

**JMR-7230-S3/S**  
**JMR-7225-7X3/9X3/6X/9X/6XH**  
**JMR-7210-6X/6XH**  
**JMR-7272-S**  
**JMR-7282-S/SH**  
**JMR-7296-6X/9X**  
**JMR-9230-S3/S**  
**JMR-9225-7X3/9X3/6X/9X/6XH**  
**JMR-9210-6X/6XH**  
**JMR-9272-S**  
**JMR-9282-S/SH**  
**JMR-9296-6X/9X**

## Marine Radar Equipment

## Instruction Manual

<Reference>



*Japan Radio Co., Ltd.*

|   |       |
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## Section 19    Adjusting and Setting up Equipment (for Services)

---

This section describes the methods for radar adjustment, installation verification, and maintenance that are conducted by the service staff by using the Service menu at installation construction of this equipment.

|  |  |
|--|--|
|  <b>CAUTION</b> |  |
|                 | Never have the equipment adjusted by unauthorized service personnel.<br>If the equipment is set up incorrectly, it may cause unstable operation.<br>Further, an accident or trouble may occur. |
|                 | Never make adjustments while sailing.<br>Doing so may adversely affect the radar functions, causing accidents and/or malfunctions.   |

### 19.1    Service Menu

The Service menu consists of three submenus of Adjustment, Installation and Maintenance. To display the Service menu, a password is required.

#### 19.1.1    To display the Service menu:

- 1**    Click on the [MENU] button on the left toolbar.  
The menu is displayed.

- 2 Change over to the second page using the page switching button, and click the [Code Input] button.

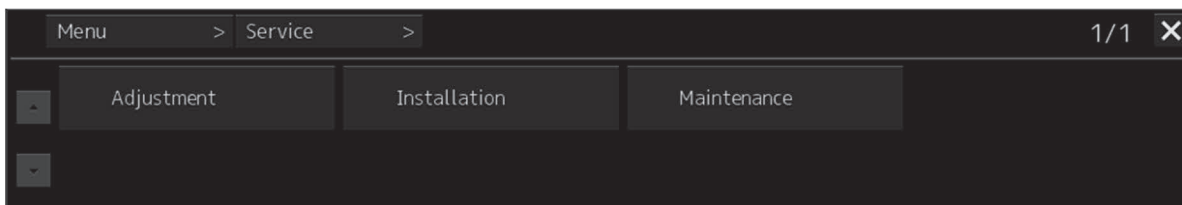
The password input dialog is displayed.



- 3 Enter 0 in Password.
- 4 Click on the [MENU] button on the left toolbar.  
The menu is displayed.
- 5 Change to the 2nd page by using the page change button.  
The [Service] button is added



- 6 Click the [Service] button.  
The submenu is displayed.



- 7 Display a submenu dialog box by clicking on one of the [Adjustment], [Installation], and [Maintenance] buttons.

---

## 19.2 Radar Adjustment

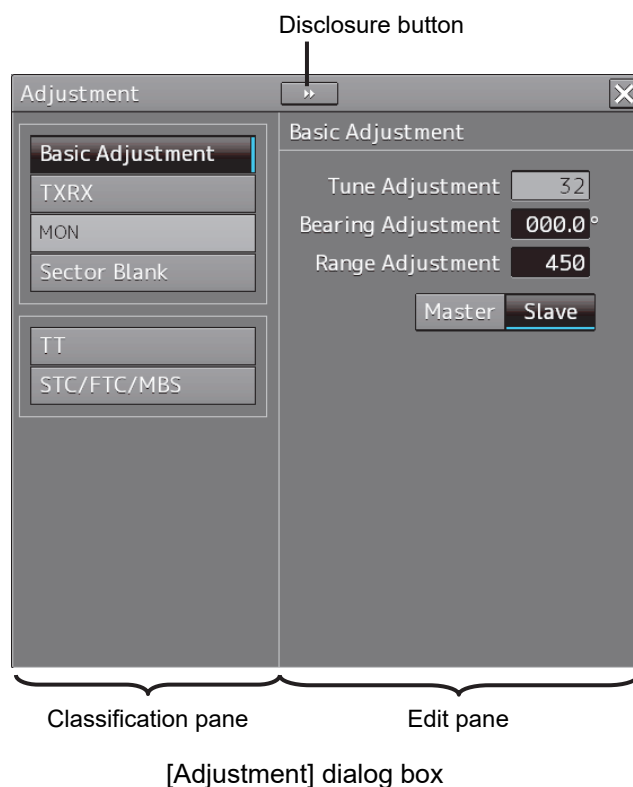
Use the [Adjustment] dialog box to adjust the radar of this equipment.

### 19.2.1 Displaying the [Adjustment] dialog box

Clicking the [Adjustment] button in the submenu displays the [Adjustment] dialog box.

The [Adjustment] dialog box consists of the classification pane and the edit pane.

By clicking the Disclosure button (>>) , you can hide the edit pane. To show the edit pane again, click the Disclosure button (<<).



#### 1 Click the item you want to set up in the classification pane.

The setup dialog of the item you selected appears in the edit pane.

#### 2 Set up in the edit pane.

#### Note

On the ECDIS screen, [Performance Monitor] and [TT] do not function. Alternatively, the setting of [Sector Blank] cannot be changed.

---

## 19.2.2 Performing basic adjustments on the radar

Perform basic adjustments on the radar by using the [Basic Adjustment] dialog.

### 19.2.2.1 Displaying the "Basic Adjustment" dialog

When you select [Basic Adjustment] in the classification pane, the [Basic Adjustment] dialog is displayed in the edit pane.



---

## 19.2.2.2 Tune adjustment

### Note

- After replacement of the magnetron, perform rough tuning while the image is stable after setting the radar to the Standby state for 20 to 30 minutes as the preheating time, operating the radar from the short pulse range, and shifting the operation to the long pulse range sequentially.
- This operation is disabled when the Radar Interswitch is set to the Slave mode.
- Not displayed when the solid-state radar antenna is connected.

### 1 Click on the [Tune Adjustment] (rough tuning) input box.

A numeric value input keyboard is displayed. (0 to 127)

### 2 Enter an adjustment value (0 to 127) in the input box so that the tuning bar indicates the maximum level (the tuning bar touches the right-most position).

For the method of using the numeric input keyboard, refer to "3.16.2 Name and function of each section of the keyboard".

## 19.2.2.3 Adjusting the bearing

Adjust the bearing so that the bearing of the target measured by the compass on the ship and the bearing of the image that is displayed on the radar match.

### Note

This function is disabled when the radar interswitch is set to the Slave mode.

### 1 Set the bearing mode to [H UP] and set the image processing mode to [Process Off].

For the bearing mode setting method, refer to "5.4.5 Setting the azimuth mode" and for the image processing mode setting method, refer to "5.4.4 Using video processing (Echo Process)".

### 2 Measure a bearing in the ship's heading direction of a suitable target (for instance, halted ship, breakwater, and buoy) by using the compass on the ship.

### 3 Click on the [Bearing Adjustment] input box.

A numeric value input keyboard is displayed.

### 4 Input an adjustment value in the input box so that the bearing of the target that was measured in Step 2 indicates a correct bearing. (0 to 359.9°)

For the method of using the numeric input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".

---

#### 19.2.2.4 Adjusting a distance

Adjust the distance of the target on the screen so that the correct distance is displayed.

- 1 On the radar screen, specify a target whose distance is available in advance.**
- 2 Click on the [Range Adjustment] input box.**  
A numeric value input keyboard is displayed.
- 3 Enter an adjustment value in the input box so that the distance of the target specified in Step 1 indicates the correct distance. (128 to 1024)**  
For the method of using the numeric input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".

#### 19.2.2.5 Radar operation modes

Click one of the radar operation mode buttons to select either the [Master] mode or the [Slave] mode.

**[Master]:**

Can control the radar antenna.

**[Slave]:**

Cannot control the radar antenna. The display unit uses the radar signals controlled by the master radar antenna.

**Note**

While in the Slave mode, the operation to control the radar antenna is disabled.

---

## 19.2.3 Adjusting Antenna

Adjust the antenna by using the [TXRX] dialog.

### 19.2.3.1 Displaying the [TXRX] dialog

When you select [TXRX] in the classification pane, the [TXRX] dialog is displayed in the edit pane.



### 19.2.3.2 Adjusting an radar antenna height

- 1** Measure the height from the sea surface to the radar antenna.
- 2** In the [Antenna height] combo box, select the setting value corresponding to the height of the antenna that was measured in step 1.
  - Under 5m
  - 5-10m
  - 10-20m
  - 20m Over

---

### 19.2.3.3 Setting a tuning bar peak value

Set the scale when the tuning bar touches the peak value.

#### Notes

- This function is disabled under radar slave mode.
- Not displayed when a solid-state radar antenna is connected.
- Disabled in ECDIS mode.

**1 Set the range to 48 NM or more.**

**2 Click on the [Tune Indicator] (tune indicator bar display) input box.**

A numeric value input keyboard is displayed.

**3 Input a setting value in the input box so that the tuning bar oscillates within the range from 80% to 90% of the maximum amplitude position (0 to 127).**

For the method of using the numeric input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".

### 19.2.3.4 Adjusting a tuning peak value

Adjust a tuning indication and an echo peak.

#### Notes

- Disabled in radar slave mode.
- Displayed under 10kW radar (NKE-2103-6, NKE-2103-6HS) only.

**1 Adjust the tuning indication bar as described in "19.2.3.3 Setting a tuning bar peak value".**

**2 Set the range to 48nm or more.**

**3 Click the [Tune Peak Adjustment] input box.**

A numerical value input keyboard is displayed.

**4 Adjust the tuning peak adjustment value so that the radar image becomes strongest when the tuning indication at the top left corner of the screen points to the maximum.**

For the method of using the numerical value input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".

### 19.2.3.5 Setting bearing pulse output

#### Notes

Disabled in ECDIS mode.

**1 From the [Output BP] (bearing pulse output) combo box, select a bearing pulse count that is output from the radar antenna (2048 or 4096).**



---

## 19.2.4 Adjusting a radar performance monitor (Radar screen only)

To adjust a radar transmitting/receiving status, use the [Performance Monitor] dialog or the [Performance Monitor (SSR)] dialog.

### 19.2.4.1 Displaying the [Performance Monitor]/[Performance Monitor (SSR)] dialog

When you select [MON] in the classification pane, the [Performance Monitor] dialog (using a magnetron radar) or the [Performance Monitor (SSR)] dialog (using a solid-state radar) is displayed in the edit pane. The items to be displayed change according to the type of the radar antenna.

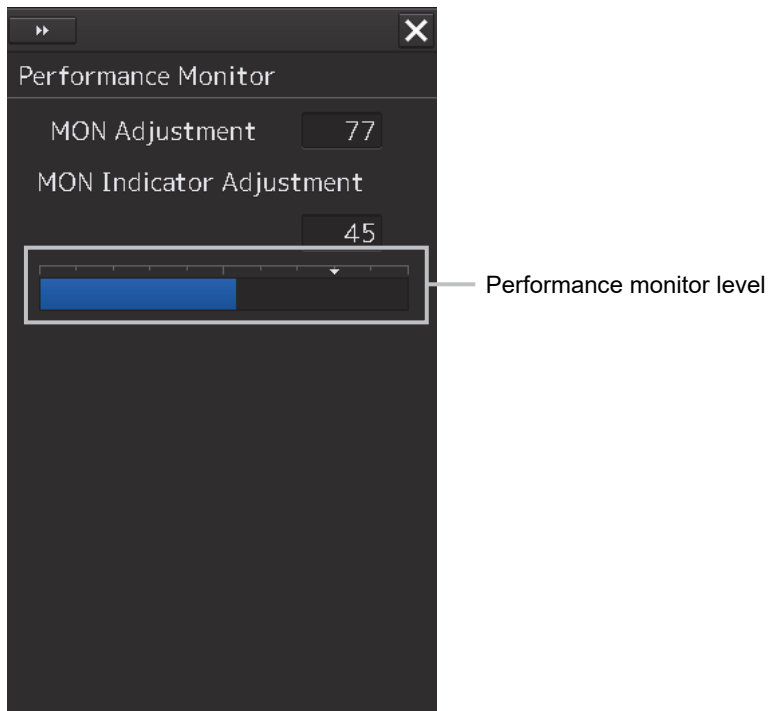
#### Note

- When the radar is in the Slave mode, the [Performance Monitor] dialog (or [Performance Monitor (SSR)] dialog is disabled.
- If a master unit other than straight connection is being set in interswitch setting, the "Performance Monitor" screen (or "Performance Monitor (SSR) " screen) is disabled (may also be enabled depending on the equipment setting.).
- When the [Performance Monitor] dialog is displayed, the sector blank in the PPI screen is hidden. When the solid state radar antenna is connected, the PM sector is displayed; in the case of the magnetron radar, the sector is not displayed.
- While adjusting the performance monitor, TGT acquisition is not canceled by the target tracking function.

If a TGT symbol is displayed inside a pattern of the performance monitor and adjusting is difficult, cancel TGT acquisition once.

## 19.2.4.2 Adjusting a magnetron radar performance monitor

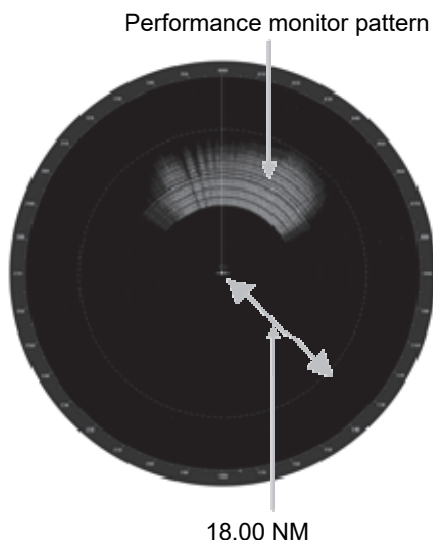
On the [Performance Monitor] dialog, adjust a magnetron radar transmitting/receiving status while checking the performance monitor level.



### Adjusting a monitor reception level

Adjust the circuit for monitoring the radar equipment reception performance.

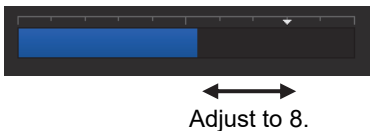
- 1 Click on the [MON Adjustment] (MON reception level adjustment) input box.**  
A numeric value input keyboard is displayed.
- 2 Enter a setting value in the input box so that the farthest position of the performance monitor pattern becomes 18.00 NM. (0 to 127)**  
For the method of using the numeric input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".



## Adjusting a monitor transmission level

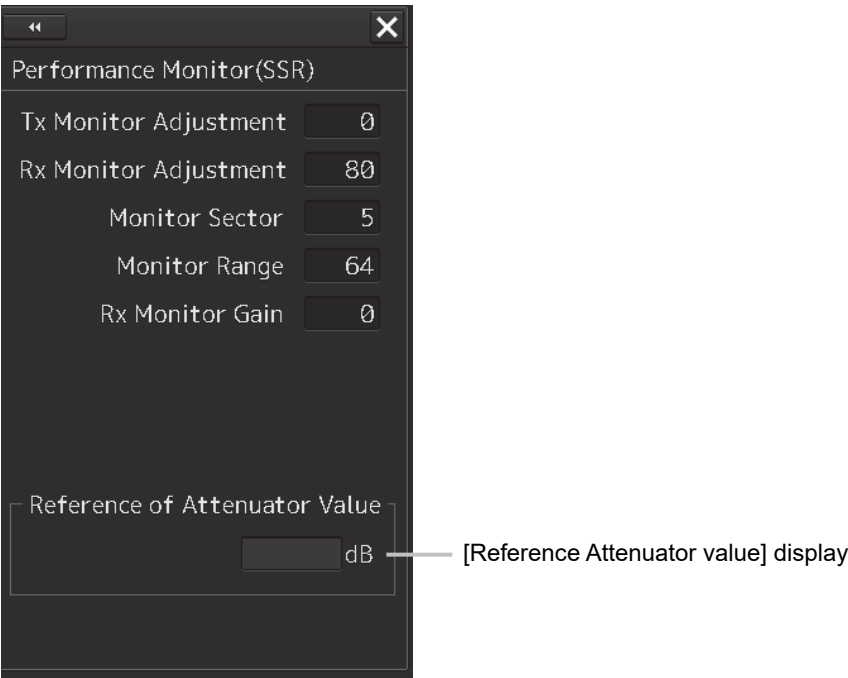
Adjust the circuit for monitoring the radar equipment transmission performance.

- 1 Click on the [MON Indicator Adjustment] input box.**  
A numeric value input keyboard is displayed.
- 2 Enter a setting value so that the MON level indicates "8" (0 to 127).**  
For the method of using the numeric input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".



### 19.2.4.3 Adjusting a performance monitor of a Solid State Radar (SSR)

Use the [Performance Monitor (SSR)] dialog.



---

The type of transmission/reception attenuator value that is used as the reference for the adjustment at the setting change varies depending on the setting item.

| Setting               | Display                           |
|-----------------------|-----------------------------------|
| Tx Monitor Adjustment | Tx Attenuator Value is displayed. |
| Rx Monitor Adjustment | Rx Attenuator Value is displayed. |
| Monitor Sector        | Rx Attenuator Value is displayed. |
| Monitor Range         | Rx Attenuator Value is displayed. |
| Rx Monitor Gain       | Rx Attenuator Value is displayed. |

Perform the following adjustments by using the transmission/reception attenuator value as the reference in the [Performance Monitor (SSR)] dialog.

**Note**

Do not change the values set in the [Monitor Range] input box and the [RX Monitor Gain] (reception monitor gain) input box.

## Adjusting a monitor transmission level

Adjust the circuit for monitoring the radar equipment transmission performance.

- 1 Click on the [TX Monitor Adjustment] (transmission monitor adjustment) input box.**  
A numeric value input keyboard is displayed.
- 2 Enter a setting value in the input box so that "0.0±1.0dB" is indicated as the [Reference Attenuator Value]. (0 to 127)**  
For the method of using the numeric input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".

## Adjusting a monitor reception level

Adjust the circuit for monitoring the radar equipment reception performance.

- 1 Click on the [Monitor Sector] input box.**  
A numeric value input keyboard is displayed.
- 2 Input a setting value in the input box so that the maximum value is indicated as the [Reference of Attenuator Value].**  
For the method of using the numeric input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".
- 3 Click on the [RX Monitor Adjustment] (reception monitor adjustment) input box.**  
A numeric value input keyboard is displayed.
- 4 Enter a setting value so that "0.0±1.0dB" is indicated as the [Reference of Attenuator Value] (0 to 127).**  
For the method of using the numeric input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".

---

## 19.2.5 Setting Sector Blank (Radar screen only)

The sector blank is an area that has been set up by specifying a fan-shaped range (sector) , stopping the transmission in that bearing, and hiding radar echoes. The sector blank runs in the relative bearing using the ship's heading as reference.

Three types of sectors can be set up (sector blanks 1/2/3).

Set sector blank by using the [Sector Blank] dialog.

### 19.2.5.1 Displaying the [Sector Blank] dialog

When you select [Sector Blank] in the classification pane, the [Sector Blank] dialog is displayed in the edit pane.



### 19.2.5.2 Setting Sector Blank

#### Note

This function is disabled under the Slave mode of the interswitch.

- 1 Select sector blank to be set by checking [Use Sector1/2/3] (using sector blank 1/2/3).**
- 2 Click on the [Make Sector1/2/3] (creating sector blank 1/2/3) button that corresponds to the sector blank number that was selected in Step 1.**  
The cursor is set to the sector blank 1/2/3 creation mode.
- 3 Draw sector blank with the cursor.**

The following information items are displayed regarding the sector blank that is being created.

**Start Angle:** Sector blank starting angle

**End Angle:** Sector blank ending angle

---

## 19.2.6 Adjusting the TT function

Adjust the following TT function parameters by using the [TT] dialog.

- Vector constant
- Quantization level
- Target symbol display position
- Gate size used for tracking
- TT limit ring

### What is quantization level?

A quantization level is a signal level that is recognized by the TT function as a target.

By setting a lower value, input of signals of weak targets in the TT target detection circuit is enabled. However, many unnecessary signals are also input, destabilizing acquisition and tracking of targets due to unnecessary signals. It is important to set a value greater than the value for detecting unnecessary signals by 4 or 5.

## CAUTION




Do not change the quantization level settings indiscreetly.

If inappropriate values are set, the acquisition of the target tracking function and the tracking function will deteriorate, possibly causing accidents.

### 19.2.6.1 Displaying the [TT] dialog

When [TT] is selected in the classification pane, the [TT] dialog is displayed in the edit pane.



