



7.2 NAVIGATOR SETTING

This section describes the electrical adjustment procedures to be performed by service engineers during system installation.

 CAUTION	
	Do not carry out the adjustments of the equipment except authorized service persons. If wrong setting is carried out, this may cause unstable operation.
	Do not carry out the adjustments during navigation. Otherwise, the radar performance may be affected, resulting in an accident or trouble.

Make an appropriate setting for each type of equipment when inputting true bearing signals, true bearing data, and speed data.

Settings and parameters are different for each type of equipment.

Make settings for the type of equipment to be connected.

II Inputting analog true bearing signals from a gyro system through synchronization and steps

By following the procedure described in the INSTALLATION MANUAL, connect the optional NSK unit (NCT-4106A) to this equipment. Then, follow the steps below to make settings.

In Section 7.2.1 “Ship Heading Equipment Setting (Heading Equipment),” select 1: GYRO (NCT-4106A, JLR10, JRL20/30).

By referring to Section 7.2.2 “NSK Unit Setting,” make a setting for the gyro system.

By referring to Section 7.2.3 “True Bearing Value Setting (Set GYRO),” make a setting such that the gyro azimuth and the radar azimuth are the same.

Refer to an applicable page for details.

[III] Inputting digital true bearing signals from a gyro system (IEC61162, NMEA0183)

By following the procedure described in the INSTALLATION MANUAL, connect the gyro system to this equipment. Then, follow the steps below to make settings.

In Section 7.2.1 “Ship Heading Equipment Setting (Heading Equipment),” select 2: COMPASS (IEC61162).
In Section 7.3.1.1 “Baud Rate Setting,” select 5. COM5 (COMPASS).
Select either 38400 bps or 48000 bps depending on the data baud rate outputted from the GPS compass.

(*) For digital signal output from the gyro system

- Select 38400 bps if possible. A higher baud rate means shorter data output cycle, which results in better course following performance.
- If the system allows setting of data output cycle, set it to 10 ms to 20 ms.
A longer data output cycle results in lower course following performance. This may affect the radar performance level and the target tracking performance level.

Refer to an applicable page for details.

[III] Inputting true bearing data from GPS Compass JLR10 or JLR20/30

By following the procedure described in the INSTALLATION MANUAL, connect GPS Compass JLR10 or JLR20/30 to this equipment. Then, follow the steps below to make settings.

In Section 7.2.1 “Ship Heading Equipment Setting (Heading Equipment),” select 1: GYRO (NCT-4106A, JLR10, JLR20/30).

True bearing value setting described in Section 7.2.3 is not required when using the GPS compass. If the GPS compass azimuth and the radar azimuth are not the same, use the GPS compass to adjust the azimuth.

Refer to an applicable page for details.

[IV] Inputting digital true bearing data from a GPS compass (other than JLR10 and JLR20/30) or other true bearing systems (IEC61162 or NMEA0183)

By following the procedure described in the INSTALLATION MANUAL, connect a GPS compass or other true bearing system to this equipment. Then, follow the steps below to make settings.

In Section 7.2.1 “Ship Heading Equipment Setting (Heading Equipment),” select 2: COMPASS (IEC61162).
In Section 7.3.1.1 “Baud Rate Setting,” select 5. COM5 (COMPASS).
Select either 38400 bps or 48000 bps depending on the data baud rate outputted from the GPS compass.

(*) For the GPS compass or other true bearing systems

- Select 38400 bps if possible. A higher baud rate means shorter data output cycle, which results in better course following performance.
- If the system allows setting of data output cycle, set it to 10 ms to 20 ms.
A longer data output cycle results in lower course following performance. This may affect the radar performance level and the target tracking performance level.

Refer to an applicable page for details.

[V] Inputting analog speed signals from a log system through synchronization and steps

By following the procedure described in the INSTALLATION MANUAL, connect the optional NSK unit (NCT-4106A) to this equipment. Then, follow the steps below to make settings.

In Section 7.2.5 “Ship Speed Equipment Setting (Speed Equipment),” select 2: LOG.

Refer to an applicable page for details.

[VI] Inputting digital speed data using a current meter or a Doppler sonar (IEC61162 or NMEA0183)

By following the procedure described in the INSTALLATION MANUAL, connect speed equipment to this equipment. Then, follow the steps below to make settings.

In Section 7.2.5 “Ship Speed Equipment Setting (Speed Equipment),” select 3: 2 AXIS W to use the sea speed. Select 4: 2 AXIS G to use the ground speed.

Refer to an applicable page for details.

[VII] Inputting GPS speed data (IEC61162 or NMEA0183)

By following the procedure described in the INSTALLATION MANUAL, connect speed equipment to this equipment. Then, follow the steps below to make settings.

In Section 7.2.5 “Ship Speed Equipment Setting (Speed Equipment),” select 5: GPS.

Refer to an applicable page for details.

[VIII] Inputting speed data manually

In Section 7.2.5 “Ship Speed Equipment Setting (Speed Equipment),” select 1: Manual.

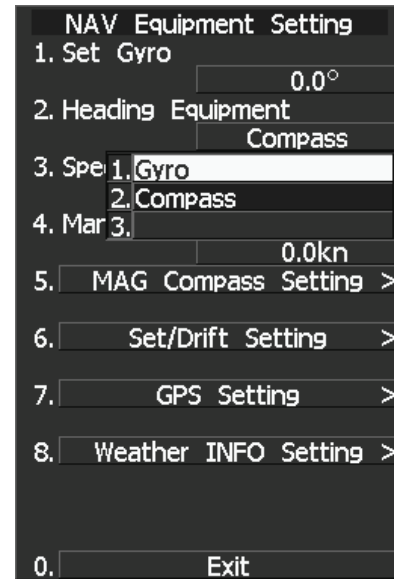
In Section 7.2.6 “Manual Speed Setting (Manual Speed),” input the speed manually using the numeric keypad or multi-dial.

Refer to an applicable page for details.

7.2.1 Ship Heading Equipment Setting (Heading Equipment)

Procedure

- 1 **Press [RADAR MENU] key.**
Main Menu opens.
- 2 **Press [7] key.**
NAV Equipment Setting menu opens.
- 3 **Press [2] key.**
Heading Equipment settings are displayed.
- 4 **From the pull-down menu, select heading equipment.**
1 : GYRO (NCT-4106A, JLR10, JLR20/30)
2 : COMPASS (IEC61162)



<The alternative procedure for steps above>

- 1 **Hold down [RADAR MENU] key.**
The Code Input Menu will appear.
- 2 **Press [0] key.**
- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**
The Adjust Menu will appear.
- 4 **Press [6] key.**
NAV Equipment Setting menu opens.
- 5 **Perform steps 3 and 4 in the “Procedure” above.**

Exit

- 1 **Press [RADAR MENU] key.**
Menu closes.

7.2.2 NSK Unit Setting

The NSK Unit circuit of the system is designed to be compatible with most types of gyro compasses by simply setting the switches.

Step motor type: 20 to 170 VDC

Synchro-motor type: Primary excitation voltage 35 to 120 VAC

Before power-on operation can be performed, the switches S1 to S5 on the NSK Unit circuit (PC4201) must be set in accordance with the type of your gyro compass by performing the procedure below. The switches are factory-set for a gyration ratio of 180X and the step motor type. Make sure of the type of the gyro compass installed on the own ship before starting the procedure below.

Procedure

1 Set S1 to "OFF."

The gyro compass and NSK Unit are turned off.

2 Set S2 and S3 in accordance with the type of your gyro compass.

There are two types of gyro compasses: one type outputs a step signal, and the other type outputs a synchro signal. Make sure of the type of the gyro compass installed on the own ship before setting the switches S2 and S3.

Synchro signal: Set the switches to [SYNC].

Step signal: Set the switches to [STEP].

3 Set the DIP switch S4.

The items to be set are listed below. For the settings, refer to Table 7-1.

S4-1: LOG alarm ON/OFF

S4-2: GYRO simulator ON/OFF

S4-3: LOG simulator ON/OFF

S4-5: Time before occurrence of GYRO alarm

S4-6: Sensor to be used (GYRO/NMEA)

S4-7/8: Baud rate when NMEA is used

4 Set the DIP switch S5.

The items to be set are listed below. For the setting, refer to Table 7-2.

S5-1: Type of gyro signal (step/synchro)

S5-2/3: Gyration ratio of gyro compass

S5-4: Gyration direction of gyro compass

S5-5: Type of log signal (pulse/synchro)

S5-7/8: Ratio of log signal

5 Connect the gyro signal and log signal cables to the terminal block.

6 Set S1 to "ON."

The gyro compass and NSK Unit are connected.

7 After power-on operation, set the true bearing according to Section 7.2.3.

8 Make sure of the radar video and the operation with the true bearing value.

9 If the true bearing value of the radar equipment is reversed, change the setting of the switch S5-4.

Table 7-1 Setting Table (S4 DIP Switch)

		1	2	3	4	5	6	7	8
OTHER SETTING	LOG ALARM	ON							
		OFF							
	GYRO SIMULATOR	ON							
		OFF							
	LOG SIMULATOR	ON							
		OFF							
	N.C.	Don't care		any					
	GYRO ALARM TIME	5s				ON			
		0.5s				OFF			
	HEADING SENSOR SOURCE	NMEA(HDT/THS)					ON		
GYRO SIGNAL					OFF				
NMEA BAUDRATE SETTING	4800						OFF	OFF	
	9600						ON	OFF	
	19200						OFF	ON	
	38400						ON	ON	

Table 7-2 Setting Table (S5 DIP Switch)

		1	2	3	4	5	6	7	8	
GYRO SIG	TYPE	STEP	ON							
		SYNC	OFF							
	RATIO	36 ×	ON	ON						
		90 ×	OFF	ON						
		180 ×	ON	OFF						
		360 ×	OFF	OFF						
DIRECTION	REV				ON					
	NOR				OFF					
LOG SIG	TYPE	SYNC				ON				
		PULSE				OFF				
	N.C.	Don't care					any			
	PULSE	100P/30 ×							ON	ON
		200P/90 ×							OFF	ON
400P/180 ×							ON	OFF		
800P/360 ×							OFF	OFF		



7.2.3 True Bearing Value Setting (Set GYRO)

Adjust the bearing that the bearing angle of the radar is the same as that of the gyro.

When the NSK unit is used to input gyro signals, in rare cases, the true bearing value indicated by the master gyro and the true bearing value indicated by this equipment do not agree with each other. If this occurs, make the setting described below to adjust the true bearing value of this equipment to the value indicated by the master gyro.

This setting is available only when the NSK unit NCT-4106A is used.

Procedure

- 1 Press [RADAR MENU] key twice.

The Main Menu will appear.

- 2 Press [7] key.

The NAV Equipment Setting Menu will appear.

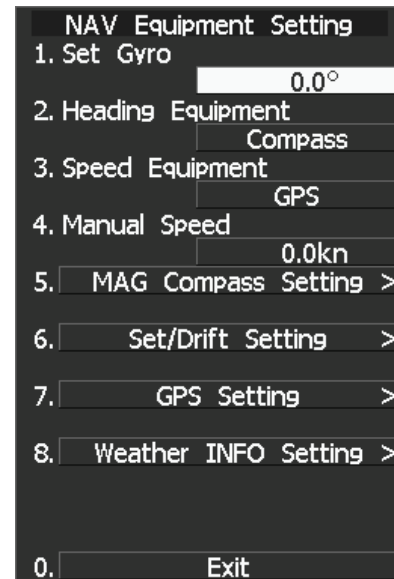
- 3 Press [1] key.

The Code Input Menu will appear.

- 4 Adjust true bearing value.

Adjust the bearing that the bearing angle of the radar is the same as that of the gyro.

The multi-function control can also be used to enter the value.



After having entered the value, move the cursor onto the “ENT” button and press [ENT] key.

<The alternative procedure for steps above>

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Press [6] key.

NAV Equipment Setting menu opens.

- 5 Perform steps 3 and 4 in the “Procedure” above.

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.

7.2.4 MAG Compass Setting

Set the MAG compass.

Procedure

- 1 Press [RADAR MENU] key twice.

The Main Menu will appear.

- 2 Press [7] key.

NAV Equipment Setting Menu will appear.

- 3 Press [5] key.

MAG Compass Setting Menu will appear.

- 4 Press [1] key.

This item is set as to whether or not the heading bearing is to be corrected. Switching between ON and OFF is done each time you press [1] key.

- 5 Press [2] key.

The Code Input Menu will appear.

- 6 Pressing a numeric key, enter the value. Select “ENT” and then determine the value.

The correction direction and angle will be set. On the screen, press “+” to make correction in the eastern direction, and press “-” to make correction in the western direction. Also enter a correction angle, pressing the numeric key.

The multi-function control is also available for the entry. To do so, enter the correction direction, press the multi-function control, enter the correction angle, and then set ENT in order.



<The alternative procedure for steps above>

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Press [6] key.

NAV Equipment Setting menu opens.

- 5 Perform steps 3 to 6 in the “Procedure” above.

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.

7.2.5 Ship Speed Equipment Setting (Speed Equipment)

Procedure

- 1 Press [RADAR MENU] key twice.

The Main Menu will appear.

- 2 Press [7] key.

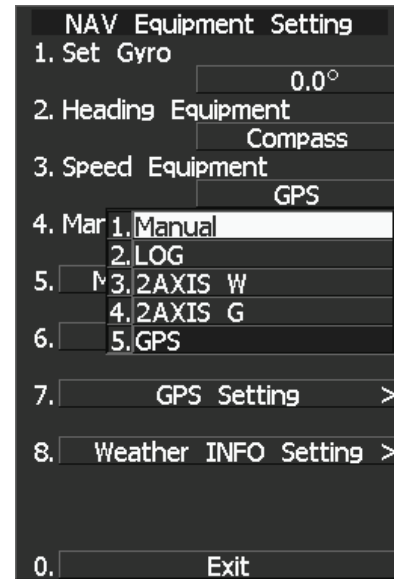
The NAV Equipment Setting Menu will appear.

- 3 Press [3] key.

- 4 Select a ship speed sensor from the pull-down menu.

Types of selectable speed sensors:

- 1: Manual
- 2: Log
- 3: 2-axis log (NMEA signal: Speed over water)
- 4: 2-axis log (NMEA signal: Speed over ground)
- 5: GPS



<The alternative procedure for steps above>

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Press [6] key.

NAV Equipment Setting menu opens.

- 5 Perform steps 3 and 4 in the “Procedure” above.

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.

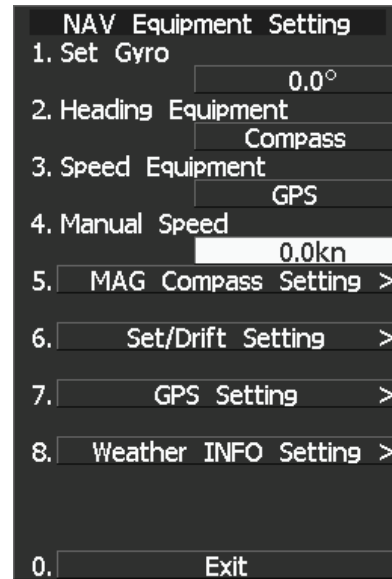
Attention

- The manually entered speed is effective only when “Manual” is set.
- 2-axis log cannot be effective when the sentence VBW of NMEA0183 is not entered.

7.2.6 Manual Speed Setting (Manual Speed)

Procedure

- 1 **Press [RADAR MENU] key twice.**
The Main Menu will appear.
- 2 **Press [7] key.**
NAV Equipment Setting Menu will appear.
- 3 **Press [4] key.**
The Code Input menu will appear.
- 4 **Pressing a numeric key, enter the value and select “ENT.”**
The multi-function control is also available for the entry.



<The alternative procedure for steps above>

- 1 **Hold down [RADAR MENU] key.**
The Code Input Menu will appear.
- 2 **Press [0] key.**
- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**
The Adjust Menu will appear.
- 4 **Press [6] key.**
NAV Equipment Setting menu opens.
- 5 **Perform steps 3 and 4 in the “Procedure” above.**

Note: The manually entered speed is effective only when “Manual” is set.

7.2.7 Current Correction (SET/DRIFT) Setting

The current set and drift will be set.

Attention

- **The manually entered speed is effective only when “Speed Equipment” is set to “Manual” or “LOG”.**

Procedure

- 1 Press [RADAR MENU] key twice.**

The Main Menu will appear.

- 2 Press [7] key.**

The NAV Equipment Setting Menu will appear.

- 3 Press [6] key.**

The Set/Drift Setting Menu will appear.

- 4 Press [1] key to enable Correction.**

The setting of Correction is switched back and forth between ON and OFF each time [1] key is pressed.

Off : Do not perform current correction.

On : Perform current correction.

- 5 Press [2] key.**

The Code Input Menu will appear.

- 6 Enter the direction of tendency.**

The direction of tendency will be set. The multi-function control is also available for the entry.

After having entered the direction, move the cursor onto the “ENT” button and press [ENT] key.

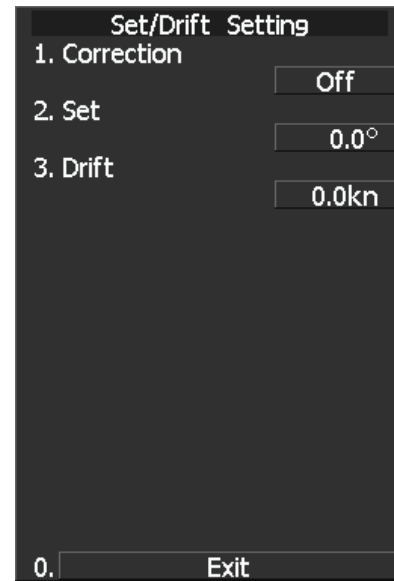
- 7 Press [3] key.**

The Code Input Menu will appear.

- 8 Enter the speed of tendency.**

The speed of tendency will be set. The multi-function control is also available for the entry.

After having enter the value, move the cursor onto the “ENT” button and press [ENT] key.



<The alternative procedure for steps above>

- 1 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 **Press [0] key.**

- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 **Press [6] key.**

NAV Equipment Setting menu opens.

- 5 **Perform steps 3 to 8 in the “Procedure” above.**




Exit

- 1 **Press [RADAR MENU] key.**

The menu will be closed.

7.3 SETTINGS

This section describes the electrical adjustment procedures to be performed by service engineers during system installation.

 CAUTION	
	Do not carry out the adjustments of the equipment except authorized service persons. If wrong setting is carried out, this may cause unstable operation.
	Do not carry out the adjustments during navigation. Otherwise, the radar performance may be affected, resulting in an accident or trouble.

7.3.1 Communication Port Setting (COM Port Setting)

External sensor signals are input to the radar equipment through a communication port. The radar equipment has five communication ports. For signals to be input from sensors or to be output to the sensors, communication ports need to be set in accordance with the sensors.

7.3.1.1 Baud Rate Setting

Set the baud rate of the signal to be entered into the COM port.

Each ports on the menu represents following connectors.

COM1(GPS)	J3 GPS
COM2(PC)	J8 NMEA
COM3(NAV1)	J6 AIS/NMEA
COM4(NAV2)	J9 AUX
COM5(NSK/COMPASS)	J5 GYRO COMPASS

Procedure

1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

2 Press [0] key.

3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

4 Press [5] key.

The COM Port Setting Menu will appear.

5 Press [1] key.

The Baud Rate Setting Menu will appear.

6 Select the port number you want to set, pressing the numeric keys [1] to [5].

The Baud Rate Selection menu will appear.

7 In the selection menu, select the baud rate you want to set, pressing the numeric key.

Selection value

- | | |
|--------------------|---------------------------------|
| 1. COM1 (GPS): | 1200/4800/*38400/9600 bps |
| 2. COM2 (PC): | 1200/4800/38400/115200/9600 bps |
| 3. COM3 (NAV1): | 1200/4800/38400/9600 bps |
| 4. COM4 (NAV2): | 1200/4800/*38400/9600 bps |
| 5. COM5 (COMPASS): | 4800/38400 bps |

* If COM1/COM4 is set to 38400 bps, signals can only be transmitted. The baud rate for reception can be set to up to 4800 bps.

COM5 can be used for receive port only. It is dedicated for COMPASS signal. This means that the port is unavailable for other signals.

The GPS, PC, NAV1, NAV2, COMPASS in the parentheses are the standard ports connecting to the external sensors.

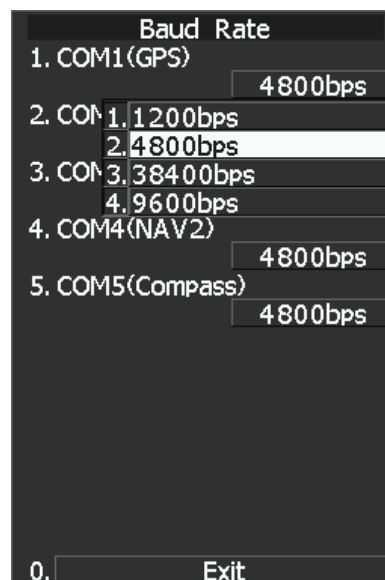
When an AIS unit is used, COM3 is used exclusively for the AIS.

Connect the AIS to COM3.

Use a port other than COM3 when connecting a device other than an AIS unit.

An external device can be connected to COM3 when an AIS unit is not used.

When a baud rate of 1200 bps is selected, a 1200 bps JRC format is used.



Exit

1 Press [RADAR MENU] key.

The Main Menu will reappear.

7.3.1.2 Reception Port Setting (RX Port)

Set the number of the port via which signals are received from sensors.

There are two methods for receiving signals: specifying a port for each sensor, or using the automatic recognition function without specifying ports.

Procedure

1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

2 Press [0] key.

3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

4 Press [5] key.

The COM Port Setting Menu will appear.

5 Press [4] key.

The RX Port Menu will appear.

6 Select the signal you want to set, pressing the numeric keys [1] to [6].

The Reception Port Setting Menu for each signal will appear.

Settable signals

1. GPS
2. DLOG
3. Depth
4. Temperature
5. Wind
6. Current
7. Rate of Turn
8. Rudder

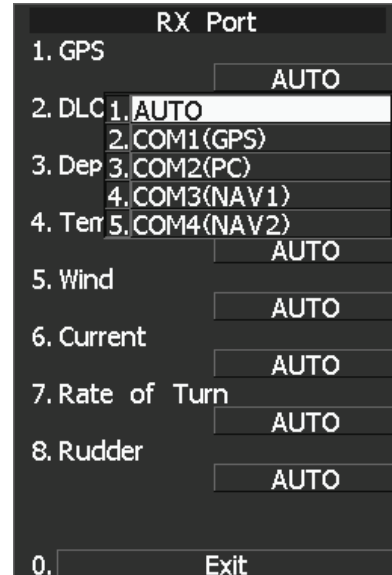
7 Select which port you want to use for output.

Types of ports to be used

1. AUTO
2. COM1 (GPS)
3. COM2 (PC)
4. COM3 (NAV1)
5. COM4 (NAV2)

* For AUTO, the initial value will be selected.

Select the number of the port to be used, pressing the numeric key.



Exit

1 Press [RADAR MENU] key.

The Main Menu will reappear.

7.3.1.3 Reception Sentence Setting (RX Sentence)

Set signal sentences to be received from sensors.

Procedure

- 1 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 **Press [0] key.**

- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 **Press [5] key.**

The COM Port Setting Menu will appear.

- 5 **Press [2] key.**

The RX Sentence Menu will appear.

- 6 **Select the signal you want to set, pressing the numeric keys [1] to [3].**

The Setting Menu for each signal will appear.

Settable signal

1. GPS (LL/COG/SOG)
2. GPS (WPT)
3. Depth
4. Wind
5. Current

- 7 **Select whether or not you want to use sentence for the signal.**

Types of sentences to be used

GPS (LL/COG/SOG): GGA/RMC/RMA/GNS/
GLL/VTG

GPS (WPT): GGA/RMC/RMB/
BWC/BWR/ZDA

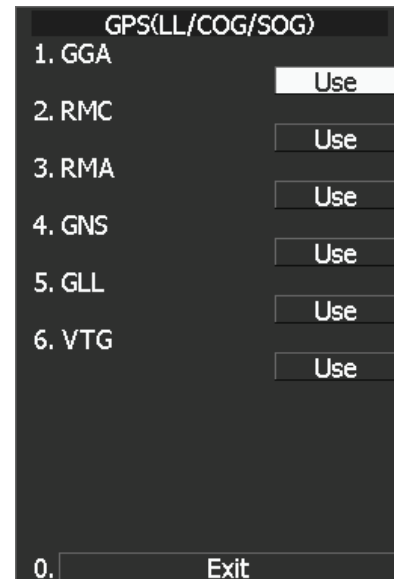
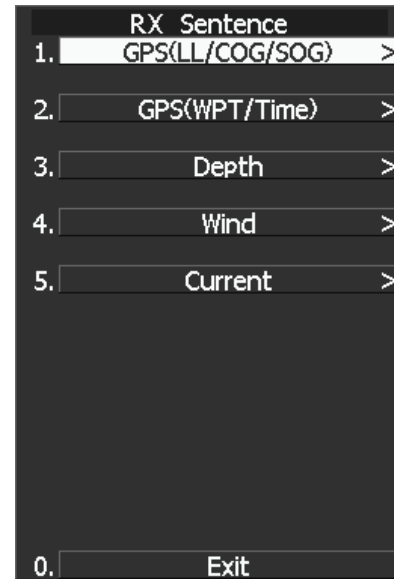
Depth: DPT/DBK/DBT/DBS

Wind: MWV/MWD

Current: CUR

After having selected a signal, choose the number of the sentence for which you want to set whether or not it is used, pressing the numeric key.

As concerns current, set layer number of CUR sentence.



Layer A:

0-999. Set the number of the sentence to be used with layer A by Layer Number.
(Initial value 3)

Layer B:

0-999. Set the number of the sentence to be used with layer B by Layer Number.
(Initial value 4)

Layer C:

0-999. Set the number of the sentence to be used with layer C by Layer Number.
(Initial value 5)

Exit

1 Press [RADAR MENU] key.

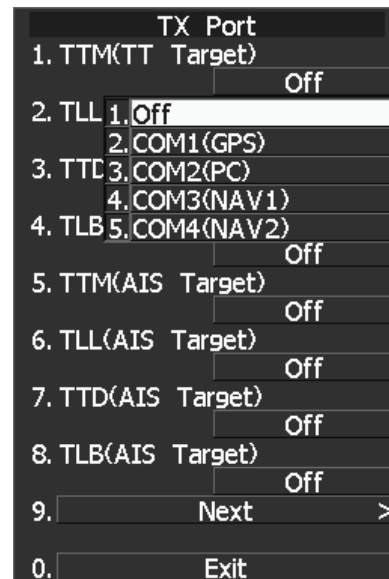
The Main Menu will reappear.

7.3.1.4 Transmission Port Setting (TX Port)

For each sentence, set a communication port through which signals are transmitted to sensors.

Procedure

- 1 **Hold down [RADAR MENU] key.**
The Code Input Menu will appear.
- 2 **Press [0] key.**
- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**
The Adjust Menu will appear.
- 4 **Press [5] key.
Press [3] key.**
The TX Port Menu will appear.
- 5 **Select the signal you want to set, pressing the numeric keys [1] to [9].**



The Output Port Setting Menu for each signal will appear.

Settable sentences

1. TTM(TT Target)
2. TLL(TT Target)
3. TTD(TT Target)
4. TLB(TT Target)
5. TTM(AIS Target)
6. TLL(AIS Target)
7. TTD(AIS Target)
8. TLB(AIS Target)



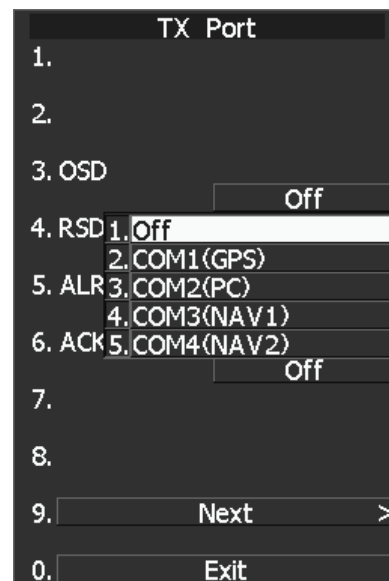
- 1.
- 2.
3. OSD
4. RSD
5. ALR
6. AIS
- 7.
- 8.



1. Remote Maintenance
2. NMEA0183 Output Format
3. NMEA0183 Talker
4. NMEA0183 TX Interval
5. APB
6. BOD
7. GGA
8. GLL



1. RMC
2. RMB
3. VTG
4. XTE
5. BWC



- 6. HDT
- 7. THS

6 Select which port you want to use for output.

Types of ports to be used

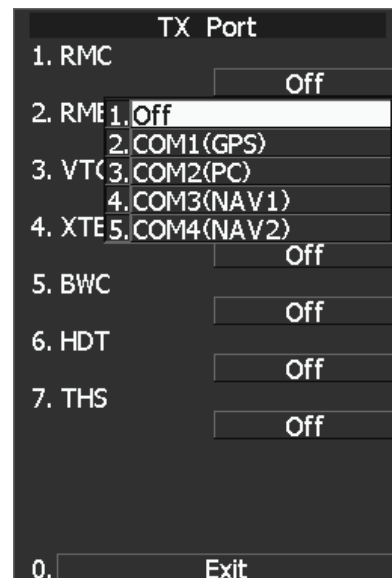
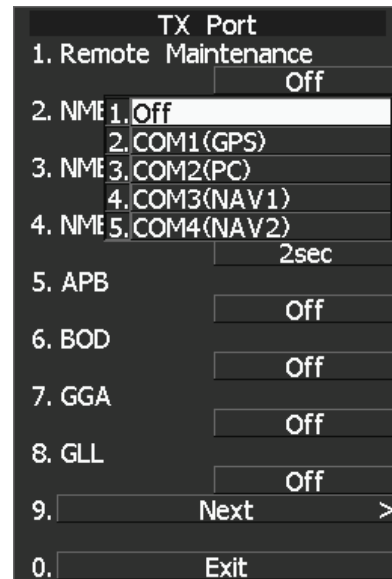
- 1. OFF
- 2. COM1 (GPS)
- 3. COM2 (PC)
- 4. COM3 (NAV1)
- 5. COM4 (NAV2)

Select the number of the port to be used, pressing the numeric key.

7 Select the output format, talker, and transmission interval.

Signals for which the above items can be set:

- NMEA0183 Output Format
Signal names: APB, BOD, GGA, GLL, RMC, RMB, VTG, XTE, BWC, HDT, THS
Selection Value: V1.5, V2.0, and V2.3
- NMEA0183 Talker
Signal names: APB, BOD, RMB, XTE, BWC, HDT, THS
Selection Value:
Standard: The talker is RA.
GP: The talker is GP.
For TTM, TLL, TTD, TLB, OSD, RSD, ALR, and AIS, the talker is always RA .
For GGA, GLL, RMC, and VTG, the talker is always GP.
- NMEA0183 TX Interval
Signal names: APB, BOD, GGA, GLL, RMC, RMB, VTG, XTE, BWC, HDT, THS
Selection Value: Set an interval in the range 1 to 9 seconds.



Note: When multiple output sentences are selected, data may not be transmitted at the selected transmission interval. In particular, the volume of TTM, TLL, TLB, and TTD data containing TT and AIS target information increases as the number of targets increases, and as a result, the transmission interval becomes longer.

Exit

1 Press [RADAR MENU] key.

The Main Menu will reappear.

* Note that, if you set COM1 and COM4 for transmission, they cannot be used as reception ports.

7.3.2 Sector Blank Setting (Sector Blank)

Set a sector range, preventing displaying the radar echo only within the area. Three types of sector can be created.

The sector blank function operates in the relative bearing with the bow.

Note: This function can be performed only when the scanner is connected to NKE-2103 and NKE-2254.

[I] Turning ON/OFF the Sector function (Sector 1, 2 and 3)

Procedure

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the "ENT" button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Press [4] key.
Press [6] key.

The Sector Blank Menu will appear.

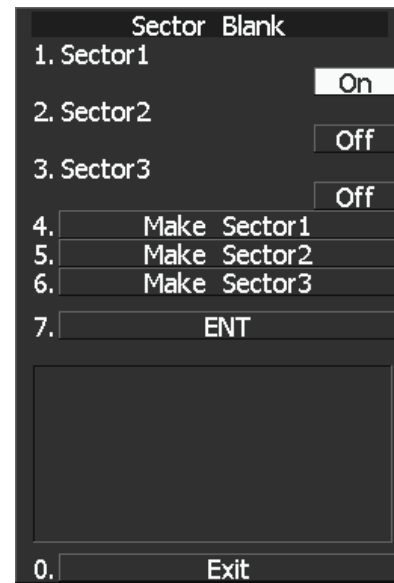
- 5 Select the number you want to excuted sector blank, Pressing the numeric keys [1] to [3].

The system allows the use of up to three sector blank areas.

Set each sector blank area to on or off.

On: The sector blank function is operated.

Off: The sector blank function is stopped.



Exit

- 1 Press [RADAR MENU] key.

The Main Menu will reappear.

[II] Making Sector Function (Make Sector 1, 2, 3)**Procedure**

1 Transmit the radar.

2 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

3 Press [0] key.

4 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

4 Press [4] key.

Press [6] key.

The Sector Blank Menu will appear.

5 Select the number you want to make sector blank, pressing the numeric keys [4] to [6].

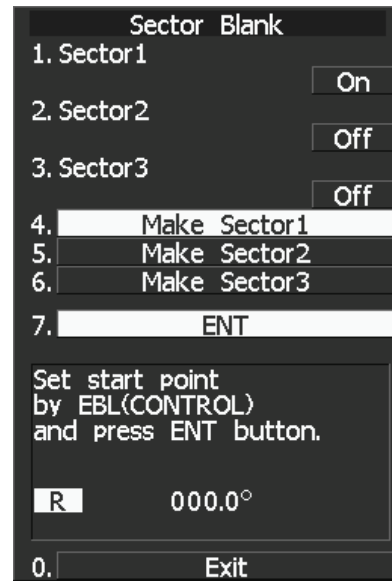
The sector blank for the numeric key pressed will be made.

6 Set the start point of the sector blank by operating the [EBL] dial, and then press 7 ENT.

The start angle of the sector blank will be set.

7 Set the end point of the sector blank by operating the [EBL] dial, and then press 7 ENT.

The end angle of the sector blank will be set.

**Exit**

1 Press [RADAR MENU] key.

The Main Menu will reappear.

7.3.3 TNI Blank Setting (TNI Blank)

Set a sector and stop tuning operation in the bearing.

If a structure such as the mast is close to the radar antenna, automatic tuning operation may become unstable. In this case, set a TNI blank in the direction of the structure in order to stabilize the tuning operation.

Only one TNI blank sector can be created. The TNI blank function operates in the relative bearing with the bow.

Note: This function can be performed only when the scanner is connected to NKE-2103 and NKE-2254.

[I] TNI Blank Function On/Off (Sector)

Procedure

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

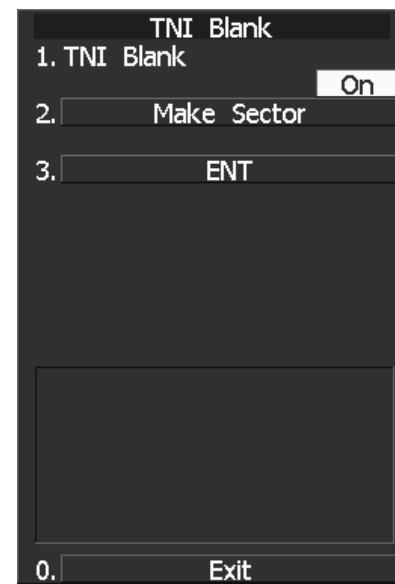
The Adjust Menu will appear.

- 4 Press the following keys.

- 4 TXRX Setting
- 9 TNI Blank
- 1 TNI Blank

On: The TNI blank function is operated.

Off: The TNI blank function is stopped.



[II] TNI Blank Area Creation (Make Sector)**Procedure**

1. Transmit the radar.

2. Hold down [RADAR MENU] key.

The Code Input Menu will appear.

3. Press [0] key.

4. Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

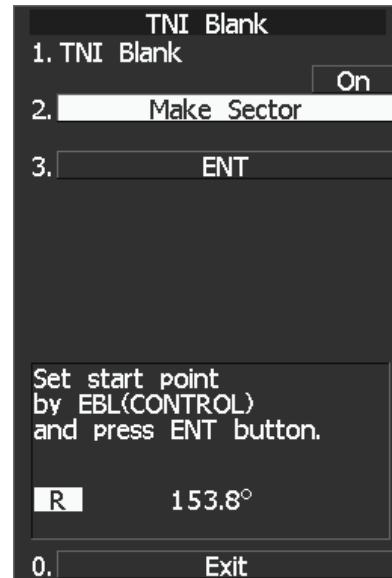
5. Press the following keys.

- 4 TXRX Setting
- 9 TNI Blank
- 2 Create sector

6. Set the starting bearing of the TNI blank by operating the [EBL] dial, and press the [ENT] key.

7. Set the ending bearing of the TNI blank by operating the [EBL] dial, and press the [ENT] key.

The TNI blank area is set.

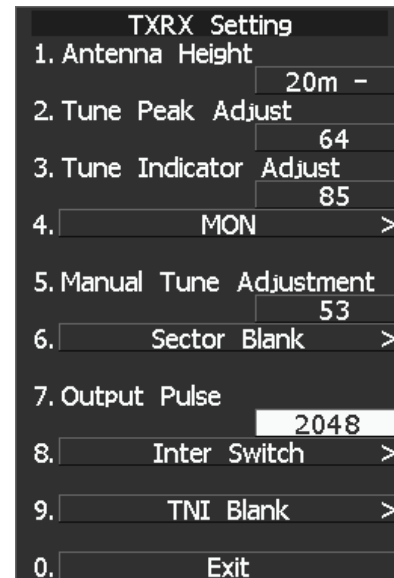


7.3.4 Bearing Pulse Output Adjustment (Output Pulse)

Set the output value of bearing pulse. This radar can set the output value to 2048 pulses and 4096 pulses. This setting is allowed only when a 25 kw antenna is used.

Procedure

- 1 Hold down [RADAR MENU] key.**
The Code Input Menu will appear.
- 2 Press [0] key.**
- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**
The Adjust Menu will appear.
- 4 Press [4] key.**
The TXRX Setting Menu will appear.
- 5 Press [7] key.**
- 6 Select a set value to be used.**



Exit

- 1 Press [RADAR MENU] key.**
The Main Menu will reappear.

7.3.5 Language Setting (Language)

You can switch between Japanese and English.

Procedure

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Press [1].

The Equipment Setup window will appear.

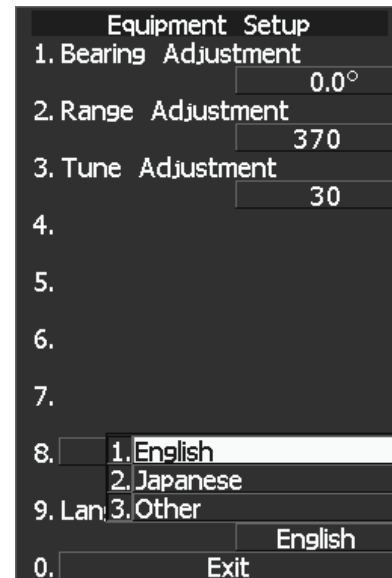
- 5 Select the language you want to display, pressing the numeric keys [1] to [3].

1. English
2. Japanese
3. Other

“Other” in 3. is a language corresponding to characters created in overseas agents.

To confirm whether or not your language is supported, contact overseas agents or our sales department.

To make the set language effective, turn off the power supply and then restart.



Exit

- 1 Press [RADAR MENU] key.

The Main Menu will reappear.

7.3.6 Date/Time Display Setting (Date/Time Setting)

In displaying the time, it is necessary to set the LOCAL TIME, LOCAL DATE and TIME ZONE. When the “ZDA” sentence of NMEA0183 is received, Date/Time is displayed automatically.

* If “ZDA” sentence is not received, the system internal clock function is used to display the date and time.

Procedure

1 Press [RADAR MENU] key twice.

The RADAR Menu will appear.

2 Open the following windows.

- 8 Open the Radar Sub Menu window.
- 4 Open the Data/Time Setting window.

