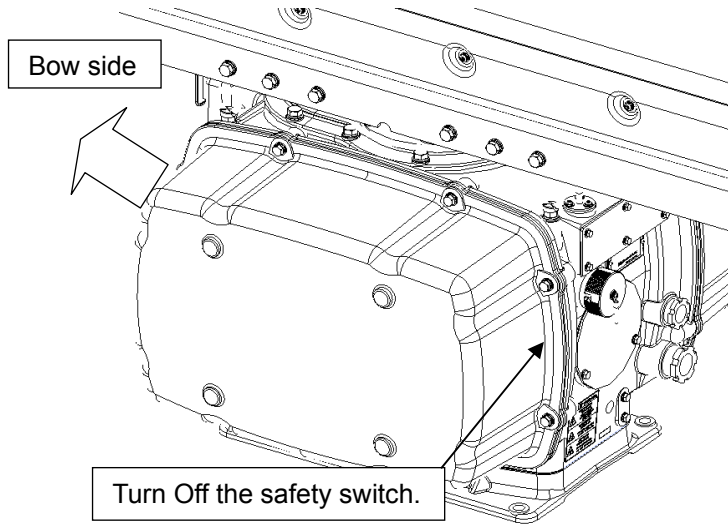
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 right (starboard) side.

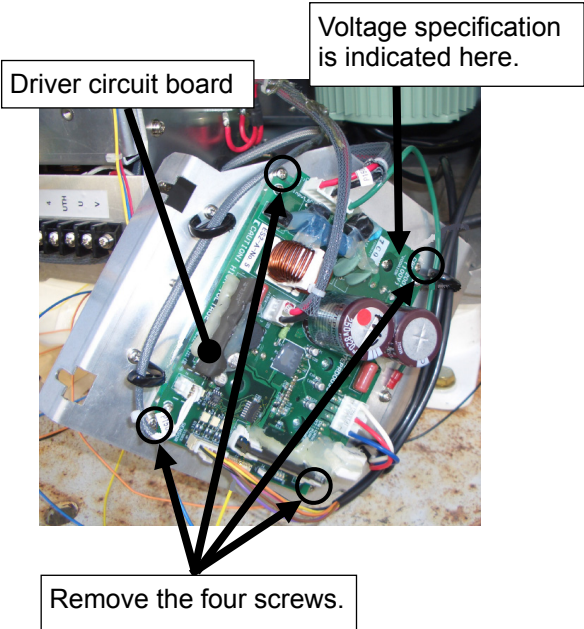
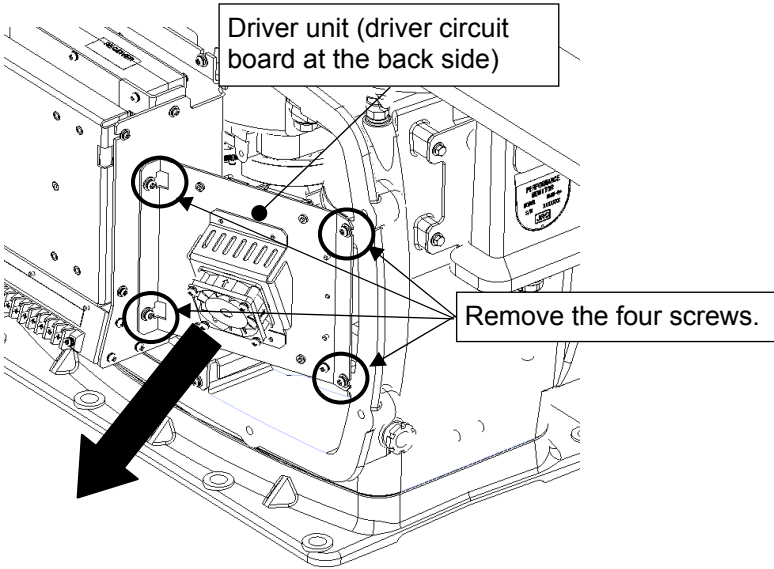
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the cover on the right (starboard) side.



Example: Port side cover removal

Step 2 Remove the motor driver circuit board.

Remove the cover on the right (starboard) side and loosen the four screws (M4) to remove the drive unit, which has the motor driver circuit board on its rear side. Remove the cables connected from the motor to the motor driver circuit board and the cables and four screws connected to the driver circuit to replace the driver circuit board with a new one.



Step 3 Incorporate the new motor driver circuit.

For the motor driver circuit there are two types of specifications, 100 V AC and 220 V AC. Check that the new motor driver circuit uses the appropriate power supply specification. (Described on the silk printing on the circuit board.)

100V AC: 7EPRD0035

220V DC: 7EPRD0034

After replacing the motor driver circuit board, follow 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 4 Operation check

After replacing the motor driver circuit board, turn On the safety switch and follow the steps 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. Check that you do not hear any unusual sound when the motor starts, rotates, and stops.




This completes motor driver circuit board replacement.

4.1.1.4 Motor Drive Circuit Board Fan 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	
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.



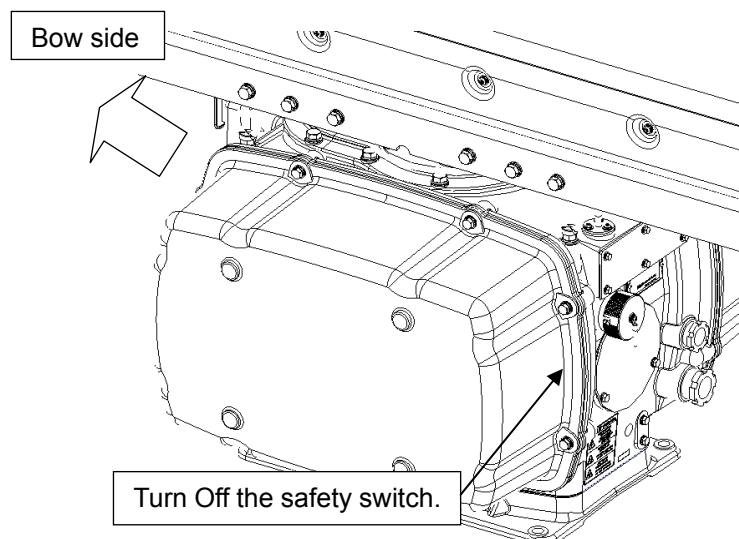
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

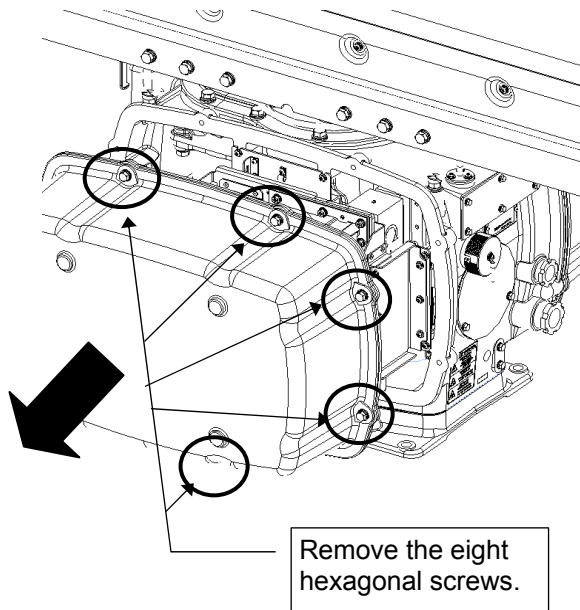


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

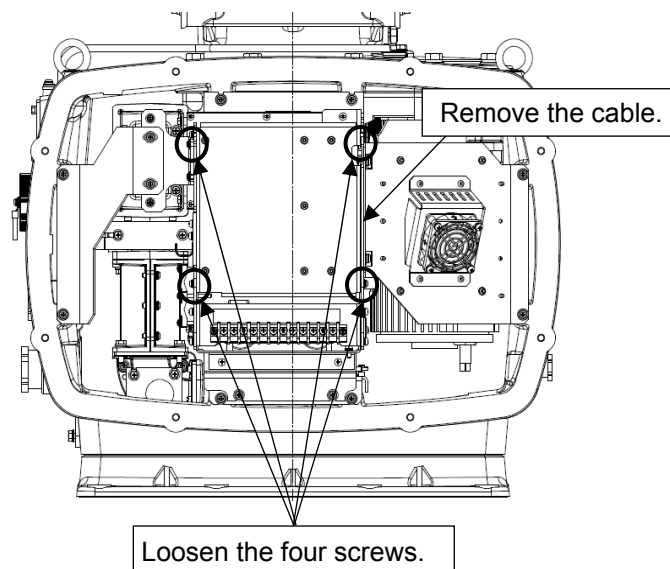


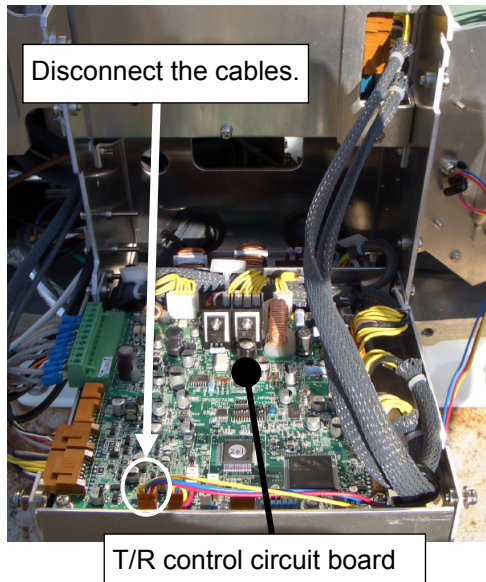


Example: Port side cover removal

Step 2 Remove the fan cable.

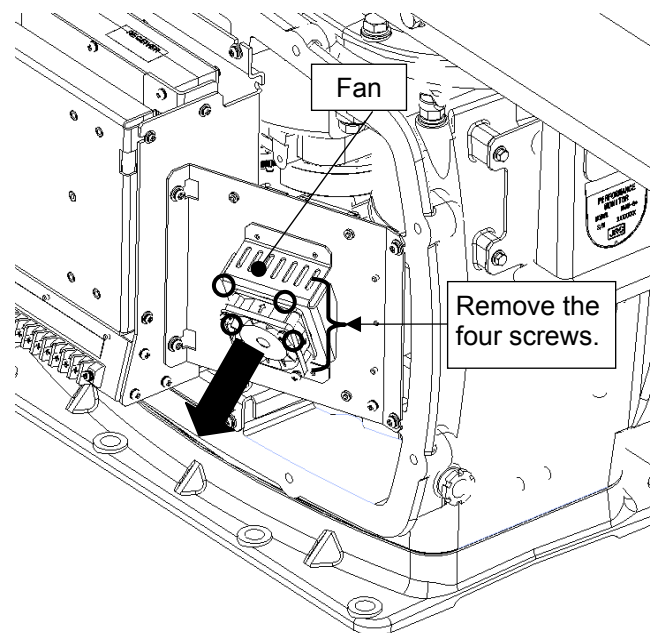
Remove the cover on the right (starboard) side and loosen the four screws (M4) to open the cover for the T/R control circuit board. Remove the motor driver circuit board fan cable (connector P1114) from the T/R control circuit board.





Step 3 Replace the fan.

Remove the four screws (M4) to replace the fan. After replacing the fan, 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 4 Operation check

After completing the replacement work, turn On the safety switch and follow the steps below to check the operation.

- (1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Check that no fan alarm comes up.




This completes modulation unit fan replacement.

4.1.1.5 Modulation Unit fan 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	
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.



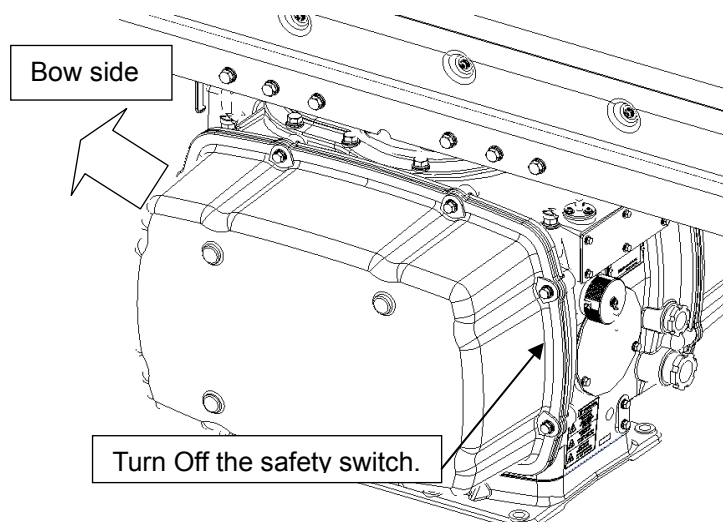
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

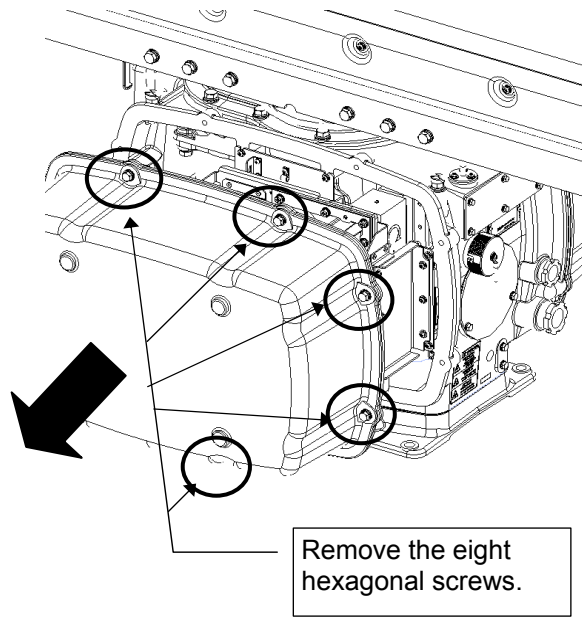


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

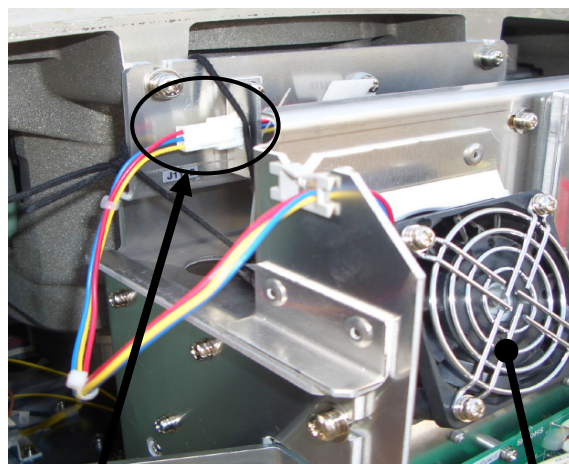




Example: Port side cover removal

Step 2 Remove the modulation unit fan cable.

Remove the cover on the left (port) side. Remove the modulation unit fan cable (connector P1112) from the relay connector.

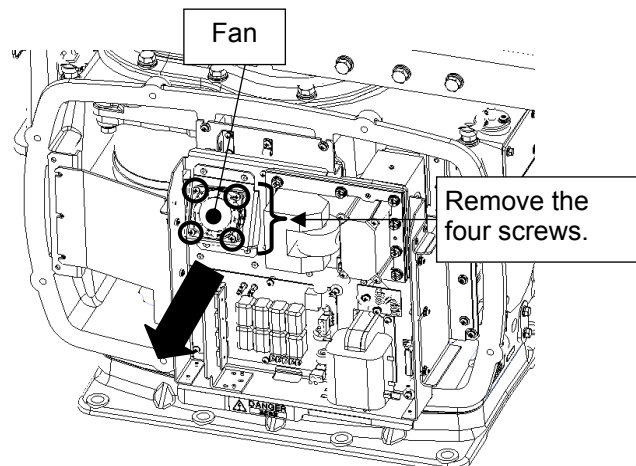


Disconnect the cables.

Fan

Step 3 Replace the modulation unit fan cable.

Remove the four screws (M4) to replace the fan. After replacing the fan, 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 4 Operation check

After completing the replacement work, turn On the safety switch and follow the steps below to check the operation.

- (1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Check that no fan alarm comes up.




This completes modulation unit fan replacement.

4.1.1.6 Modulation Circuit Board (CPA-264) 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	
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.



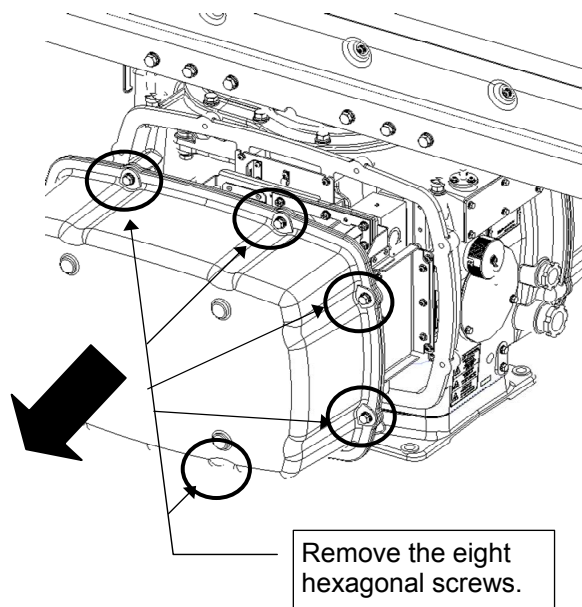
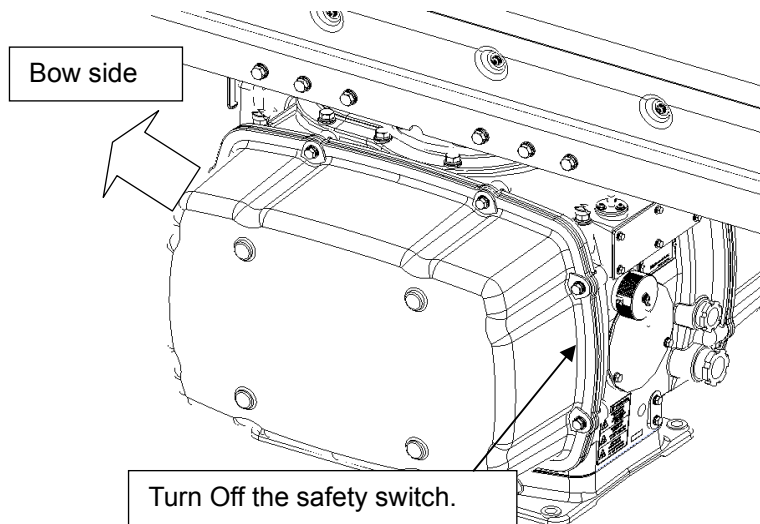
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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.