TT

Vector Constant 4

VD Level Mode(Manual) Auto Threshold1 ▾

VD Level(Manual) 8

VD Level(Auto) 15

Target Position Center ▾

Gate Size Medium ▾

☐ Limit Ring

---

### 19.2.6.2 Setting vector constants

Adjust the vector tracking of the target tracking function.

#### Note

Do not change this setting unnecessarily. Normally, set 4 for [Vector Constant].

### 19.2.6.3 Setting a quantization level at manual acquisition

## CAUTION



The optimum values are set for the VD Level and Constant. Do not change it carelessly. Otherwise, the performances of the target tracking function may be affected and an accident may result.

- 1 Select a threshold value of a quantization mode at manual acquisition from the [VD Level Mode (Manual) ] (quantization mode at manual acquisition) combo box.**
  - Auto Threshold1
  - Auto Threshold2
  - Manual Threshold

### 19.2.6.4 Setting a quantization level at automatic acquisition.

## CAUTION



The optimum values are set for the VD Level and Constant. Do not change it carelessly. Otherwise, the performances of the target tracking function may be affected and an accident may result.

- 1 Click on the [VD Level (Auto) ] (quantization level at automatic acquisition) input box.**

A numeric value input keyboard is displayed.
- 2 Enter a setting value in the input box. (0 to 255)**

For the method of using the numeric input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".

---

### 19.2.6.5 Setting a gate size used for tracking

- 1 Select a gate size from the [Gate Size] combo box.
  - Small
  - Medium
  - Large

### 19.2.6.6 Displaying a TT limit ring

- 1 To display a TT limit ring, select the [Limit Ring] check box.

## 19.2.7 Adjusting MBS

MBS (Main Bang Suppression) adjustment is to adjust a display unit processing circuit in order to suppress main bang, which is the reflection signal from a microwave transmission circuit of a waveguide that normally appears as an image of a circle at the center of the radar screen.

Perform MBS adjustment by using the [MBS] dialog.

### WARNING



Do not change Initial Level/Area Offset indiscreetly.

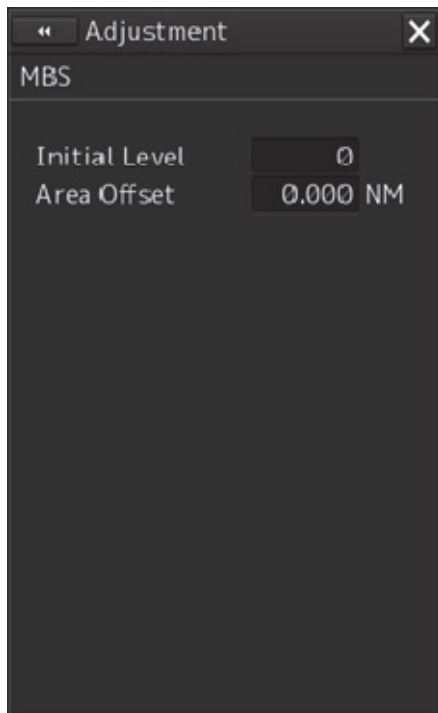
If wrong adjustment is performed, the nearest target will be erased, causing collision to lead to death or serious injury.



---

### 19.2.7.1 Displaying the [MBS] dialog

When you select [MBS] in the classification pane, the [MBS] dialog is displayed in the edit pane.



### 19.2.7.2 Performing MBS adjustment

- 1 Click on the [Initial Level] (MBS initial level) input box.**  
A numeric value input keyboard is displayed.
- 2 Enter an initial level of MBS so that the image of main bang becomes optimum (faint image remains on the screen). (0 to 1023)**  
For the method of using the numeric input keyboard, refer to "3.17.2 Names and functions of the sections of the keyboard".

### 19.2.7.3 Adjusting a MBS application range

- 1 Expand the display range up to the range where a main bang can be identified.**
- 2 Click the [Area Offset] (MBS application) input box.**  
A numerical value input keyboard is displayed.
- 3 Adjust the application range so that the main bang adjustment range becomes the optimum (distance where only the main bang section becomes the MBS adjustment range) (-0.200NM ~ 0.200NM).**  
Adjust the range together with the MBS adjustment to the degree where the nearest target will not be lost.  
For the method of using the numerical value input keyboard, refer to "3.17.2 Name and function of each section of the keyboard".

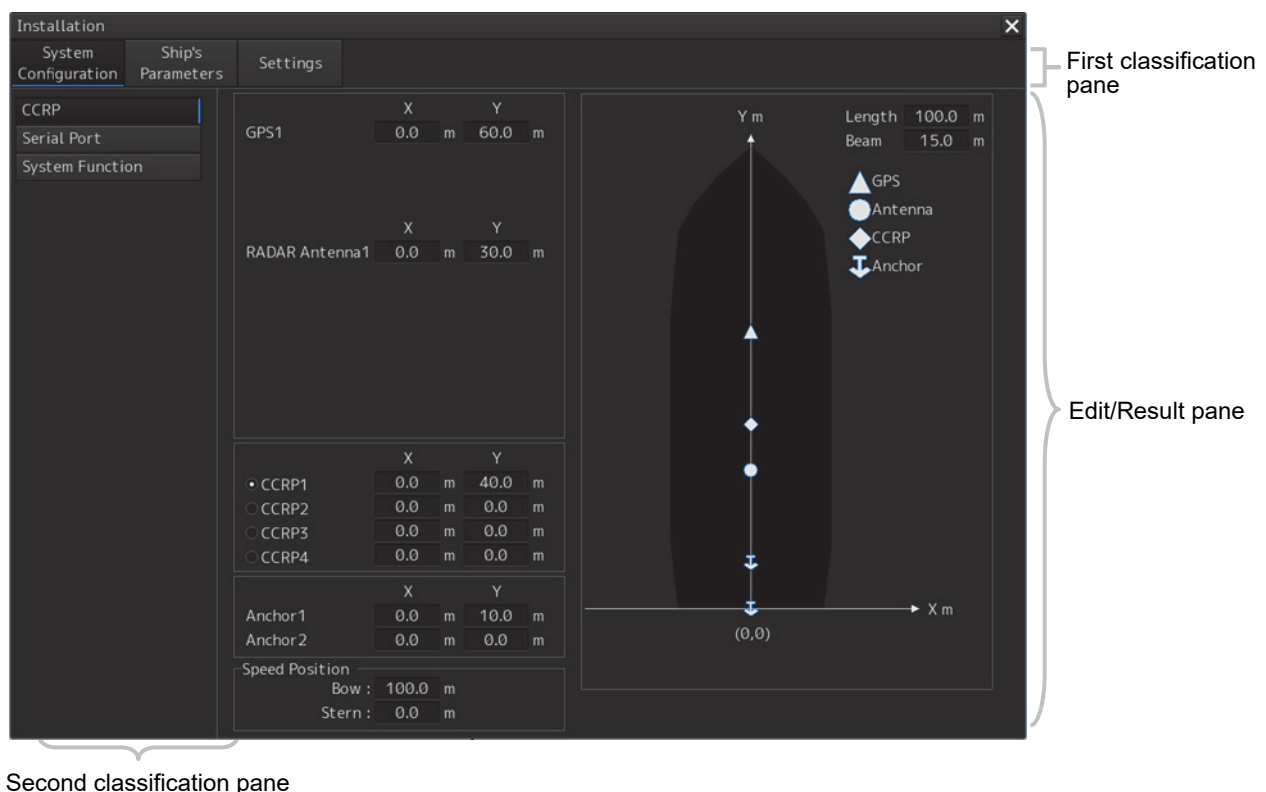
## 19.3 Verifying Installation and Initial Setting

Use the [Installation] dialog box to verify the installation of this equipment and perform initial setting.

### 19.3.1 Displaying the [Installation] dialog box

Clicking on the [Installation] in the submenu, the [Installation] dialog box appears.

The [Installation] dialog box consists of the classification pane and the edit/result pane. The classification pane consists of two-level layers of the first classification pane and the second classification pane.



#### 1 Click the item you want to set up in the classification pane.

The setup dialog of the item you selected is displayed in the edit/result pane.

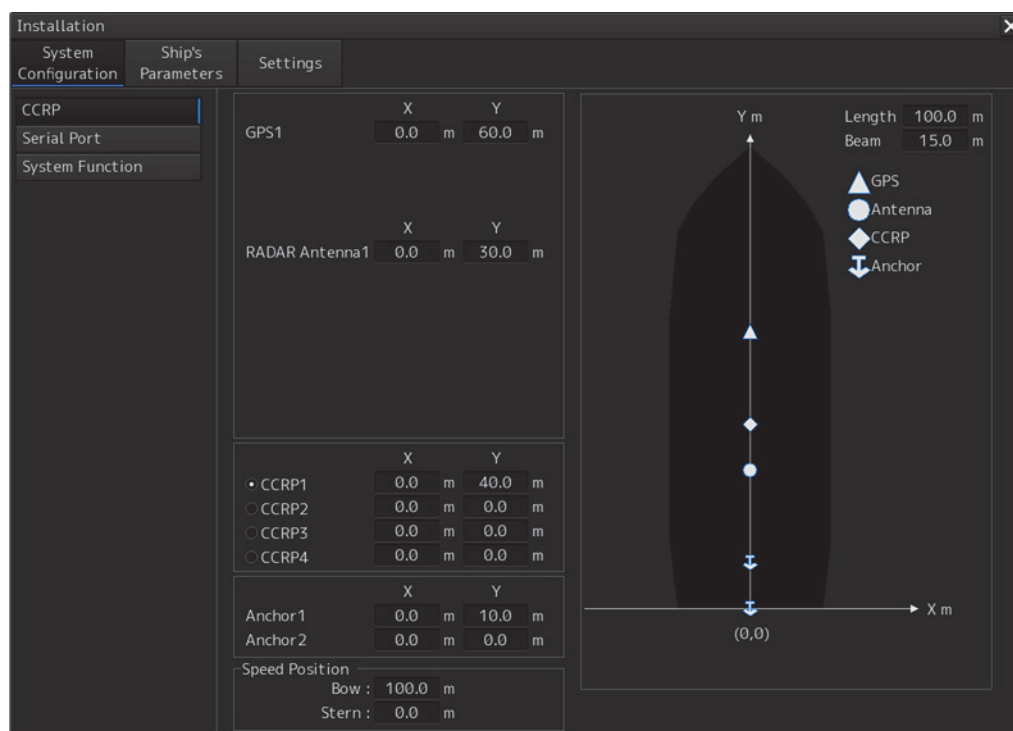
#### 2 Set up in the edit/result pane or check the setup result.

## 19.3.2 Verifying/Setting CCRP (Consistent Common Reference Point)

Set a measurement reference position (CCRP) on own ship by using the "CCRP" dialog.

### 19.3.2.1 Displaying the [CCRP] dialog

When you select [System Configuration] in the first classification pane and [CCRP] in the second classification pane, the [CCRP] dialog is displayed in the edit/result pane.



#### Note

Set up the GPS radar antenna correctly. The latitude and longitude data received from the GPS is compensated and then displayed as own ship's latitude and longitude. If the GPS radar antenna is not set up correctly, an AIS symbol and a radar echo may deviate when displayed.

## 19.3.2.2 Setting CCRP

Set the following items in the [CCRP] dialog.

| Setting Item   | Description of Setting   | Setting Value  |
|--|--|--|
| Length (of ship)   | Enter the ship's length in the box.  | 1.0 to 1022.0m   |
| Beam (ship's width)  | Enter the ship's width in the box.   | 1.0 to 126.0m  |
| GPSx<br>(When two or more GPS units are present, "x" indicates the unit number.) | <p>Enter the equipment positions of GPSx in the boxes.</p> <p>X: Horizontal axis position on the ship of the applicable GPS (Center: 0)</p> <p>Y: Front-back axis position on the ship of the applicable GPS (Stern: 0)</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>This item may not be displayed depending on the equipment setting.</li> <li>When the input range is changed by modifying [Length] and [Beam], if a value exceeding the input range after modifying has already been entered, the value will be corrected to the maximum or minimum value.</li> </ul>   | <p>Changes depending on the value of [Length] and [Beam].</p> <p>If Length=a and Beam=b:</p> <p>X   -b/2 to b/2</p> <p>Y    0.0 to a</p> <p>For example,</p> <ul style="list-style-type: none"> <li>if Length=1.0 and Beam=1.0:           <p>X   -0.5 to 0.5</p> <p>Y    0.0 to 1.0</p> </li> <li>if Length=700.0 and Beam=70.0:           <p>X   -35.0 to 35.0</p> <p>Y    0.0 to 700.0</p> </li> </ul> |
| Radar Antennas1 to 8<br>(equipment positions of radar antennas1 to 8)            | <p>Enter the equipment positions of Radar Antennas1 to 8 in the boxes.</p> <p>X: Horizontal axis position of radar antennas 1 to 8 on the ship (Center: 0)</p> <p>Y: Front-back axis position of radar antennas 1 to 8 on the ship (Stern: 0)</p> <p><b>Note</b></p> <ul style="list-style-type: none"> <li>If "No Equipment" is specified in the [DipSW] settings of the interswitch unit, this is not displayed.</li> <li>When the input range is changed by modifying [Length] and [Beam], if a value exceeding the input range after modifying has already been entered, the value will be corrected to the maximum or minimum value.</li> </ul> |  |
| CCRP1/2/3/4  | <p>Enter the positions of CCRP1 to CCRP4 of the ship in the boxes.</p> <p>X: Horizontal axis position of CCRP1/2/3/4 on the ship (Center: 0)</p> <p>Y: Front-back axis position of CCRP1/2/3/4 on the ship (Stern: 0)</p> <p><b>Note</b></p> <p>When the input range is changed by modifying [Length] and [Beam], if a value exceeding the input range after modifying has already been entered, the value will be corrected to the maximum or minimum value.</p>  |  |

| Setting Item                               | Description of Setting  | Setting Value  |
|--|---|--|
| Radio button on the left side of each CCRP | Select the position to be used as the ship's CCRP by clicking the applicable button.  | CCRP1<br>CCRP2<br>CCRP3<br>CCRP4                       |
| Anchor1                                    | An anchor position can be set as an offset from the stern center.<br>It can not be set outside the boat.<br>X: The horizontal axis position on the shipboard of Anchor 1 (center is 0)<br>Y: Front-rear axis position on the shipboard of Anchor 1 (stern is 0) | If Length=a and Beam=b:<br>X -b/2 to b/2<br>Y 0.0 to a |
| Anchor2                                    | An anchor position can be set as an offset from the stern center.<br>It can not be set outside the boat.<br>X: The horizontal axis position on the shipboard of Anchor 2(center is 0)<br>Y: Front-rear axis position on the shipboard of Anchor 2 (stern is 0)  | If Length=a and Beam=b:<br>X -b/2 to b/2<br>Y 0.0 to a |
| Speed Position Bow                         | Enter the distance to the bow starboard/port speed display point.   | 0.0 to Ship's length m                                 |
| Speed Position Stern                       | Enter the distance to the stern starboard/port speed display point.   | 0.0 to Ship's length m                                 |

### Synchronizing setting

The [CCRP] dialog enables common setting items and individual setting items for RADAR, ECDIS, and Conning (called a task station individually). Once common items are set in any of the task stations, RADAR, ECDIS, and Conning, the settings are reflected (synchronized) in other task stations.

By setting common items in the state where all the task stations are active, the common setting items are synchronized in all the task stations.

## 19.3.3 Setting a Serial Port

19

Verify the setting of the serial port of this equipment and perform initial setting by using the [Serial Port] dialog.

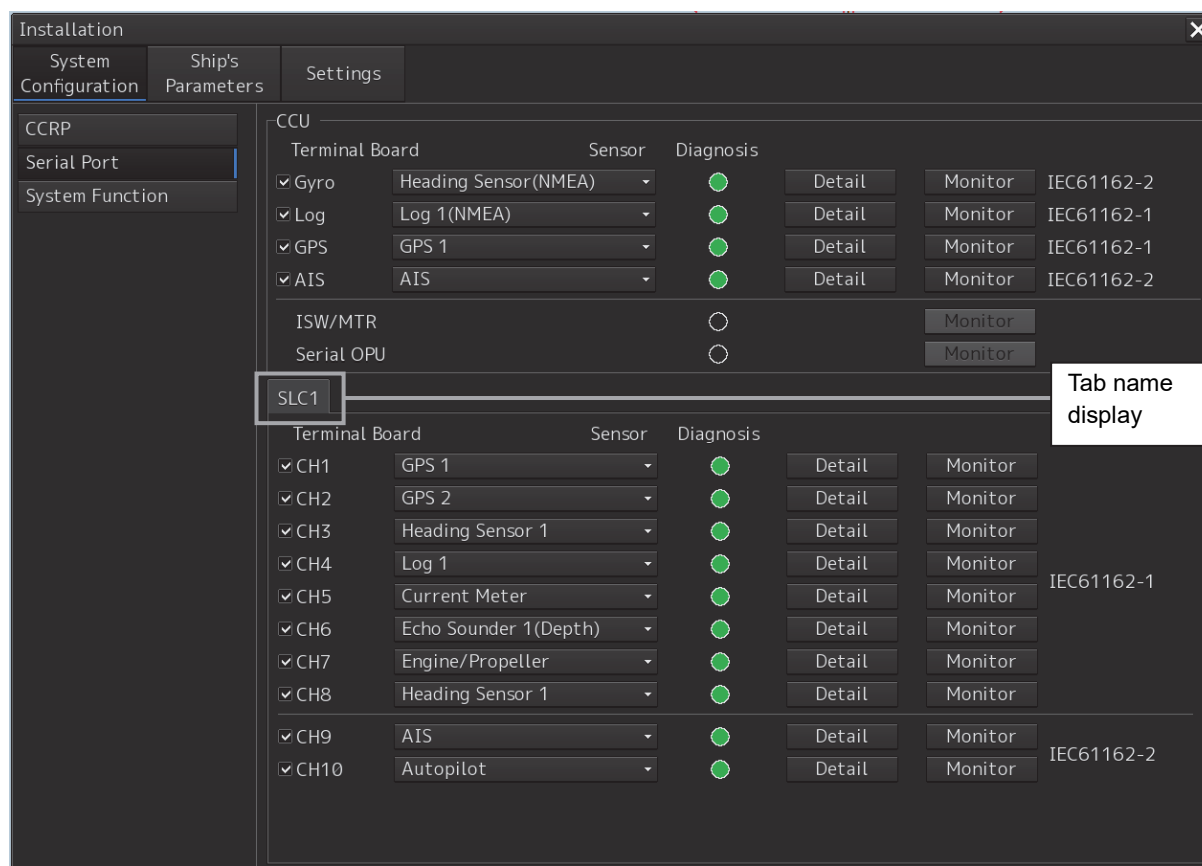
### Synchronizing setting

The [Serial Port] dialog enables common setting items and individual setting items for RADAR, ECDIS, and Conning (called a task station individually). Once common items are set in any of the task stations, RADAR, ECDIS, and Conning, the settings are reflected (synchronized) in other task stations.

By setting common items in the state where all the task stations are active, the common setting items are synchronized in all the task stations.

### 19.3.3.1 Displaying the [Serial Port] dialog

When you select [System Configuration] in the first classification pane and [Serial Port] in the second classification pane, the [Serial Port] dialog is displayed in the edit/result pane.



### 19.3.3.2 [Diagnosis] lamp light colors

The [Diagnosis] lamp indicates the Diagnosis result on whether or not the sentence of the sensor specified for each serial port has been received successfully and the status of ISW/MTR/Serial OPU.

**Lit in red:** Data not received.

**Lit in green:** Data is receiving.

**Lit in orange:** In Diagnosis (before decision).

**No color:** Serial port is disabled.

### 19.3.3.3 Setting a serial port

In the [Serial Port] dialog, allocate the sensors to be connected for the serial port on CCU (Central Control Unit) and the serial port on SLC/ALC.

#### Setting a serial port on the CCU

Set each item as follows.

"Table A: Sensors that can be selected by serial ports on CCU" shows selectable sensors.

However, the sensors that actually can be selected vary depending on the equipment setting.