3 Set information about date and time.

[1] UTC/LMT (Time display system)

Press [1] to switch the time mode between:

- UTC: Universal Time Coordinate
- LMT: Local Time

[2] LMT Date

Input the date in local time.

Press [2] key and call up the numeric keypad.

Input the date using the numeric keypad or the multi-dial.

Then, press [ENT] button.

[3] LMT Time

Input the time in local time.

Input the time using the numeric keypad or the multi-dial.

Then, press [ENT] button.

[4] Time Zone

Input the time-zone difference between the universal time and local time.

Input the time difference using the numeric keypad or the multi-dial.

Then, press [ENT] button.

[5] Display Style

Set one of the following date display formats.

Press [5] key and select a date display format.

YYYY-MM-DD Example: 2007-12-31

MMM DD, YYYY Example: Dec 31, 2007

DD MMM, YYYY Example: 31 Dec, 2007

Date/Time Setting	
1. UTC/LMT	UTC
2. LMT Date	2008-01-01
3. LMT Time	12:00
4. Time Zone	+00:00
5. Display Style	YYYY-MM-DD
0.	Exit

Exit

1 Press [RADAR MENU] key.

The menu will be closed.

Attention

- The “ZDA” sentence of NMEA0183 take presedence of the above setting.

7.4 ADJUSTMENT

This section describes the electrical adjustment procedures to be performed by service engineers during system installation.



CAUTION



Do not carry out the adjustments of the equipment except authorized service persons. If wrong setting is carried out, this may cause unstable operation.



Do not carry out the adjustments during navigation. Otherwise, the radar performance may be affected, resulting in an accident or trouble.

7.4.1 Noise Level Adjustment (Noise Level)

[!] Noise Level Adjustment for Signal Processing

Procedure

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 When the Adjust Menu appears, press [8] key.

The SP/TT INIT Setup Menu will appear.

- 5 Press [1] key.

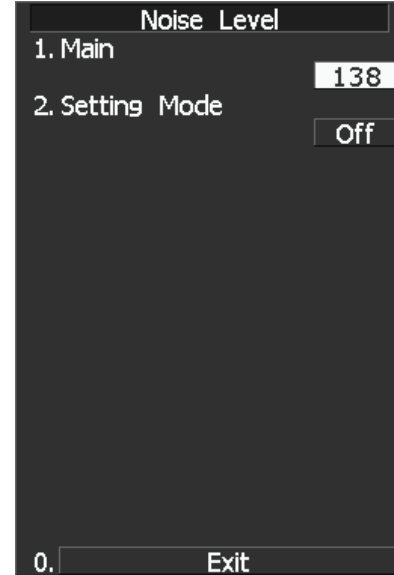
The Noise Level Menu will appear.

- 6 Press [1] key.

The Code Input Menu will open to change the noise level value.

- 7 Change the value to display echo correctly.

In addition to the entry on the Code Input menu, the Multi-functional Dial Control is available to change the value.



Note: The noise level is factory-set. After system installation, a great change in the noise level adjustment value should be avoided; it should be fine adjusted within ± 5 .

Exit

- 1 Press [RADAR MENU] key.

The Main Menu will reappear.

[II] Noise Level Adjustment Mode (Setting Mode)**Procedure****1 Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

2 Press [0] key.**3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

4 When the Adjust Menu appears, press [8] key.

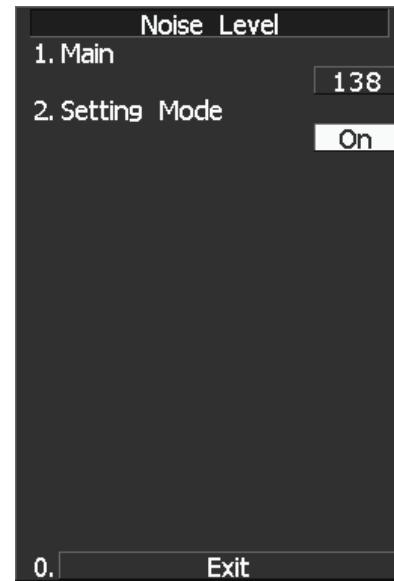
The SP/TT INIT Setup Menu will appear.

5 Press [1] key.

Noise Level Menu will appear.

6 Press [2] key.

The noise level adjustment mode is switched between on and off.

**Factory-adjustment method**

- The GAIN control is set to the maximum position, the SEA control is set to the minimum position, the RAIN control is set to the minimum position, and IR, AUTO-SEA, AUTO-RAIN, PROC, FUNC, and TRAILS are all set to off.
- The noise level adjustment mode is turned on.
- While the noise level adjustment value is decreased gradually, the value with which radar echoes no longer appear is determined as the set value.
- Ten is added to the set value (with which radar echoes no longer appear), and the result is set as the final noise level adjustment value.
- The noise level adjustment mode is turned off when the adjustment is finished.

Exit**1 Press [RADAR MENU] key.**

The Main Menu will reappear.

7.4.2 Adjustment of Target Tracking Function (TT)



CAUTION



Optimal values have been set for Video Level and Vector Constant; therefore, never change their values unless absolutely necessary. Failure to comply may result in accidents that would lower target tracking performance.

[!] Vector Constant Adjustment (Vector Constant)

Adjust the vector follow-up performance of the target tracking function.
The vector constant is adjusted to an optimal value, so do not change it carelessly.

Attention

- **Do not change the set value carelessly.**
The vector constant shall be set to 4 normally. If the vector constant value is higher, a target's vector will be better followed up when the target and own ship change their course or speed, but the vector accuracy will be lower on the contrary.

Procedure

- 1 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 **Press [0] key.**
- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 **Press [8] key while the Adjust Menu is open.**

The SP/TT INIT Setup Menu will appear.

- 5 **Press [2] key.**

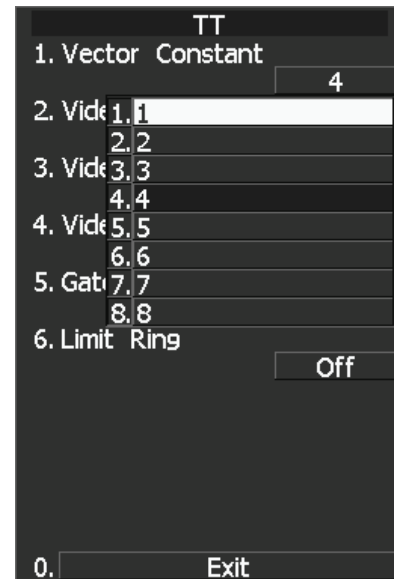
The TT Menu will appear.

- 6 **Press [1] key.**

The window for setting vector constants will appear.

- 7 **Select the value you want to set, pressing the numeric keys [1] to [8].**

To improve vector follow-up performance, increase the set value.
To stabilize vectors, decrease the set value.

**Exit**

- 1 **Press [RADAR MENU] key.**

The Main Menu will reappear.

7

[II] Quantization Level Adjustment (Video Level)

Use the target tracking function (TT) to adjust the level of the signal to be recognized as a target. If a small value is set, even weak target signals will be input to the target detection circuit of the target tracking function. However, many unnecessary signals are also input, which may cause unstable target acquisition or tracking. It is important to set a value four or five greater than the value with which unnecessary signals are detected. The quantization level is adjusted to an optimal value, so do not change it carelessly.

**CAUTION**

**Do not change the set quantization level carelessly.
If the level deviates from the proper value, the TT
acquisition and tracking functions will deteriorate.
Otherwise, this may cause accidents.**

Procedure

- 1 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 **Press [0] key.**

- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 **Press [8] key while the Adjust Menu is open.**

The SP/TT INIT Setup Menu will appear.

- 5 **Press [2] key.**

The TT Menu will appear.

- **To change the quantization level of the automatic acquisition area**

- 6 **Press [2] key.**

The numeric keypad for inputting the quantization level of the automatic acquisition area opens.

- 7 **Enter the Video TD Level value.**

The multi-function control can also be used to enter the value.

After having entered the value, move the cursor onto the “ENT” button and press [ENT] key.

The quantization level can be entered using the numeric keypad, or the multi-function control knob.

When entry is complete, set the cursor over the "ENT" button on the numeric keypad, and press [ENT].

You can set this value smaller to detect targets with weaker signals, but by doing so the unit may pick up unwanted signals that can cause the display of targets to be unstable. Setting this to a larger value can cause the unit to ignore weaker signals. Filtering out unwanted signals can stabilize the display of targets, but targets with weaker signals can be more difficult to detect.

- **To change the quantization level of tracking and manual acquisition**

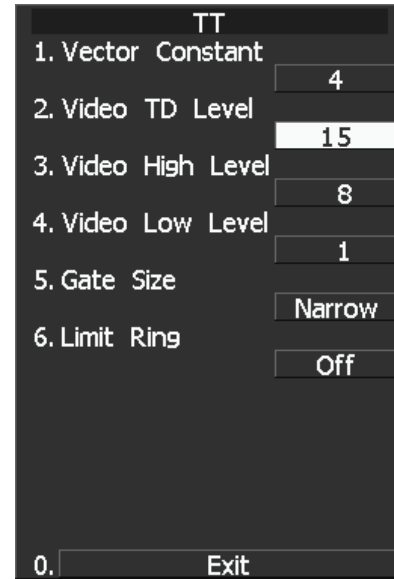
- 6 **Press [3] key.**

The numeric keypad for inputting the quantization level of tracking and manual acquisition opens.

- 7 **Enter the Video High Level value.**

The multi-function control can also be used to enter the value.

After having entered the value, move the cursor onto the “ENT” button and press [ENT] key.



The quantization level can be entered using the numeric keypad, or the multi-function control knob.

When entry is complete, set the cursor over the "ENT" button on the numeric keypad, and press [ENT].

You can set this value smaller to detect targets with weaker signals, but by doing so the unit may pick up unwanted signals that can cause the display of targets to be unstable. Setting this to a larger value can cause the unit to ignore weaker signals. Filtering out unwanted signals can stabilize the display of targets, but targets with weaker signals can be more difficult to detect.

Exit

- 1 Press [RADAR MENU] key.

The Main Menu will reappear.

[III] Gate Size Adjustment (Gate Size)

Use the target tracking function (TT) to set a target search area.

The gate size is adjusted to an optimal value, so do not change it carelessly.

Procedure

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the "ENT" button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Press [8] key while Adjust Menu is open.

SP/TT INIT Setup menu opens.

- 5 Press [2] key.

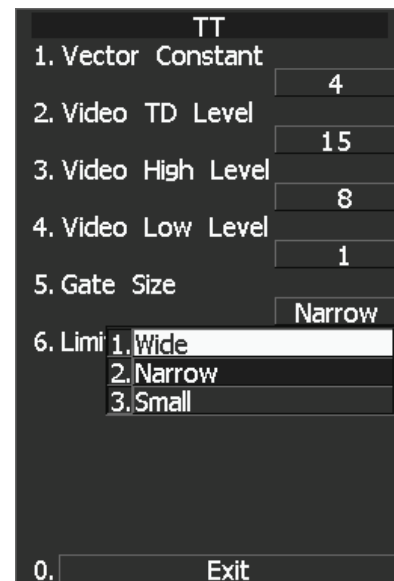
TT menu opens.

- 6 Press [5] key and select a desired gate size.

Narrow: Small gate size

Normal: Medium gate size

Wide: Large gate size



7

Exit

- 1 Press [RADAR MENU] key.

The Main Menu will reappear.

[IV] CPA Limit Ring Display On/Off (Limit Ring)

Use the target tracking function (TT) to determine whether to display the CPA limit for determining a dangerous ship. When the CPA limit ring display function is turned on and a relative vector is used, the CPA limit ring is displayed as a circle.

Procedure

- 1 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 **Press [0] key.**

- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 **Press [8] key while Adjust Menu is open.**

SP/TT INIT Setup menu opens.

- 5 **Press [2] key.**

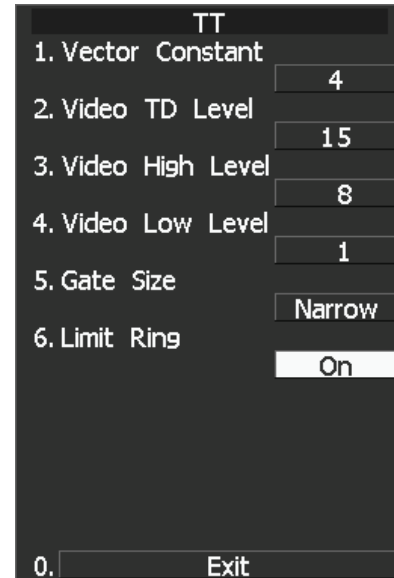
TT menu opens.

- 6 **Press [6] key.**

Activate or deactivate the CPA limit ring display function.

Off: Limit ring not displayed

On: Limit ring displayed



Exit

- 1 **Press [RADAR MENU] key.**

The Main Menu will reappear.

7.4.3 Main Bang Suppression Adjustment (MBS Level)

Main Bang Suppression is adjusted to suppress main bang, a reflection signal from 3D circuit including wave guide tube, that generally appears as a circular image focusing on the center of the radar display. Optimum adjustment allows main bang image to remain lightly on the display.

This adjustment is made for settings in the processing circuit of the display unit.



WARNING



Do not change MBS Level/Area unless absolutely necessary.

Incorrect adjustment may erase targets in point-blank range and cause collision, resulting in death or serious injury.

Procedure

1 Perform the following operation before setting.

- Set the range to 0.125 nm.
- Set the radar video enhance function (ENH).
- Set the correlation processing function (PROC) to OFF.
- Rotate [AUTO-RAIN] control to the minimum position (counterclockwise fully).
- Rotate [GAIN/PL] control to the maximum position (clockwise fully).
- Rotate the [AUTO-SEA] control to achieve the strength with which main bang can be judged.

2 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

3 Press [0] key.

4 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

5 Press [8] key.

The SP/TT INIT Setup Menu will appear.

6 Press [3] key.

The MBS Menu will appear.



7 Press [2] key.

The numeric keypad to be used in MBS Area Menu will appear.

8 Input “20” as an MBS Area setting value.

The value can also be entered with the multi-dial.
Press [ENT] key after inputting the value.

9 Input [1] key.

The numeric keypad to be used in MBS Level Menu will appear.

10 Input an MBS Level setting value such that the main bang image remains lightly on the display.

The value can also be entered with the multi-dial.
Press [ENT] key after inputting the value.

11 Press [2] key.

The numeric keypad to be used in MBS Area Menu will appear.

12 Input an MBS area setting value such that the suppression area and the main bang image completely overlap with each other.

The value can also be entered with the multi-dial.
Press [ENT] key after inputting the value.

Exit

1 Press [RADAR MENU] key.

The Main Menu will reappear.

7.4.4 Adjustment of Performance Monitor (NJU-85)

After replacement of either of the following units, adjust the performance monitor according to the procedure in this section:

- Performance monitor
- Antenna unit

[I] Transmission Monitor Adjustment (MON Adjustment)

Adjust the circuit for monitoring the transmission performance of the radar equipment.

Procedure

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

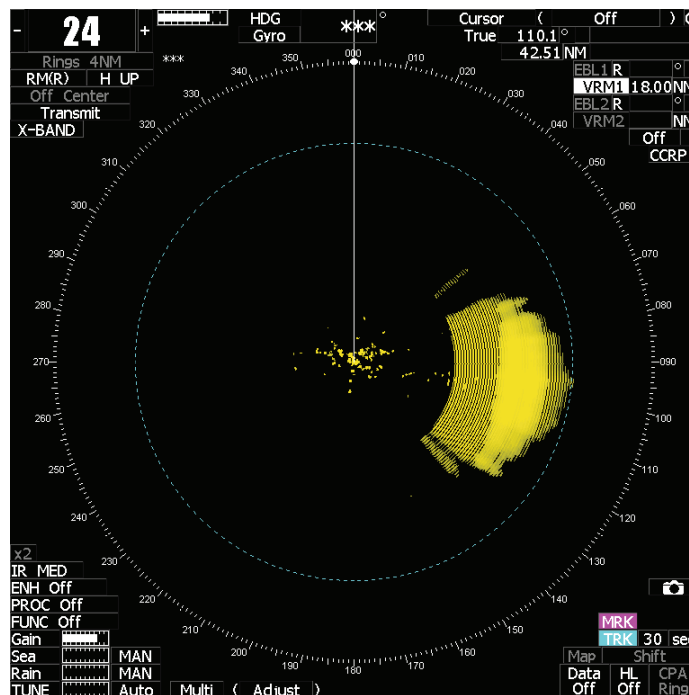
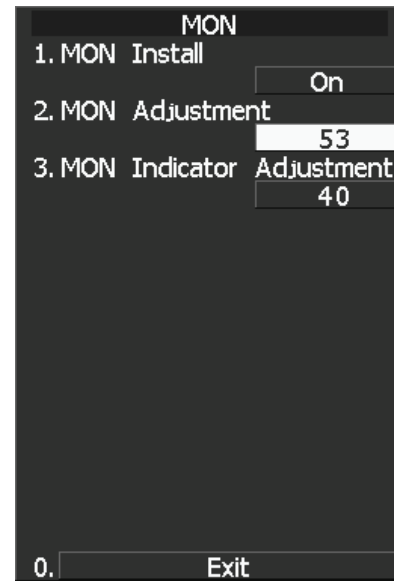
- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Open Adjust Menu.

- 4 TXRX Setting
- 4 MON
- 2 MON Adjustment

- 5 Increase or decrease the adjustment value so that the farthest point of the performance monitor pattern touches the 18.0 nm line.



[II] Reception Monitor Adjustment (MON Indicator Adjustment)

Adjust the circuit for monitoring the reception performance of the radar equipment.

Procedure

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

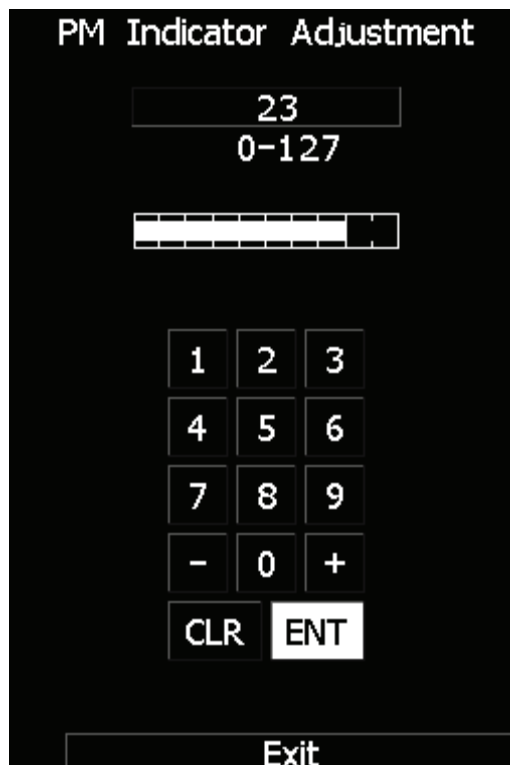
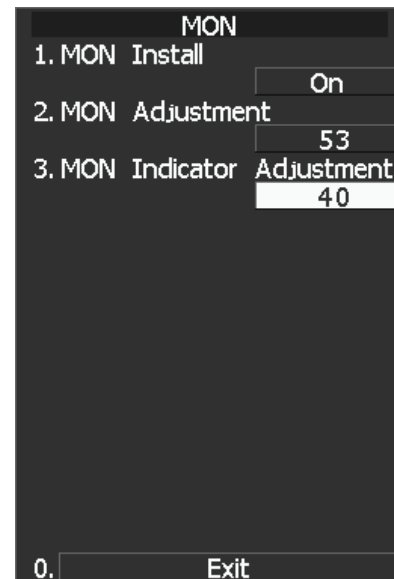
- 3 Move the cursor onto the "ENT" button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Open Adjust Menu.

4 TXRX Setting
4 MON
2 MON Indicator Adjustment

- 5 Increase or decrease the adjustment value so that the performance monitor level indicator will be adjusted to "8."






- 6 Press the **EXIT** button to close the adjustment menu.

Note: During performance monitor adjustment, all acquisitions by the target tracking function are released. The released target acquisitions are not recovered.

7.5 MAINTENANCE MENU

This item is provided for equipment maintenance, including settings of antenna safety switch, master reset, etc.

 CAUTION	
	Only our service engineers are to make the adjustment. Neglecting this caution may cause accidents and failures.
	Do not make the adjustments during navigation. Otherwise, adjustments may affect the radar functions, causing accidents and failures.

7.5.1 Scanner Safety Switch Setting (Safety Switch)

Use this switch to measure the transmission/reception performance while the antenna is in stopped state.

Procedure

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Press [2] key.

The Maintenance Menu will appear.

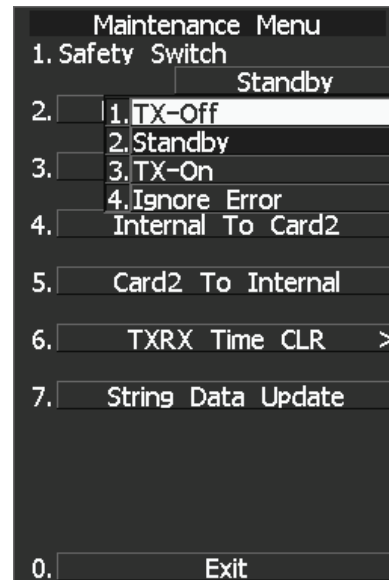
- 5 Press [1] key.

Setting items for the scanner safety switch will appear.

- 6 Select the item you want to set, pressing the numeric key [1] to [4].

1. TX OFF:
Stops transmission. (The screen remains in the transmission status.)
2. STANDBY: (Normal setting)
Stops transmission. (The screen switches to the standby status)
3. TX-ON:
Continues transmission without changes. (The display unit remains in transmission state.)
(However, errors in bearing signals etc. are to occur due to safety switch-off.)
4. IGNORE ERROR:
Continues transmission without changes.(Errors in bearing signals etc. due to safety switch-off are also ignored.)

- 7 Change the setting back to **2. Standby** when the work is finished.



Exit

- 1 Press [RADAR MENU] key.

The Main Menu will reappear.

7.5.2 Initialization of Memory Area (Area Initial)

If system operation is unstable, it may be stabilized by initializing the memory area. To initialize the memory area, follow the procedure in this section. The memory area is reset to the factory setting when initialized.

[I] Partial Master Reset

Procedure

1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

2 Press [0] key.

3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

4 Press [2] key.

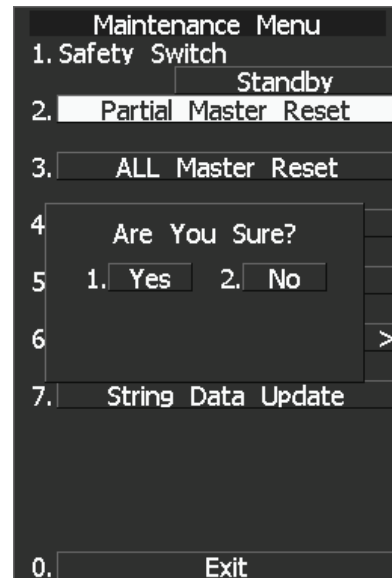
The Maintenance Menu will appear.

5 Press [2] key.

The Partial Master Reset Execution Check window will appear.

- 1 YES: Execution of Partial Master Reset
- 2 NO: Cancellation

The memory areas of specified items are initialized, and the system is restarted.



[II] All Master Reset (All Master Reset)

Procedure

- 1 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

- 2 Press [0] key.

- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

- 4 Press [2] key.

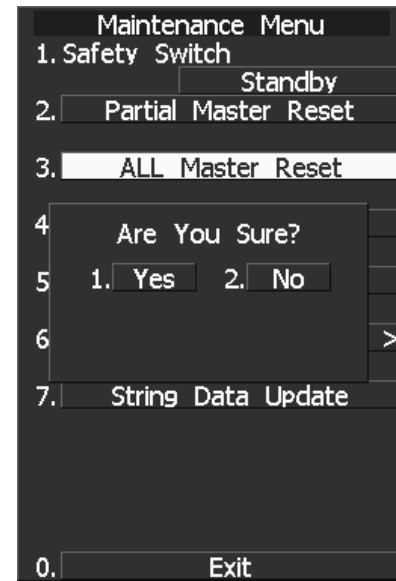
The Maintenance Menu will appear.

- 5 Press [3] key.

The All Master Reset Execution Check window will appear.

- 1 YES: Execution of All Master Reset
- 2 NO: Cancellation

The whole memory area is initialized, and the system is restarted.



7.5.3 Save of Internal Memory Data (Card2)

The system can save internal memory data such as item settings in menus onto a flash memory card. If the radar processing circuit in the system has been replaced, the set values before the circuit replacement can be restored by reading the set values you saved before the replacement.

To save the internal memory data onto a flash memory card (option), the card must be inserted in card slot beforehand.

The data which are saved : Setting in menus, Trails of own ship (7000 points), Track of other ship (20 target x 1500 points, TT option), user map (256 points), etc.

The data which always changes (for example Radar echo, etc) are not saved.

[I] Copying of Internal Settings onto Card (Internal to Card)

Save the internal memory data, such as item settings in menus, onto a flash memory card.

The internal memory data should be saved at completion of system setting, and the operation condition should be saved periodically.

Procedure

- 1 **Insert a flash memory card into the CARD slot 2.**

The lower slot is slot 1; the upper slot is slot 2.

- 2 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 3 **Press [0] key.**

- 4 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 5 **Press [2] key.**

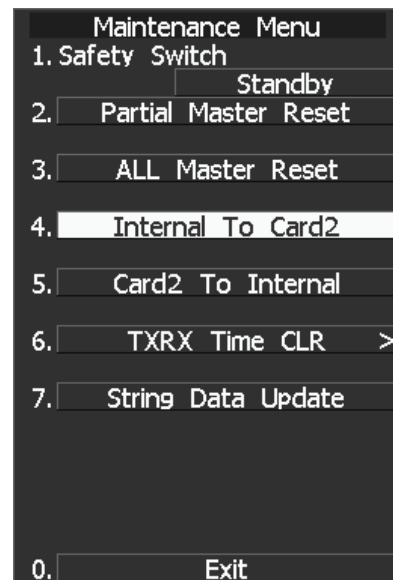
The Maintenance Menu will appear.

- 6 **Press [4] key.**

The execution check window will open to check whether or not you want to copy the internal settings to Card2.

- 1 YES: Execution of copy
- 2 NO: Cancellation

If YES is selected, the internal memory data is saved on the flash memory card.



Exit

- 1 **Press [RADAR MENU] key.**

The Main Menu will reappear.

[II] Reading of Internal Settings from Card (Card to Internal)

Read the saved memory data from the flash memory card into the system memory.
Perform the read operation in order to return the system to the previous operation condition after replacement of the radar processing circuit in the system.

Procedure

- 1 Insert the memory flash card, in which internal settings have been saved, into Card slot 2.**

The lower slot is slot 1; the upper slot is slot 2.

- 2 Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 3 Press [0] key.**

- 4 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 5 Press [2] key.**

The Maintenance Menu will appear.

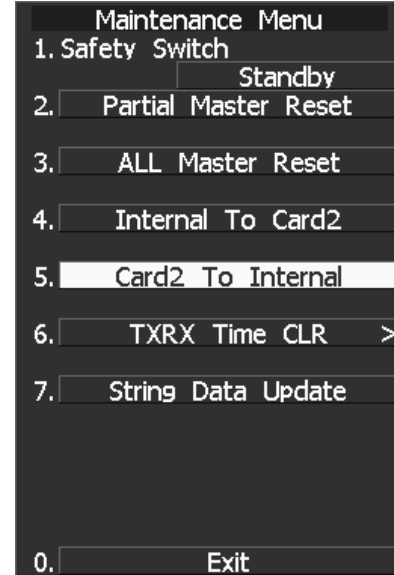
- 6 Press [5] key.**

The execution check window will open to check whether or not you want to read the internal settings from Card2.

- 1 YES: Read
- 2 NO: Cancellation

If YES is selected, the memory data is read from the flash memory card into the system memory.

After the internal memory area is updated, the system is restarted.



7.5.4 Update of Character String Data (String Data Update)

The system is designed to transfer and display external character strings as the second language display. The second language is factory-set to "Japanese."

Ask our agent or sales department for the supply of character strings to be updated.

To update character strings, the flash memory card (option) containing the character string file must be inserted in card slot 2.

Procedure

1 Insert a flash memory card containing character string data into CARD slot 2.

2 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

3 Press [0] key.

4 Move the cursor onto the "ENT" button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

5 Press [2] key.

The Maintenance Menu will appear.

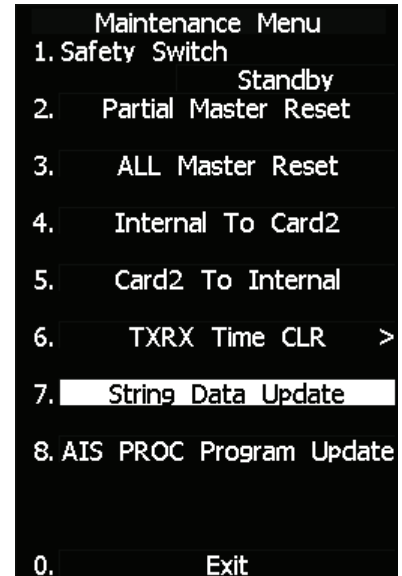
6 Press [7] key.

A dialog appears asking if you wish to load the character string data from Card2.

- 1 YES : Load data.
- 2 NO : Cancel.

If YES is selected, the character string file on the flash memory card is read into the system, and the second language area is updated.

To display the read character strings in the second language, select Other in the menu shown in Section 7.3.5 "Language Setting (Language)".



7.5.5 Clear of Antenna Operation Time (TXRX Time CLR)

The system adds up the following operation time and contains it in the antenna unit:

- Transmission time
- Motor run time

Clear the above total time when the magnetron or antenna unit motor is replaced.

[1] Transmission Time Clear (TX Time Clear)

Clear the transmission time of the antenna unit.

Perform the following procedure to clear the transmission time when the magnetron is replaced.

Procedure

- 1 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 **Press [0] key.**

- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 **Press [2] key.**

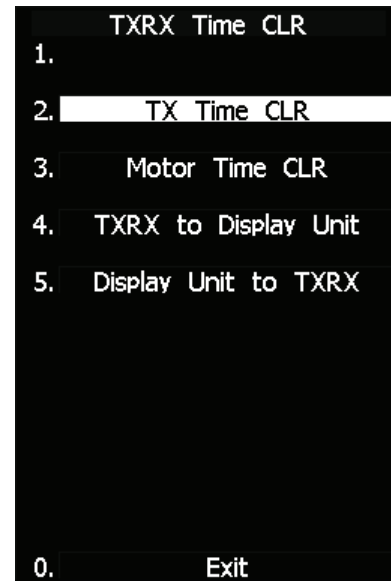
The Maintenance Menu will appear.

- 5 **Press [6] key.**

Press [2] key.

6. **Select Yes in the Transmission Time Clear Confirmation Window.**

The transmission time in the antenna's internal control circuit is cleared to 0.



[II] Motor Run Time Clear (Motor Time Clear)

Clear the transmission time of the antenna unit.

Perform the following procedure to clear the transmission time when the magnetron is replaced.

Note: This function can be performed only when the scanner is connected to NKE-2103 and NKE-2254.

Procedure

- 1 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 **Press [0] key.**

- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 **Press [2] key.**

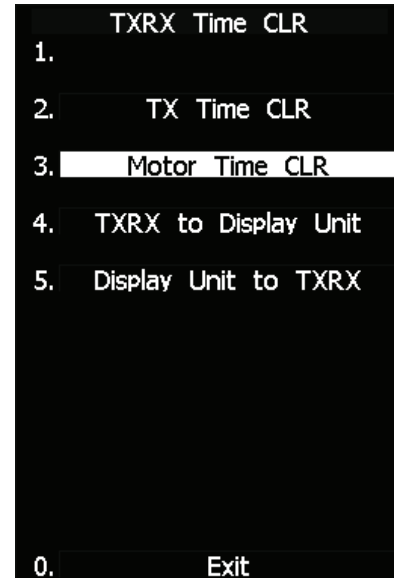
The Maintenance Menu will appear.

- 5 **Press [6] key.**

Press [3] key.

6. **Select Yes in the Motor Run Time Clear Confirmation Window.**

The motor run time in the antenna's internal control circuit is cleared to 0.



[III] Antenna -> Display Unit (TXRX to Display Unit)

Save the following antenna time data from the antenna unit into the display unit.

- Antenna's operating hours
- Transmission time
- Motor run time

Perform the following procedure to inherit the antenna time data when the antenna's internal control circuit is replaced.

1. Saving the antenna time data
2. Replacing the antenna's internal control circuit
3. Restoring the antenna time data

Note: This function can be performed only when the scanner is connected to NKE-2103 and NKE-2254.

Procedure

- 1 Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 Press [0] key.**

- 3 Move the cursor onto the "ENT" button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 Press [2] key.**

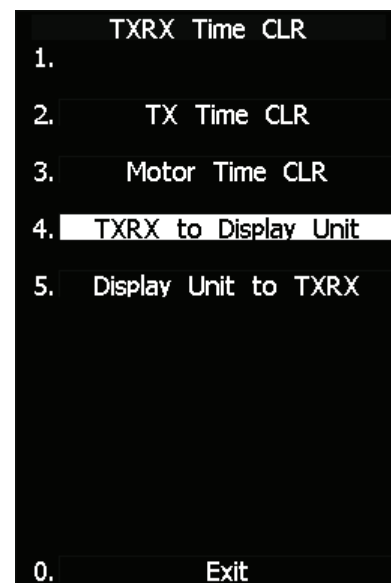
The Maintenance Menu will appear.

- 5 Press [6] key.**

Press [4] key.

- 6. Select Yes in the Antenna -> Display Unit Confirmation Window.**

The antenna time data in the antenna's internal control circuit is saved transferred to the display unit.



[IV] Display Unit -> Antenna (Display Unit to TXRX)

Restore the antenna time data from the display unit into the antenna's internal control circuit.
Perform the following procedure to inherit the antenna time data when the antenna's internal control circuit is replaced.

1. Saving the antenna time data
2. Replacing the antenna's internal control circuit
3. Restoring the antenna time data

Note: This function can be performed only when the scanner is connected to NKE-2103 and NKE-2254.

Procedure

- 1 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 **Press [0] key.**
- 3 **Move the cursor onto the "ENT" button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 **Press [2] key.**

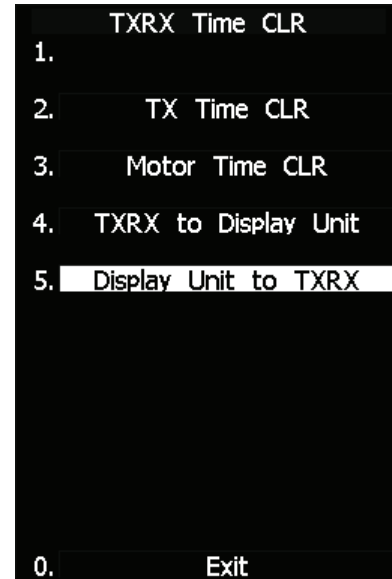
The Maintenance Menu will appear.

- 5 **Press [6] key.**

Press [4] key.

6. **Select in the Display Unit -> Antenna Confirmation Window.**

The antenna time data in the display unit is restored transferred to the antenna's internal control circuit.



7.5.6 Update of AIS Processor Program (AIS PROC Program Update)

AIS processor programs can be updated by using a flash memory card. In order to update AIS processor programs, the flash memory card (optional) containing the update program file must be inserted in the card slot 2 beforehand.

[I] Transmission Time Clear (TX Time Clear)

Clear the transmission time of the antenna unit.

Perform the following procedure to clear the transmission time when the magnetron is replaced.

Procedure

1 Insert the flash memory card, containing the update program file for AIS processor programs, into the CARD slot 2.

2 Hold down [RADAR MENU] key.

The Code Input Menu will appear.

3 Press [0] key.

4 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.

The Adjust Menu will appear.

5 Press [2] key.

The Maintenance Menu will appear.

6 Press [6] key.

The window asking whether to update AIS processor programs and whether to execute character strings will open.

1 YES: Program update execution

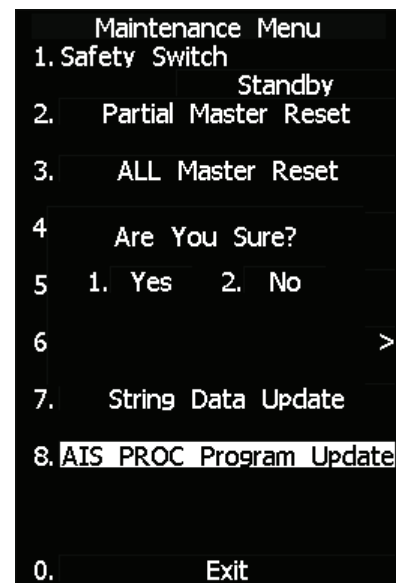
2 NO: Program update cancel

When 1. YES is selected:

The AIS processor programs on the flash memory card are updated read into the equipment.

Follow the displayed instructions during program update.

Do not turn off this equipment during program update.



SECTION 8

MAINTENANCE AND INSPECTION

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8.1 ROUTINE MAINTENANCE



DANGER



Never carry out internal inspection or repair work of the equipment by users.

Inspection or repair work by unauthorized personnel may result in fire hazard or electric shock.

Ask the nearest branch, business office or a dealer for inspection and repair.



Turn off the main power before maintenance work.

Otherwise, an electric shock may result.



Turn off the main power before cleaning the equipment. Especially, make sure to turn off the indicator if a rectifier is used. Otherwise, equipment failure, or death or serious injury due to electric shock may result, because voltage is outputted from the rectifier even when the radar is not operating.

For operating the radar equipment in the good conditions, it is necessary to make the maintenance work as described below. If maintenance is made properly, troubles will reduce. It is recommended to make regular maintenance work.

Common points of maintenance for each unit are as follow:

Clean the equipment.

Remove the dust, dirt, and sea water rest on the equipment cabinet with a piece of dry cloth. Especially, clean the air vents with a brush for good ventilation.

8.2 MAINTENANCE ON EACH UNIT

8.2.1 Scanner Unit NKE-2062/2103/2254



DANGER



When conducting maintenance work on the antenna, make sure to turn its main power off.

Failure to comply may result in electrocution or injuries.



Make sure to turn off the antenna operation switch.

Failure to comply may result in injuries caused by physical contact with the rotating antenna.



Do not touch the radiator. Even if the power is turned off, the radiator may be rotated by the wind.

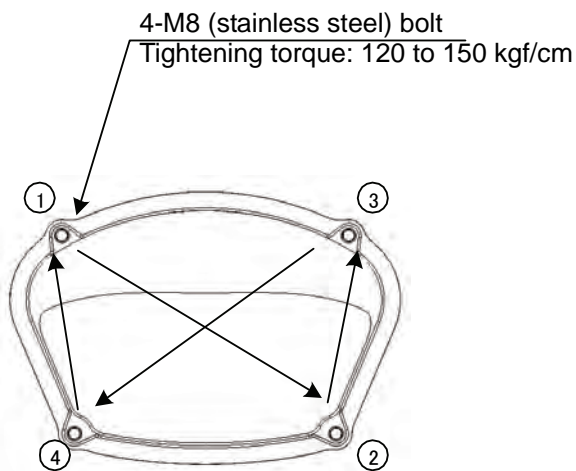
After the work, turn "ON" the scanner unit safety switch.

Precautions in Mounting the Cover

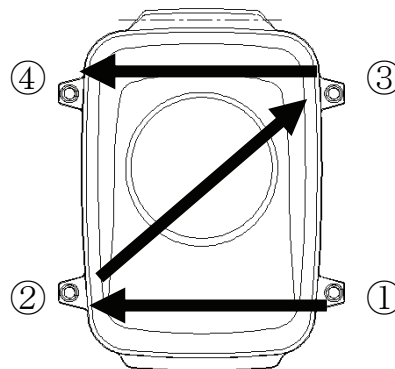
When the cover is removed for regular checkup and replacement of parts and refitted after such work, the procedure of fastening bolts shall be taken with the following precautions:

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

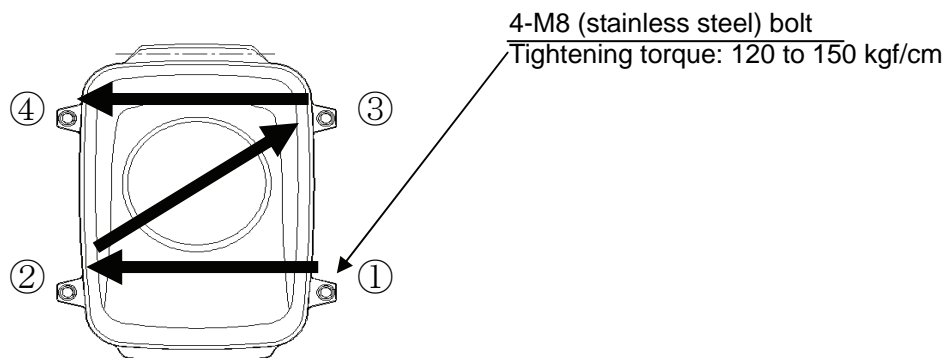
*: Fasten the bolts in the diagonal order.