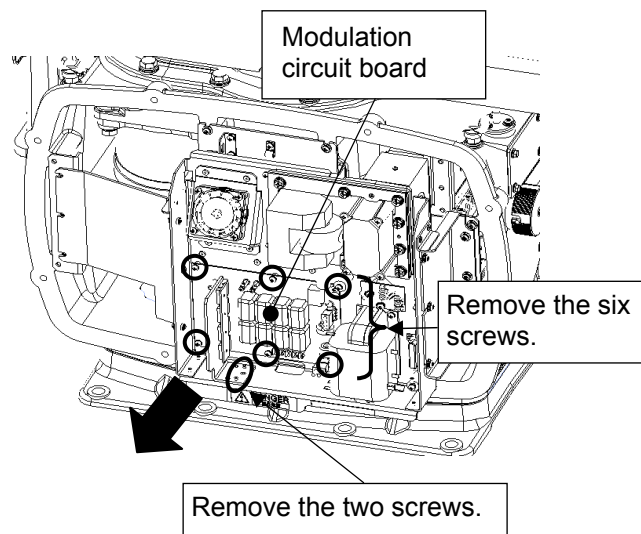
Example: Port side cover removal

Step 2 Remove the modulation circuit board cables.

Remove the cover on the left (port) side to remove all cables connected to the modulation circuit board (CPA-264).

Step 3 **Replace the modulator circuit board.**

Remove the two screws (M4) holding the metal sheet and the radiating plate of the modulation circuit board and the six screws (M4) holding the modulation circuit board, to replace the modulation circuit board. If reusing the heat radiation plate on the modulator, be sure to install the insulation sheet between the TR5-8 and the heat radiation plate so that it is straight. After replacing the modulation 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 4 **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 preheat countdown is completed, start transmission and check that the radar image appears without error.
Transmit the radio wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.


This completes modulation circuit board replacement.

4.1.1.7 Modulation Circuit Board (NMA-551) 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	Non-magnetic 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.



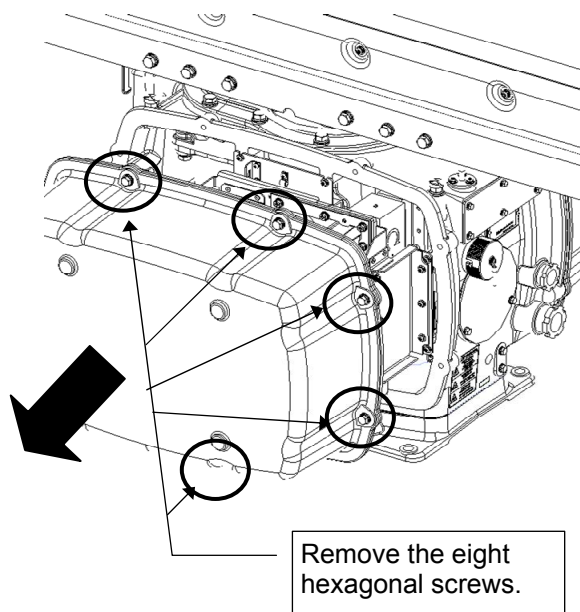
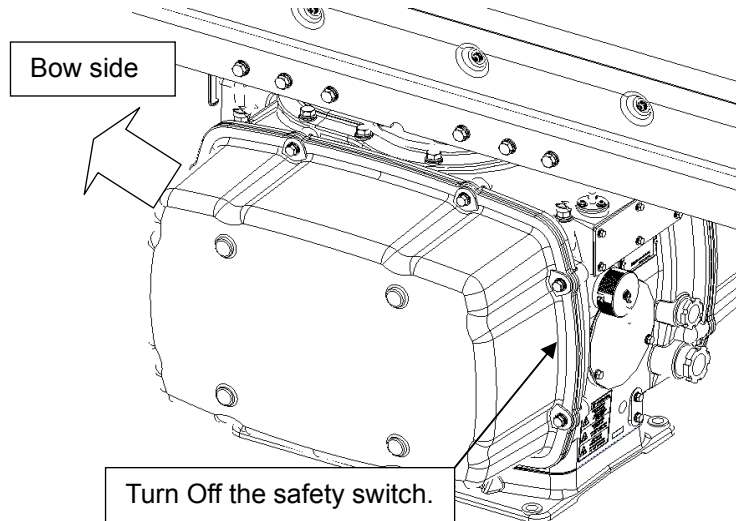
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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.

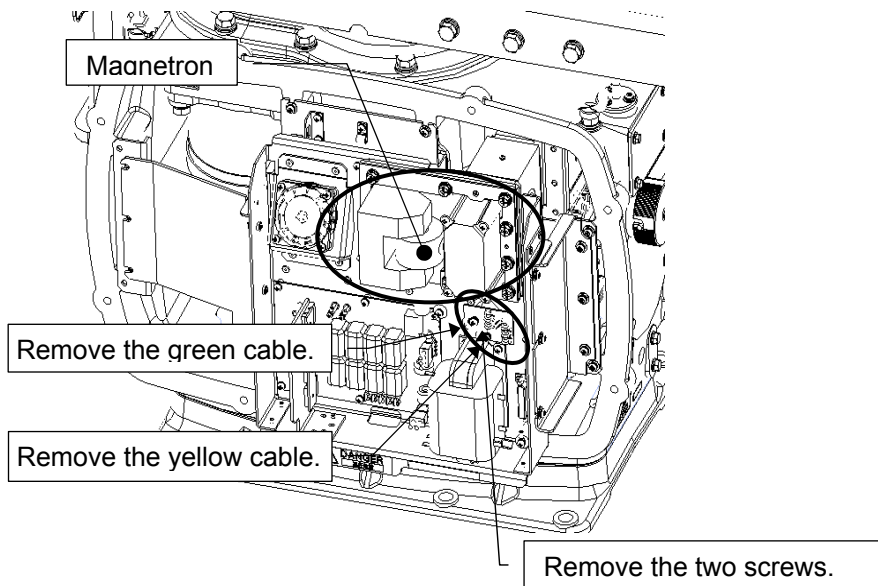
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the cover on the left (port) side.



Example: Port side cover removal

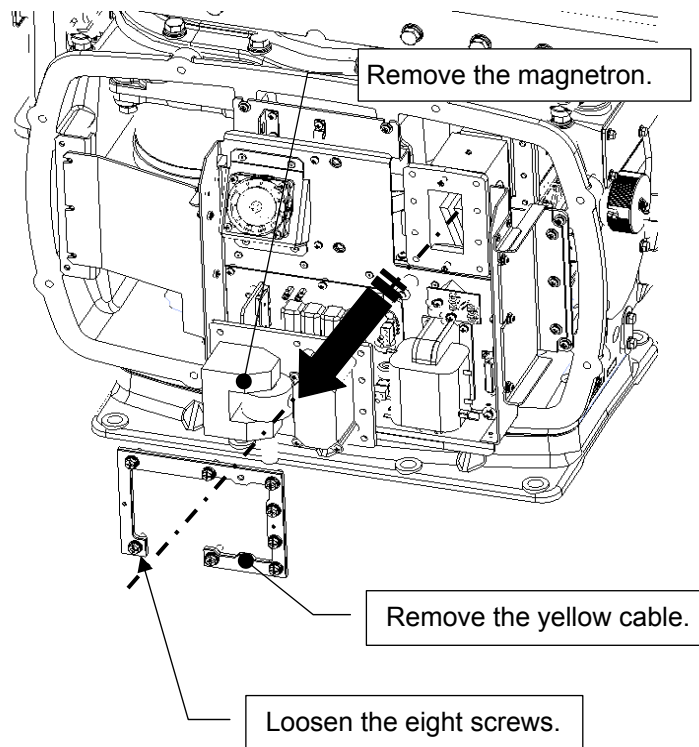
Step 2 Remove the screws holding the magnetron cable.


Measure the voltage between pin 1 and pin 3 of CPA-264 (modulation circuit) by using the multimeter (1000 V DC or more), check that there is no remaining electric charge in the modulation high-voltage circuit board. Remove the two screws (M4) holding the magnetron cables (both yellow and green).




Step 3 Remove the fixture holding the magnetron.

Remove the eight screws (M6) to remove the fixture holding the magnetron. The screws cannot be removed from the fixture, so loosen the all eight screws and remove the magnetron together with the fixture.

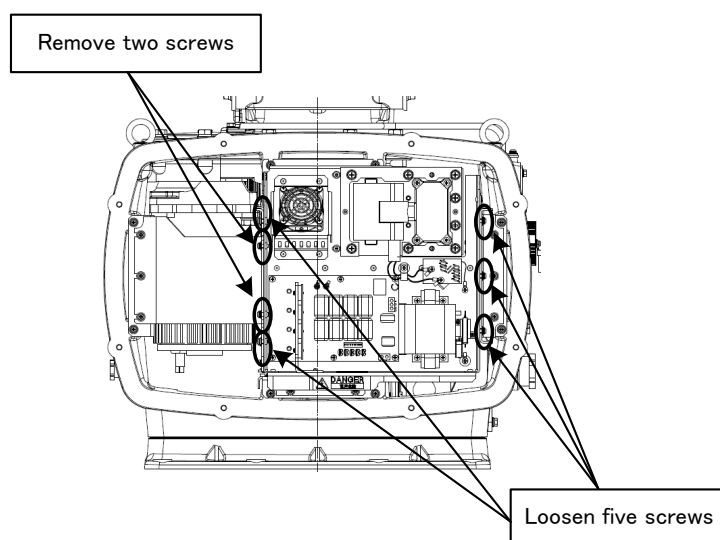


 The magnetron is held by a hook, but be careful not to let it fall.

 Use a non-magnetic screwdriver. If the magnetron comes into contact with any metal (tool), its performance may deteriorate.

Step 4 Replace the modulation unit.

Remove the two screws (M5), loosen the five screws (M5) holding the modulation unit, and replace it. After replacing the modulation circuit board, assemble the unit in the reverse order of the disassembly procedure. Install the magnetron that was removed to the original position. 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 preheat countdown is completed, start transmission and check that the radar image appears without error.

Transmit the radio wave in long pulse range mode and open the service engineer menu to check that the magnetron current stands between the 5th and 7th calibration markings.




This completes modulation unit replacement.

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.



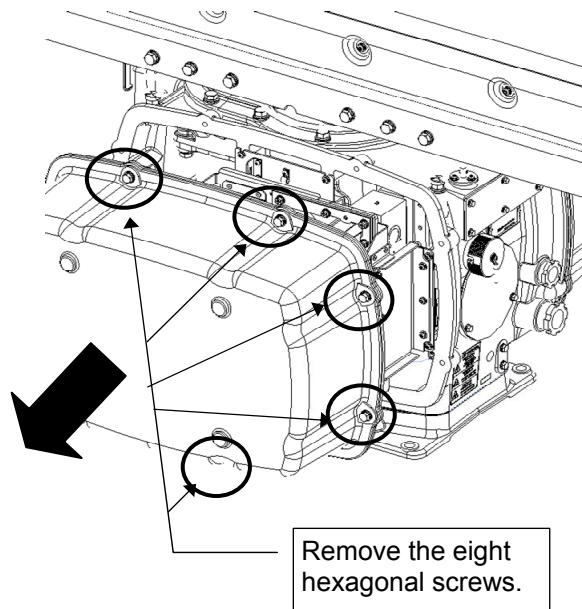
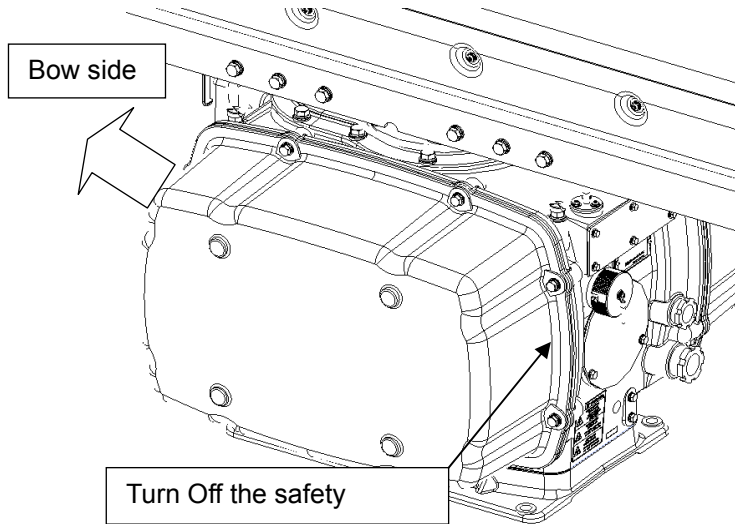
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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.

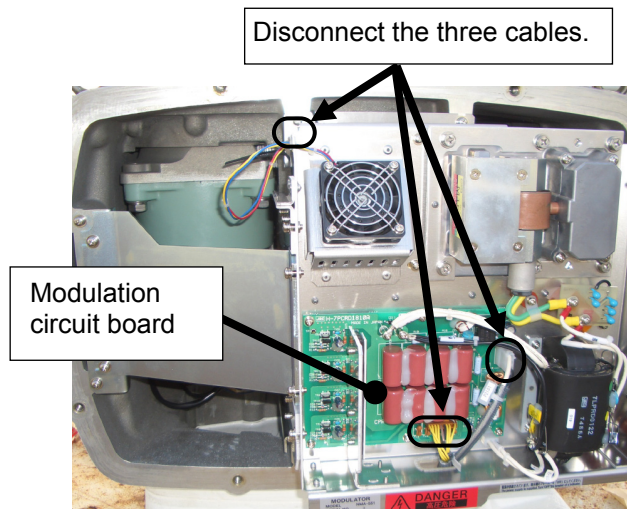
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the cover on the left (port) side.



Example: Port side cover removal

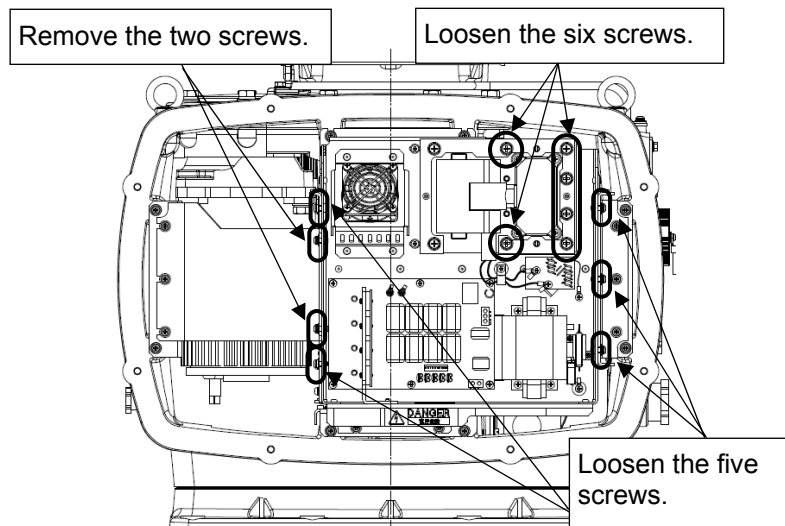
Step 2 Remove the modulation circuit board cables.

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).



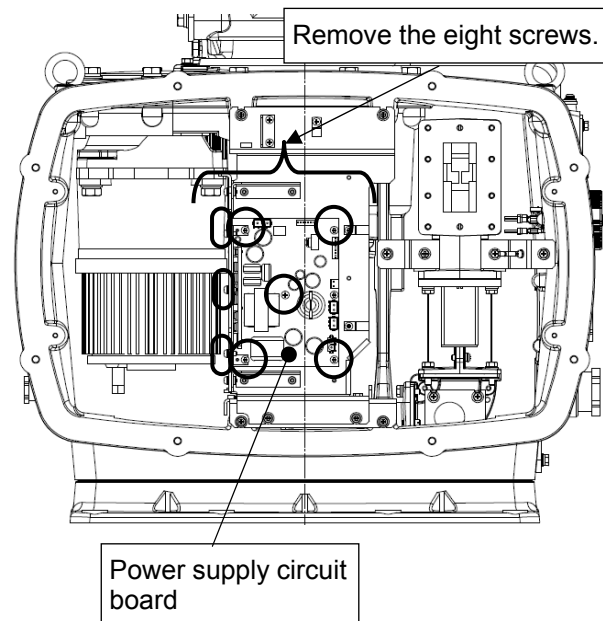
Step 3 Remove the modulation circuit board.

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.

4.1.1.9 T/R Control Circuit Board (CMC-1205R) 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	
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 Back up the scanner unit data.