For the sensor communication speed, refer to "Selectable baud rates".

| Setting Item | Description of Setting  | Setting Value                            |
|--------------|---|--|
| Gyro         | <ol style="list-style-type: none"> <li>1. Select the check box and enable the serial port for the Gyro.</li> <li>2. Select a sensor to be connected to the serial port for Gyro from the [Sensor] combo box. When not selecting a sensor, set [ - ].</li> </ol>   | To enable: Select.<br>To disable: Clear. |
| LOG          | <ol style="list-style-type: none"> <li>1. Select the check box and enable the serial port for the LOG.</li> <li>2. Select a sensor to be connected to the serial port for LOG from the [Sensor] combo box. When not selecting a sensor, set [ - ].</li> </ol>     | To enable: Select.<br>To disable: Clear. |
| GPS          | <ol style="list-style-type: none"> <li>1. Select the check box and enable the serial port for the GPS.</li> <li>2. Select a sensor to be connected to the serial port for the GPS from the [Sensor] combo box. When not selecting a sensor, set [ - ].</li> </ol> | To enable: Select.<br>To disable: Clear. |
| AIS          | <ol style="list-style-type: none"> <li>1. Select the check box and enable the serial port for the AIS.</li> <li>2. Select a sensor to be connected to the serial port for the AIS from the [Sensor] combo box. When not selecting a sensor, set [ - ].</li> </ol> | To enable: Select.<br>To disable: Clear. |

Table A: Sensors that can be selected by serial ports on CCU

| Serial port | Sensor name   |
|-------------|---|
| Gyro        | Heading Sensor (NMEA) , Heading Sensor1 (NMEA) * <sup>1</sup> , Heading Sensor2 (NMEA) * <sup>1</sup>             |
|             | Heading Sensor (Gyro I/F) , Heading Sensor1 (Gyro I/F) * <sup>1</sup> , Heading Sensor2 (Gyro I/F) * <sup>1</sup> |
| LOG         | Log (NMEA) , Log1 (NMEA) * <sup>2</sup> , Log2 (NMEA) * <sup>2</sup>  |
|             | Log (Gyro I/F) * <sup>3</sup>   |
|             | Selector  |
| GPS         | GPS 1   |
|             | GPS 2* <sup>4</sup>   |
|             | GPS 3* <sup>4</sup>   |
|             | GPS 4* <sup>4</sup>   |
|             | Selector  |
| AIS         | AIS   |

\*1: Only when two heading sensors are available

\*2: Only when two logs are available

\*3: Only when Heading Sensor (Gyro I/F) is selected for Gyro of CCU

\*4: May not be displayed depending on the number of GPS units

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## Setting serial ports on SLC/ALC

Set the serial ports on SLC/ALC that is installed as follows.

| Setting item               | Setting contents   | Setting value                      |
|----------------------------|--|------------------------------------|
| CH1 to CH8<br>(RS-422)     | <ol style="list-style-type: none"><li>Click on any of the tabs, SLC1 (M) to SLC4 (M) /SLC1 (S) to SLC4 (S) /ALC1 to ALC4.</li><li>Enable the serial port of the channel by selecting the check box.</li><li>Select a sensor*1 to be connected to the channel on the [Sensor] combo box. When not selecting a sensor, select [ - ].</li></ol> | Enable: Selected<br>Disable: Clear |
| CH9/CH10<br>(RS-422/RS485) | <ol style="list-style-type: none"><li>Click on any of the tabs, SLC1 (M) to SLC4 (M) /SLC1 (S) to SLC4 (S) /ALC1 to ALC4.</li><li>Enable the serial port of the channel by selecting the check box.</li><li>Select a sensor*1 to be connected to the channel on the [Sensor] combo box. When not selecting a sensor, select [ - ].</li></ol> | Enable: Selected<br>Disable: Clear |

\*1: The sensors that can be selected on SLC/ALC are indicated below.

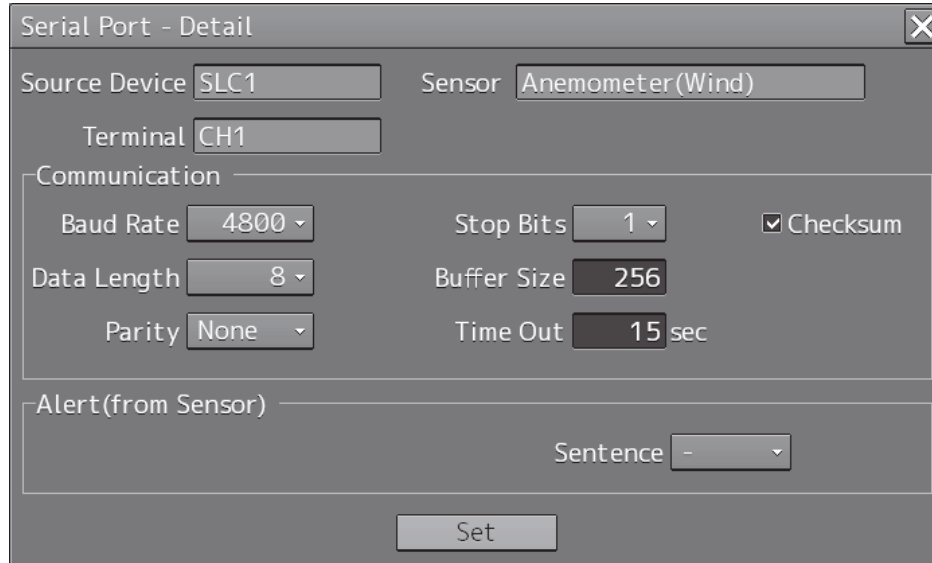
However, the sensors that can be actually selected vary depending on the equipment setting.

Heading Sensor 1, Heading Sensor 2, Log 1, Log 2, GPS 1, GPS 2, GPS 3, GPS 4, Ship's Clock, Echo Sounder (Depth) , Echo Sounder 2 (Depth) ,AIS, NAVTEX, Anemometer (Wind) , Water Temperature Meter, Current Meter, Climate Meter, TRI, Autopilot, Rudder, Engine/Propeller, Engine Telegraph, Thruster, Azimuth Thruster, Generator, Fin Stabilizer, YEOMAN Digitizer, RADAR1 (TT RX) , RADAR2 (TT RX) , Gyro Switch , Alert (to CAM) , Alert (from Subsystem) , Alert (to BNWAS) , IAS (MODBUS) , DSC , IAS(NMEA) , NAV/Alert , Plotter , GPS Buoy



### 19.3.3.4 To change the communication settings of the Serial Port

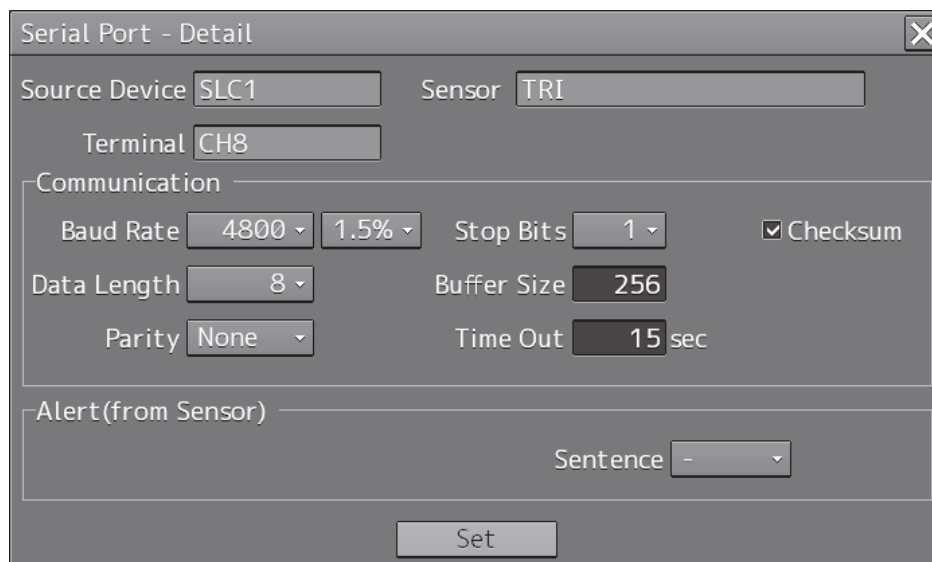
Click the [Detail] button of the enabled serial port and display the [Detail] dialog.



The dialog box is titled "Serial Port - Detail" and has a close button (X) in the top right corner. It contains the following fields and controls:

- Source Device: SLC1
- Sensor: Anemometer(Wind)
- Terminal: CH1
- Communication section:
  - Baud Rate: 4800
  - Stop Bits: 1
  - Checksum: ☒
  - Data Length: 8
  - Buffer Size: 256
  - Parity: None
  - Time Out: 15 sec
- Alert(from Sensor) section:
  - Sentence: -
- Set button at the bottom.

When selecting CH1 to CH7



The dialog box is titled "Serial Port - Detail" and has a close button (X) in the top right corner. It contains the following fields and controls:

- Source Device: SLC1
- Sensor: TRI
- Terminal: CH8
- Communication section:
  - Baud Rate: 4800, 1.5%
  - Stop Bits: 1
  - Checksum: ☒
  - Data Length: 8
  - Buffer Size: 256
  - Parity: None
  - Time Out: 15 sec
- Alert(from Sensor) section:
  - Sentence: -
- Set button at the bottom.

When selecting CH8 to CH10

The setting target can be checked with [Source Device] display, [Terminal] display and [Sensor] display.

Perform the settings shown in the following table and then click on the [Set] button.

| Setting Item                         | Description of Setting  | Setting Value   |
|--------------------------------------|---|---|
| Baud Rate                            | Select the baud rate of the serial port on the combo box.<br>In the [Detail] dialog of any of CH8 to CH10, the [Baud Rate] addition ratio combo box is displayed on the right side of the [Baud Rate] combo box.  | Selectable baud rates vary depending on the serial port (refer to "Selectable baud rates").   |
| [Baud Rate] addition ratio combo box | Displayed in the [Detail] dialog of CH8 to CH10. By using this combo box, the addition ratio (%) for adjusting the baud rate can be changed. The baud rate is determined by adding the additional ratio to the value that is set in the [Baud Rate] combo box.<br>Example) $4800 \times (1 + \frac{1.5}{100}) = 4872$<br>Additional ratio | 0.0% to 3.0% (can be set in the unit of 0.5%)   |
| Data Length                          | Select the data length of the corresponding serial port from the combo box.   | 5/6/7/8   |
| Parity                               | Select the parity of the corresponding serial port from the combo box.  | None/Odd/Even   |
| Stop Bits (Stop Bit Length)          | Select the stop bit length of the corresponding serial port from the combo box.   | 1/2   |
| Buffer Size                          | Enter the buffer size of the corresponding serial port from the list.   | 0 to 10240 byte   |
| Time Out                             | Enter the time-out duration of the corresponding serial port from the list.   | 0 to 999s   |
| Checksum                             | Select the check box and enable the checksum of the sentence of the corresponding serial port.  | To enable: Select.<br>To disable: Clear.  |
| Subsystem                            | Set the equipment to be connected for Alert Handling.<br>Displayed only when the sensor is "Alert (from Subsystem) " or "Alert (to CAM) ".<br>The selection is also allowed for the subsystem that has already been used in the channel of some other serial port.  | "Alert (from Subsystem) ":<br>Equipment that is set as -/installed (Task Station and sensor)<br>"Alert (to CAM) ":<br>Equipment that is set as -/installed (Task Station) |
| Primary/Secondary                    | Select Primary or Secondary for IAS (MODBUS) input.<br>Displayed only when the sensor is "IAS (MODBUS) ".   | Primary: Primary system<br>Secondary: Secondary system  |

| Setting Item | Description of Setting   | Setting Value   |
|--------------|--|---|
| Sentence     | Select the sentence of Alert Handling.<br>Displayed when the sensor is other than "Alert (BNWAS)", "IAS (MODBUS)", "DSC" or "NAV/Alert". | Normal sensor such as GPS and Log:<br>-/ALR/ALF<br>"Alert (from Subsystem/to CAM) ":<br>ALR/ALF |

### Selectable baud rates

| Serial port                                       | Baud rate                  |
|---|----------------------------|
| Serial point on CCU                               |                            |
| Gyro (at selection of Heading Sensor (NMEA) )     | 4800/38400                 |
| Gyro (at selection of Heading Sensor (Gyro I/F) ) | Fixed to 38400             |
| Log (at selection of Log (NMEA))                  | Fixed to 4800              |
| Log (at selection of Log (Gyro I/F))              | Fixed to 38400             |
| GPS   | Fixed to 4800              |
| AIS   | Fixed to 38400             |
| Serial port on SLC/ALC                            |                            |
| CH1-8   | 2400/4800/9600             |
| CH9/10  | 2400/4800/9600/19200/38400 |
| Gyro I/F  | Fixed to 38400             |

## 19.3.4 Setting a System Function

Verify the setting of the system function of this equipment and perform initial setting by using the [System Function] dialog.

### 19.3.4.1 Displaying a [System Function] dialog

When you select [System Configuration] in the first classification pane and [System Function] in the second classification pane, the [System Function] dialog is displayed in the edit/result pane.

| Equipment                |                      | Connection | System Function | SFI    |      | Cluster | Control | Alert |      |
|--------------------------|----------------------|------------|-----------------|--------|------|---------|---------|-------|------|
|                          |                      |            |                 | Talker | No.  |         | Tx      |       |      |
| <input type="checkbox"/> | No.1 RADAR           | LAN        | RADAR           | RA     | 0002 | Nav     | TGTD    | ●     | TGTD |
| <input type="checkbox"/> | No.2 RADAR           | LAN        | RADAR           | RA     | 0003 | Nav     | TGTD    | ●     | TGTD |
| <input type="checkbox"/> | No.1 ECDIS           | LAN        | ECDIS           | EI     | 0004 | Nav     | NAVD    | ●     | NAVD |
| <input type="checkbox"/> | No.1 ECDIS           | LAN        | Track Cont...   | TC     | 0004 | Nav     | NAVD    | ●     | NAVD |
| <input type="checkbox"/> | No.2 ECDIS           | LAN        | ECDIS           | EI     | 0005 | Nav     | NAVD    | ●     | NAVD |
| <input type="checkbox"/> | No.1 CON             | LAN        | CONNING         | II     | 0001 | Nav     | MISC    | ○     | MISC |
| <input type="checkbox"/> | VDR                  | LAN        | VDR             | VR     | 0001 | Nav     | MISC    | ●     | MISC |
| <input type="checkbox"/> | Heading Sensor 1     | SLC(Main)  | Heading         | HE     | 0003 | Nav     | SATD    | ●     | SATD |
| <input type="checkbox"/> | Heading Sensor 1     | CCU        | Heading         | ---    | ---  | ---     | ---     | ---   | ---  |
| <input type="checkbox"/> | Log 1                | SLC(Main)  | Log             | VD     | 0002 | Nav     | NAVD    | ●     | NAVD |
| <input type="checkbox"/> | Log 1                | CCU        | Log             | ---    | ---  | ---     | ---     | ---   | ---  |
| <input type="checkbox"/> | GPS 1                | SLC(Main)  | GPS             | GP     | 0001 | Nav     | NAVD    | ●     | NAVD |
| <input type="checkbox"/> | GPS 1                | CCU        | GPS             | ---    | ---  | ---     | ---     | ---   | ---  |
| <input type="checkbox"/> | GPS 2                | SLC(Main)  | GPS             | GP     | 0006 | Nav     | NAVD    | ●     | NAVD |
| <input type="checkbox"/> | Echo Sounder 1(T/... | SLC(Main)  | Depth           | SD     | 0004 | Nav     | NAVD    | ●     | NAVD |
| <input type="checkbox"/> | AIS                  | SLC(Main)  | AIS             | AI     | 0009 | Nav     | TGTD    | ●     | TGTD |
| <input type="checkbox"/> | AIS                  | CCU        | AIS             | ---    | ---  | ---     | ---     | ---   | ---  |
| <input type="checkbox"/> | NAVTEX               | SLC(Main)  | NAVTEX          | CR     | 0007 | Nav     | RCOM    | ●     | RCOM |
| <input type="checkbox"/> | Current Meter        | SLC(Main)  | Weather         | WI     | 0010 | Nav     | NAVD    | ●     | NAVD |
| <input type="checkbox"/> | Autopilot            | SLC(Main)  | Autopilot       | AG     | 0008 | Nav     | NAVD    | ●     | NAVD |
| <input type="checkbox"/> | Engine/Propeller     | SLC(Main)  | Engine/Pro...   | ER     | 0005 | Nav     | MISC    | ●     | MISC |
| <input type="checkbox"/> | SLC 1(Main)          | LAN        | SNGF            | SI     | 0013 | Nav     | MISC    | ●     | MISC |

Buttons: Delete, Add, Edit

### 19.3.4.2 Lamp light colors

- The lamp of control indicates the Diagnosis result on whether or not the data of control of the specified for each equipment has been received successfully.
- The lamp of alert indicates the Diagnosis result on whether or not the data of Alert of the specified for each equipment has been received successfully.

**Lit in red:** Data not received.

**Lit in green:** Data is receiving.

**Lit in orange:** In Diagnosis (before decision).

**No color:** System function is disabled.

### 19.3.4.3 Setting a system function

In the [System Function] dialog, allocate the system functions to be connected for LAN.

#### Add a system function (New equipment)

Click the [Add] button and display the [System Function (Add)] dialog.

Perform the settings shown in the following table and then click on the [Set] button.

| Setting Item                                    |                        | Description of Setting  | Setting Value   |
|---|------------------------|---|---|
| Equipment                                       |                        | Select an Equipment* <sup>1</sup> on the combo box.<br>In the case of "Add a system function (Existing equipment)", equipment can not be changed.                                       | The Equipment that can be actually selected vary depending on the installation setting. |
| Talker ID* <sup>6</sup>                         | Mnemonic               | Select the Mnemonic* <sup>2</sup> of Talker ID on the combo box.  | The Mnemonic of Talker ID vary depending on the equipment.                              |
|   | Instance No            | Enter the Instance No of Talker ID.   | 0001 to 9999<br>The Instance No of Talker ID vary depending on the equipment.           |
| Cluster ID                                      |                        | Enter the Cluster ID* <sup>3</sup> .<br>It can also be set by selecting Equipment on the Reserved combo box.<br>In the case of "Edit a system function", Cluster ID can not be changed. | Nav/Com/Aut/Cgo/Htl/ICT/SSe/Pos/.ROV  |
| Transmission Group* <sup>6</sup> (Control/Data) |                        | Select the Transmission Group* <sup>4</sup> for Control/Data.   | The Transmission Group (Control/Data) vary depending on the equipment.                  |
| Transmission Group (Alert)                      | Transmit* <sup>6</sup> | Select the Transmission Group* <sup>4</sup> of Transmit for Alert.  | The Transmission Group (Alert) vary depending on the equipment. * <sup>5</sup>          |
|   | Receive* <sup>6</sup>  | Select the Transmission Group* <sup>4</sup> of Receive for Alert.   | CAM1* <sup>5</sup>  |
|   | Timeout                | Enter the time-out duration.  | 0 to 120s (Default: 60s)  |
| Use Wildcard for Alert Command                  |                        | Select the check box and enable the Use Wildcard for Alert Command.   | To enable: Select (Default)<br>To disable: Clear  |

\*1: The Equipment that can be selected are indicated below.

However, the equipment that can be actually selected vary depending on the installation setting.

Heading Sensor 1, Heading Sensor 2, Gyro Switch, Log 1, Log 2, GPS 1, GPS 2, GPS 3, GPS 4, Ship's Clock, Echo Sounder1(T/D 1, T/D2), Echo Sounder2(T/D 3), AIS, NAVTEX, Anemometer 1, Water TEMP Meter, Current Meter, Climate Meter, ROT Indicator, Autopilot, Rudder, Engine/Propeller, Engine Telegraph, Thruster, Azimuth

Thruster, Generator, S-JOY/Joystick 1~5, BNWAS, General Equipment(Alert)1~10, GPS Buoy, Plotter, DSC, IAS, CAM, NAV/Alert, RADAR1,RADAR2, VDR

Note:

IAS and NAVTEX: Only NMEA is supported.

CAM is settings for connecting to an external CAM by LAN.

\*2: The Mnemonic of Talker ID that can be selected are indicated below.

AG, AI, BN, CA, CR, EI, ER, GP, HC, HE, II, JA, JB, JC, JD, JE, JF, JG, JH, RA, SD, SG, SI, SS, TC, TI, U0, U1, U2, U3, U4, U5, U6, U7, U8, U9, VD, VR, WI, ZA

\*3: Clusters are groups of functionalities aimed at a responsible operator, which can be distributed over systems. Cluster ID is the identifier of the Cluster.

Set the Cluster ID to "Nav" for equipment in the navigation-bridge cluster. If CAM need category C alert from another cluster group, set the Cluster ID according to the transmission specifications of the equipment. Cluster ID can be set any string of a maximum of 15 characters. Cluster ID that equipment is task station is Nav and cannot be changed.