Bolt Tightening Procedure of NKE-2254 Cover



Bolt Tightening Procedure of NKE-2062 Cover



Bolt Tightening Procedure of NKE-2103 Cover

(1) Radiator**Attention**

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

Check up and clean the radiator.

(2) Rotating section

- (a) **Supply Oil Seal**
An S-band scanner unit without a grease nipple needs grease supply. Remove the cap of the grease nipple on the front of the radiator support, and supply grease with a grease gun. Make the oiling every six months. The oil quantity shall be approximately 100 g, which is as much as the grease comes out of the oil seal. Use the grease of Mobilux 2 of Mobil Oil.
- (b) **Oiling gears**
Apply grease evenly to the tooth surfaces of the main shaft drive gear and the encoder drive gear with a spreader or brush. Oiling in short intervals is more effective to prevent the gears from wear and tear and extend their service life, but oil at least every six months. Use Mobilux2 of Mobile Oil.
- (c) **Mounting legs**
Check the mounting legs and mounting bolts of the scanner unit case for corrosion at intervals and maintain them to prevent danger. Apply paint to them once a half year because painting is the best measure against corrosion.

8.2.2 Display Unit NCD-4380



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

Dust accumulated on the screen will reduce clarity and darken the video. For cleaning it, wipe it with a piece of soft cloth (flannel or cotton). Do not wipe it strongly with a piece of dry cloth nor use gasoline or thinner.

8.3 PERFORMANCE CHECK

Make operational check on the radar equipment regularly and if any problem is found, investigate it immediately. Pay special attention to the high voltage sections in checking and take full care that no trouble is caused by any error or carelessness in measurement. Take note of the results of checking, which can be used effectively in the next check work.

Operational check shall be made in accordance with Table 8-1 Function Check List in the order as specified in it.

Table 8-1 Check List

Equipment	Item to be checked	Criteria	Remarks
Transmitter-receiver Unit	Tuning LED of Receiver	The LED is lighting during operation	48NM range
Display Unit	Video and echoes on the screen Sensitivity LCD brilliance can be controlled correctly Various markers Various numerical indications Lighting	Can be correctly controlled	
	Safety Switch Various Currents and Voltages	Refer to [II] in Section 8.3.1.1	
	Communications Lines	Refer to [III] in Section 8.3.1.1	
	Memory	Refer to [I] in Section 8.3.1.1	
	Panel	Refer to Section 8.3.1.3	
	Monitor	Refer to Section 8.3.1.2	
	TT	Refer to Section 5.2.7	
	Magnetron current	Refer to Section 8.3.1.7	
	Performance Monitor	Refer to Section 8.3.1.4	
	Error Logging Display	Refer to Section 8.3.1.5	
	System Information Display	Refer to Section 8.3.1.6	

8.3.1 Test Menu

The performance status of this radar equipment can be checked on the TEST Menu.

Self Test	[I] Self-diagnostic function
Monitor Test	[II] Monitor check
Keyboard Test	[III] Operation panel check
MON Display	[IV] Performance monitor
Error Logging	[V] Error log display
System INFO	[VI] System information display
MAGI	[VII] Indication of magnetron current

* Execution of MON Display requires a performance monitor unit NJU-85.

Procedure

- 1 Press [RADAR MENU] key twice.

Press [8] key.

Press [9] key.

The TEST Menu will appear.

* Software button ⑥ located at the operation/message area in Section 2.3.9 is also available.

- 2 Select the check item you want to check, pressing the numeric keys [1] to [6] on Test Menu.

The list of check items will appear.



Exit

- 1 Press [RADAR MENU] key.

The TEST Menu will be closed.

8.3.1.1 Self-diagnosis function

Check of Memory, Scanner Unit, and Communications Lines

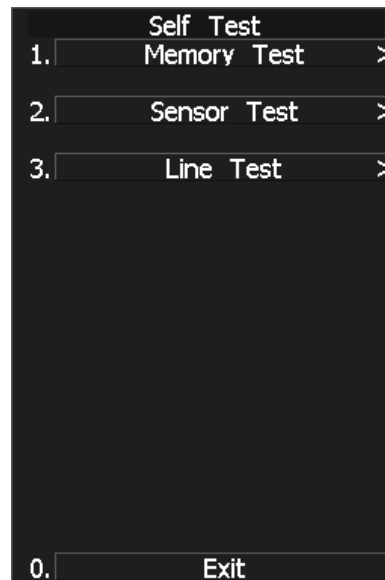
Memory Test	1) Memory check
Sensor Test	2) Antenna check
Line Test	3) Communication line check

Procedure 1 Press [1] key while the Test Menu is open.

The SELF TEST Menu will appear.

2 Select the item you want to check, pressing numeric keys [1] to [3] .

The SELF CHECK Menu will appear.



Exit 1 Press [RADAR MENU] key.

The Self Test Menu will be closed.

[I] Memory Test

Checks for the performance of built-in memory.

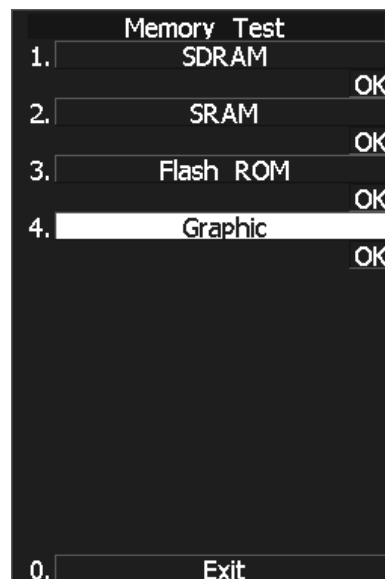
SDRAM	SDRAM check
SRAM	SRAM check
FLASH ROM	Flash ROM check
GRAPHIC	Graphic check

Procedure 1 Press [1] key while the Self Test menu is open.

The Memory Test Menu will appear.

2 Select the item you want to check, pressing numeric keys [1] to [4].

When no abnormality is found, OK is displayed.
When an abnormality is found, NG is displayed.



Exit 1 Press [RADAR MENU] key.

The menu will be closed.

III] Sensor Test

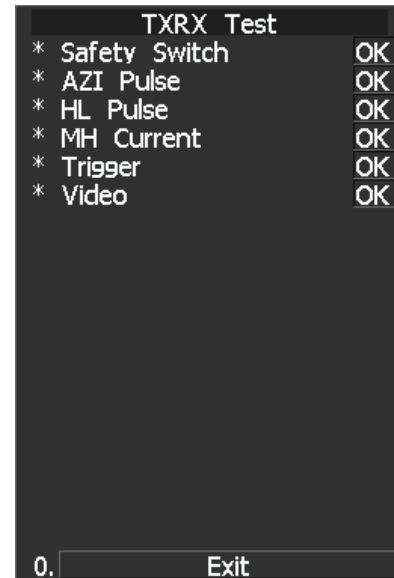
Checks for signals from the antenna.

Safety Switch	Antenna's safety switch check
AZI Pulse	Antenna rotation signal check
HL Pulse	Heading line signal check
MH Current	Check on the load current of high voltage in the modulator
Trigger	Radar trigger signal check
Video	Radar video check

Procedure

- 1 Press [2] key while the Self Test menu is open.

The Sensor Test menu will appear.
 When no abnormality is found, OK is displayed.
 When an abnormality is found, NG is displayed.
 In standby, * * will appear.



Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.

III] Check of Communication Lines (Line Test)

Check communication with operational devices and external navigators.

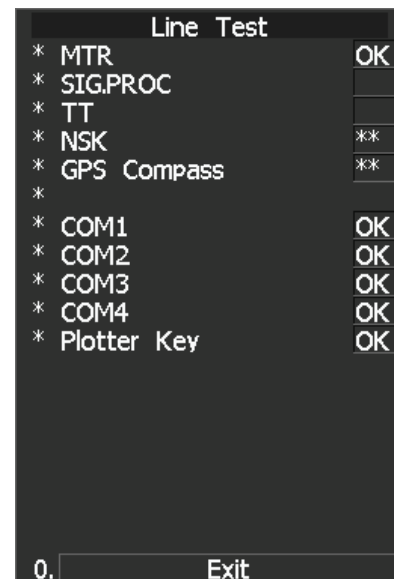
MTR	Check on connection with the transmitter-receiver
NSK	Check on connection with the NSK unit
GPS Compass	Check on connection with the GPS compass
COM1	Check on connection with COM1
COM2	Check on connection with COM2
COM3	Check on connection with COM3
COM4	Check on connection with COM4
Plotter Key	Check on connection with Plotter Key.

Procedure

- 1 Press [3] key with the Self Test menu open.

The Line Test menu will appear.
 When no abnormality is found, OK is displayed.
 When an abnormality is found, NG is displayed.

The status display field of equipment not connected is * *.



Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.

8.3.1.2 Monitor Test

Checks for the display.
The test pattern will be shown on the display.

Procedure

- 1 Press [2] key while the Test Menu is open.

The Monitor Test Menu will appear.

- 2 Select the item number you want to display, pressing numeric keys [1] to [5] of the test pattern.

The selected test pattern will be displayed.

- Pattern 1: All colors are filled with white.
- Pattern 2: A white box is displayed on the black background of 1024 × 768 dots.
- Pattern 3: Displays rectangle × 2, circle × 2, and cross-shape × 13 (white lines on the black background).
- Pattern 4: Displays “H” of 9 dots × 9 dots on the entire screen (white character on the black background).
- Pattern 5: Gray scale display (16 levels)
- Pattern 6: Displays a color bar.
- Pattern 7: The square figure of a specified RGB value is shown at the center of the display.



- 3 To return to the original display, press any key. If Pattern7 is selected, resetting is performed by pressing the CLR button.

If errors occur in the monitor, no test pattern will appear.

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.

8.3.1.3 Operation Panel Test

Checks for the controls and switches of the operation panel.

Key Test	1) Key check
Buzzer Test	2) Buzzer check
Light	3) Keyboard light check

Procedure

- 1 Press [3] key while the Test Menu is open.

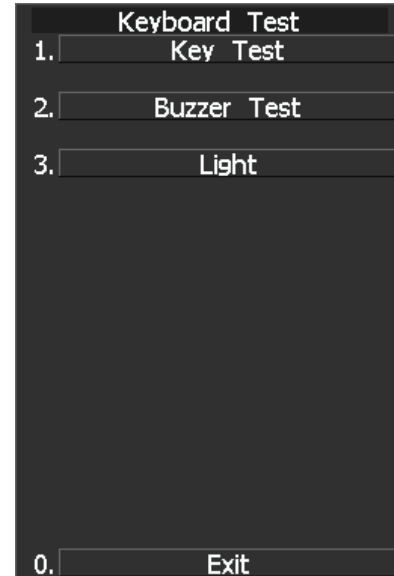
The Keyboard Test Menu will appear.
- 2 Select the item number you want to check, pressing numeric keys [1] to [3] of the item.

The check contents will be displayed.

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.



[1] Key Check

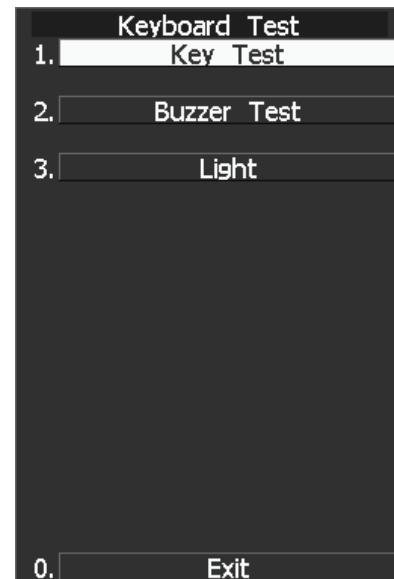
Checks for the controls and switches of the operation panel.

Procedure

- 1 Press [1] key while the Keyboard Test menu is open.

The operation panel image will appear at the upper left of the display.

Each key on the operation panel on the display is shown in reverse video at the same time the key is pressed, and the name of the pressed key is displayed.
- 2 To perform resetting, position the cursor to "EXIT" shown on the left side of the display, and press the [ENT] key or [0] key.



Exit

- 1 Press [0] key.

The menu will be closed.

[II] Buzzer Test

Checks for the operation panel buzzer.

Procedure

- 1 Press [2] key while the Keyboard Test menu is open.

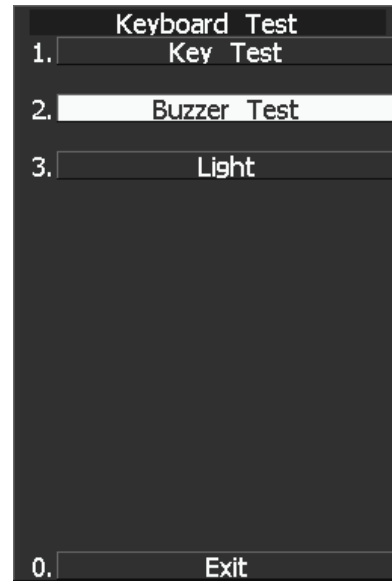
The buzzer will sound.

- 2 The buzzer automatically stops after it sounds for a specified length of time.

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.



[III] Light

Checks for the operation panel light.

Procedure

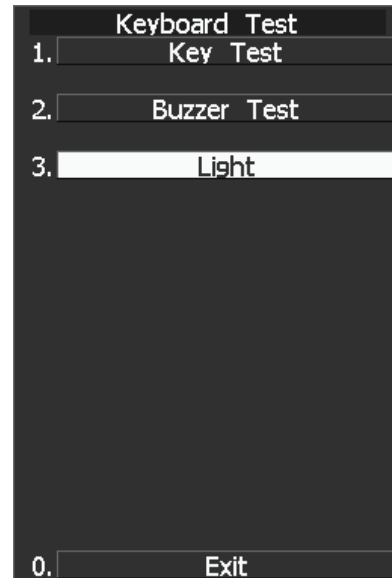
- 1 Press [3] key while the Keyboard Test menu is open.

The brightness of the operation panel is gradually intensified at four levels.

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.



8.3.1.4 MON Display

The performance monitor status is shown.

* A performance monitor unit is required.

Transmitter System Check attenuation in the transmitter system
Attenuation Value

Receiver System Check attenuation in the receiver system
MON Pattern Range
Attenuation Value

Procedure

- 1 Press [4] key while Test Menu is open.

MON Display menu opens.

- 2 Turn [VRM] control to slide the VRM to the end of the performance monitor pattern.

Attenuation in the receiver system is displayed in Attenuation Value of Receiver System.

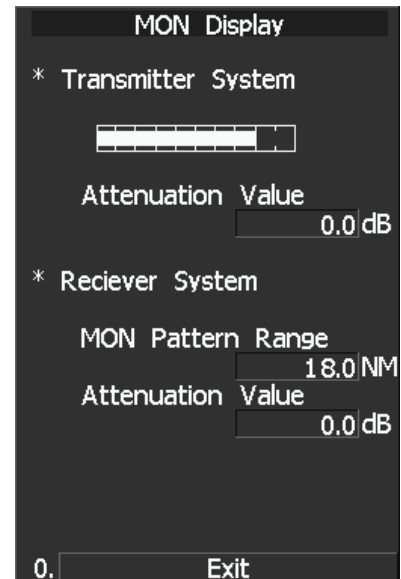
- 3 Check the attenuation value.

* Transmitter System
Attenuation Value

Normal operating range :
-7.0dB<indication value<+2.0dB

* Receiver System
Attenuation Value

Normal operating range :
-3.0dB<indication value<+3.5dB



Note: If Receiver System Attenuation Value display is under -3 dB or Transmitter System Attenuation Value display is under -7 dB with the the performance monitor test, radar should be checked by service engineer. This means that the TX/RX unit may be faulty. Consult with the near-by dealer or our sales department.

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.

8.3.1.5 Alarm Logging

Displays previously occurred system errors with the dates and times when they occurred.
The current error is displayed in reverse video.

Procedure

- 1 Press [5] key while the Test Menu is open.

The Alarm Log will appear.

- 2 Error logs will be displayed.

For the display contents, refer to Table 8-2, Table 8-3 and Table 8-4.

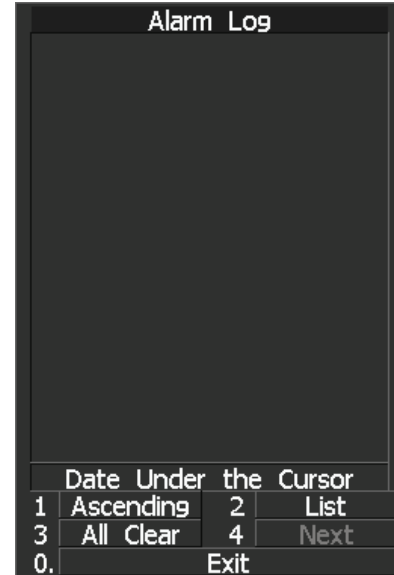
Press [1] key to switch the error log display modes between chronological display and reverse chronological display.

Press [2] key to switch between error log display and alarm list display.

Press [3] key to delete all error logs.

Press [4] key to see the next page.

Place the cursor over the listed error to see when it occurred.

**Exit**

- 1 Press [RADAR MENU] key.

The menu will be closed.

Table 8-2 System alarm warning list 1: Scanner

Message	Class	Description	ALR No.
TXRX(AZI)	Alarm	Scanner: Rotation signal (BP) error.	311
TXRX(Data)	Alarm	Scanner: Communication data error, checksum error or data mismatched.	901
TXRX(Fan 1)	Alarm	Scanner: FAN 1 error.	320
TXRX(Fan 2)	Alarm	Scanner: FAN 2 error.	902
TXRX(Heater)	Alarm	Scanner: Magnetron heater voltage error.	314
TXRX(HL)	Alarm	Scanner: Reference rotation signal (HL) error.	312
TXRX(MHV)	Alarm	Scanner: Modulator's high voltage alarm.	315
TXRX(Motor)	Alarm	Scanner: Motor current error.	317
TXRX(Reverse)	Alarm	Scanner: Reverse rotation.	313
TXRX(SSW Off)	Alarm	Scanner: Safety switch OFF.	308
TXRX(Time Out)	Alarm	Scanner: No communication.	326
TXRX(Trigger)	Alarm	Scanner: TRIGGER error.	310
TXRX(Video)	Alarm	Scanner: VIDEO error.	309

ALR No: Unique alarm number in ALR sentence and ACK sentence.

Table 8-3 System alarm warning list 2: Display

Message	Class	Description	ALR No.
AIS PROC(Data)	Alarm	AIS processing circuit: Communication data error or checksum error.	919
AIS PROC(Time Out)	Alarm	AIS processing circuit: No communication.	328
Indicator(Fan)	Alarm	LCD monitor: FAN error.	905
Keyboard(Data)	Alarm	Operation unit: Communication data error, checksum error or data mismatched.	906
Keyboard(Time Out)	Alarm	Operation unit: No communication.	325
Keyboard2(Data)	Alarm	Second operation unit: Communication data error, checksum error or data mismatched.	908
Keyboard2(Time Out)	Alarm	Second operation unit: No communication.	907
PROC(AZI)	Alarm	Process unit: Rotation signal error.	305
PROC(HL)	Alarm	Process unit: Reference rotation signal error.	306
PROC(Interrupt)	Alarm	Process unit: Interrupt error.	913
PROC(Reverse)	Alarm	Process unit: Reverse rotation error.	307
PROC(Trigger)	Alarm	Process unit: Trigger error.	304
PROC(Video)	Alarm	Process unit: VIDEO error.	303

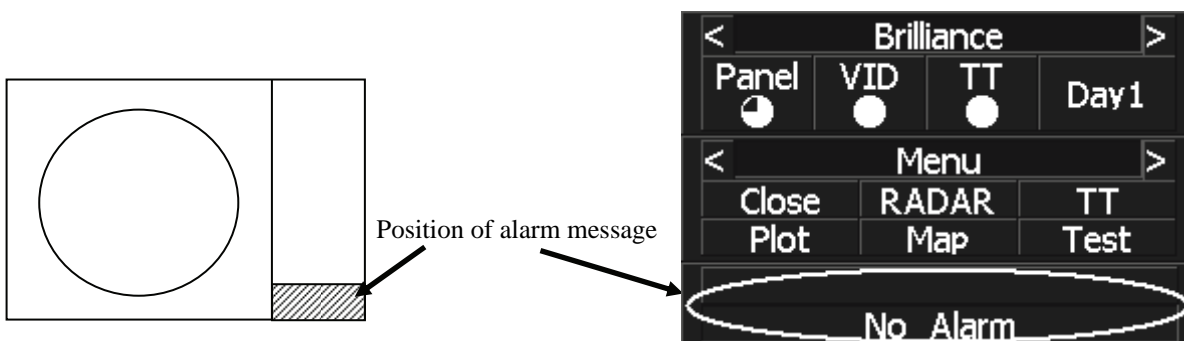
ALR No: Unique alarm number in ALR sentence and ACK sentence.

Table 8-4 System alarm warning list 3: External device communication

Message	Class	Description	ALR No.
2AXG(Data)	Alarm	2AXG: Communication data error.	911
2AXG(Time out)	Alarm	2AXG: No communication.	342
2AXW(Data)	Alarm	2AXW: Communication data error.	910
2AXW(Time out)	Alarm	2AXW: No communication.	341
AIS(Alarm ***)	Alarm	AIS alarm and the alarm number.	
AIS(Data)	Alarm	AIS: Communication data error or checksum error.	918
AIS(Time Out)	Alarm	AIS: No communication.	116
Autopilot(Data)	Alarm	Autopilot: Communication data error or checksum error.	930
Autopilot(Time Out)	Alarm	Autopilot: No communication.	101
COM Port1(Open)	Alarm	COM1: Port error.	920
COM Port2(Open)	Alarm	COM2: Port error.	921
COM Port3(Open)	Alarm	COM3: Port error.	922
COM Port4(Open)	Alarm	COM4: Port error.	923
Current(Data)	Alarm	Tidal current: Communication data error or checksum error.	927
Current(Time Out)	Alarm	Tidal current: No communication.	119
Depth(Data)	Alarm	Water depth: Communication data error or checksum error.	924
Depth(Time Out)	Alarm	Water depth: No communication.	115
GPS(Date)	Alarm	Valid date data from GPS not receive.	112
GPS(Datum)	Alarm	Valid geodetic system data from GPS not receive.	122
GPS(Position)	Alarm	Valid latitude and longitude data from GPS not receive.	102
GPS(Speed)	Alarm	Valid speed data from GPS not receive.	343
Heading(Time Out)	Alarm	Heading data: No communication.	113
L/L(Out of Bounds)	Alarm	L/L Own ship's latitude is over 85°N or 85°S.	123
Log(Data)	Alarm	Log: Communication data error (error bit detected).	111
NSK(Time Out)	Alarm	NSK unit: No communication.	324
Rate of Turn(Data)	Alarm	Rate of Turn: Communication data error or checksum error.	928
Rate of Turn(Time Out)	Alarm	Rate of Turn: No communication.	120
Rudder(Data)	Alarm	Rudder Sensor Angle: Communication data error or checksum error.	929
Rudder(Time Out)	Alarm	Rudder Sensor Angle: No communication.	121
Temperature(Data)	Alarm	Water temperature: Communication data error or checksum error.	925
Temperature(Time Out)	Alarm	Water temperature: No communication.	117
Wind(Data)	Alarm	Wind direction/velocity: Communication data error or checksum error.	926
Wind(Time Out)	Alarm	Wind direction/velocity: No communication.	118

ALR No: Unique alarm number in ALR sentence and ACK sentence.

Reference: Alarm message is displayed in the lower right of the display.



8.3.1.6 System INFO

Displays the current system information.

Indicator	Processor software version information
TXRX	Scanner software version information
System No.	System number
TXRX Time	
Total	Total operating time of the scanner unit (Total power-on time of the antenna unit)
Motor	Total operating time (Total power-on time)
Transmit	Total transmitting time (Total time during which radar was transmitted)
System Time	
Total	Total operating time of the display unit (Total power-on time of the display unit)

Procedure

- 1 Press [6] key while the Test Menu is open.

The System INFO Menu will appear.

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.

```

System INFO
* Indicator          Ver.02.00
* TXRX              Ver.02.00
* System No.       No.02.00

* TXRX Time
  Transmit         100 hrs
  Motor            100 hrs
  Total            100 hrs
* System Time
  Total            100 hrs

Exit
  
```

8.3.1.7 MAGI

Displays the MAGI bar indicating the magnetron current to check.

Procedure

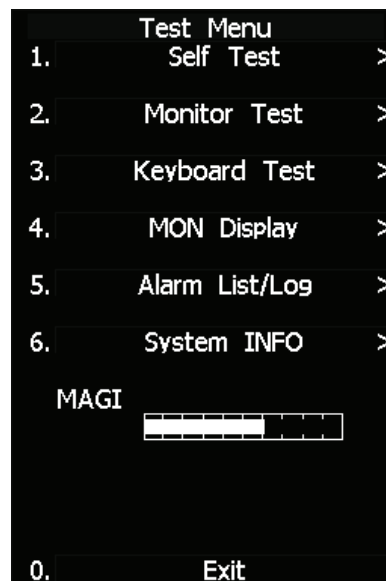
- 1 Check if the MAGI bar in the Test Menu reads the value below in a range of 24 NM.

6 kW: 4 to 5 scale marks
 10 kW: 4 to 7 scale marks
 25 kW: 6 to 9 scale marks

Exit

- 1 Press [RADAR MENU] key.

The menu will be closed.



8.3.2 Line Monitor

Serial communication data can be seen on the built-in Line monitor.
Line monitor can be used to make sure that the serial data are received properly.

Procedure

- 1 **Hold down [RADAR MENU] key.**

The Code Input Menu will appear.

- 2 **Press [0] key.**

- 3 **Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**

The Adjust Menu will appear.

- 4 **Press [5] key.**

The COM Port Setting Menu will appear.

- 5 **Press [7] key.**

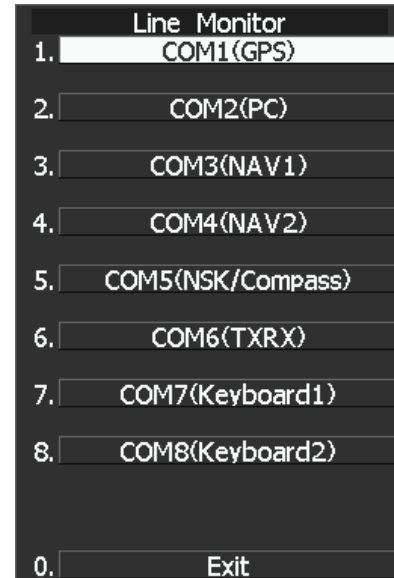
The LINE MONITOR menu will appear.

- 6 **Select the Communication port you want to see, pressing the numeric keys [1] to [8].**

The LINE MONITOR appears.
Refer to the next page for the display.

Each ports on the menu repesets followingconnectors.

COM1(GPS)	J3 GPS
COM2(PC)	J8 NMEA
COM3(NAV1)	J6 AIS/NMEA
COM4(NAV2)	J9 AUX (Option)
COM5(NSK/COMPASS)	J5 GYRO / COMPASS
COM6(TXRX)	J2 SCANNER
COM7(KEY BOARD1)	J4 KEY BOARD
COM8(KEY BOARD2)	J9 AUX (Optioon)



Exit

- 1 **Press [0] key.**
- 2 **Press [RADAR MENU] key.**

The Main Menu will reappear.

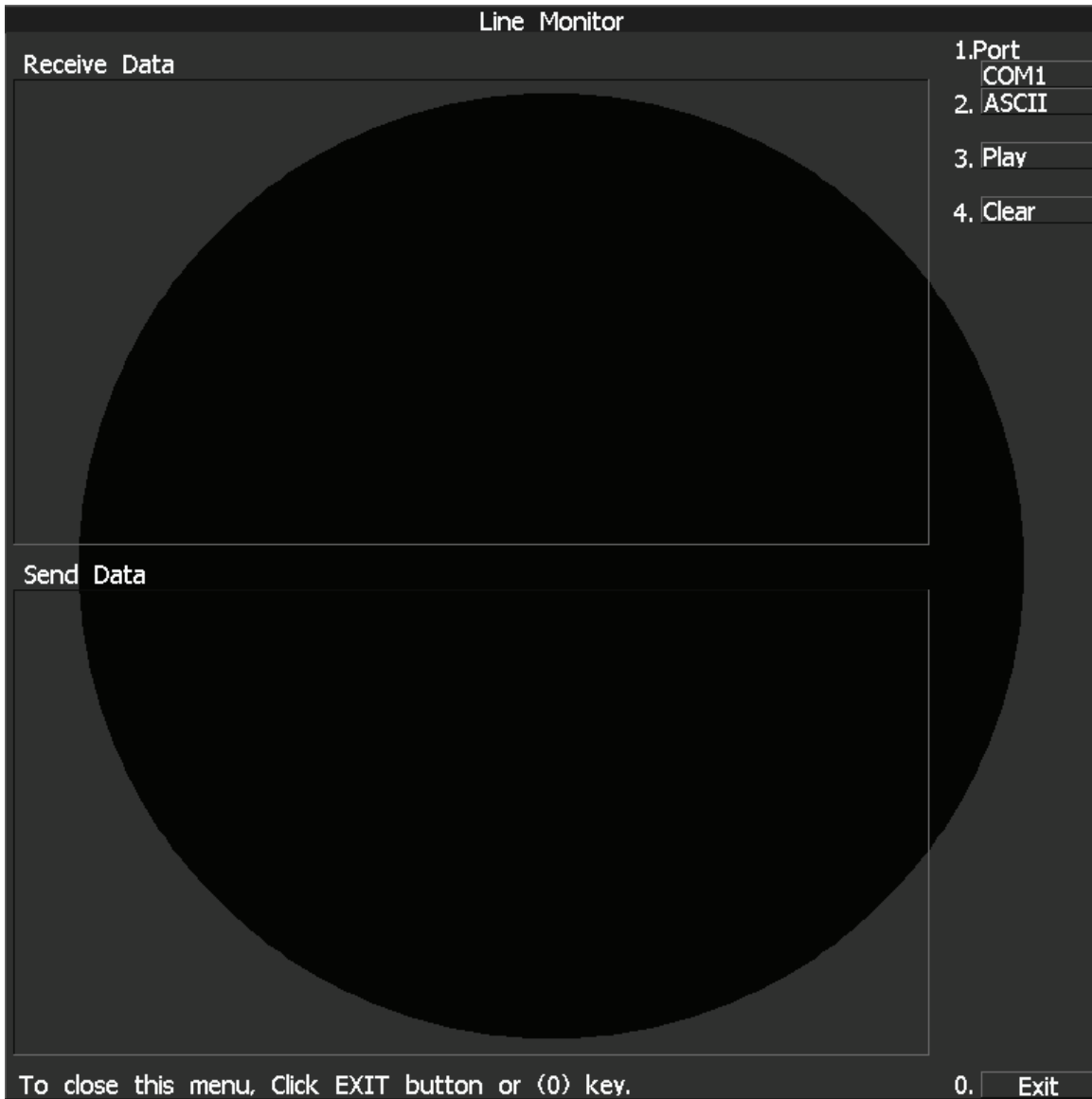
LINE MONITOR display

Received data ; The received serial communication data are displayed.

Transmitted data ; The transmitted serial communication data are displayed.

On-screen controls ; Line monitor can be controlled by the following soft keys on the upper right corner of the LINE MONITOR.

1. Port selection ; This key selects communication port to be displayed.
2. Data format selection ; This key switches the data format between ASCII format and binary format.
3. Play and Stop ; This key activates or deactivates data display renewing.
4. Clear ; The key clears all data.

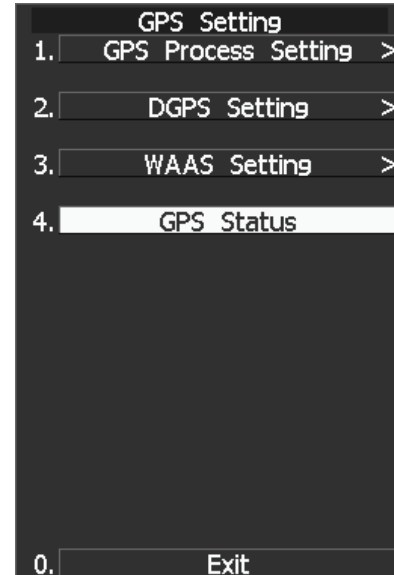


8.3.3 GPS Reception Status Display (GPS Status)

Display the reception status of the GPS receiver (GPS, DGPS and WAAS receivers) currently connected. Seize the status of satellites that are currently performing positioning.

Procedure

- 1 Press [RADAR MENU] key.**
The Main Menu will appear.
- 2 Press [7] key.**
NAV Equipment Setting Menu will appear.
- 3 Press [7] key.**
GPS Setting Menu will appear.
- 4 Press [4] key.**
GPS Status Menu will appear.

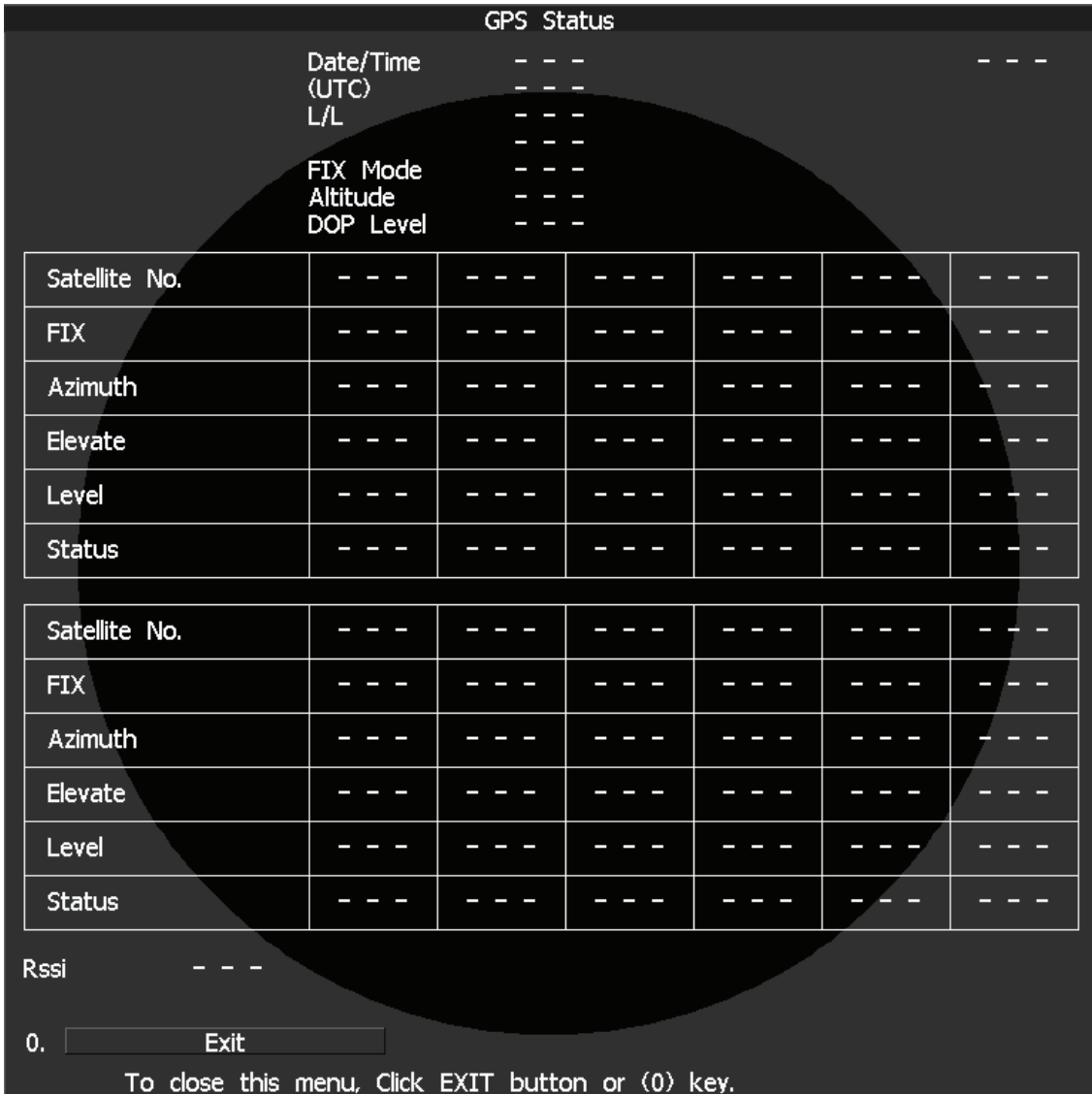


<The alternative procedure for steps above>

- 1 Hold down [RADAR MENU] key.**
The Code Input Menu will appear.
- 2 Press [0] key.**
- 3 Move the cursor onto the “ENT” button in the Code Input menu, and press [ENT] key.**
The Adjust Menu will appear.
- 4 Press [6] key.**
NAV Equipment Setting menu opens.
- 5 Perform steps 3 and 4 in the “Procedure” above.**

Exit

- 1 Press [0] key.**
The Status Menu will be closed.
- 2 Press [RADAR MENU] key.**
The menu will be closed.



GPS Status Display

The following items are to appear on the Status display.

- DATE/TIME : Local date and time
- (UTC) : Greenwich Mean Time
- L/L : Current latitude and longitude

- FIX MODE : Fix Mode (2D positioning/3D positioning)
- ALT : Altitude of own ship. Setting the Fix Mode to 2D displays the antenna height initially set.
- DOP LEVEL : Precision of positioning results. As the value is smaller, the indicated precision is higher.

- SATELLITE No. : Satellite No.
- FIX : Is positioning data used?
- AZIMUTH : Azimuthal angle of satellite
- ELEVATE : Elevation angle of satellite
- LEVEL : Reception signal level
- STATUS : Current status of satellite
- RSSI : Reception intensity of Beacon station

8.4 REPLACEMENT OF MAJOR PARTS

The system includes parts that need periodic replacement. The parts should be replaced as scheduled. Use of parts over their service life can cause a system failure.



WARNING



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






Direct exposure to electromagnetic waves at close range will have adverse effects on the human body.



When conducting maintenance work, make sure to turn off the power and unplug the power connector J1 of the radar process unit so that the power supply to the equipment is completely cut off.

Some equipment components can carry electrical current even after the power switch is turned off, and conducting maintenance work without unplugging the power connector may result in electrocution, equipment failure, or accidents.

**CAUTION**

-  Turn off the main power source before replacing parts. Otherwise, an electric shock or trouble may be caused.
-  Before replacing the magnetron, turn off the main power source and wait for 5 minutes or more until the high voltage circuits are discharged. Otherwise, an electric shock may be caused.
-  Take off your wrist watch when bringing your hands close to the magnetron. Otherwise, your watch may be damaged because the magnetron is a strong magnet.
-  Two or more persons shall replace the liquid crystal monitor. If only one person does this work, he may drop the LCD, resulting in injury.
-  Even after the main power source is turned off, some high voltages remain for a while. Do not contact the inverter circuit in the LCD with bare hands. Otherwise, an electric shock may be caused.

8.4.1 Parts Required for Periodic Replacement

Here are parts required for periodic replacement

Part name	Interval
1. Magnetron	4000 hours
2. Motor	10000 hours
3. LCD backlight	50000 hours
4. Fan motor	20000 hours
5. Backup battery	5 years

8.4.2 Replacement of magnetron

Before replacing the magnetron, turn off the main power source, wait for five minutes or more, and confirm that no charge remains in the high-voltage modulator circuit.

When mounting a new magnetron, do not touch the magnet with a screwdriver or put it on an iron plate. After replacement, connect the lead wire correctly.

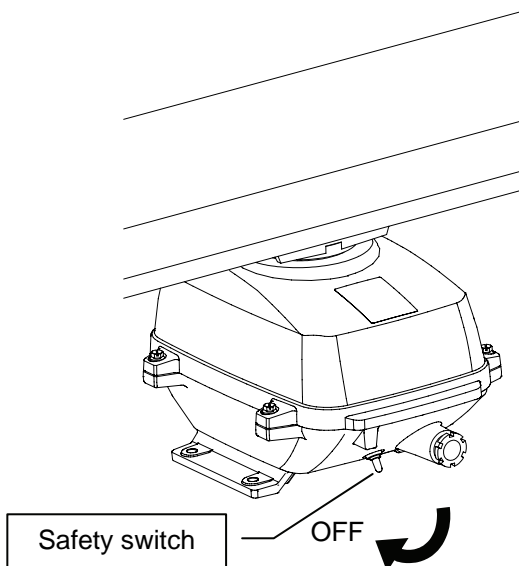
Handling of Magnetron under Long-Time Storage

The magnetron that has been kept in storage for a long time may cause sparks and operate unstably when its operation is started. Perform the aging in the following procedure:

- (1) Warm up the cathode for a longer time than usually. (20 to 30 minutes in the STBY state.)
- (2) Start the operation from the short pulse range and shift it gradually to the longer pulse ranges. If the operation becomes unstable during this process, return it to the standby mode immediately. Keep the state for 5 to 10 minutes until the operation is restarted.

How to replace a 6kW antenna magnetron

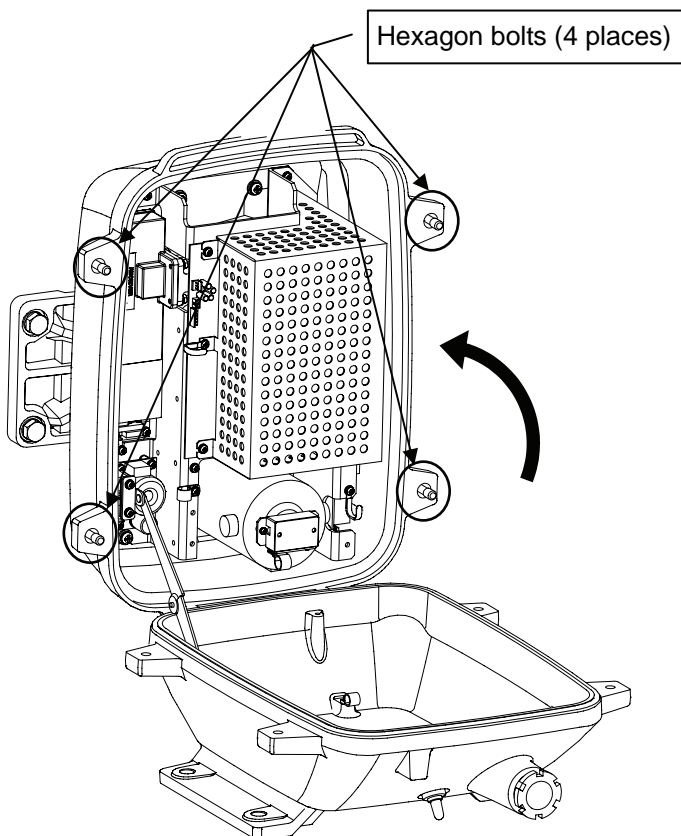
Make sure that all radars are turned off before replacing the magnetron (if there are multiple radar devices, turn them all off). It is also recommended that the breaker be turned off for safety.

Step 1: Turn off the antenna safety switch.

When replacing a magnetron, make sure to first turn off the antenna safety switch.

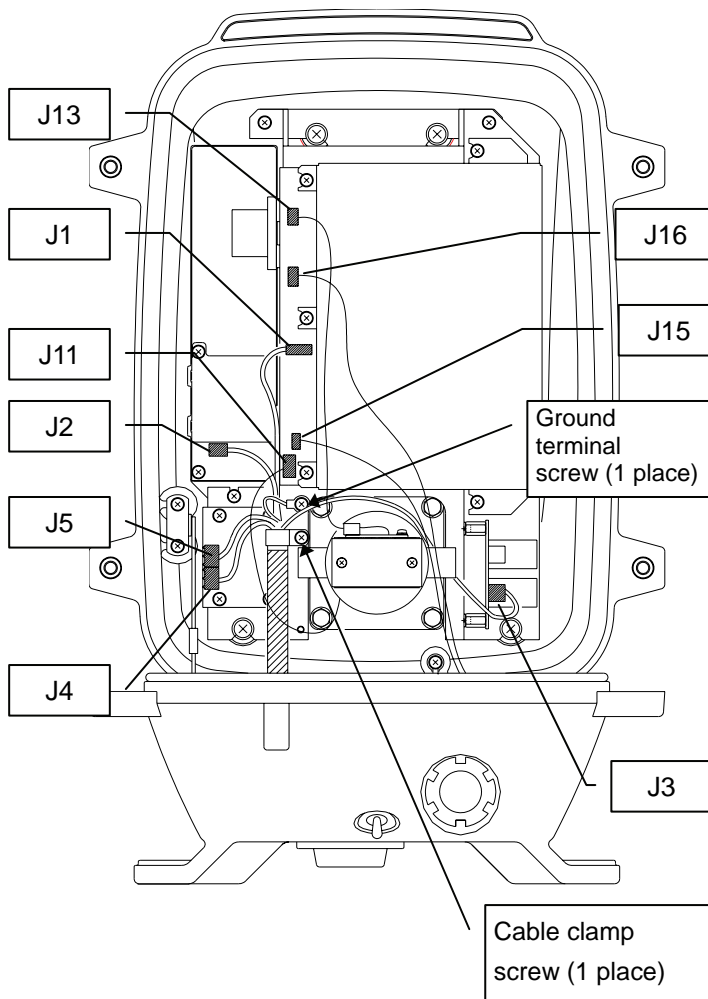
The switch is at the rear bottom of the antenna.

Turn off the switch.

Step 2: Remove the bolts and open the top cover.

The top cover is fixed with 4 hexagon bolts (M8 captive screw).

Step 3: Remove the cable.



Remove the equipment cable connectors (5 places). (J1 through J5)

Remove the safety switch connectors (2 places). (J15 and J16)

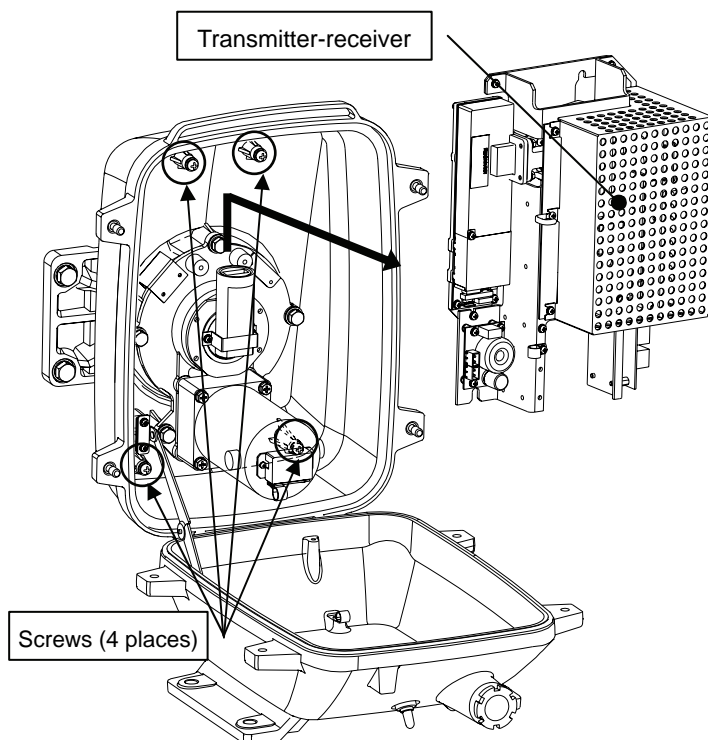
Remove the motor connector (2 places). (J11 and J13)

Remove 9 connectors in total.

Remove the screws (1 place) and remove the ground terminal.

Remove the screw (1 place) and remove the cable clamp as well as the equipment cable.

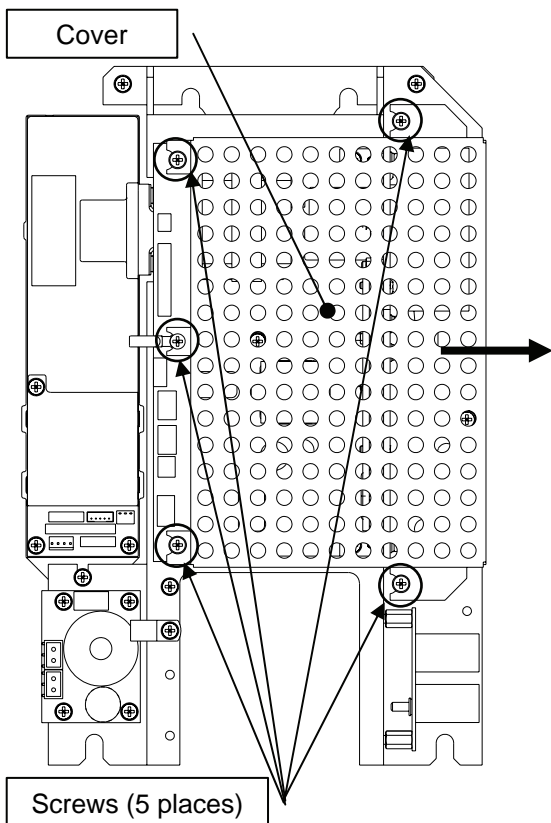
Step 4: Remove the transmitter-receiver.



Loosen all the screws (4 places).

Slide upward and remove the transmitter-receiver.

Step 5: Remove the cover.



Loosen all the screws (5 places).

Slide the cover to the right and remove it.

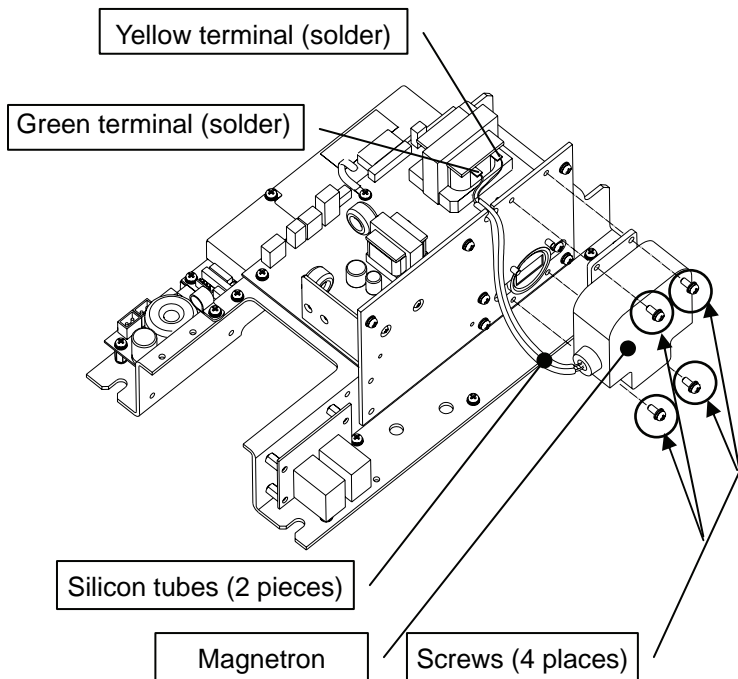


Use a shielded screw driver.
Metal (tools) may deteriorate if they come in contact with the magnetron.

Remove the screws (4 places).
Remove the magnetron cable (solder).

Replace the magnetron.

Step 6: Replace the magnetron.



Two silicon tubes are moved to the magnetron cable for the exchange and it changes it.

Replace the magnetron.



Please solder with a correct terminal when you solder a yellow terminal and a green terminal with the pulse transformer. Moreover, please note that solder might not fall on the circuit when soldering.

Reverse the order to complete the procedure.

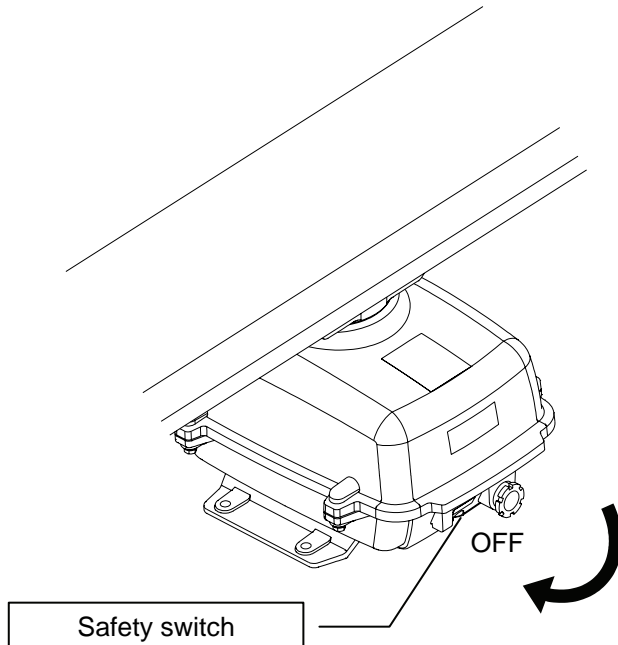
Make sure that all bolts and screws are tightened again, and all cables are properly re-connected.


This completes the magnetron replacement procedure.

How to replace a 10 kW antenna magnetron

Make sure that all radars are turned off before replacing the magnetron (if there are multiple radar devices, turn them all off). It is also recommended that the breaker be turned off for safety.

Step 1: Turn off the antenna safety switch.

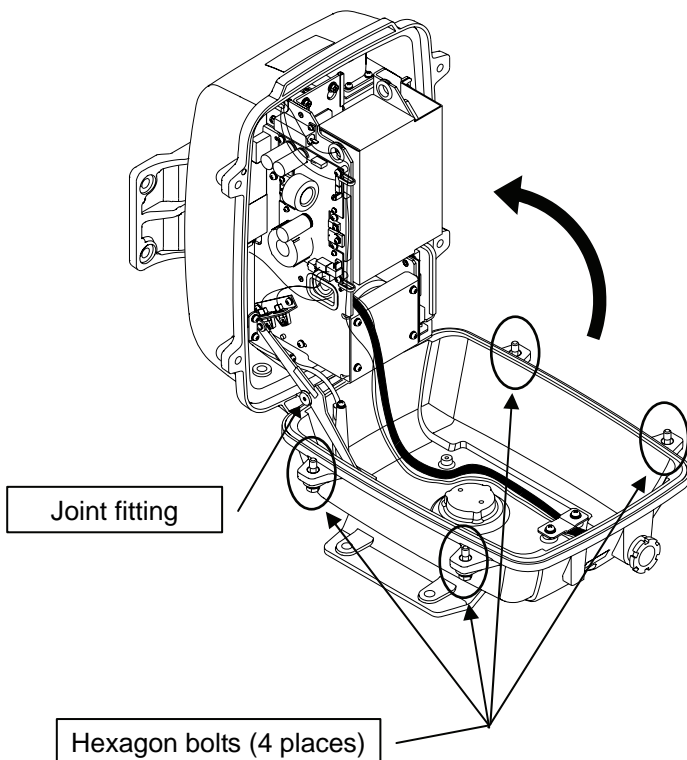


 When replacing a motor, make sure to first turn off the antenna safety switch.

The switch is at the rear bottom of the antenna.

Turn off the switch.

Step 2: Remove the bolts and open the top cover.

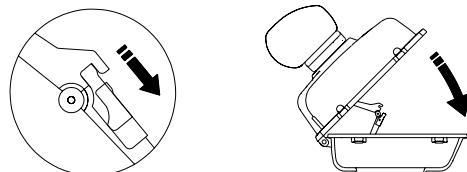


The top cover is fixed with 4 hexagon bolts (M8 captive screw).

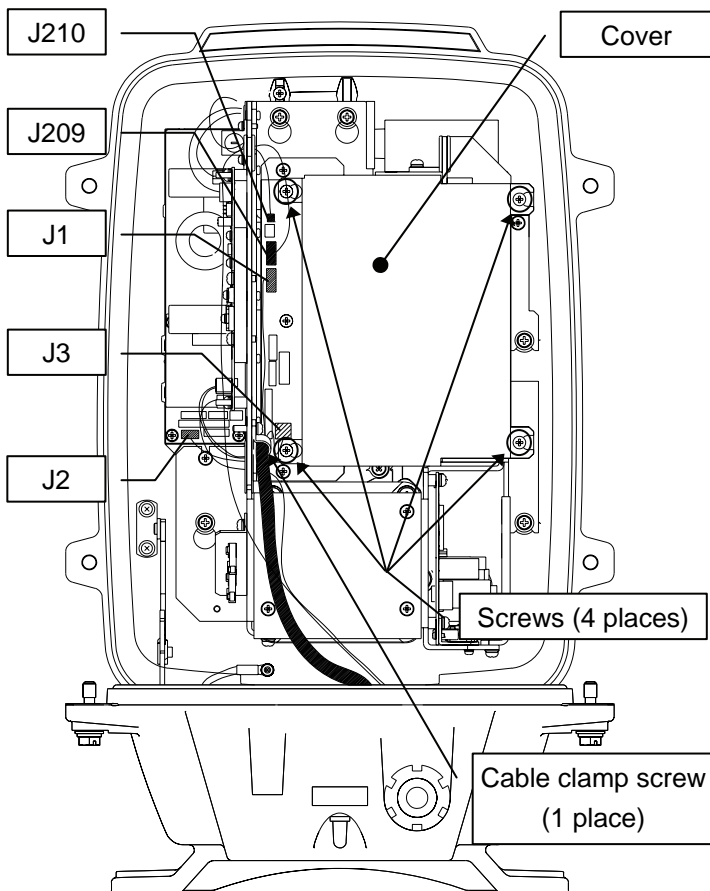
Remove the bolts and fully open the top cover such that the stopper of the joint fitting is locked.

* When closing the top cover

Release the stopper of the joint fitting before closing the top cover.



Step 3: Remove the cable.



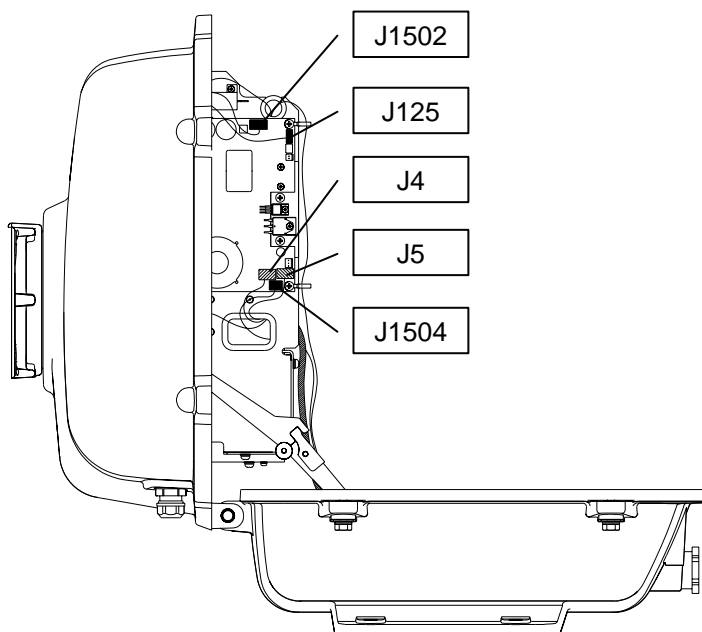
Loosen all the screws (4 places).

Slide the cover to the left and remove it.

Remove the encoder connector (1 place).
(J209)

Remove the equipment cable connectors
(5 places).
(J1 through J5)

Remove the safety switch connectors
(2 places).
(J210 and J1504)



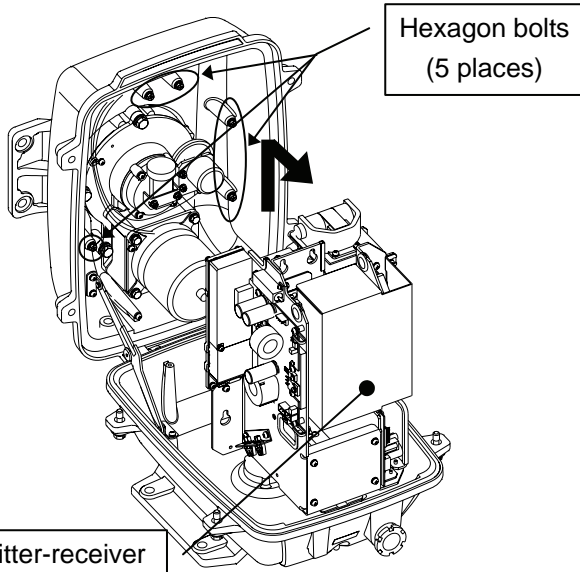
Remove the motor connector (2 places).
(J1502 and J125)

Remove 10 connectors in total.

* When a PM monitor (optional) is installed,
remove the connectors (2 places) and then
remove the screwed ground terminal.

Remove the screw (1 place) and remove the
cable clamp as well as the equipment cable.

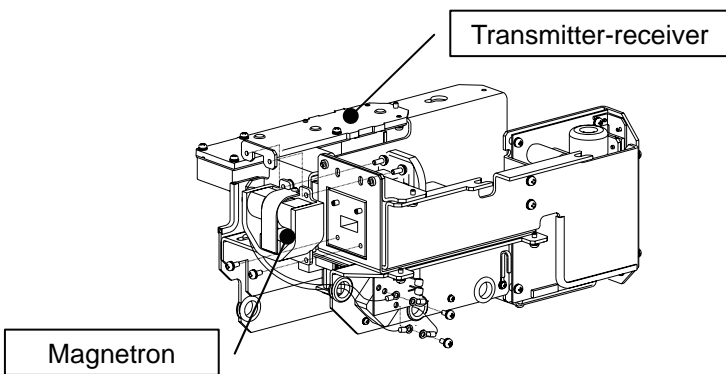
Step 4: Remove the transmitter-receiver.



Loosen all the hexagon bolts.

Slide upward and remove the transmitter-receiver.

Step 5: Replace the magnetron.

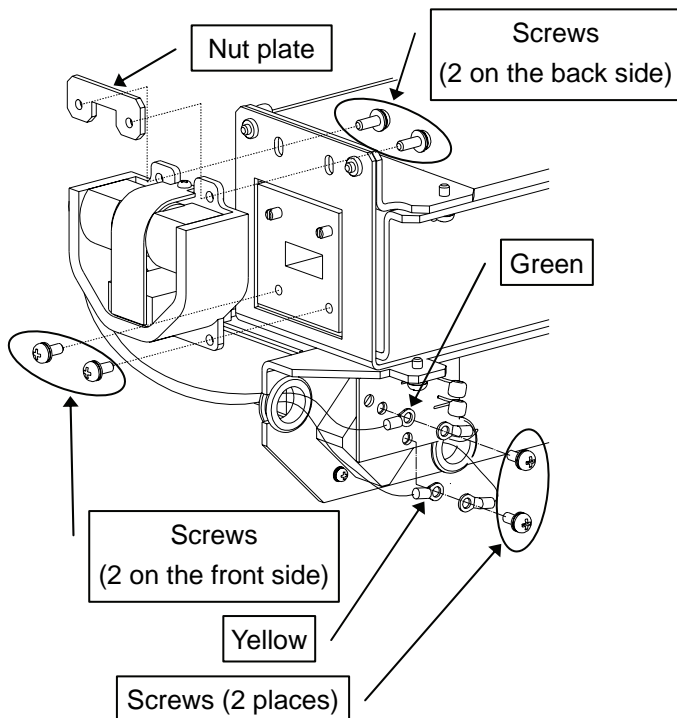


Remove the screws (2 places) and remove the magnetron cable.



Use a shielded screw driver.
Metal (tools) may deteriorate if they come in contact with the magnetron.

Remove the screws (4 places) and remove the magnetron.



Set the new magnetron in place.

Fix the magnetron and pulse transformer cables (yellow and green, respectively) carefully in place.

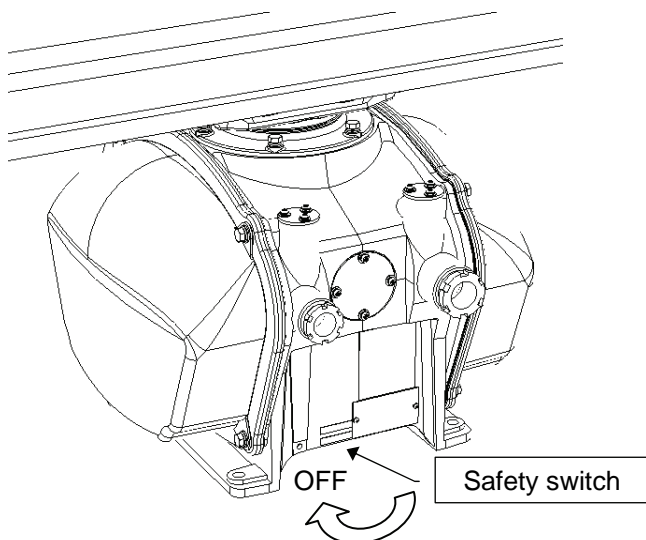
Reverse the order to complete the procedure.

Make sure that all bolts and screws are tightened again, and all cables are properly re-connected.

This completes the magnetron replacement procedure.

How to replace a 25 kW antenna magnetron

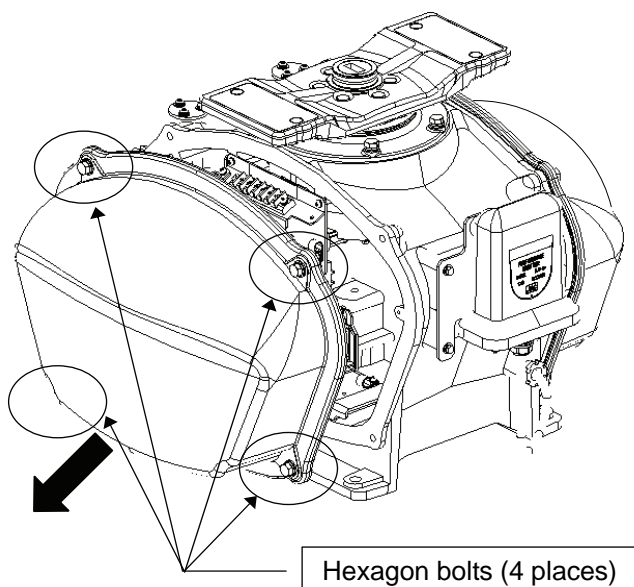
Make sure that all radars are turned off before replacing the magnetron (if there are multiple radar devices, turn them all off). It is also recommended that the breaker be turned off for safety.

Step 1: Turn off the antenna safety switch.

When replacing a magnetron, make sure to first turn off the antenna safety switch.

The switch is at the rear bottom of the antenna.

Turn off the switch.

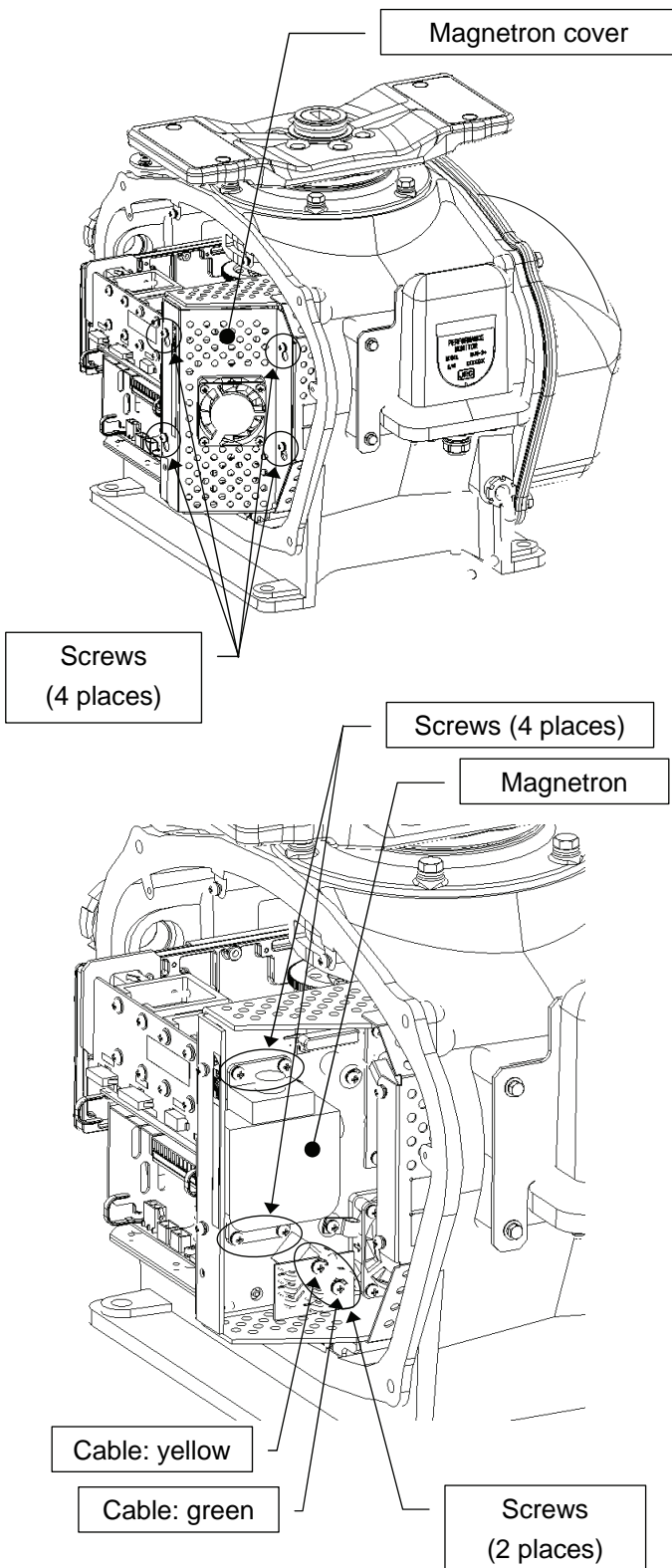
Step 2: Remove the cover.

The magnetron is placed on the right hand side (starboard side) of the antenna. Therefore, remove the right cover.

The cover is fixed with 4 hexagon bolts (M8 Captive Screw).


Place the cover in a safe place.
Prevent dust from being attached to the gasket.

Step 3: Replace the magnetron.



Remove the screws (M4X10, at 4 places) and remove the magnetron cover.

Remove the screws (M4X12, at 2 places) and remove the magnetron cable.

 Use a shielded screw driver. Metal (tools) may deteriorate if they come in contact with the magnetron.

Remove the screws (M4X12, at 4 places) and remove the magnetron.

Do not lose the removed screws.

Set the new magnetron and cable in place.

Reverse the order to complete the procedure.

Make sure that all bolts and screws are tightened again, and all cables are properly re-connected.

This completes the magnetron replacement procedure.

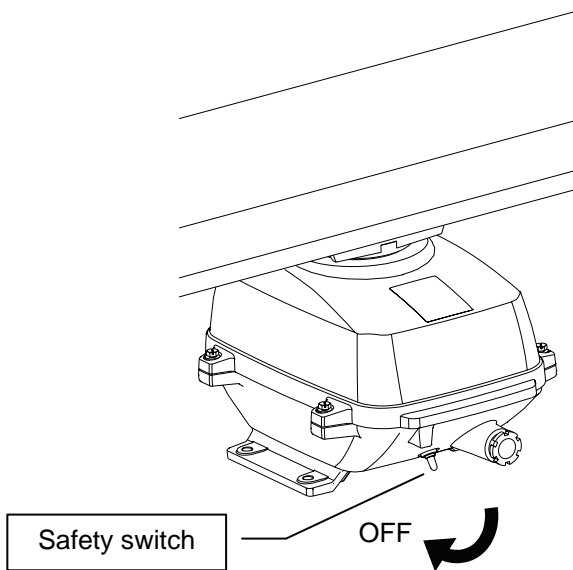
8.4.3 Motor Replacement

First remove the cover, and then remove the socket of the motor. Remove the screws that hold the motor, and remove the motor. Connect the leads correctly after replacing the motor.

How to replace a 6kW antenna motor

Make sure that all radars are turned off before replacing the magnetron (if there are multiple radar devices, turn them all off). It is also recommended that the breaker be turned off for safety.

Step 1: Turn off the antenna safety switch.

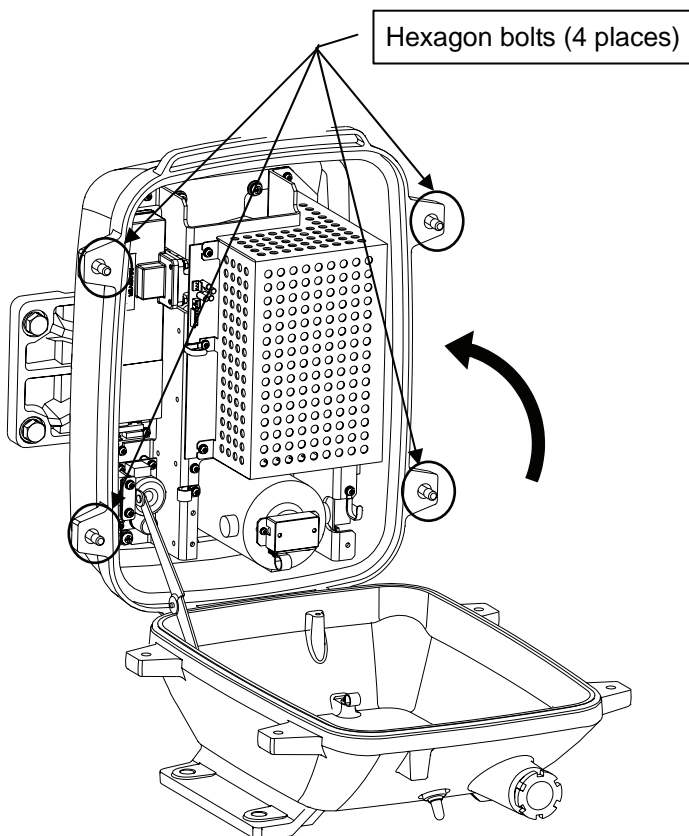


When replacing a motor, make sure to first turn off the antenna safety switch.

The switch is at the rear bottom of the antenna.

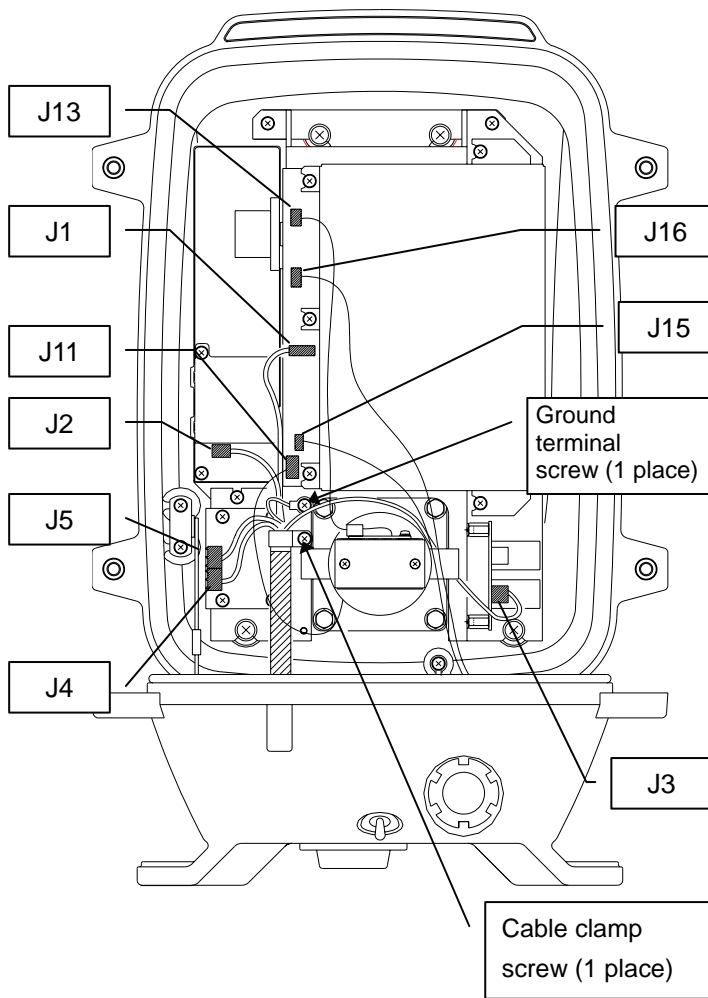
Turn off the switch.

Step 2: Remove the bolts and open the top cover.



The top cover is fixed with 4 hexagon bolts (M8 captive screw).

Step 3: Remove the cable.



Remove the equipment cable connectors (5 places).
(J1 through J5)

Remove the safety switch connectors (2 places).
(J15 and J16)

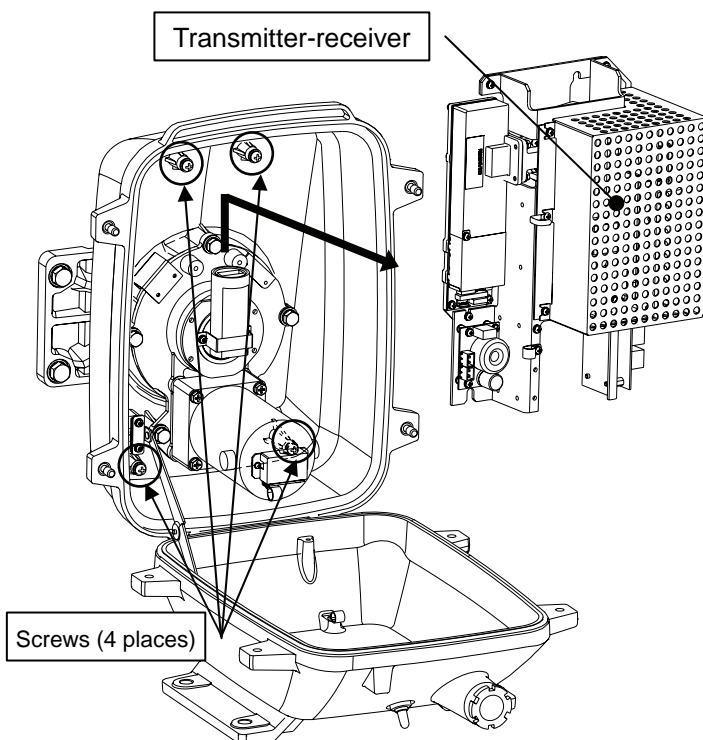
Remove the motor connectors (2 places).
(J11 and J13)

Remove 9 connectors in total.

Remove the screw (1 place) and remove the ground terminal.

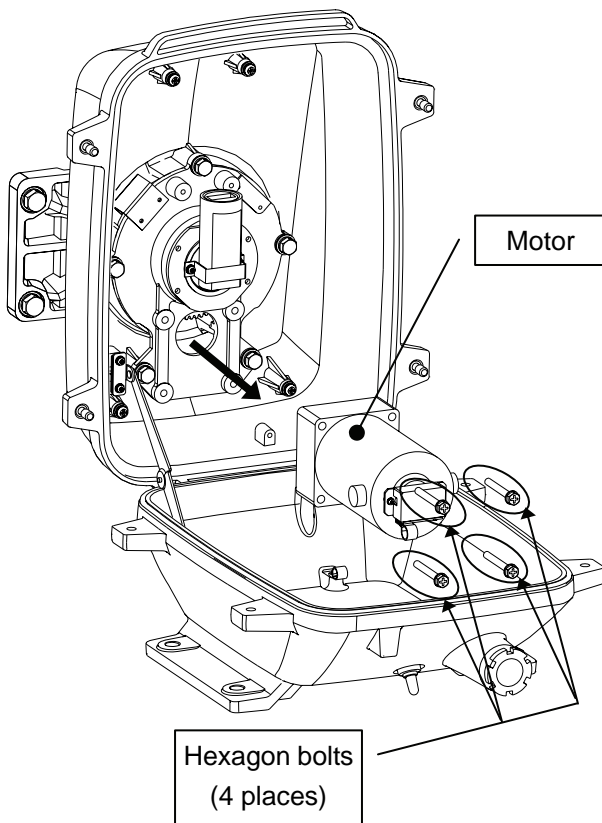
Remove the screw (1 place) and remove the cable clamp as well as the equipment cable.