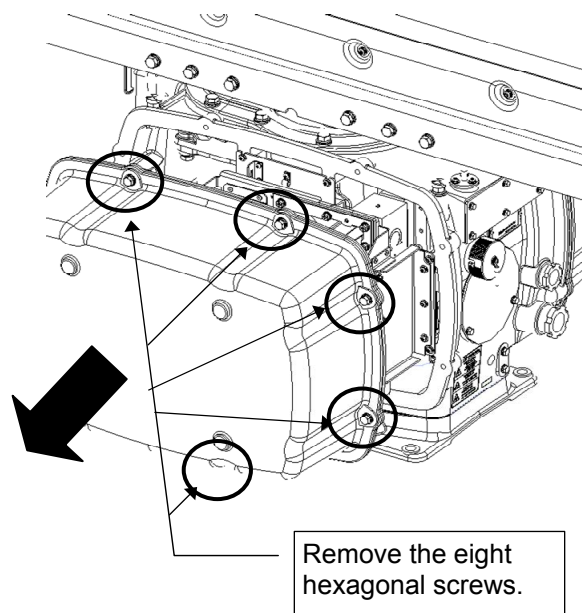
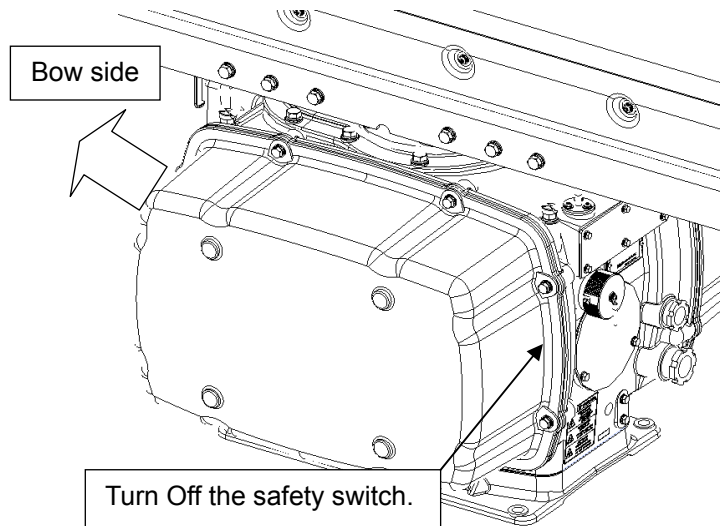
Before starting replacement work, open the service engineer menu on the display unit and back up the scanner unit data (transmission time and motor rotation time).



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

Step 2 Turn Off the safety switch (to the lower side) and remove the cover on the right (starboard) side.

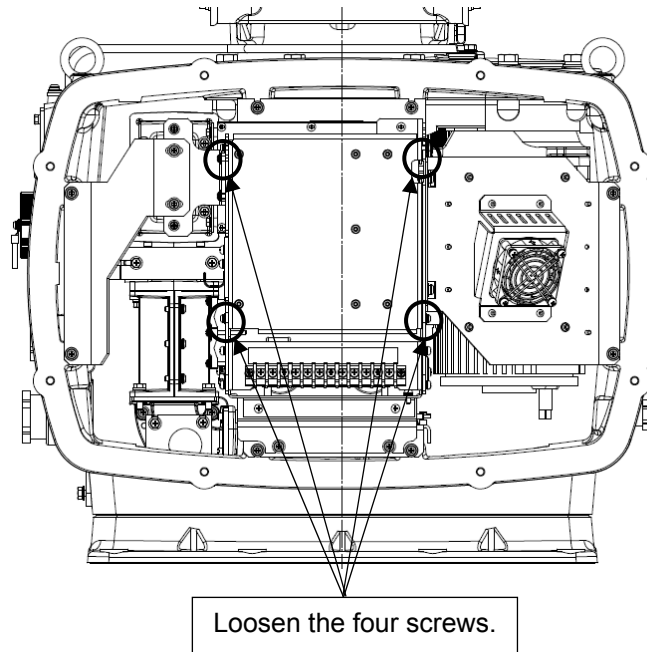
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the cover on the right (starboard) side.



Example: Port side cover removal

Step 2 Open the T/R control circuit board cover.

Remove the cover on the right (starboard) side. Loosen the four screws (M4) to open the T/R control circuit board cover to the front.



Step 3 Replace the T/R control circuit board.

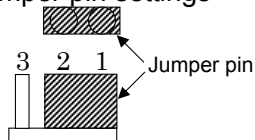
Remove the cable connected to the T/R control circuit board and the seven screws (M4) to replace it.



Set the DIP switches and the jumper pins on the T/R control circuit board to the settings for NKE-1130.

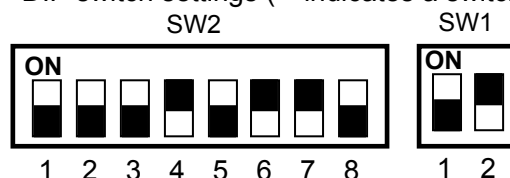
©NKE-1130 (30 kW, S-band, 2 units, AC motor)

- Jumper pin settings

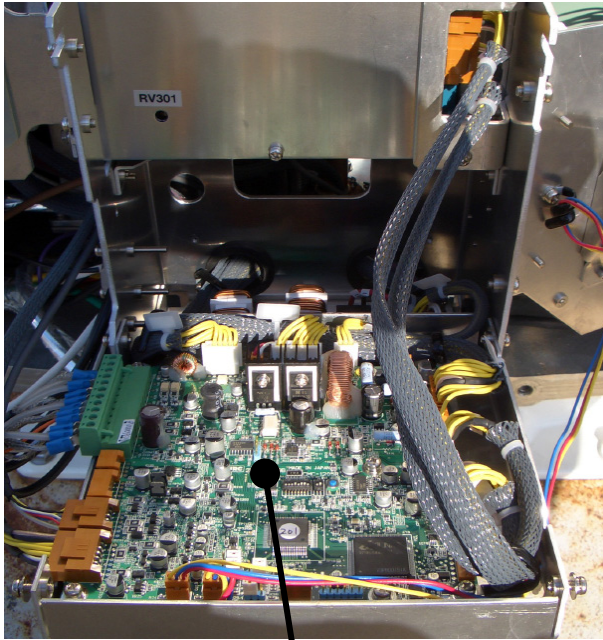


J92,J93,J95,J96: 1-2 short circuit

- DIP switch settings (■ indicates a switch.)



After replacing the T/R control 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.



T/R control circuit board

Step 4 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 and open the service engineer menu. Restore the scanner unit time and check that all data is recovered from before replacing the T/R control circuit board (check the transmission time and the motor rotation time).

- (2) After the countdown is completed, start transmission and check that the radar image appears without error.




This completes T/R control circuit board replacement.

4.1.1.10 Relay Filter Circuit Board (CSC-656) 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	
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.



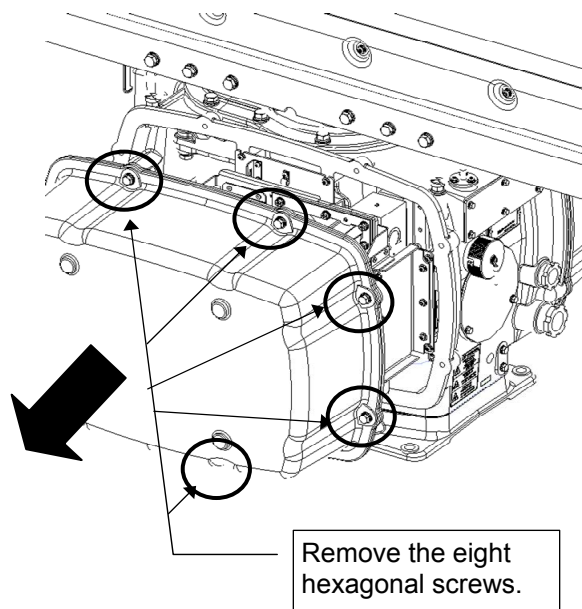
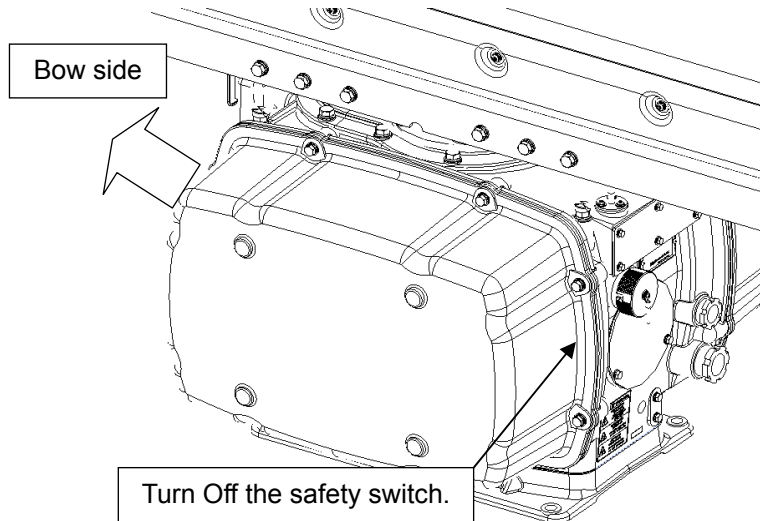
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 right (starboard) side.

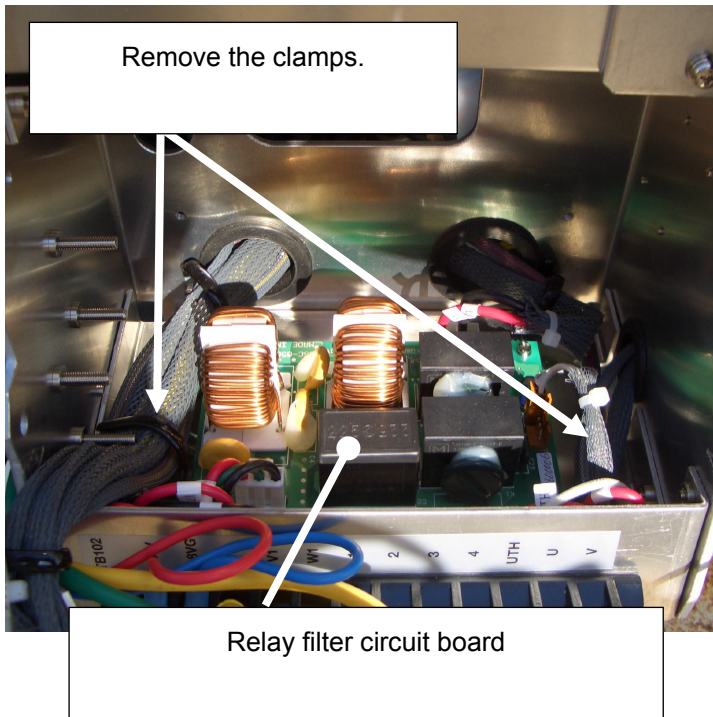
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn Off it (to the lower side). Remove the cover on the right (starboard) side.



Example: Port side cover removal

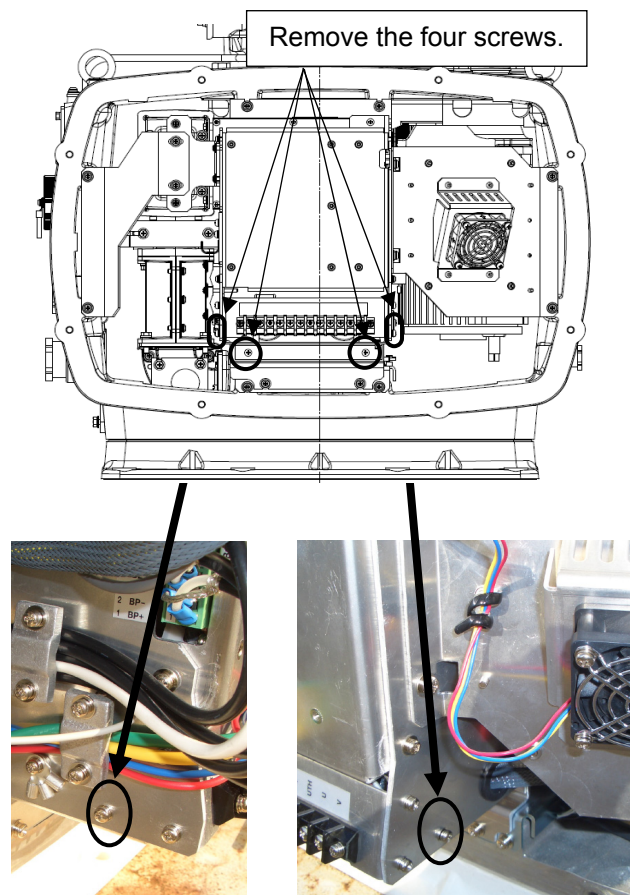
Step 2 Remove the cable clamps around the relay filter circuit board.

Remove the cover on the right (starboard) side. Open the T/R control circuit board cover to the front to remove the cable clamps around the relay filter circuit board.



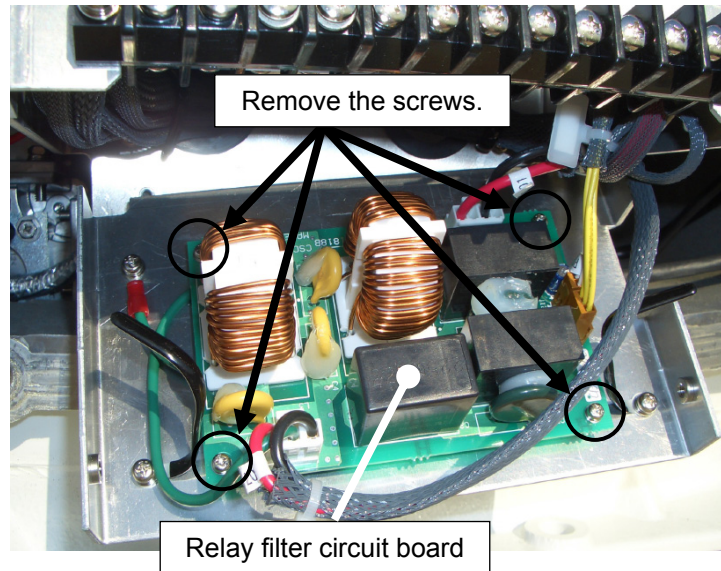
Step 3 Remove the metal fixture holding the relay filter circuit board.

Remove the four screws (M4) to remove the metal fixture holding the relay filter circuit board, which is located at the bottom of the terminal block.



Step 4 **Replace the relay filter circuit board**

Remove the cable connected to the relay filter circuit board and the four screws (M4) to replace the relay filter circuit board. After replacing it, follow 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 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 T/R control circuit board replacement.

4.1.1.11 Receiving Unit (NRG-229) 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.



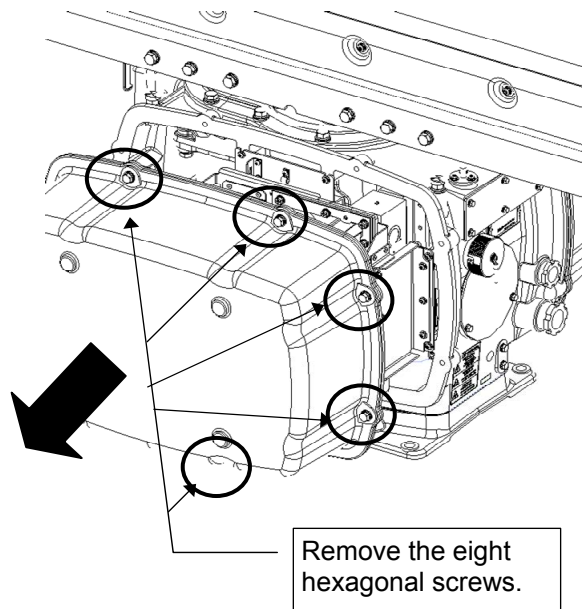
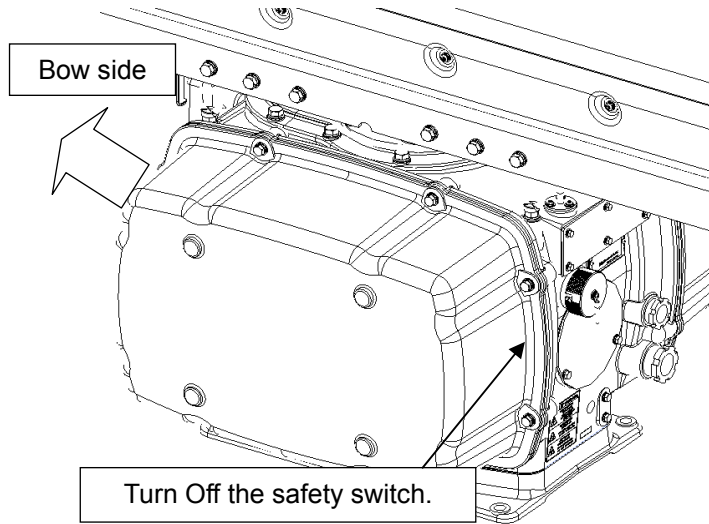
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 right (starboard) side.

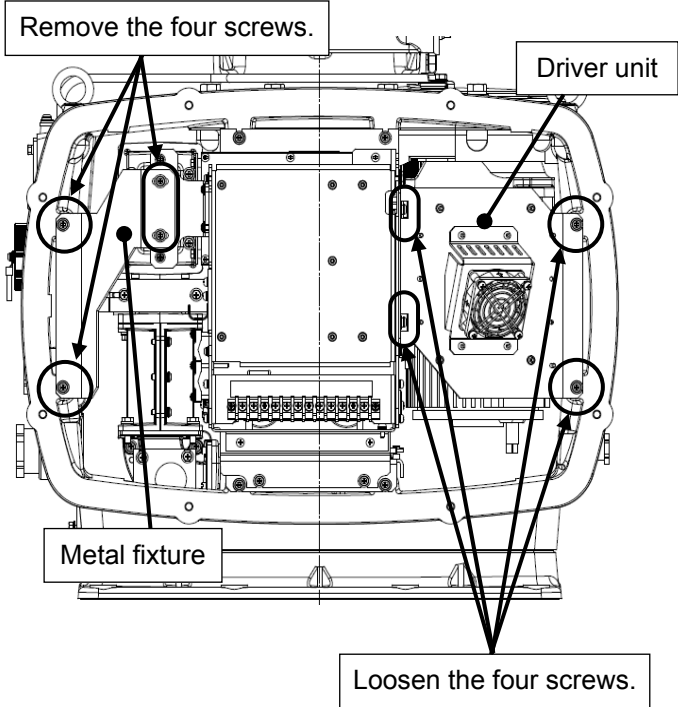
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn Off it (to the lower side). Remove the cover on the right (starboard) side.



Example: Port side cover removal

Step 2 Remove the driver unit.

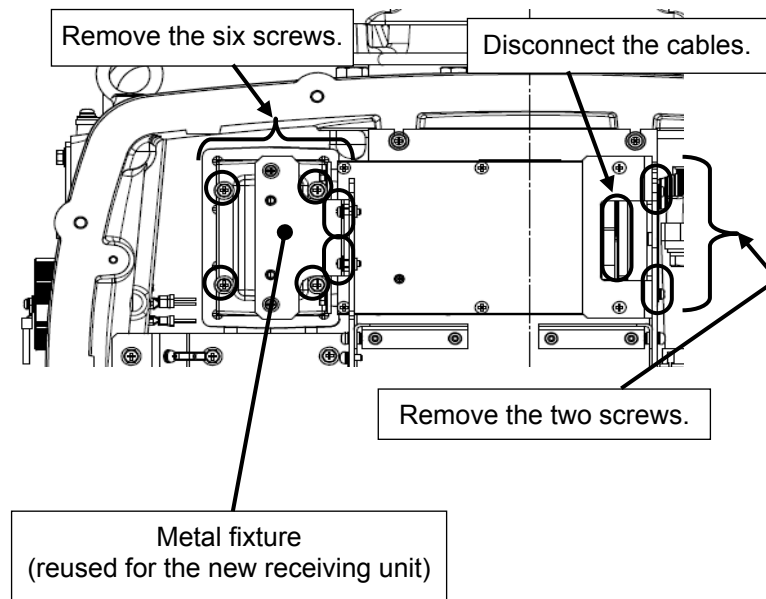
Remove the cover on the right (starboard) side. Remove the four screws (M5) to remove the metal fixture. Loosen the four screws (M4) to remove the driver unit.



Step 3 **Replace the receiving unit.**

Open the T/R control circuit board cover to the front to remove the cables connected to the receiving unit. Remove the four screws (M5) holding the receiving unit flange, the two screws (M5) holding the metal fixture, and the screw at the right side of the receiving unit to replace the it.

Attach the metal fixture attached to the flange removed from the receiving unit you just removed and put it onto the new receiving unit. After replacing the receiving unit, 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 4 **Operation check**

After replacing the receiving unit, 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. Transmit the radio wave in the long range mode and open the service engineer menu to perform tuning adjustment. Adjust the setting in the service engineer menu until the tuning indication bar on the display unit reaches the 8th calibration marking.




This completes receiving unit replacement.

4.1.1.12 Encoder (CHT-71A) 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 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	
3	Socket wrench* ¹	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 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.



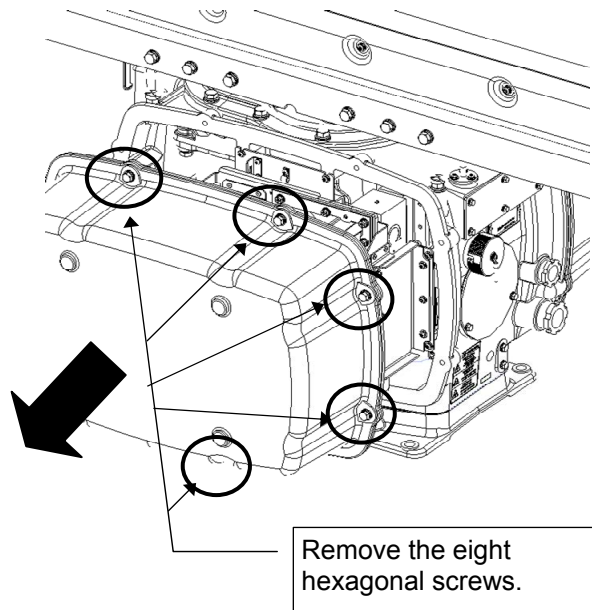
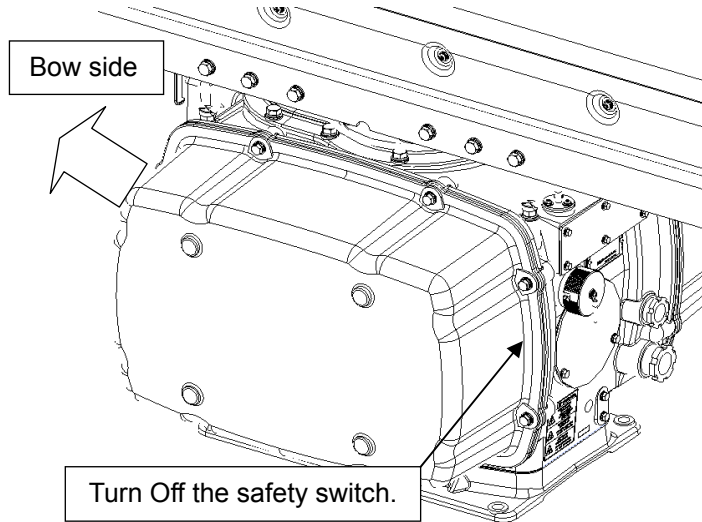
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 **Set the safety switch to Off and remove the covers on both sides.**

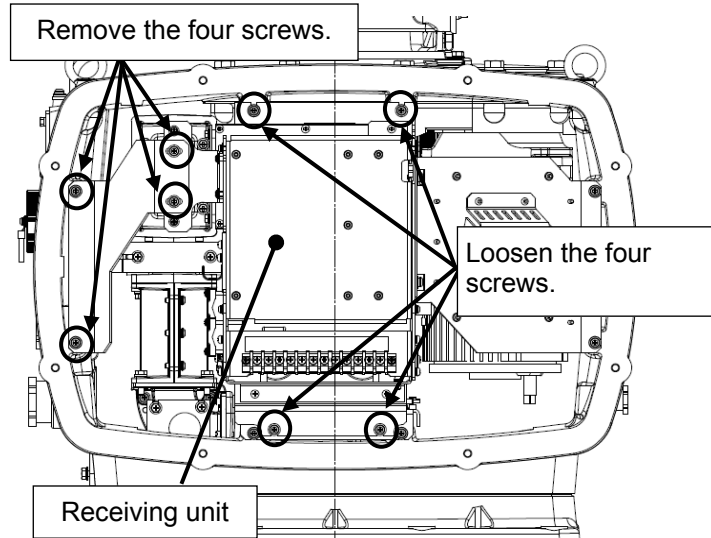
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the covers on both sides.



Example: Port side cover removal

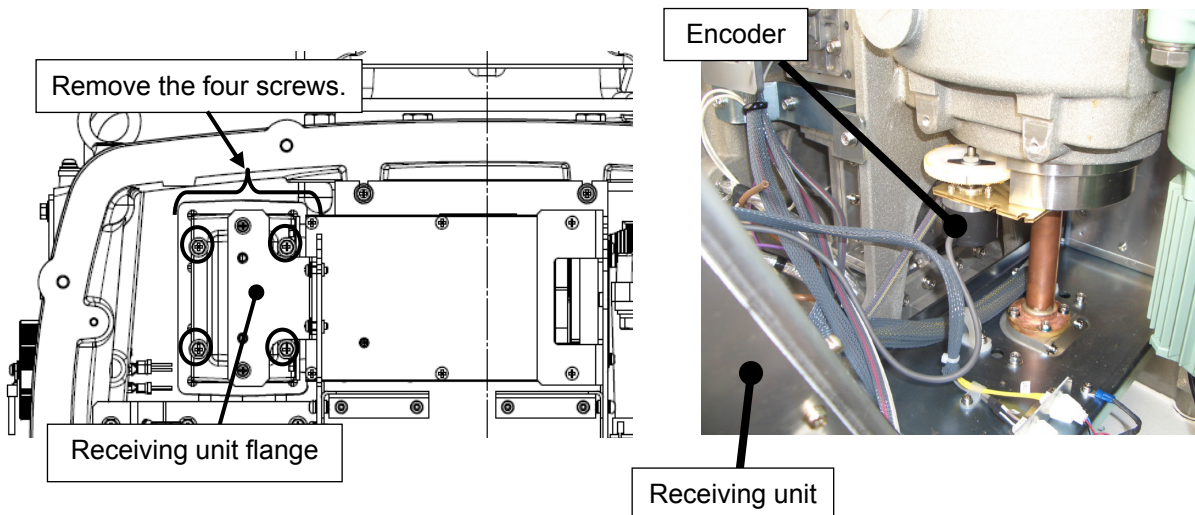
Step 2 Loosen the receiving unit.

Remove the covers on the both sides. Remove the four screws (M5) to remove the metal fixture. Loosen the four screws (M4) so that the receiving unit is held halfway.



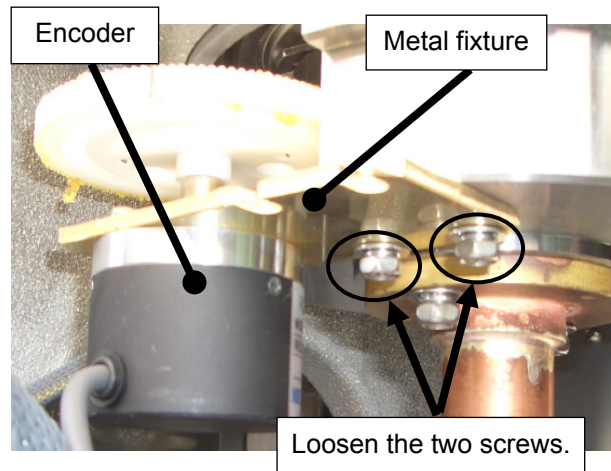
Step 3 Remove the receiving unit.

Remove the four screws (M5) from the receiving unit flange and remove the screws loosened halfway in (Step 2) above to remove the receiving unit.



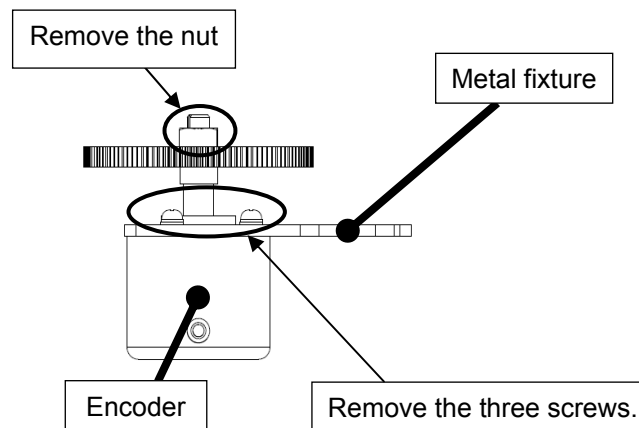
Step 4 Remove the encoder.

Loosen the two screws (M4) to remove the encoder together with the metal fixture.



Step 5 Replace the encoder.

Remove the metal fixture and the gear wheel attached to the encoder. Put them onto the new encoder and put it back into the unit. After replacing the encoder, follow 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 6 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. Open the service engineer menu to perform azimuth adjustment.




This completes encoder replacement.

4.1.1.13 Brake Control Circuit (CCB-655A) 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 7 mm (for M4 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 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.



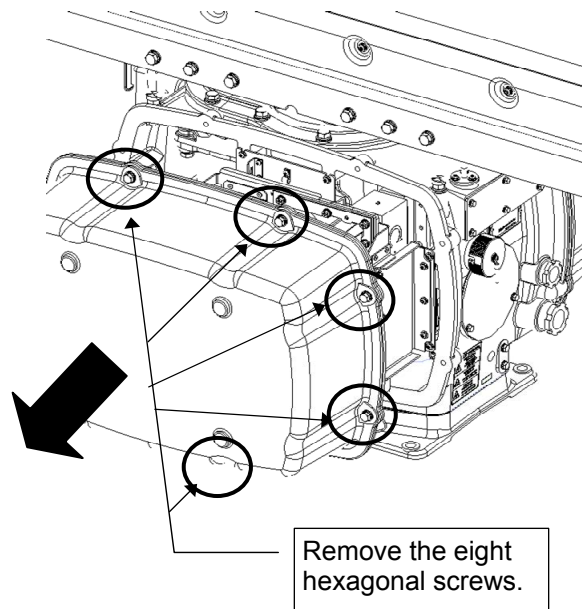
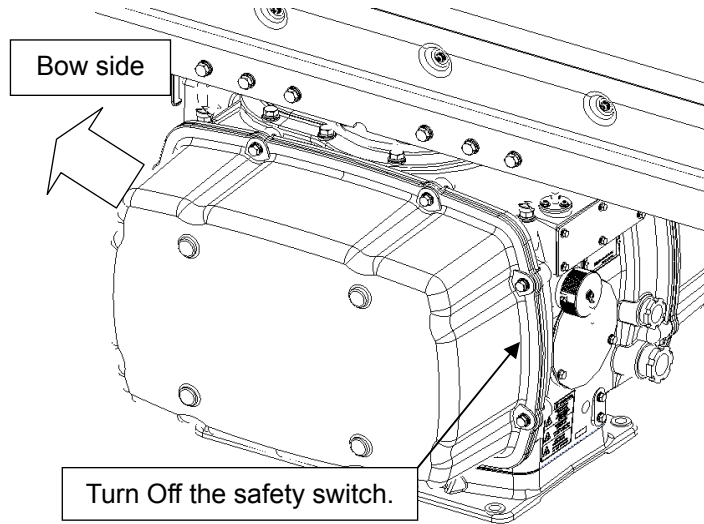
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 right (starboard) side.

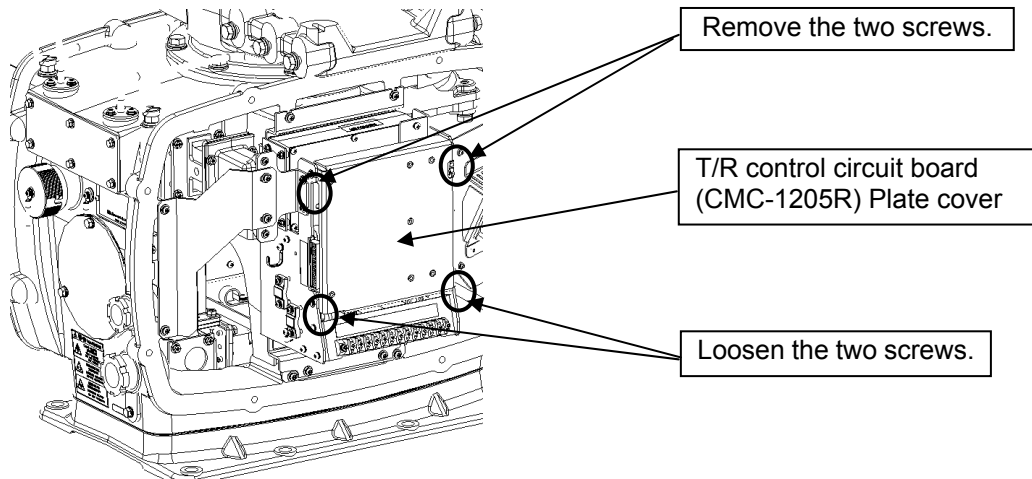
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the cover on the right (starboard) side.



Example: Port side cover removal

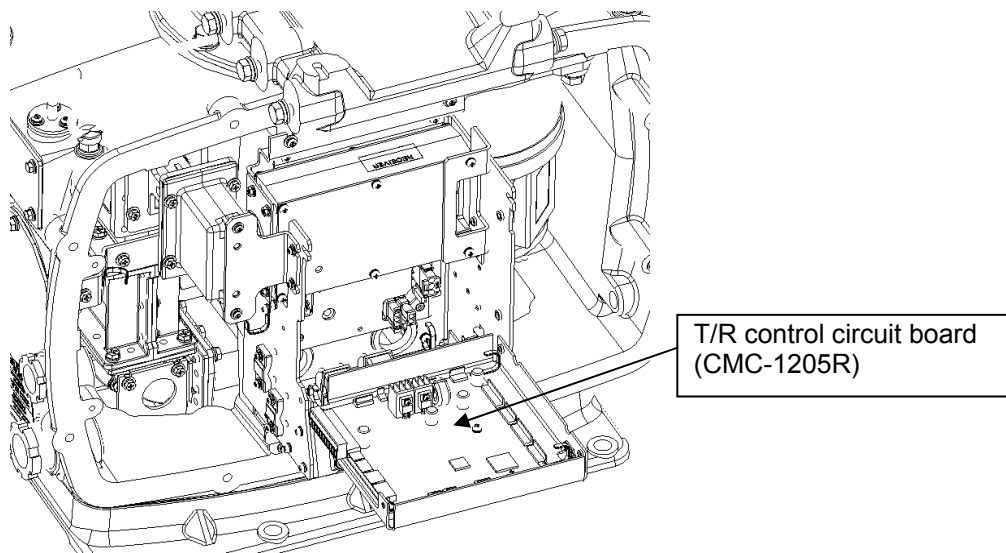
Step 2 Loosen the screws of the T/R control circuit board plate cover.

Remove the cover on the right side (starboard side), remove the two screws (M4) holding the T/R control circuit (CMC-1205R) plate cover, and loosen another two screws.



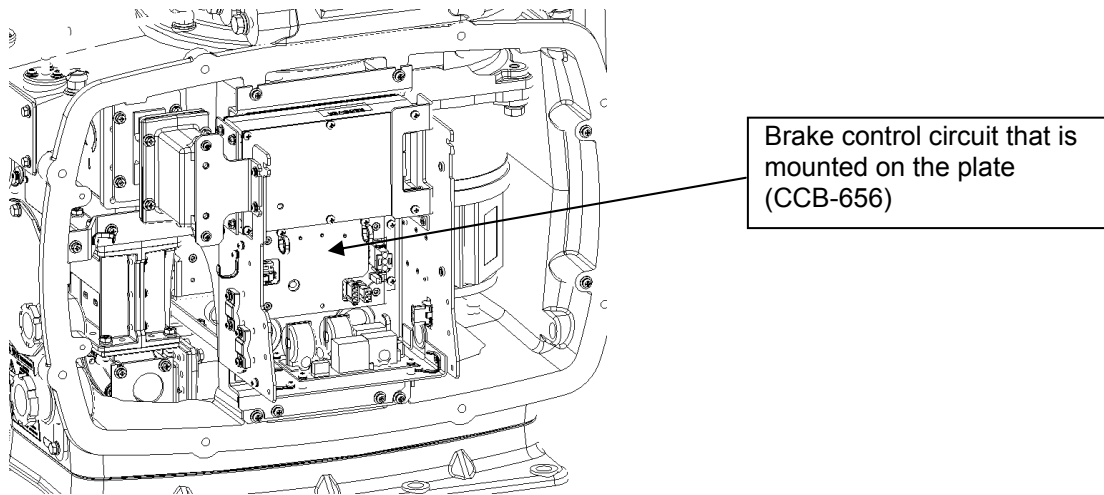
Step 3 Remove the T/R control circuit.

Push down the T/R control circuit cover and remove all the connectors that are connected to it. Remove the two screws (M4) that were loosened by the procedure and remove the T/R control circuit together with the plate cover.



Step 4 **Replace the brake control circuit.**

Remove all the connectors that are connected to the brake control circuit (CCB-656). Remove the four screws (M4) from the plate on which the brake control circuit is held and replace it together with the plate. After replacing the brake control circuit, reassemble the unit by 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 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 brake control circuit replacement.

4.1.1.14 Brake Circuit (CFA-255) 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	
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.



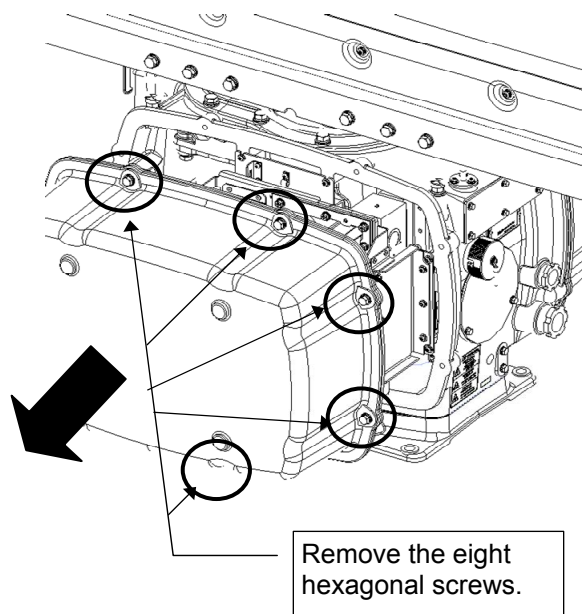
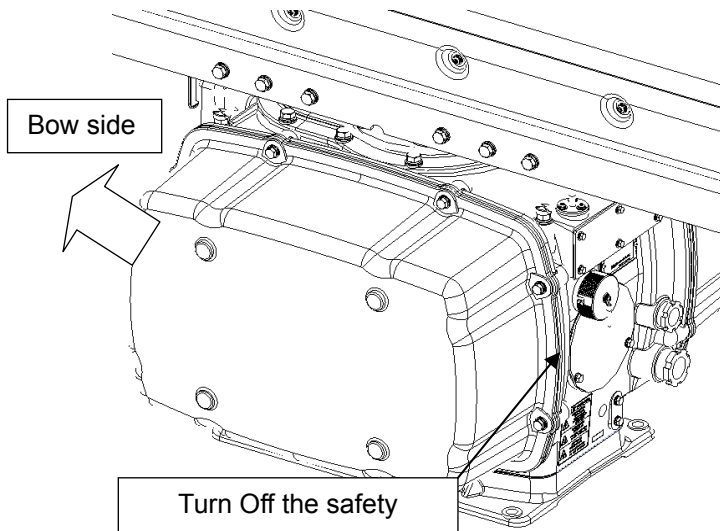
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 right (starboard) side.

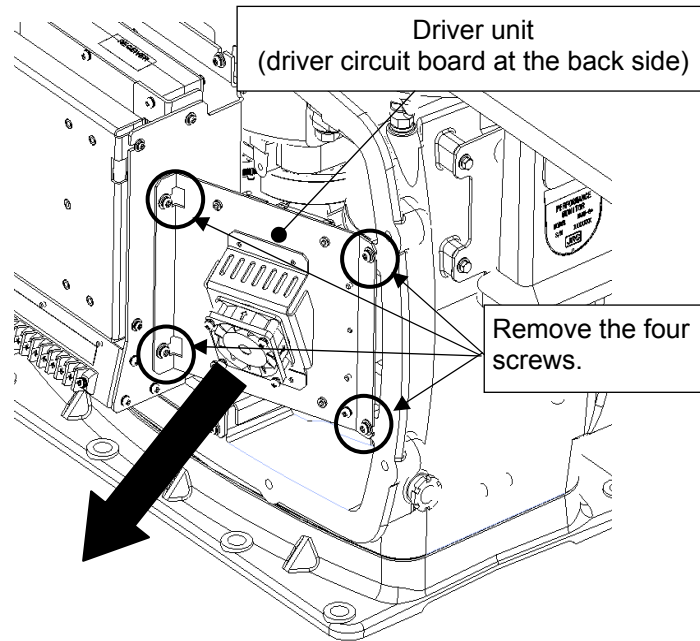
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the cover on the right (starboard) side.



Example: Port side cover removal

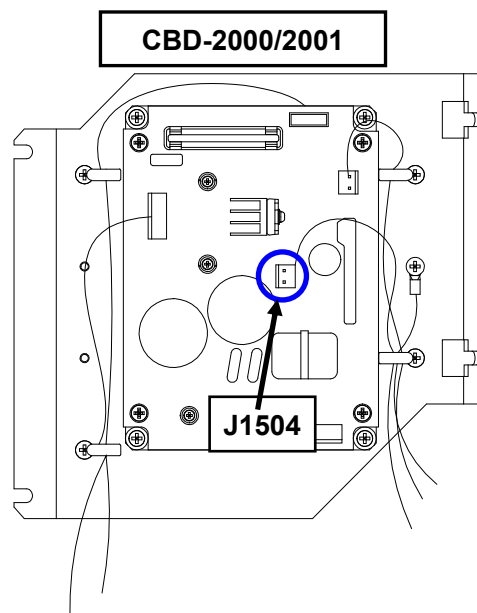
Step 2 **Remove the motor driver unit.**

Remove the cover on the right (starboard) side and loosen the four screws (M4) to remove the drive unit, which has the motor driver circuit board on its rear side. Remove the cable that is connected from the motor driver to the driver circuit.



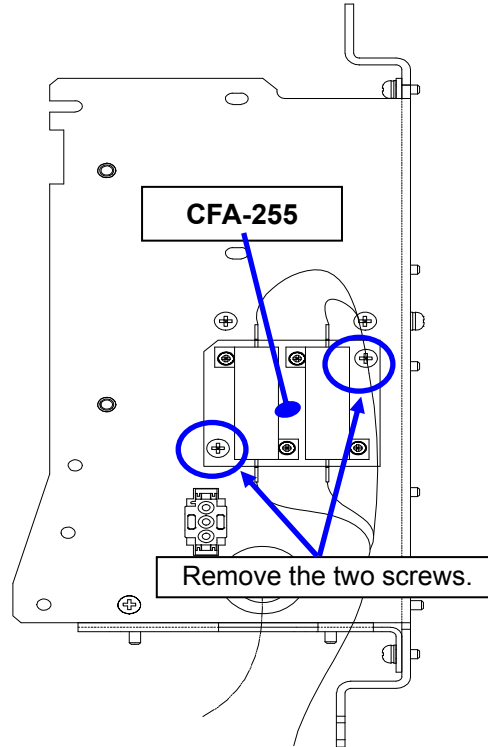
Step 3 **Remove the motor driver circuit board.**

Remove the driver unit and remove the cable that is connected to J1504 of the motor driver circuit (CBD-2000/2001).



Step 5 Replace the brake circuit.

Remove the two screws (M4) holding the brake circuit on the right side of the chassis and replace it (CFA-255: resistor with cable). After replacing the brake circuit, reassemble the unit by 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 6 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 brake circuit replacement.

4.1.1.15 Brake Circuit Unit (NZR-17) 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.



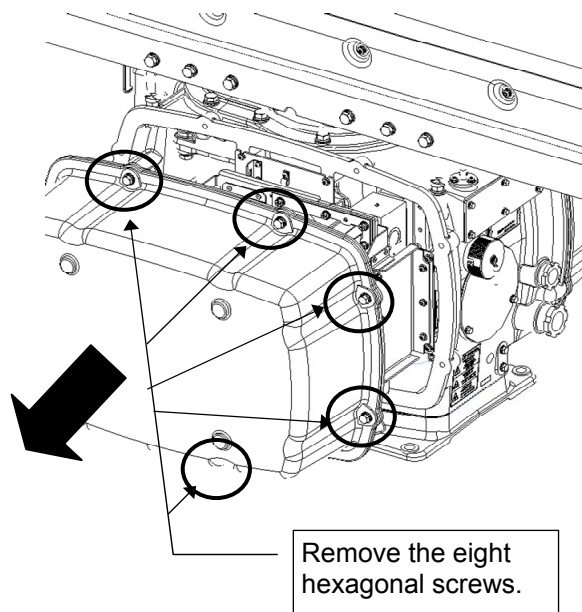
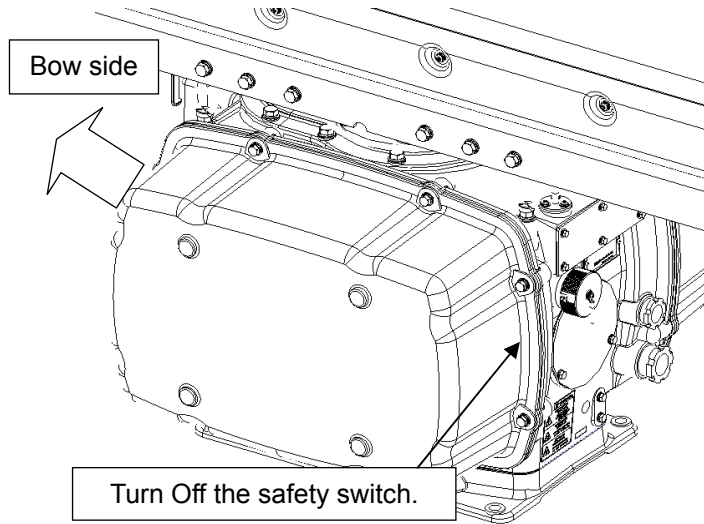
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 right (starboard) side.

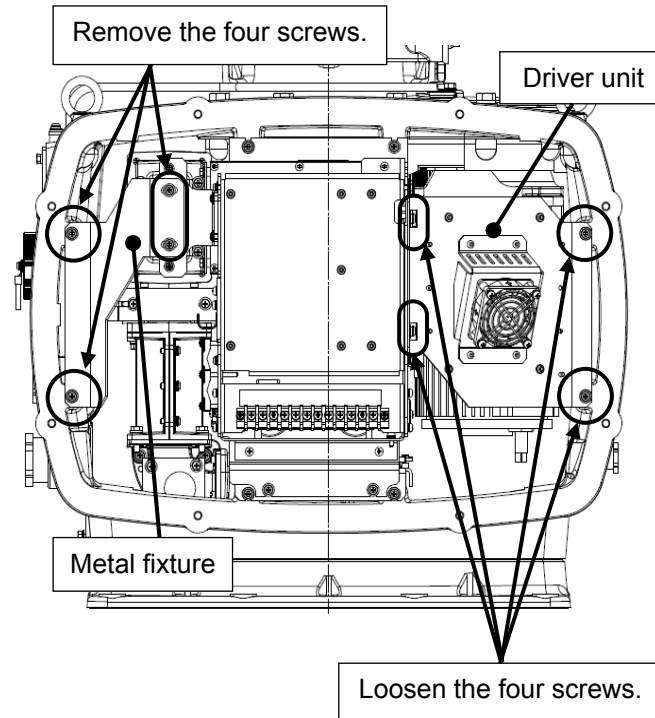
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the cover on the right (starboard) side.



Example: Port side cover removal

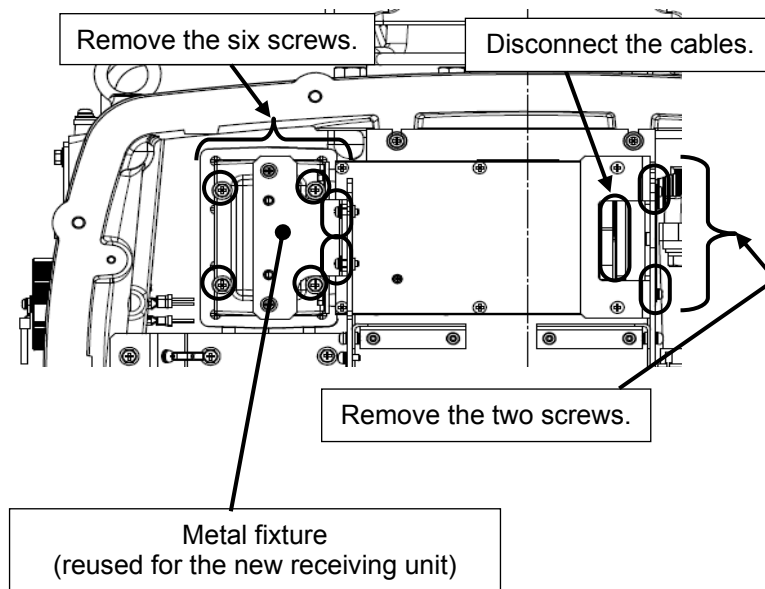
Step 2 Remove the driver unit.

Remove the cover on the right (starboard) side. Remove the four screws (M5) to remove the metal fixture. Loosen the four screws (M4) to remove the driver unit.



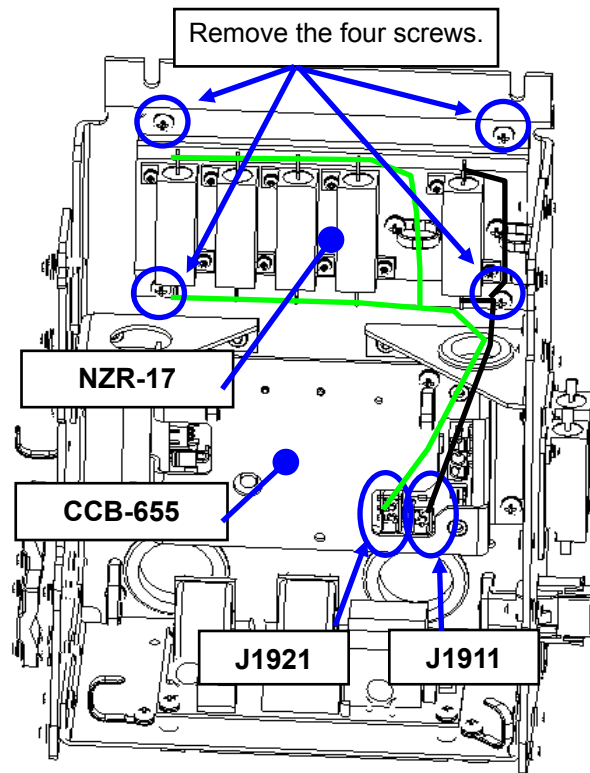
Step 3 Remove the receiving unit.

Open the T/R control circuit board cover to the front to remove the cables connected to the receiving unit. Remove the four screws (M5) holding the receiving unit flange, the two screws (M5) holding the metal fixture, and the screw at the right side of the receiving unit to replace it.



Step 4 **Replace the brake circuit unit.**

Remove the cables that are connected to J1921 and J1911 of the brake control circuit (CCB-655). Remove the four screws (M4) and replace the brake circuit unit (NZR-17). After replacing the brake circuit, reassemble the unit by 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 completing the replacement work, turn On the safety switch and carry out the following work.

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

This completes brake circuit unit replacement.

4.1.1.16 Performance Monitor (NJU-84) Replacement/NKE-1130

Instruction for Equipment

装備要領

1. Adapter installation

アダプタの取り付け

The adapter is installed in Performance Monitor(NJU-84) with the bolt of the attachment.
(6-B5X12SUS,SW5,W5)

パフォーマンスモニタ(NJU-84)にアダプタを付属のボルトで固定する。
(6-B5X12SUS、SW5、W5)

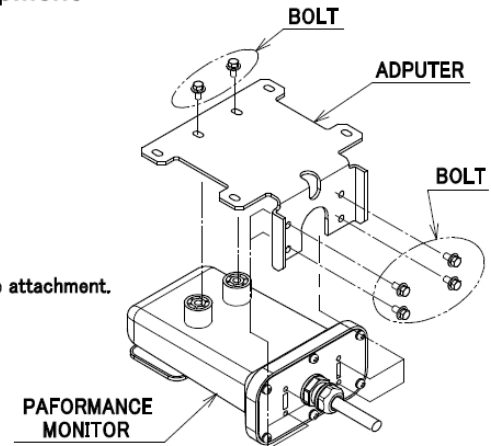


Fig1 (図1)

2. Performance Monitor Installation

パフォーマンスモニタユニットの取り付け

Mount Performance Monitor on the SCANNER UNIT with the attached bolt.
(4-B5X12SUS,SW5,W5)

パフォーマンスモニタを空中線に付属のボルトで固定します。
(4-B5X12SUS、SW5、W5)

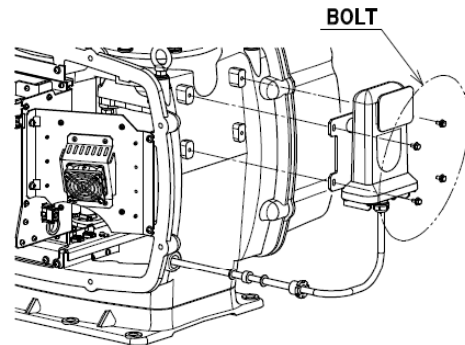


Fig2 (図2)

3. Wiring

配線

Put the cable grand into the Cable ,as shown in Fig.3

Unknit outer shieldnet and wrap it around a washer.

ケーブルに縮付グラウンドワッシャ ガasketをケーブルに通します。(図3)
外側のシールドネットをほどき、座金に巻きつけてください。

Each connector (J81,J82) and the earth terminal are connected. ,as shown in Fig.4
コネクタ(J81、J82)に接続して、アースはねじにて固定します。(図4)

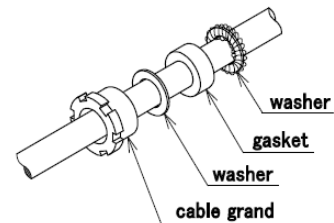


Fig3 (図3)

4. Check and adjustment

確認と調整

After installation, carry out the adjustment and check the operation of the Performance Monitor according to the "Radar operation manual".

装備後、「レーダ取扱説明書」要領に従い、パフォーマンスモニタの動作確認・調整を必ず実施してください。

5. Water proof

防水処理

Apply silicone sealant around the cable inlet, ,as shown in Fig.4

ケーブルグラウンド部をシールする。(図4)

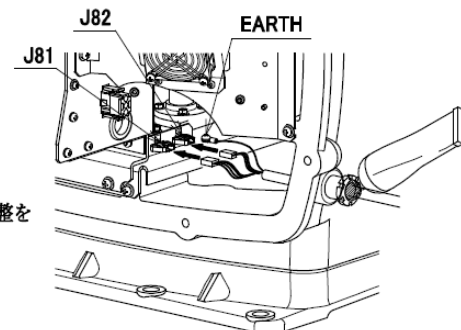


Fig4 (図4)




4.1.2 NKE-1139 Scanner Unit

4.1.2.1 Motor Replacement/NKE-1139

[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), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 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.



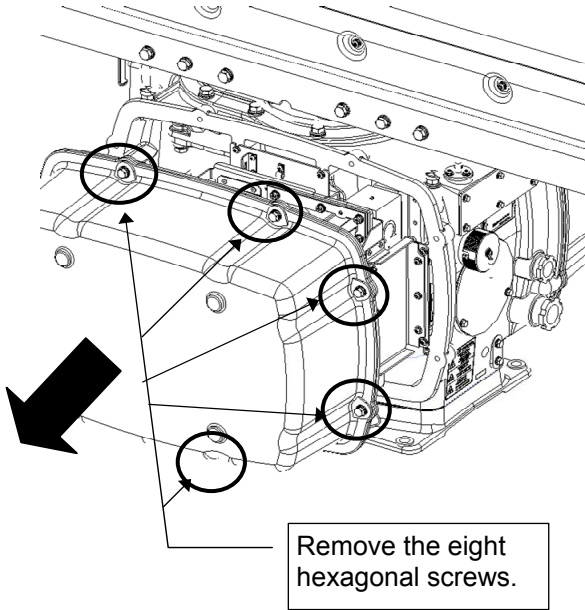
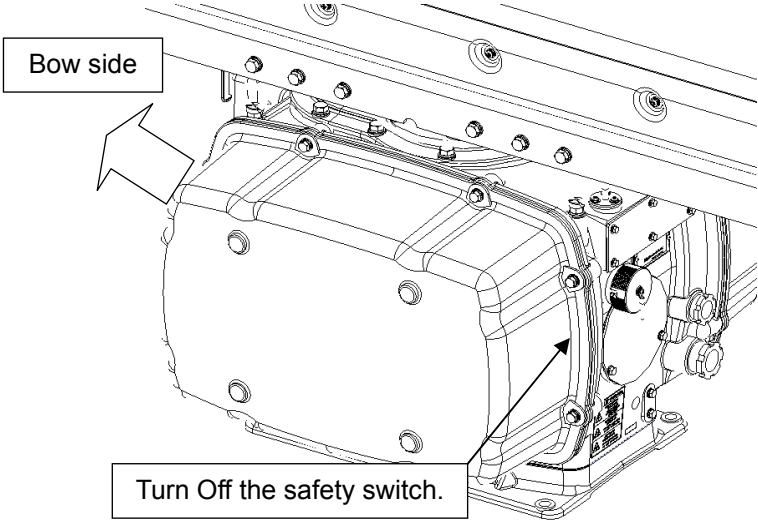
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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.

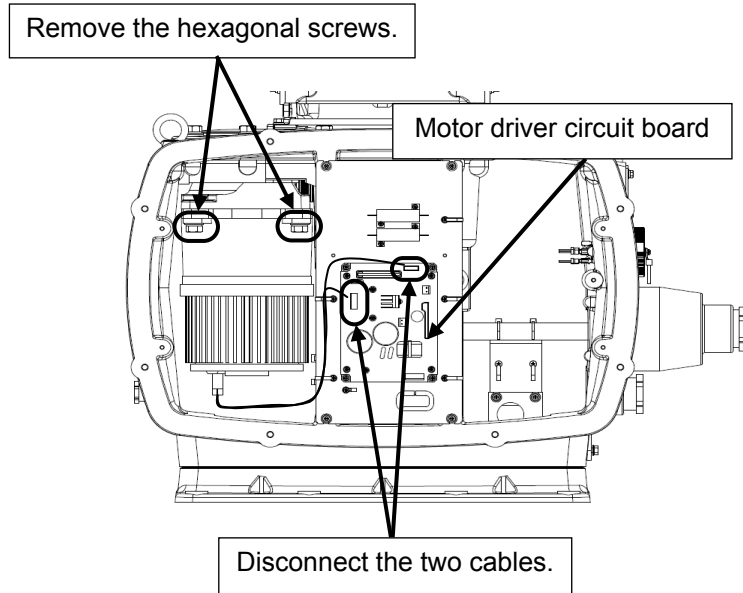
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the side cover.



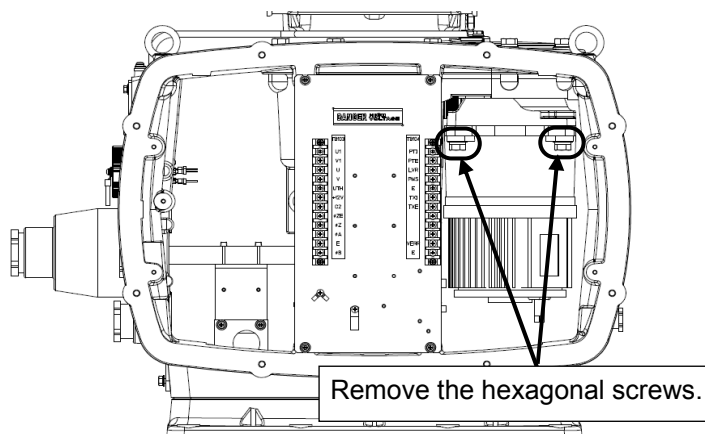
Example: Port side cover removal

Step 2 Remove the motor.

Remove the covers on the both sides, and remove the cables that connect the motor driver circuit board in the left (port) side to the motor. Remove the hexagonal bolts on the right and left sides that hold the motor in position (four bolts: M10 x 40, SW10, W10), and then remove it.



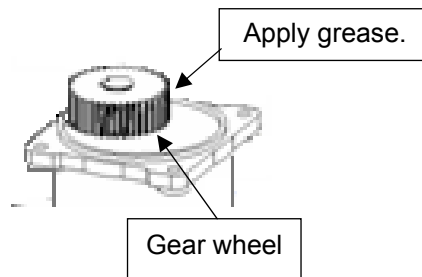
Port side



Starboard side

Step 3 **Apply grease to the new motor.**

Apply grease to the gear wheel of the new motor.



Step 4 **Place the replacement motor.**

Place the replacement motor in the scanner unit and fix it in place with the hexagonal bolts. Tighten the bolts to the appropriate torque (380 kgf-cm), so they are free of looseness. After having replaced the motor, 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 completing the replacement work, turn On the safety switch and follow the steps below to check the operation.

1. Turn On the radar. After preheat countdown is finished, start transmission and check that the radar image is correctly displayed. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.
2. Open the service engineer menu and initialize the motor rotation time.




This completes motor replacement.

4.1.2.2 Motor Drive Circuit Board Replacement/NKE-1139

[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	
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.



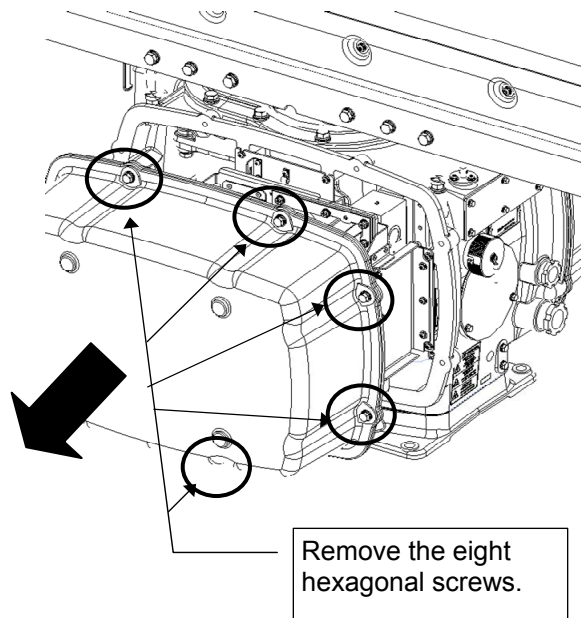
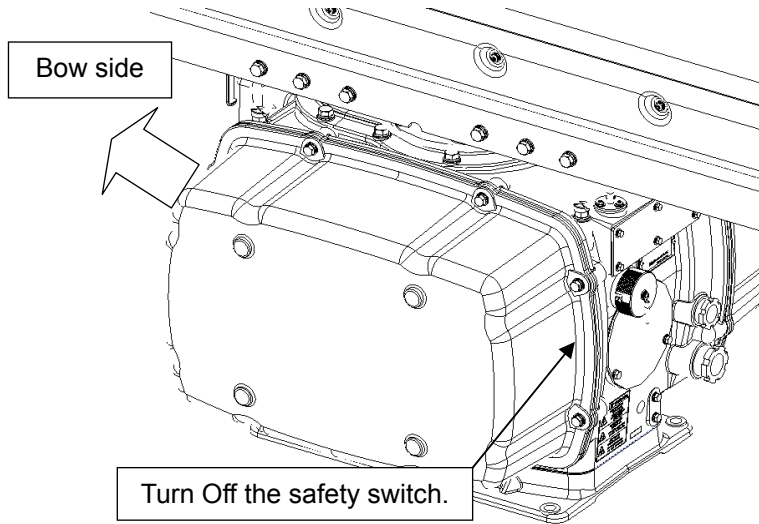
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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.

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 side cover.



Example: Port side cover removal

Step 2 Replace the driver circuit board.

Remove the cables connected to the driver circuit board and the screws (four M4 screws) and replace it.



For the motor driver circuit there are two types of specifications, 100 V AC and 220 V AC.

Check that the new motor driver circuit uses the appropriate power supply specification. (Described on the silk printing on circuit board.)

After having replaced the driver 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 3 Operation check

After completing the replacement work, turn On the safety switch and follow the steps below to check the operation.

1. Turn On the radar. After preheat countdown is finished, start transmission and check that the radar image is correctly displayed. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.
2. Open the service engineer menu and initialize the motor rotation time.




This completes motor replacement.

4.1.2.3 Encoder (CHT-71A) Replacement/NKE-1139

[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 7 mm (for M4 screws), 8 mm (for M6 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 8 mm (for M6 screws), 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.



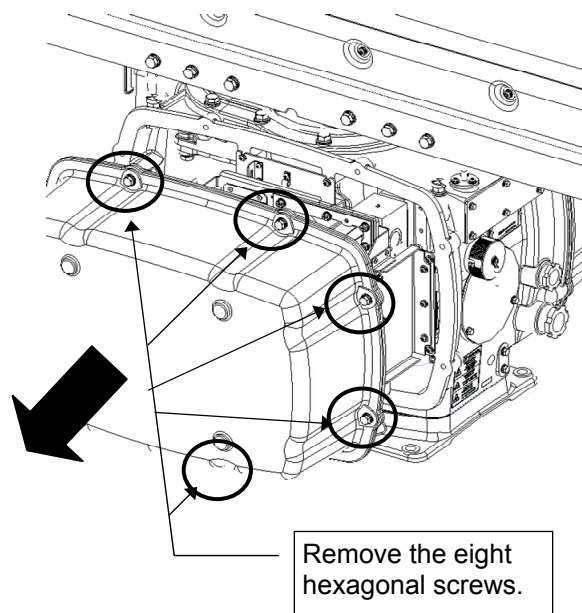
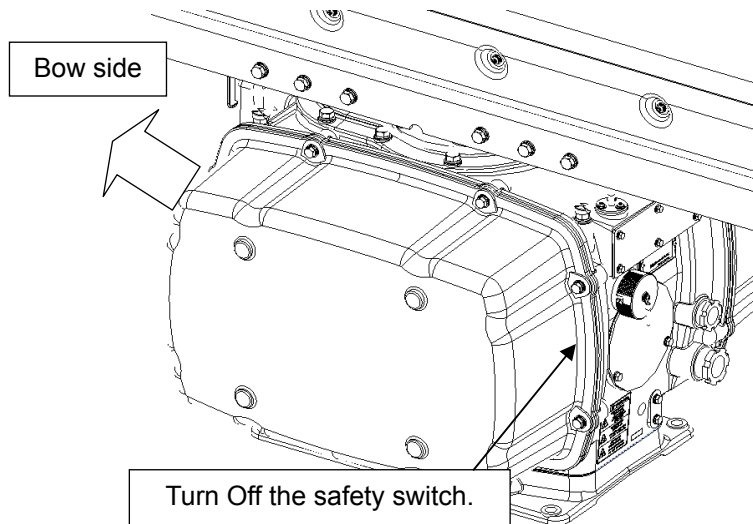
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 **Set the safety switches to Off (down) and remove the covers on both sides.**

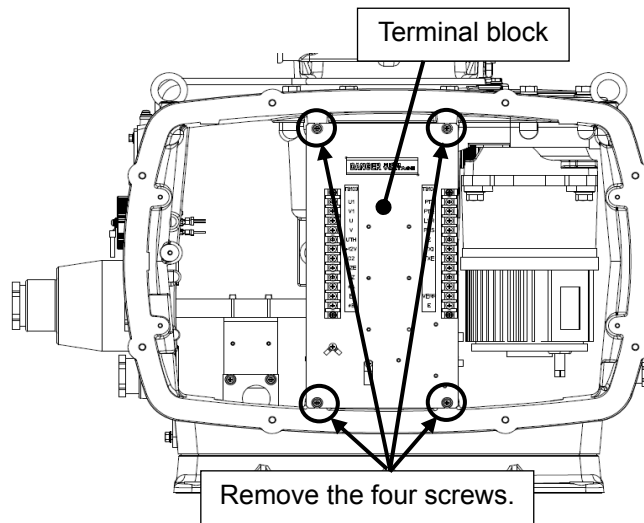
The safety switch is located on the rear (stern) side of the scanner unit. Open the cover for the safety switch and turn it Off (to the lower side). Remove the covers on both sides.



Example: Port side cover removal

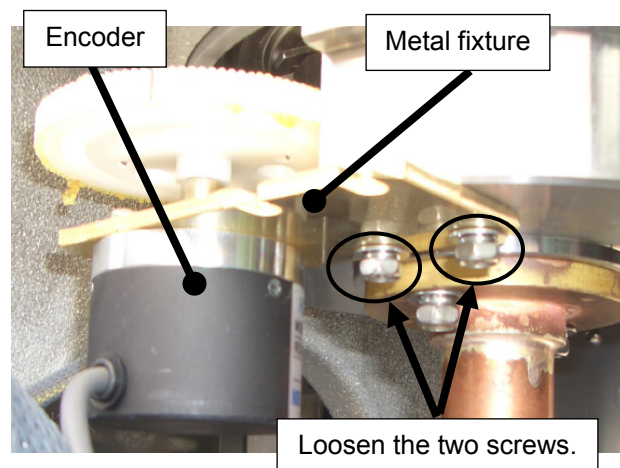
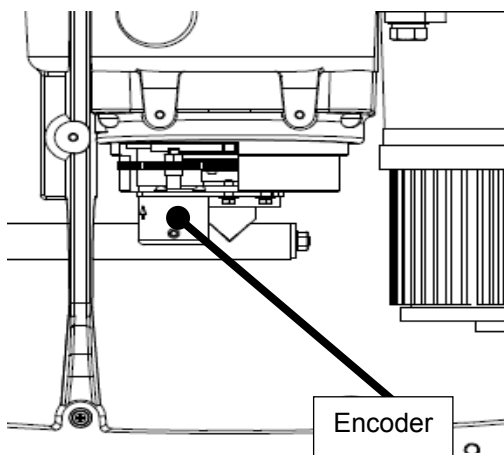
Step 2 **Remove the terminal block**

Remove the cover from the right (starboard) and remove the screws (four M5 screws) to remove the terminal block.



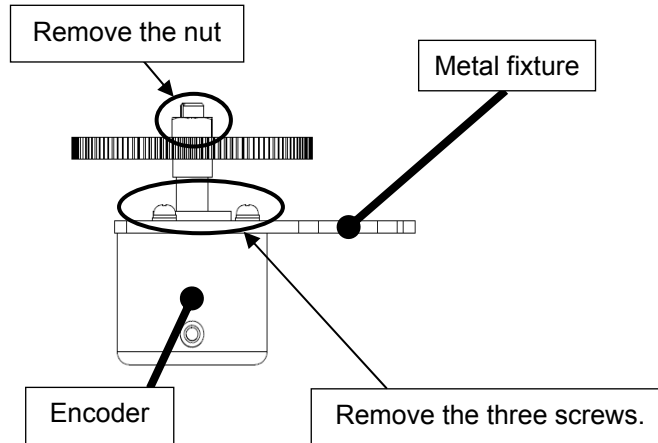
Step 3 **Remove the encoder block**

Loosen the two screws (M4) to remove the encoder together with the metal fixture.



Step 4 Replace the encoder

Remove the metal fixture and the gear wheel attached to the encoder. Put them onto the new encoder and put it back into the unit. After replacing the encoder, follow 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 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. Open the service engineer menu to perform azimuth adjustment.




This completes encoder replacement.

4.1.2.4 Brake Control Circuit (CCB-655A) Replacement/NKE-1139

[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 7 mm (for M4 screws), 13 mm (for M8 screws)	
3	Socket wrench*1	Width across flats 7 mm (for M4 screws), 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.



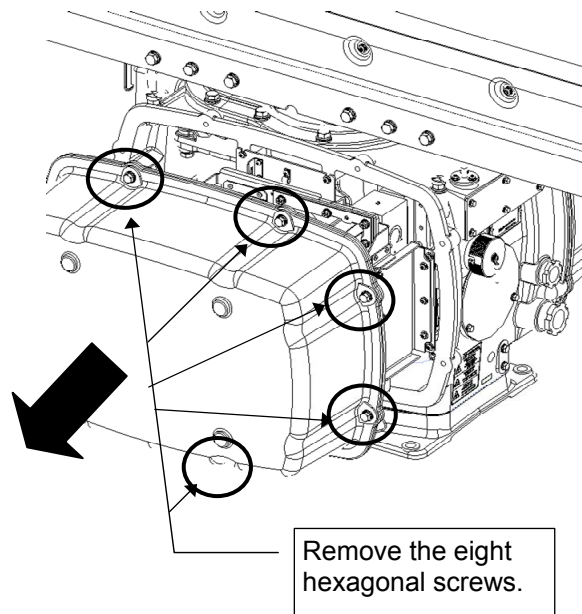
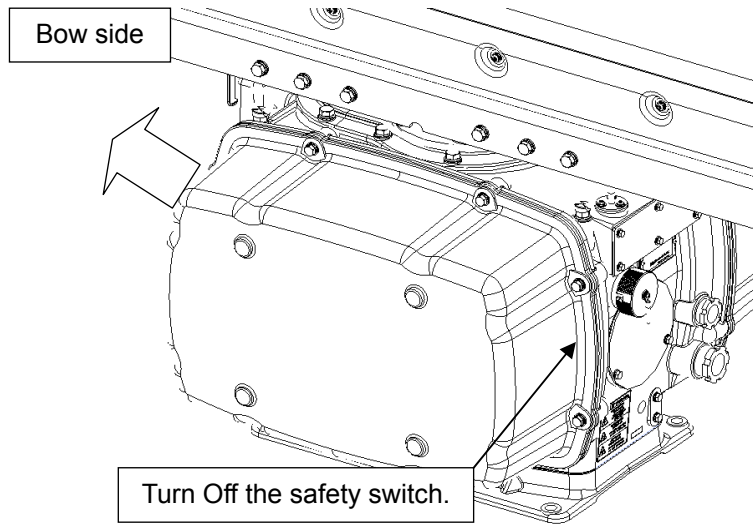
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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 side cover.

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 side cover.

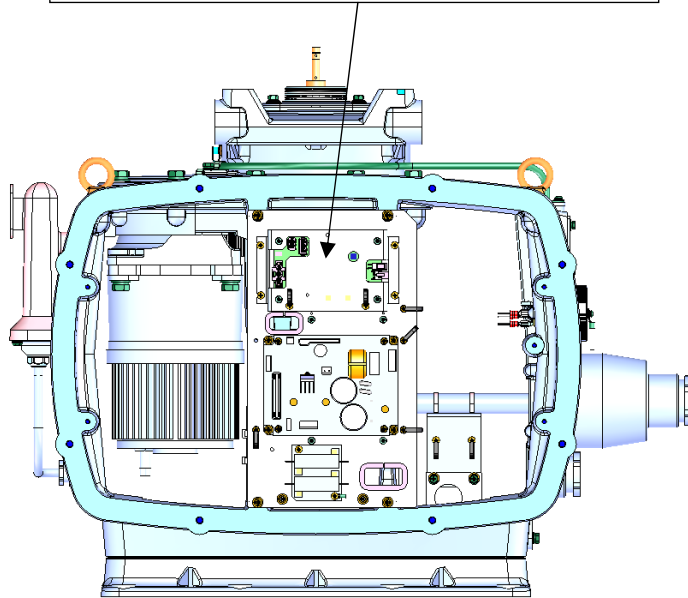


Example: Port side cover removal

Step 2 **Replace the brake control circuit.**

Remove the cover on the left side (port side) and remove all the connectors that are connected to the brake control circuit (CCB-655). Remove the four screws (M4) that are holding the mounting plate and replace it by removing the existing one together with the plate. After replacing the brake control circuit, reassemble the unit by 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.

Plate holding the brake control circuit (CCB-655)
(brake control circuit is behind the plate)



Step 3 **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 brake control circuit replacement.

4.1.2.5 Brake Circuit (CFA-255) Replacement/NKE-1139

[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	
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.



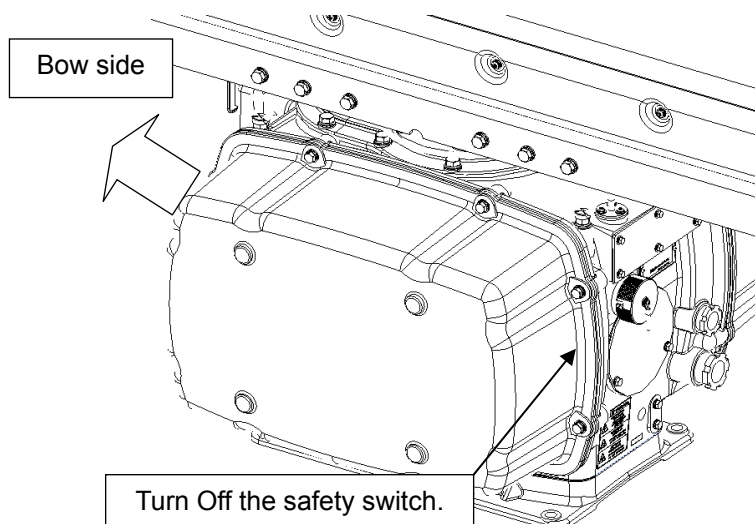
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

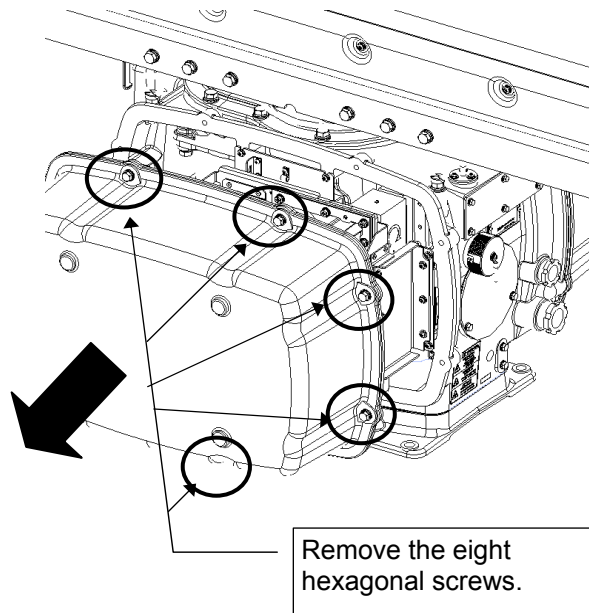


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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 side cover.



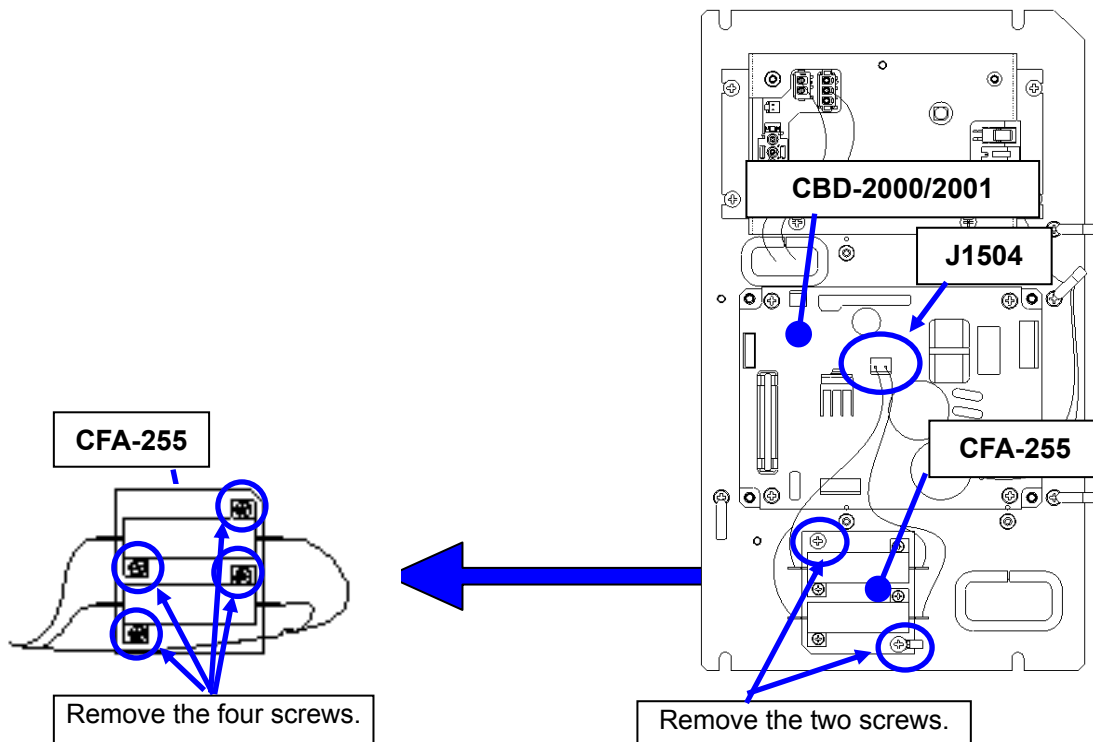


Remove the eight hexagonal screws.

Example: Port side cover removal

Step 2 Replace the brake circuit.

Remove the cover on the port side and remove the cable that is connected to J1504 of the motor driver circuit (7EPRD0034/35). Remove the two screws (M4) and replace the brake circuit (CFA-255: resistor with cable). After replacing the circuit, reassemble the unit by 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 3 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 brake circuit replacement.

4.1.2.6 Brake Circuit unit (NZR-17) Replacement/NKE-1139

[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.



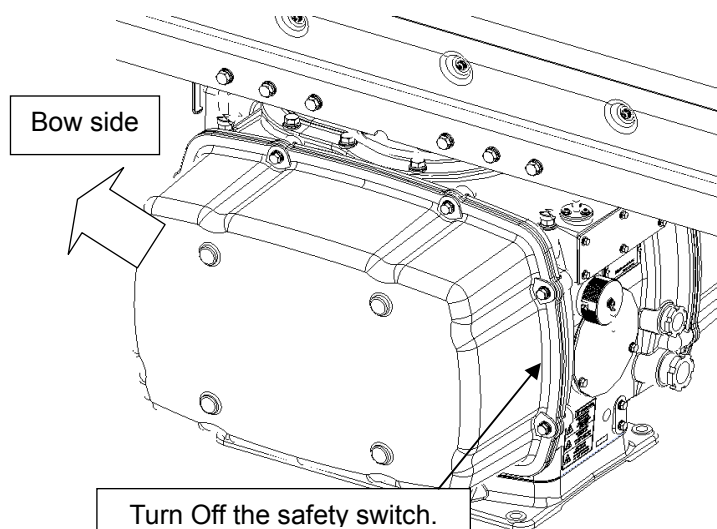
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

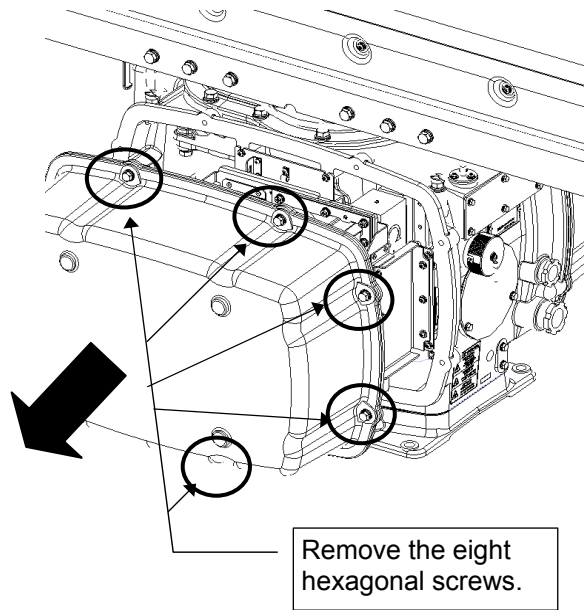


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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 side cover.

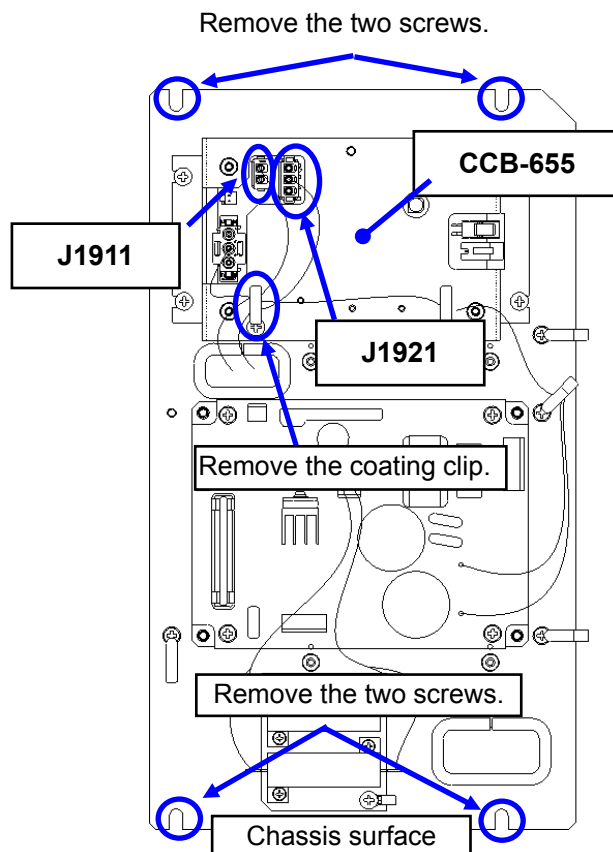




Example: Port side cover removal

Step 2 Remove the cable from rake control circuit.

Remove the cover on the port side and remove the cables that are connected to J1921 and J1911 of the brake control circuit (CCB-655).



Step 3 **Replace the brake circuit unit.**

Remove the four screws (M5) that are holding the chassis.

Remove the four screws that are holding the brake circuit at the rear of the chassis and then remove it. Remove the eight screws (CFA-261) or two screws (CFA-262) that are holding the resistor and replace it. After replacing the brake circuit unit, reassemble the unit by 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 4 **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 brake circuit unit replacement.

4.1.2.7 Performance Monitor (NJU-84) Replacement/NKE-1139

Instruction for Equipment

装備要領

1. Adapter installation アダプタの取り付け

The adapter is installed in Performance Monitor(NJU-84) with the bolt of the attachment.
(6-B5X12SUS,SW5,W5)
パフォーマンスモニタ(NJU-84)にアダプタを付属のボルトで固定する。
(6-B5X12SUS、SW5、W5)

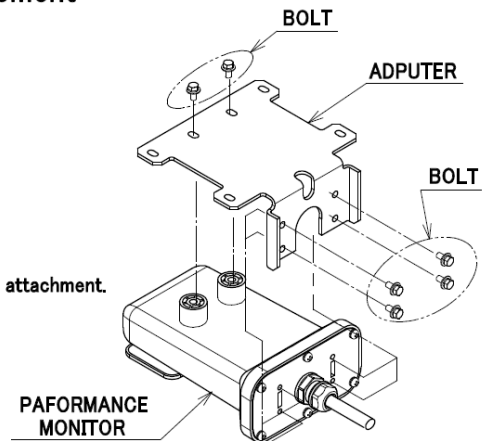


Fig1 (図1)

2. Performance Monitor Installation パフォーマンスモニタユニットの取り付け

Mount Performance Monitor on the SCANNER UNIT with the attached bolt.
(4-B5X12SUS,SW5,W5)
パフォーマンスモニタを空中線に付属のボルトで固定します。
(4-B5X12SUS、SW5、W5)

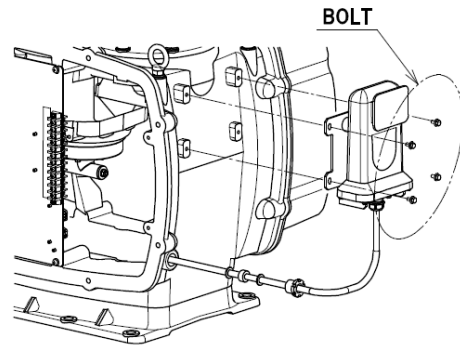


Fig2 (図2)

3. Wiring 配線

Put the cable gland into the Cable ,as shown in Fig.3
Unknit outer shieldnet and wrap it around a washer.
ケーブルに締付グランド ワッシャ ガasketを通します。(図3)
外側のシールドネットをほどき、座金に巻きつけてください。

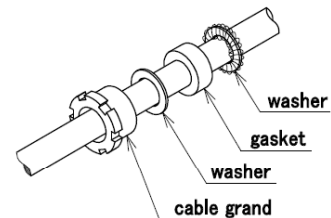


Fig3 (図3)

Each connector (J81,J82) and the earth terminal are connected. ,as shown in Fig.4
コネクタ(J81、J82)に接続して、アースはねじにて固定します。(図4)

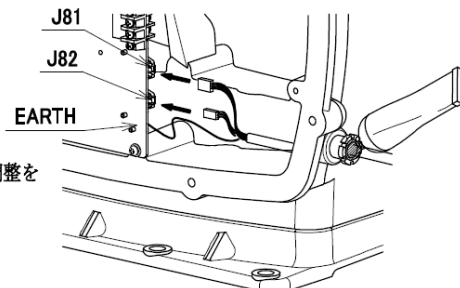


Fig4 (図4)

4. Check and adjustment 確認と調整

After installation, carry out the adjustment and check the operation of the Performance Monitor according to the "Radar operation manual".
装備後、「レーダ取扱説明書」要領に従い、パフォーマンスモニタの動作確認・調整を必ず実施してください。

5. Water proof 防水処理

Apply silicone sealant around the cable inlet, ,as shown in Fig.4
ケーブルグランド部をシールする。(図4)

4.1.3 NKE-1125 Scanner Unit

4.1.3.1 Magnetron Replacement/NKE-1125

CAUTION



When replacing magnetrons, make sure to shut off the main power and let the equipment stand for more than 5 minutes to discharge the high-voltage circuit.

Failure may result in electric shock.



Make sure to take off your watch when your hand must get close to the magnetron.

Failure may result in damage to the watch since the magnetron is a strong magnet.

Cautions on handling the magnetrons that have been stored for a long period of time

Since the magnetrons that have been stored for a long period of time may become unstable at the start of the use due to the occurrence of spark, etc., apply aging by using the following procedure.

1 Extend the preheat period. (**Standby: 20 to 30 minutes**)



2 Start from the short pulse range and shift to the long pulse range sequentially.

If the operation becomes unstable during this period, return to Standby immediately, maintain the status for 5 to 10 minutes and start operation again. Repeat this procedure.

[Required Tools]

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

Table Required Tools

No	Name	Size	Appearance
1	Non-magnetic 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.

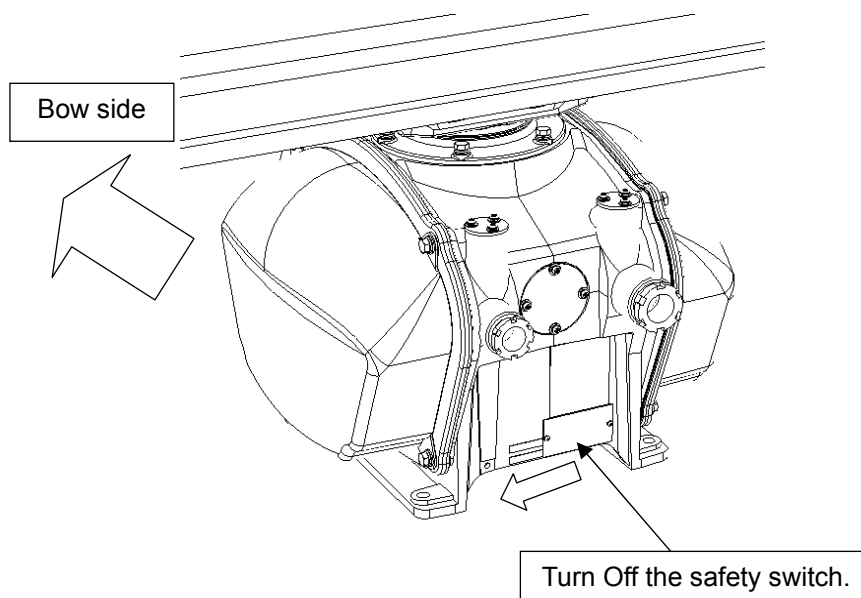


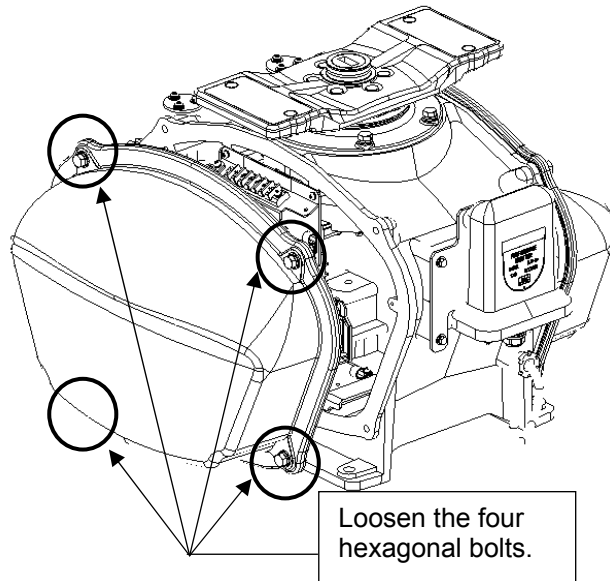
Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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.

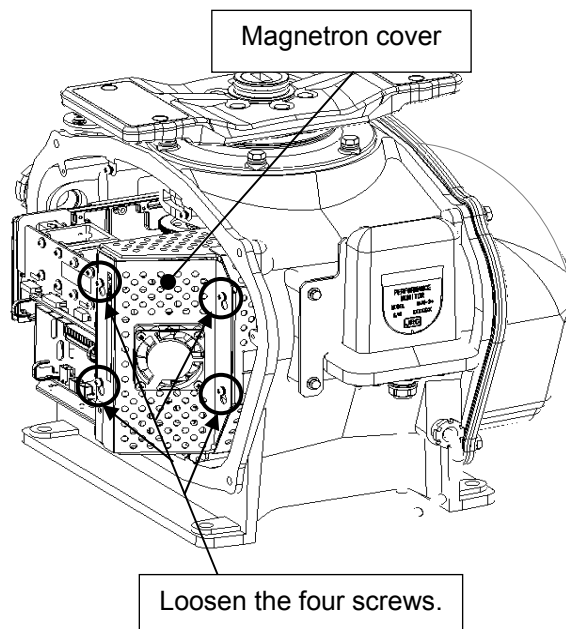




Example: Starboard side cover removal

Step 2 Remove the magnetron cover.

Remove the covers from the right (starboard) side and loosen the screws (four M4 screws) to remove the magnetron cover.



Step 3 Replace the magnetron cover.

Make sure there is no charge remaining in the modulation high-voltage circuit board, and then remove the screws (two M4 screws) holding the magnetron cables (yellow and green) in place.

Remove the screws (four M4 screws) holding the magnetron in place, then replace the magnetron after cutting the leads (yellow and green) for the replacement magnetron to an appropriate length.

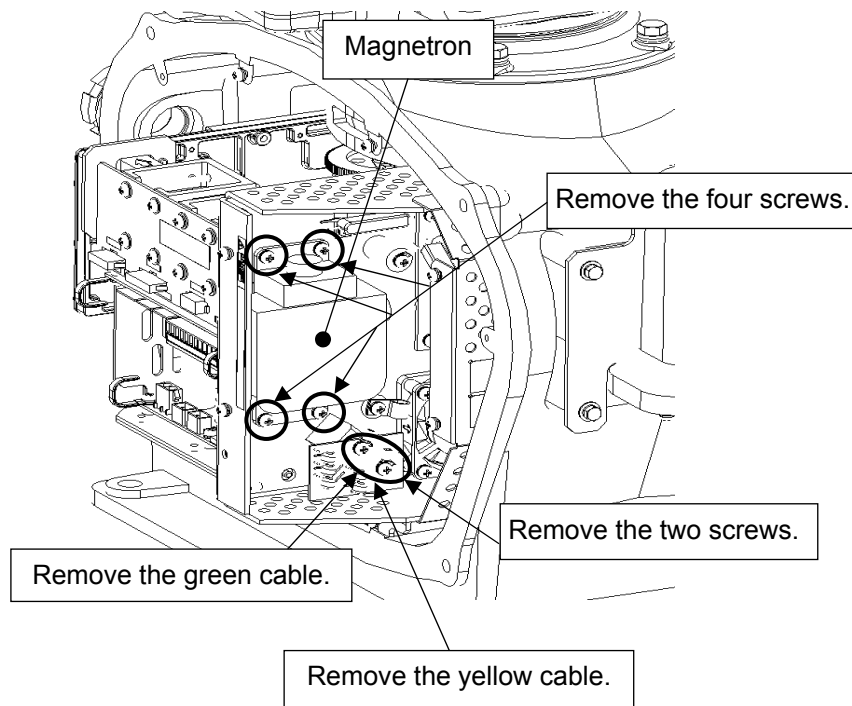
After having replaced the magnetron, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



Use a non-magnetic screwdriver because the contact of the metal tool with the magnetron causes deterioration of its performance.



Make sure that the magnetron leads (yellow and green) do not contact and are pulled away from other parts or the casing. Contact may cause them to discharge.



Step 4 Operation check

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

- (1) Turn On the radar and allow sufficient preheating time (20 to 30 minutes in the STBY mode).
- (2) Start transmission on a short pulse range and change the range to the longer ranges. Open the service engineer menu and provisionally adjust the tuning.



Check the magnetron current on the test menu during the time and if operation becomes unstable, bring the radar unit back to STBY mode and restart transmission after allowing for an interval of 5 to 10 minutes.

- (3) After transmitting on a long range for about fifteen minutes, return to the service engineer menu and adjust the tuning. Perform the adjustment in the service engineer menu until the tuning display bar on the display unit reaches the 8th calibration mark. With the service engineer menu open, also make sure the magnetron current is shown between the 6th and 9th calibration markings.
- (4) Finally, initialize the transmission time in the service engineer menu.




This completes magnetron replacement.

4.1.3.2 Motor 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), 17 mm (for M10 screws)	
3	Socket wrench*1	Width across flats 13 mm (for M8 screws), 17 mm (for M10 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.

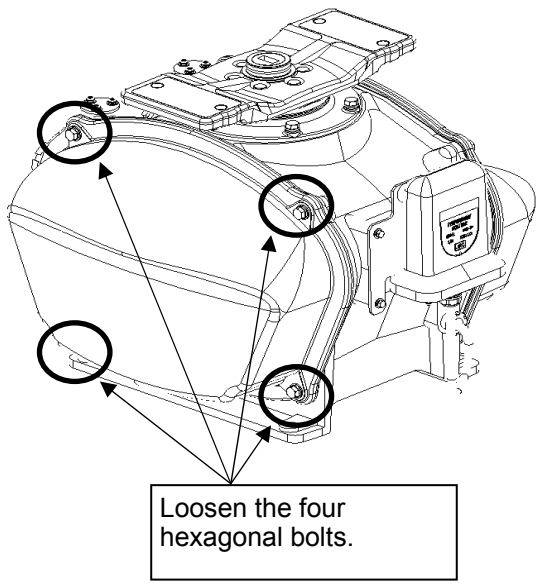
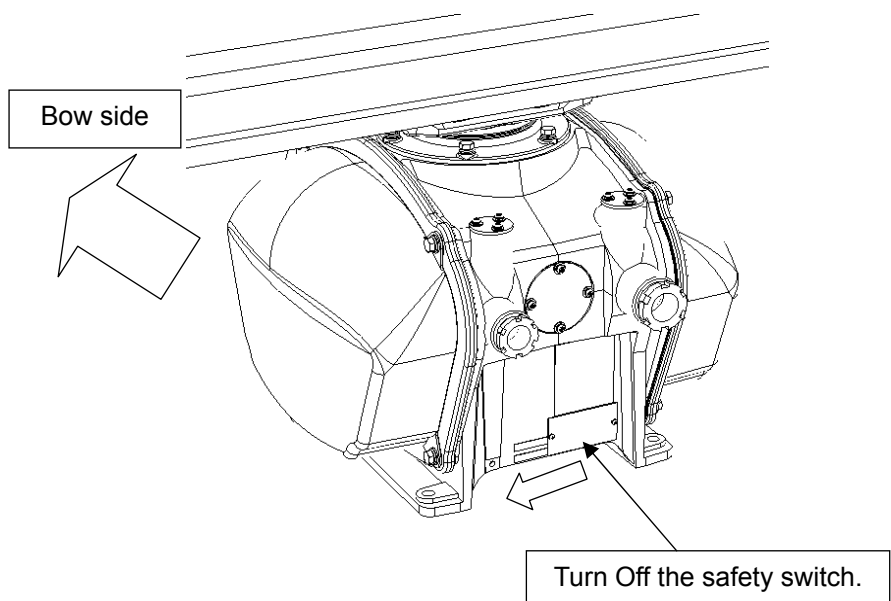


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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.

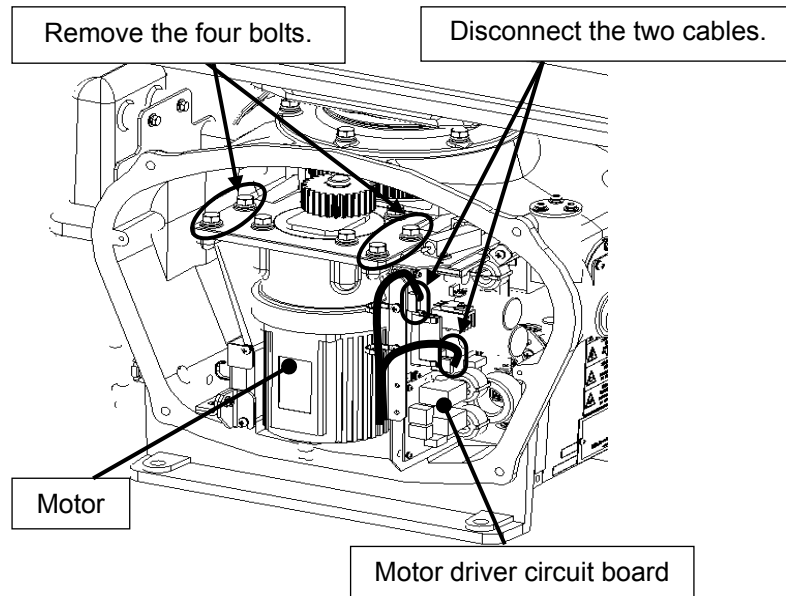
Loosen the hexagonal bolts (four bolts) and remove the pedestal cover.



Example: Starboard side cover removal

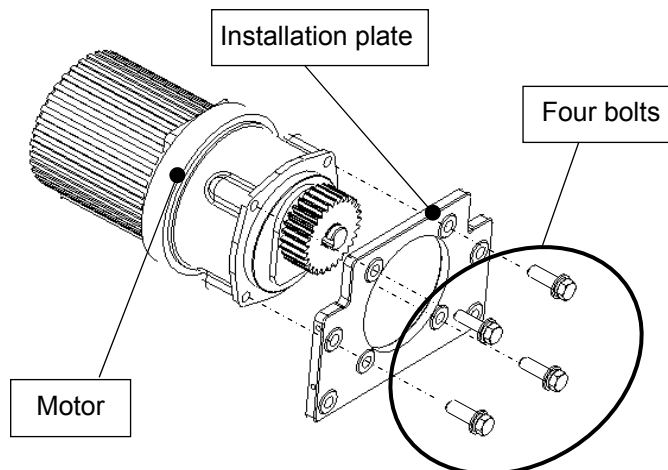
Step 2 Remove the motor.

Remove the cover on the left (port) side and remove the cables connected to the motor driver circuit board. Remove the hexagonal bolts (four M8 bolts) and remove the motor.

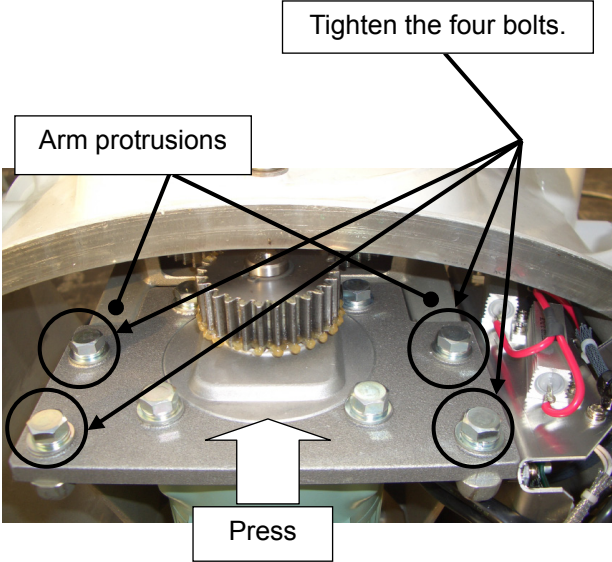


Step 3 Replace the motor.

Remove the hexagonal bolts (four M8 bolts) and remove the installation plate from the motor. Attach the installation plate to the replacement motor. Do not forget to tighten the hexagonal bolts to an appropriate torque (210 kgf-cm) so they are free of looseness.

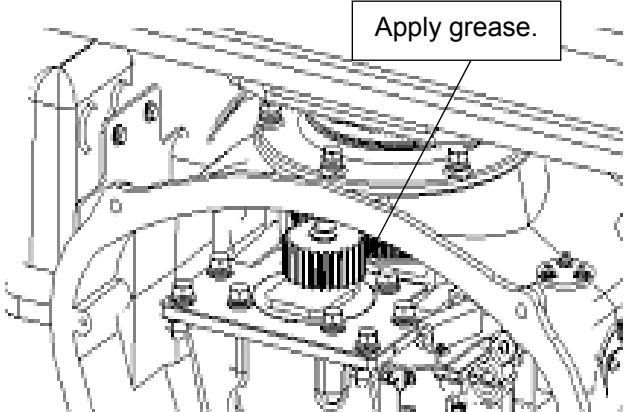


Install the motor into the scanner unit. Press the motor against the protrusions of the arm fixed to the motor on which the arm extends through the wall of the casing, adjust it to minimize backlash, and fix it in place. Do not forget to tighten the hexagonal bolts, to an appropriate torque (140 kgf-cm) so they are free of looseness.



Step 4 Apply grease to the new motor.

After having installed the motor, grease the gear wheel. After having replaced the motor, reassemble the unit by 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 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. Check that the motor does not make any abnormal sound when it starts to rotate, while it is rotating, or when it stops.

This completes motor replacement.