The cluster ID that can be selected are indicated below.

| Cluster ID | Cluster group           |
|------------|-------------------------|
| Nav        | Navigation              |
| Com        | Communication           |
| Aut        | Automation              |
| Cgo        | Cargo                   |
| Htl        | Hotel                   |
| ICT        | ICT                     |
| SSe        | Safety/Security         |
| Pos        | Position control        |
| ROV        | Remote operated vehicle |

\*4: The Transmission Group that can be selected are indicated below.

| Transmission Group | IP Address   | Port number |
|--------------------|--------------|-------------|
| MISC               | 239.192.0.1  | 60001       |
| TGTD               | 239.192.0.2  | 60002       |
| SATD               | 239.192.0.3  | 60003       |
| NAVD               | 239.192.0.4  | 60004       |
| VDRD               | 239.192.0.5  | 60005       |
| RCOM               | 239.192.0.6  | 60006       |
| TIME               | 239.192.0.7  | 60007       |
| PROP               | 239.192.0.8  | 60008       |
| USR1               | 239.192.0.9  | 60009       |
| USR2               | 239.192.0.10 | 60010       |
| USR3               | 239.192.0.11 | 60011       |
| USR4               | 239.192.0.12 | 60012       |
| USR5               | 239.192.0.13 | 60013       |
| USR6               | 239.192.0.14 | 60014       |
| USR7               | 239.192.0.15 | 60015       |
| USR8               | 239.192.0.16 | 60016       |
| BAM1               | 239.192.0.17 | 60017       |
| BAM2               | 239.192.0.18 | 60018       |
| CAM1               | 239.192.0.19 | 60019       |
| CAM2               | 239.192.0.20 | 60020       |
| NETA               | 239.192.0.56 | 60056       |

\*5: BAM1/BAM2 and CAM1/CAM2 are available for system integrators to balance the traffic, for example higher volume radar in BAM1/CAM1 and low volume sensor, for example gyro, in BAM2/CAM2.

| Equipment        | Connection | System Function | SFI    |      | Cluster | Control |  | Alert |      |
|------------------|------------|-----------------|--------|------|---------|---------|--|-------|------|
|                  |            |                 | Talker | No.  |         | Tx      |  | Tx    | Rx   |
| No.1 RADAR       | LAN        | RADAR           | RA     | 0001 | Nav     | TGTD    |  | BAM1  | CAM1 |
| Heading Sensor 1 | LAN        | Gyro,North      | HE     | 0003 | Nav     | SATD    |  | BAM2  | CAM2 |

\*6: Talker ID Mnemonic, Talker ID Instance No, Transmission Group (Control/Data), Transmission Group (Alert) Transmit and Transmission Group (Alert) Receive can also be set by selecting Equipment on the preset combo box. The following default values will be set.

| Equipment                  | System Function  | TalkerID Mnemonic | TalkerID Instance No | Transmission Group (Control/Data) | Transmission Group (Alert) Transmit | Transmission Group (Alert) Receive |
|----------------------------|------------------|-------------------|----------------------|-----------------------------------|-------------------------------------|------------------------------------|
| RADAR                      | RADAR            | RA                | (TaskStationNo.)     | TGTD                              | TGTD                                | CAM1                               |
| ECDIS                      | ECDIS            | EI                | (TaskStationNo.)     | NAVD                              | NAVD                                | CAM1                               |
| CONNING                    | CONNING          | II                | (TaskStationNo.)     | MISC                              | MISC                                | CAM1                               |
| CAM                        | CAM              | CA                | (TaskStationNo.)     | CAM1                              | CAM1                                | CAM1                               |
| TCS                        | TrackControl     | TC                | (TaskStationNo.)     | NAVD                              | NAVD                                | CAM1                               |
| Heading Sensor 1           | Heading          | HE                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| Heading Sensor 2           | Heading          | HE                | 0002                 | NAVD                              | NAVD                                | CAM1                               |
| Gyro Switch                | Heading          | HE                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| Log 1                      | Log              | VD                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| Log 2                      | Log              | VD                | 0002                 | NAVD                              | NAVD                                | CAM1                               |
| GPS 1                      | GPS              | GP                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| GPS 2                      | GPS              | GP                | 0002                 | NAVD                              | NAVD                                | CAM1                               |
| GPS 3                      | GPS              | GP                | 0003                 | NAVD                              | NAVD                                | CAM1                               |
| GPS 4                      | GPS              | GP                | 0004                 | NAVD                              | NAVD                                | CAM1                               |
| Ship's Clock               | Clock            | ZA                | 0001                 | TIME                              | TIME                                | CAM1                               |
| Echo Sounder1(T/D 1, T/D2) | Depth            | SD                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| Echo Sounder2(T/D 3)       | Depth            | SD                | 0002                 | NAVD                              | NAVD                                | CAM1                               |
| AIS                        | AIS              | AI                | 0001                 | TGTD                              | TGTD                                | CAM1                               |
| NAVTEX                     | NAVTEX           | CR                | 0001                 | RCOM                              | RCOM                                | CAM1                               |
| Anemometer 1               | Weather          | WI                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| Water TEMP Meter           | Weather          | WI                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| Current Meter              | Weather          | WI                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| Climate Meter              | Weather          | WI                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| ROT Indicator              | TRI              | TI                | 0001                 | SATD                              | SATD                                | CAM1                               |
| Autopilot                  | Auto Pilot       | AG                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| Rudder                     | Rudder           | SG                | 0001                 | MISC                              | MISC                                | CAM1                               |
| Engine/Propeller           | Engine/Propeller | ER                | 0001                 | MISC                              | MISC                                | CAM1                               |
| Engine Telegraph           | Engine Telegraph | ER                | 0001                 | MISC                              | MISC                                | CAM1                               |
| Thruster                   | Thruster         | ER                | 0001                 | MISC                              | MISC                                | CAM1                               |
| Azimuth Thruster           | Azimuth Thruster | ER                | 0001                 | MISC                              | MISC                                | CAM1                               |
| Generator                  | Generator        | ER                | 0001                 | MISC                              | MISC                                | CAM1                               |
| S-JOY/Joystick             | S-JOY/Joystick   | SG                | 0001                 | MISC                              | -                                   | -                                  |
| BNWAS                      | BNWAS            | BN                | 0001                 | -                                 | VDRD                                | CAM1                               |
| General Equipment(Alert) 1 | General 1        | U0                | 0001                 | -                                 | MISC                                | CAM1                               |
| General Equipment(Alert) 2 | General 2        | U0                | 0002                 | -                                 | MISC                                | CAM1                               |
| General Equipment(Alert) 3 | General 3        | U0                | 0003                 | -                                 | MISC                                | CAM1                               |
| General                    | General          | U0                | 0004                 | -                                 | MISC                                | CAM1                               |

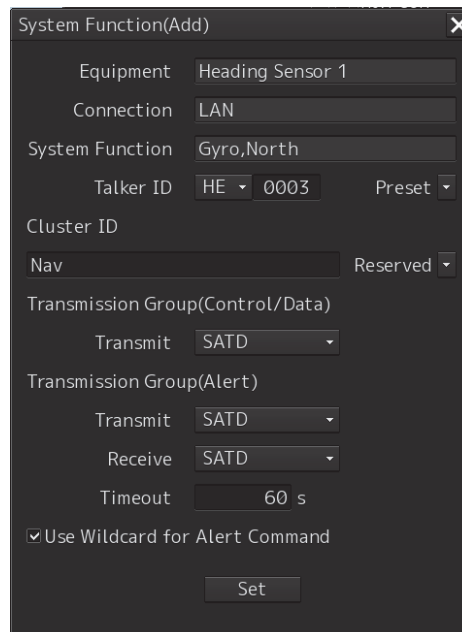
| Equipment                   | System Function | TalkerID Mnemonic | TalkerID Instance No | Transmission Group (Control/Data) | Transmission Group (Alert) Transmit | Transmission Group (Alert) Receive |
|-----------------------------|-----------------|-------------------|----------------------|-----------------------------------|-------------------------------------|------------------------------------|
| Equipment(Alert) 4          | 4               |                   |                      |                                   |                                     |                                    |
| General Equipment(Alert) 5  | General 5       | U0                | 0005                 | -                                 | MISC                                | CAM1                               |
| General Equipment(Alert) 6  | General 6       | U0                | 0006                 | -                                 | MISC                                | CAM1                               |
| General Equipment(Alert) 7  | General 7       | U0                | 0007                 | -                                 | MISC                                | CAM1                               |
| General Equipment(Alert) 8  | General 8       | U0                | 0008                 | -                                 | MISC                                | CAM1                               |
| General Equipment(Alert) 9  | General 9       | U0                | 0009                 | -                                 | MISC                                | CAM1                               |
| General Equipment(Alert) 10 | General 10      | U0                | 0010                 | -                                 | MISC                                | CAM1                               |
| GPS Buoy                    | GPS             | GP                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| Plotter                     | GPS             | GP                | 0001                 | NAVD                              | NAVD                                | CAM1                               |
| DSC                         | DSC             | U1                | 0001                 | -                                 | MISC                                | CAM1                               |
| IAS                         | IAS             | JE                | 0001                 | MISC                              | MISC                                | CAM1                               |
| CAM                         | CAM             | CA                | 0001                 | CAM1                              | CAM1                                | CAM1                               |
| NAV/Alert                   | NAV/Alert       | ER                | 0001                 | MISC                              | -                                   | -                                  |
| RADAR1                      | RADAR           | RA                | 0001                 | TGTD                              | -                                   | -                                  |
| RADAR2                      | RADAR           | RA                | 0002                 | TGTD                              | -                                   | -                                  |
| VDR                         | VDR             | VR                | 0001                 | MISC                              | MISC                                | CAM1                               |
| SLC 1(Main)                 | SNGF            | SI                | 0013                 | MISC                              | -                                   | -                                  |
| SLC 2(Main)                 | SNGF            | SI                | 0113                 | MISC                              | -                                   | -                                  |
| SLC 3(Main)                 | SNGF            | SI                | 0213                 | MISC                              | -                                   | -                                  |
| SLC 4(Main)                 | SNGF            | SI                | 0313                 | MISC                              | -                                   | -                                  |
| SLC 1(Sub)                  | SNGF            | SI                | 0063                 | MISC                              | -                                   | -                                  |
| SLC 2(Sub)                  | SNGF            | SI                | 0163                 | MISC                              | -                                   | -                                  |
| SLC 3(Sub)                  | SNGF            | SI                | 0263                 | MISC                              | -                                   | -                                  |
| SLC 4(Sub)                  | SNGF            | SI                | 0363                 | MISC                              | -                                   | -                                  |
| ALC 1                       | SNGF            | SI                | 1213                 | MISC                              | -                                   | -                                  |
| ALC 2                       | SNGF            | SI                | 1313                 | MISC                              | -                                   | -                                  |
| ALC 3                       | SNGF            | SI                | 1413                 | MISC                              | -                                   | -                                  |
| ALC 4                       | SNGF            | SI                | 1513                 | MISC                              | -                                   | -                                  |



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### Add a system function (Existing equipment)

Select the check box and Click the [Add] button and display the [System Function (Add)] dialog.



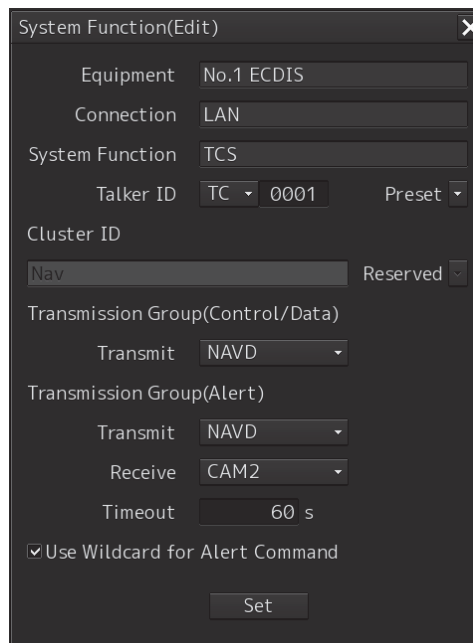
The screenshot shows the 'System Function(Add)' dialog box. It contains the following fields and controls:

- Equipment: Heading Sensor 1
- Connection: LAN
- System Function: Gyro,North
- Talker ID: HE (dropdown), 0003 (text), Preset (dropdown)
- Cluster ID: Nav (dropdown), Reserved (dropdown)
- Transmission Group(Control/Data): Transmit (dropdown), SATD (dropdown)
- Transmission Group(Alert): Transmit (dropdown), SATD (dropdown); Receive (dropdown), SATD (dropdown)
- Timeout: 60 s
- ☒ Use Wildcard for Alert Command
- Set button

Perform the settings referring to **Add a system function (New equipment)**. Equipment can not be changed on the [System Function (Add)] dialog.

### Edit a system function

Select the check box and click the [Edit] button and display the [System Function (Edit)] dialog.



The screenshot shows the 'System Function(Edit)' dialog box. It contains the following fields and controls:

- Equipment: No.1 ECDIS
- Connection: LAN
- System Function: TCS
- Talker ID: TC (dropdown), 0001 (text), Preset (dropdown)
- Cluster ID: Nav (dropdown), Reserved (dropdown)
- Transmission Group(Control/Data): Transmit (dropdown), NAVD (dropdown)
- Transmission Group(Alert): Transmit (dropdown), NAVD (dropdown); Receive (dropdown), CAM2 (dropdown)
- Timeout: 60 s
- ☒ Use Wildcard for Alert Command
- Set button

Perform the settings referring to **Add a system function (New equipment)**. Cluster ID can not be changed on the [System Function (Edit)] dialog.

---

## Delete a system function

Select the check box and click the [Delete] button. Selected a system function is deleted.

### Note:

- Set the each setting according to the transmission specifications of the equipment connected to the LAN.
- Equipment connected to the SLC / ALC serial port or CCU cannot add or edit or delete system functions. System function of Equipment connected to the SLC / ALC serial port or CCU are registered automatically by serial port setting on [Serial Port] dialog.
- The native system function of VDR, No.x RADAR, ECDIS, CON, MFD, RPS can not delete on [System Function] dialog.

## 19.3.5 Setting own ship's parameters

Set parameter values of own ship by using the [Ship's Parameters] dialog.

### 19.3.5.1 Displaying the [Ship's Parameters] dialog

When you select [Ship's Parameters] in the classification pane, the [Ship's Parameters] dialog is displayed in the edit/result pane.

Installation

System Configuration | **Ship's Parameters** | Settings

Ship General

Ship's Name

Length 100.0 m

Beam 15.0 m

Height from keel to MAX point 30.0 m

Keel-Trans 5.0 m

MAX Course Change 150.0 °

MAX Speed Limit 30.0 kn

MIN Speed Limit 5.0 kn

MAX ROT 0300.0 °/min

MIN ROT 000.1 °/min

MIN Turn Radius 0.50 NM

MIN Safety Contour 0 m

### 19.3.5.2 Setting own ship's parameters

Set the following items in the [Ship's Parameters] dialog.

| Setting Item   | Description of Setting  | Setting Value      |
|--|---|--------------------|
| Ship's Name  | Enter own ship's name in the box.   | Max. 20 characters |
| Length (of ship)   | Enter own ship's length in the box.   | 1.0 to 1022.0 m    |
| Beam (ship's width)  | Enter own ship's beam in the box.   | 1.0 to 126.0 m     |
| Height from keel to MAX point                                | Enter the height of the ship from the keel to the maximum point in the box.   | 1.0 to 126.0 m     |
| Keel-Trans<br>(distance between the transducer and the keel) | Enter the distance between the transducer of the depth sounder and the keel. (Required when displaying the water depth with the keel fixed) | 0.0 to 20.0 m      |
| MAX Course Change<br>(limit value of course change angle)    | Enter the limit value of the course change angle of the planned route in the box.   | 20.0 to 359.9°     |
| MAX Speed Limit  | Enter the ship's maximum speed in the box.  | 10.0 to 99.9 kn    |
| MIN Speed Limit  | Enter the ship's minimum speed in the box.  | 0.0 to 89.9 kn     |
| MAX ROT  | Enter the maximum rate of turn in the box.  | 1.0 to 1200°/min   |
| MIN ROT  | Enter the minimum rate of turn in the box.  | 0.0 to 570.0°/min  |
| MIN Turn Radius  | Enter the minimum turn radius in the box.   | 0.00 to 9.99 NM    |

| Setting Item   | Description of Setting                               | Setting Value |
|--|--|---------------|
| MIN Safety Contour<br>(Minimum value of SafetyContour that can be set) | Enter the minimiu value of SafetyContour in the box. | 0 to 200      |

#### Note

When the MIN Safety Contour is set greater than the value of the Safety Contour already set, the value of the MIN Safety Contour is used as the Safety Contour. When it set the MIN Safety Contour, please confirm the setting of the Safety Contour. The Safety Contour can be set from Page2 of [Menu]-[View]-[Options]-[Chart Common].

## Synchronizing setting

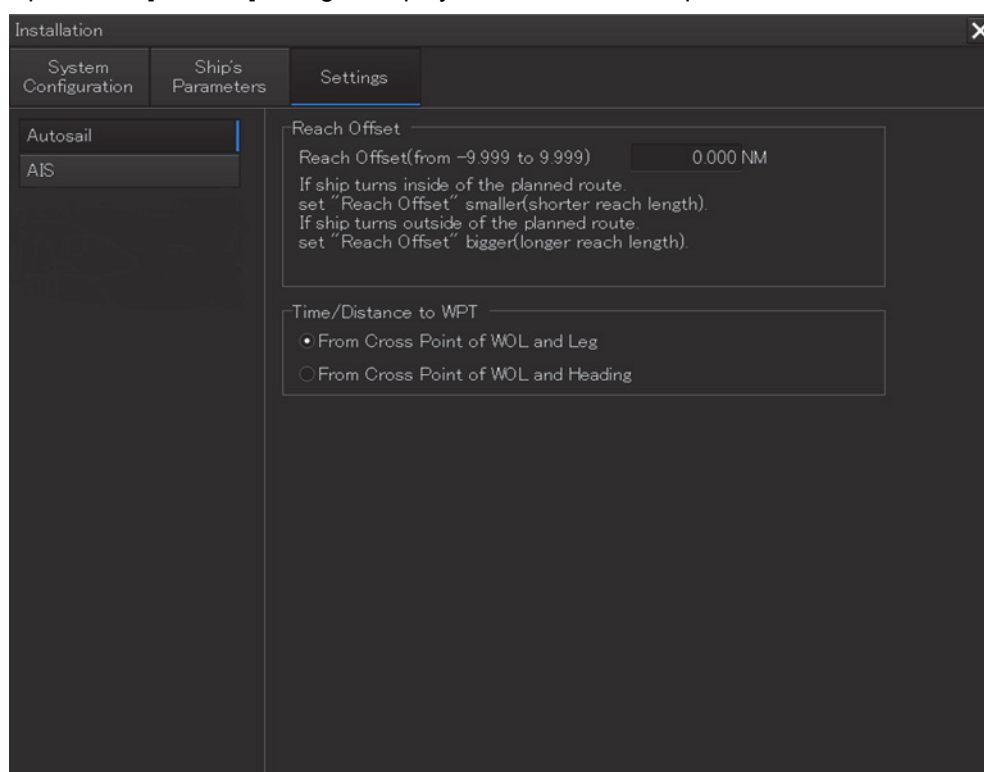
The [Ship's Parameters] dialog enables common setting items and individual setting items for RADAR, ECDIS, and Conning (called a task station individually). Once common items are set in any of the task stations, RADAR, ECDIS, and Conning, the settings are reflected (synchronized) in other task stations. By setting common items in the state where all the task stations are active, the common setting items are synchronized in all the task stations.

## 19.3.6 Setting the automatic sailing system

By using the [Autosail] dialog, verify and initialize the automatic sailing system that is installed in this equipment.

### 19.3.6.1 Displaying the [Autosail] dialog

When you select [Settings] in the first classification pane and [Autosail] in the second classification pane, the [Autosail] dialog is displayed in the edit/result pane.



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### 19.3.6.2 Setting the automatic sailing system

Set the following items in the [Auto Sail] dialog.

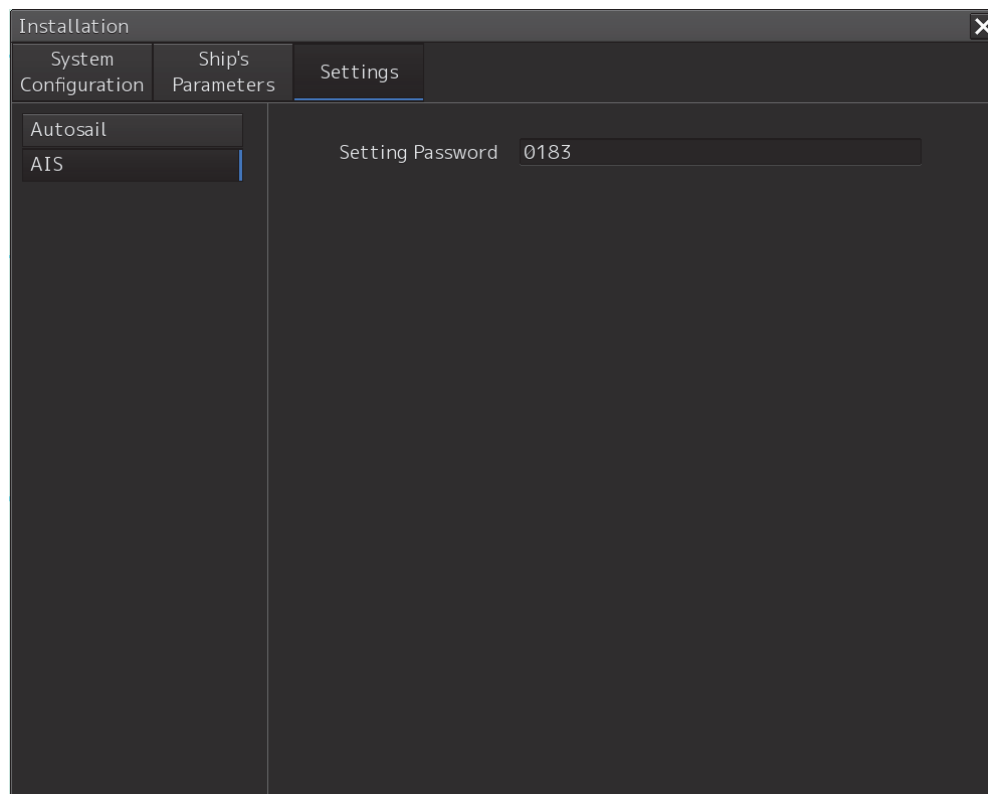
| Setting Item         | Description of Setting   | Setting Value   |
|----------------------|--|---|
| Reach Offset         | Enter the reach offset in the box.   | -9.999 to 9.999 NM  |
| Time/Distance to WPT | Select this to select a parameter for calculating the time and distance from own ship to the WPT.<br><b>From Cross Point of WOL and Leg:</b><br>Center point between own ship and the WOL<br><b>From Cross Point of WOL and Heading:</b><br>Center point of own ship's heading and the WOL | <ul style="list-style-type: none"><li>• From Cross Point of WOL and Leg</li><li>• From Cross Point of WOL and Heading</li></ul> |

### 19.3.7 Setting the AIS password

Set the AIS password by using the [AIS] dialog.

#### 19.3.7.1 Displaying the [AIS] dialog

When [Settings] is selected in the 1st classification pane and [AIS] is selected in the 2nd classification pane, the [AIS] dialog is displayed in the edit/result pane.



---

### 19.3.7.2 Setting the AIS password

Set the following item on the [AIS] dialog.

| Setting item     | Description of setting   | Setting value                            |
|------------------|--|--|
| Setting Password | To change Voyage data from the external device, JHS-183 requires the password.<br>When the AIS password is changed, change this setting value.<br>When the password is not required, this setting value is ignored in (JHS-182). | Up to 32 characters (numeric value only) |

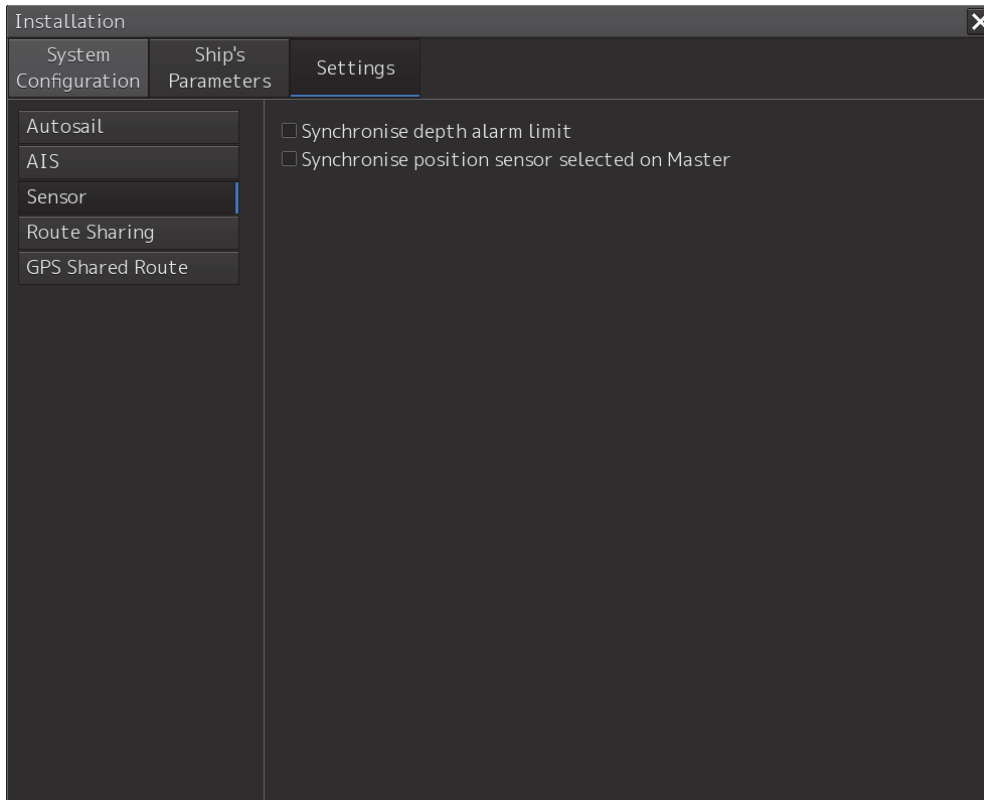
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## 19.3.8 Setting Sensor

The alert set point (Alarm Limit) display and GPS switching interlocking function can be set for depth display on the “Sensor” dialog.

### 19.3.8.1 Displaying the [Sensor] dialog

When [Settings] is selected in the 1st classification pane and [Sensor] is selected in the 2nd classification pane, the [Sensor] dialog is displayed in the edit/result pane.



### 19.3.8.2 Displaying an alert set point

**Check the [Synchronise depth alarm limit] check box.**

The depth that is set in [Depth below keel Alarm] of the [Depth/Safety Contour] dialog of the “Alert” menu is displayed as the alarm set point (Alarm Limit). Subsequently, the setting value of [Depth below keel Alarm] is fixed and the value can no longer be changed.

To reset the alarm set point display, uncheck the [Synchronise depth alarm limit] check box.

---

### 19.3.8.3 Setting the GPS switching linkage function

**Check the [Synchronise position sensor selected Master] check box.**

A badge is displayed on the Top screen (own ship's position) of the equipment with the GPS Selector control authorization.

When the GPS switching linkage function is enabled, the GPS sensor source with other equipment is linked.



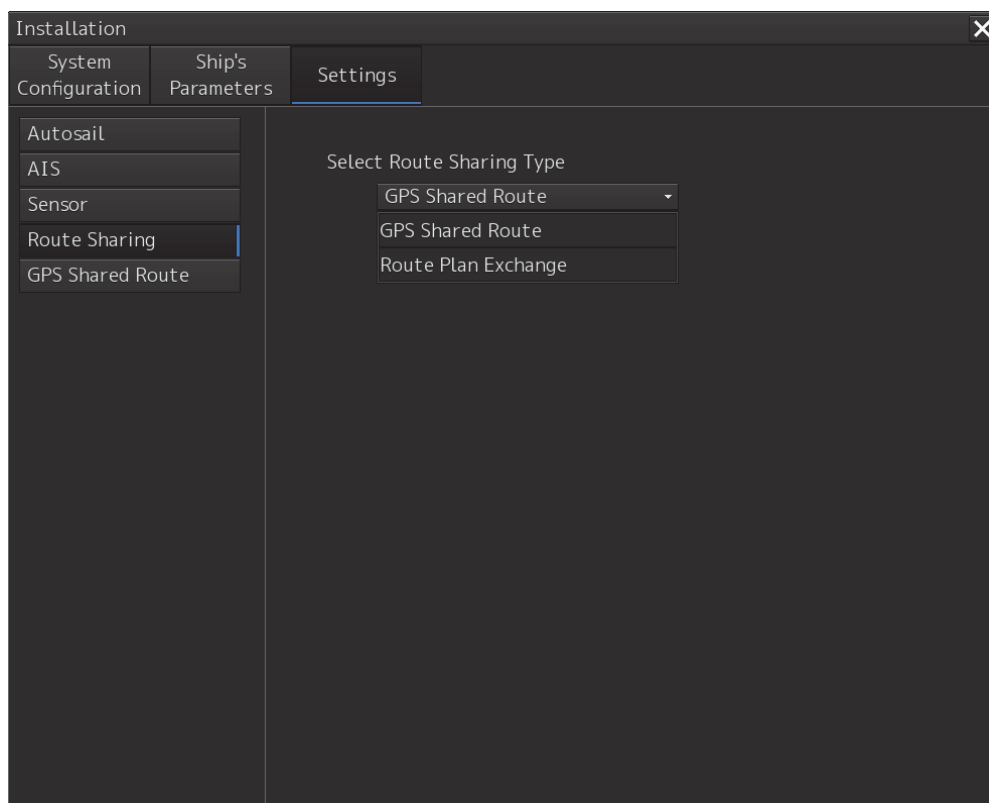
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## 19.3.9 Setting Route Sharing

In the "Route Sharing" dialog, change the route sharing method used for route sharing.

### 19.3.9.1 Displaying the [Route Sharing] dialog

When [Settings] is selected in the 1st classification pane and [Route Sharing] is selected in the 2nd classification pane, the [Route Sharing] dialog is displayed in the edit/result pane.



### 19.3.9.2 Selecting a route sharing method

From the combo box, select the route sharing method to use.

**GPS Shared Route**

**Route Plan Exchange**

When selected, the selected item is added to the left pane

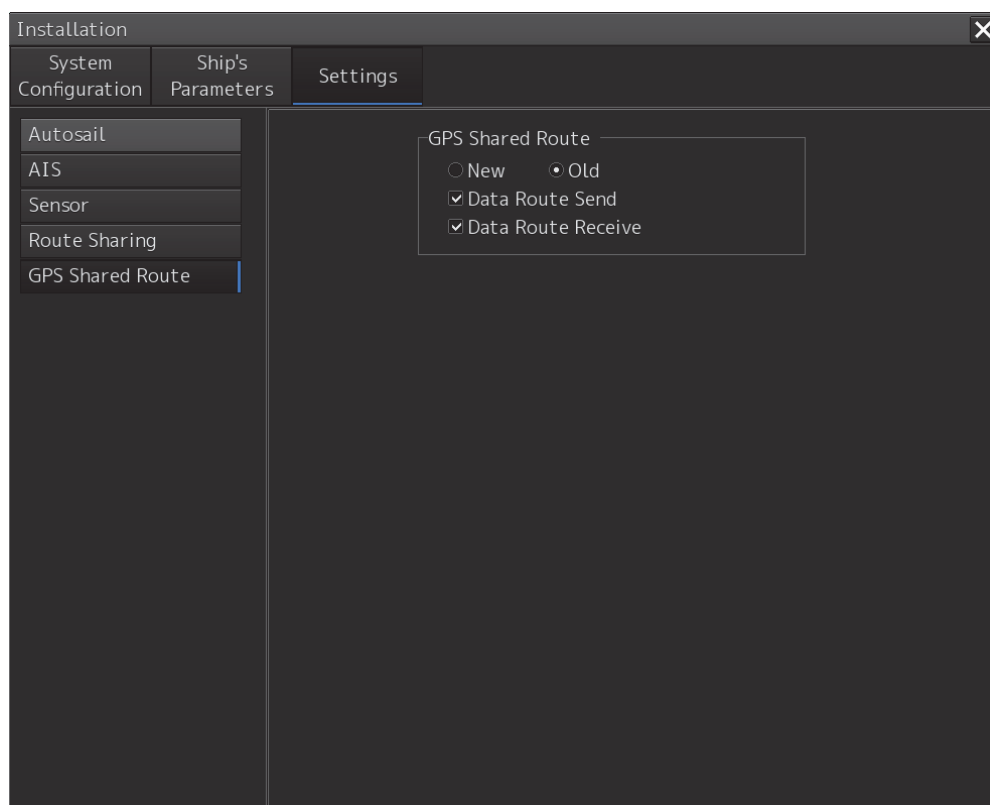
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## 19.3.10 Setting the GPS Shared Route

This function enables the switching between new route sharing and old route sharing and the setting of data route transmission/reception to ON/OFF.

### 19.3.10.1 Displaying the [GPS Shared Route] dialog

When [Settings] is selected in the 1st classification pane and [GPS Shared Route] is selected in the 2nd classification pane, the [GPS Shared Route] dialog is displayed in the edit/result pane.



### 19.3.10.2 Setting the GPS Shared Route

You can switch various settings on and off by checking as shown in the table below. For the INS configuration, the New and Old check boxes are hidden.

| Setting item       | Setting contents   | Setting value      |
|--------------------|--|--------------------|
| New                | Sharing of a new route can be set to On/Off.   | On: Default<br>Off |
| Old                | Sharing of an old route can be set to On/Off.  | On<br>Off: Default |
| Data Route Send    | Data route transmission can be set to On/Off.<br>On:<br>[Send to GPS] of [Route Planning]-[▼] is enabled.<br>Transmission log is displayed in the Status Log column of the Send to GPS screen.<br>Off:<br>[Send to GPS] of [Route Planning]-[▼] is disabled. | On: Default<br>Off |
| Data Route Receive | Data route reception can be set to On/Off.<br>On:<br>Reception log is displayed in the Status Log column of the Send to GPS screen.<br>Off:<br>Reception log is not displayed in the Status Log column of the Send to GPS screen.                            | On: Default<br>Off |

---

## 19.3.11 Setting the Route Plan Exchange

You can switch the enable / disable of route plan exchange and make various settings.

### 19.3.11.1 Displaying the [Route Plan Exchange] dialog

When [Settings] is selected in the 1st classification pane and [Route Plan Exchange] is selected in the 2nd classification pane, the [Route Plan Exchange] dialog is displayed in the edit/result pane.

The screenshot shows the 'Installation' dialog box with the 'Settings' tab selected. On the left, a list of settings includes 'Autosail', 'AIS', 'Sensor', 'Route Sharing', and 'Route Plan Exchange', which is currently selected. The main area is titled 'Route Plan Exchange' and contains the following controls:

- ☐ Enable Route Plan Exchange
- Address: 239.192.0.25 (dropdown menu)
- Port: 60025 (input box)
- Timeout: 15 s (input box)
- Destination Equipment** section:
  - Input the correct SFI of destination.
  - Table with columns: SFI and Transmission Group.
  - Equipment 1: ☒ SFI: II 0000 Transmission Group: MISC
  - Equipment 2: ☐ SFI: 11 0000 Transmission Group: MISC
  - Equipment 3: ☐ SFI: 11 0000 Transmission Group: MISC
- Set the SFI of Own Task Station into the destination equipments.
- SFI of Own Task Station is, EI0001 (input box)

### 19.3.11.2 Setting the Route Plan Exchange

When the **Enable Route Plan Exchange** check box is set to On, the route plan exchange function is enabled.

In the **Address** combo box, you can select the multicast address to be used for route plan exchanges from the following five.

•239.192.0.21 •239.192.0.22 •239.192.0.23 •239.192.0.24 •239.192.0.25

In the **Timeout** input box, you can set the response waiting timeout judgment value in the route plan exchange.

In the **SFI** combo box, you can set two prefix characters that form SFI.

In the **Transmission Group** combo box, you can set the transmission group to be specified when sending and receiving.

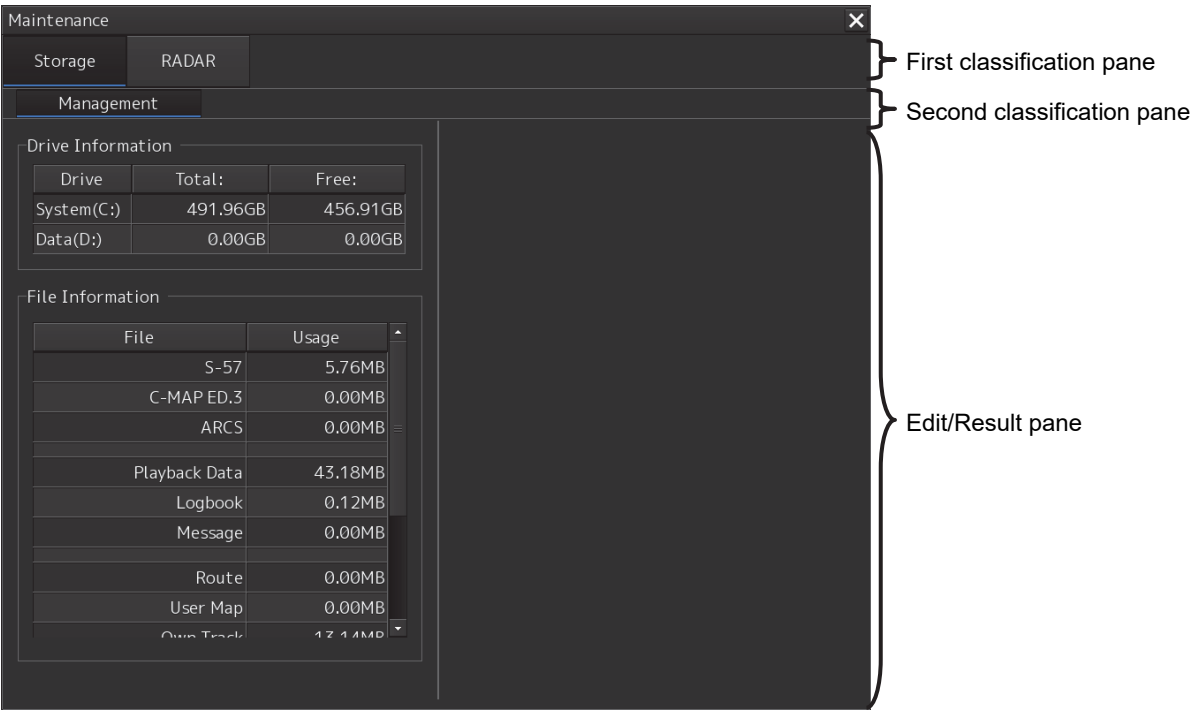
In **SFI display box of Own Task Station**, its own SFI is displayed.

# 19.4 Maintenance

Use the [Maintenance] dialog box for maintenance operation of this equipment.

## 19.4.1 Displaying the [Maintenance] dialog box

Clicking the [Maintenance] button in the submenu displays the [Maintenance] dialog box. The [Maintenance] dialog box in the submenu consists of the classification pane and the edit/result pane. The classification pane consists of two-level layers of the first classification pane and the second classification pane.

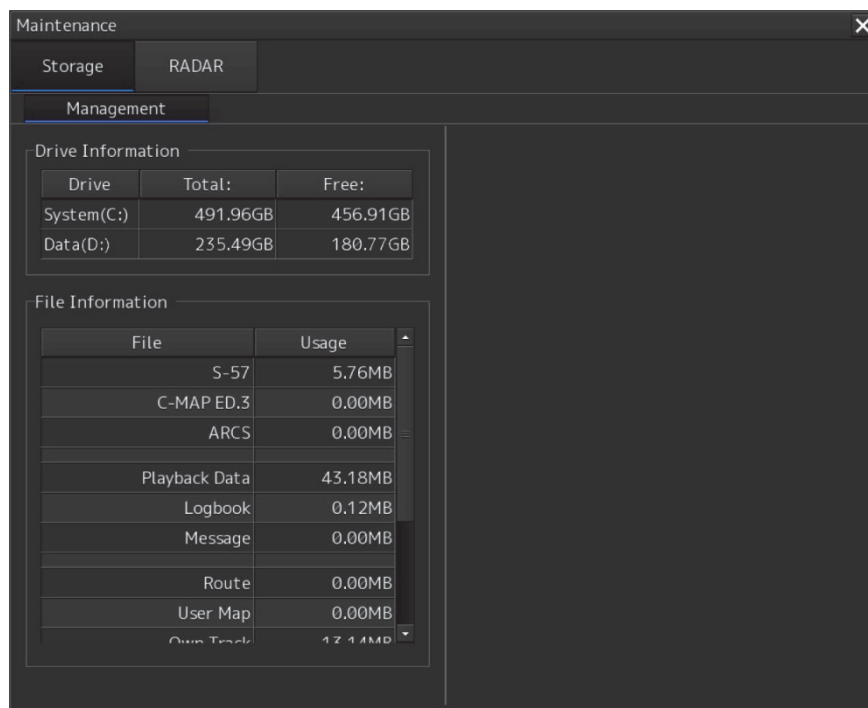


**Note**  
In the ECDIS screen, [RADAR] finction does not work.

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## 19.4.2 Managing storage

When you select [Storage] in the first classification pane and [Management] in the second classification pane, the [Management] dialog is displayed in the edit/result pane.



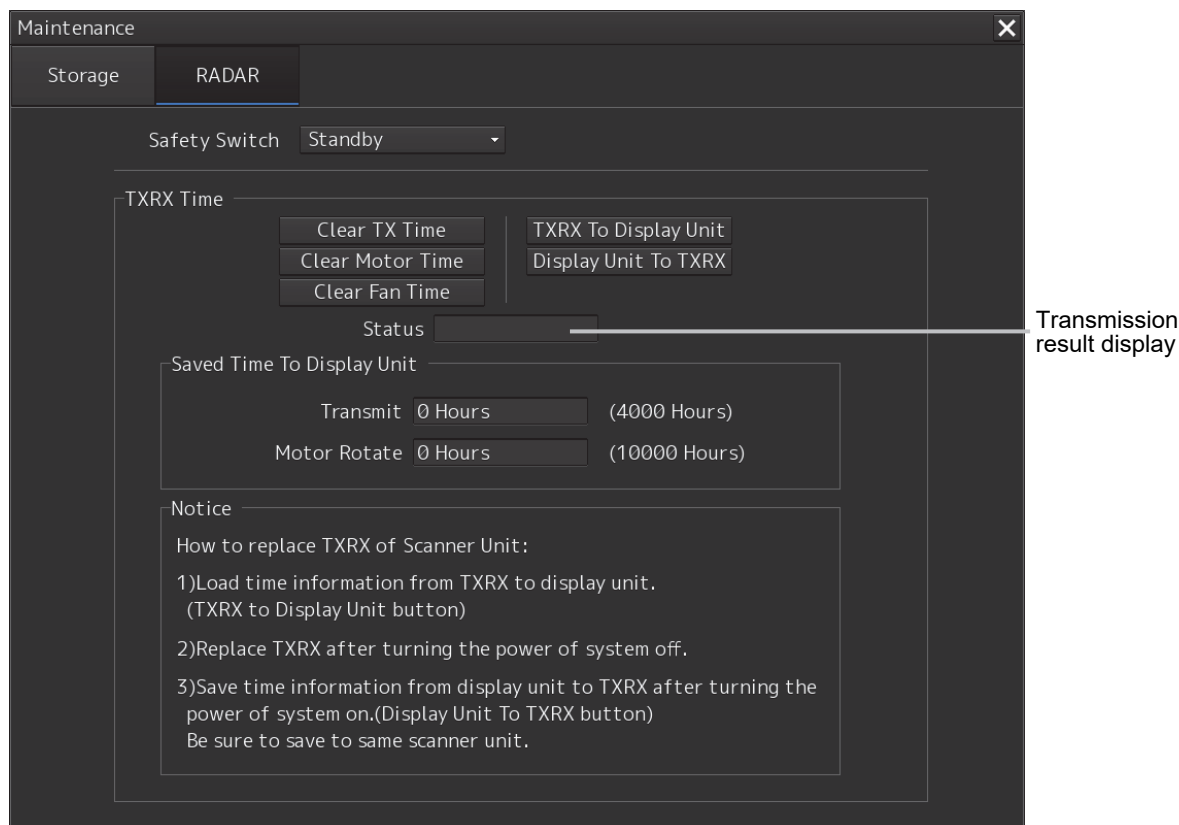
The total storage capacity and free space on each of the drives (C and D) are displayed in the [Drive Information] list. The capacity of each of the files stored on the drives is displayed in the [File Information] list. The files managed by File Manager are applicable.

## 19.4.3 Maintaining the radar (Radar screen only)

Use the [RADAR] dialog to maintain the radar.

### 19.4.3.1 Displaying the [RADAR] dialog

When you select [RADAR] in the classification pane, the RADAR dialog is displayed in the edit/result pane.



### 19.4.3.2 Changing the operation mode of the safety switch

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Open the list of the [Safety Switch] box and select the operation to be performed when the safety switch of the antenna is set to OFF.

| Setting | Operation  |
|---------|--|
| TX-Off  | <ul style="list-style-type: none"><li>• No radiant section's rotation and transmission</li><li>• PPI screen in the transmitting state</li><li>• Maintains the transmitting state without generating BP or BZ alarm</li></ul>   |
| Standby | <ul style="list-style-type: none"><li>• No radiant section's rotation and transmission</li><li>• PPI screen standby</li></ul>  |
| TX-On   | <ul style="list-style-type: none"><li>• No radiant section's rotation, with transmission</li><li>• PPI screen in the transmitting state</li><li>• Maintains the transmitting state without generating BP or BZ alarm</li></ul> |

---

### 19.4.3.3 Clearing a radar antenna operation time

The total transmission time and the total motor rotation time of a radar antenna can be cleared.

#### Clearing the total transmission time of a radar antenna

- 1 Click on the [Clear TX Time] (resetting transmission time) button.

#### Clearing the total motor rotation time of a radar antenna

- 1 Click on the [Clear Motor Time] (resetting the motor rotation time) button.

### 19.4.3.4 Replacing a TXRX circuit of a radar antenna

Verify the total transmission time and the total motor rotation time of the radar antenna and use the information as the guideline for replacement.

#### Acquiring the data of the total transmission time and the total motor rotation time from a radar antenna

- 1 Click on the [TXRX To Display Unit] (transmitting from an antenna to a display unit) button.

The data of the total transmission time and the total motor rotation time is acquired from the antenna and is stored in a display unit. The time that is acquired is displayed on the [Saved Time To Display Unit] display section.

**Transmit:** Total time acquired from the radar antenna

**Motor Rotate:** Total motor rotation time acquired from the radar antenna

#### Storing data of the total transmission time and the total motor rotation time in the radar antenna

- 1 Click the [Display Unit To TXRX] button (transmission from the display to the radar antenna).

The total transmission time and total motor rotation time saved in the display unit are saved to the radar antenna.

If data is saved normally, the data saved in the display unit will be deleted.

When a command is sent from the display unit to the radar antenna, the transmission result is displayed as follows.

**Result waiting state:** "Sending..." is displayed blinking at intervals of 1 sec.

**When the result is success:** "Completed" is displayed.

**When the result is failure:** "Not Completed" is displayed.



---

## Replacing a TXRX circuit

The operation procedure and notes are displayed on the Notice display.

- 1** By clicking on the [TXRX To Display Unit] button, load the data of the total transmission time and the total motor rotation time from the radar antenna to the display unit.
- 2** Turn off the power of the system and replace the TXRX circuit.
- 3** Turn on the power of the system and write the data of the total transmission time and the total motor rotation time in the transceiver unit of the radar antenna by clicking on the [Display Unit To TXRX].

### Note

Make sure that data is written to the transceiver unit of the same radar antenna when the data is loaded.



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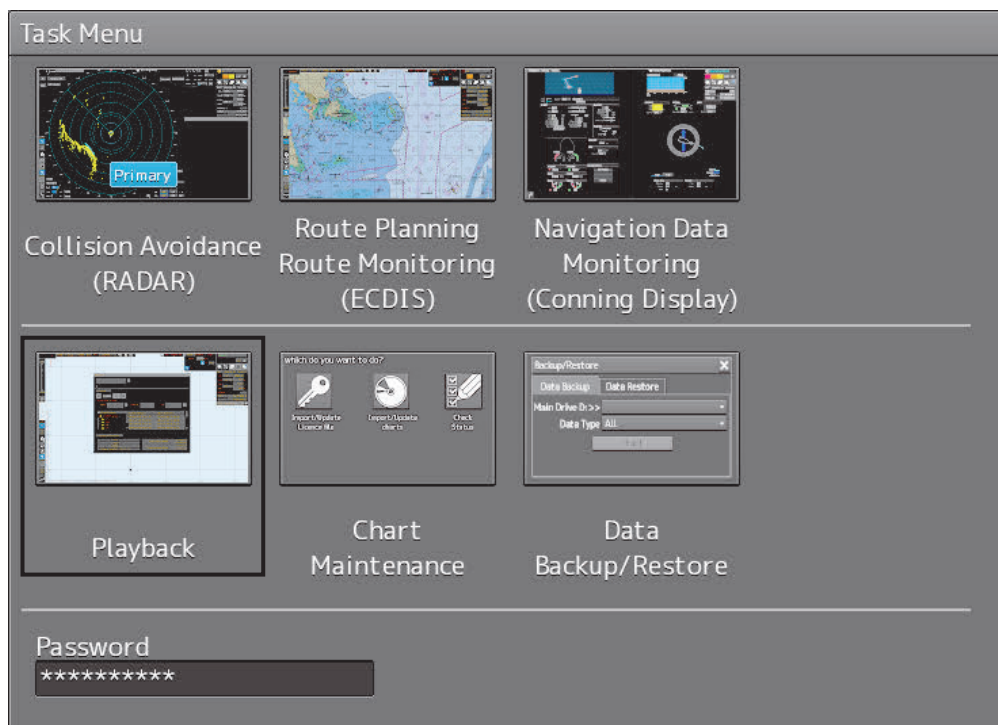
## Section 20    Playing Back Data Recorded During Navigation

---

The following information recorded during navigation can be played back on the ECDIS screen.

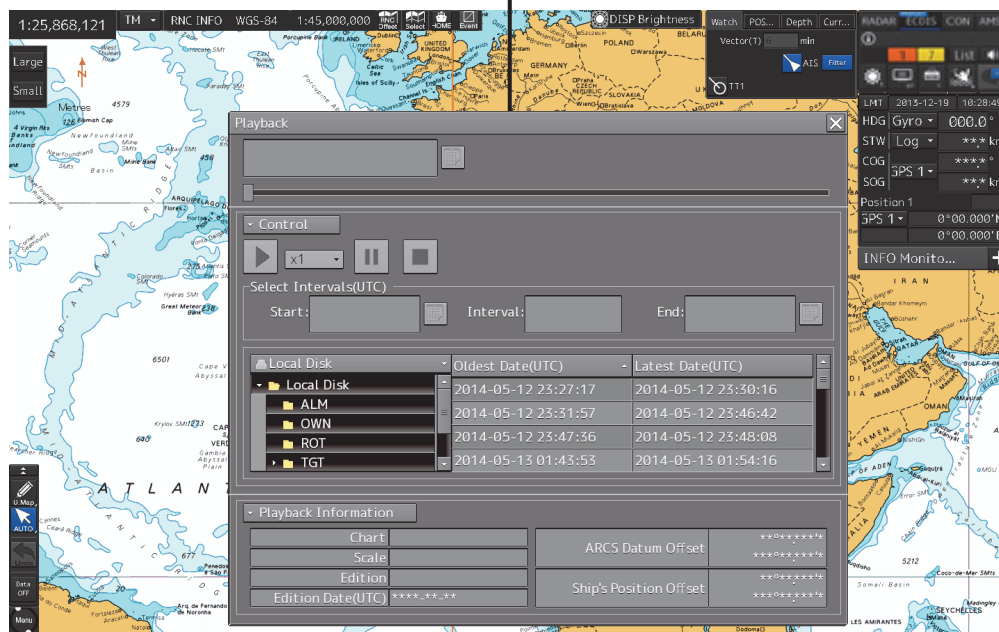
- Own ship's information
- Other ship's information
- Route information
- Alarm information

Click on the [Playback] button on the Task Menu.





The following ECDIS screen appears and the playback controller is displayed. (Playback mode)

Playback controller

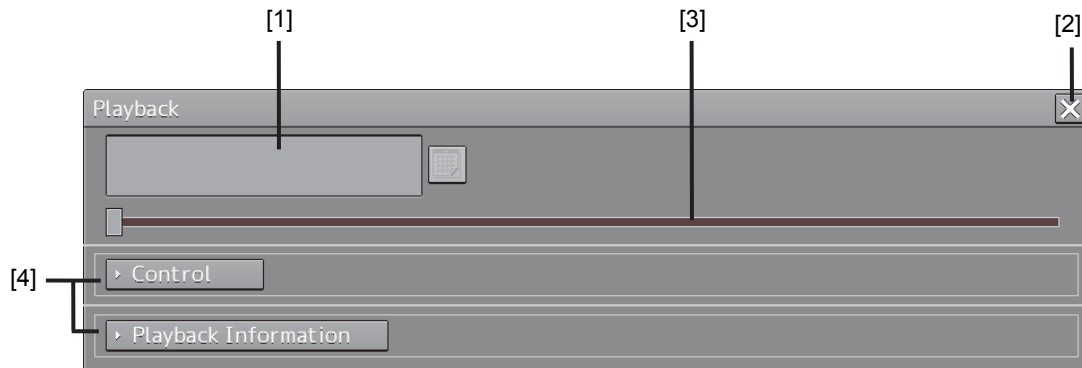


The playback controller can move to any position on the Playback dialog box; however, it cannot be minimized.

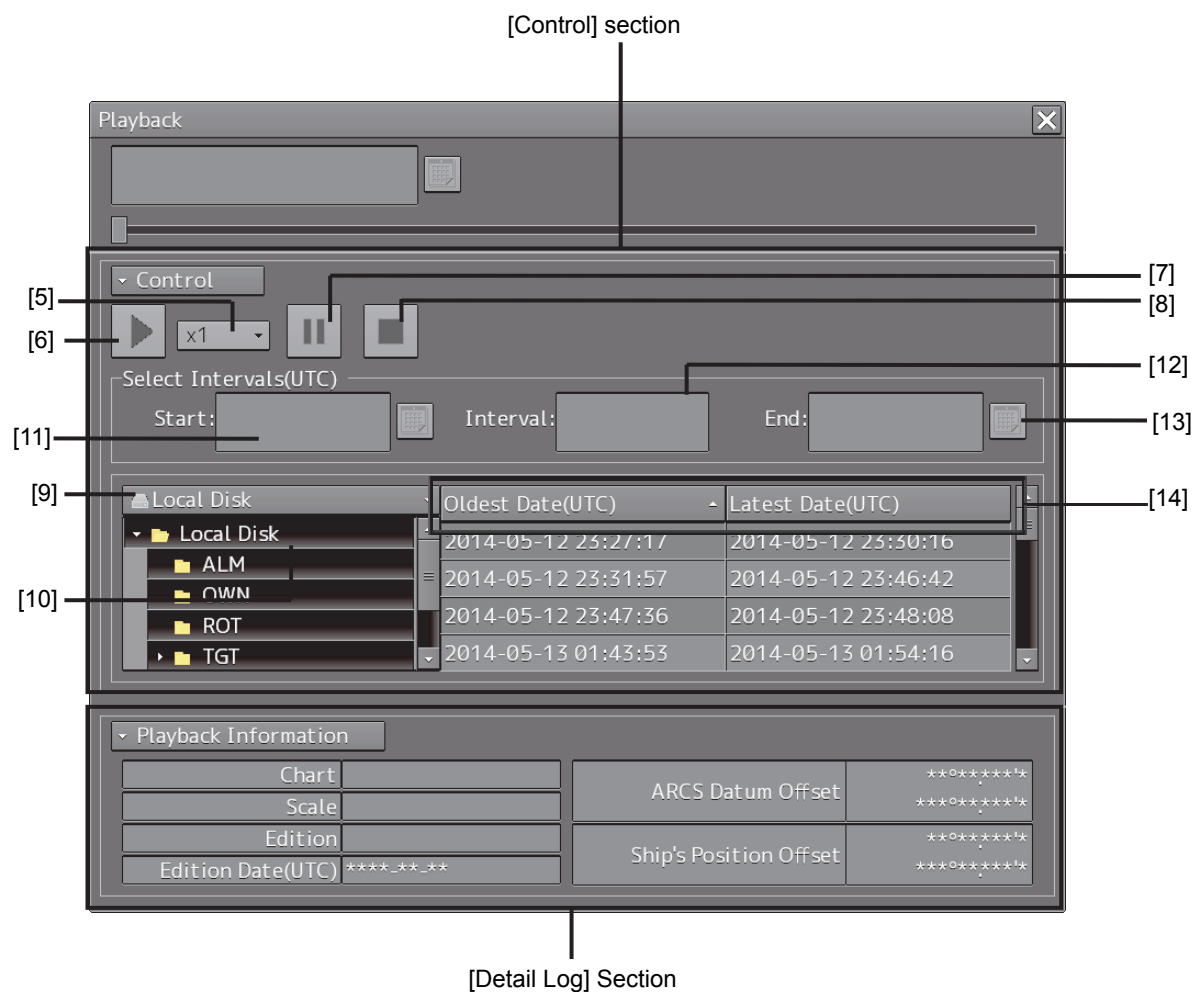
## 20.1 Playback Controller

The view of the playback controller can be switched between simplified display and full display by clicking the View Change button (  or  ).

### Simplified Display



### Full Display



## Upper Part of the Playback Controller

| Number | Name                | Function   |
|--------|---------------------|--|
| 1      | Playback time       | The playback time is displayed.  |
| 2      | [X] (Close) button  | Exits playback.  |
| 3      | Playback slider     | <p>The progress of playback is displayed. The playback position can be changed by moving the slider control.</p> <ul style="list-style-type: none"> <li>• During playback, the pointer of the playback slider cannot be dragged.</li> <li>• During halt/temporary halt, the pointer of the playback slider cannot be dragged to any position.</li> </ul> |
| 4      | View switch buttons | Switch between full display/simple display of the control unit and the playback information unit.  |

## [Control] Section

| Number | Name                         | Function   |
|--------|------------------------------|--|
| 5      | Playback speed selection box | Select the playback speed from the list. (x1, x2, x4, x10, x30, x60)   |
| 6      | Playback button              | Executes playback. When this button is clicked during playback, the playback speed changes in the following order: x1 ⇒ x2 ⇒ x4 ⇒ x10 ⇒ x30 ⇒ x60 ⇒ x1 ⇒ .....   |
| 7      | Pause button                 | Pauses playback. To resume, click the Playback button again.   |
| 8      | Stop button                  | Stops playback. When playback is stopped, the playback time returns to the playback start time and the playback slider control returns to the playback start time position.  |
| 9      | Drive selection box          | Select a data drive storing navigation record data from the list.  |
| 10     | Folder tree                  | Folders storing navigation record data are displayed in tree view.   |
| 11     | Playback start time          | <p>The playback start time is displayed. By clicking the calendar icon, you can display the calendar picker and change the playback start time.</p> <p>Specify the playback time range concurrently with the playback end time. The range can be specified within the range from the start to the end of the recording of the log data.</p>  |
| 12     | Playback segment             | The playback segment is displayed. (When a playback list has not been selected, this box is blank.)  |
| 13     | Playback end time            | <p>The playback end time is displayed. (When a playback list has not been selected, this box is blank.) By clicking the calendar icon, you can display the calendar picker and change the playback end time.</p> <p>Specify the playback time range concurrently with the playback start time. The range can be specified within the range from the start to the end of the recording of the log data.</p> |
| 14     | Playback list                | Each record data is displayed in the order of the oldest time to the latest time. When [Oldest Date] or [Latest Date] on the title bar is clicked on, the data is sorted in the order of the oldest data or latest data.   |

---

**[Detail Log] Section**

Information of each record data is displayed.

| Name                   | Function  |
|------------------------|---|
| Chart                  | The cell having the cell name of the chart being displayed when recorded is shown.                |
| Scale                  | The scale of the chart being displayed when recorded is shown.                                    |
| Edition                | The version of the cell having the cell name of the chart being displayed when recorded is shown. |
| Edition Date (UTC)     | The issue date of the chart being displayed when recorded is shown.                               |
| ARCS Datum Offset      | The offset value of the ARCS chart when recorded is shown.  |
| Ship's Position Offset | The offset value of own ship's position when recorded is shown.                                   |

---

## 20.2 Selecting Playback Data

Select the navigation record data you want to play back.

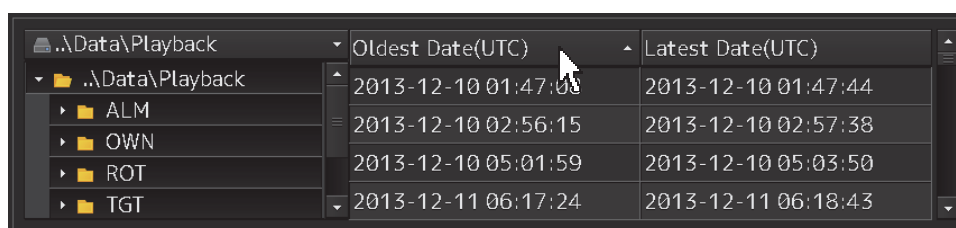
- 1 Click on the Drive Selection box to open the list, and then select a data drive storing navigation record data.



Folders saved on the selected data drive are displayed in tree view.

- 2 Select a folder storing the navigation record data you want to play back (ex. Playback folder).

Each navigation record data is displayed in the order of the oldest time to the latest time.

A screenshot of the software interface showing a tree view of folders on the left and a table of navigation record data on the right. The tree view shows '..\Data\Playback' expanded, with subfolders 'ALM', 'OWN', 'ROT', and 'TGT'. The table has two columns: 'Oldest Date(UTC)' and 'Latest Date(UTC)'. The data rows are as follows:

| Oldest Date(UTC)    | Latest Date(UTC)    |
|---------------------|---------------------|
| 2013-12-10 01:47:08 | 2013-12-10 01:47:44 |
| 2013-12-10 02:56:15 | 2013-12-10 02:57:38 |
| 2013-12-10 05:01:59 | 2013-12-10 05:03:50 |
| 2013-12-11 06:17:24 | 2013-12-11 06:18:43 |

- 3 Select the navigation record data you want to play back.

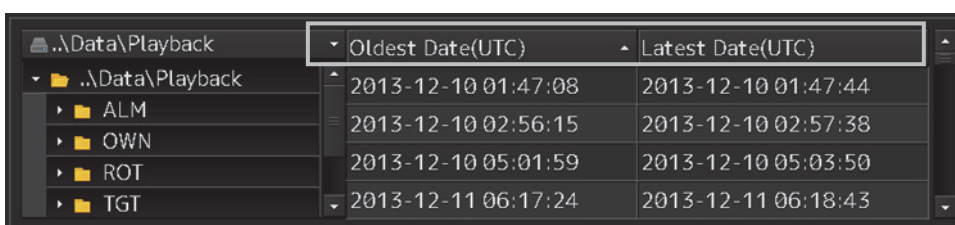
The oldest time and latest time of the selected navigation record data are reset to their initial values and then displayed in the playback list.

When navigation record data is selected, a chart is displayed in such a way that the position of own ship when recording has started is at the center of the dialog box. When display setting is executed, own ship's track is displayed on the chart.

### 20.2.1 Sorting the Playback List

Sort the logbook data display sequence in the ascending/descending sequence based on the oldest time/latest time.

- 1 Click the title bar on the control section.



To sort navigation record data by the oldest time, click on [Oldest Date(UTC)]; to sort it by the latest time, click on [Latest Date(UTC)].



---

## 20.3 Playing back Logbook Data

Play back the selected logbook data.

### To Start Playback

**1 Click on the Playback button.**

Playback of navigation record data starts.

The Playback button is highlighted during playback, and the playback time indicator and the playback slider control are also linked with the playback.

### To Pause Playback

**1 Click on the Pause button.**

Playback of navigation record data pauses.

The Pause button is highlighted while pausing, and the playback time indicator and the playback slider control also pause.

To resume, click on the Playback button.

### To Stop Playback

**1 Click on the Stop button.**

Playback of navigation record data stops.

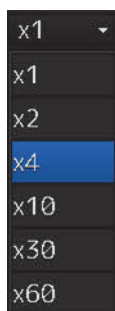
The Stop button is highlighted while stopping, and the playback time is reset to the playback start time and the playback slider control returns to the starting point at the left edge.

---

## 20.3.1 Changing the Playback Speed

Change the playback speed of logbook data.

- 1 Select a playback speed from the list in the Playback Speed Selection box.



Navigation record data is played back at the selected playback speed.

The time shown on the playback time indicator and the progress shown on the playback slider control change according to the playback speed.

The playback speed can be changed by clicking on the Playback button repeatedly.

Each time the Playback button is clicked, the playback speed changes in the following order: x1 ⇒ x2 ⇒ x4 ⇒ x10 ⇒ x30 ⇒ x60 ⇒ x1 ⇒ .....

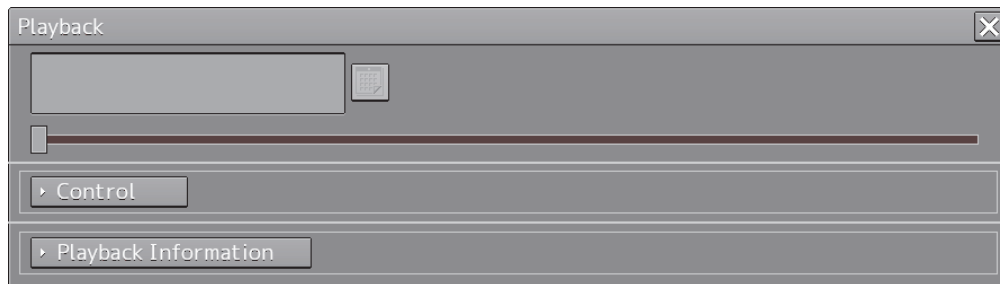
---

## 20.4 Exiting the Playback Mode

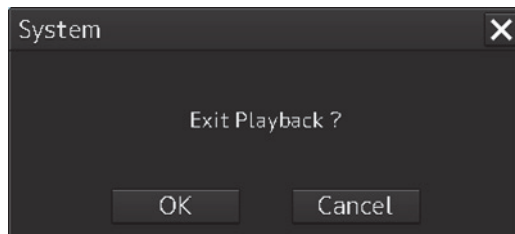
Other tasks cannot be executed while the Playback dialog box is being displayed (during the Playback mode).

To execute other tasks, exit the Playback mode.

- 1 Click on the [X] (Close) button on the playback controller.



The Exit Confirmation dialog box appears.



- 2 Click on the [OK] button.

The playback controller closes and the Playback mode ends.

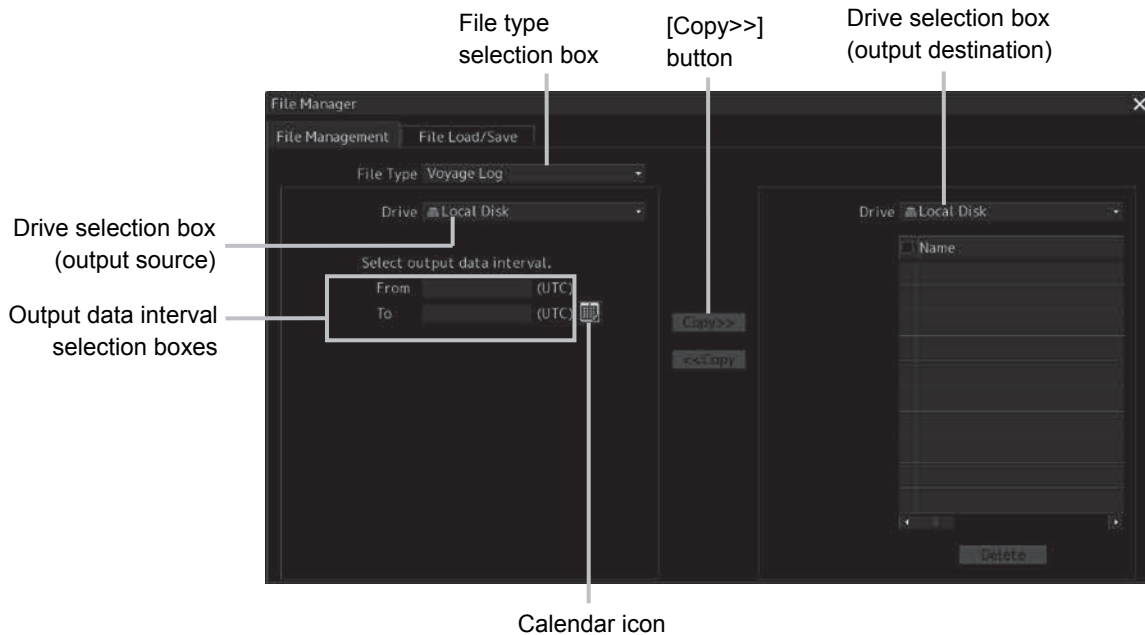
To cancel exiting the Playback mode, click on the [Cancel] button.

---

## 20.5 Outputting Navigation Record Data

Select navigation record data from the File Manager submenu of the Tools menu, and then copy it to the output destination you specify.

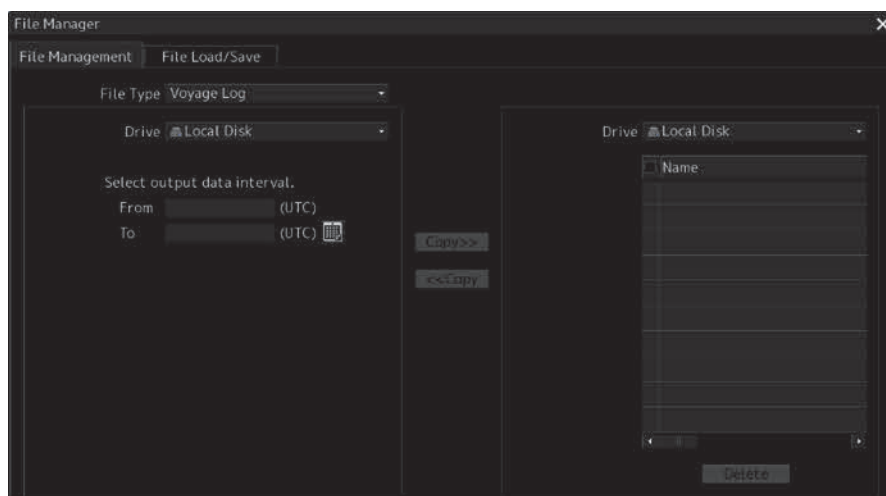
### 1 Open the File Manager submenu of the Tools menu.



### 2 Select [Voyage Log] from the File type selection box, and then select [Local Disk] from the Drive at the output source selection box.

Below the Drive at the output source selection box, the output data interval selection boxes and the calendar icon appear.

- 3 By clicking on the Calendar icon, specify the duration of the logbook data to be output.**  
The selected dates appear in the output data interval selection boxes.



- 4 Specify the drive of the output destination from the output destination drive selection box and the output destination folder from the folder tree.**  
The [Copy>>] button takes effect.

- 5 Click on the [Copy>>] button.**

The following folder is created in the output destination path, and the navigation record data having the specified interval is copied to this folder.

Folder name: Playback\_120108\_120109

Output data start time [yymmdd]      Output data end time [yymmdd]

---

## 20.6 Functional Restrictions when in the Playback Mode

Some functions are restricted in playback mode. The restricted functions are disabled.

---

# Section 21 Maintenance & Inspection

---

## 21.1 Maintenance Functions Executed from Menu

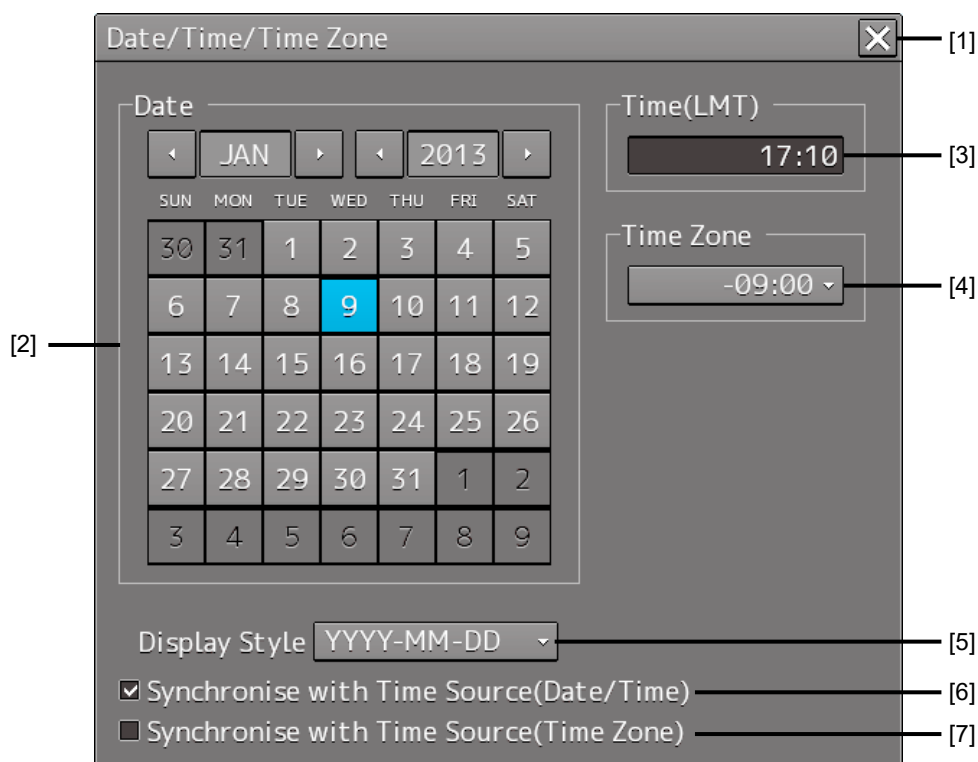
This section explains maintenance functions that are executed from the menu.

### 21.1.1 Starting maintenance functions

- 1 Click on the [Menu] button on the left Toolbar.**  
The menu is displayed.
- 2 Click on the [Maintenance] button on the menu.**  
The submenu is displayed.
- 3 Click on a button on the submenu.**  
The dialog box of the selected maintenance function is displayed.

### 21.1.2 Setting Date/Time/Time Zone

- 1 Click on the [Menu] button on the left Toolbar.**  
The menu is displayed.
- 2 Click on the [Maintenance] - [Date/Time/Time Zone] button on the menu.**  
The [Date/Time/Time Zone] dialog box appears.



---

**[1] [X] button**

Click on this button to close the [Date/Time/Time Zone] dialog box.

**[2] [Date]**

Set the year, month and day on the calendar.

For the details of how to use the calendar, refer to "3.17 Setting a Date and a Time [Calendar Operation)".

**[3] [Time(LMT)]**

Enter the time in the input box. The time entered will be reflected on the clock.

**[4] [Time Zone]**

Enter the time zone in the time zone input box.

A time zone can be selected between -13:30 and +13:30 from UTC.

**[5] [Display Style]**

From the list, select the style to display the date.

- YYYY-MM-DD (Japanese style)
- MMM DD,YYYY (North American style)
- DD MMM,YYYY (European style)

**[6] [Synchronise with Time Source (Date/Time) ](synchronization of time with GPS)**

When this item is checked, date and time are synchronized by using the time information (ZDA sentence) from GPS.

**[7] [Synchronise with Time Source (Time Zone) ](synchronization of time difference with GPS)**

When this item is checked, time difference is synchronized by using the time information (ZDA sentence) from GPS.

**Note**

When [Synchronize with Time Source (Date/Time)] is not checked, the time is reset to the initial value at the start of power supply. Therefore, set a correct time manually.



---

## 21.1.3 Confirming System Information

System information can be confirmed.

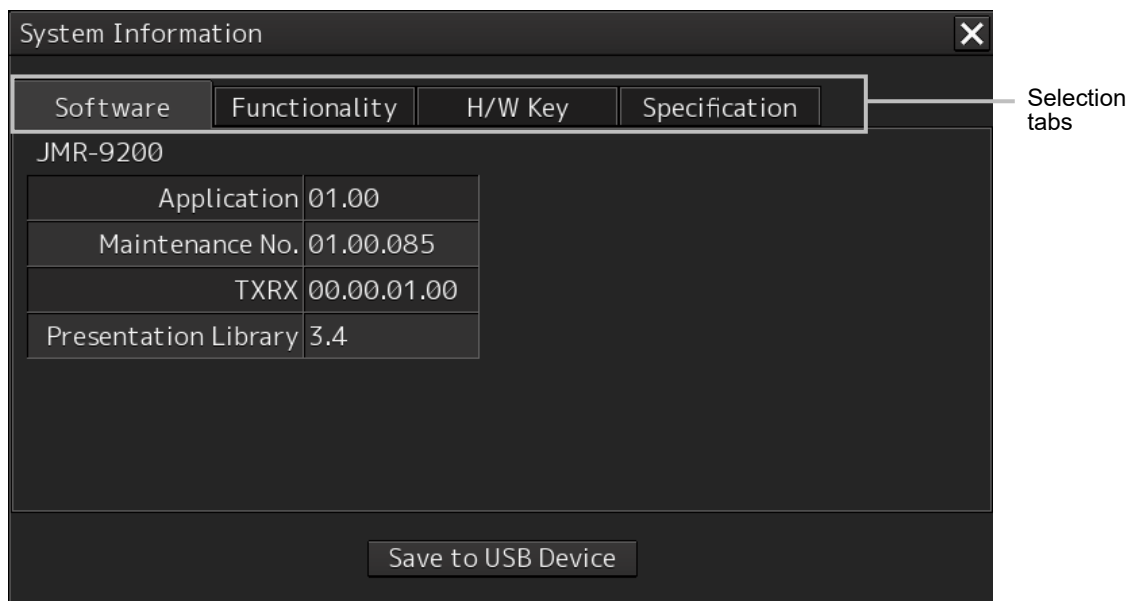
- 1 Click on the [Menu] button on the left Toolbar.

The menu is displayed.

- 2 Click on the [Maintenance] - [System Information] button on the menu.

The [System Information] dialog box appears.


The contents of the dialog will be switched by clicking on the selection tabs provided in the dialog box.





### Note

The System Information screen also can be opened by right-clicking the [Menu] key.

### 21.1.3.1 Confirming software information



## WARNING

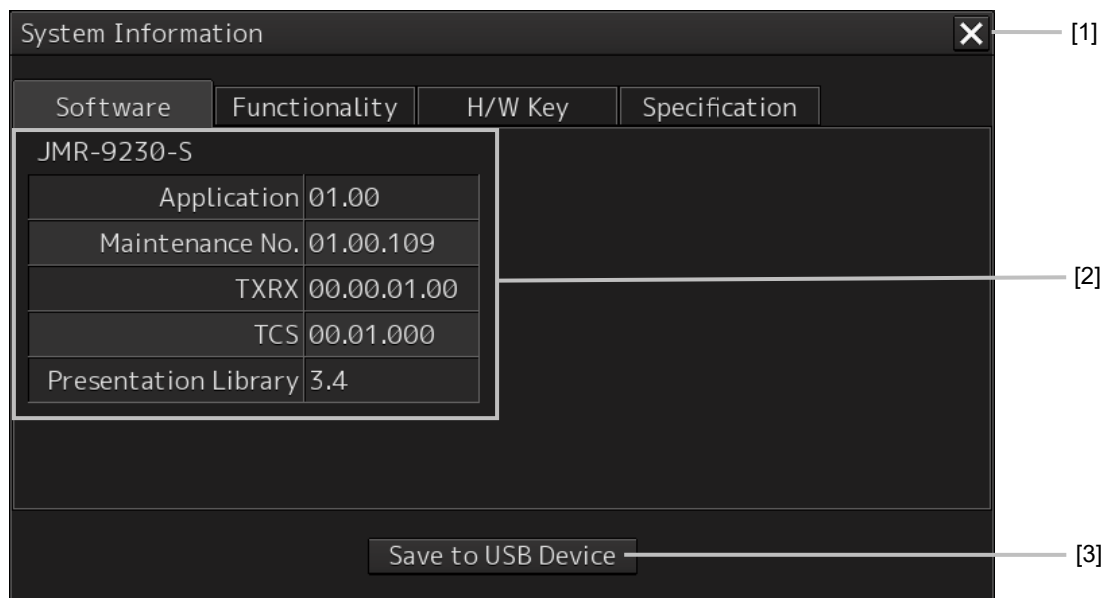
  


When you want to use a USB flash memory to read or write a file, make sure in advance that the USB flash memory is not affected by a computer virus. If the indicator is infected with a virus, other equipment will also be infected, with the result that a trouble will occur.

Before removing the USB flash memory, check for the access lamp of the USB flash memory and make sure that it is not being accessed. If you remove the USB flash memory when it is accessed, data may be destroyed and a trouble may occur.

Software information can be confirmed.

- 1 Click on the [Menu] button on the left Toolbar.**  
The menu is displayed.
- 2 Click on the [Maintenance] - [System Information] button on the menu.**  
The [System Information] dialog box appears.
- 3 Click on the [Software] tab.**  
The software information is displayed.



#### [1] [X] button

Click on this button to close the [System Information] dialog box.

---

---

## [2] Software information

| Item                 | Displayed information  |
|----------------------|--|
| Jxx-xxxx             | Type and model name of the system  |
| Application          | Version of the application software  |
| Maintenance No.      | 7-digit maintenance number   |
| TXRX                 | Version of the software used for the radar transmitter-receiver unit<br>* This information is displayed when the system is equipped with the RADAR function. |
| TCS                  | Version of the software used for TCS<br>* This information is displayed when the system is equipped with the TCS function.                                   |
| Presentation Library | Edition of S52 Presentation Library<br>Displayed for ECDIS or RADAR (ENC chart display license available) only   |

## [3] [Save to USB Device] (Saving to USB flash memory) button

Click on this button to save the displayed information in a USB flash memory in the text format.

---

### 21.1.3.2 Checking the enable/disable statuses of the functions that have been installed

## WARNING



When you want to use a USB flash memory to read or write a file, make sure in advance that the USB flash memory is not affected by a computer virus. If the indicator is infected with a virus, other equipment will also be infected, with the result that a trouble will occur.



Before removing the USB flash memory, check for the access lamp of the USB flash memory and make sure that it is not being accessed. If you remove the USB flash memory when it is accessed, data may be destroyed and a trouble may occur.

**1 Click on the [Menu] button on the left Toolbar.**

The menu is displayed.

**2 Click on the [Maintenance] - [System Information] button on the menu.**

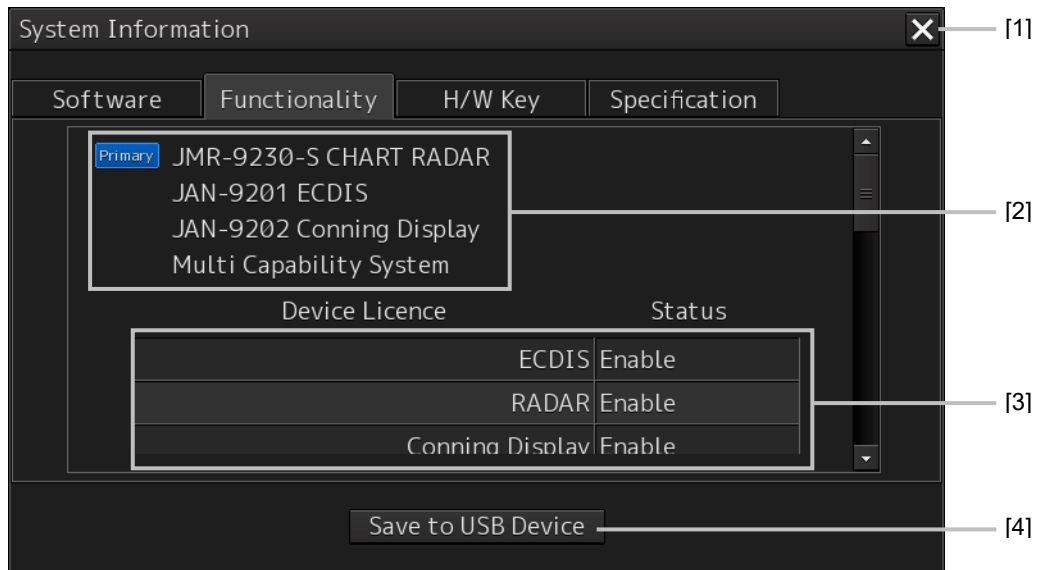
The [System Information] dialog box appears.

**3 Click on the [Functionality] tab.**

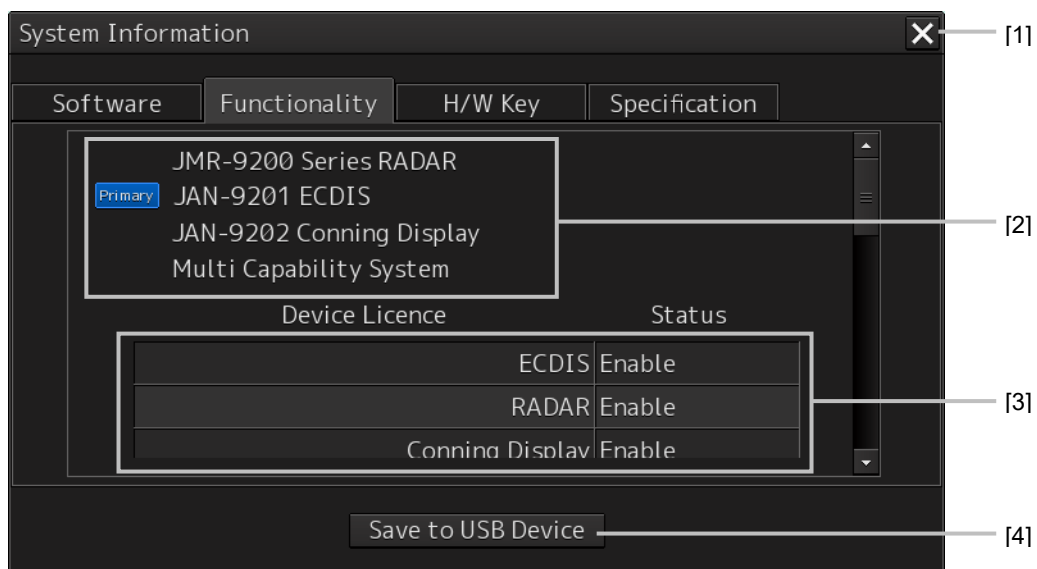
The functionality information is displayed.

The display contents vary depending on the number of operation modes and whether the modes include the primary task (shown by this equipment).

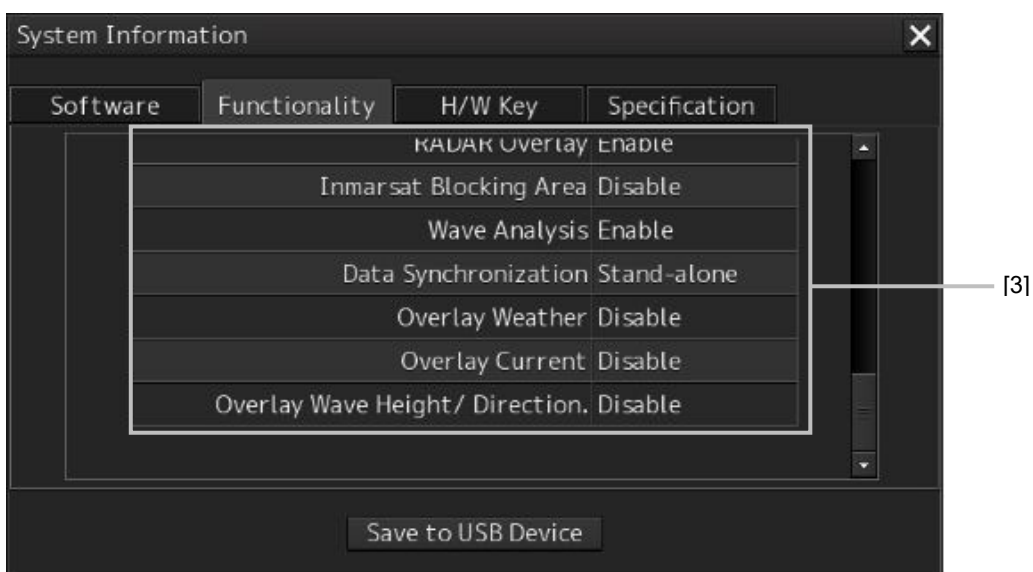
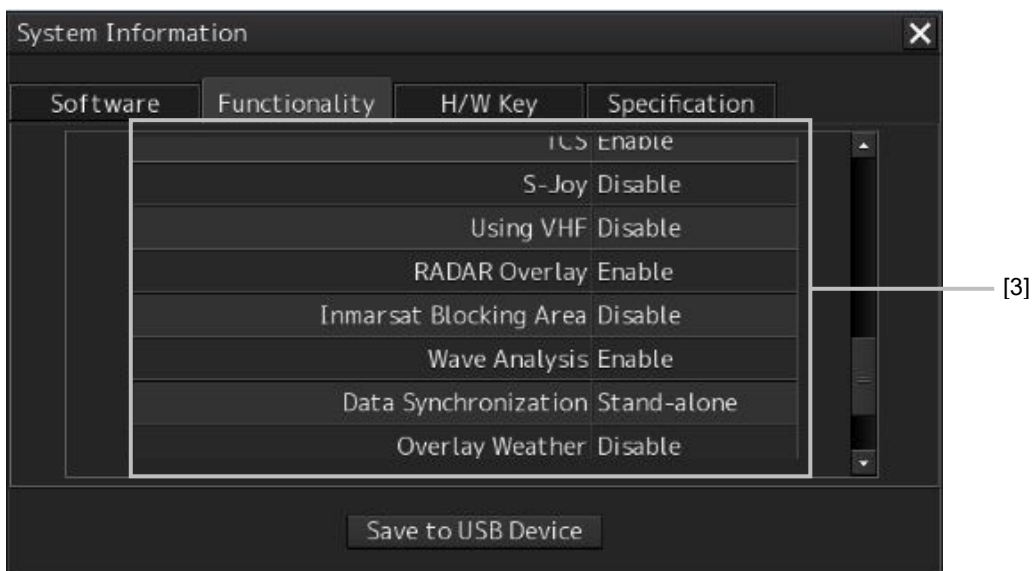
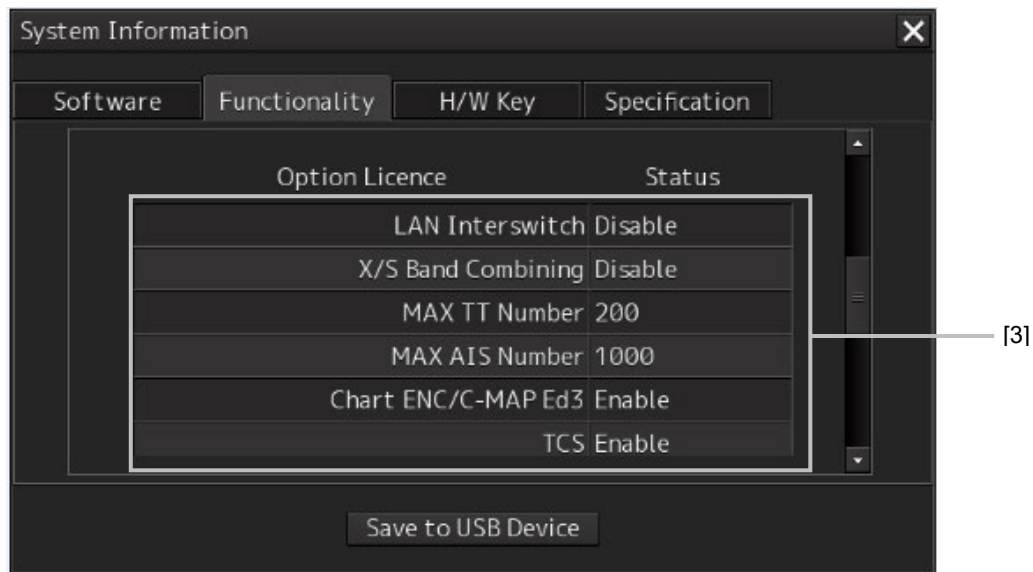
[The system has multiple operation modes and RADAR is the primary task]



[The system has multiple operation modes and RADAR is not the primary task]



[Section that is displayed when the above screen is scrolled down (example)]



---

### [1] [X] button

Click on this button to close the [System Information] dialog box.

### [2] Format

The system format and model name of this equipment are displayed.

(Example: JAN-9201)

The [Primary] badge is displayed in front of the format for the primary task.

### [3] Functionality

The functions that are installed are displayed in [Device Licence] and [Option Licence].




One of the following is displayed in [Status].

| [Status]            | Meaning   |
|---------------------|---|
| Enable              | Indicates that the function can be used.  |
| Disable             | Indicates that the function cannot be used.   |
| Value (such as 500) | Indicates the setting value of the option license of the function.  |
| Stand-alone         | This indicates that it is not possible to use the function of synchronization with other equipment, and independent operation has to be made. |

### [4] [Save to USB Device] (Saving to USB flash memory) button

Click on this button to save the displayed information in a USB flash memory in the text format.

## 21.1.3.3 Confirming H/W key information

|  |   |
|--|---|
|  <b>WARNING</b> |   |
|                 | When you want to use a USB flash memory to read or write a file, make sure in advance that the USB flash memory is not affected by a computer virus. If the indicator is infected with a virus, other equipment will also be infected, with the result that a trouble will occur. |
|                 | Before removing the USB flash memory, check for the access lamp of the USB flash memory and make sure that it is not being accessed. If you remove the USB flash memory when it is accessed, data may be destroyed and a trouble may occur.                                       |

Hardware key information can be confirmed.

This information is displayed only for the equipment with the ECDIS function.

#### **1 Click on the [Menu] button on the left Toolbar.**

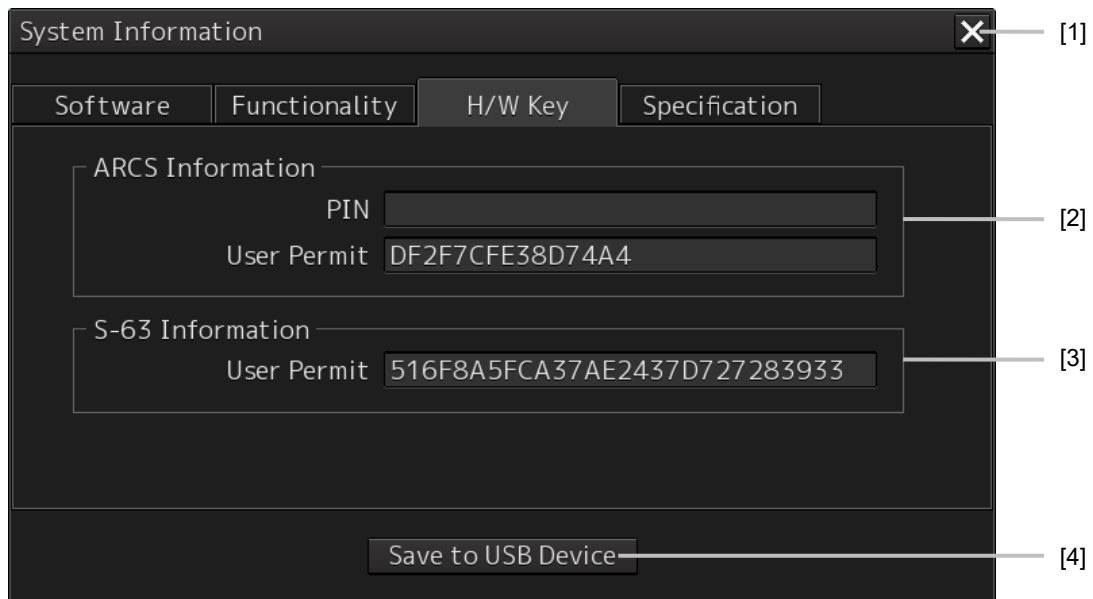
The menu is displayed.

#### **2 Click on the [Maintenance] - [System Information] button on the menu.**

The [System Information] dialog box appears.

### 3 Click on the [H/W Key] tab.

The hardware key information is displayed.



#### [1] [X]

Click on this button to close the [System Information] dialog box.

#### [2] [ARCS Information]

The ARCS PIN number and User Permit are displayed.

#### [3] [S-63 Information]




The S-63 User Permit is displayed.

#### [4] [Save to USB Device] (Saving to USB flash memory) button

Click on this button to save the displayed information in a USB flash memory in the text format.



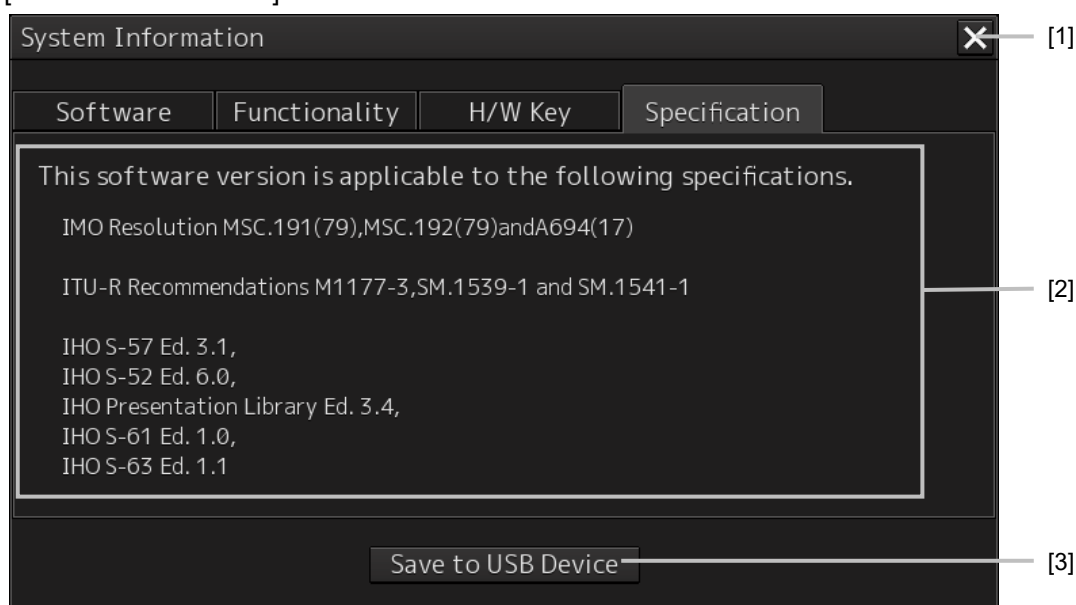
### 21.1.3.4 Confirming the compliant standards for the equipment

|  |   |
|--|---|
|  <b>WARNING</b> |   |
|                 | When you want to use a USB flash memory to read or write a file, make sure in advance that the USB flash memory is not affected by a computer virus. If the indicator is infected with a virus, other equipment will also be infected, with the result that a trouble will occur. |
|                 | Before removing the USB flash memory, check for the access lamp of the USB flash memory and make sure that it is not being accessed. If you remove the USB flash memory when it is accessed, data may be destroyed and a trouble may occur.                                       |

When the equipment license of RADAR or ECDIS is available, the standard relating to the equipment license is displayed.

- 1 Click on the [Menu] button on the left Toolbar.**  
The menu is displayed.
- 2 Click on the [Maintenance] - [System Information] button on the menu.**  
The [System Information] dialog box appears.
- 3 Click on the [Specification] tab.**  
The equipment license standard specification information is displayed.

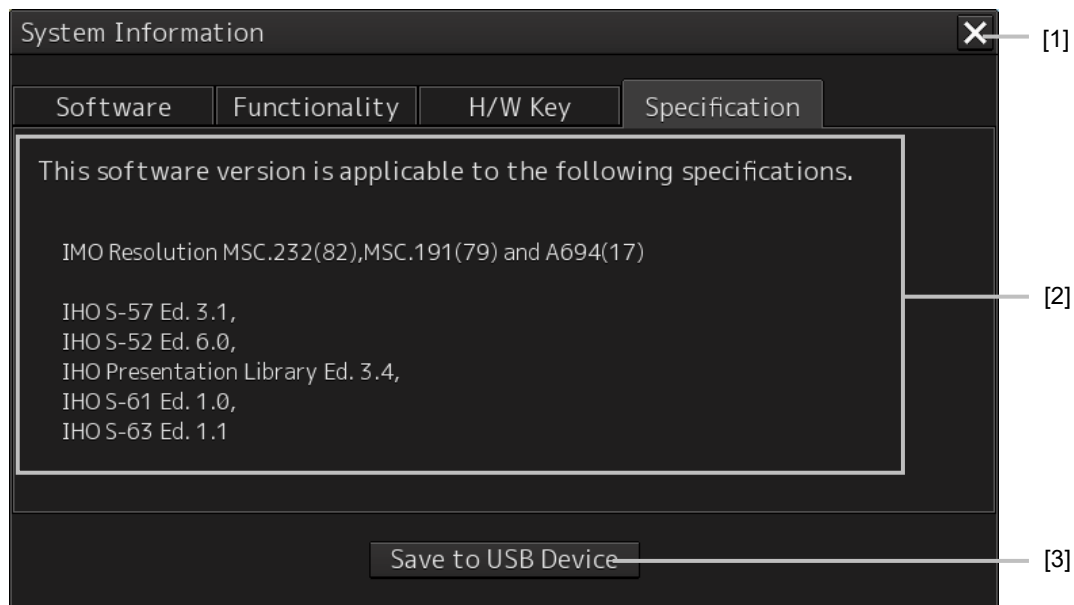
[In the case of RADAR]



#### Memo

The IHO information is displayed only when there is ENC chart display as an optional license.

[In the case of ECDIS]



**[1] [X] button**

Closes the [System Information] dialog box.

**[2] