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### 4.1.3.3 Motor Drive Circuit Board 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                                     |  |
| 2  | Open-end wrench*1    | Width across flats<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>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.**

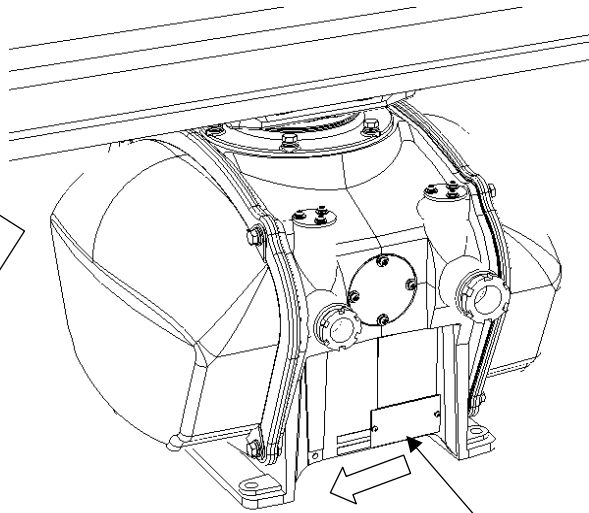
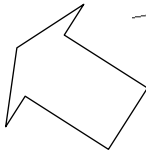
Before beginning work, turn Off the safety switch located on the bottom of the stern side of the scanner unit.

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

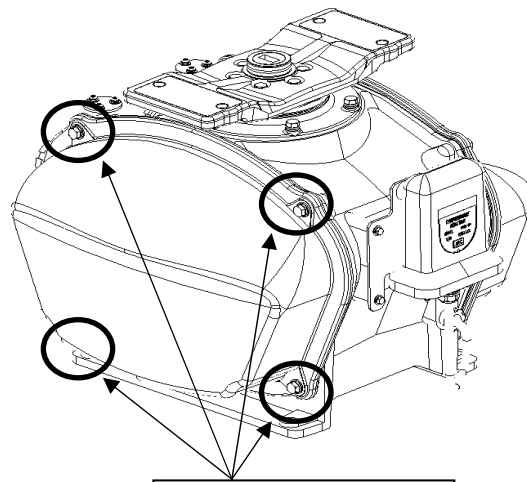
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Bow side



Turn Off the safety switch.



Loosen the four hexagonal bolts.

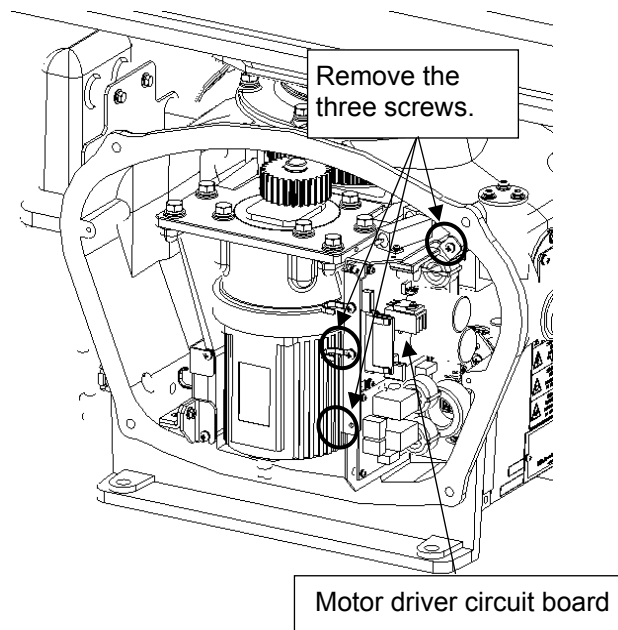
Example: Starboard side cover removal

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## **Step 2 Remove the metal plate of the motor driver circuit board and relay filter circuit board**

Remove the cover on the left (port) side. Remove the cable connecting to the motor driver circuit board and relay filter circuit board. After removing the screw (three M4 screws) and the cable, remove the metal plate to which the motor driver circuit board and relay filter circuit board are attached.



## **Step 3 Replace the motor driver circuit board.**

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



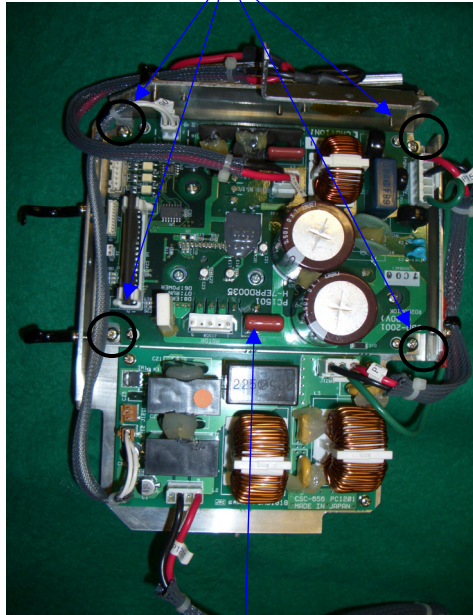
For the motor driver circuit there are two types of specifications, 100 V AC and 220 V AC. Check that the new motor driver circuit uses the appropriate power supply specification. (Described on the silk printing on circuit board.)

After having replaced the motor driver circuit board, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the screws and connect the cables.

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Remove the four screws.



Motor driver 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. 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 driver circuit board replacement.

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### 4.1.3.4 Magnetron Fan 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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>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.

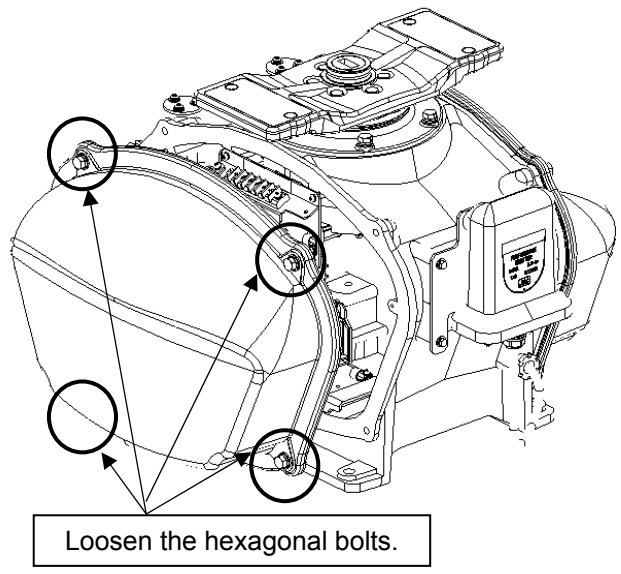
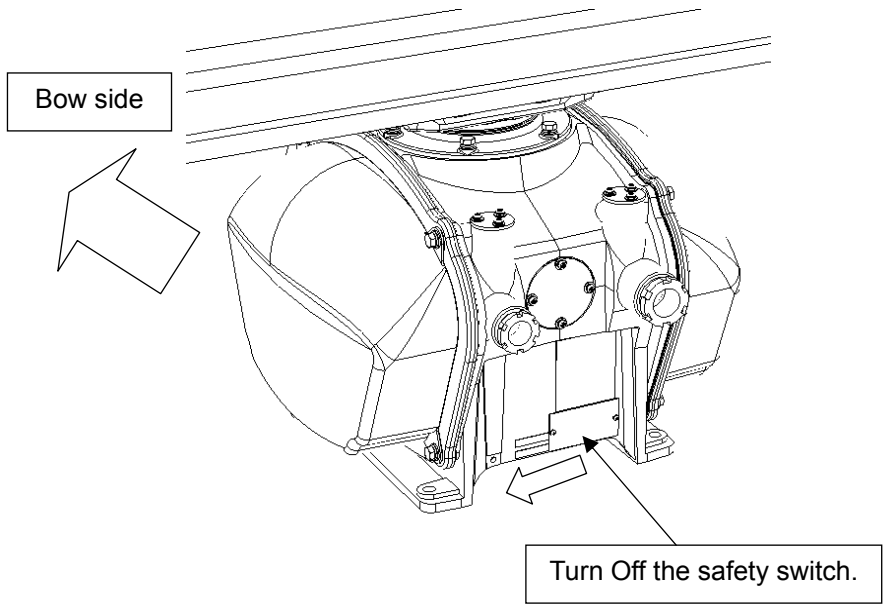


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

#### **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.



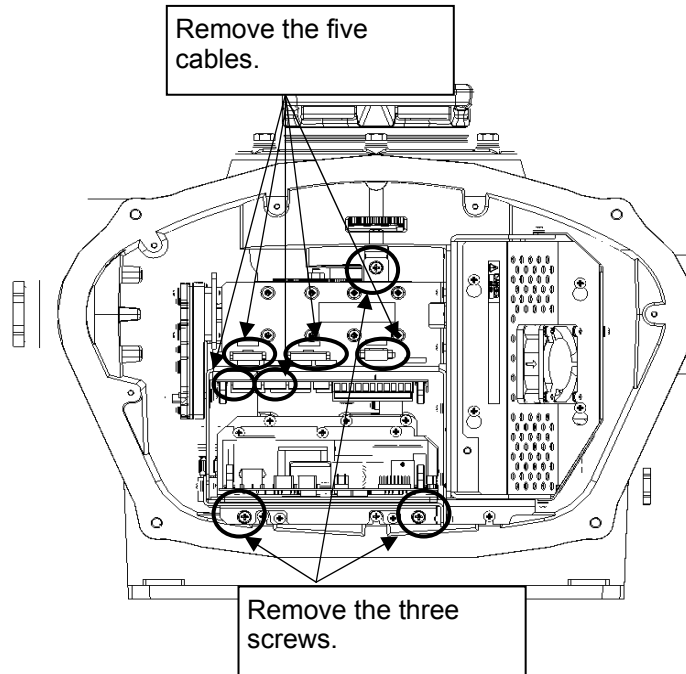
Example: Starboard side cover removal

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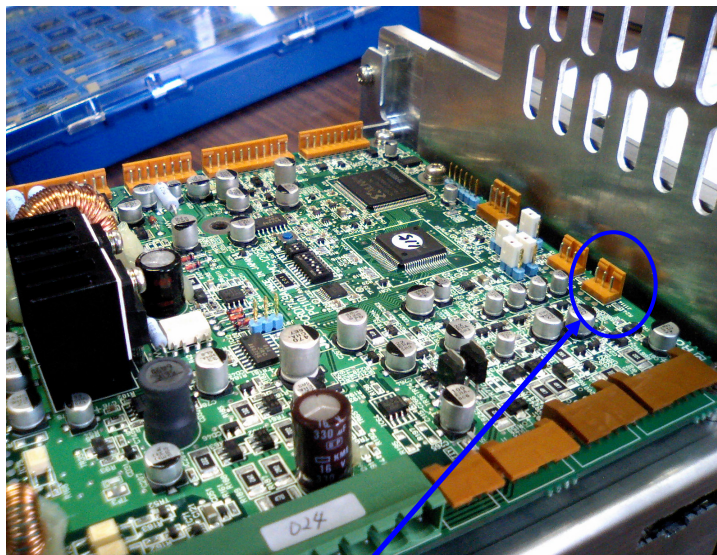
## **Step 2    Remove the transmitter-receiver unit.**

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



## **Step 3    Remove the fan cable.**

Remove the cable for the fan that is connected to the T/R control circuit board.

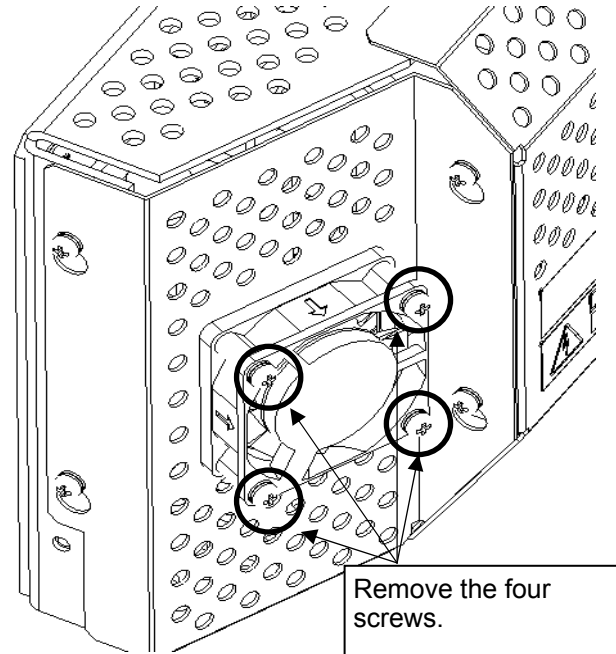


Remove the cable.

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#### **Step 4     Replace the fan.**

Remove the screws (four M4 screws) holding the fan in place and replace it. 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 5     Operation check**

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

- (1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Check that the fan alarm is not triggered.

This completes magnetron fan replacement.



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### 4.1.3.5 Modulator Circuit (CPA-264) 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  |  |
| 2  | Open-end wrench*1    | Width across flats<br>7 mm (for M4 screws),<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>7 mm (for M4 screws),<br>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.

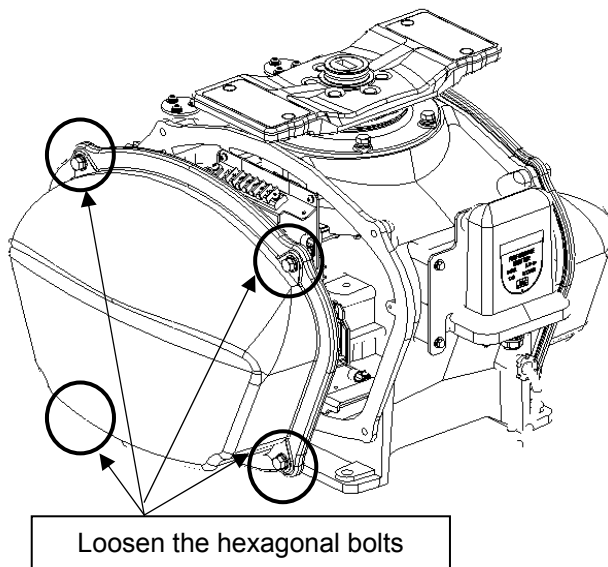
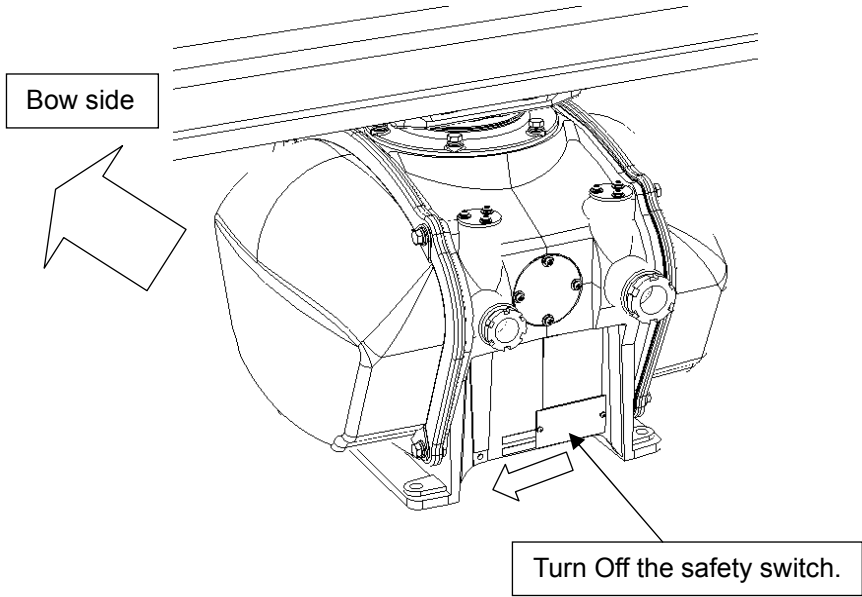


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

#### **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.

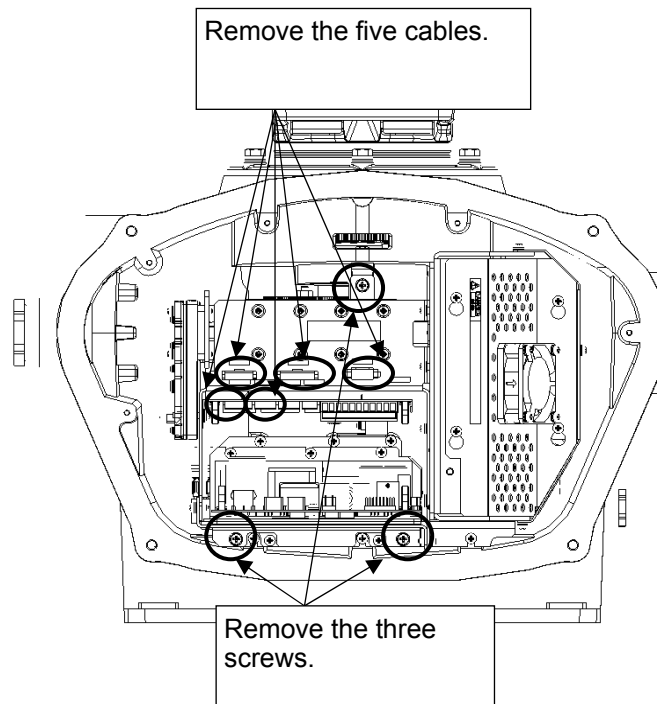


Example: Starboard side cover removal

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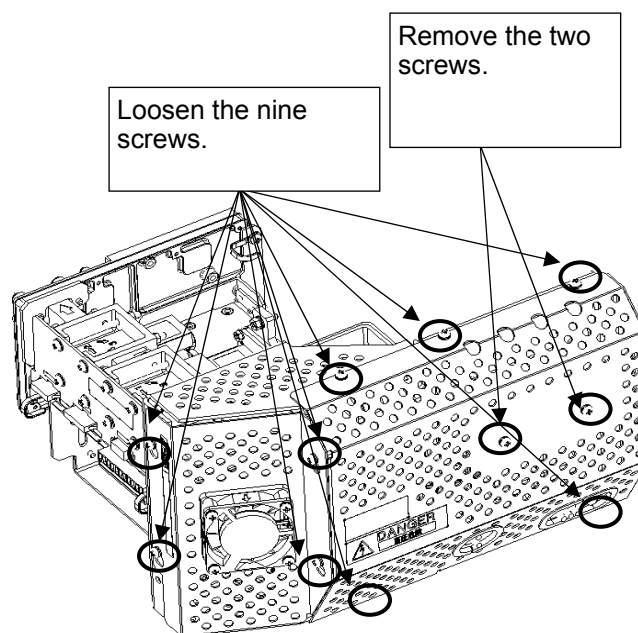
## **Step 2 Remove the transmitter-receiver unit.**

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



## **Step 3 Remove the modulator circuit board cover.**

Loosen the screws (nine M4 screws) holding the cover in place, remove the screws (two M4 screws) holding the heat radiation plate in place, and then remove the cover.



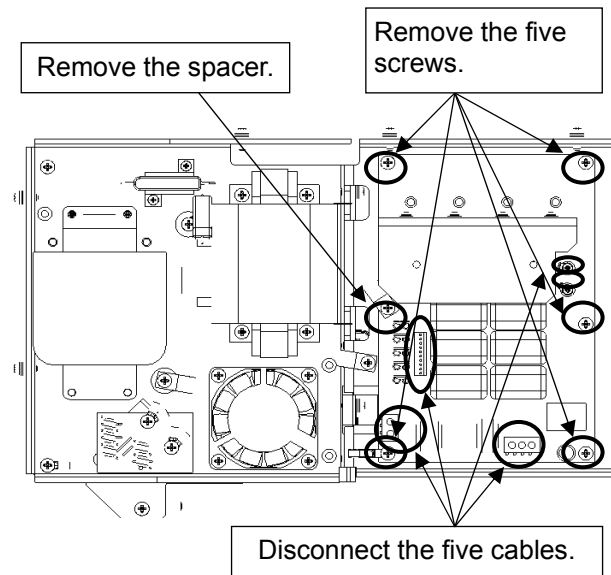
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#### **Step 4**     **Replace the modulator circuit board.**

Remove the cables connected to the modulator circuit board, then remove the screws (five M4 screws) holding it in place and the spacer (one 7 mm (nominal) spacer), and then replace it.

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 having replaced the modulator circuit board, reassemble the unit following the disassembly procedure in the reverse order. Do not forget to tighten the screws and connect the cables.



#### **Step 5**     **Operation check**

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

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

Emit 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 modulator circuit board replacement.

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### 4.1.3.6 Modulation Unit Fan 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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>13 mm (for M8 screws) |  |

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



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



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

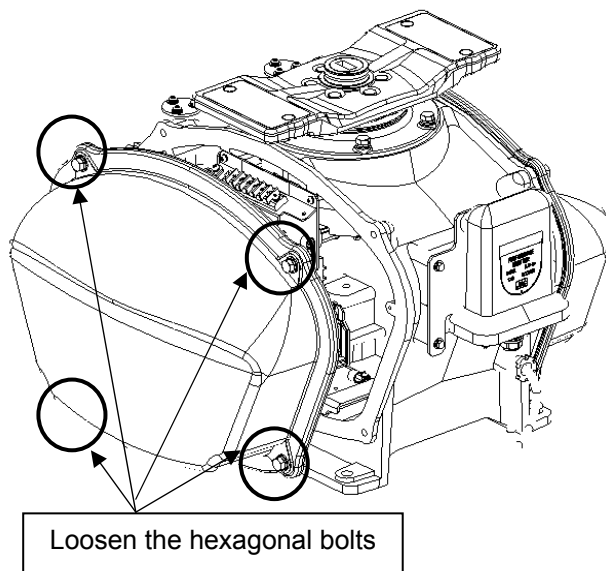
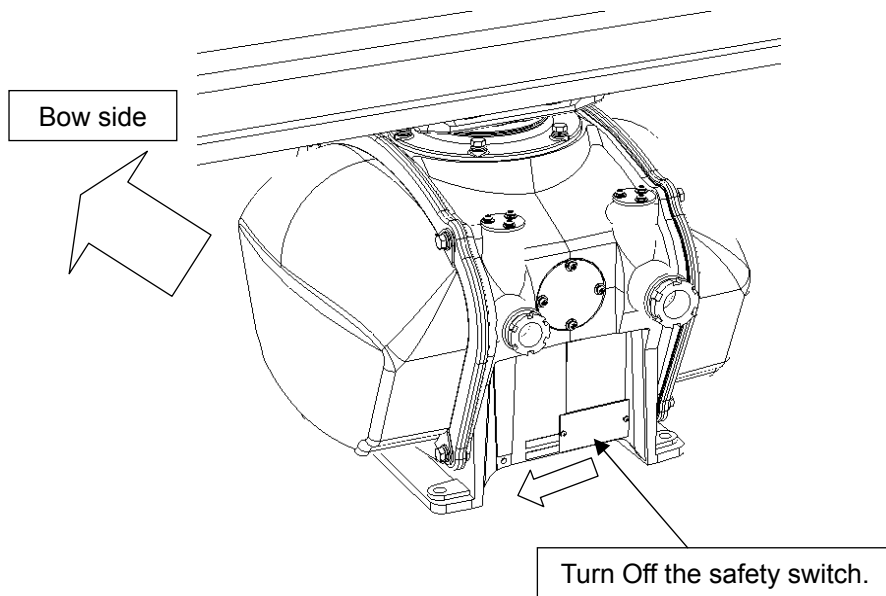


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

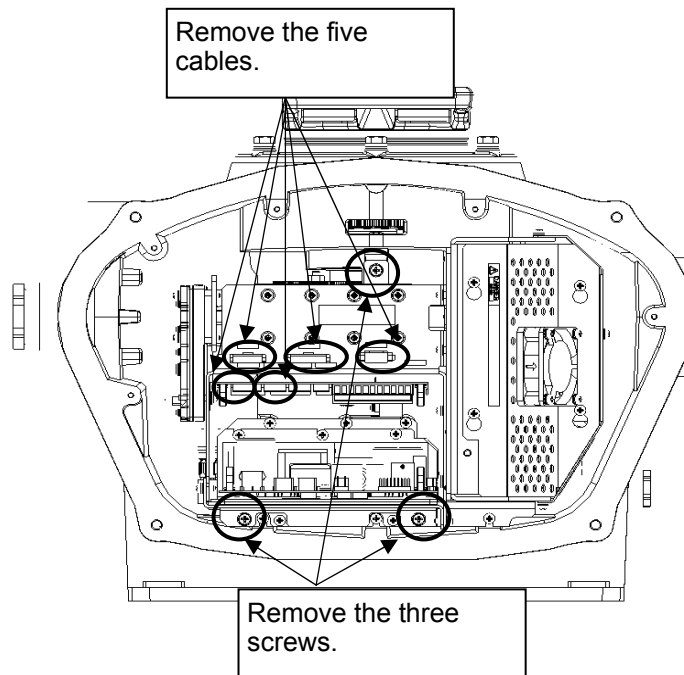
Loosen the hexagonal bolts (four bolts) and remove the pedestal cover.



Example: Starboard side cover removal

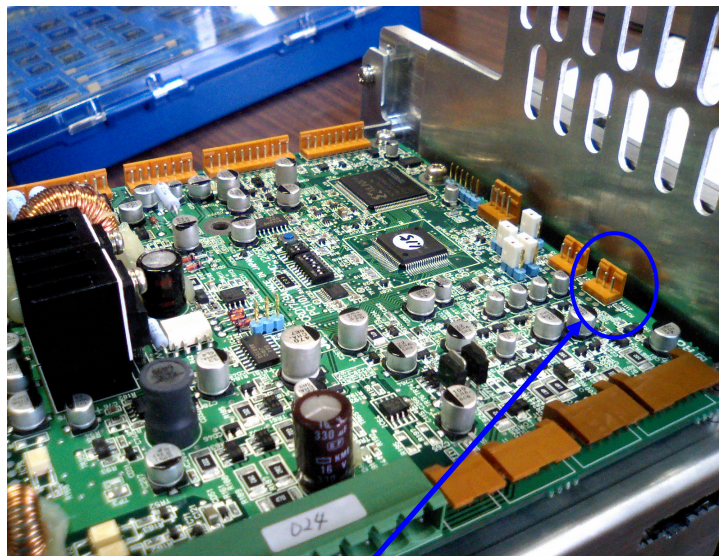
**Step 2 Remove the transmitter-receiver unit.**

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



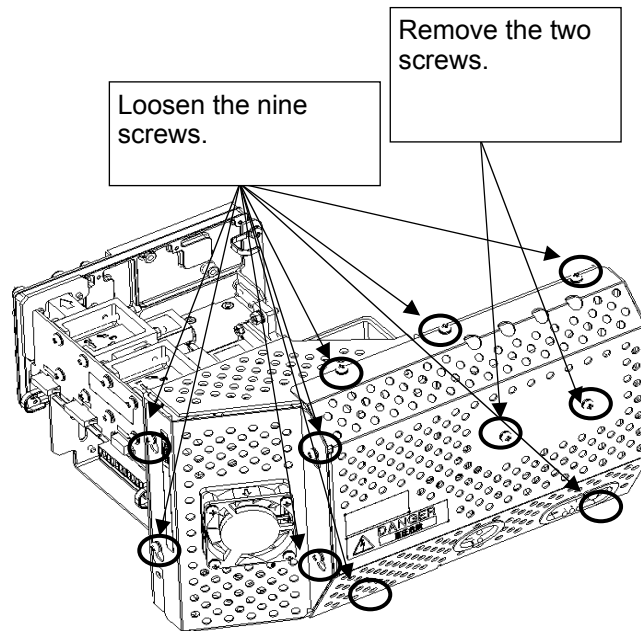
**Step 3 Remove the fan cable.**

Remove the cable for the fan that is connected to the T/R control circuit board.



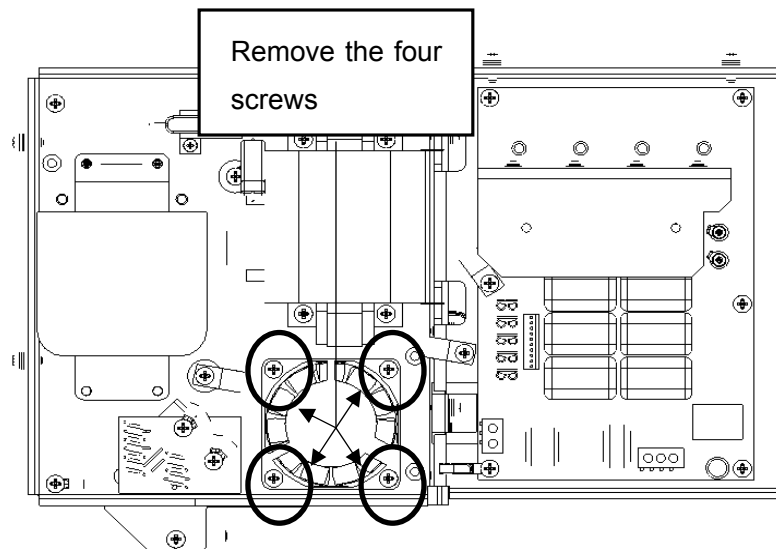
Remove the cable.

Loosen the screws (nine M4 screws) holding the cover in place, remove the screws (two M4 screws) holding the heat radiation plate in place, and remove the cover.



#### **Step 4**     **Replace the modulation unit fan cable.**

Remove the screws (four M4 screws) holding the fan in place and replace it. 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 5**     **Operation check**

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

- (1) Turn On the Display unit. After the countdown is completed, start transmission and check that the radar image appears without error. Check that the fan alarm is not triggered.

This completes modulation unit fan replacement.






### 4.1.3.7 Modulation Unit (NMA-550) 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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>13 mm (for M8 screws) |  |

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



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



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

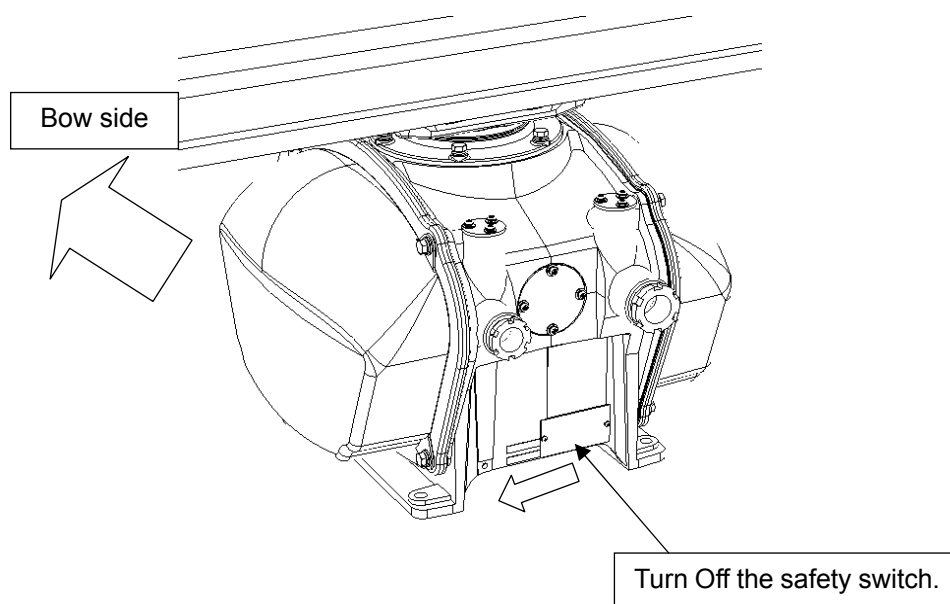


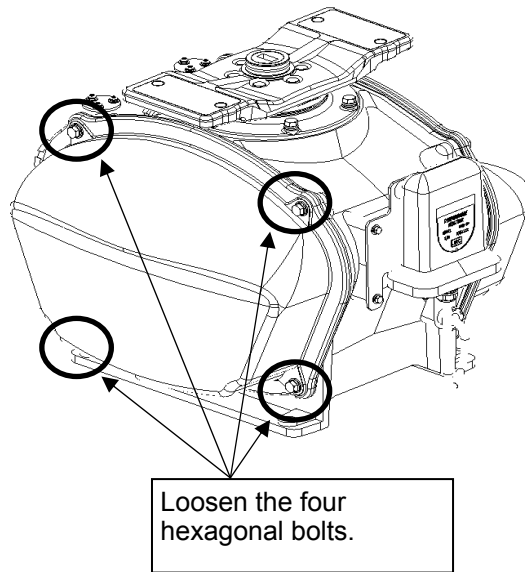
Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

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

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

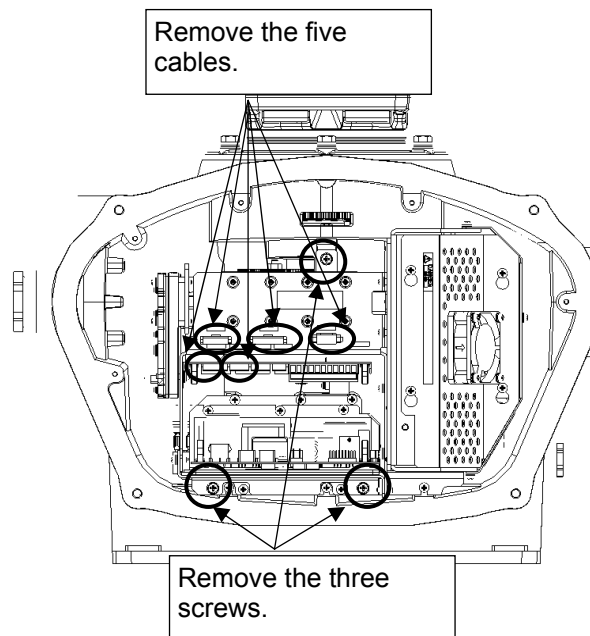




Example: Starboard side cover removal

**Step 2 Remove the transmitter-receiver unit.**

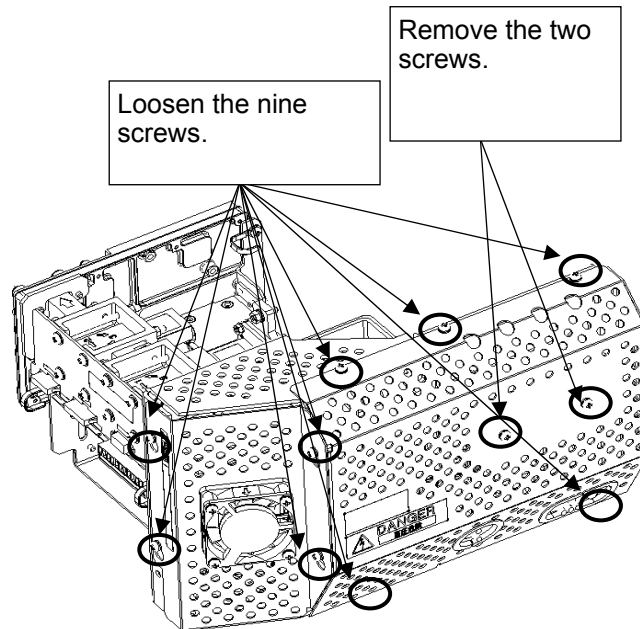
Remove the cover on the right (starboard) side, remove the cables connected to the transmitter-receiver unit and the screws (three M5 screws) holding it in place, and then remove it.



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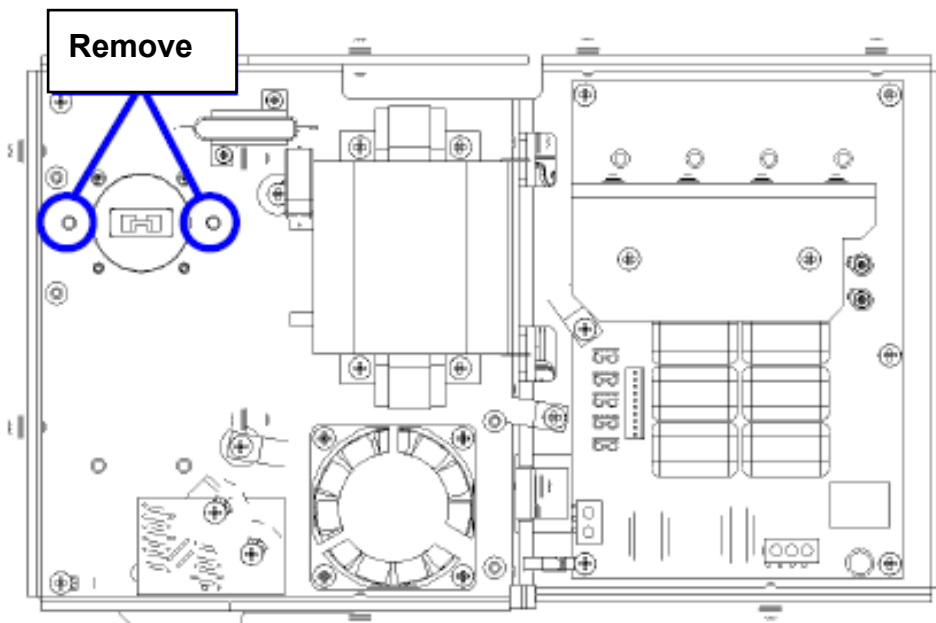
**Step 3 Remove the transmitter-receiver unit cover and remove the magnetron.**

Loosen the screws (nine M4 screws) holding the cover in place. Remove the screws (two M4 screws) holding the heat radiation plate in place and remove the cover. Then, remove the magnetron.



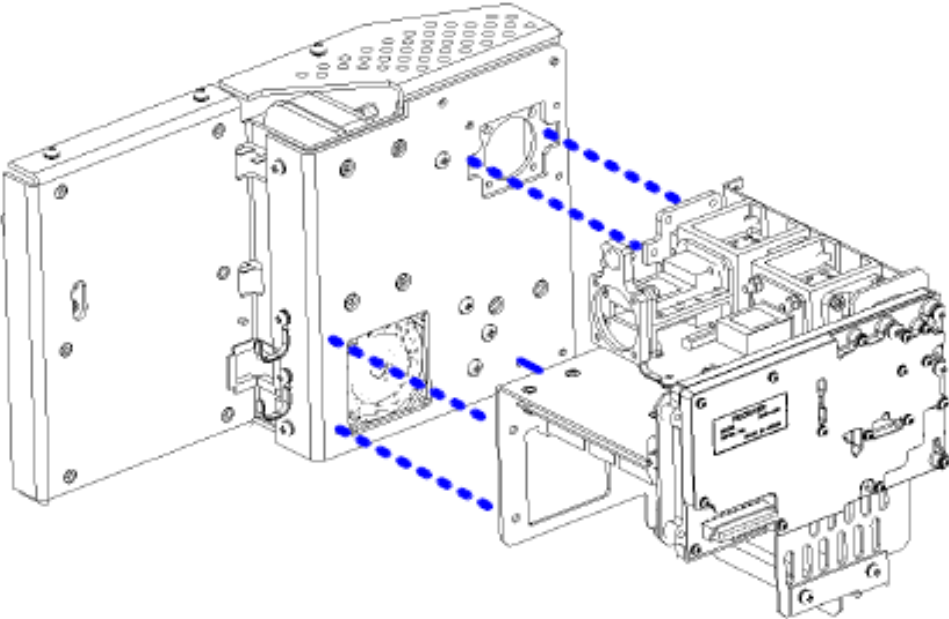
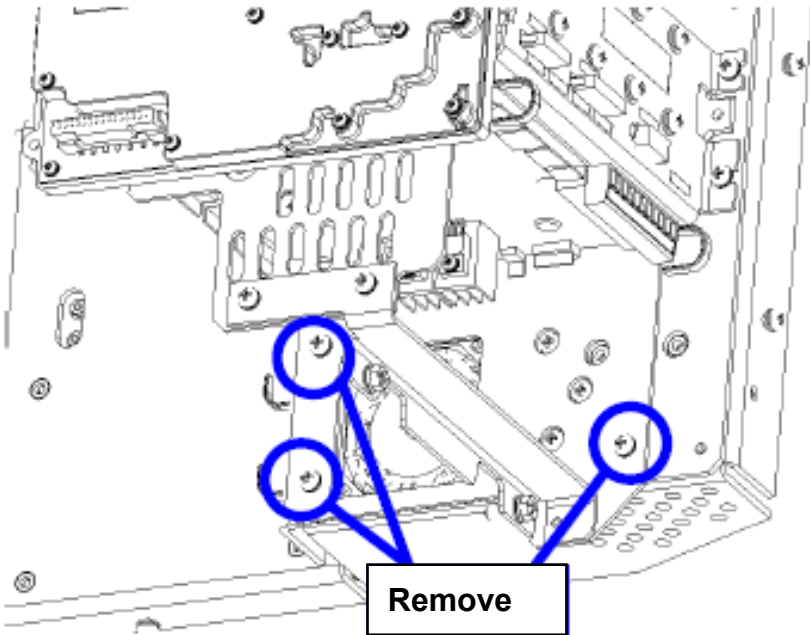
**Step 4 Remove the waveguide holding screws.**

Remove the two connection waveguide holding screws (M4).



**Step 5 Remove the screws at the rear of the modulation unit.**

Remove the three screws (M4) at the rear of the modulation unit.

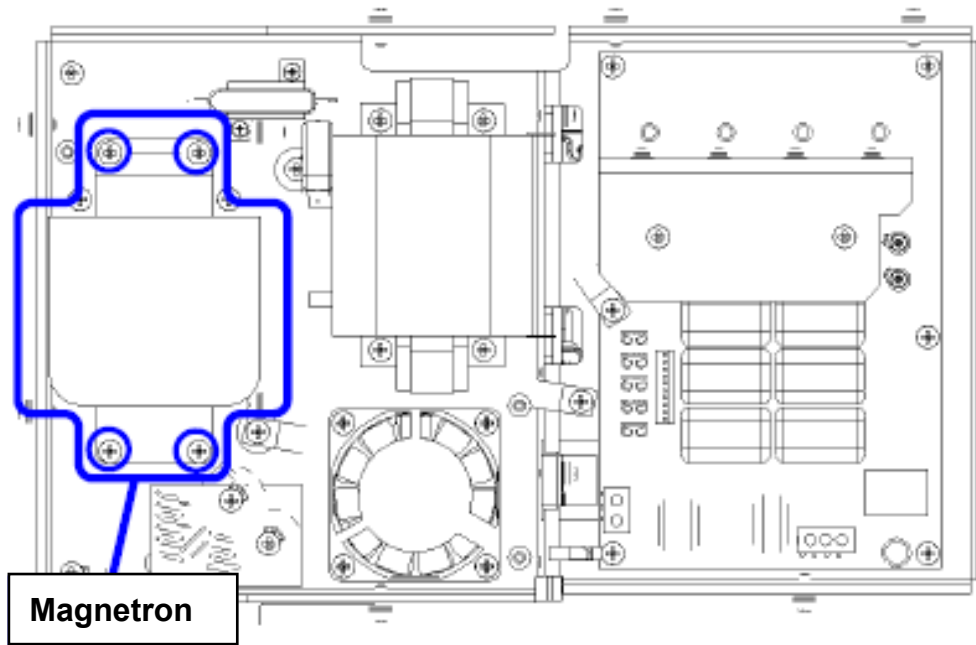


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## **Step 6     Replace the modulation unit.**

Install the magnetron that was removed in Step 3 to the new modulation unit.

Then, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and do not forget to reconnect the cables.



## **Step 7     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.

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.

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

#### [Required Tools]

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

Table Required Tools

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

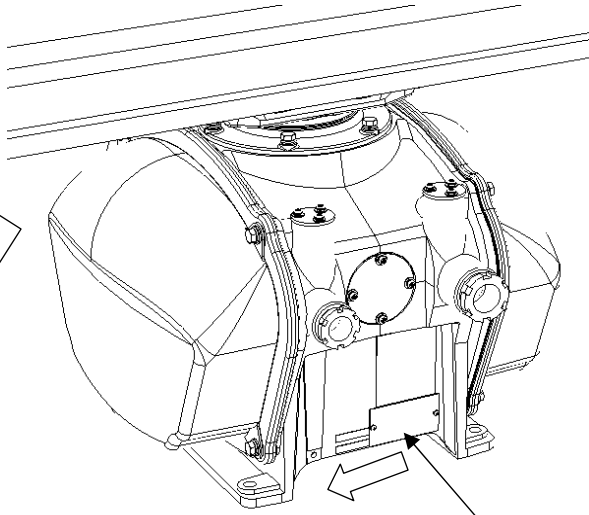
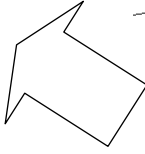
Before beginning work, turn Off the safety switch located on the bottom of the stern side of the scanner unit.

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

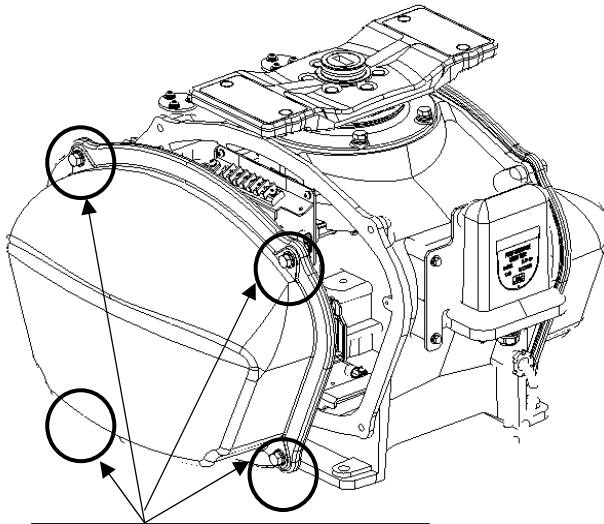
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Bow side



Turn Off the safety switch.



Loosen the hexagonal bolts

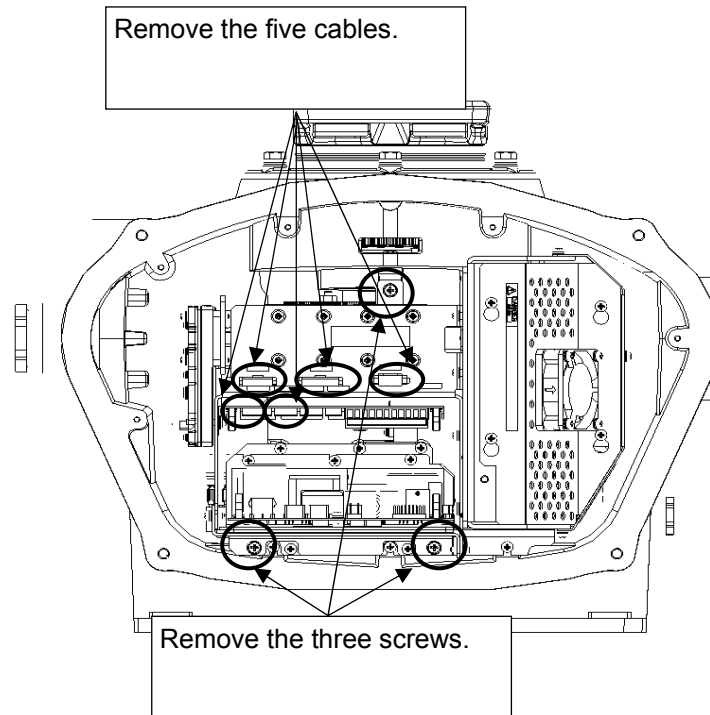
Example: Starboard side cover removal

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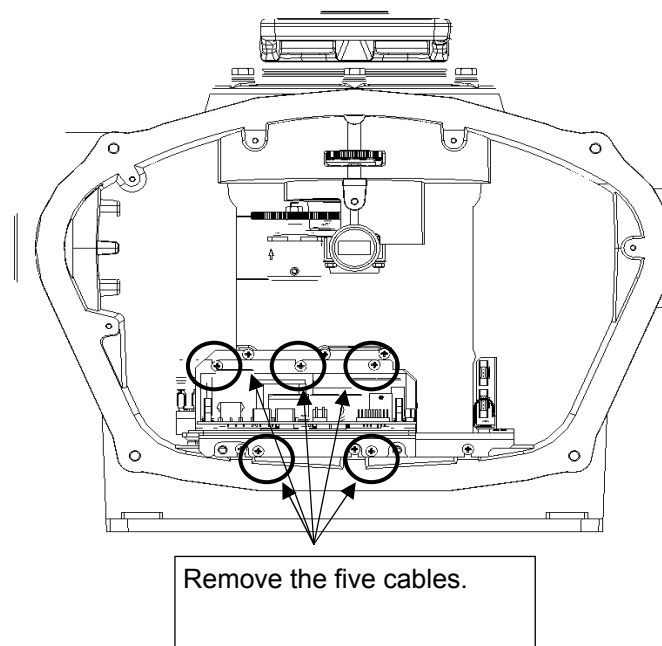
**Step 2 Remove the transmitter-receiver unit.**

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



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

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





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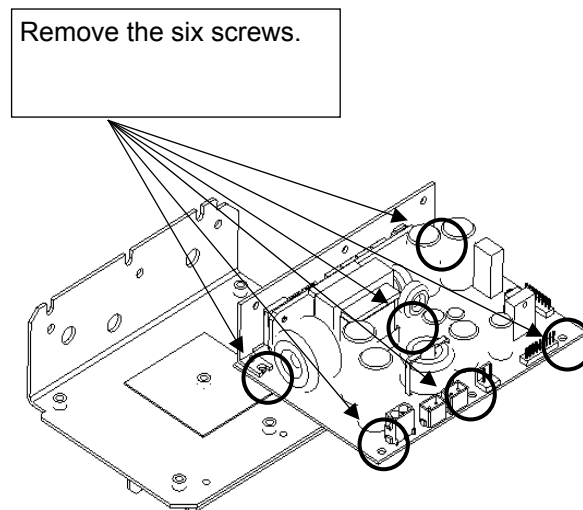
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#### **Step 4**     **Replace the power supply circuit board**

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

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

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



#### **Step 5**     **Operation check**

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

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




This completes power supply circuit board replacement.

### 4.1.3.9 T/R Control Circuit (CMC-1205R) 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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>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 beginning the replacement procedure, open the service engineer menu of the radar display unit and back up the scanner unit data (transmission time and motor rotation time).



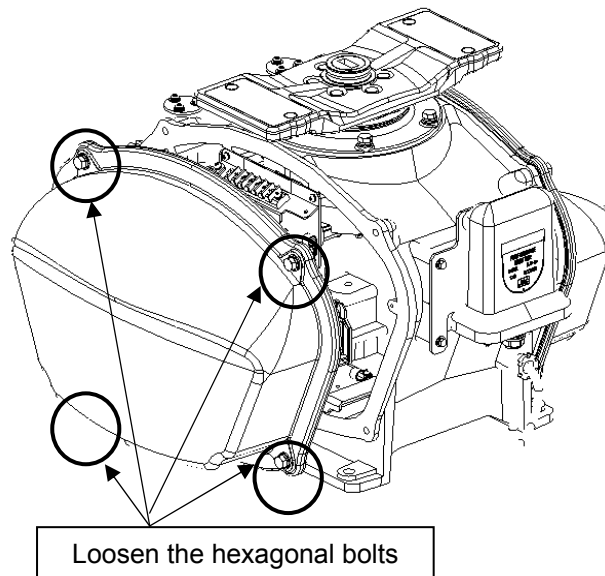
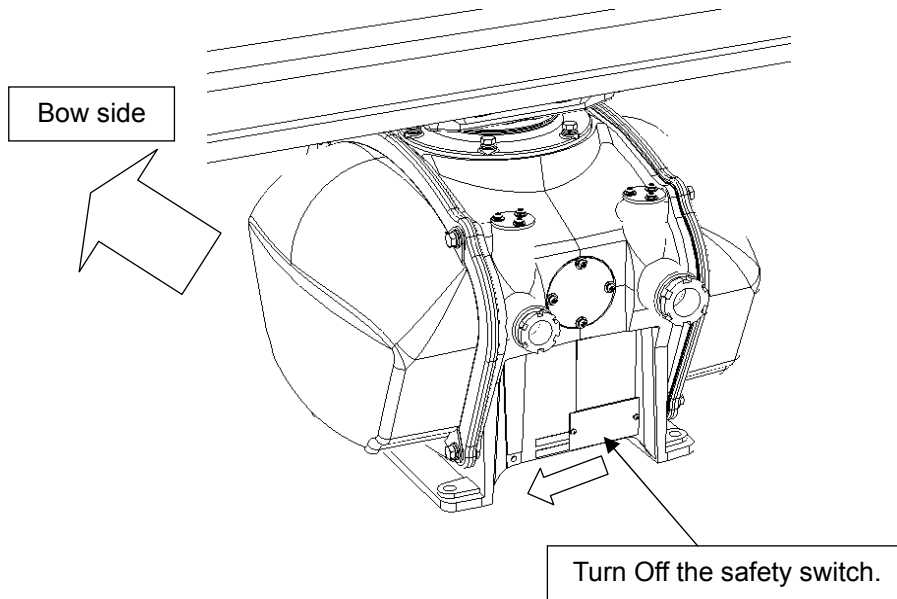
If you do not back up this data, it will not be possible to maintain continuity in scanner data such as the magnetron usage time

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## **Step 2 Turn Off the safety switch and remove the cover.**

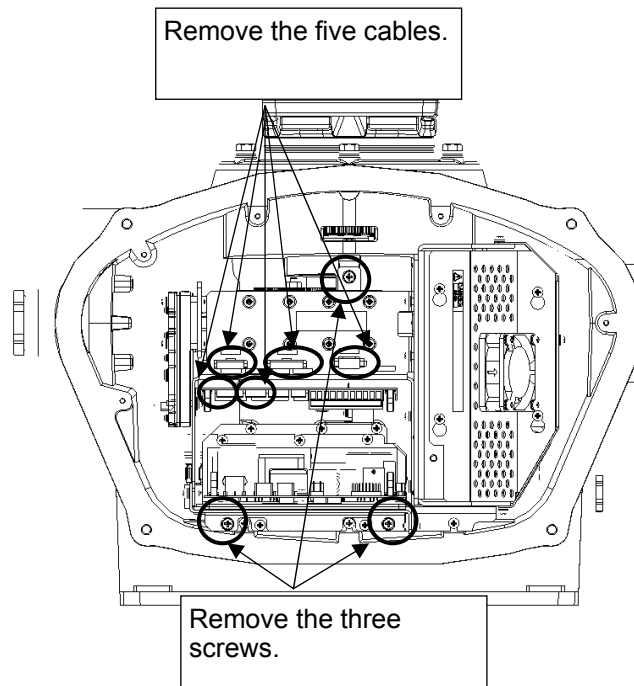
Before beginning work, turn Off the safety switch located on the bottom of the stern side of the scanner unit. Loosen the hexagonal bolts (four bolts) and remove the pedestal cover.



Example: Starboard side cover removal

## **Step 3 Remove the transmitter-receiver unit.**

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



**Step 4 Replace the T/R control circuit board.**

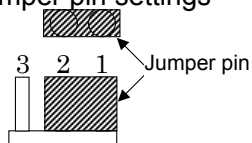
Remove the cables connected to the T/R control circuit board and the screws (seven M4 screws). Then replace it.



Set the DIP switch and jumper pins on the T/R control circuit board for the NKE-1125.

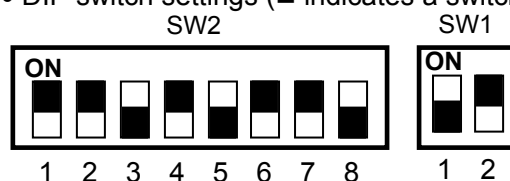
**©NKE-1125 (25 kW, X-band, 2 units, AC motor)**

- 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 screws and connect the cables.

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## **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 radar, open the service engineer menu, restore the scanner unit times, and make sure that the data has been correctly continued before/after the T/R control circuit board replacement (check the transmission time and the motor rotation time).
  
- (2) Begin transmission once the countdown is complete and check that the radar image is correctly displayed.




This completes T/R control circuit board replacement.

### 4.1.3.10 Relay Filter Circuit (CSC-656) 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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>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.

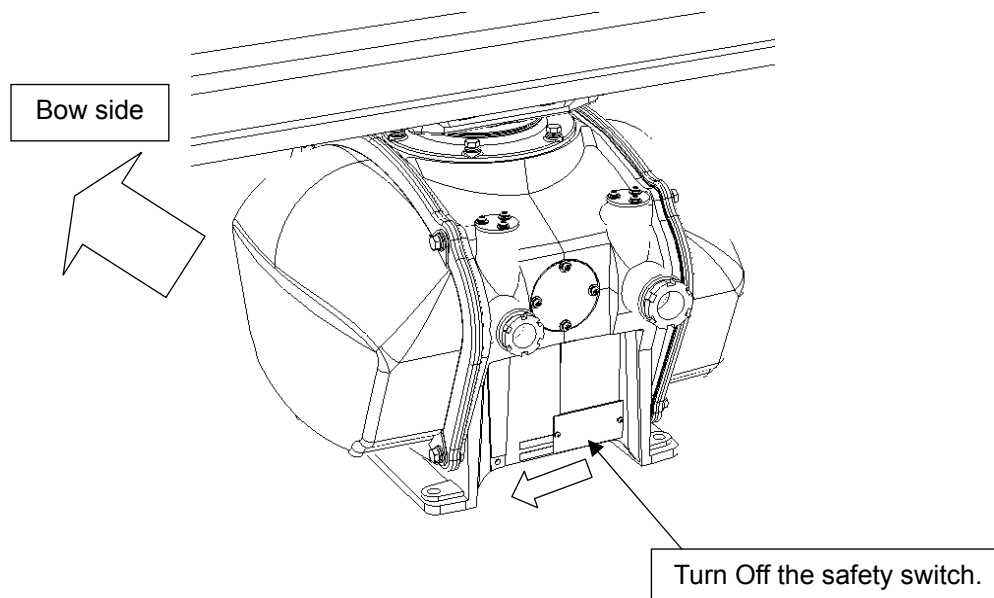


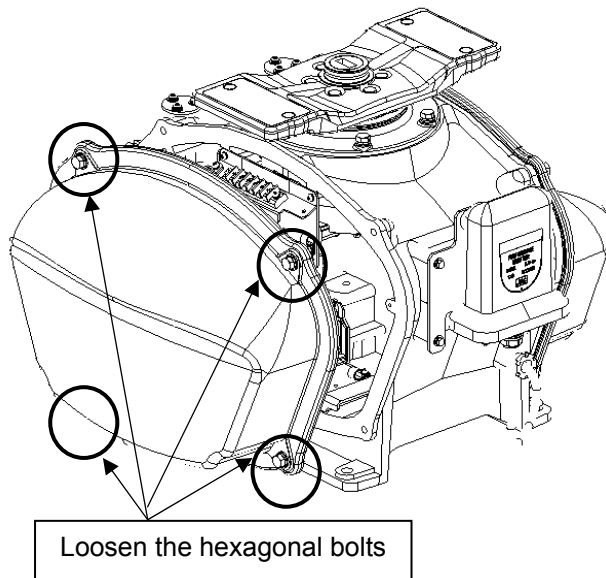
Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

#### **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.

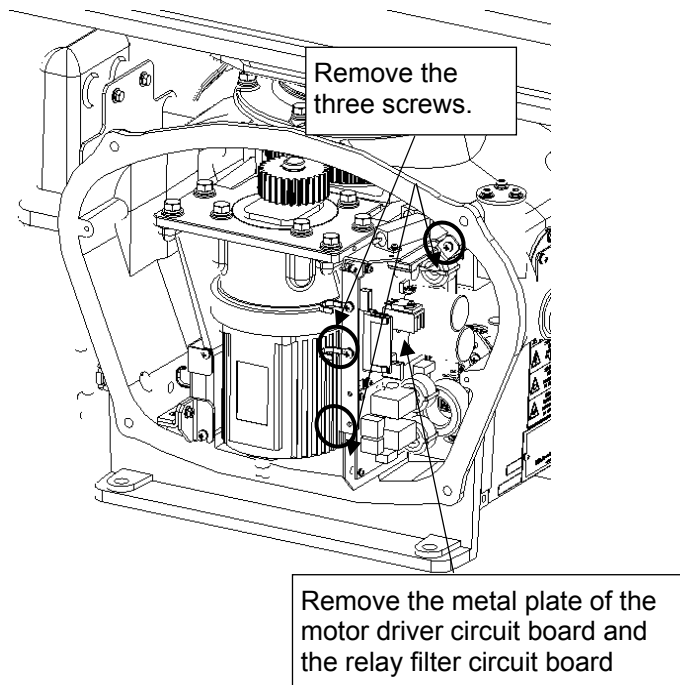




Example: Starboard side cover removal

**Step 2 Remove the metal plate of the motor driver circuit board and relay filter circuit board**

Remove the cover on the left (port) side. Remove the cable connecting to the motor driver circuit board and relay filter circuit board. After removing the screw (three M4 screws) and the cable, remove the metal plate to which the motor driver circuit board and relay filter circuit board are attached.

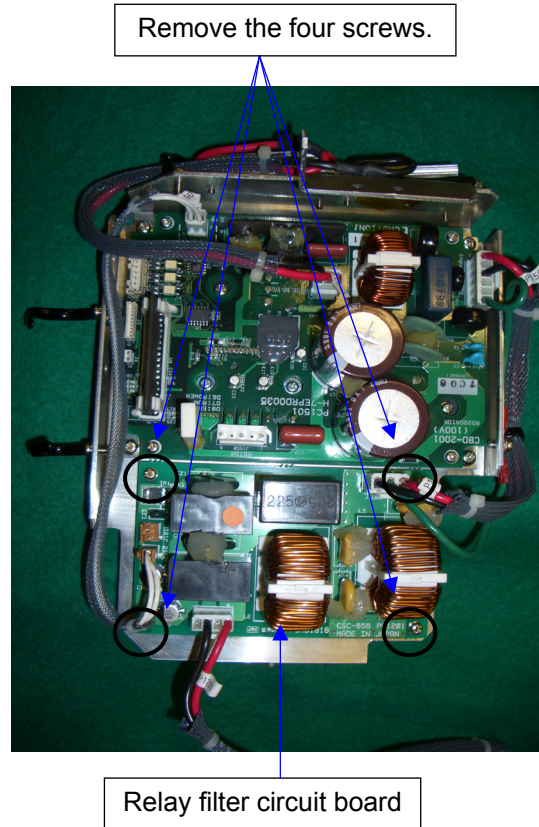


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### **Step 3**     **Replace the relay filter circuit board.**

Remove the screws holding the relay filter circuit board in place (four M4 screws) and replace it. After having replaced the relay filter 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 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 relay filter circuit board replacement.






### 4.1.3.11 Receiver (NRG-162A) 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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>13 mm (for M8 screws) |  |

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



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



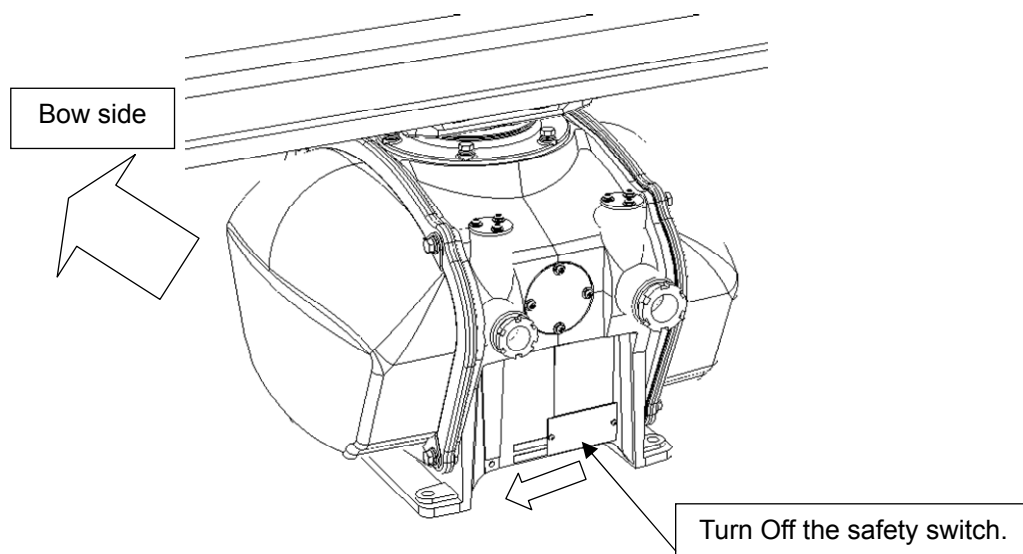
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.

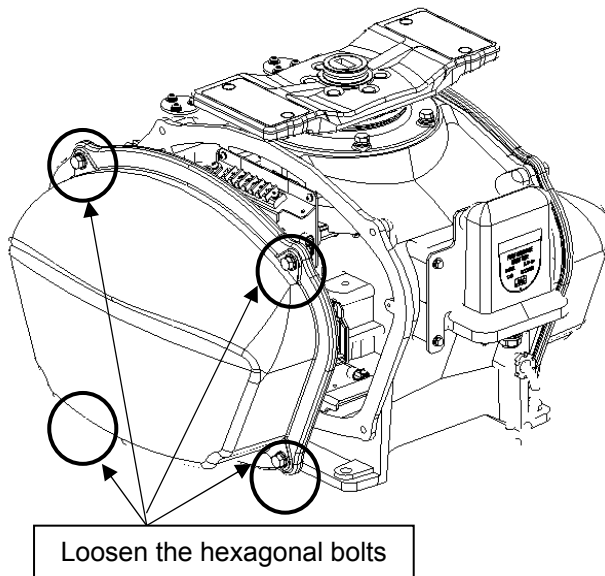


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

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

Before beginning work, turn Off the safety switch located on the bottom of the stern side of the scanner unit. Loosen the hexagonal bolts (four bolts) and remove the pedestal cover.

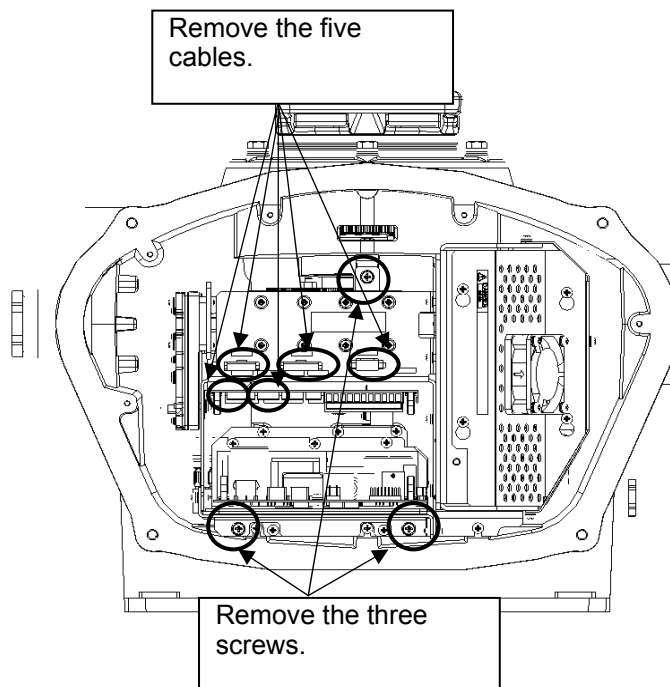




Example: Starboard side cover removal

**Step 2 Remove the transmitter-receiver unit.**

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



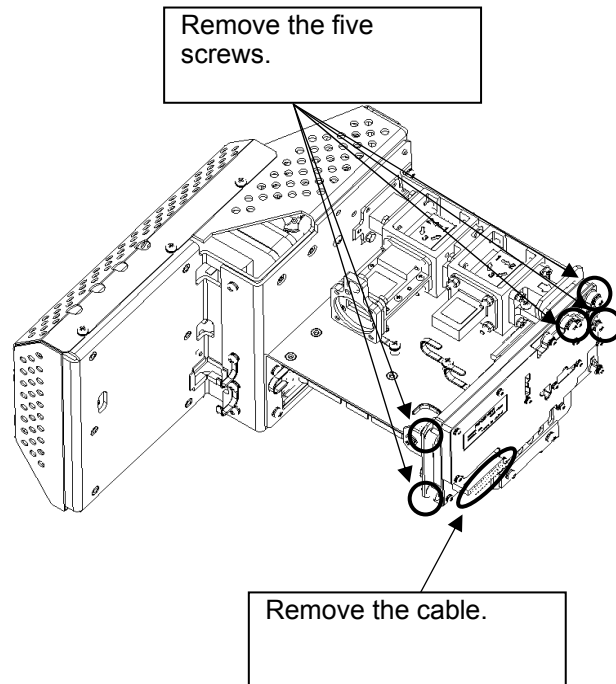
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### **Step 3**     **Replace the receiving unit.**

Remove the screws (five M4 screws) holding the receiver in place. Remove the cables connected to the receiver, then replace it. Transfer the metal fitting from the removed receiver to the replacement receiver and fit it into the casing.

After having replaced the receiver, 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 having completed the replacement, 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. Transmit the radio wave in the long range mode and open the service engineer menu to perform tuning adjustment. Perform the adjustment in the service engineer menu until the tuning display bar on the display unit reaches the 8th calibration mark.




This completes receiving unit replacement.

## 4.1.3.12 Encoder (CHT-71A) 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<br>7 mm (for M4 screws),<br>8 mm (for M6 screws),<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>7 mm (for M4 screws),<br>8 mm (for M6 screws),<br>13 mm (for M8 screws) |  |

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



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



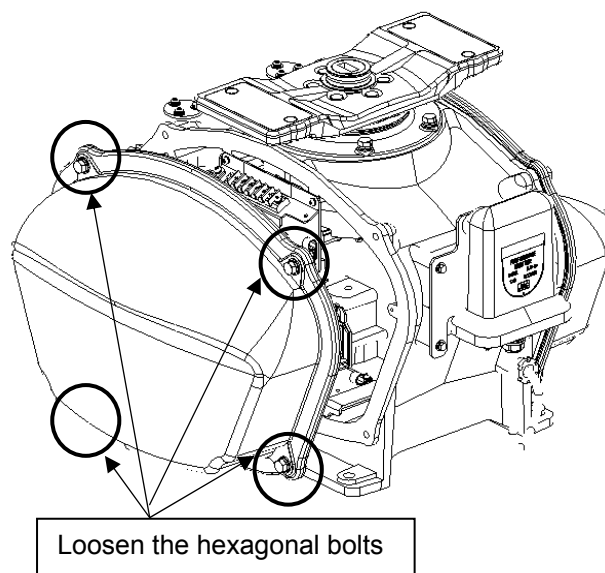
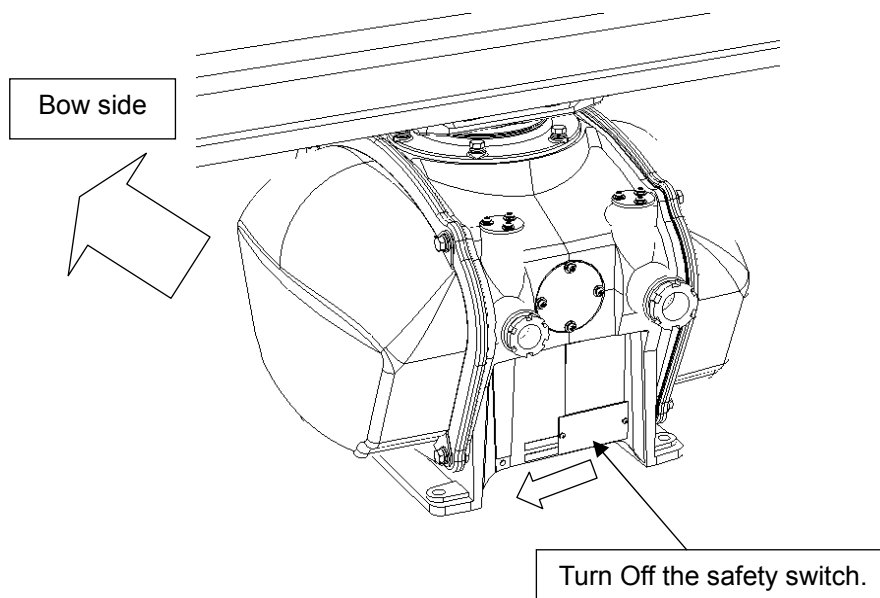
Before conducting replacement work, turn Off the circuit breaker for the power supply of the display unit.



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

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

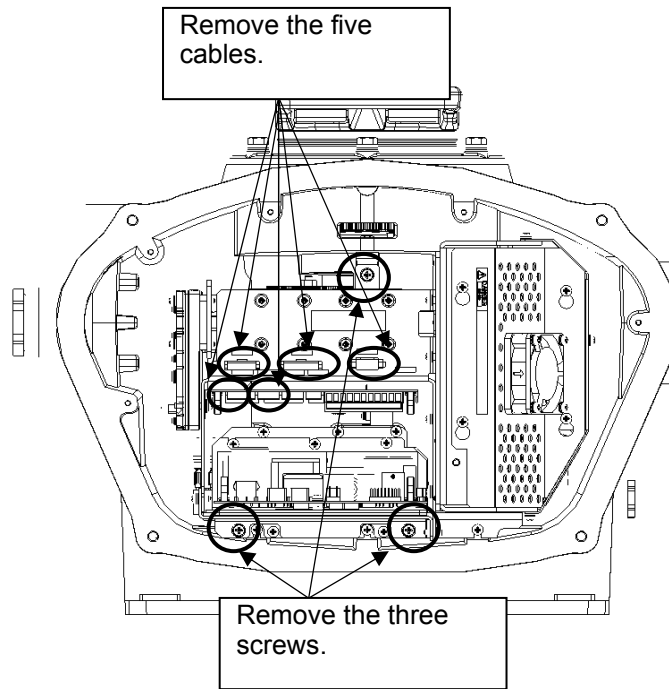
Before beginning work, turn Off the safety switch located on the bottom of the stern side of the scanner unit. Loosen the hexagonal bolts (four bolts) and remove the pedestal cover.



Example: Starboard side cover removal

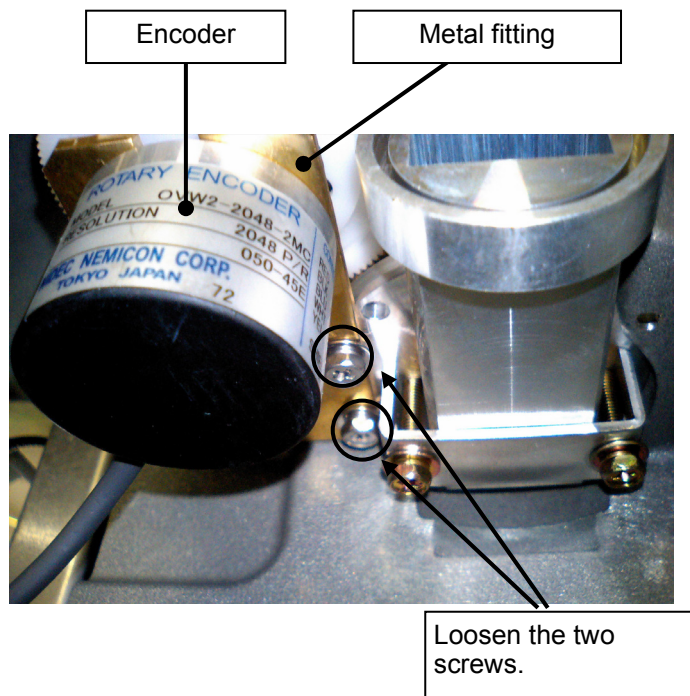
## **Step 2 Remove the transmitter-receiver unit.**

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



**Step 3 Remove the encoder.**

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

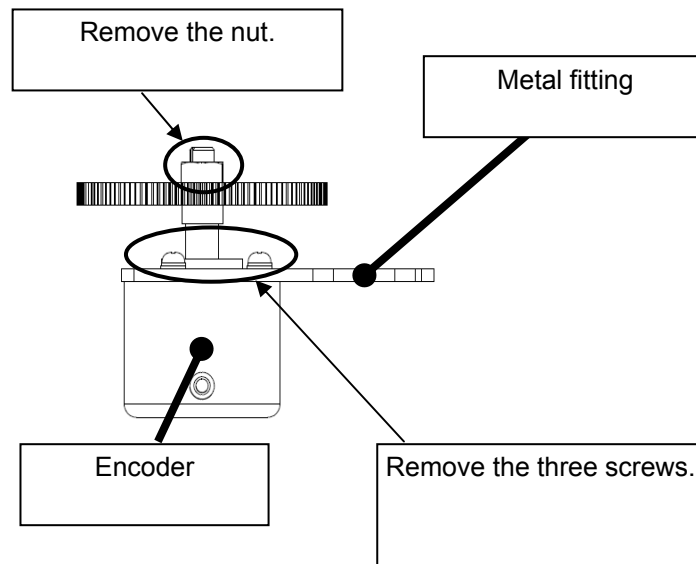


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#### **Step 4**    **Replace the encoder.**

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.

### 4.1.3.13 Brake Control Circuit (CCB-655A) 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<br>7 mm (for M4 screws),<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>7 mm (for M4 screws),<br>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.

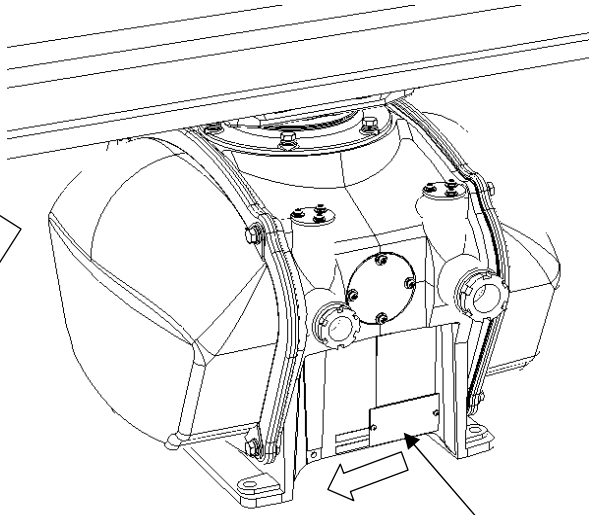
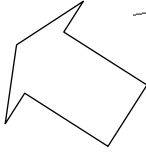
Loosen the hexagonal bolts (four bolts) and remove the pedestal cover.



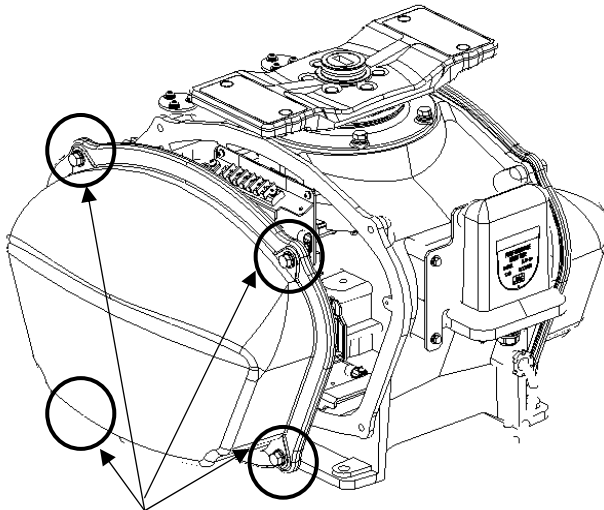
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Bow side



Turn Off the safety switch.



Loosen the hexagonal bolts

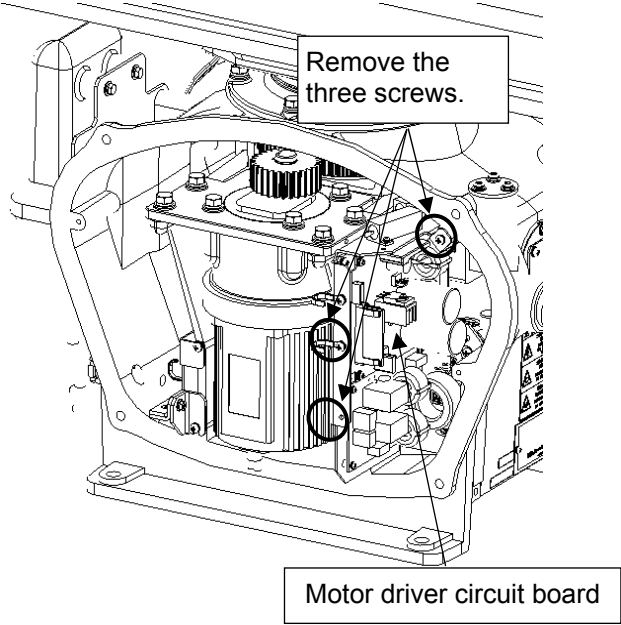
Example: Starboard side cover removal

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**Step 2 Remove the metal plate of the motor driver circuit board and relay filter circuit board**

Remove the cover on the left (port) side. Remove the cable connecting to the motor driver circuit board and relay filter circuit board. After removing the screw (three M4 screws) and the cable, remove the metal plate to which the motor driver circuit board and relay filter circuit board are attached.



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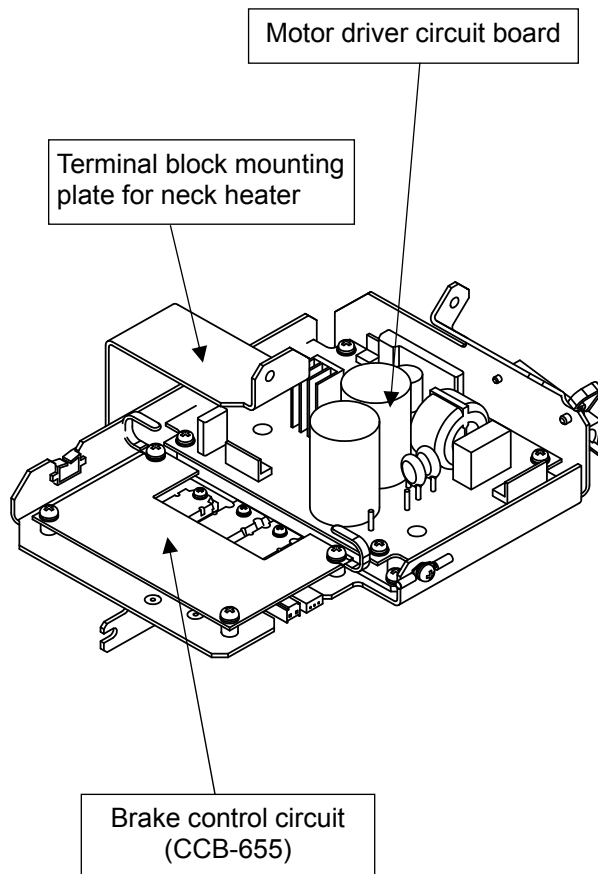
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### **Step 3**     **Replace the brake control circuit.**

Remove the cable that is connected to the brake control circuit.

Then, remove the motor driver circuit by removing the four screws (M4), the relay filter by removing the four screws (M4), and the neck heater terminal block mounting plate by removing the two screws (M4).

Replace the brake control circuit by removing the four spacers (M4) and two FET screws (M3) that are holding the circuit board. 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 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 control circuit replacement.

### 4.1.3.14 Brake Circuit (CFA-253) 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                                     |  |
| 2  | Open-end wrench*1    | Width across flats<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>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.

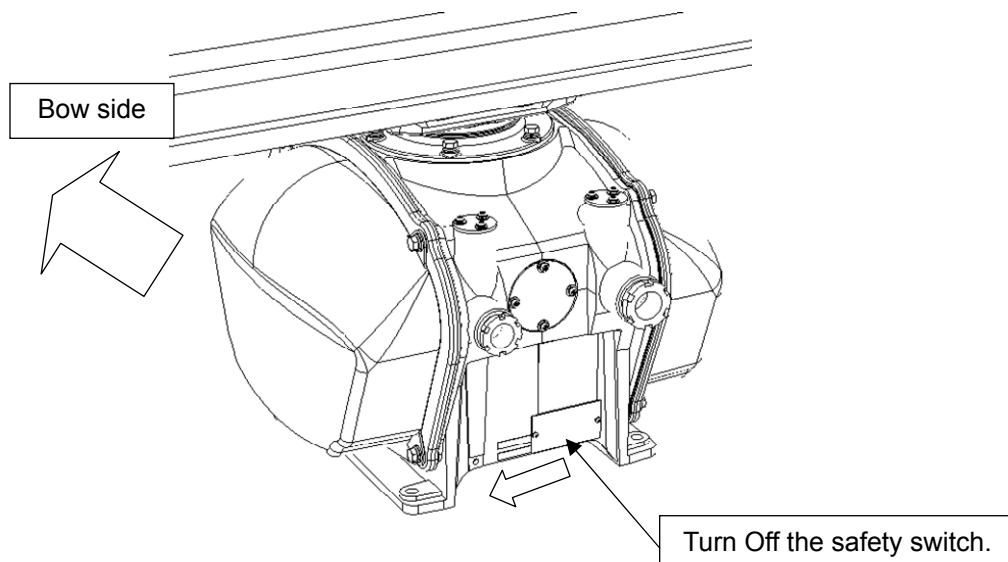


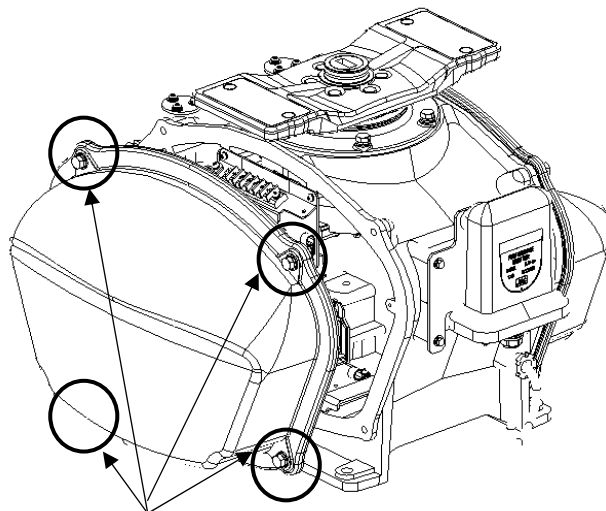
Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

#### **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.



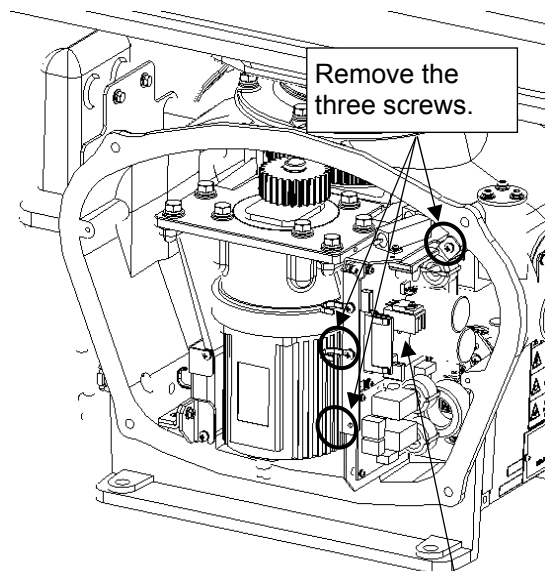


Loosen the hexagonal bolts

Example: Starboard side cover removal

**Step 2 Remove the metal plate of the motor driver circuit board and relay filter circuit board**

Remove the cover on the left (port) side, remove the cable connecting to the motor driver circuit board and relay filter circuit board and the screw (three M4 screws) securing the cable, and remove the metal plate to which the motor driver circuit board and relay filter circuit board is attached.



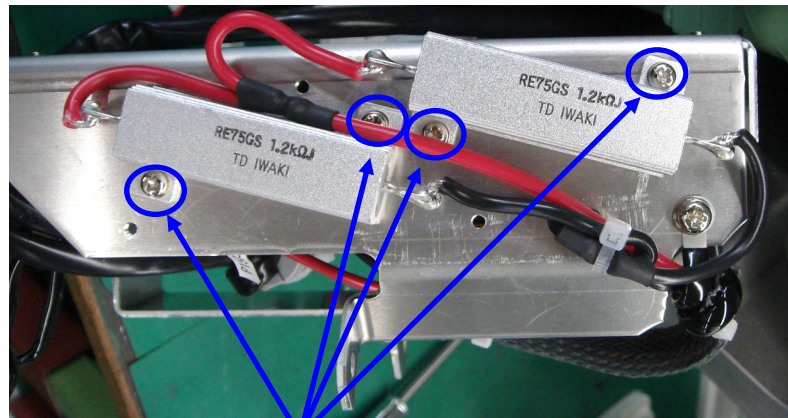
Remove the three screws.

Remove the metal plate of the motor driver circuit board and the relay filter circuit board

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

Remove the four screws (M4) on the resistors at the top of the unit. Remove the cable that is connected to J1504 of the motor driver circuit, and replace the brake circuit (CFA-253: resistor with cable). After replacing the brake circuit, 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.



Remove the four screws.

### **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 replacement.

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### 4.1.3.15 Brake Circuit Unit (NZR-16) 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                                     |  |
| 2  | Open-end wrench*1    | Width across flats<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>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.

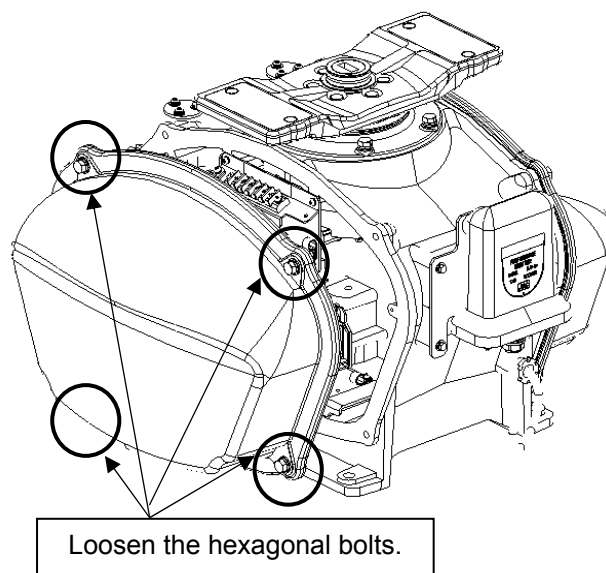
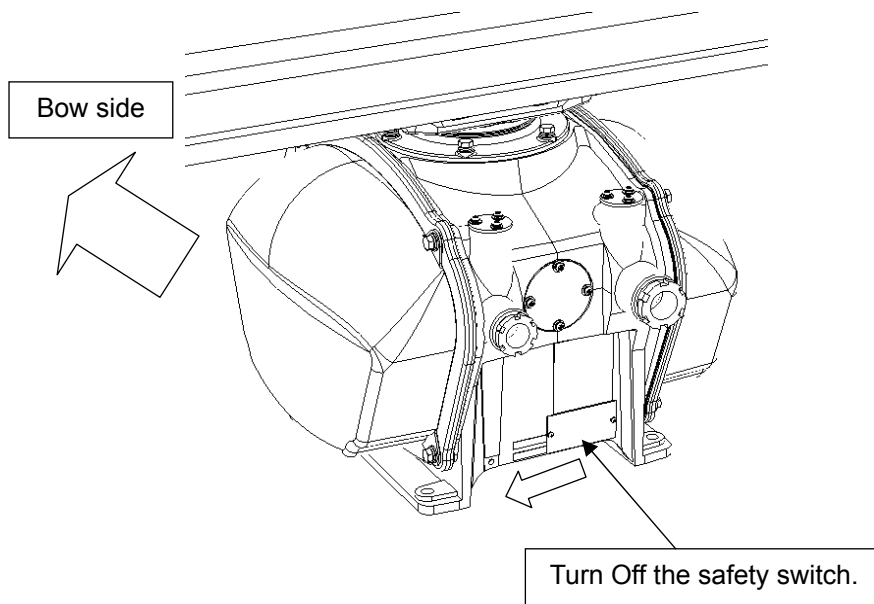


Exercise care not to lose bolts, screws and other parts removed from the Scanner unit, as they will be used again in later steps.

#### **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.

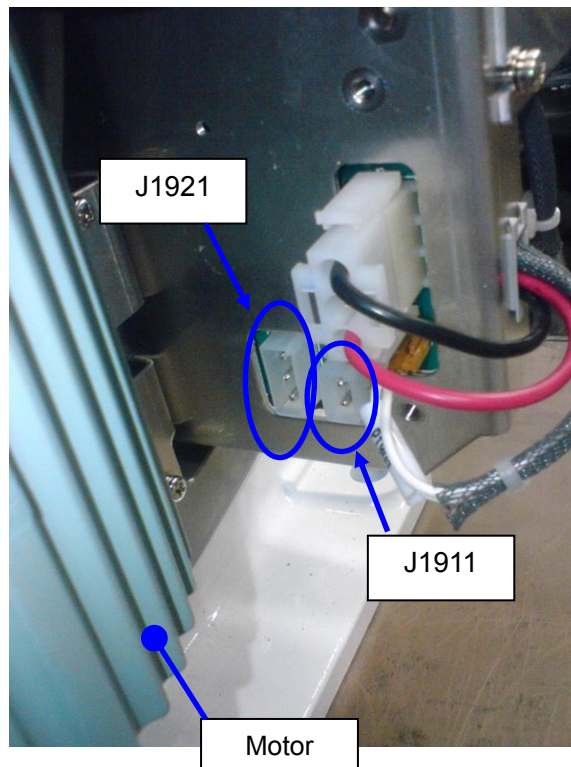


Example: Starboard side cover removal

## **Step 2 Remove the brake control circuit cable**

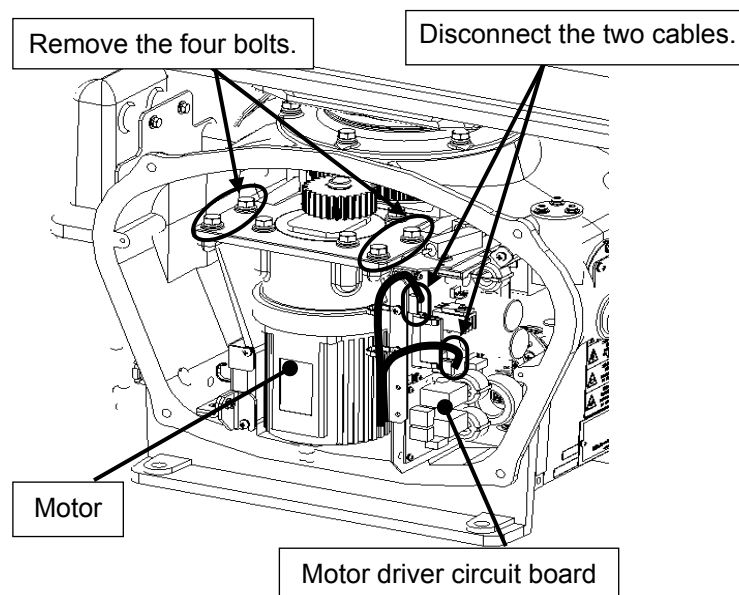
Remove the cover on the left (port) side and remove the cables connected to J1911 and J1921 of the brake control circuit (CCB-655).





### **Step 3 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.

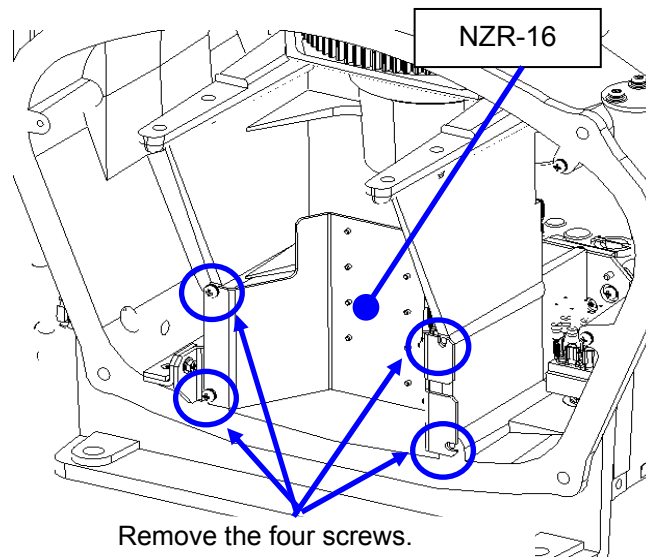


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#### **Step 4**    **Replace the brake circuit unit.**

Remove four screws (M4) and replace the break circuit unit (NZR-16). After replacing the brake circuit, 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 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.

## 4.1.3.16 Performance Monitor (NJU-85) Replacement/NKE-1125

### 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-85) with the bolt of the attachment.

(6-B5X12SUS,SW5,W5)

パフォーマンスモニタ(NJU-85)にアダプタを付属のボルトで固定する。

(6-B5X12SUS、SW5、W5)

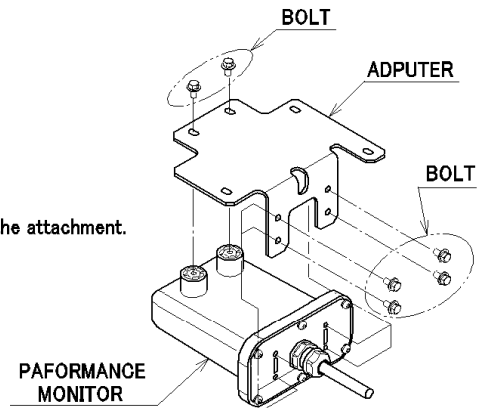


Fig1 (図1)

#### 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.

(3-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。

(3-B5X12SUS、SW5、W5)

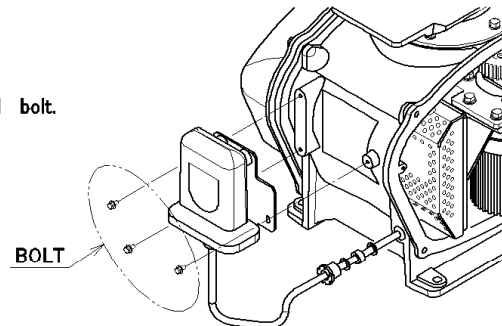


Fig2 (図2)

#### 3. Wiring

##### 配線

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

Each connector (J81,J82) and the earth terminal are connected. ,as shown in Fig.4

ケーブルに締付グラウンド ワッシャ ガasketをケーブルに通します。(図3)

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)

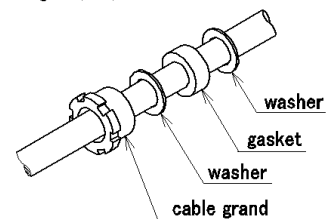


Fig3 (図3)

#### 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)

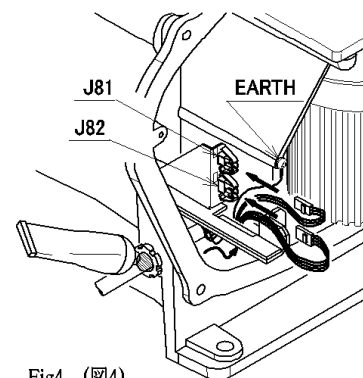


Fig4 (図4)

MTZ303916

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## 4.1.4 NKE-1129 Scanner Unit

### 4.1.4.1 Motor Replacement/NKE-1129

See the section for NKE-1125.

### 4.1.4.2 Motor drive Circuit Board Replacement/NKE-1129




See the section for NKE-1125.

### 4.1.4.3 Encoder (CHT-71A) Replacement/NKE-1129

#### [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<br>7 mm (for M4 screws),<br>8 mm (for M6 screws),<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>7 mm (for M4 screws),<br>8 mm (for M6 screws),<br>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 radar antenna.



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



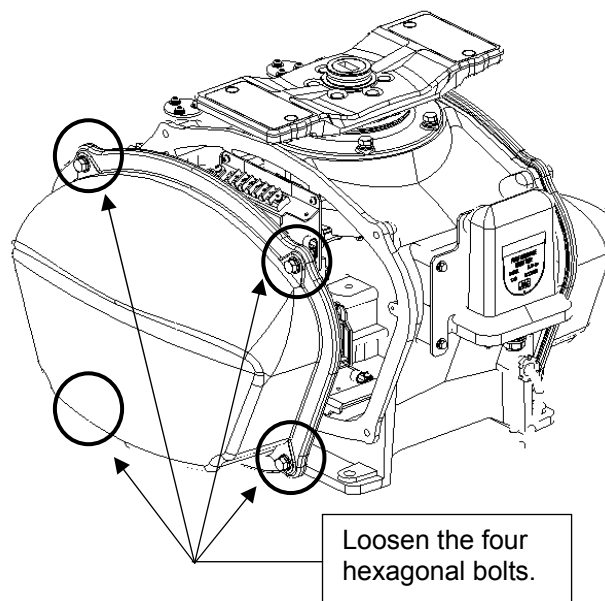
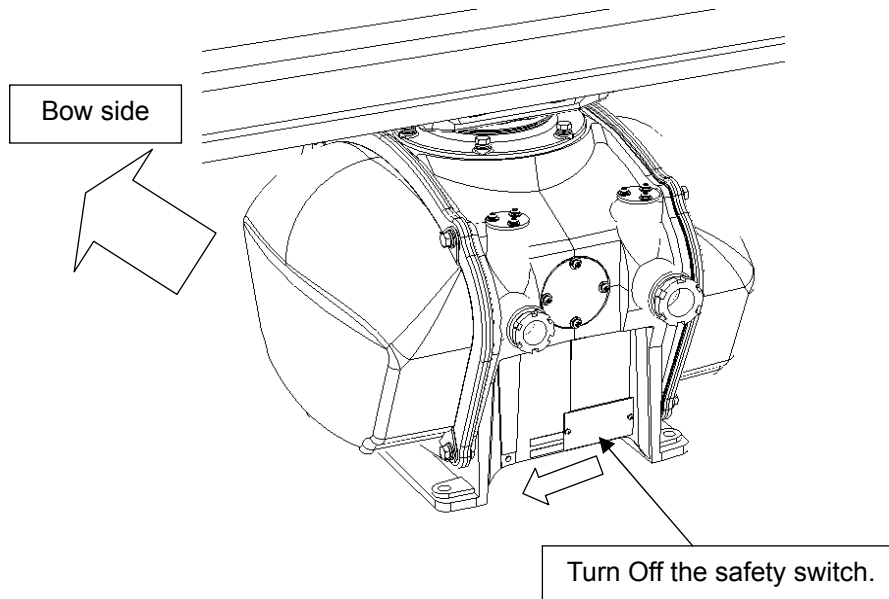
Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

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**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.



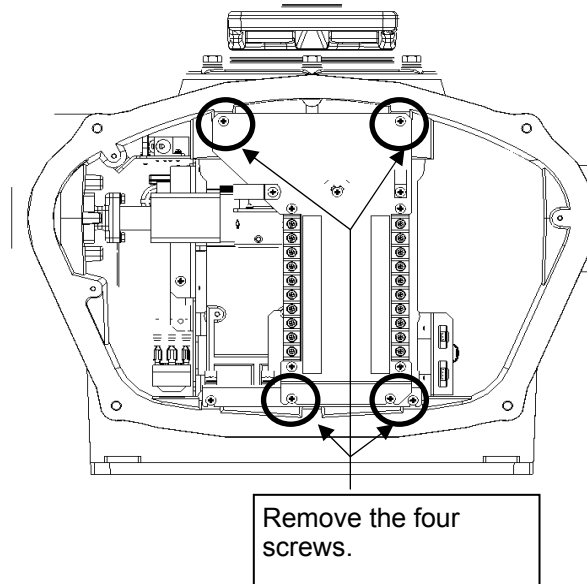
Example: Removal of starboard side cover.

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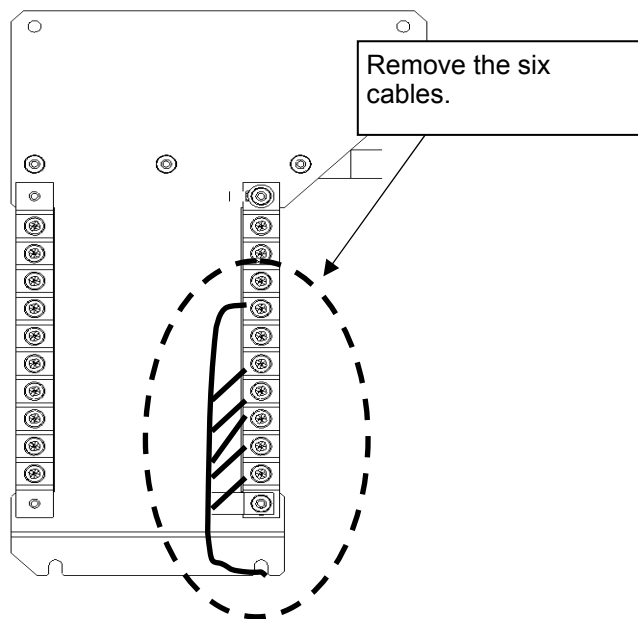
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**Step 2 Remove the plate from the terminal block.**

Remove the covers from the right (starboard) side. Remove the screws (four M4 screws) to remove the plate to which the terminal block is attached.



**Step 3 Remove the encoder cable.**

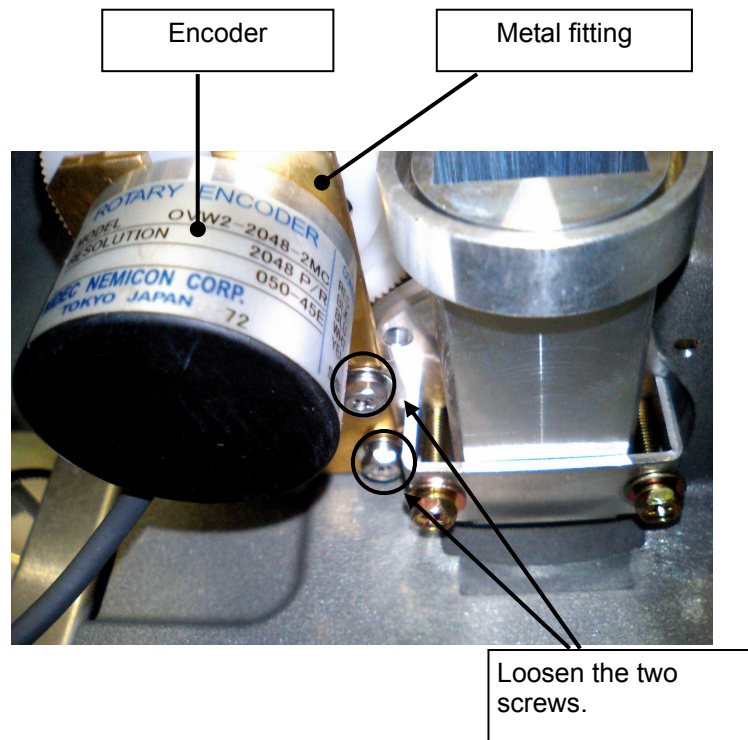


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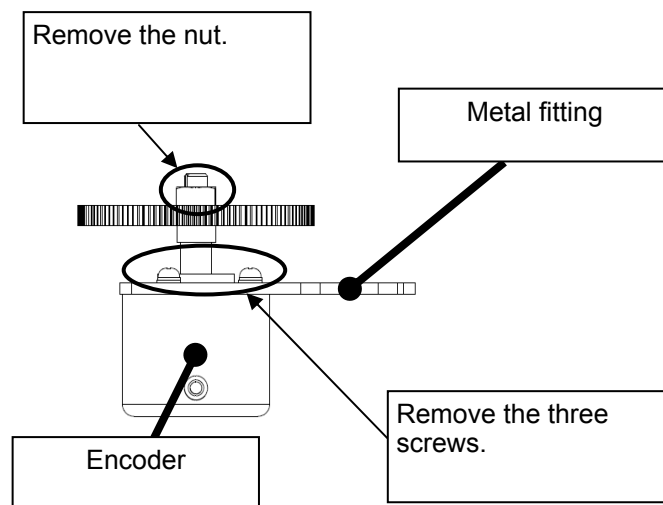
#### **Step 4 Remove the encoder.**

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.



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## **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.

### **4.1.4.4    Brake Control Circuit (CCB-655A) Replacement/NKE-1129**

See the section for NKE-1125.

### **4.1.4.5    Brake Circuit (CFA-253) Replacement/NKE-1129**

See the section for NKE-1125.

### **4.1.4.6    Brake Circuit Unit (NZR-15) Replacement/NKE-1129**

See the section for NKE-1125.

### **4.1.4.7    Performance Monitor (NJU-85) Replacement/NKE-1129**

See the section for NKE-1125.



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## 4.1.5 NKE-2254-HS Scanner Unit

### 4.1.5.1 Magnetron Replacement/NKE-2254-HS




See the section for NKE-1125.

### 4.1.5.2 Motor Replacement/NKE-2254-HS

#### [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<br>13 mm (for M8 screws),<br>17 mm (for M10 screws) |    |
| 3  | Socket wrench*1      | Width across flats<br>13 mm (for M8 screws),<br>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 radar antenna.



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

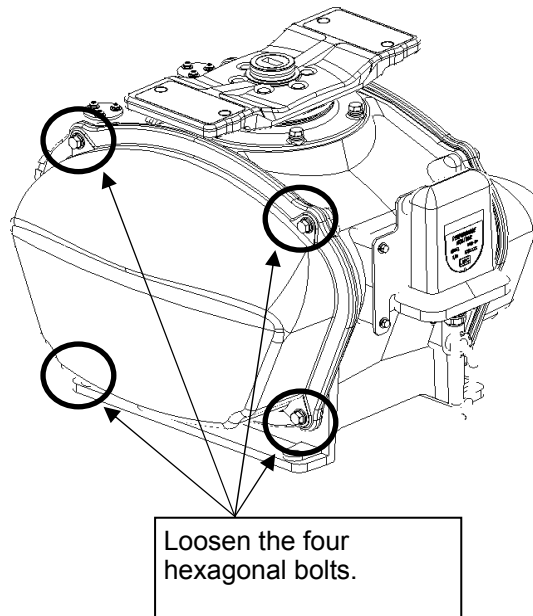
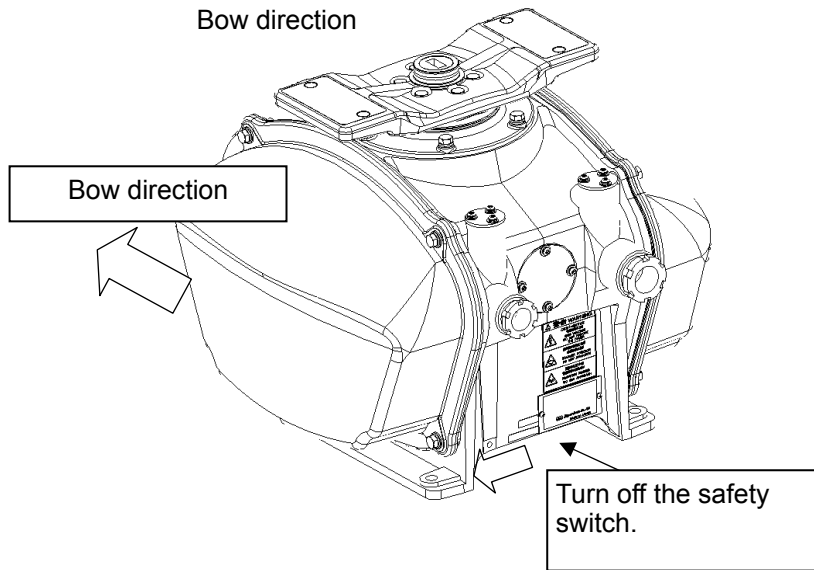


Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

#### **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.



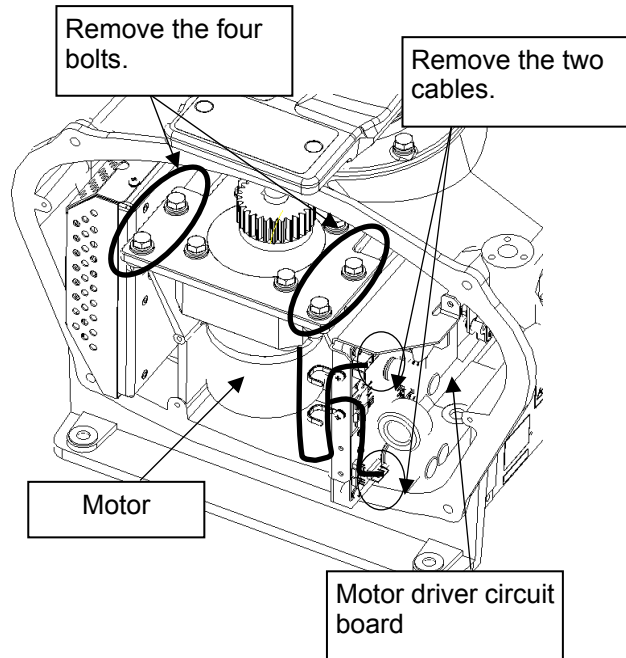
Example: Removal of starboard side cover.

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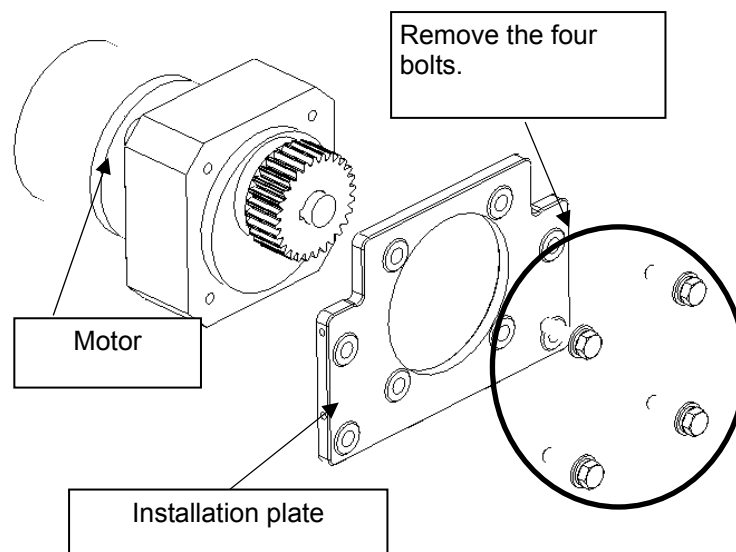
## **Step 2    Remove the motor.**

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



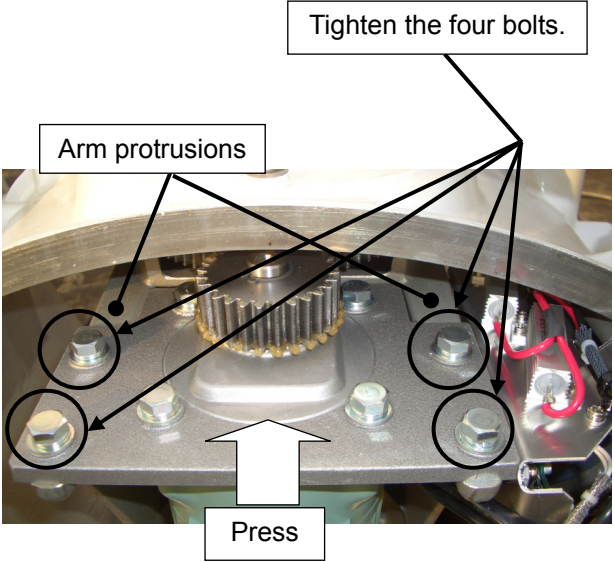
## **Step 3    Replace the motor.**

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.



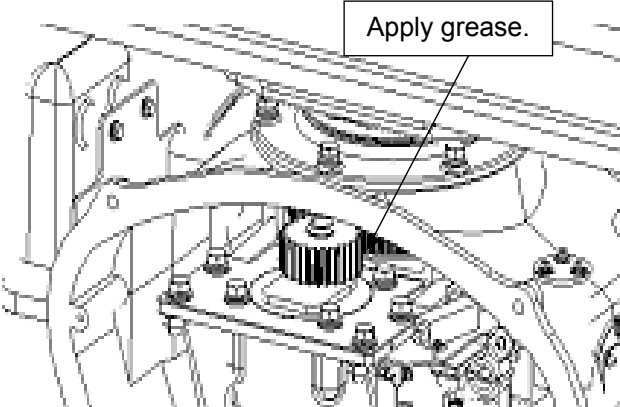
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Install the motor into the scanner unit. Press the motor against the protrusions of the arm fixed to the motor on which the arm extends through the wall of the casing, adjust it to minimize backlash, and fix it in place. Do not forget to tighten the 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.



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## **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.

### 4.1.5.3 Motor drive Circuit Board (CBD-1779) Replacement/NKE-2254-HS

#### [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<br>13 mm (for M8 screws),<br>17 mm (for M10 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>13 mm (for M8 screws),<br>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 radar antenna.



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

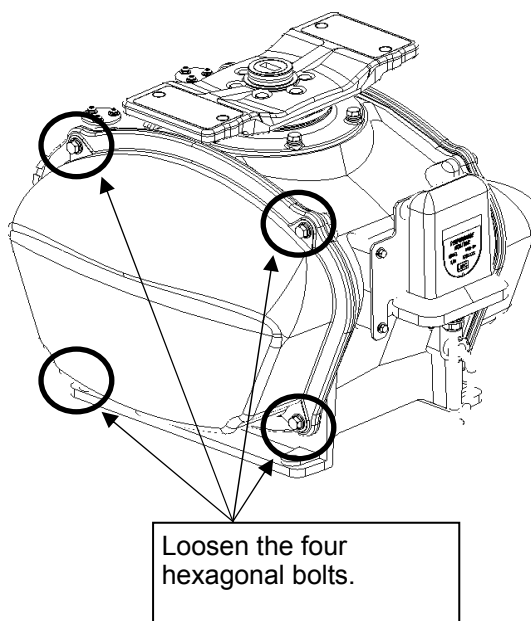
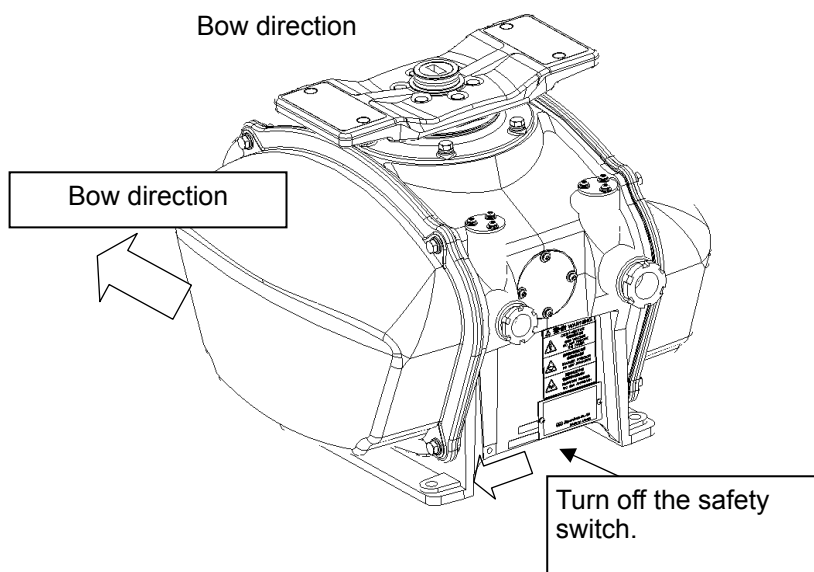


Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

#### **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.



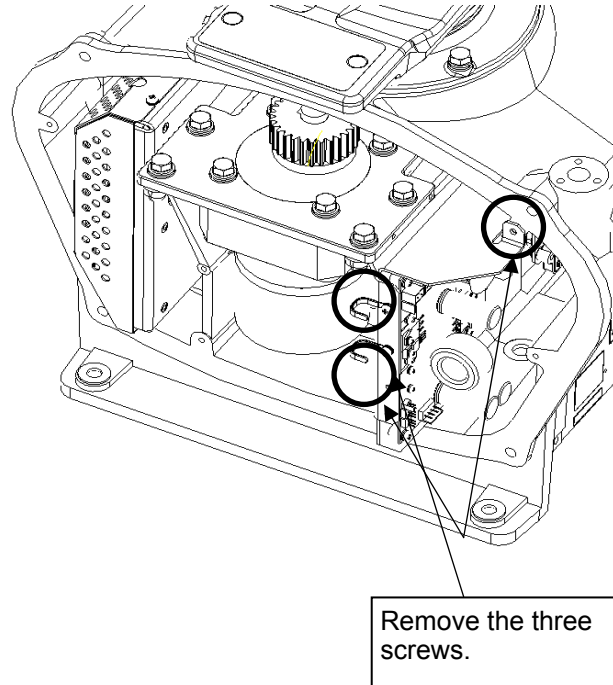
Example: Removal of starboard side cover.

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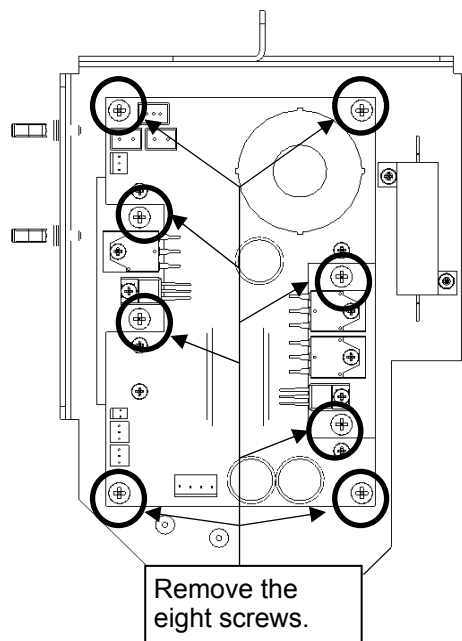
## **Step 2 Remove the plate of the Motor driver circuit.**

Remove the cover on the left (port) side. Remove the screws (three M4 screws) and cables connected to the motor driver circuit board. Remove the metal plate to which motor driver circuit board and relay filter circuit board are attached.



## **Step 3 Replace the Motor driver circuit.**

Remove the cables connected to the motor driver circuit board. Remove the screws (four M4 screws) and then replace it. After having replaced the driver circuit board, 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.





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#### **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. 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 driver circuit replacement.

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#### 4.1.5.4 Modulator Circuit (CPA-264) Replacement/NKE-2254-HS

See the section for NKE-1125.

#### 4.1.5.5 Modulator (NMA-550) Replacement/NKE-2254-HS

See the section for NKE-1125.

#### 4.1.5.6 Power Supply Circuit Board (CBD-1682A) Replacement/NKE-2254-HS

See the section for NKE-1125.

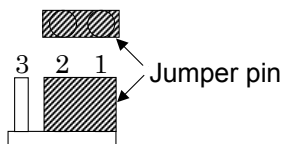
#### 4.1.5.7 T/R Control Circuit (CMC-1205R) Replacement/NKE-2254-HS

See the section for NKE-1125.

For NKE-2254-HS, set the jumper pins and Dip switches as follows.

©NKE-2254-HS (25 kW, X-band, 2 units, high-speed DC motor)

• Jumper pin settings



• DIP switch settings (■ indicates a switch.)



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

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#### 4.1.5.8 Receiver (NRG-162A) Replacement/NKE-2254-HS

See the section for NKE-1125.

#### 4.1.5.9 Encoder (CHT-71A) Replacement/NKE-2254-HS

See the section for NKE-1125.

#### 4.1.5.10 Magnetron Fan Replacement/NKE-2254-HS

See the section for NKE-1125.

#### 4.1.5.11 Modulator Fan Replacement/NKE-2254-HS

See the section for NKE-1125.

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## 4.1.5.12 Brake Circuit (CFA-257) Replacement/NKE-2254-HS

### [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<br>13 mm (for M8 screws),<br>17 mm (for M10 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>13 mm (for M8 screws),<br>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 radar antenna.



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

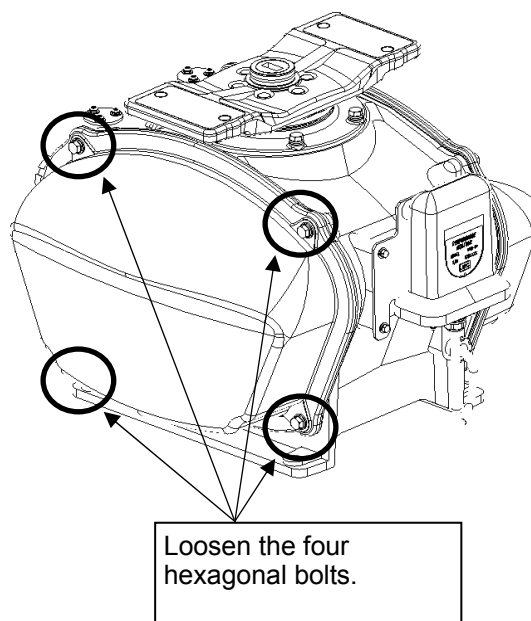
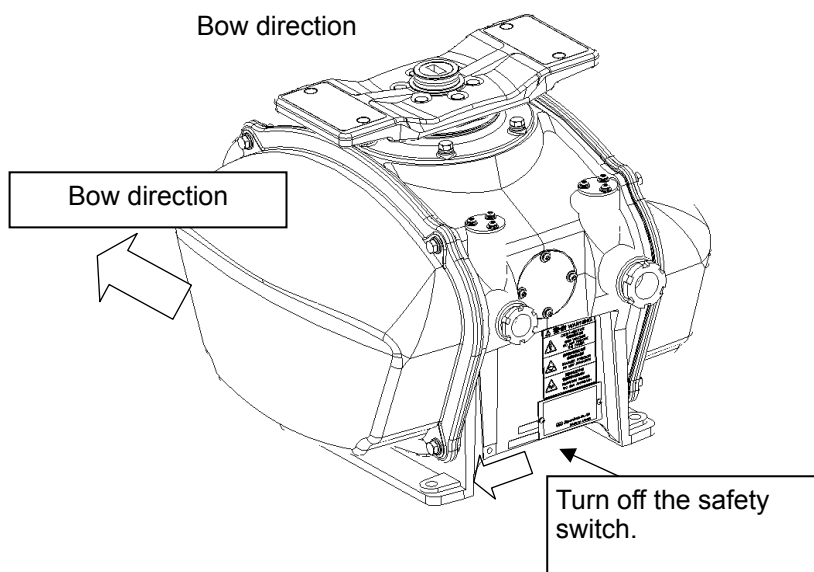


Exercise care not to lose bolts, screws and other parts removed from the radar antenna, as they will be used again in later steps.

### **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.



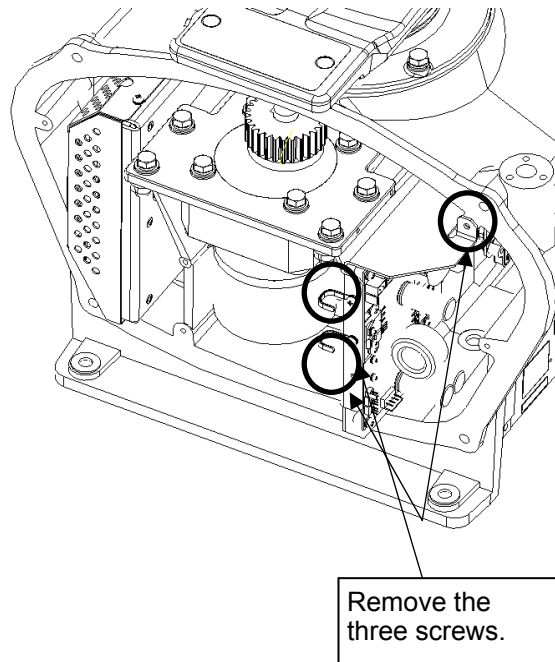
Example: Removal of starboard side cover.

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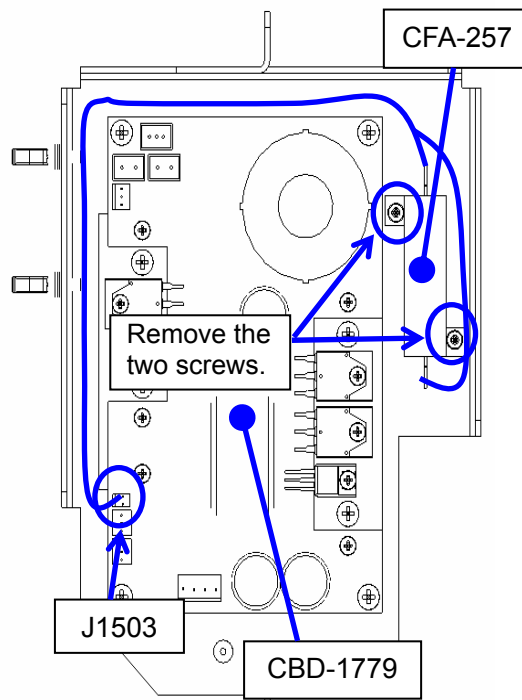
## **Step 2**    **Remove the plate from the Motor driver circuit.**

Remove the cover on the left (port) side, Remove the screws (three M4 screws) and cables connected to the motor driver circuit board. Remove the metal plate to which motor driver circuit board and relay filter circuit board are attached..



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

Remove the cable that is connected to J1503 of the Motor driver circuit (CBD-1779). Remove the two screws (M3) that are holding the resistor and replace the brake circuit (CFA-257: Resistor with cable). After replacing the brake, reassemble the unit following the deassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



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#### **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 replacement.

#### **4.1.5.13 Performance Monitor (NJU-85) Replacement/NKE-2254-HS**

See the section for NKE-1125.

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## 4.1.6 NKE-2103, NKE-2103-HS Scanner Unit

### 4.1.6.1 Magnetron Replacement/NKE-2103

# 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 wristwatch 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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1                   | Width across flats<br>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 radar antenna.



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 radar antenna, as they will be used again in later steps.

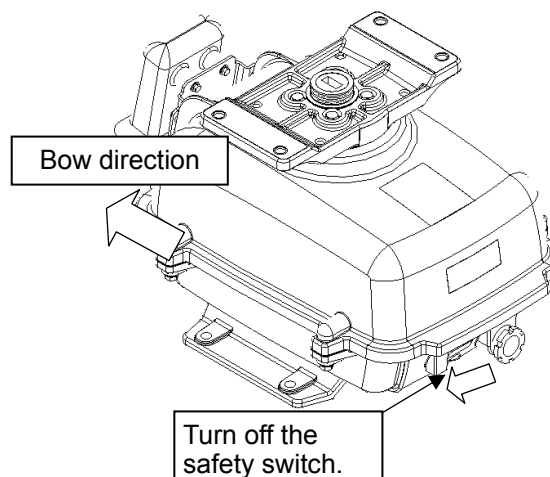
## **Step 1 Turn Off the safety switch and open the cover.**

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

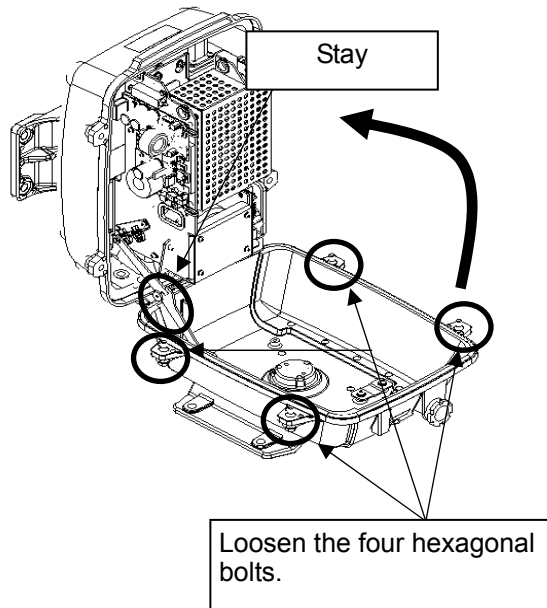
Loosen the hexagonal bolts (four bolts) and open the upper cover until the stopper of the stay operates.



When closing the upper cover, release the stay stopper and then tighten the cover.

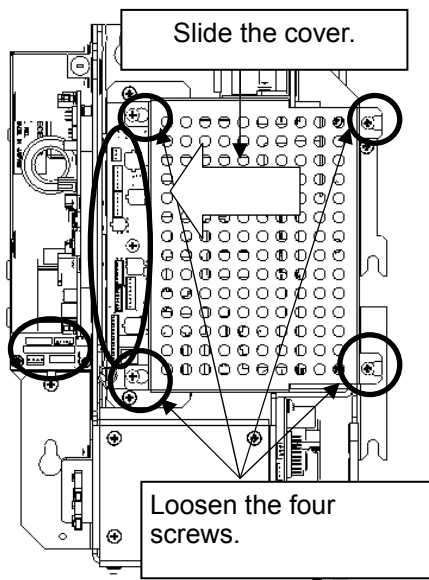






**Step 2 Remove the transmitter-receiver unit cover**

Open the upper cover, loosen the screws (four M4 screws), remove the transmitter-receiver unit cover, and disconnect the cables connected to the transmitter-receiver unit (ten cables). Slide the cover of the transmitter-receiver unit to remove it.

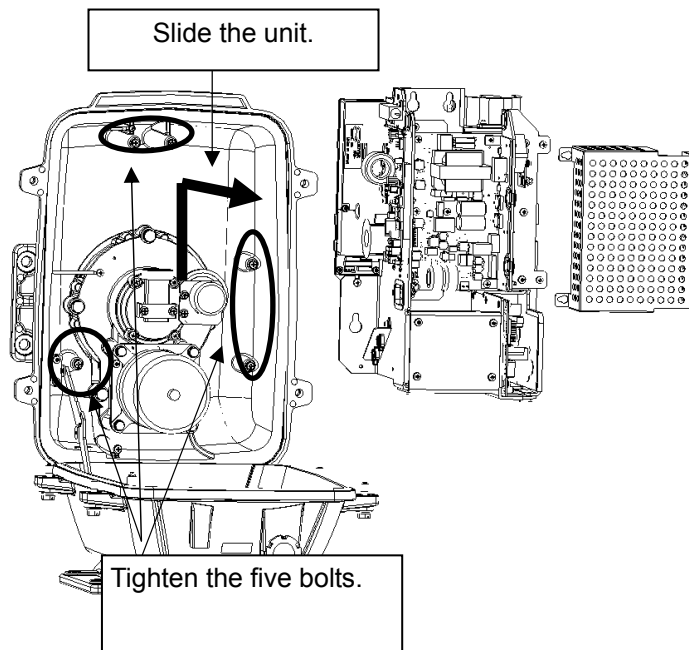


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### **Step 3 Remove the transmitter-receiver unit**

Loosen the bolts (five M5 bolts) and remove the transmitter-receiver unit. Slide it upward to remove.



### **Step 4 Replace the magnetron cover.**

Remove the screws (six M4 screws) holding the magnetron in place and then replace it.

Cut the leads (yellow and green) for the replacement magnetron to an appropriate length, then tighten the screws and fix the cables in place.

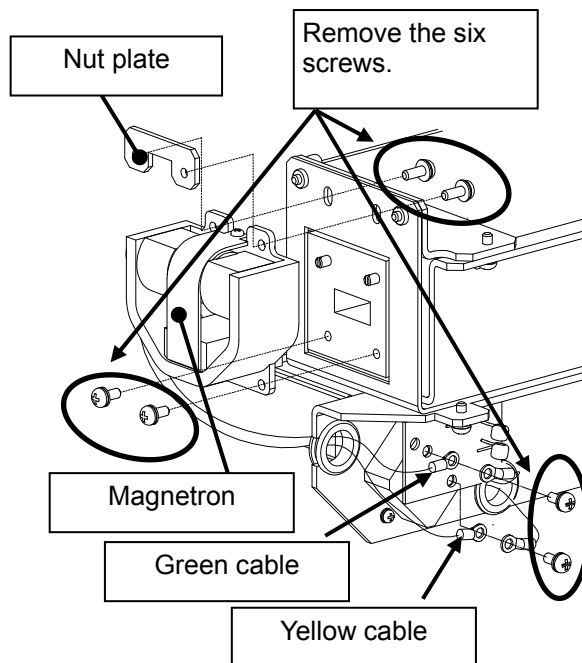
After having replaced the magnetron, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and make sure that the cables are connected.



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 5    Operation check**

After completing the replacement work, close the cover, 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 long pulse range. 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 4th and 7th calibration markings.
- (4) Finally, initialize the transmission time in the service engineer menu.

This completes magnetron replacement.

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## 4.1.6.2 Motor Replacement/NKE-2103

### [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<br>10 mm (for M6 screws),<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>10 mm (for M6 screws),<br>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 radar antenna.



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 radar antenna, as they will be used again in later steps.

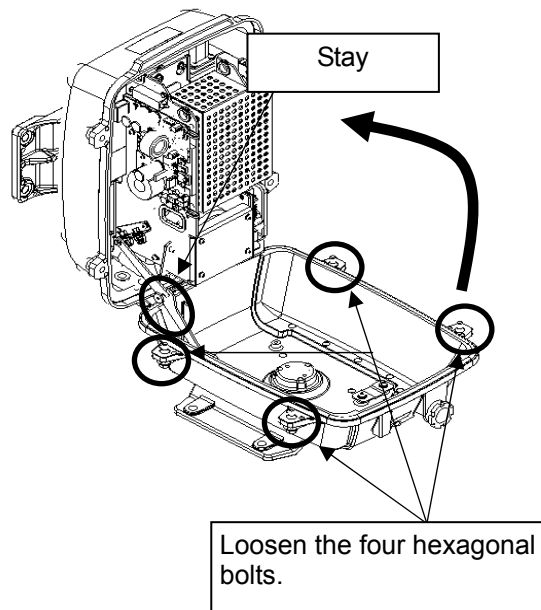
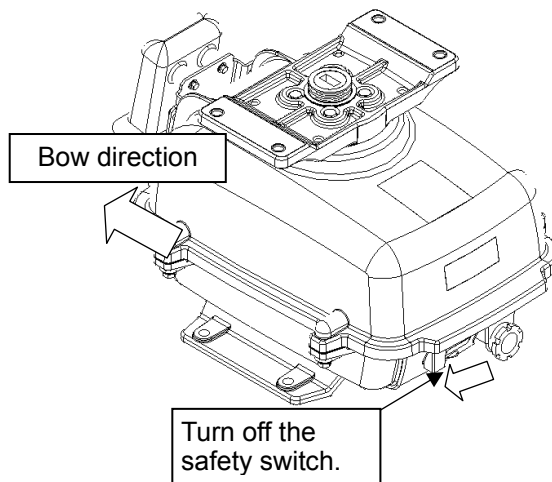
### **Step 1 Turn Off the safety switch and open the cover.**

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

Loosen the hexagonal bolts (four bolts) and open the upper cover until the stopper of the stay operates.

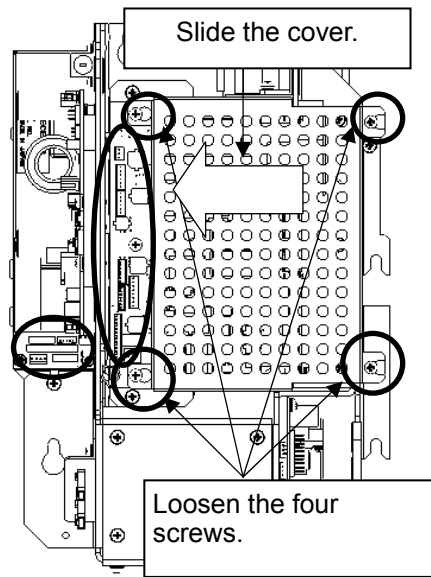


When closing the upper cover, release the stay stopper and then tighten the cover.



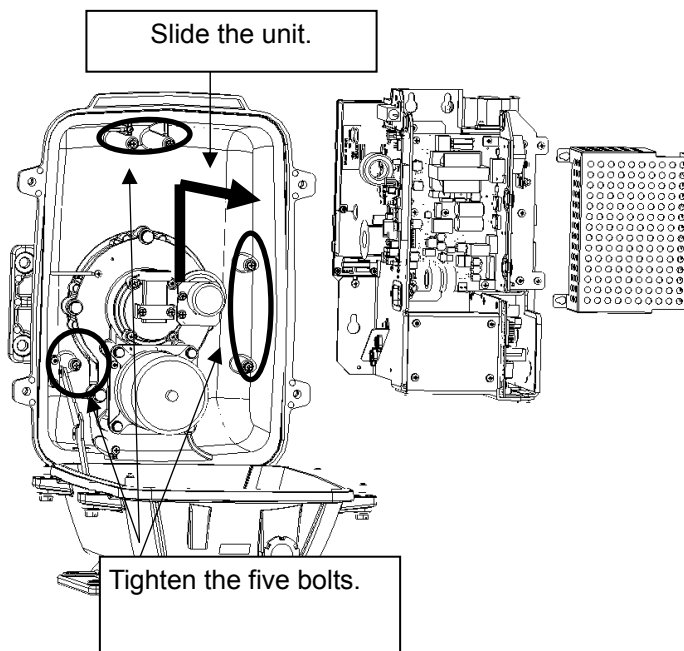
## **Step 2 Remove the transmitter-receiver unit cover**

Open the upper cover, loosen the screws (four M4 screws), remove the transmitter-receiver unit cover, and disconnect the cables connected to the transmitter-receiver unit (ten cables). Slide the cover of the transmitter-receiver unit to remove it.



### **Step 3    Remove the transmitter-receiver unit**

Loosen the bolts (five M5 bolts) and remove the transmitter-receiver unit. Slide it upward to remove.



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#### **Step 4     Replace the motor.**

Remove the hexagonal bolts (four M6 bolts) and remove the motor. Grease the gear wheel of the replacement motor and place it in the casing. Do not forget to tighten the hexagonal bolts to an appropriate torque (72 kgf-cm) so they are free of looseness.

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 do not forget to reconnect the cables.



Clamp the cables so they do not interfere with the rotation of the motor's rotors.

#### **Step 5     Operation check**

After completing the replacement work, close the cover, 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.

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### 4.1.6.3 Motor driver circuit Replacement/NKE-2103

#### [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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>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 radar antenna.



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 radar antenna, as they will be used again in later steps.

#### **Step 1 Turn Off the safety switch and open the cover.**

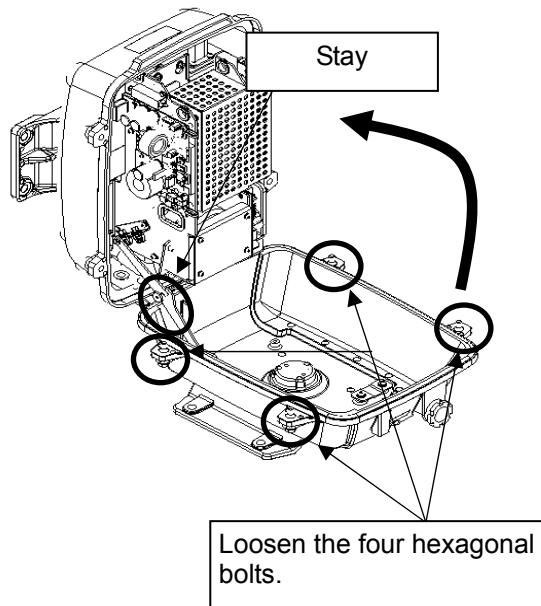
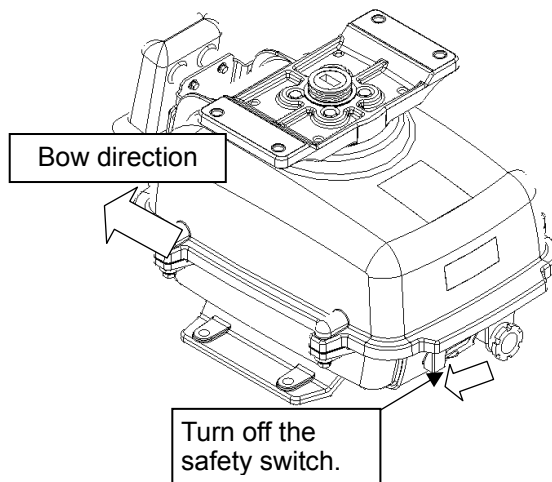
Before beginning work, turn Off the safety switch on the bottom of the scanner unit.

Loosen the hexagonal bolts (four bolts) and open the upper cover until the stopper of the stay operates.



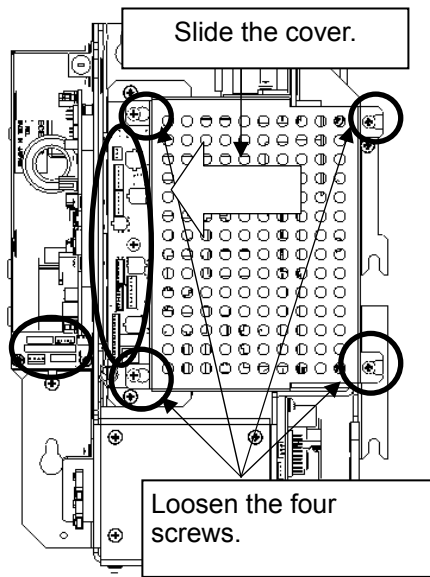
When closing the upper cover, release the stay stopper and then tighten the cover.





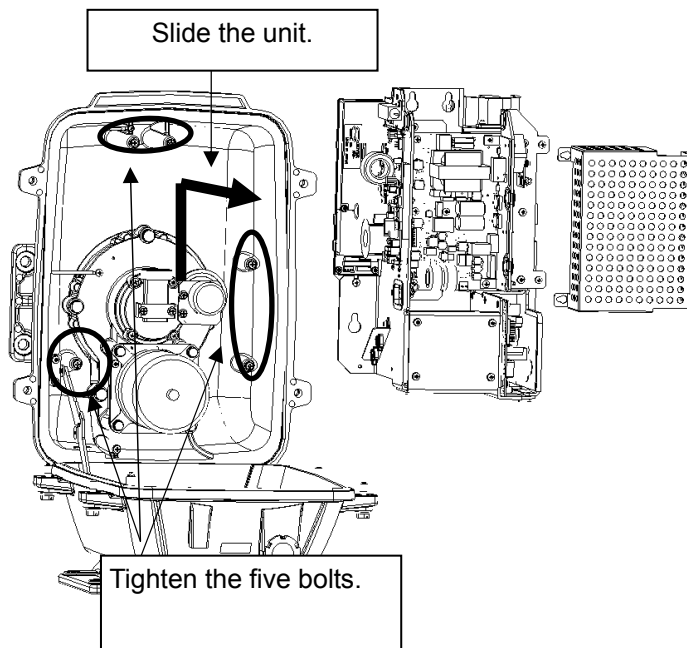
## **Step 2 Remove the transmitter-receiver unit cover**

Open the upper cover, loosen the screws (four M4 screws), remove the transmitter-receiver unit cover, and disconnect the cables connected to the transmitter-receiver unit (ten cables). Slide the cover of the transmitter-receiver unit to remove it.



### **Step 3 Remove the transmitter-receiver unit**

Loosen the bolts (five M5 bolts) and remove the transmitter-receiver unit. Slide it upward to remove.



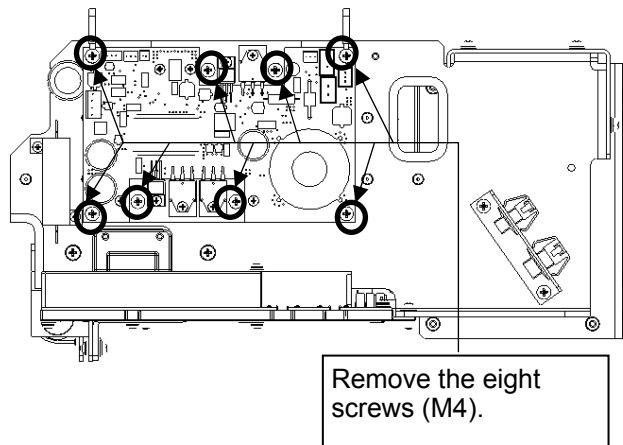
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#### **Step 4     Replace the Motor driver circuit.**

Remove the cables and screws (eight M4 screws) connected to the Motor driver circuit, and then replace it.

After having replaced the Motor driver 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, close the cover, 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 Motor driver circuit replacement.

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#### 4.1.6.4 Modulator Circuit (CME-363) Replacement/NKE-2103

##### [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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>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 radar antenna.



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 radar antenna, as they will be used again in later steps.

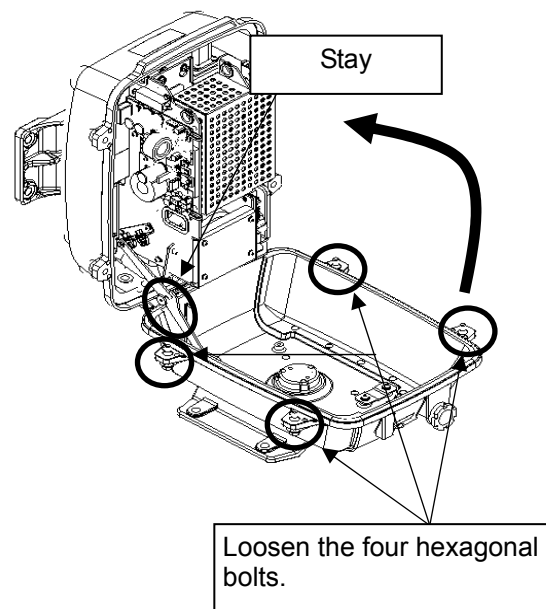
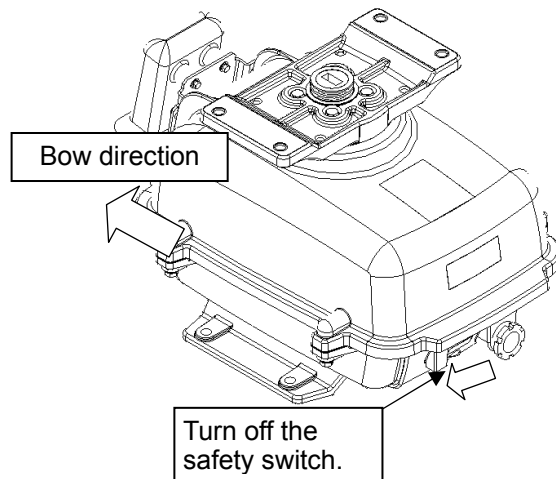
#### **Step 1 Turn Off the safety switch and open the cover.**

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

Loosen the hexagonal bolts (four bolts) and open the upper cover until the stopper of the stay operates.

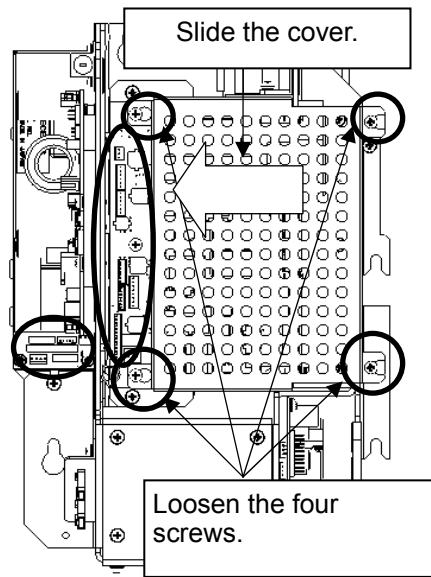


When closing the upper cover, release the stay stopper and then tighten the cover.



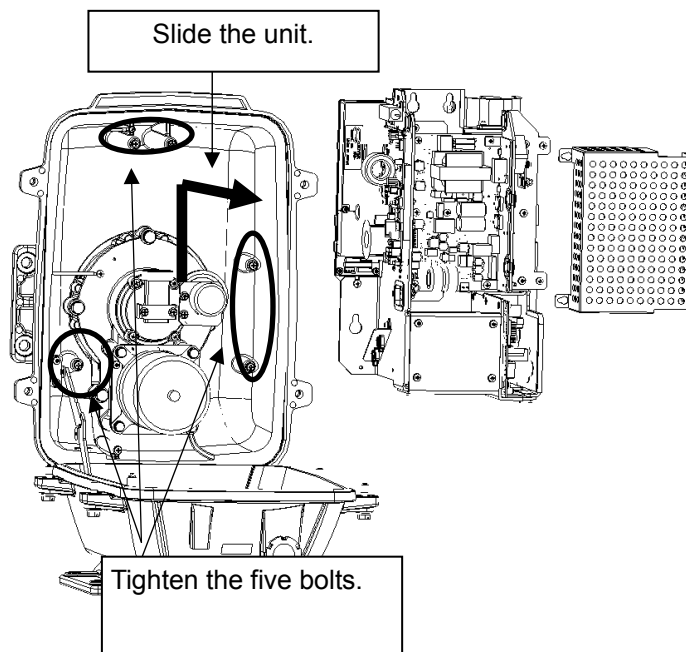
## **Step 2 Remove the transmitter-receiver unit cover**

Open the upper cover, loosen the screws (four M4 screws), remove the transmitter-receiver unit cover, and disconnect the cables connected to the transmitter-receiver unit (ten cables). Slide the cover of the transmitter-receiver unit to remove it.



### **Step 3 Remove the transmitter-receiver unit**

Loosen the bolts (five M5 bolts) and remove the transmitter-receiver unit. Slide it upward to remove.



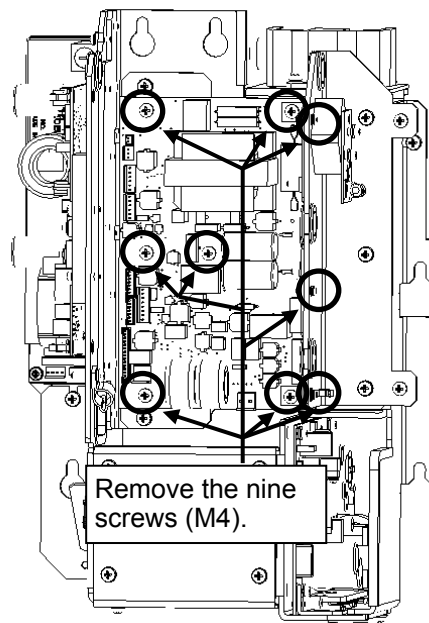
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#### **Step 4**     **Replace the modulator circuit board.**

Remove the screws (nine M4 screws) holding the modulator circuit board in place and disconnect the cables connected to it, then replace. If you are reusing the heat radiation plate on the modulator, be sure to install the insulation sheet between TR17, TR18, and the heat radiation plate so that it is straight.

After having replaced the modulator circuit board, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and do not forget to reconnect the cables.



#### **Step 5**     **Operation check**

After having completed the replacement, close the cover, 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.

Transmit the radar 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 modulator circuit board replacement.

## 4.1.6.5 Power Supply Circuit Board (CBD-1783) Replacement/NKE-2103

### [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<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>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 radar antenna.



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 radar antenna, as they will be used again in later steps.

### **Step 1 Turn Off the safety switch and open the cover.**

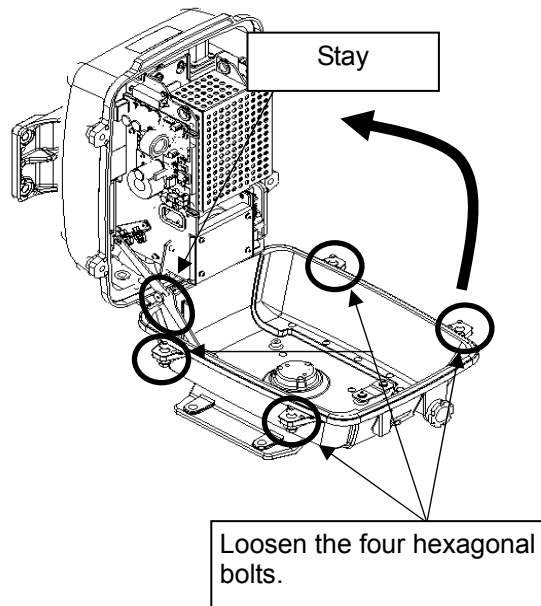
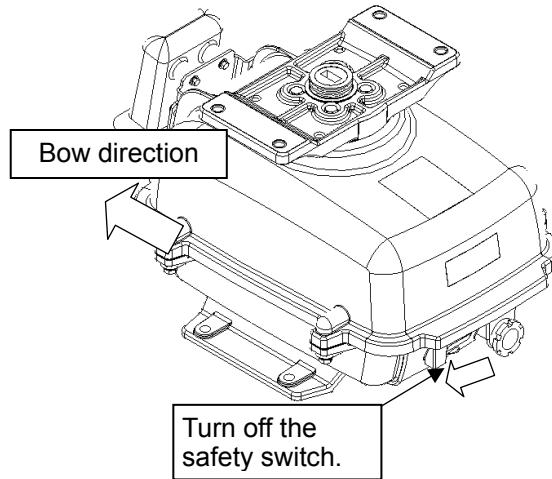
Before beginning work, turn Off the safety switch on the bottom of the scanner unit.

Loosen the hexagonal bolts (four bolts) and open the upper cover until the stopper of the stay operates.



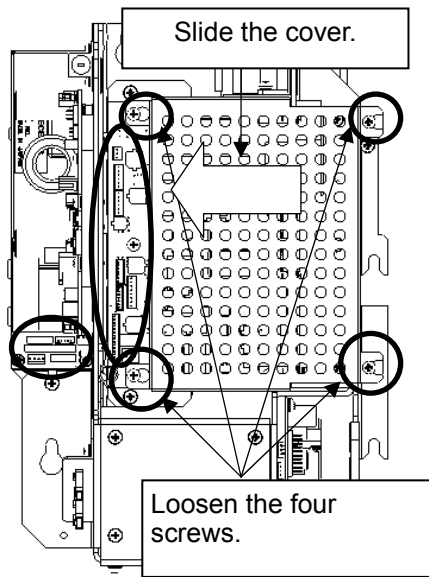
When closing the upper cover, release the stay stopper and then tighten the cover.





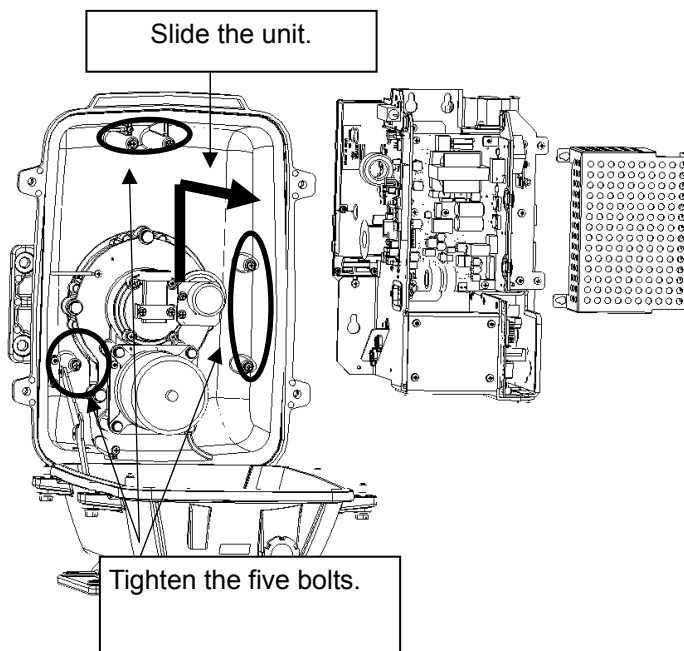
## **Step 2 Remove the transmitter-receiver unit cover**

Open the upper cover, loosen the screws (four M4 screws), remove the transmitter-receiver unit cover, and disconnect the cables connected to the transmitter-receiver unit (ten cables). Slide the cover of the transmitter-receiver unit to remove it.



### **Step 3 Remove the transmitter-receiver unit**

Loosen the bolts (five M5 bolts) and remove the transmitter-receiver unit. Slide it upward to remove.

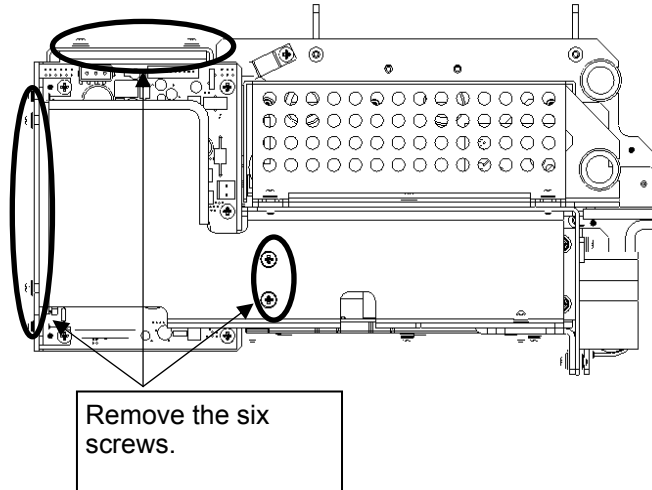


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#### **Step 4 Remove the power supply.**

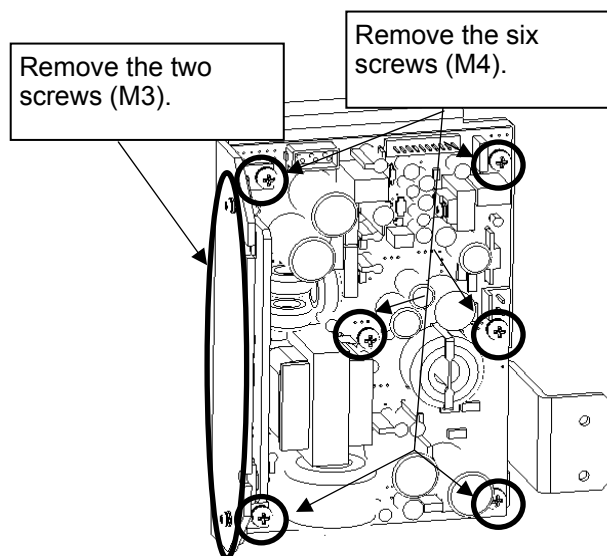
Remove the cables and screws (six M4 screws). Remove the power supply unit from the transmitter-receiver unit.



#### **Step 5 Replace the power supply circuit board**

Remove the screws (six M4 screws and two M3 screws). And then remove the power supply circuit board from the installation plate. If the thermal conductive pad on the casing on the back of the power supply circuit board (the soldered side) is damaged, affix a new one to the replacement power supply circuit board.

After having replaced the power supply circuit board, reassemble the unit by following the disassembly procedure in the reverse order. Do not forget to tighten the bolts or screws, and do not forget to reconnect the cables.



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## **Step 6      Operation check**

After having completed the replacement, close the cover, 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 is correctly displayed.

This completes power supply circuit board replacement.

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## 4.1.6.6 Receiver (NRG-610) Replacement/NKE-2103

### [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<br>7 mm (for M4 screws)<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1                   | Width across flats<br>7 mm (for M4 screws)<br>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 radar antenna.



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 radar antenna, as they will be used again in later steps.

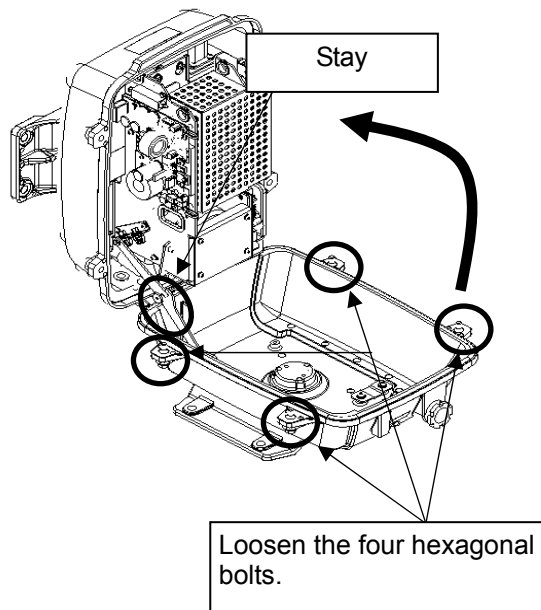
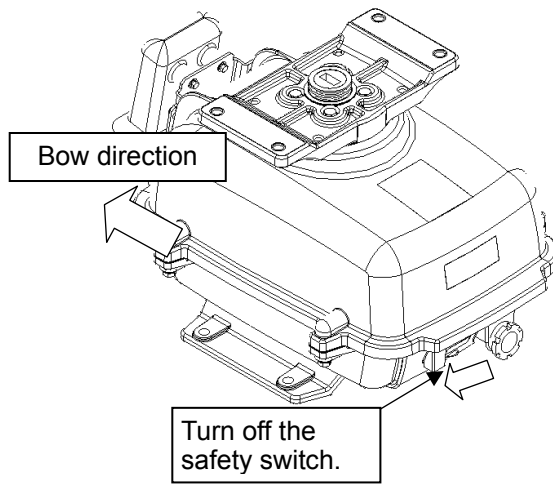
### **Step 1 Turn Off the safety switch and open the cover.**

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

Loosen the hexagonal bolts (four bolts) and open the upper cover until the stopper of the stay operates.



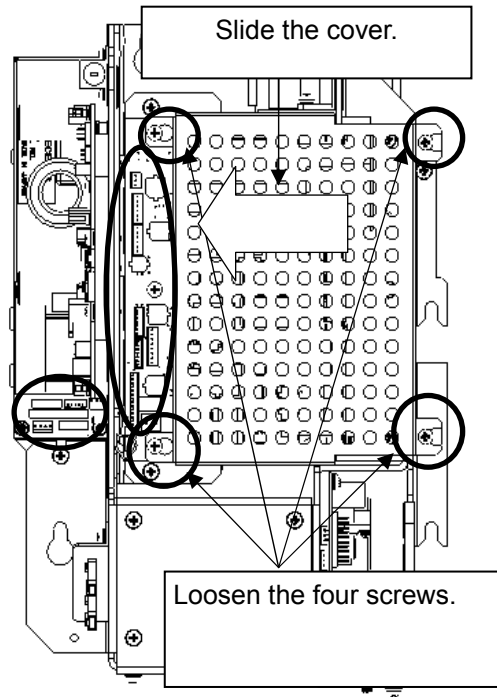
When closing the upper cover, release the stay stopper and then tighten the cover.



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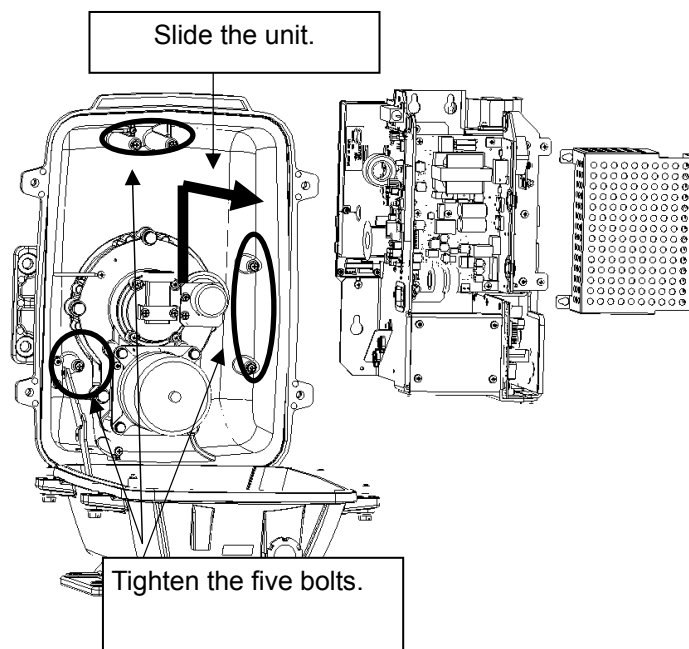
## **Step 2 Remove the transmitter-receiver unit cover**

Open the upper cover, loosen the screws (four M4 screws), remove the transmitter-receiver unit cover, and disconnect the cables connected to the transmitter-receiver unit (ten cables). Slide the cover of the transmitter-receiver unit to remove it.



## **Step 3 Remove the transmitter-receiver unit**

Loosen the bolts (five M5 bolts) and remove the transmitter-receiver unit. Slide it upward to remove.



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#### **Step 4 Remove the magnetron.**

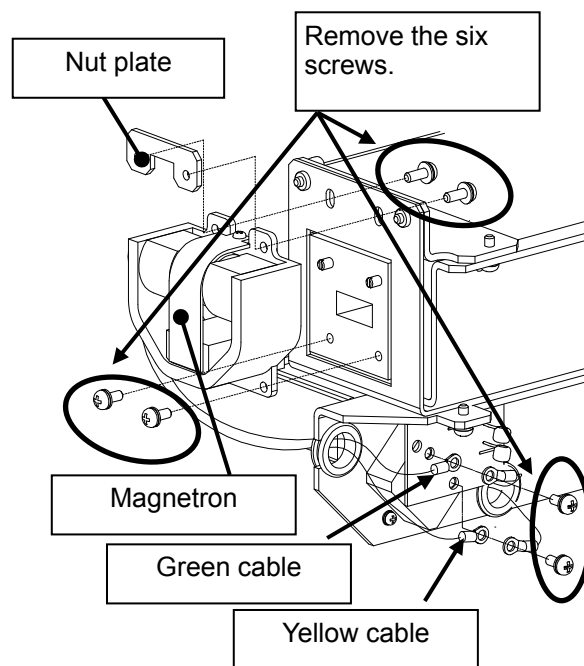
Remove the screws (six M4 screws) holding the magnetron in place and remove the magnetron.



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.

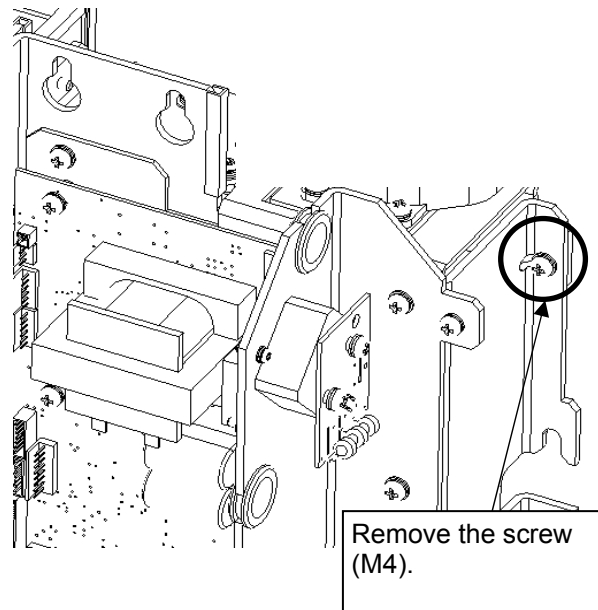




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### **Step 5    Remove the microwave transmission circuit.**

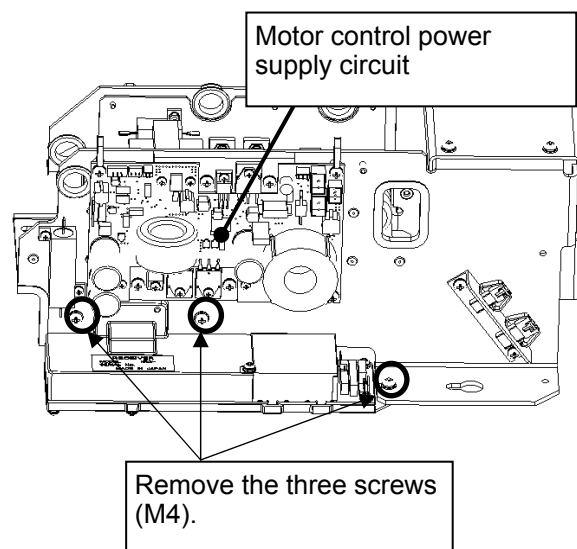
Remove the M4 screw near the magnetron.



Remove the screws (three M4 screws) on the motor control power supply side, and remove the microwave transmission circuit from the chassis.

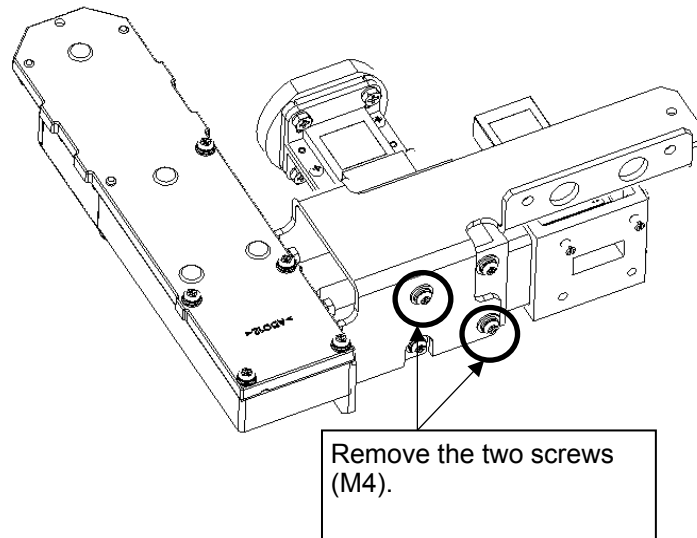
### **Step 6    Replace the receiver.**

Remove the screws (three M4 screws) on the motor control power supply side, and remove the microwave transmission circuit from the chassis.



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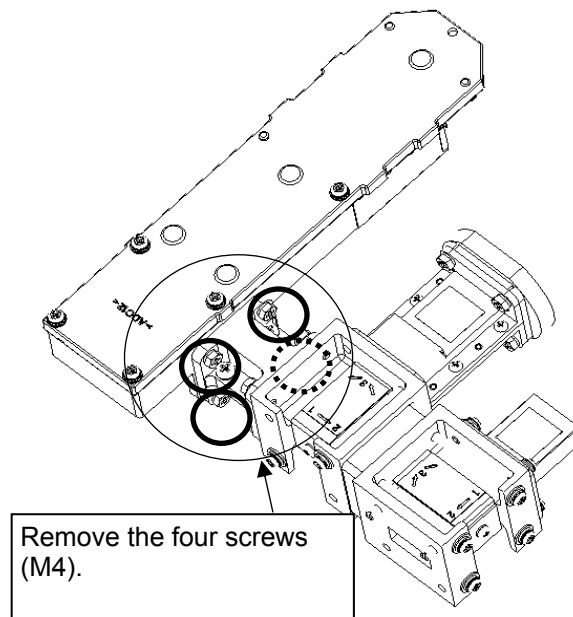
Remove the two screws (M4) holding the microwave transmission circuit to remove it from the installation plate.



Remove the screws (four M4 screws) holding the receiver in place and replace it. After having replaced the receiver, 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.



After having replaced the receiver, reassemble the transmitter-receiver unit taking care to ensure good fitting. If the fitting is poor, loosen the screws and readjust the unit.



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#### **Step 4      Operation check**

After having completed the replacement, close the cover, 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. Transmit the radar wave in the long range mode and open the service engineer menu to perform tuning adjustment. Perform the adjustment in the service engineer menu until the tuning display bar on the display unit reaches the 8th calibration mark.




This completes receiving unit replacement.

## 4.1.6.7 Encoder Replacement/NKE-2103

### [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<br>7 mm (for M4 screws),<br>13 mm (for M8 screws) |  |
| 3  | Socket wrench*1      | Width across flats<br>7 mm (for M4 screws),<br>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 radar antenna.



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 radar antenna, as they will be used again in later steps.

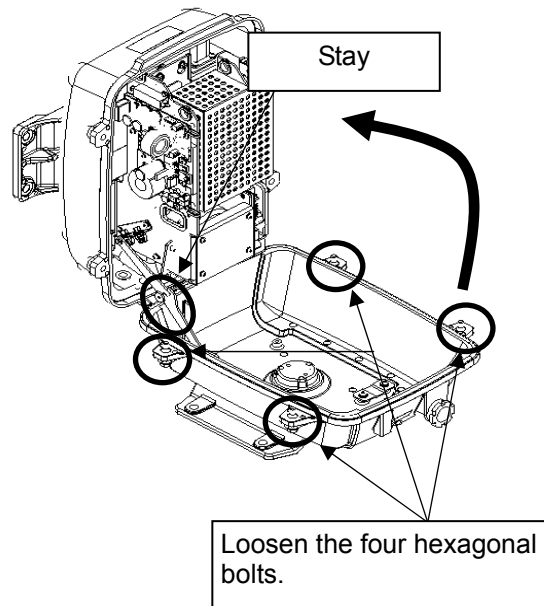
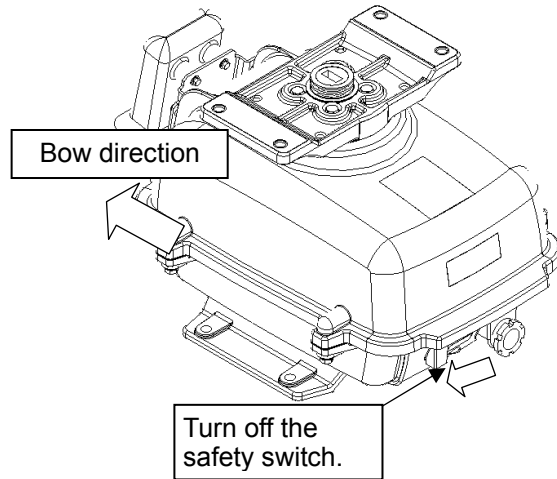
### **Step 1 Turn Off the safety switch and open the cover.**

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

Loosen the hexagonal bolts (four bolts) and open the upper cover until the stopper of the stay operates.

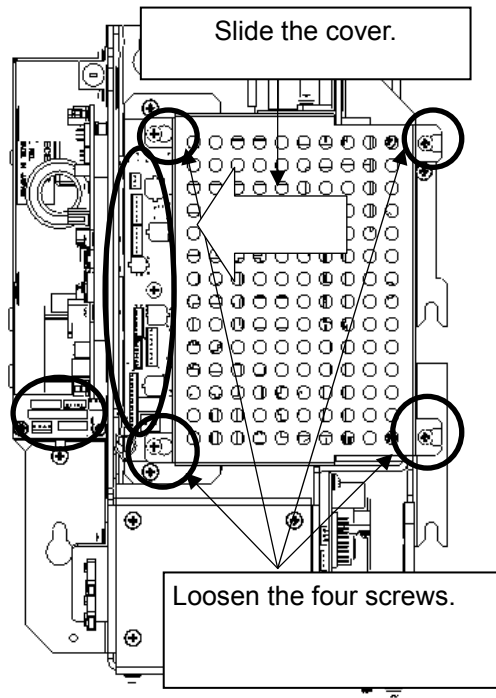


When closing the upper cover, release the stay stopper and then tighten the cover.



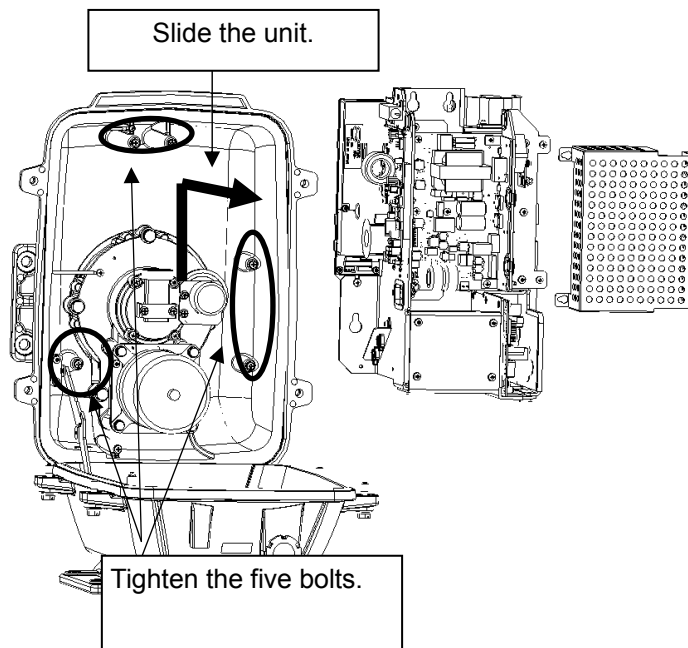
## **Step 2 Remove the transmitter-receiver unit cover**

Open the upper cover, loosen the screws (four M4 screws), remove the transmitter-receiver unit cover, and disconnect the cables connected to the transmitter-receiver unit (ten cables). Slide the cover of the transmitter-receiver unit to remove it.



### **Step 3 Remove the transmitter-receiver unit**

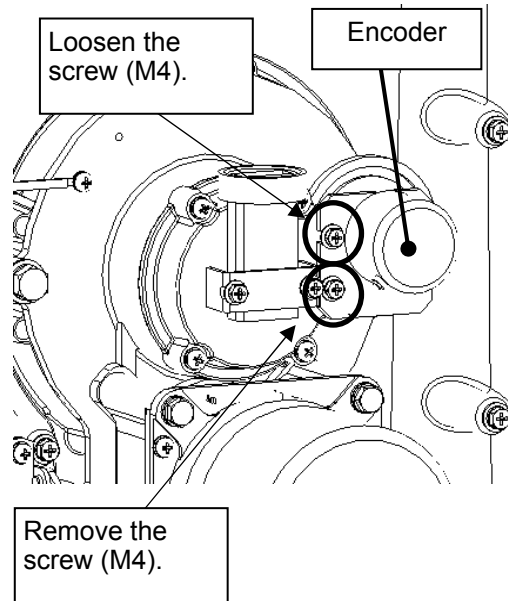
Loosen the bolts (five M5 bolts) and remove the transmitter-receiver unit. Slide it upward to remove.



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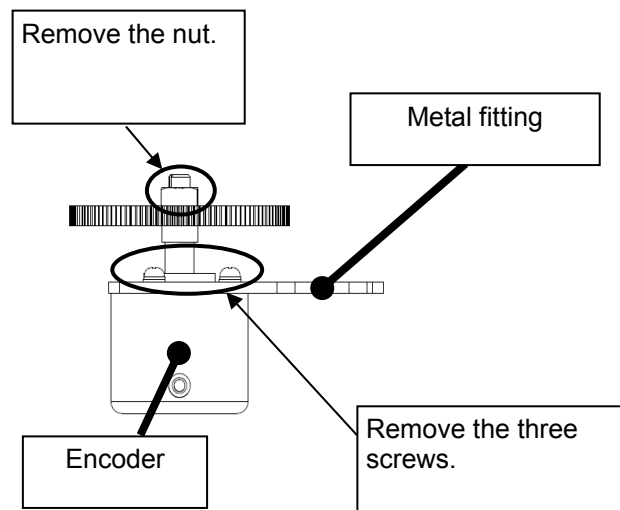
#### **Step 4 Remove the encoder.**

Remove the two screws (M4) holding the encoder to remove it from the housing.



#### **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 the encoder 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.



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## **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.