Step 4: remove the transmitter-receiver.



Loosen all the screws (4 places).

Slide upward and remove the transmitter-receiver.

Step 5: Replace the motor.

Remove the hexagon bolts (M6, at 4 places) and then remove the motor.

Apply grease to the gears of the new motor, and bolt the new motor.

Tighten the hexagonal bolts using a torque wrench (72 kgf · cm).

Reverse the order to complete the procedure.

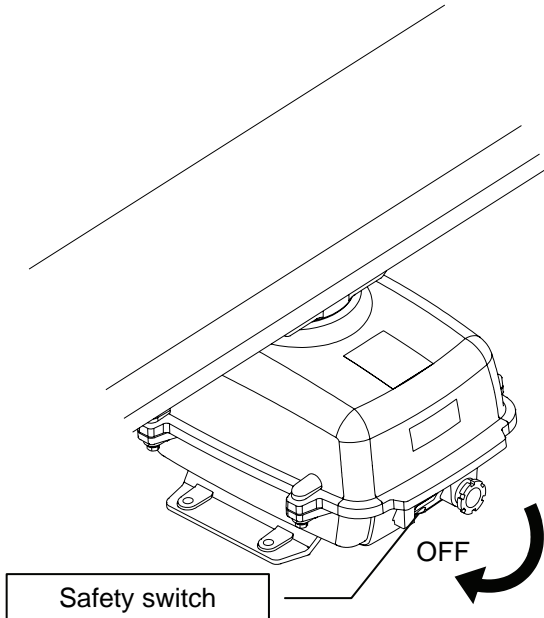
Make sure that all bolts and screws are tightened again, and all cables are properly re-connected.

This completes the motor replacement procedure.

How to replace a 10 kW antenna motor

Make sure that all radars are turned off before replacing the magnetron (if there are multiple radar devices, turn them all off). It is also recommended that the breaker be turned off for safety.

Step 1: Turn off the antenna safety switch.

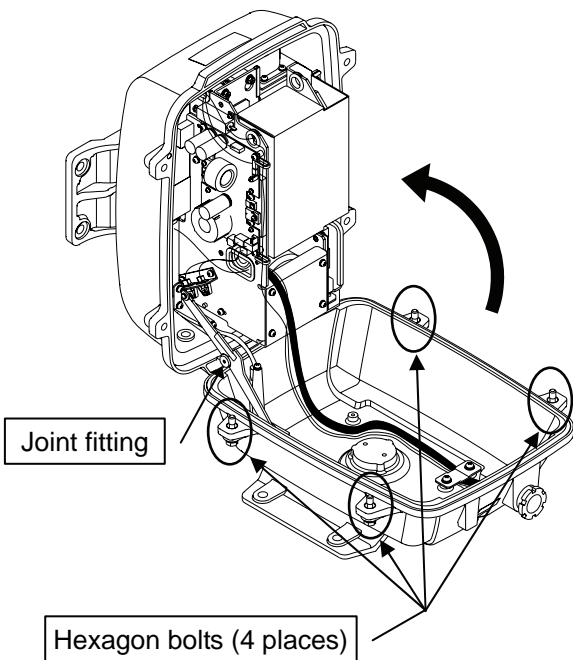


When replacing a motor, make sure to first turn off the antenna safety switch.

The switch is at the rear bottom of the antenna.

Turn off the switch.

Step 2: Remove the bolts and open the top cover.

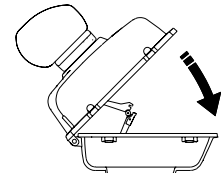
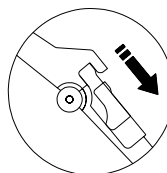


The top cover is fixed with 4 hexagon bolts (M8 captive screw).

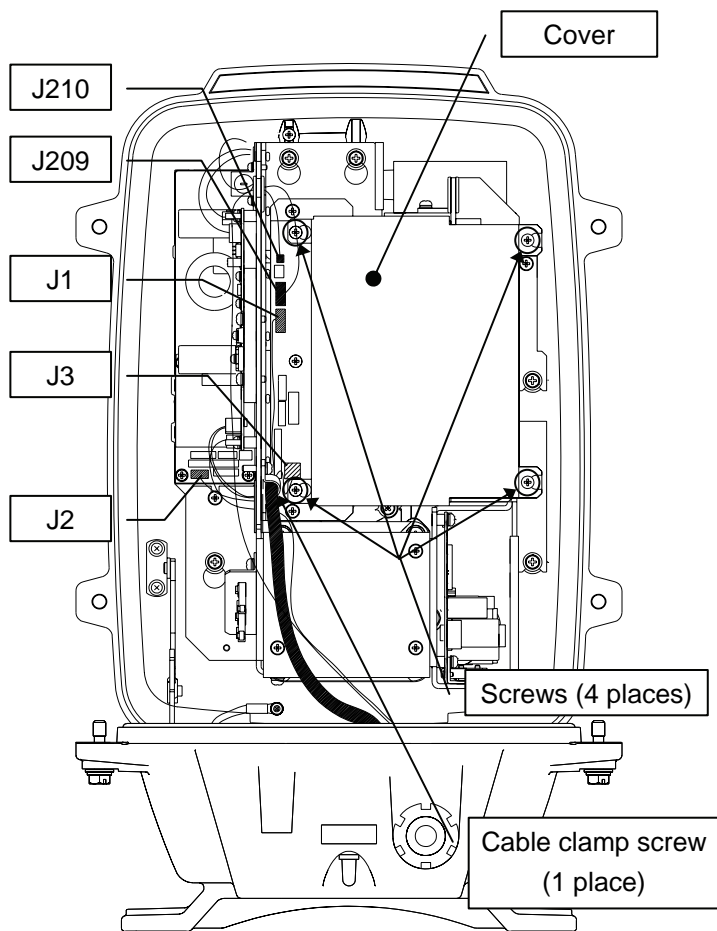
Remove the bolts and fully open the top cover such that the stopper of the joint fitting is locked.

* When closing the top cover

Release the stopper of the joint fitting before closing the top cover.



Step 3: Remove the cable.



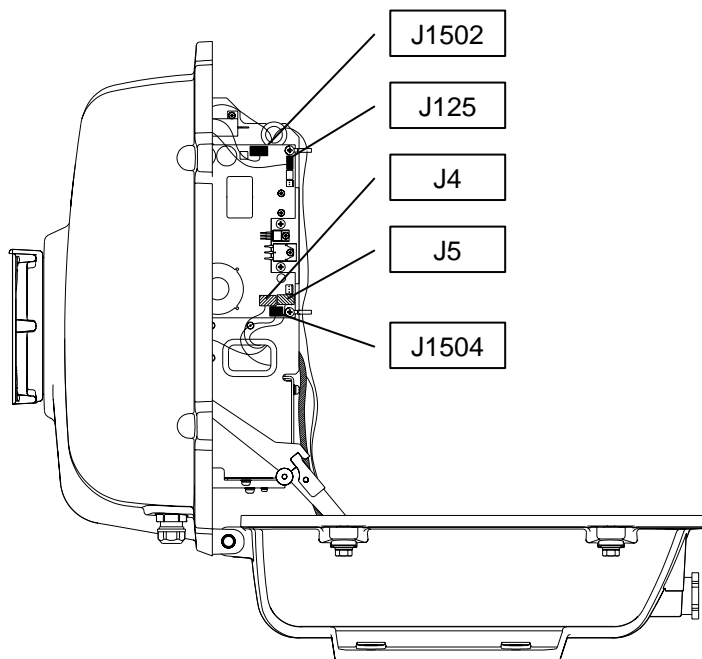
Loosen all the screws (4 places).

Slide the cover to the left and remove it.

Remove the encoder connector (1 place).
(J209)

Remove the equipment cable connectors
(5 places).
(J1 through J5)

Remove the safety switch connectors
(2 places).
(J210 and J1504)



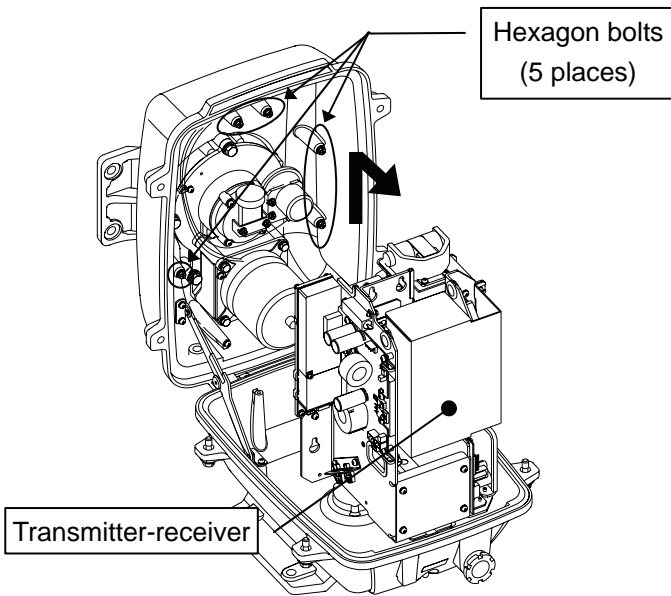
Remove the motor connectors (2 places).
(J1502 and J125)

Remove 10 connectors in total.

* When a PM monitor (optional) is installed,
remove the connectors (2 places) and then
remove the screwed ground terminal.

Remove the screw (1 place) and remove the
cable clamp as well as the equipment cable.

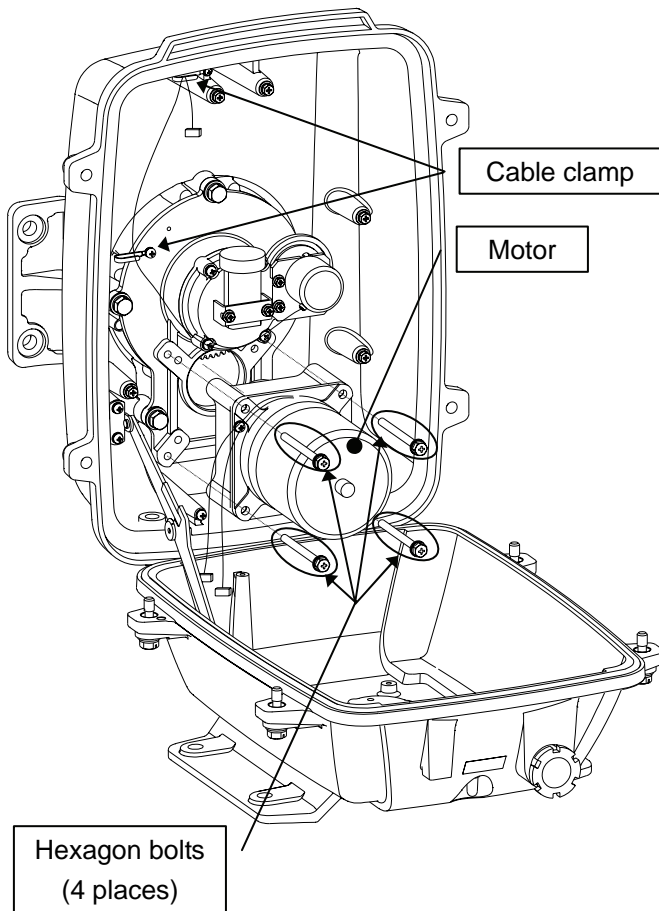
Step 4: Remove the transmitter-receiver.



Loosen all the hexagon bolts (5 places).

Slide upward and remove the transmitter-receiver.

Step 5: Replace the motor.



Remove the motor cable from the cable clamp.

Remove the hexagon bolts (M6, at 4 places) and then remove the motor.

Apply grease to the gears of the new motor, and bolt the new motor.

Tighten the hexagonal bolts using a torque wrench (72 kgf·cm).

Reverse the order to complete the procedure.

The rotor of the motor rotates. Clamp the cable such that it will not touch the rotor.

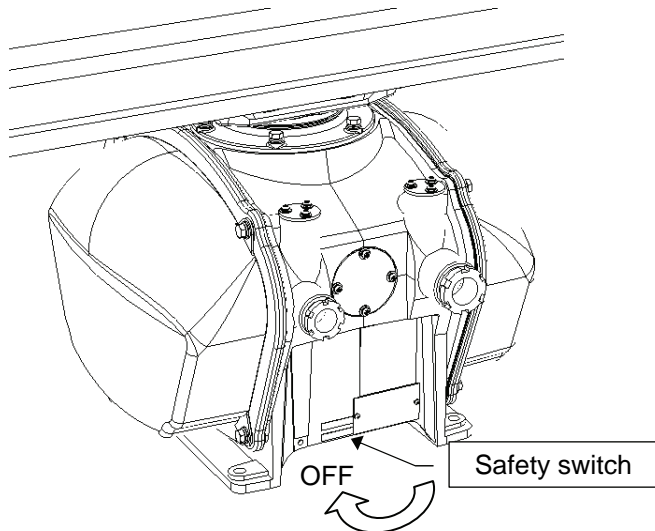
Make sure that all bolts and screws are tightened again, and all cables are properly re-connected.


This completes the motor replacement procedure.

How to replace a 25 kW antenna motor

Make sure that all radars are turned off before replacing the magnetron (if there are multiple radar devices, turn them all off). It is also recommended that the breaker be turned off for safety.

Step 1: Turn off the antenna safety switch.

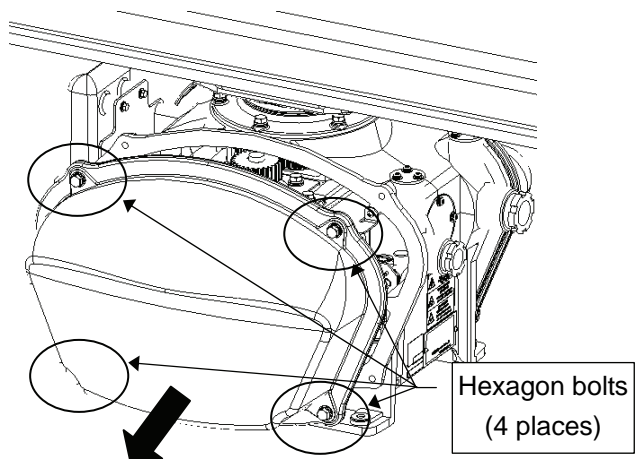


 When replacing a motor, make sure to first turn off the antenna safety switch.

The switch is at the rear bottom of the antenna.

Turn off the switch.

Step 2: Remove the cover.



The motor is placed on the left hand side (port side) of the antenna.

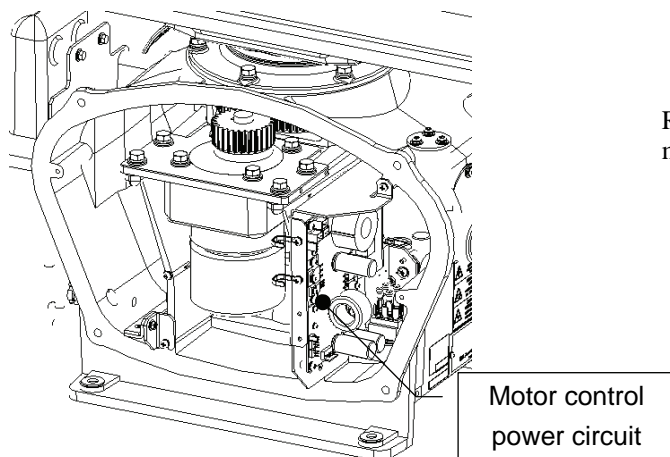
Therefore, remove the left cover.

The cover is fixed with 4 hexagon bolts (M8 captive screw).

Place the cover in a safe place.
Prevent dust from being attached to the gasket.

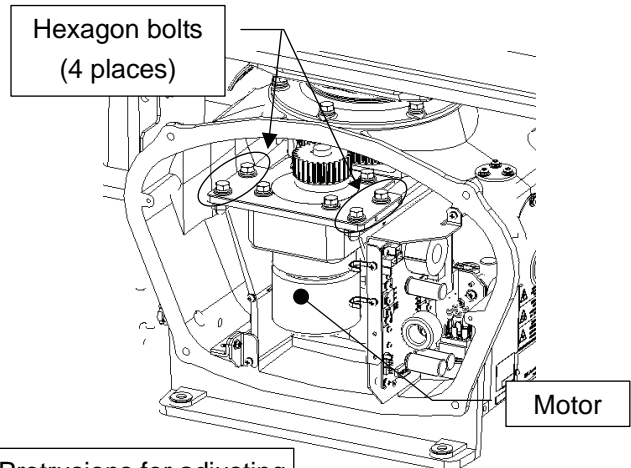
8

Step 3: Remove the motor cable.



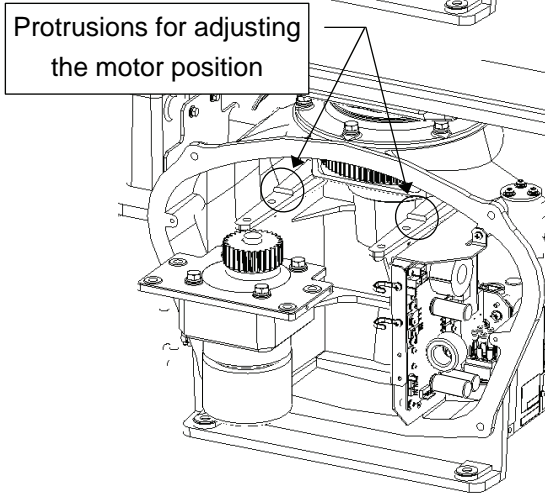
Remove the motor cable connected to the motor control power circuit.

Step 4: Replace the motor.



The motor is fixed with 4 hexagon bolts (M8 x 20 SW W, embedded type).

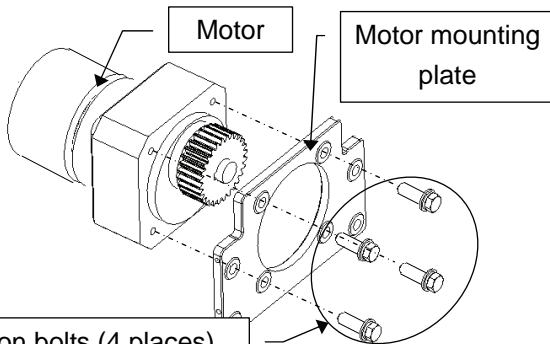
Remove all the hexagon bolts (4 pieces).



Remove the motor.



The motor weighs about 6 kg.
Handle it carefully.

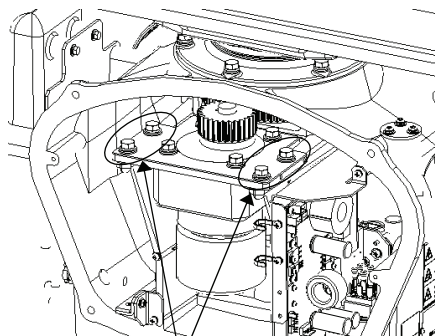


Attach the mounting plate to the new motor.

Remove the motor mounting plate from the removed motor. The mounting plate is fixed with 4 hexagon bolts (M8 x 30 SW W, embedded type).

Attach the removed parts to the new motor. Make sure to properly tighten all the hexagon bolts at the optimal torque (210 kgf·cm).

Hexagon bolts (4 places)
Torque wrench (210 kgf·cm)

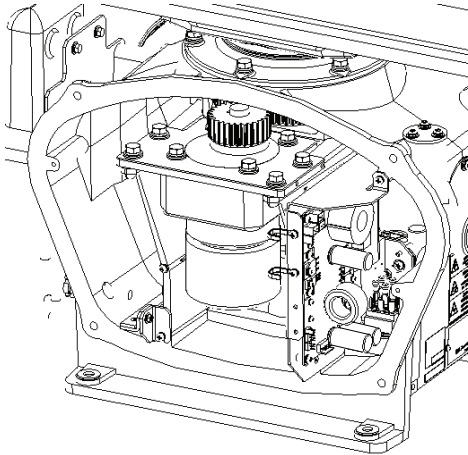


Place the motor in the antenna.

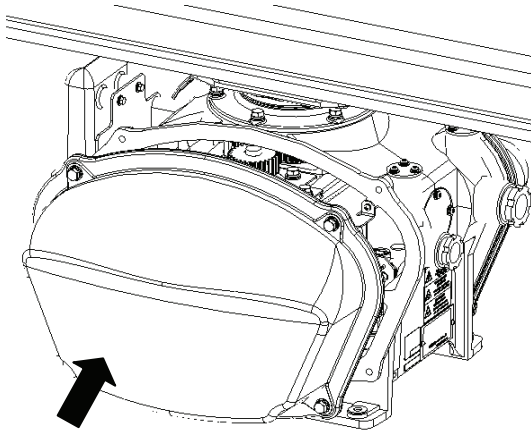
Press the motor against the protrusions from the arms of the case, and adjust its position to minimize the backlash.

Make sure to properly tighten all the hexagon bolts at the optimal torque (140 kgf·cm).

Apply grease to the gear after placing the motor in the case.

Step 5: Connect the motor cables.

Reconnect the cables to the motor control power circuit.

Step 6: Put the cover on.

Before attaching the cover to the antenna, make sure that the gasket of the cover is not deformed or cracked. Also, remove any dust attached to the gasket.

Fix the cover with 4 hexagon bolts.

Failure to tighten the bolts or loose bolts will affect waterproof property; therefore, make sure to tighten all the bolts at the optimal torque.

Turn on the antenna safety switch.

This completes the motor replacement procedure.

8.4.4 Replacement of Diode Limiter (A303)

Remove the 4 screws fixing the receiver. Remove the 4 screws fixing the diode and the limiter, and remove diode limiter. When mounting the diode limiter, take care of the mounting direction and mount it in the arrow direction facing it the receiver front end.

Connect the wiring in the same way as before the replacement.



8.4.5 Replacement of Backup Battery

Caution: Replacement of backup battery must be made by specialized service personnel.
For details, refer to Service Manual.

A coin-cell battery maintains radar system configuration, date, and time information while power off condition. radar system configuration is saving to non-volatile memory at fixed intervals.

How to Replacement of Backup Battery

1. Remove the Coin-Cell Battery from the Holder

Be careful, don't break holder.

3. Fix the Coin-Cell Battery in the Holder

Turn up + surface.
Battery type : CR2450



SECTION 9

TROUBLESHOOTING AND AFTER-SALES SERVICE

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9.1 FAULT FINDING

In case of semiconductor circuits, it is deemed that there are few cases in which the used semiconductor devices have inferior quality or performance deterioration except due to insufficient design or inspection or by other external and artificial causes. In general, the relatively many causes are disconnection in a high-value resistor due to moisture, a defective variable resistor and poor contact of a switch or relay. Some troubles are caused by defective parts, imperfect adjustment (such as tuning adjustment) or insufficient service (such as poor cable contact). It will also be effective to check and readjust these points.

9.1.1 List of Alarms and other Indications

If any of the following alarm occurs, the system displays the alarm message in red in order to attract the attention of operator. Other messages are displayed with the suitable color which is yellow or blue depending on the level of message importance.

Alarm:	Red	<ul style="list-style-type: none"> • Collision-related Alarm • Navigation Alarm • System Alarm
Warning:	Yellow	<ul style="list-style-type: none"> • System Warning
Information:	Blue	<ul style="list-style-type: none"> • Operation Information

Table 9-1 List of Notification

Message	Class	Description	ALR No.
CCRP Changed	INFO	CCRP is automatic changed.	
Copying	INFO	Display is capturing to file.	
GPS (HDOP)	Warning	The HDOP level is increased (Decrease in the GPS accuracy.).	
GPS(Low Integrity)	Warning	GPS Low integrity	
MON Test	Warning	Performance monitor is active.	
Position Reset	INFO	Change the latitude and longitude sentence.	
Set GYRO	INFO	Set a course with the gyro.	
TM Reset	INFO	Use care of resetting TM.	
TXRX(Standby)	INFO	Scanner Ready for transmission	
Weather Information	INFO	Weather information received.	

ALR No: Unique alarm number in ALR sentence and ACK sentence.

Table 9-2 List of Target Tracking Alarms and AIS Function Critical Alarms

Message	Class	Description	ALR No.
AIS(CPA/TCPA)	Alarm	There is a AIS dangerous target.	931
TT(CPA/TCPA)	Alarm	There is a TT dangerous target.	301

ALR No: Unique alarm number in ALR sentence and ACK sentence.

**Table 9-3 List of RADAR Alarm, Target Tracking Alarms and AIS Function Alarms**

Message	Class	Description	ALR No.
AIS (ACT 95% Capacity)	INFO	Over 95% of the maximum number of AIS targets to be activated.	
AIS(ACT MAX)	INFO	Maximum number of AIS targets to be activated.	334
AIS(CPA/TCPA)	Alarm	There is a AIS dangerous target.	931
AIS(Data)	Alarm	AIS communication error. The data of communication with the AIS unit contains an error.	918
AIS(Lost)	Alarm	AIS Target has been lost. (Failure in receiving AIS target data for a specified time.)	335
AIS(New Target)	Alarm	AIS Automatic new target acquisition in the automatic acquisition area.	302
AIS(Time Out)	Alarm	No communication with AIS. The AIS transponder is not connected correctly or the power is turned off.	116
AIS 95% Capacity	INFO	Over 95% of the maximum number of AIS targets.	
AIS Alarm ***	Alarm	Alarm information issued with the ALR sentence by the AIS. *** is a 3-digit number which is Local Alarm No in the ALR sentence.	
AIS MAX Target	INFO	Maximum number of AIS targets.	333
AIS PROC(Data)	Alarm	AIS I/F communication error. The data of communication with the AIS unit.	919
AIS PROC(Time Out)	Alarm	No communication with AIS I/F. The AIS unit is nor connected or is not operating.	328
REF TT(Lost)	Alarm	Decrease in the reference target accuracy. (Reference TT target has been lost.)	337
Radar Alarm(In)	Alarm	Targets have entered the radar alarm range.	933
Radar Alarm(Out)	Alarm	Targets have left the radar alarm range.	934
TT(CPA/TCPA)	Alarm	There is a TT dangerous target.	301
TT(Data *)	Alarm	Communication error with the TT processing unit. The target tracking unit is malfunctioning.	323 914 915 916
TT(Lost)	Alarm	TT Target has been lost. (Failure in tracking the target that has been under tracking.)	336
TT (MAX 95% Capacity)	INFO	Over 95% of the maximum number of targets to be tracked.	
TT(MAX Target)	INFO	The maximum number of targets is under acquisition.	338
TT(New Target)	Alarm	TT Automatic new target acquisition in the automatic acquisition area.	932

ALR No: Unique alarm number in ALR sentence and ACK sentence.

Table 9-4 List of Route Error Messages and Warnings

Message	Class	Description	ALR No.
Radar Alarm(In)	Alarm	Targets have entered the radar alarm range.	933
Radar Alarm(Out)	Alarm	Targets have left the radar alarm range.	934
Route(Approach)	Alarm	Approach the route.	938
Route(Break Off)	Alarm	Out of the route.	939
WPT(Arrival)	Alarm	Arrive at way point.	936
WPT(Break Off)	Alarm	Out of the way point.	937

ALR No: Unique alarm number in ALR sentence and ACK sentence.

Table 9-5 List of Operational Error Messages and Warnings

Message	Class	Description	ALR No.
Can't Transmit	INFO	Transmission cannot be executed. Tried to transmit within 5 second after standby or when the transmitter-receiver has any trouble.	
Card Full	INFO	Card capacity insufficient.	
Delete Failed	INFO	Data deletion from the card failed.	
Format Failed	INFO	Card format failed.	
In Use	INFO	Data cannot be deleted / changed because it is being used now.	
In Use	INFO	Data has been inputted.	
Invalid Card	INFO	Card is not valid.	
Invalid Data	INFO	The value is invalid. Tried to enter any data beyond its range.	
MAX Point	INFO	The maximum number of points has been reached. Tried to enter navigation information beyond the specified.	
No Card	INFO	Card not detected yet.	
No Position Data	INFO	There is no position data. Mark or line input when the latitude and longitude is invalid.	
No Heading Data	INFO	There is no bearing data. Target tracking operation or TM selection when bearing data is invalid.	
Not Allowed	INFO	General operation error.	
Out of Bounds	INFO	The latitude cannot be displayed on the map.	
Out of Bounds	INFO	The latitude is outside the displayable latitude range.	
Out of Range	INFO	Out of operation range.	
Read Failed	INFO	Data load from the card failed.	
Write Failed	INFO	Data write to the card failed.	

ALR No: Unique alarm number in ALR sentence and ACK sentence.



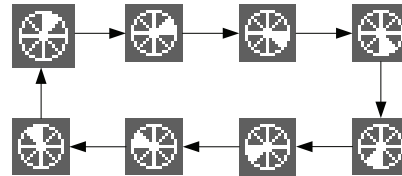
9.1.2 Operation Checking

When the system is operating, the operation status (located at the upper right of the screen) is changing pictures.

If picture freeze occurred, turn off the system and restart the system.



Operation status



9.1.3 Fuse Checking

Melted fuses are caused by any clear cause. When a fuse is replaced, it is necessary to check the related circuits even if there is no trouble. In checking, note that there is some dispersion in the fusing characteristics. Table 9-6 shows a list of fuses used in the equipment.

Table 9-6 Fuse List

Location	Parts No.	Current Rating	Type	Protection Circuit	Scanner Unit
Radar processing circuit	F2	5A	ST4-5AN1	I/F circuit	NKE-2103 (10kw)
Radar processing circuit	F3	10A	ST6-10AN1	I/F circuit	NKE-2103 (10kw)
Radar processing circuit	F2	10A	ST6-10AN1	I/F circuit	NKE-2254 (25kw)
Radar processing circuit	F3	10A	ST6-10AN1	I/F circuit	NKE-2254 (25kw)

9.2 TROUBLE SHOOTING

As this radar equipment includes complicated circuits, it is necessary to request a specialist engineer for repair or instructions for remedy if any circuit is defective.

There are also troubles by the following causes, which should be referred to in checking or repair work.

1 Poor Contact in Terminal Board of Inter-Unit Cables

- a) Poor contact in terminal board
- b) The cable end is not fully connected, that it, contacted with earthed another terminal.
- c) Disconnected cable wire

2 Poor Contact of Connector within Unit

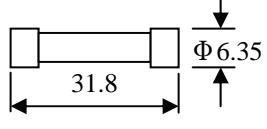
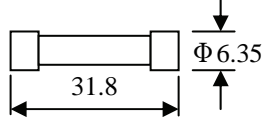
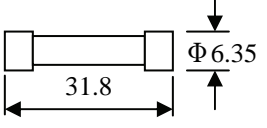
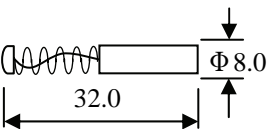
Reference: This radar equipment is provided with 8-13 standard spares.



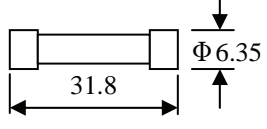
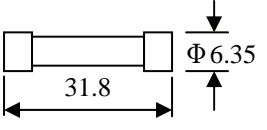
9.2.1 Spares

Table 9-7 Spares

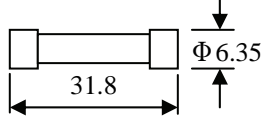
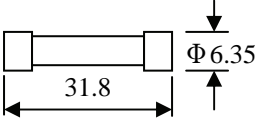
7ZXRD0013 : Scanner NKE-2062 (6kw)

Name	Type/Code	Shape (mm)	In use	Spare	Parts No.	Location
Fuse (For DC12V)	ST4-6.3AN1 (5ZFCA00051)		1	3	F2	Inside processing unit
Fuse (For DC24V)	ST4-3.15AN1 (5ZFCA00047)		1	3	F2	Inside processing unit
Fuse	ST4-5AN1 (5ZFCA00050)		1	3	F3	Inside processing unit
Motor brush	54531-01 (BRXP05247)		1	2	-	Scanner monitor

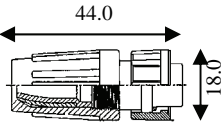
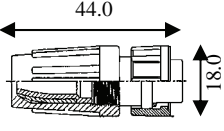
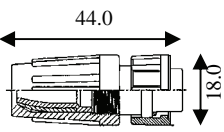
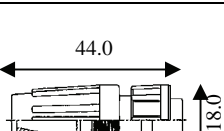
7ZXRD0026 : Scanner NKE-2103 (10kw)

Name	Type/Code	Shape (mm)	Number	Parts No.	Location	Application
Fuse	ST4-5AN1 (5ZFCA00050)		4	F2	Inside processing unit	For the antenna motor
Fuse	ST6-10AN1 (5ZFCA00053)		4	F3	Inside processing unit	For the power supply to antenna

7ZXRD0015 : Scanner NKE-2254 (25kw)

Name	Type/Code	Shape (mm)	Number	Parts No.	Location	Application
Fuse	ST6-10AN1 (5ZFCA00053)		4	F2	Inside processing unit	For the antenna motor
Fuse	ST6-10AN1 (5ZFCA00053)		4	F3	Inside processing unit	For the power supply to antenna

7ZXRD0027 : Processor unit NDC-1460

Name	Type/Cde	Shape (mm)	In use	Spare	Parts No.	Loccation	Application
Connector	LTWBD-06BFFA-LL7001 (5JCDX00032)		1	1	P3	Inside processing unit	Mainly for GPS connection
Connector	LTWBD-08BFFA-LL7001 (5JCDX00034)		1	1	P5	Inside processing unit	Mainly for connecting course equipment such as a GPS compass
Connector	LTWBD-07BFFA-LL7001 (5JCD00033)		1	1	P6	Inside processing unit	For AIS connection For connecting other external devices when the AIS is not used
Connector	LTWCD-14BFFA-LL7001 (5JCDX0052)		1	1	P9	Inside processing unit	For connecting external devices For acquiring 2-axis logs, current data, and wind direction data



9.2.2 Special Parts

Table 9-8 Special Parts

[I] JMA-5208/HS

Parts No.	Name	Type	Manufacturer	Location	Code
V101	Magnetron	MSF1422B	NJRC	Scanner	5VMAA00068
A101	Circulator	FCX68	Toshiba	Scanner	6AJRD00001
A102	Diode Limiter	NJS6930	NJRC	Scanner	5EZAA00024

[II] JMA-5212-4/6/4HS/6HS

Parts No.	Name	Type	Manufacturer	Location	Code
V101	Magnetron	MAF1565N	NJRC	Scanner unit	5VHAA00102
A101/A102	Circulator	FCX68R	OrientMicrowave	Scanner unit	5AJIX00027
A103	Dummy	NJC4002	NJRC	Scanner unit	5ANDF00001
A104	Filter	NJC9952	NJRC	Scanner unit	5AWAX00002
A301	Diode Limiter	NJS6930	NJRC	Scanner unit	5ATBT00006

[III] JMA-5222-7/9

Parts No.	Name	Type	Manufacturer	Location	Code
V1	Magnetron	M1568BS	NJRC	Scanner unit	5VMAA00106
A101/A102	Circulator	NJC3901M	NJRC	Scanner unit	5AJBV00007
A103	Dummy	NJC4002	NJRC	Scanner unit	5ANDF00001
A104	Filter	NJC9952	NJRC	Scanner unit	5AWAX00002
A301	Diode Limiter	NJS6930	NJRC	Scanner unit	5ATBT00006

9.2.3 Circuit Block to be Repaired

Table 9-9 Circuit Block to be Repaired (JMA-5208)

Location	Circuit Block	Type	Remarks
Scanner	Motor with gear	CBP-153	DC brush motor (ordinary)
Scanner	Modulator	CME-323	Excluding Magnetron
Scanner	Receiver	NRG-226	Including CAE-475-1
Processor	Radar processing circuit	CDC-1350	
Processor	DSP circuit (TT)	NCA-877A	
Processor	Power supply terminal circuit unit	NBD-866A	
Processor	AIS processing circuit	CDC-1353	
Operation panel unit	Operation circuit	CCK-979	
Operation panel unit	PS2 connector circuit	CQC-1204	
Display	Brilliance control circuit	CCK-970	Brilliance controller
NSK unit	Gyro IF circuit	CMJ-304E	

Table 9-10 Circuit Block to be Repaired (JMA-5208HS)

Location	Circuit Block	Type	Remarks
Scanner	Motor with gear	CBP-169	DC brushless motor
Scanner	Modulator	CME-339	Excluding Magnetron
Scanner	Receiver	NRG-226	Including CAE-475-1
Processor	Radar processing circuit	CDC-1350	
Processor	DSP circuit (TT)	NCA-877A	
Processor	Power supply terminal circuit unit	NBD-866A	
Processor	AIS processing circuit	CDC-1353	
Operation panel unit	Operation circuit	CCK-979	
Operation panel unit	PS2 connector circuit	CQC-1204	
Display	Brilliance control circuit	CCK-970	Brilliance controller
NSK unit	Gyro IF circuit	CMJ-304E	

Table 9-11 Circuit Block to be Repaired (JMA-5212-4/6/4HS/6HS)

Location	Circuit Block	Type	Remarks
Scanner	Motor with gear	7BDRD0048*	DC brushless motor
Scanner	Modulation circuit	CME-363	Excluding Magnetron
Scanner	Receiver	NRG-610	Including CAE-529-1
Scanner	Power supply circuit	CBD-1783	
Scanner	Encoder	CHT71A	
Scanner	Motor control power circuit	CBD-1779	
Scanner	Performance monitor	NJU-85	
Processor	Radar processing circuit	CDC-1350	
Processor	DSP circuit (TT)	NCA-877A	
Processor	Power supply terminal circuit unit	NBD-866A	
Processor	AIS processing circuit	CDC-1353	
Operation panel unit	Operation circuit	CCK-979	
Operation panel unit	PS2 connector circuit	CQC-1204	
Display	Brilliance control circuit	CCK-970	Brilliance controller
NSK unit	Gyro IF circuit	CMJ-304E	

"*" means revision, such as A, B and so on.

**Table 9-12 Circuit Block to be Repaired (JMA-5222-7/9)**

Location	Circuit Block	Type	Remarks
Scanner	Motor with gear	7BDRD0044A*	DC brushless motor (ordinary speed)
Scanner	Modulator	NMA-550	Including CPA-264 Including CMB-404 Excluding Magnetron
Scanner	Receiver	NRG-162A	Including CMA-866A
Scanner	Modulation circuit	CPA-264	
Scanner	Power supply circuit	CBD-1682A	
Scanner	T/R control circuit	CMC-1205R	
Scanner	Motor control circuit	CBD-1779	
Scanner	Heater control circuit	CHG-216	Optional (AC100V)
Scanner	Encoder	CHT71A	
Scanner	Fan	7BFRD0002*	
Scanner	Performance monitor	NJU-85	
Processor	Radar processing circuit	CDC-1350	
Processor	DSP circuit (TT)	NCA-877A	
Processor	Power supply terminal circuit unit	NBD-866A	
Processor	AIS processing circuit	CDC-1353	
Operation panel unit	Operation circuit	CCK-979	
Operation panel unit	PS2 connector circuit	CQC-1204	
Display	Brilliance control circuit	CCK-970	Brilliance controller
NSK unit	Gyro IF circuit	CMJ-304E	

"*" means revision, such as A, B and so on.

9.3 AFTER-SALES SERVICE

9.3.1 Keeping period of maintenance parts

Keeping period of maintenance parts is ten years from the production is discontinued.

9.3.2 When you Request for Repair

If you suppose the product may be out of order, read the description in Section 9.1 “FAULT FINDING” and Section 9.2 “TROUBLE SHOOTING” carefully and check the suspected point again.

If it is still out of order, you are recommended to stop operation of the equipment and consult with the dealer from whom you purchased the product, or our branch office in your country or district, the sales department in our main office in Tokyo.

- **Repair within the Warranty Period**

If any failure occurs in the product during its normal operation in accordance with the instruction manual, the dealer or JRC will repair free of charge. In case that any failure is caused due to misuse, faulty operation, negligence or force major such as natural disaster and fire, the product will be repaired with charges.

- **Repair after the Warranty Period**

If any defective function of the product is recoverable by repair, the repair of it will be made at your own charge upon your request.

- **Necessary Information for Repair**

- ☆ Product name, model, manufacturing date and serial number
- ☆ Trouble conditions (as detailed as possible. Refer to “Radar Failure Check List” in page 9-10.)
- ☆ Name of company/organization, address and telephone number

9.3.3 Recommended Maintenance

The performance of the product may deteriorate due to the secular change of the parts used in it, though such deterioration depends upon the conditions of operation.

So checkup and maintenance is recommendable for the product in addition to your daily care.

For maintenance, consult with the near-by dealer or our sales department.

Such maintenance will be made with charges.

For further details of after-sale service, contact the JRC Offices.



Radar Failure Check List

When placing an order for repair of the product, it is requested that you could confirm the check items and fill the results and sent the sheet to our contact.

If there is any unclear items, contact the ship on which the product is installed, and give the correct information on the product.

Ship name: _____ Phone: _____ Fax: _____

Radar general model name: JMA- _____ Serial No. : _____

(Write the full model name correctly)

(1) Check the following items in the order of the number, and circle the applicable answer between YES or NO. If the item cannot be determined as YES or NO, explain in detail in the item (18), others.

(2) If any of the items (1) to (5) is marked as NO, check the fuse of the product (refer to Section 9.1.2 and 9.2).

(3) Check the items (4) to (17) while the transmission (TX) is ON.

*Functions mentioned in the items (14), (15) and (17) may be optional, answer is not necessary.

No.	Check Item	Result	
		YES	NO
(1)	Power can be turned on. (The lamp on the Operation unit is lit)	YES	NO
(2)	A few minutes after powering-on, it will become standby status .	YES	NO
(3)	When powering-on (or TX ON), LCD monitor something is lit.	YES	NO
(4)	The antenna rotates at the transmission (TX) ON. (Check the following items while transmission is ON)	YES	NO
(5)	Current is supplied to the magnetron. (Refer to the instruction manual)	YES	NO
(6)	Turning is enabled. (Check with the range of 6 NM or more)	YES	NO
(7)	Fixed marker is displayed.	YES	NO
(8)	VRM is displayed.	YES	NO
(9)	While noise is displayed while set at SEA and RAIN minimum, GAIN maximum, IR-OFF and range 48 NM.	YES	NO
(10)	Target reflection echo is displayed.	YES	NO
(11)	Sensitivity of reflection echo is normal.	YES	NO
(12)	EBL is displayed.	YES	NO
(13)	Cursor mark moves.	YES	NO
*(14)	GYRO course can be set and normally displayed.	YES	NO
*(15)	LOG speed can be normally displayed.	YES	NO
(16)	Target tracking function works normally.	YES	NO
*(17)	If equipped with an interswitch, when switching from the straight mode (II) to (X), the failures (items marked NO) in the above (1) to (16), are switched over to the other unit.	YES	NO

(18) Others (Error message, etc.) _____



SECTION 10 DISPOSAL

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10.1 DISPOSAL OF THE UNIT

When disposing of this unit, be sure to follow the local laws and regulations for the place of disposal.



10.2

DISPOSAL OF USED BATTERIES



WARNING



When disposing of used lithium batteries, be sure to insulate the batteries by taping the \oplus and \ominus terminals. Otherwise, heat generation, explosion or a fire may occur.

In this unit, Lithium batteries are used for the following parts:
Radar Processing circuit (CDC-1350): BT1 (Maxell: CR2450)

- Do not store used lithium batteries. Dispose of them in accordance with regulations of local government.
- When disposing of used lithium batteries be sure to insulate the batteries by taping the \oplus and \ominus terminals. For disposal of batteries, be sure to follow the local laws and regulations. For detail, consult with the dealer you purchased the product our business office, or local government.

10.3 DISPOSAL OF USED MAGNETRON

Magnetron is used in the Scanner (2062/2103/2254)

- When the magnetron is replaced with a new one, return the used magnetron to our dealer or business office.
For detail, consult with our dealer or business office.



10.4 ABOUT THE CHINA ROHS

有毒有害物质或元素的名称及含量

(Names & Content of toxic and hazardous substances or elements)

形式名(Type): JMA-5200MK2 Series

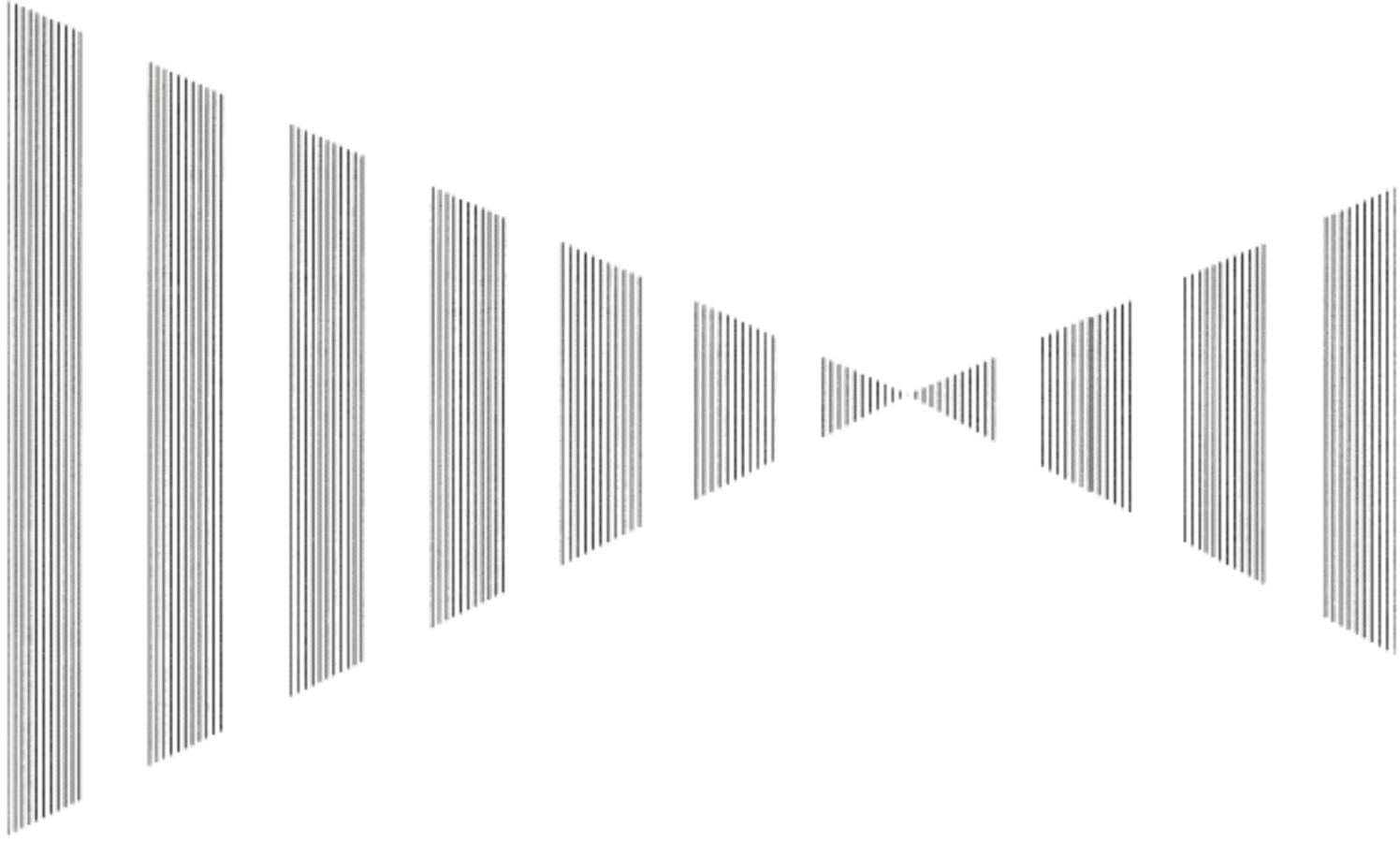
名称(Name): RADAR

部件名称 (Part name)	有毒有害物质或元素 (Toxic and Hazardous Substances and Elements)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
雷达天线单元 (Scanner Unit)	×	×	○	×	×	×
收发信单元 (Transmitter-receiver Unit)	×	×	×	×	×	×
主船内装置 (Inboard Unit) · 显示装置 (Display Unit) · 键盘装置 (OperationUnit) · 信号处理装置 (RADAR Process Unit)	×	×	×	×	×	×
外部设备 (Peripherals) · 选择 (Options) · 电线类 (Cables) · 手册 (Documentts)	×	×	×	×	×	×
<p>○: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11306-2006 标准规定的限量要求以下。 (Indicates that this toxic, or hazardous substance contained in all of the homogeneous materials for this part is below the requirement in SJ/T11363-2006.)</p> <p>×: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。 (Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T 11363-2006.)</p>						



SECTION 11

SPECIFICATIONS



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11.1

JMA-5208/HS TYPE RADAR

(1) Class of Emission	P0N
(2) Display	Color Raster Scan
(3) Screen	15-inch Color LCD Effective diameter of radar display, more than 180 mm
(4) Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96nm
(5) Range Resolution	Less than 25m
(6) Minimum Detectable Range	Less than 35m
(7) Range Accuracy	Less than 1% of the maximum distance of the range scale in use or less than 15m whichever is larger
(8) Bearing Accuracy	Less than 1°
(9) Bearing Indication	Relative Motion mode: Head-up/Course-up/North-up True Motion mode: Course-up/North-up
(10) Ambient Condition	According to IEC60945-4 Temperature Scanner: -25 to +55°C (Storage Temperature: -25 to +70°C) Other Unit except Scanner: -15 to +55°C Relative Humidity 93% at +40°C Vibration 2 to 13.2Hz, amplitude $\pm 1\text{mm}$ $\pm 10\%$ 13.2 to 100Hz, acceleration 7m/s^2 Velocity of the wind 51.5m/s(100kt)
(11) Power Supply Input	+24VDC (Display Unit) +24VDC (Scanner) * NBA-5111
(12) Power Consumption	Approx. 300W (In maximum wind velocity)
(13) Power Supply Voltage Fluctuation	+32V/24V/12VDC -10/+30% (JMA-5208) +24VDC -10/+30% (JMA-5208HS)
(14) Pre-heating Time	Approx. Within 1min30sec



11.2 JMA-5212-4/6/4HS/6HS TYPE RADAR

(1) Class of emission	P0N
(2) Display	Color Raster Scan, PPI Method
(3) Screen	15-inch Color LCD Effective diameter of radar display, more than 180 mm
(4) Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96 nm
(5) Range Resolution	Less than 30m
(6) Minimum Detective Range	Less than 40m
(7) Range Accuracy	Less than 1% of the maximum distance of the range scale in use or less than 15m whichever is larger
(8) Bearing Accuracy	Less than 1°
(9) Bearing Indication	Relative Motion mode: Head-up/Course-up/North-up True Motion mode: Course-up/North-up
(10) Ambient Condition	According to IEC60945-4 Temperature Scanner: -25 to +55°C (Storage Temperature: -25 to +70°C) Other Unit except Scanner: -15 to +55°C Relative Humidity 93% at +40°C Vibration 2 to 13.2Hz, amplitude ±1mm ±10% 13.2 to 100Hz, acceleration 7m/s ² Velocity of the wind 51.5m/s (100kt)
(11) Power Supply Input	+24VDC (Display Unit) +24VDC (Scanner) * Display Unit and Scanner correspond to 100/110/115/220/230/240VAC, 1φ, 50/60Hz when use NBA-5111.
(12) Power Consumption	Approx. 600W (In maximum wind velocity)
(13) Power Supply Voltage Fluctuation	+24VDC -10/+30% (Display Unit) +24VDC -10/+30% (Scanner Unit)
(14) Pre-heating Time	Approx. Within 1min30sec

11.3 JMA-5222-7/9 TYPE RADAR

(1) Class of emission	P0N
(2) Display	Color Raster Scan, PPI Method
(3) Screen	15-inch Color LCD Effective diameter of radar display, more than 180 mm
(4) Range Scale	0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96 nm
(5) Range Resolution	Less than 30m
(6) Minimum Detective Range	Less than 40m
(7) Range Accuracy	Less than 1% of the maximum distance of the range scale in use or less than 15m whichever is larger
(8) Bearing Accuracy	Less than 1°
(9) Bearing Indication	Relative Motion mode: Head-up/Course-up/North-up True Motion mode: Course-up/North-up
(10) Ambient Condition	According to IEC60945-4 Temperature Scanner: -25 to +55°C (Storage Temperature: -25 to +70°C) Other Unit except Scanner: -15 to +55°C Relative Humidity 93% at +40°C Vibration 2 to 13.2Hz, amplitude ±1mm ±10% 13.2 to 100Hz, acceleration 0.7m/s ² Velocity of the wind 51.5m/s (100kt)
(11) Power Supply Input	+24VDC (Display Unit) +24VDC (Scanner) * Display Unit and Scanner correspond to 100/110/115/220/230/240VAC, 1φ, 50/60Hz when use NBA-5111.
(12) Power Consumption	Approx. 680W (In maximum wind velocity)
(13) Power Supply Voltage Fluctuation	+24VDC -10/+30% (Display Unit) +24VDC -10/+30% (Scanner Unit)
(14) Pre-heating Time	Approx. Within 3min



11.4 SCANNER (NKE-2062)

(1) Dimensions	Height 432mm×Swing Circle 1220mm			
(2) Mass	Approx. 24kg			
(3) Polarization	Horizontal Polarization			
(4) Directional Characteristic	Horizontal Beam Width:	2° (-3dB width)		
	Vertical Beam Width:	30° (-3dB width)		
	Sidelobe Level:	Below -23dB (within ±10°)		
		Below -26dB (outside ±10°)		
(5) Revolution	Approx. 27rpm (Normal)			
(6) Peak Power	6 kW			
(7) Transmitting Frequency	9410 ±30MHz			
(8) Transmitting Tube	Magnetron [MSF1422B]			
(9) Pulse width/Repetition Frequency	Short	Middle	Long	
	0.125NM	0.08μs/2250Hz		
	0.25NM	0.08μs/2250Hz		
	0.5NM	0.08μs/2250Hz	0.25μs/1700Hz	
	0.75NM	0.08μs/2250Hz	0.25μs/1700Hz	0.5μs/1200Hz
	1.5NM	0.08μs/2250Hz	0.25μs/1700Hz	0.5μs/1200Hz
	3NM	0.25μs/1700Hz	0.5μs/1200Hz	1.0μs/650Hz
	6NM	0.25μs/1700Hz	0.5μs/1200Hz	1.0μs/650Hz
	12NM	0.25μs/1700Hz	0.5μs/1200Hz	1.0μs/650Hz
	24NM			1.0μs/650Hz
	48NM			1.0μs/650Hz
	96NM			1.0μs/650Hz
(10) Duplexer	Circulator + Diode Limiter			
(11) Mixer	MIC Front End			
(12) Intermediate Frequency Amplifier	Intermediate Frequency: 60MHz			
	Band Width:	20MHz(0.08μs)		
		6MHz(0.25μs,0.5μs)		
		3MHz(0.8μs, 1μs)		
	Gain:	More than 90dB		
	Amplifying Characteristics:	Logarithmic Amplifier		
(13) Overall Noise Figure	6dB(Average)			

11.5 SCANNER (NKE-2062HS)

(1) Dimensions	Height 432mm×Swing Circle 1220mm			
(2) Mass	Approx. 24kg			
(3) Polarization	Horizontal Polarization			
(4) Directional Characteristic	Horizontal Beam Width:	2° (-3dB width)		
	Vertical Beam Width:	30° (-3dB width)		
	Sidelobe Level:	Below -23dB (within ±10°)		
		Below -26dB (outside ±10°)		
(5) Revolution	Approx. 48rpm			
(6) Peak Power	6 kW			
(7) Transmitting Frequency	9410 ±30MHz			
(8) Transmitting Tube	Magnetron [MSF1422B]			
(9) Pulse width/Repetition Frequency	Short	Middle	Long	
	0.125NM	0.08μs/2250Hz		
	0.25NM	0.08μs/2250Hz		
	0.5NM	0.08μs/2250Hz	0.25μs/1700Hz	
	0.75NM	0.08μs/2250Hz	0.25μs/1700Hz	0.5μs/1200Hz
	1.5NM	0.08μs/2250Hz	0.25μs/1700Hz	0.5μs/1200Hz
	3NM	0.25μs/1700Hz	0.5μs/1200Hz	1.0μs/650Hz
	6NM	0.25μs/1700Hz	0.5μs/1200Hz	1.0μs/650Hz
	12NM	0.25μs/1700Hz	0.5μs/1200Hz	1.0μs/650Hz
	24NM			1.0μs/650Hz
	48NM			1.0μs/650Hz
	96NM			1.0μs/650Hz
(10) Duplexer	Circulator + Diode Limiter			
(11) Mixer	MIC Front End			
(12) Intermediate Frequency Amplifier	Intermediate Frequency: 60MHz			
	Band Width:	20MHz(0.08μs)		
		6MHz(0.25μs,0.5μs)		
		3MHz(0.8μs, 1μs)		
	Gain:	More than 90dB		
	Amplifying Characteristics:	Logarithmic Amplifier		
(13) Overall Noise Figure	6dB(Average)			



11.6 SCANNER (NKE-2103-4/6)

- | | |
|---------------------------------------|--|
| (1) Dimensions | 10kW-4ft: Height 458mm×Swing Circle 1285mm
10kW-6ft: Height 458mm×Swing Circle 1910mm |
| (2) Mass | 10kW-4ft: Approx. 38 kg
10kW-6ft: Approx. 40 kg |
| (3) Polarization | Horizontal Polarization |
| (4) Directional Characteristic | Horizontal Beam Width: 1.8° (4ft, -3dB width)
1.2° (6ft, -3dB width)
Vertical Beam Width: 20° (4/6ft, -3dB width)
Sidelobe Level: Below -26dB (4/6ft, within ±10°)
Below -30dB (4/6ft, outside ±10°) |
| (5) Revolution | Approx. 27rpm (4/6ft, Normal) |
| (6) Peak Power | 10kW ±50% |
| (7) Transmitting Frequency | 9410 ±30MHz |
| (8) Transmitting Tube | Magnetron [MAF1565N] |
| (9) Pulse width/Repetition Frequency | SP1 : 0.08μs/2250Hz/Wide
MP1 : 0.25μs/1700Hz/Middle、MP2 : 0.5μs/1200Hz/Middle
LP1 : 0.8μs/750Hz/Narrow、LP2 : 1.0μs/650Hz/Narrow |
| | 0.125NM 0.08μs/2250Hz(SP1) |
| | 0.25NM 0.08μs/2250Hz(SP1) |
| | 0.5NM 0.08μs/2250Hz(SP1) 0.25μs/1700Hz(MP1) |
| | 0.75NM 0.08μs/2250Hz(SP1) 0.25μs/1700Hz(MP1) 0.5μs/1200Hz(MP2) |
| | 1.5NM 0.08μs/2250Hz(SP1) 0.25μs/1700Hz(MP1) 0.5μs/1200Hz(MP2) |
| | 3NM 0.25μs/1700Hz(MP1) 0.5μs/1200Hz(MP2) 0.8μs/750Hz(LP1) |
| | 6NM 0.5μs/1200Hz(MP2) 0.8μs/750Hz(LP1) 1.0μs/650Hz(LP2) |
| | 12NM 0.5μs/1200Hz(MP2) 0.8μs/750Hz(LP1) 1.0μs/650Hz(LP2) |
| | 24NM 1.0μs/650Hz(LP2) |
| | 48NM 1.0μs/650Hz(LP2) |
| | 96NM 1.0μs/650Hz(LP2) |
| (10) Duplexer | Circulator + Diode Limiter |
| (11) Mixer | MIC Front End |
| (12) Intermediate Frequency Amplifier | Intermediate Frequency: 60MHz
Band Width: 20MHz(0.08μs)
8MHz(0.25μs,0.5μs)
3MHz(0.8μs, 1μs)
Gain: More than 90dB
Amplifying Characteristics: Logarithmic Amplifier |
| (13) Overall Noise Figure | 7.5dB (Average) |

11.7

SCANNER (NKE-2103-4HS/6HS)

- (1) Dimensions 10kW-4ft: Height 458mm×Swing Circle 1285mm
10kW-6ft: Height 458mm×Swing Circle 1910mm
- (2) Mass 10kW-4ft: Approx. 38 kg
10kW-6ft: Approx. 40 kg
- (3) Polarization Horizontal Polarization
- (4) Directional Characteristic Horizontal Beam Width: 1.8° (4ft, -3dB width)
1.2° (6ft, -3dB width)
Vertical Beam Width: 20° (4/6ft, -3dB width)
Sidelobe Level: Below -26dB (4/6ft, within ±10°)
Below -30dB (4/6ft, outside ±10°)
- (5) Revolution Approx. 48rpm (4/6ft)
- (6) Peak Power 10kW ±50%
- (7) Transmitting Frequency 9410 ±30MHz
- (8) Transmitting Tube Magnetron [MAF1565N]
- (9) Pulse width/Repetition Frequency
SP1 : 0.08μs/2250Hz/Wide
MP1 : 0.25μs/1700Hz/Middle、MP2 : 0.5μs/1200Hz/Middle
LP1 : 0.8μs/750Hz/Narrow、LP2 : 1.0μs/650Hz/Narrow
- | | | | |
|---------|--------------------|--------------------|-------------------|
| 0.125NM | 0.08μs/2250Hz(SP1) | | |
| 0.25NM | 0.08μs/2250Hz(SP1) | | |
| 0.5NM | 0.08μs/2250Hz(SP1) | 0.25μs/1700Hz(MP1) | |
| 0.75NM | 0.08μs/2250Hz(SP1) | 0.25μs/1700Hz(MP1) | 0.5μs/1200Hz(MP2) |
| 1.5NM | 0.08μs/2250Hz(SP1) | 0.25μs/1700Hz(MP1) | 0.5μs/1200Hz(MP2) |
| 3NM | 0.25μs/1700Hz(MP1) | 0.5μs/1200Hz(MP2) | 0.8μs/750Hz(LP1) |
| 6NM | 0.5μs/1200Hz(MP2) | 0.8μs/750Hz(LP1) | 1.0μs/650Hz(LP2) |
| 12NM | 0.5μs/1200Hz(MP2) | 0.8μs/750Hz(LP1) | 1.0μs/650Hz(LP2) |
| 24NM | | | 1.0μs/650Hz(LP2) |
| 48NM | | | 1.0μs/650Hz(LP2) |
| 96NM | | | 1.0μs/650Hz(LP2) |
- (10) Duplexer Circulator + Diode Limiter
- (11) Mixer MIC Front End
- (12) Intermediate Frequency Amplifier Intermediate Frequency: 60MHz
Band Width: 20MHz(0.08μs)
8MHz(0.25μs,0.5μs)
3MHz(0.8μs, 1μs)
Gain: More than 90dB
Amplifying Characteristics: Logarithmic Amplifier
- (13) Overall Noise Figure 7.5dB (Average)



11.8 SCANNER (NKE-2254-7/9)

- | | |
|---------------------------------------|--|
| (1) Dimensions | 25kW-7ft: Height 536mm×Swing Circle 2270mm
25kW-9ft: Height 536mm×Swing Circle 2825mm |
| (2) Mass | 25kW-7ft: Approx. 58 kg
25kW-9ft: Approx. 60 kg |
| (3) Polarization | Horizontal Polarization |
| (4) Directional Characteristics | Horizontal Beam Width: 1.0° (7ft, -3dB width)
0.8° (9ft, -3dB width)
Vertical Beam Width: 20° (7/9ft, -3dB width)
Sidelobe Level: Below -26dB
(7/9ft, within ±10°)
Below -30dB
(7/9ft, outside ±10°) |
| (5) Revolution | 24rpm (7/9ft, Normal) |
| (6) Peak Power | 25kW ±50% |
| (7) Transmitting Frequency | 9410 ±30MHz |
| (8) Transmitting Tube | Magnetron [M1568BS] |
| (9) Pulse Width/Repetition Frequency | SP1 : 0.07μs/2250Hz/Wide
MP1 : 0.2μs/2250Hz/Middle、MP2 : 0.4μs/1400Hz/Middle
LP1 : 0.8μs/750Hz/Narrow、LP2 : 1.0μs/650Hz/Narrow、LP3 : 1.2μs/510Hz/Narrow |
| | 0.125NM 0.07μs/2250Hz(SP1)
0.25NM 0.07μs/2250Hz(SP1)
0.5NM 0.07μs/2250Hz(SP1) 0.2μs/2250Hz(MP1)
0.75NM 0.07μs/2250Hz(SP1) 0.2μs/2250Hz(MP1) 0.4μs/1400Hz(MP2)
1.5NM 0.07μs/2250Hz(SP1) 0.2μs/2250Hz(MP1) 0.4μs/1400Hz(MP2)
3NM 0.2μs/2250Hz(MP1) 0.4μs/1400Hz(MP2) 0.8μs/750Hz(LP1)
6NM 0.4μs/1400Hz(MP2) 0.8μs/750Hz(LP1) 1.0μs/650Hz(LP2)
12NM 0.4μs/1400Hz(MP2) 0.8μs/750Hz(LP1) 1.0μs/650Hz(LP2)
24NM 1.0μs/650Hz(LP2)
48NM 1.0μs/650Hz(LP2)
96NM 1.2μs/510Hz(LP3) |
| (10) Duplexer | Circulator + Diode Limiter |
| (11) Mixer | MIC Front End |
| (12) Intermediate Frequency Amplifier | Intermediate Frequency: 60MHz
Band Width: 25MHz(0.07μs)
8MHz(0.2μs, 0.4μs)
3MHz(0.8μs, 1.0μs, 1.2μs)
Gain: More than 90dB
Amplifying Characteristics: Logarithmic Amplifier |
| (13) Overall Noise Figure | 7.5dB (Average) |

11.9 DISPLAY UNIT (NCD-4380)

- | | |
|----------------------------|--|
| (1) Structure | Desk Top Type
(LCD Monitor Unit/Keyboard Unit/Processor Unit Separation Structure) |
| (2) Screen | 15-inch Color LCD 1024x768 dot (XGA)
Viewing Distance: 1m from the center of Display |
| (3) Display mode | Radar mode
Synthesis mode (Synthesis Radar echo and Coastline)
Plotter mode (Require Plotter Unit (option)) |
| (4) Range Scale | 0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96nm |
| (5) Range Marker | 0.025, 0.05, 0.1, 0.25, 0.25, 0.5, 1, 2, 4, 8, 16nm |
| (6) Bearing Indication | Rader mode/Synthesis mode
Relative motion: North-up, Course-up, Head-up
True motion: North-up, Course-up
True motion (Plotter mode (Option)): N-up, C-up |
| (7) Variable Range Maker | 2VRM (Digital Display)
VRM Range:0.000 to 97.7nm (0.000 to 181.1km) |
| (8) Electric Bearing lines | 2EBL(Digital Display)
Each EBL can be floating displayed.
EBL unit of Display: 0.1°
EBL Range: 0.000° to 359.9°
Bearing Indication: Relative bearing and True bearing can be switched. |
| (9) Cursor | Target Range, Bearing and Latitude presentation can be possible to move with trackball. |



11.10 PROCESSOR UNIT (NDC-1460)

(1) Structure	Desk Top Type (Horizontal putting and length putting using combinedly)
(2) Dimensions	Height 125mm×Width 340mm×Depth 347mm
(3) Mass	Approx. 4kg
(4) Tune Method	AUTO/MANUAL (Bar-graph indicate)
(5) STC (SEA)	AUTO/MANUAL
(6) FTC (RAIN)	AUTO/MANUAL
(7) Radar Interference Rejection	Built-in (The effect can be adjusted by three stages.)
(8) Scan Correlation	Function1/2/3, 2 Peak Hold Processing1/2 Automatic change of processing method. (Target range synchronize/Clutter synchronize)
(9) Bearing Marker	360° in 1° digit. Relative motion: Fixation True motion: Rewrite at a position correct in every scan.
(10) Heading Line	Electronic
(11) Radar Alarm	Invasion, Seccession, OFF can be Selected. With buzzer sound.(Possible to output to External buzzer.) Ring, operating in $r\theta$ space, relative position *Automatically acquisition by TT described in Section “TT”
(12) Off Center	Within 66% of the radius of any range. (Except 96nm) Can be operated in all mode in relative motion. Trail is succeed at Off Center mode.
(13) True motion Unit	Built-in (Except 96nm)
(14) True motion reset position	66% of radius of any range. Possible to manual reset.



11.11 TARGET TRACKING UNIT (NCA-877A)

Radar mode, synthesis mode

- | | |
|----------------|--|
| 1) Acquisition | MANUAL/AUTO (by automatic acquisition/activation zone) |
| 2) Tracking | 30 target (Automatic tracking)
Maximum tracking range: 32nm (Available all range scale) |
| 3) Display | Tracking data: 2 at the same time. (Can be scroll.)
Naming function: Possible to name by the alphabet up to 8 characters to each target.
The range, bearing, CPA, TCPA, true course, true speed, BCR, BCT of target can be displayed.
(When naming is displayed, BCR/BCT can't be displayed.)
Vector display: True/Relative
Past position |
| 4) Alarm | Automatic acquisition/activation zone
Danger ship: CPA limit 0.1 to 9.9 nm, TCPA limit 1 to 99 min |

Synthesis mode

- | | |
|-----------------------|--|
| 5) Another ship track | 20 targets. 1500 point per one target can be displayed.
(including AIS targets)
Display color: 7 colors
(The display color of each target can be set.)
(The display color of all targets can be set by the batch. In this case, the display color is one color.)
Interval of save: 3/5/10/30 sec, 1/3/5/10/130/160 min, 1/3/5/10 nm
Possible to storage in memory card (Option). |
|-----------------------|--|

11.12 AIS UNIT (NQA-2155)

Radar mode, synthesis mode

1) Activation

30 target

MANUAL/AUTO (by automatic activation/activation zone)

2) Display

130 target (sleeping target and activated target)

AIS data: 1 at the same time. (simple display)

Vector display: True/Relative

Past position

The message can be displayed. (broadcast message, addressed message)

Target information in numerical values: Select one of the following four screens:

- Navigation information screen
True bearing, Distance, Course, Speed, CPA, TCPA,
Heading bearing, Turning speed
- Destination and position information screen
Destination, Estimated time of arrival, Latitude and longitude,
Position fixing equipment, RAIM, Position fixing accuracy
- Ship information screen
Ship name, Call sign, MMSI, IMO number, Navigation status
- AtoN information screen
AtoN class, AtoN type

3) Alarm

Automatic activation/activation zone

Danger ship: CPA limit 0.1 to 9.9 nm, TCPA limit 1 to 99 min

Synthesis mode

4) Another ship track

20 targets. 1500 point per one target can be displayed. (including TTs)

Display color: 7 colors

(The display color of each target can be set.)

(The display color of all targets can be set by the batch. In this case, the display color is one color.)

Interval of save: 3/5/10/30 sec, 1/3/5/10/130/160 min, 1/3/5/10 nm

Possible to storage in memory card (Option).



11.13 PLOTTER UNIT

(1) Plotter (Normal) (Synthesis mode)

Projection:	Mercator projection (Latitude 70 degree or less.)
Scale:	Radar synchronize range scale
Own ship trail:	Color of 1 stage. Interval of storage 3/5/10/30 sec, 1/3/5/10/30/60 min or every 0.1/0.2/0.3/0.5/1/3/5/10 nm and OFF
Cursor mark :	Storage Capacity 7,000 point
Coastline data :	Coastline ROM Card (Option) (ERC, JRC, C-Map NT+) One selected isobath can be displayed.
Painting out:	ON/OFF can be selected.

(2) Plotter (Option NDB-44) (Synthesis mode)

Projection:	Mercator projection (Latitude 70 degree or less.)
Scale:	Synchronize range scale
Own ship trail:	Color of 7 stages. Interval of storage: 3/5/10/30 sec, 1/3/5/10/30/60 min or every 0.1/0.2/0.3/0.5/1/3/5/10 nm and OFF
Cursor mark:	Storage capacity of own ship trail: 7,000 point Color of 7 stages Storage capacity of cursor mark: 20,000 point Variety of cursor Mark: 19
Event mark:	Color of 7 stages Storage capacity of event mark: Include in cursor mark Variety of event mark: 3 kinds, (Two kinds can be switched. /8 form to selection.) Variety of external event mark: One kind, Monochrome
Line:	Color of 7 stage Storage capacity of line: Include in cursor mark Variety of line: Solid line, broken line, alternate long and short dash line
Coast line data:	Coast line ROM card (Option) (ERC, JRC, C-Map NT+) Selected one isoline can be displayed.
Painting out:	ON/OFF can be selected.
External memory:	Memory card (Option)
Destination and sea route:	Destination can be set up to 99 point. Information of destination: Azimuth, distance and the time to required destination. Setting of sea route: 10 sea routes. (10 destination for one sea route can be set.) Alarm of sea route: Destination, Secession, Invetion, Secession
Position compensation:	Radar display synchronize range scale coast line by manual.

(3) Plotter (Option NDB-44) (Synthesis mode)

Projection:	Mercator projection (Latitude 85 degree or less.)
Scale:	1/1,000 to 1/10,000,000 are continuously selected. 10 stage can be changed (Preset can be used)
Own ship trail:	Color of 7 stages. Interval of storage: 3/5/10/30 sec, 1/3/5/10/30/60 min or every 0.1/0.2/0.3/0.5/1/3/5/10 nm and OFF Storage capacity of own ship trail: 7,000 point
Cursor mark:	Color of 7 stages Storage capacity of cursor mark: 20,000 point Variety of cursor Mark: 19
Event mark:	Color of 7 stages Storage capacity of event mark: Include in cursor mark Variety of event mark: 3 kinds, (Two kinds can be switched. /8 form to selection.) Variety of external event mark: One kind, Monochrome
Line:	Color of 7 stage Storage capacity of line: Include in cursor mark Variety of line: Solid line, broken line, alternate long and short dash line
Coast line data:	Coast line ROM card (Option)(ERC, JRC, C-Map NT+) Selected one isoline can be displayed.
Painting out:	ON/OFF can be selected.
External memory:	Memory card (Option) Own ship trail, another ship trail, cursor mark, event mark, line, destination, sea route can be memorized.
Destination and sea route:	Destination can be set up to 99 point. Information of destination: Azimuth, distance and the time to required destination. Setting of sea route: 10 sea routes. (10 destination for one sea route can be set.) Alarm of sea route: Destination, Seccession, Invetion, Seccession



11.14 KEYBOARD UNIT (NCE-7699A)

- (1) Structure Structure of keyboard unit is separate from processor unit.
 Desk-Top type
 Correspond Flush mount
- (2) Switch Gain (Transmit pulse width can be changed by PUSH-SW.)
 SEA (AUTO/MANU can be changed by PUSH-SW.)
 RAIN (AUTO/MANU can be changed by PUSH-SW.)
 MULTI (Adjustment item can be changed by PUSH-SW.)
 EBL (Floating EBL ON/OFF can be changed by PUSH-SW.)
 VRM
 Trackball
- (3) Operation switch
- | | |
|---|---|
| STBY/OFF (Standby/Power off): | Stop transmit, Power off. |
| TX/OFF (Transmit start/Power off): | Start transmit, Power off |
| PANEL(Brightness of keyboard adjustment): | Brightness of keyboard switch adjust. |
| ALARM ACK(Stop Alarm): | Acknowledge and stop alarm. |
| EBL1(EBL1): | Selection display and non-display of EBL1. |
| EBL2(EBL2): | Selection display and non-display of EBL2. |
| VRM1(VRM1): | Selection display and non-display of VRM1. |
| VRM2(VRM2): | Selection display and non-display of VRM2. |
| RANGE+(Increase display range): | Increase display range. |
| RANGE-(decrease display range): | decrease display range. |
| ACQ(acquisition): | TT target acquisition |
| TGT DATA(Numeric display): | Numeric display of tracking target. |
| TGT CNCL(Release of selection): | Release of selection of tracking target. |
| MOB(Marker): | Turning on and release marker. |
| ENT(Enter): | Left side button of trackball. |
| CLR/INFO(Release/Information): | Right side of trackball. |
| MAP(Display mode): | Selection display and non-display of MAP(NAV LINE, etc...). |
| | Selection of Rader, Synthesis and Plotter mode. |
| AZI MODE(Display azimuth): | Selection of North-up, Course-Up, Head-Up. |
| TM/RM(True/Relative Motion): | Selection true motion, relative motion. |
| RR/HL(Fixed ring/Heading Line): | Selection display and non-display of fixed ring and heading line. |
| OFF CENT(Off Center): | Off center operation |
| AZ (Guard zone alarm): | Setting and release of automatic acquisition/activate zone. |
| VECT T/R (True/Relative motion vector): | Selection of true motion and relative motion of vector. |
| TRAILS (Trails): | Selection display and non-display of trails. |
| Day/Night(Brightness of screen switch): | Selection of screen arrangement of color. |
| FUNC(Function): | Selection of signal processing. |
| USER KEY1(User key1): | User assignment key1. |
| USER KEY2(User key2): | User assignment key2. |
| RADAR MENU(Radar menu): | Rader menu. |
| MARK(MARK): | Selection display and non-display of mark. |
| TT MENU(TT menu): | TT menu. |

11.15 PERFORMANCE MONITOR (NJU-85)

- | | |
|-------------------------|-------------------------------------|
| (1) Dimensions | Height 130mm×Width 149mm×Depth 70mm |
| (2) Mass | Approx. 1.2kg |
| (3) Operating frequency | 9410 ±30MHz |

11.16 INPUT ENABLE SIGNAL

- | | |
|--|--|
| (1) Navigation equipment: | IEC61162-1/2
Receive port NAV1/NAV2/GPS port
Receive capability sentence.
Longitude/Latitude: GGA>RMC>RMA>GNS/GLL
Waypoint: RMB>BWC(BWR)
COG/SOG: RMC>RMA>VTG
SPEED: VBW
Day/Time information: ZDA
Alarm acknowledge: ACK
Rate of Turn : ROT
Rudder : RSA |
| (2) Bearing signal: | GYRO-SYNC: 360X, 180X, 90X, 30X. (Require optional NSK unit NCT-4106A)
GYRO-STEP: 360X, 180X, 90X, 30X. (Require optional NSK unit NCT-4106A)
JRC-NSK format (JLR-10, JLR20/30)
IEC61162-2 38400bps: THS>HDT>HDG>HDM>VHW
(over 40Hz)
IEC61162-1: THS>HDT>HDG>HDM>VHW
* Can't be use for target tracking. |
| (3) Speed signal: | LOG-SYNC: 360X, 180X,90X, 30X. (Require optional NSK unit NCT-4106A)
LOG-PULSE: 800, 400, 200, 100. (Require optional NSK unit NCT-4106A) |
| (4) External event mark: | Contact input by way of terminal board. |
| (5) Depth: | DPT>DBK>DBT>DBS, JRC format |
| (6) Water temperature: | MTW, JRC format |
| (7) Tendency: | CUR, JRC format |
| (8) Direction of wind, velocity of wind: | MWV, MWD |
| (9) AIS: | IEC61162-2
VDM, VDO (Require optional AIS process unit NQA-2155) |

Note: The Speed measuring accuracy of speed sensor shall confirm to IMO Resolution MSC.96(72).
The measuring accuracy of GPS shall confirm to IMO Resolution MSC.112(73).



11.17 OUTPUT ENABLE SIGNAL

- | | |
|---|---|
| (1) Slave video | Radar video: TIY, VD, BP(2048p), BZ (Option) |
| (2) Navigation information | IEC61162-1/2
Radar system data: RSD
Own ship data: OSD
Tracking target data: TTM, TLL, TTD, TLB
Alarm: ALR
Auto pilot: APB
Bearing of destination: BOD
Latitude/Longitude data : GGA, GLL, RMC
Waypoint data : RMB, BWC
COG/SOG data : VTG
Cross track error: XTE
Heading data: HDT, THS |
| (3) Failure of RADAR
or External alarm | J5 (NSK/COMPASS connector) ⑥ALM+, ⑦ALM-
NCT-4106A(TB40) option
Refer to 3.21 and 3.22 in Installation manual. |
| (4) External monitor | Multi scan monitor, Analog RGB, HD15pin Connector (Option) |

11.18 STANDARD CONFIGURATION

- | | |
|-----------------------------|---|
| (1) Scanner | 1 |
| (2) Display unit | 1 (Processor unit, LCD unit, Keyboard unit) |
| (3) Power cable | CFQ-5436-5 (5m) |
| (4) Equipment reserve parts | 1 |
| (5) Instruction manual | 1 (Japanese or English) |

Note: An equipment cable is optional.
Purchase an equipment cable of desired length.

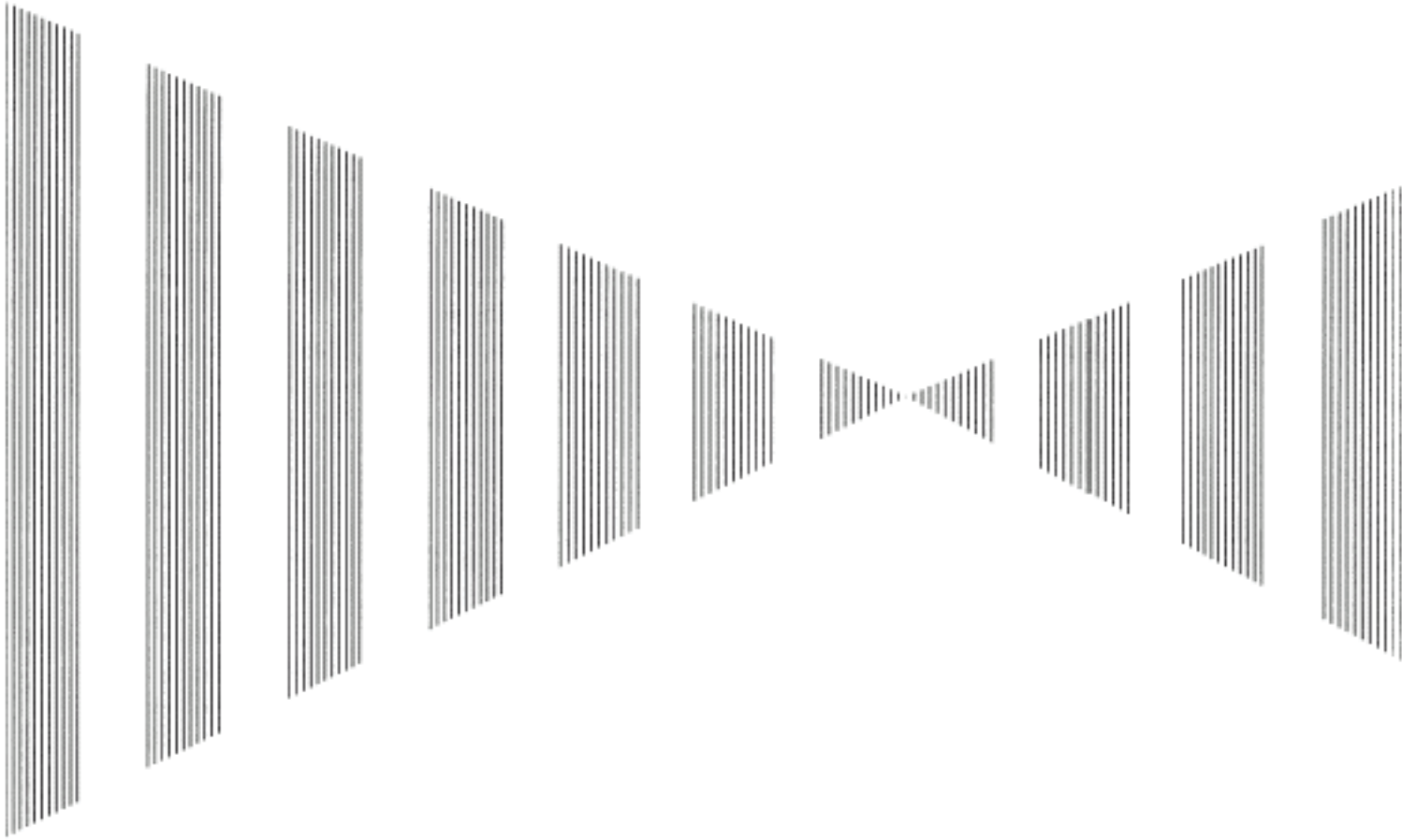
11.19 EQUIPMENT DISTANCE BETWEEN OTHER INSTRUMENTS

	Maximum
(1) LCD monitor to processor unit	5m
(2) Keyboard unit to processor unit	5m
(3) Scanner to display unit (10/25kw)	65m
(4) Scanner to display unit (6kw NKE-2062 DC12V)	20m
(5) Scanner to display unit (6kw NKE-2062 DC32V/24V)	30m
(6) Scanner to display unit (6kw NKE-2062HS DC24V)	30m

11.20 OTHERS (OPTION)

- Equipment cable 6/10/25 kW type (connectors on both ends)
Cable length:
10m CFQ-6912-10/15m CFQ-6912-15
20m CFQ-6912-20/30m CFQ-6912-30
40m CFQ-6912-40/50m CFQ-6912-50
65m CFQ-6912-65
- TT unit NCA-877A
- NSK unit NCT-4106A
- AIS unit NQA-2155
- Plotter unit NDB-44
- X band performance monitor NJU-85
- Display stand MPBX42944
- Horizontal sun visor for NWZ-164 MPOL30369
- Vertical sun visor for NWZ-164 MPOL30370
- Simple ISW cable CFQ-5251 (5 m)
- Sub-monitor lead cable CFQ-5350 (7ZCRD1153)
- ISW/sub-operation unit lead cable CFQ-5351 (7ZCRD1152)
- NMEA lead cable CFQ-5352 (7ZCRD1212)
- NMEA lead cable 2 CFQ-5462 (2CH pair for transmission and receive)
- Cable between connected NMEA units CFQ-6560 (10 m)
- JLR-10 connection cable CFQ-6934 (10 m)
- JLR-20/30 connection cable CFQ-5469
- Keyboard extension cable CFQ-6999 (10 m)
- NDW-51 connection cable CFQ-7082
- Coast line ROM card
- Memory card
- Rectifier unit NBA-5111

APPENDIX



- FIGURE 1 JMA-5208/HS, JMA-5212-4/6/4HS/6HS, JMA-5222-7/9 BLOCK DIAGRAM
- FIGURE 2 JMA-5208/HS INTER-CONNECTION DIAGRAM
- FIGURE 3 JMA-5212-4/6/4HS/6HS INTER-CONNECTION DIAGRAM
- FIGURE 4 JMA-5222-7/9 INTER-CONNECTION DIAGRAM
- FIGURE 5 PRIMARY POWER SUPPLY DIAGRAM,
TYPE JMA-5208/HS, JMA-5212-4/6/4HS/6HS, JMA-5222-7/9
- FIGURE 6 PROCESSOR UNIT, NDC-1460 INTER-CONNECTION DIAGRAM
- FIGURE 7 KEY-BOARD UNIT, NCE-7699A INTER-CONNECTION DIAGRAM
- FIGURE 8 NKE-2062 SCANNER UNIT INTERCONNECTION DIAGRAM
- FIGURE 9 NKE-2062HS SCANNER UNIT INTERCONNECTION DIAGRAM
- FIGURE 10 NKE-2103 SCANNER UNIT INTERCONNECTION DIAGRAM
- FIGURE 11 NKE-2254 INTERCONNECTION DIAGRAM OF SCANNER UNIT
- FIGURE 12 JMA-5200MK2 ON-SCREEN CONTROLS

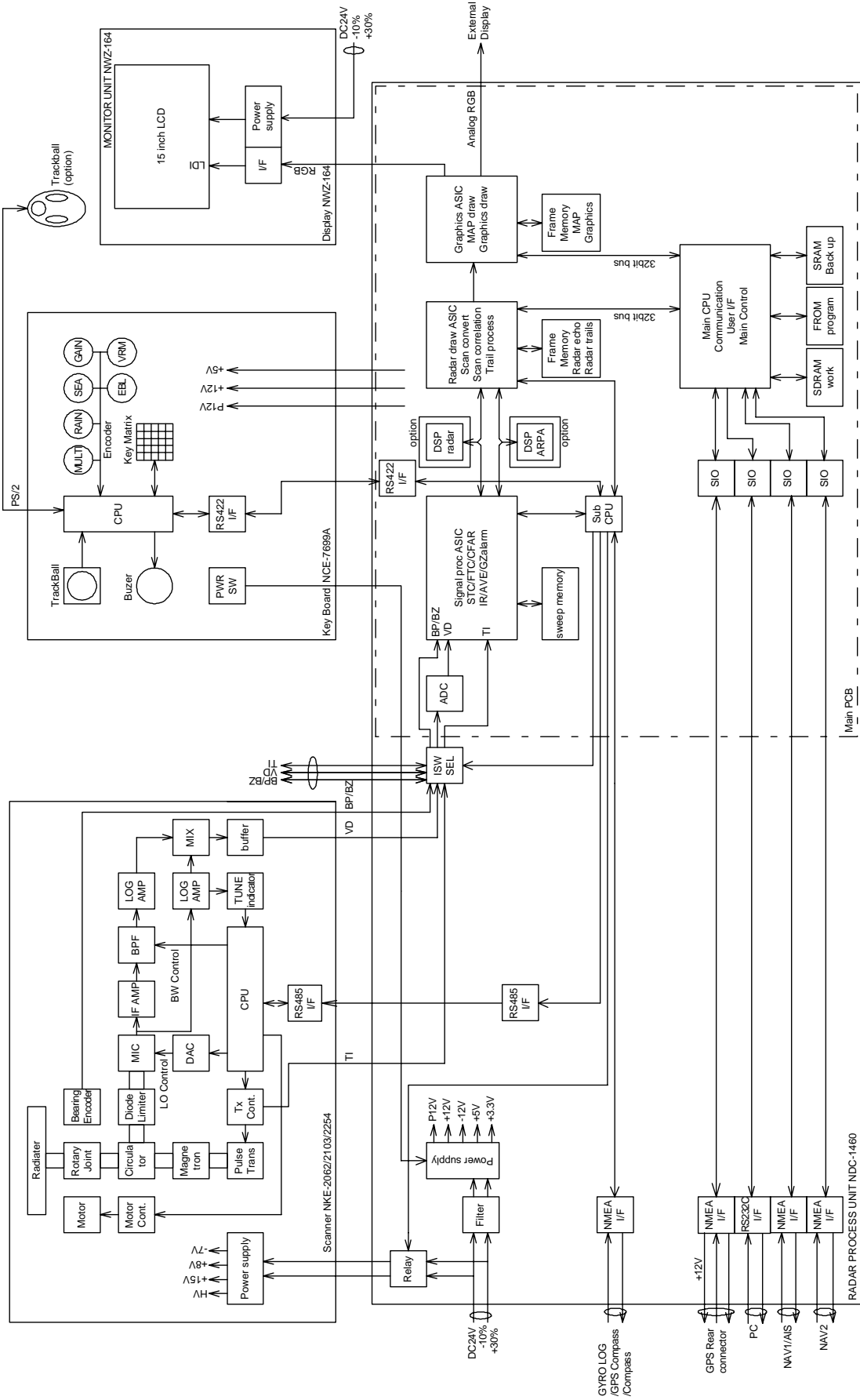
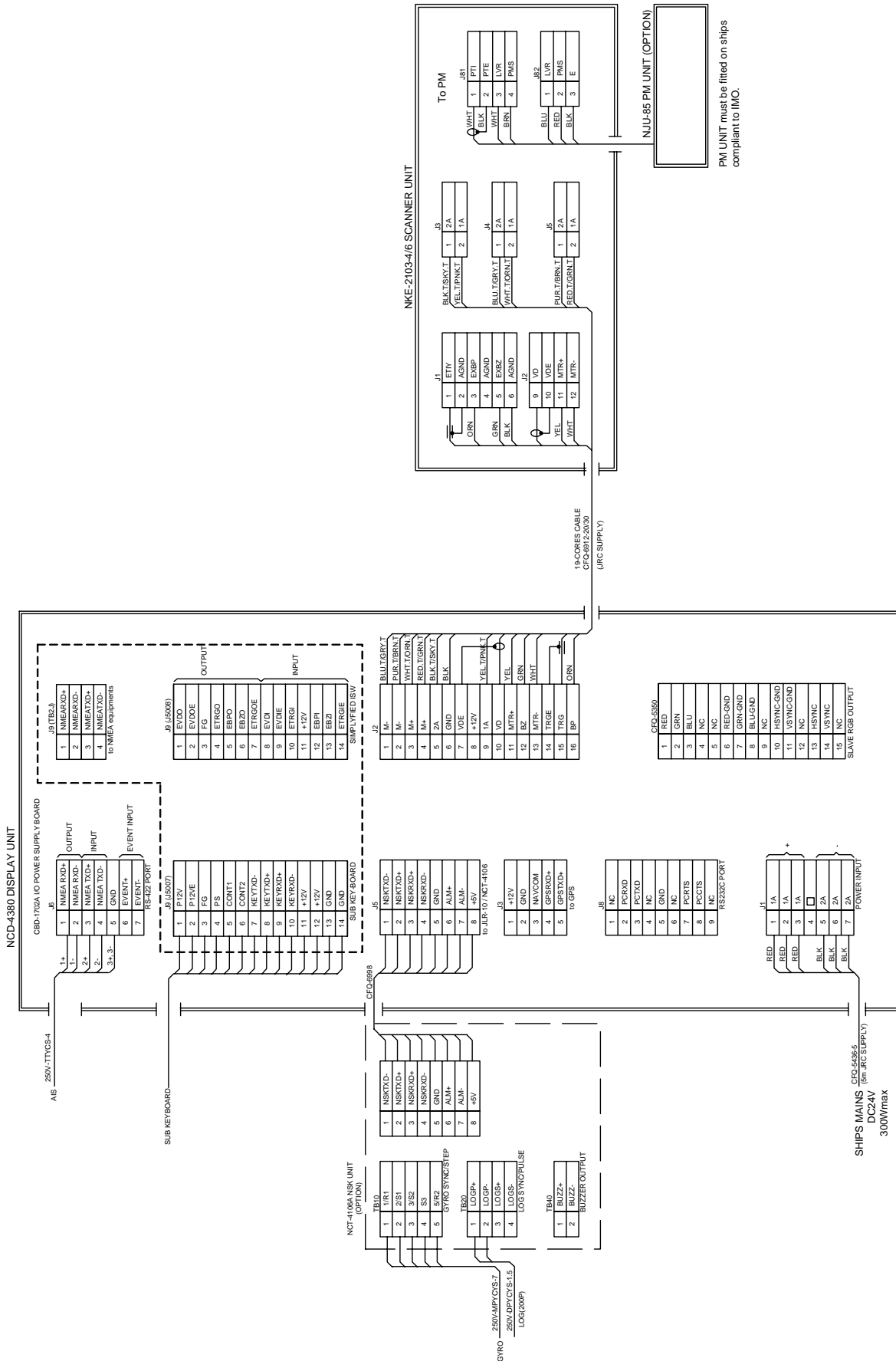


Figure 1 JMA-5208/HS, JMA-5212-4/6/4HS/6HS, JMA-5222-7/9 Block Diagram



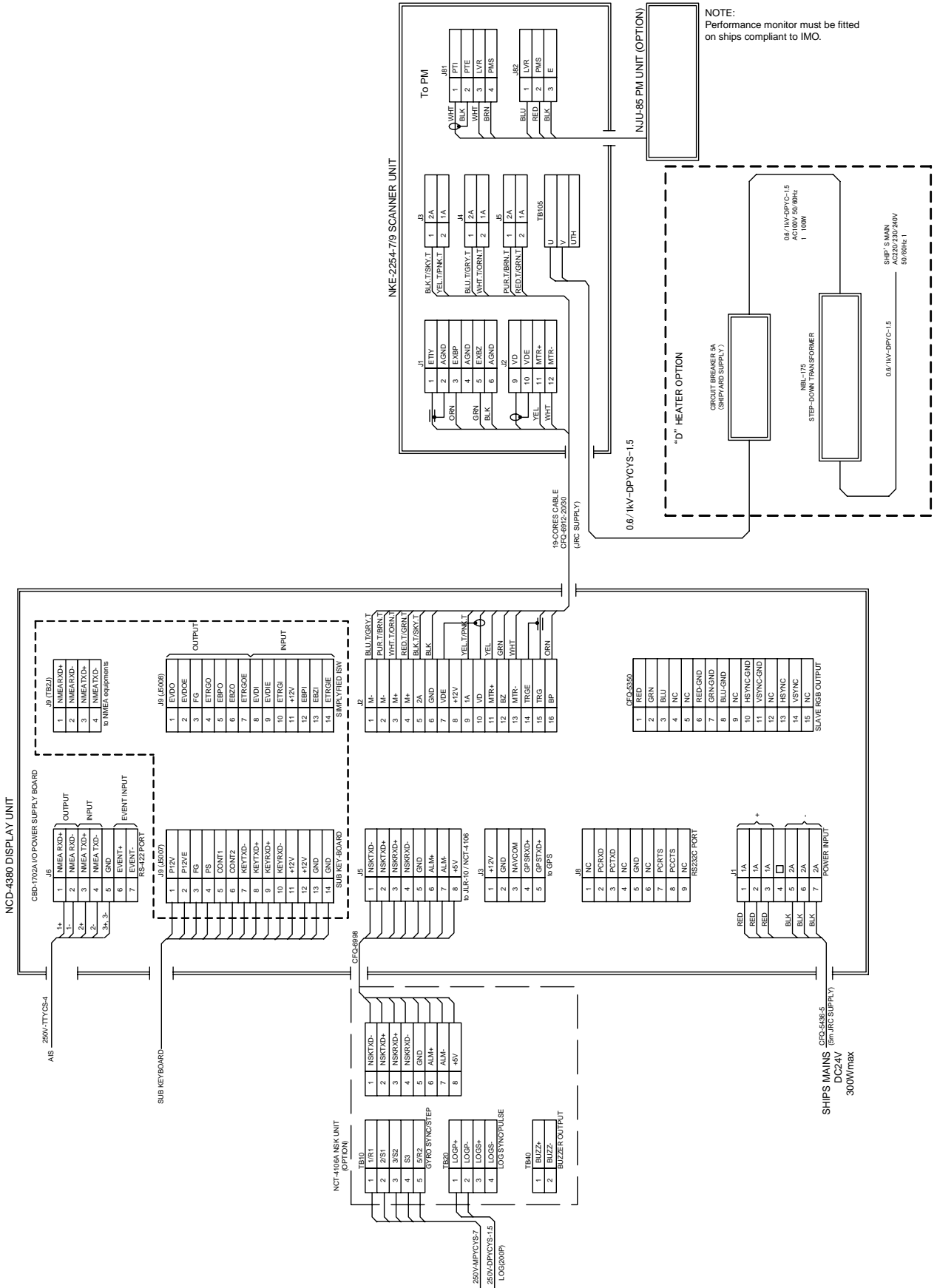


Figure 4 JMA-5222-7/9 Inter-connection Diagram

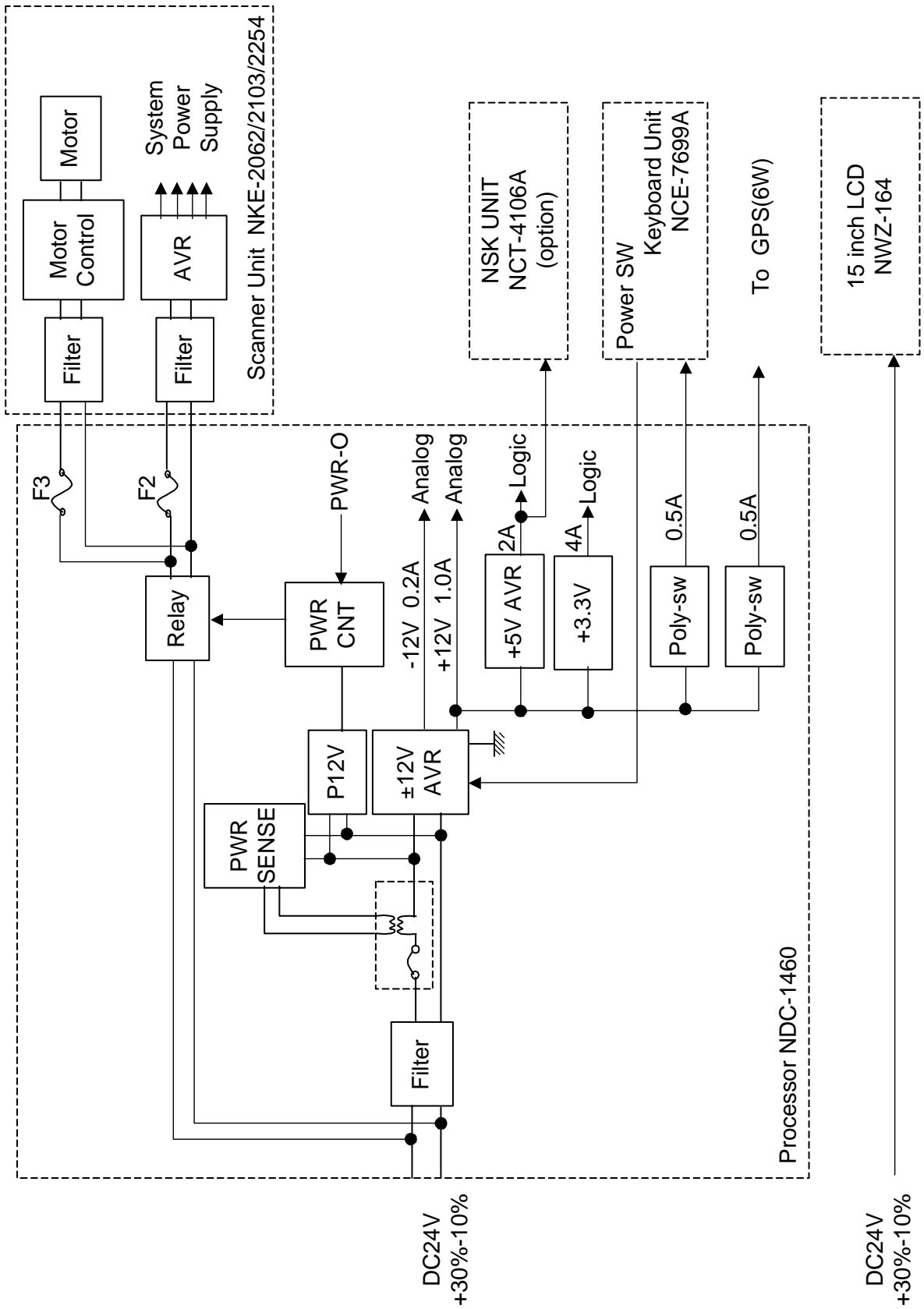


Figure 5 Primary Power Supply Diagram,
 Type JMA-5208/HS, JMA-5212-4/6/4HS/6HS, JMA-5222-7/9

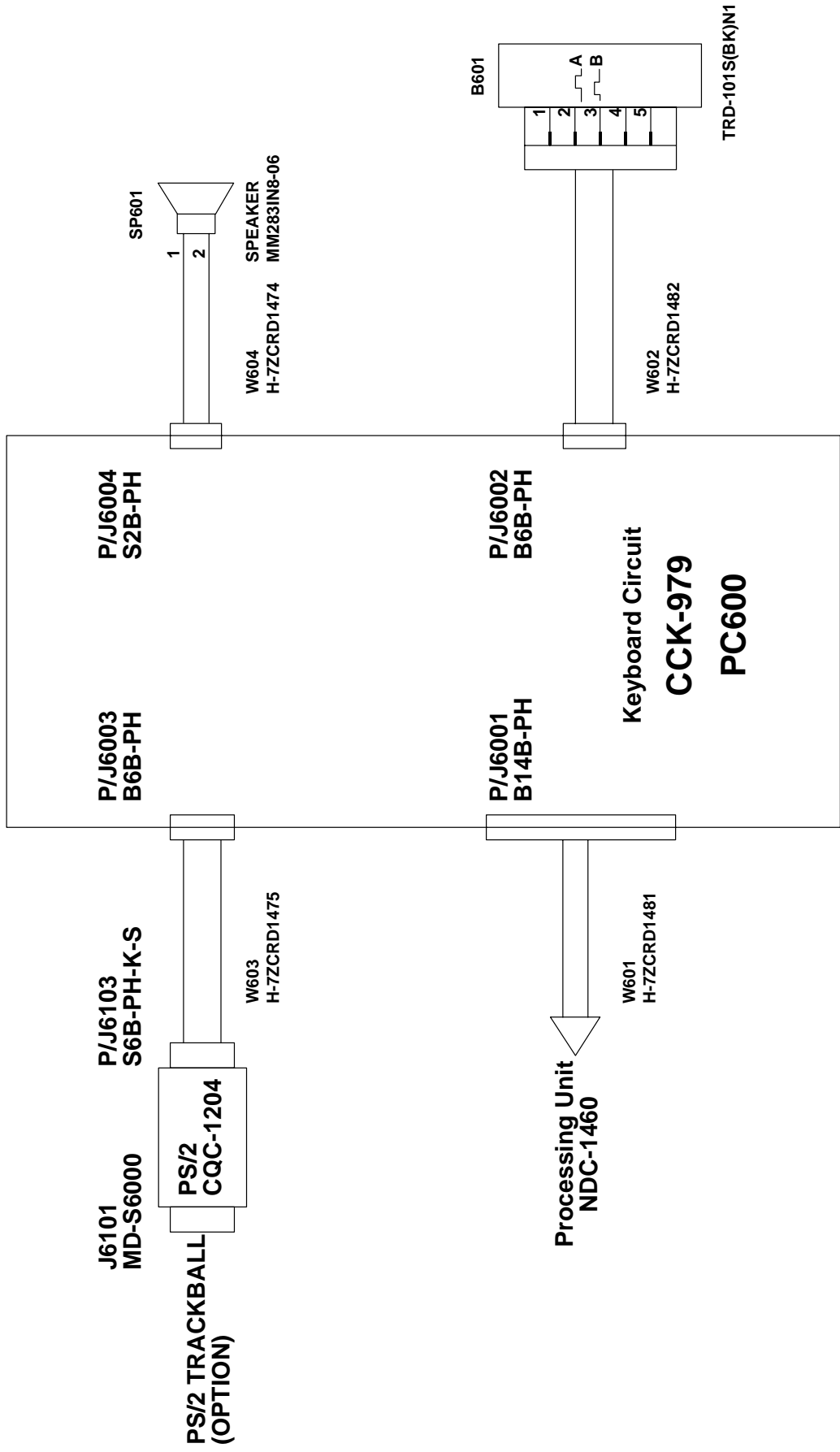


Figure 7 Keyboard Unit, NCE-7699A Inter-connection Diagram

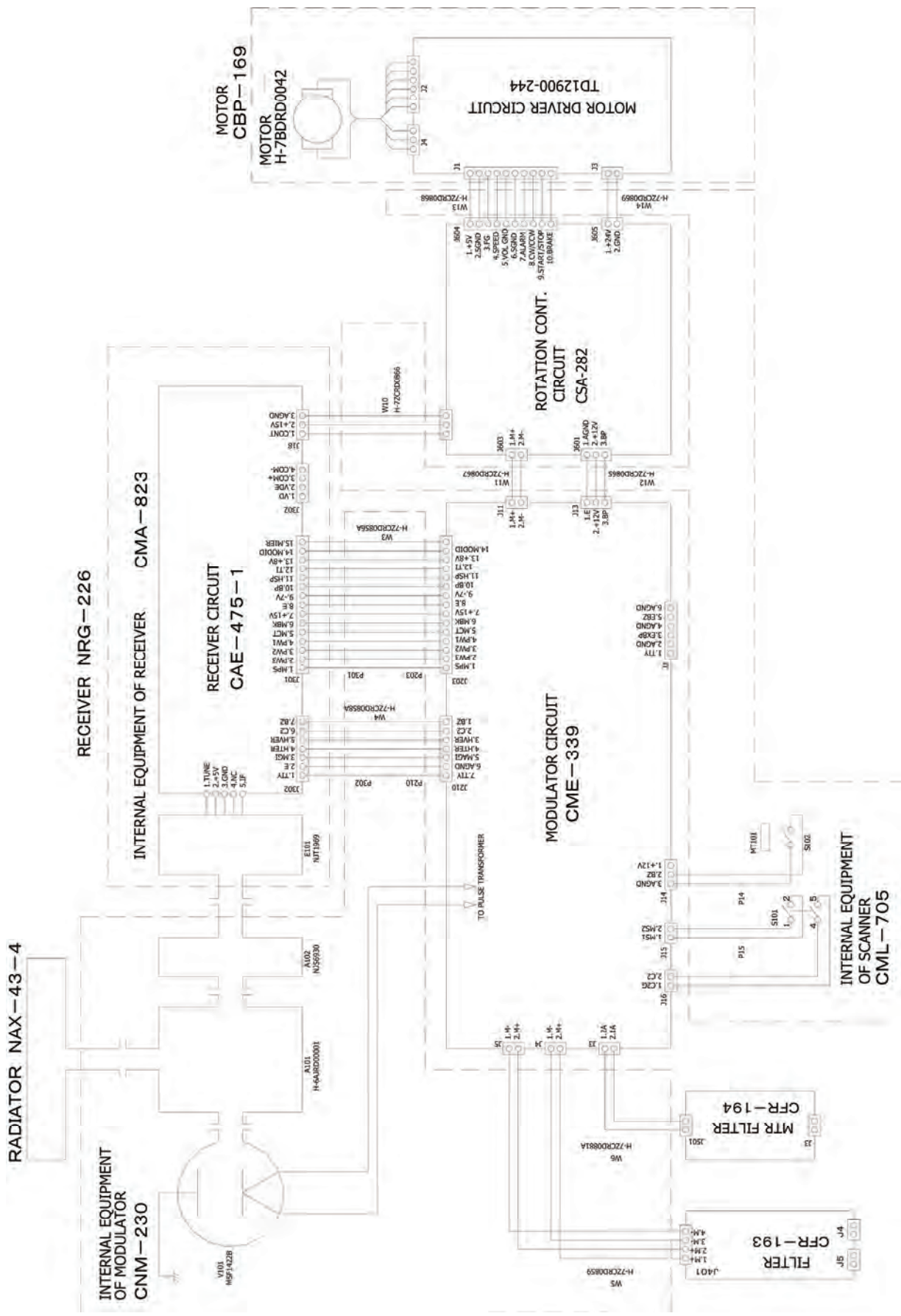
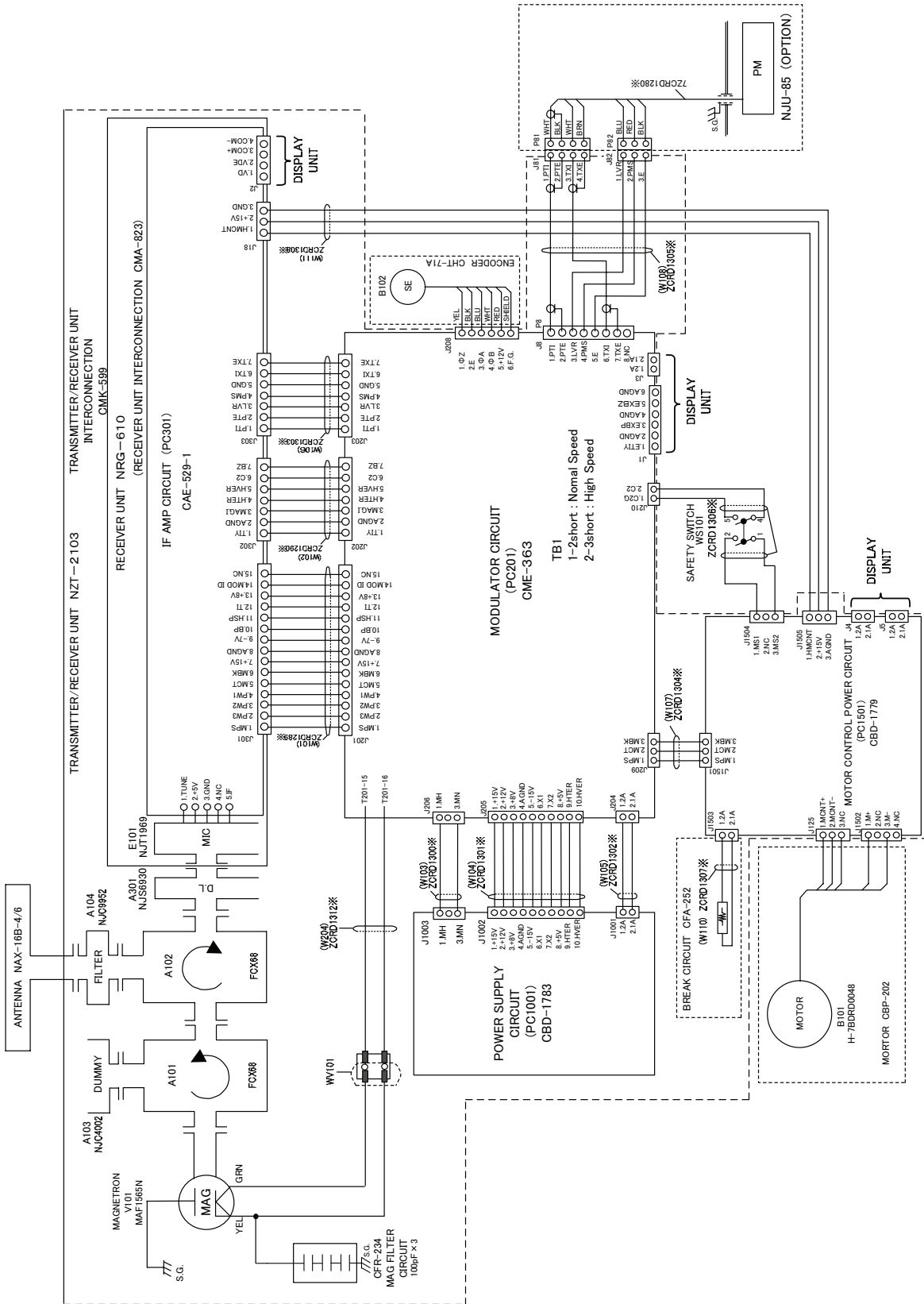


Figure 9 NKE-2062HS Scanner Unit Interconnection Diagram



SCANNER UNIT INTERCONNECTION
CAX-10

Figure 10 NKE-2103 Scanner Unit Interconnection Diagram

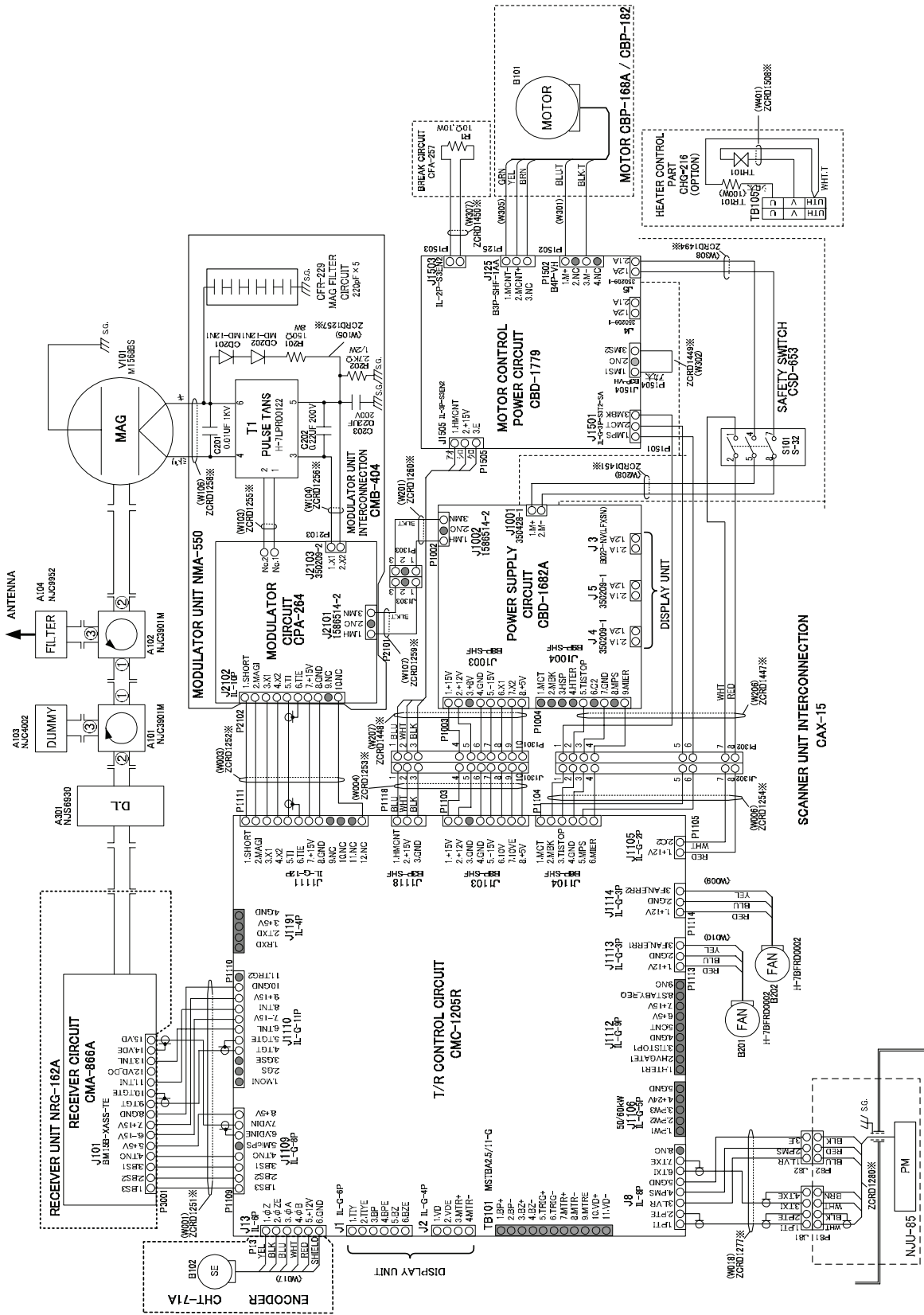


Figure 11 NKE-2254 Interconnection Diagram of Scanner Unit

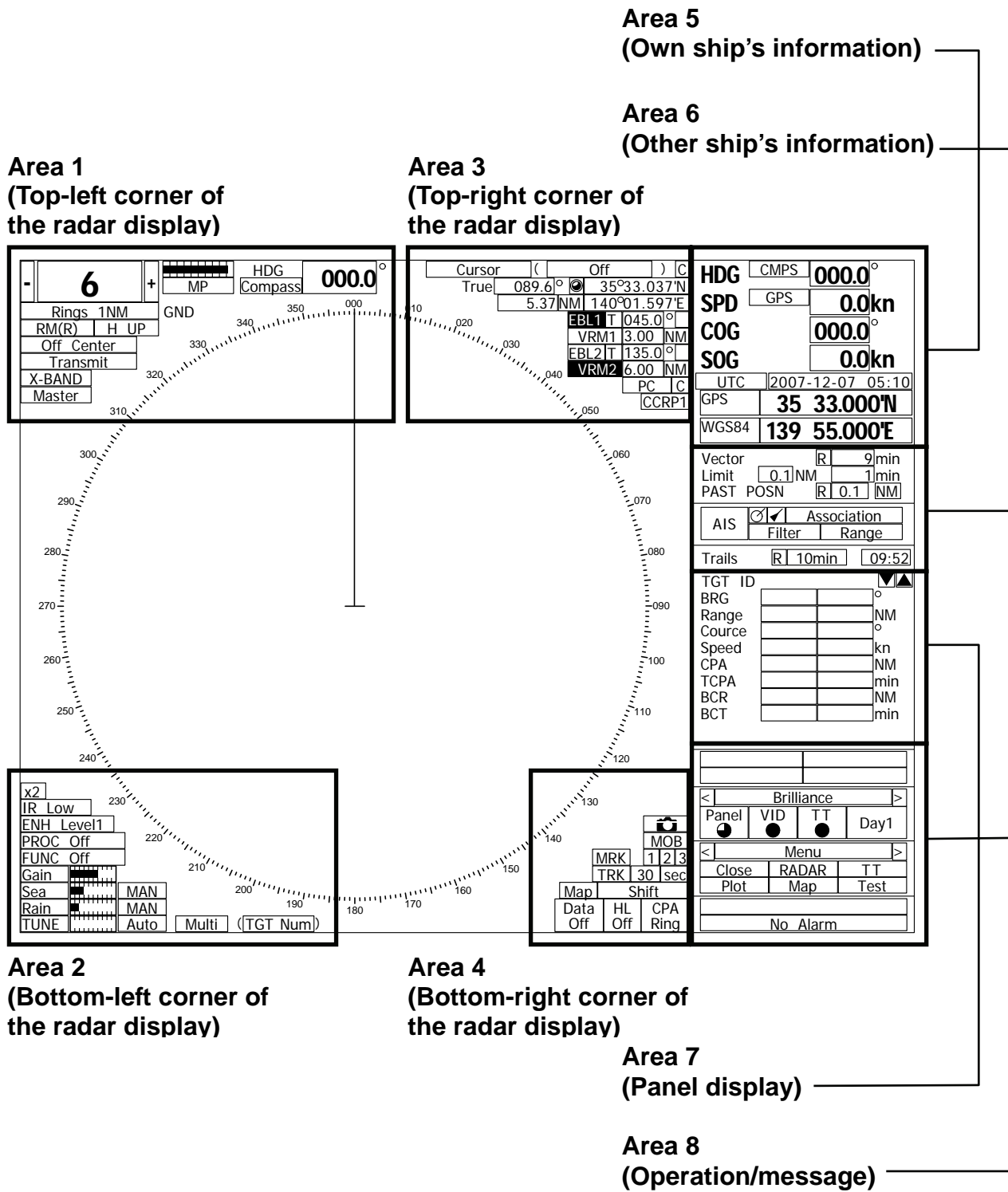
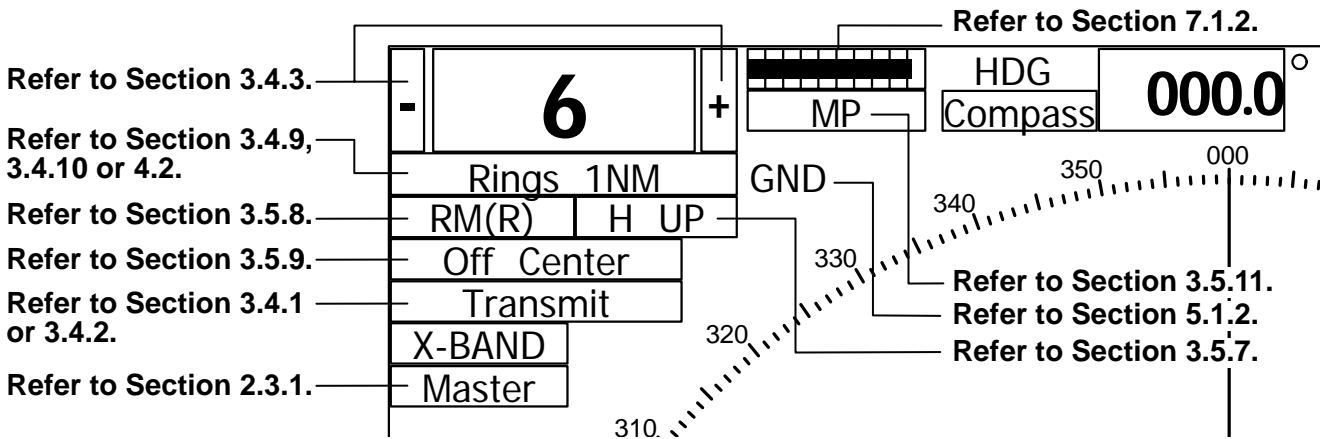
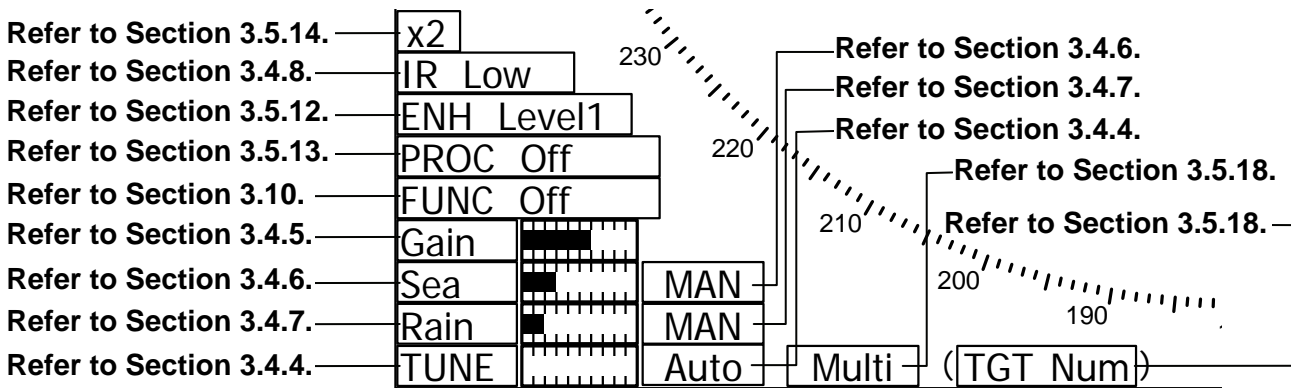


Figure 12 JMA-5200MK2 ON-screen Controls

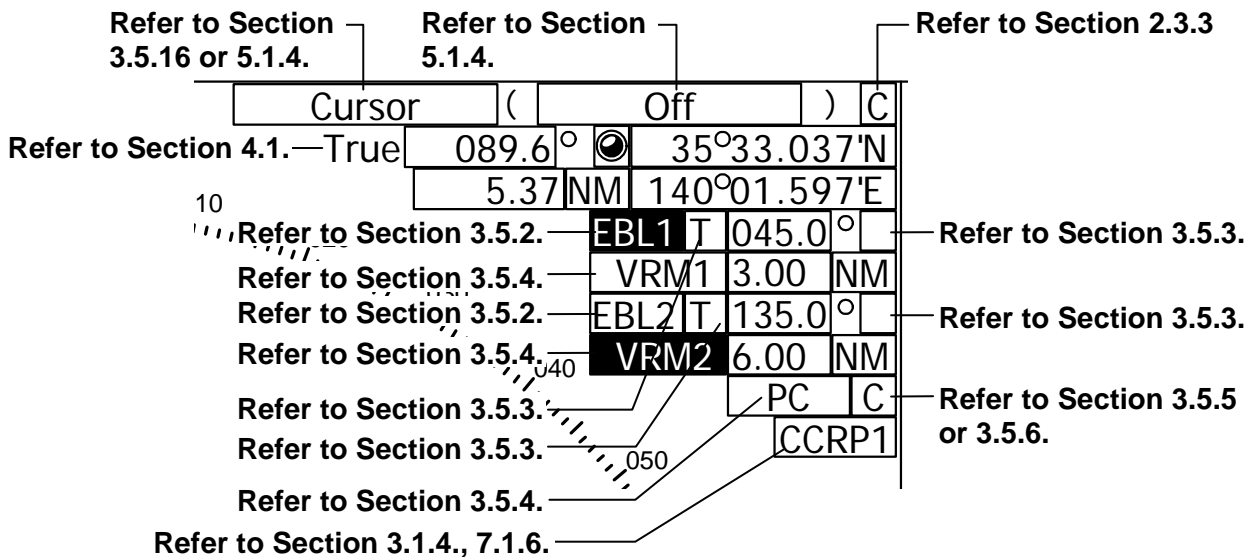
Area 1 (Top-left corner of the radar display)



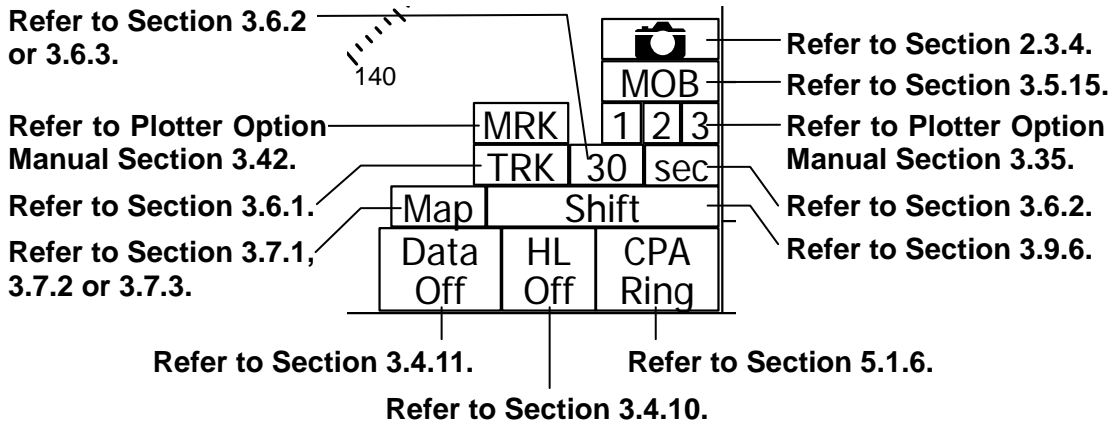
Area 2 (Bottom-left corner of the radar display)



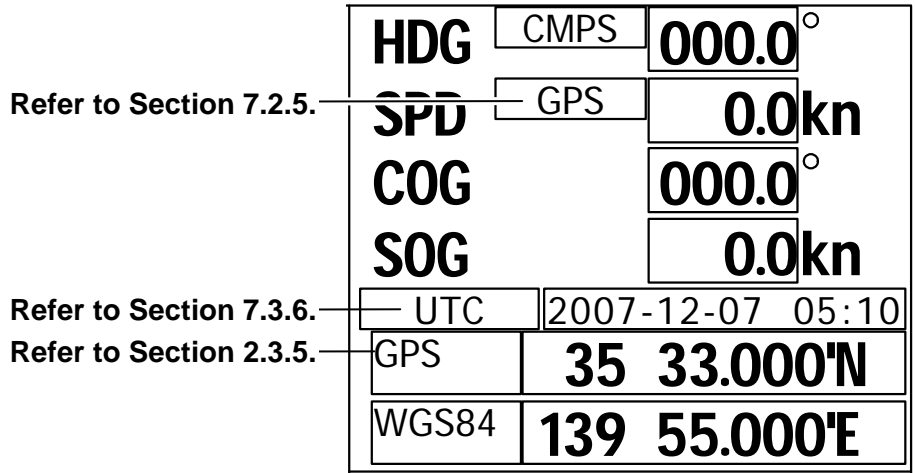
Area 3 (Top-right corner of the radar display)



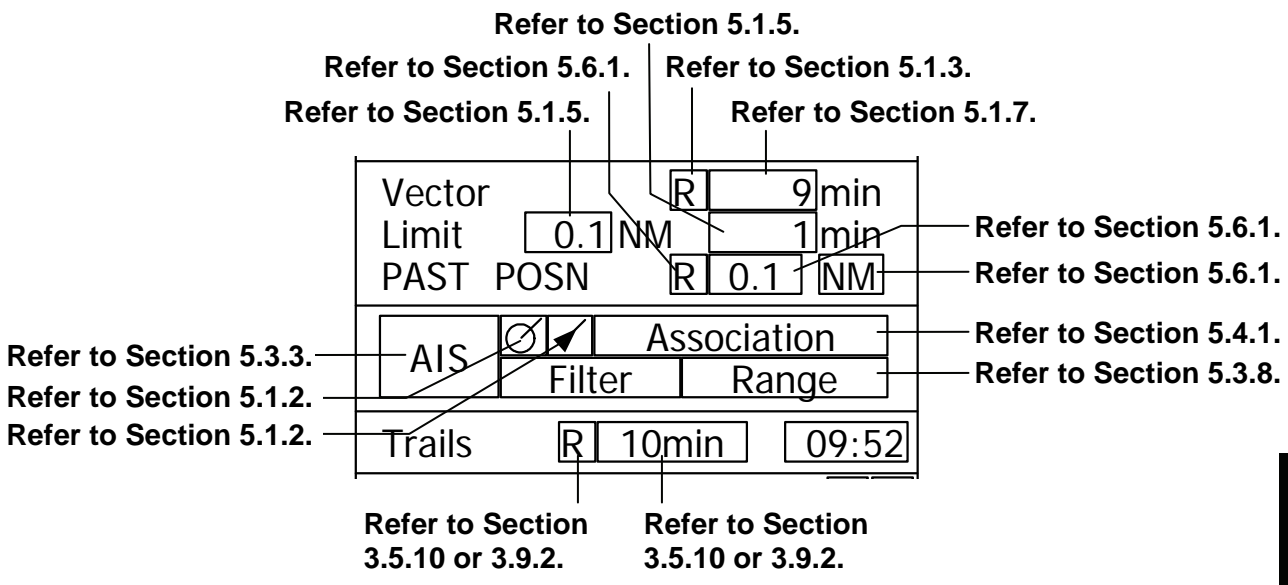
Area 4 (Bottom-right corner of the radar display)



Area 5 (Own ship's information)



Area 6 (Other ship's information)



Area 7 (Panel display)

AIS ID	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
DEST	<input type="text"/>			
ETA	<input type="text"/>			
POSN	<input type="text"/>			
EPFS	<input type="text"/>			
RAIM	<input type="text"/>			
POSN Accuracy	<input type="text"/>			

AIS ID	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
BRG	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Range	<input type="text"/>	<input type="text"/>	<input type="text"/>	NM
COG	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
SOG	<input type="text"/>	<input type="text"/>	<input type="text"/>	kn
CPA	<input type="text"/>	<input type="text"/>	<input type="text"/>	NM
TCPA	<input type="text"/>	<input type="text"/>	<input type="text"/>	min
HDG	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ROT	<input type="text"/>	<input type="text"/>	<input type="text"/>	°/min

AIS ID	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Name	<input type="text"/>			
Call SIGN	<input type="text"/>			
MMSI	<input type="text"/>			
IMO Number	<input type="text"/>			
NAV Status	<input type="text"/>			

AIS ID	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
AtoN Real/Virtual	<input type="text"/>			
AtoN Type	<input type="text"/>			

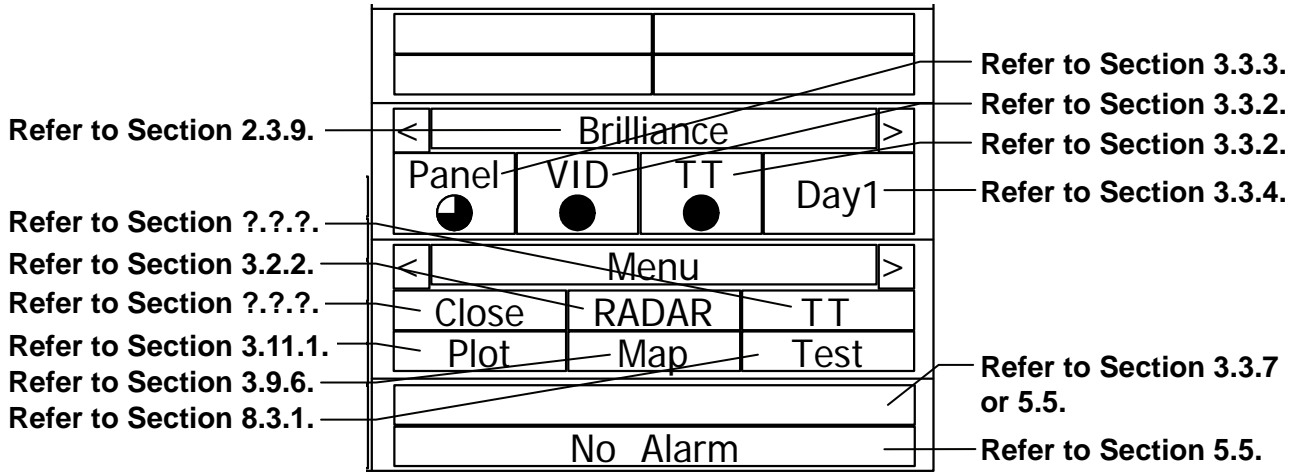
Refer to Section 5.3.6.

Refer to Section 5.2.3.

Area 7 (Panel display)

TT ID	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
BRG	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Range	<input type="text"/>	<input type="text"/>	<input type="text"/>	NM
Course	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Speed	<input type="text"/>	<input type="text"/>	<input type="text"/>	kn
CPA	<input type="text"/>	<input type="text"/>	<input type="text"/>	NM
TCPA	<input type="text"/>	<input type="text"/>	<input type="text"/>	min
BCR	<input type="text"/>	<input type="text"/>	<input type="text"/>	NM
BCT	<input type="text"/>	<input type="text"/>	<input type="text"/>	min
BCR	<input type="text"/>	<input type="text"/>	<input type="text"/>	NM
BCT	<input type="text"/>	<input type="text"/>	<input type="text"/>	min

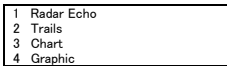
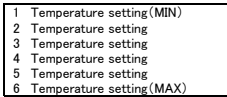
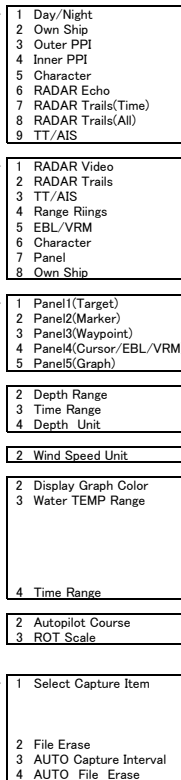
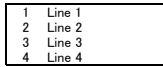
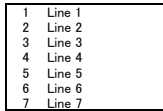
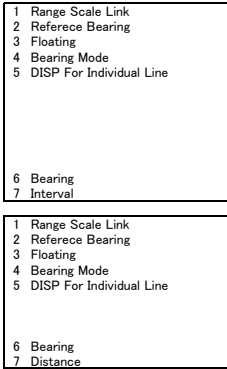
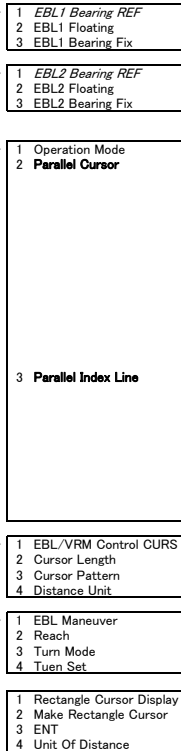
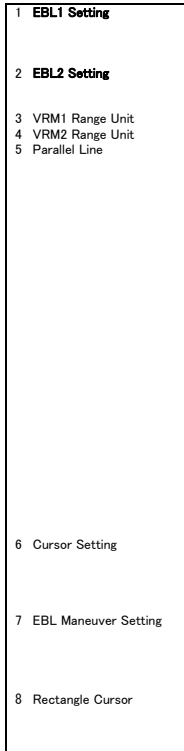
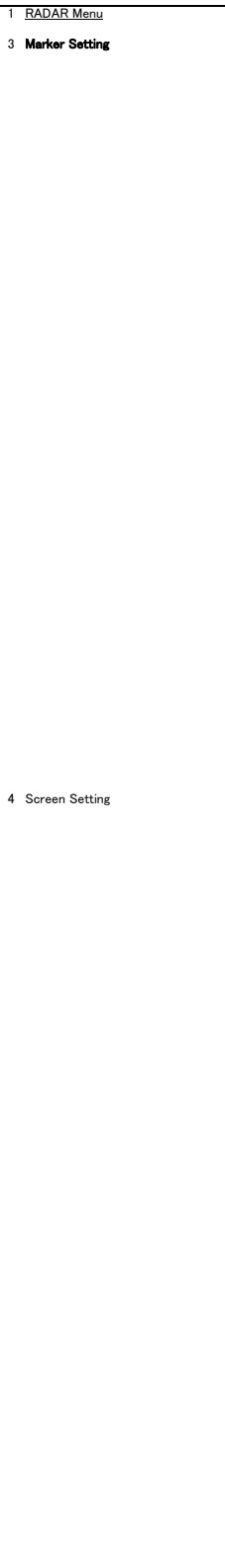
Area 8 (Operation/message)



JMA-5200MK2 Series Radar Menu Function List

- With Plotter
- With TT Unit
- With AIS Unit
- With TT or AIS Unit
- With TT and AIS Unit

Main Menu



5 TXRX Setting

- 1 PRF Fine Tuning
- 2 Stagger Trigger
- 4 PRF
- 5 Band Select
- 6 Inter Switch Setting
- 7 Pulse Length Pattern

1 Select TXRX

1 3NM
2 6nm
3 12NM

1 3NM
2 6NM
3 12NM

1 3NM

10kw

25kw

6kw

6 NAV Information

- 1 Waypoint Display
- 2 NAV Display Setting
- 3 User Map Setting
- 4 Geodetic

1 Line1
2 Line2
3 Line3
4 Mark1
5 Mark2
6 Mark3
7 Mark4

1 Own Ship Position
2 Load
3 Unload
4 Save

5 Erase

6 Edit User Map

7 Shift
8 Shift Clear

1 Device
2 Load User Map

1 Device
2 Save User Map
3 All Files to Card2

1 Device
2 Erase User Map

1 Clear Map Object

2 Make Map Object

3 Correct
4 Delete
5 Insert

1 Line1
2 Line2
3 Line3
4 Mark1
5 Mark2
6 Mark3
7 Mark4
8 All

1 Line1
2 Line2
3 Line3
4 Mark1
5 Mark2
6 Mark3
7 Mark4
8 Enter

7 NAV Equipment Setting

- 1 Set GYRO
- 2 Heading Equipment
- 3 Speed Equipment
- 4 Manual Speed
- 5 MAG Compass Setting
- 6 Set/Drift Setting
- 7 GPS Setting
- 8 Weather INFO Setting

1 Heading Correction
2 Correct Value

1 Correction
2 Set
3 Drift

1 GPS Process Setting

2 DGPS Setting

3 SBAS Setting

4 GPS Status

1 Position
2 Exclusion
3 Geodetic
4 Antenna Height
5 Fix Mode
6 DOP Level
7 Position Average
8 Master Reset
9 Send Data

1 Mode
2 Frequency
3 Baud Rate(BPS)
4 DGPS Mode
5 Send Data

1 Mode
2 Ranging
3 NG SBAS
4 SBAS Select Mode
5 SBAS No.
6 Send Data

1 Display Weather INFO
2 SEL Observation Place
3 RX Message Display
4 RX Buzzer

8 Graphic Display
9 Plot_Menu
0 EXIT

8 RADAR Sub Menu

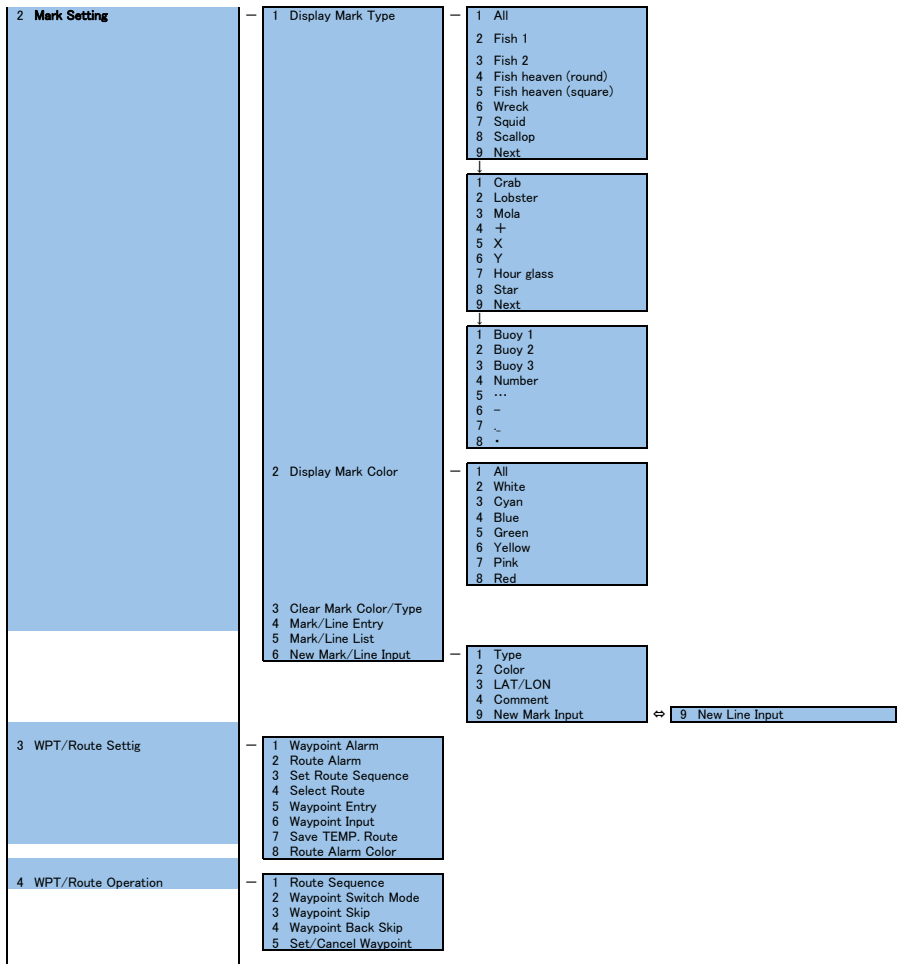
- 1 PIN Setting
 - 1 Load PIN Setting
 - 2 Save PIN Setting
 - 3 Delete PIN Setting
- 2 Multi Dial Setting
 - 1 Vector Length
 - 2 Trails Length
 - 3 TT TGT Display No.
 - 4 C-UP Angle
 - 5 Own Track Color
 - 6 Mark/Line Color
- 3 User Key Setting
 - 1 User Key1
 - 2 User Key2
- 4 Date/Time Setting
 - 1 UTC/LOCAL
 - 2 Local Date
 - 3 Local Time
 - 4 Time Zone
 - 5 Display Style
- 5 Buzzer Volume
- 6 Jog Dial Button Mode
 - 1 Left Jog Dial
 - 2 Right Jog Dial
- 9 Test Menu
 - 1 Self Test
 - 1 Memory Test
 - 1 SDRAM
 - 2 SRAM
 - 3 FLASH ROM
 - 4 GRPHIC
 - 2 TXRX Test
 - 1 SAFETY SWITCH
 - 2 AZI PULSE
 - 3 HL PULSE
 - 4 MH CURRENT
 - 5 TRIGGER
 - 6 VIDEO
 - 3 Line Test
 - TXRX
 - NSK
 - COMPASS
 - COM1
 - COM2
 - COM3
 - COM4
 - Plotter Key
 - 2 Monitor Test
 - 1 Pattern 1
 - 2 Pattern 2
 - 3 Pattern 3
 - 4 Pattern 4
 - 5 Pattern 5
 - 6 Pattern 6
 - 7 Pattern 7
 - 3 Keyboard Test
 - 1 Key Test
 - 2 Buzzer Test
 - 3 Light
 - 4 MON Display
 - 5 Alarm List/Log
 - 6 System Info

0 EXIT

Plot Menu

1 Own Track Setting

- 1 OWN Track Interval
- 2 DISP Own Track
 - 2 DISP Own Track Color
 - 1 All
 - 2 White
 - 3 Cyan
 - 4 Blue
 - 5 Green
 - 6 Yellow
 - 7 Pink
 - 8 Red
- 3 Clear Own Track
- 3 Clear Own Track Color
- 4 OWN Track Memory
- 5 Track Color
- 6 Track Memory
- 7 Num/Vector Display
- 9 Next
 - 1 Water Depth Setting
 - 1 Depth setting (MIN)
 - 2 Depth setting
 - 3 Depth setting
 - 4 Depth setting
 - 5 Depth setting
 - 6 Depth setting (MAX)
 - 2 Water TEMP. Setting
 - 1 Temperature setting
 - 2 Temperature setting
 - 3 Temperature setting
 - 4 Temperature setting
 - 5 Temperature setting
 - 6 Temperature setting
 - 3 Tideway Setting
 - 1 Tideway Size
 - 2 Layer A
 - 3 Layer B
 - 4 Layer C



5 Map Setting	1 Fill Land Area	1 Grid Display	
	2 C-MAP Setting	2 Sounding Display	
		3 Sounding Unit	
		4 Light Sectors Display	
		5 Light Sectors Level	
		6 Chart Boundary	
		7 Buoy&Beacon	
		8 Names	
		9 Next	
		1 Land Marks	
	2 River&Lake		
	3 Cultural		
	4 Bottom Type		
	5 Under Water		
	6		
	7 Depth Contour		
	3 JRC/ERC Setting	1 Day/Night	
		2 Color of Land	
		3 Bright of Land	
		4 Color of Sea	
		5 Bright of Sea	
		6 Color of Name	
		7 Bright of Name	
		8 Bright of Track/Mark/Line	
		9 Next	
		1 LAT/LON Line	
		2 Color of L/L Line	
		3 Bright of L/L Line	
		4 ERC Display Request	
		5 ERC Mark	
		6 JRC Card Display	1 Lighthouse
			2 Buoy
			3 Rough Line
			4 Other Line
		7 Copy JRC Chart to CF	
		8 Fishing Area Display	
	4 Contour Setting	1 10m	
		2 20m	
		3 30m	
		4 40m	
		5 50m	
		6 60m	
		7 70m	
		8 80m	
		9 Other	
	5 Map Display Setting	1 Shift Coast Line 1	
		2 Shift Coast Line 2	
		3 LAT/LON Correction	
		4 Map Center Position	
		5 LORAN C Correction	1 Chain
			2 TD1
			3 TD2
			4 TD1 Correction
			5 TD2 Correction
		6 LORAN A Correction	1 LOP1
			2 LOP2
			3 TD1 Correction
			4 TD2 Correction
		7 DECCA Correction	1 Chain
			2 LOP1
			3 LOP2
			4 LOP1 Correction
			5 LOP2 Correction
	6 Select JRC Chart File	1 Disp File Information	

		* Disp File Information	
	7 Map Draw AZI Mode		
	8 JRC Chart Draw Mode		
6 MEM CAPA/Copy	1 Copy Internal -> Card2		
	2 Copy Card2 -> Internal		
	3 Copy Card1->Card2		
	4 Clear File		
	5 Card2 Own Track Display		
	6 Card2 Mark Display		
	7 Show Card1		
	8 Show Card2		
7 CLR MEM/INIT Card	1 Clear Mark/Line Data		
	2 Clear WPT/Route Data		
	3 Format Card2		
8 Plot Setting	1 Scale/Couse Up Setup	1 Scale	
		2 Preset Scale	
		3 Course Up Data	1 Tolerance
			2 Averaging
			3 Round Speed
	2 Curosr/Number Display	1 Shape of Current Position	
		2 Current POS Blink	
		3 Unit of Speed	
		4 Unit of Distance	
		5 Current Position Display	
	6 Select Line		
	7 Select Mark Size		
	8 Select Cursor Mark		
	9 Next		
	1 Event Mark 1		
	2 Event Mark 2		
	3 Select WPT Mark Size		
	4 Cursor Vector DISP		
	5 Cursor Vector Length		
	6 Waypoint Vector		
	7 Status of Origin/DEST		
	9 Next		
	1 WPT Number Display		
	2 RTE Number Display		
	3 Scalebar Display		
	4 Numeric Mark		
	5 Comment Font Size		
0 EXIT	3 Basic	1 AUTO Backup	

TT Menu

- 1 TT Setting
- 2 AIS Setting
- 3 Target Setting
- 4 Target Track Setting
- 5 AZ Setting
- 6 TT Test Menu

- 1
- 2 TT Symbol Display
- 3 Target Number Display
- 4
- 5
- 6

- 1 AIS Function
- 2 AIS Symbol Display
- 3 AIS Received Message
- 4 Display Lost Target Data
- 5 Own Ship's AIS Data
- 6 AIS Filter Setting
- 7 Target Number Display
- 8 AIS Alarm Setting
- 9 Next

2 AIS Data DISP. Setting

- 1 Association Setting
- 2 Vector Time
- 3 Past Position
- 5 CPA Limit
- 6 TCPA Limit
- 7 CPA Ring

- 1 Track Function
- 2 Track Color

3 Track Display

- 4 Track Memory Interval
- 5 Clear Track Color
- 6 Clear Track Number
- 7 Card2 Track Display

1 AZ

- 2 RADAR Alarm
- 3 Set AZ Key

- 1 Test Video
- 2 TT Simulator
- 3 Status
- 4 Gate Display

- 1 Addressed Message
- 2 Broadcast Message

- 1 Filter Type
- 2 Make AIS Filter
- 3 Filter Display
- 4 ENT
- 5 Filter Mode

- 1 CPA/TCPA Alarm
- 2 Lost Alarm
- 3
- 4
- 5

- 1 Association
- 2 Priority
- 3 Bearing
- 4 Range
- 5 Course
- 6 Speed
- 7 Hysteresis
- 8 Non-hysteresis
- 9 Applicable AIS Target

- 1 All
- 2 Target Track No.1
- 3 Target Track No.2
- 4 Target Track No.3
- 5 Target Track No.4
- 6 Target Track No.5
- 7 Target Track No.6
- 8 Target Track No.7
- 9 Next

- 1 Target Track No.8
- 2 Target Track No.9
- 3 Target Track No.10
- 4 Target Track No.11
- 5 Target Track No.12
- 6 Target Track No.13
- 7 Target Track No.14
- 8 Target Track No.15
- 9 Next

- 1 Target Track No.16
- 2 Target Track No.17
- 3 Target Track No.18
- 4 Target Track No.19
- 5 Target Track No.20

- 1 All
- 2 Target Track No.1
- 3 Target Track No.2
- 4 Target Track No.3
- 5 Target Track No.4
- 6 Target Track No.5
- 7 Target Track No.6
- 8 Target Track No.7
- 9 Next

- 1 Target Track No.8
- 2 Target Track No.9
- 3 Target Track No.10
- 4 Target Track No.11
- 5 Target Track No.12
- 6 Target Track No.13
- 7 Target Track No.14
- 8 Target Track No.15
- 9 Next

- 1 Target Track No.16
- 2 Target Track No.17
- 3 Target Track No.18
- 4 Target Track No.19
- 5 Target Track No.20

- 1 AZ 1
- 2 AZ 2
- 3 Make AZ 1
- 4 Make AZ 2
- 5 ENT

- 1 Sector RADAR Alarm
- 3 Make Sector Alarm
- 5 RADAR Alarm Mode
- 6 Sensitivity Level

- 1 AZ Alarm
- 2 Sector RADAR Alarm

- 1 Sector Alarm 1
- 2 Sector Alarm 2

- 1 Sector Alarm 1
- 2 Sector Alarm 2
- 3 ENT

- 1 AZ Alarm 1
- 2 AZ Alarm 2

- 1 Sector Alarm 1
- 2 Sector Alarm 2

TT Individual Setting - 1 Name
 2 Track Color
 3 Association Priority
 4 Reference Target

Adjust Menu

1 Equipment Setup
 2 Maintenance Menu
 3 AIS
 4 TXRX Setting

1 Bearing Adjustment
 2 Range Adjustment
 3 Tune Adjustment
 8 INSTALLATION
 9 Language

1 DATE
 2 NAME
 3 COMPANY

1 Safty Switch
 2 Partial Master Reset
 3 All Master Reset
 4 Internal To Card2
 5 Card2 To Internal
 6 TXRX TIME CLR
 7 String Data Update

1 TOTAL TIME CLR
 2 TX TIME CLR
 3 MOTOR TIME CLR
 4 TXRX to Display Unit
 5 Display Unit to TXRX

1 AIS Processor
 2 Max Target
 3 Receive AIS Messages

1 Message 1
 2 Message 2
 3 Message 3
 4 Message 4
 5 Message 5
 6 Message 6
 7 Message 7
 8 Message 8
 9 Next

1 Message 9
 2 Message 10
 3 Message 11
 4 Message 12
 5 Message 13
 6 Message 14
 7 Message 15
 8 Message 16
 9 Next

1 Message 17
 2 Message 18
 3 Message 19
 4 Message 20
 5 Message 21
 6 Message 22
 7 Message 23
 8 Message 24
 9 Next

1 Message 25
 2 Message 26
 3 Message 27
 4 Message 28
 5 Message 29
 6 Message 30
 7 Message 31

1 Antenna Height
 2 Tune Peak Adjustment
 3 Tune Indicator
 4 MON
 5 Manual Tune Adjustment
 6 Sector Blank
 7 Output Pulse
 8 INTER SWITCH
 9 TNI Blank

1 MON INSTALL
 2 MON Adjustment
 3 MON Indicator

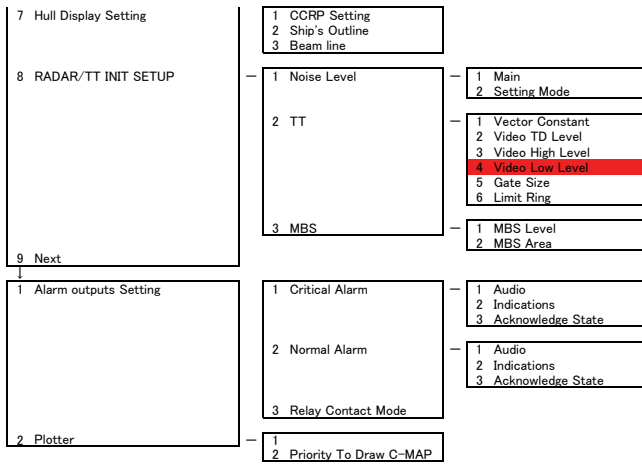
1 Sector1
 2 Sector2
 3 Sector3
 4 Make Sector1
 5 Make Sector2
 6 Make Sector3

1 ISW INSTALL
 3 S-ISW TXRX Power

1 TNI Blank
 2 Make Sector

5 COM Port Setting

5 COM Port Setting	1 Baud Rate	<ul style="list-style-type: none"> 1 COM1(GPS) 2 COM2(PC) 3 COM3(NAV1) 4 COM4(NAV2) 5 COM5(COMPASS) 	
	2 RX Sentence	1 GPS(LL/COG/SOG)	<ul style="list-style-type: none"> 1 GGA 2 RMC 3 RMA 4 GNS 5 GLL 6 VTG
		2 GPS(WPT)	<ul style="list-style-type: none"> 1 RMB 2 BWC 3 BWR
		3 Depth	<ul style="list-style-type: none"> 1 DPT 2 DBK 3 DBT 4 DBS
		4 Wind	<ul style="list-style-type: none"> 1 MWV 2 MWD
		5 Current	<ul style="list-style-type: none"> 1 Data Set Number 2 Layer A 3 Layer B 4 Layer C
	3 TX Port	<ul style="list-style-type: none"> 1 TTM(TT Target) 2 TLL(TT Target) 3 TTD(TT Target) 4 TLB(TT Target) 5 TTM(AIS Target) 6 TLL(AIS Target) 7 TTD(AIS Target) 8 TLB(AIS Target) 9 Next 	
		<ul style="list-style-type: none"> 3 OSD 4 RSD 5 ALR 6 ACK 9 Next 	
		<ul style="list-style-type: none"> 1 Remote Maintenance 2 NMEA0183 Output Format 3 NMEA0183 Talker 4 NMEA0183 TX Interval 5 APB 6 BOD 7 GGA 8 GLL 9 Next 	
		<ul style="list-style-type: none"> 1 RMC 2 RMB 3 VTG 4 XTE 5 BWC 6 HDT 7 THS 	
4 RX Port		<ul style="list-style-type: none"> 1 GPS 2 DLOG 3 Depth 4 Temperature 5 Wind 6 Current 7 Rate of Turn 8 Rudder 	
7 LINE MONITOR	<ul style="list-style-type: none"> 1 COM1(GPS) 2 COM2(PC) 3 COM3(NAV1) 4 COM4(NAV2) 5 COM5(NSK) 6 COM6(TXRX) 7 COM7(Keyboard1) 8 COM8(Keyboard2) 		
6 NAV Equipment Setting	1 Set GYRO		
	2 Heading Equipment		
	3 Speed Equipment		
	4 Manual Speed		
	5 MAG Compass Setting	<ul style="list-style-type: none"> 1 Heading Correction 2 Correct Value 	
	6 Set/Drift Setting	<ul style="list-style-type: none"> 1 Correction 2 Set 3 Drift 	
	7 GPS Setting	1 GPS Process Setting	<ul style="list-style-type: none"> 1 Position 2 Exclusion 3 Geodetic 4 Antenna Height 5 Fix Mode 6 DOP Level 7 Position Average 8 Master Reset 9 Send Data
		2 DGPS Setting	<ul style="list-style-type: none"> 1 Mode 2 Frequency 3 Baud Rate(BPS) 4 DGPS Mode 5 Send Data
3 SBAS Setting		<ul style="list-style-type: none"> 1 Mode 2 Ranging 3 NG SBAS 4 SBAS Select Mode 5 SBAS No. 6 Send Data 	
4 GPS Status			
8 Weather INFO Setting	<ul style="list-style-type: none"> 1 Display Weather INFO 2 SEL_Observation Place 3 RX Message Display 4 RX Buzzer 		



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CODE No.7ZPRD0703

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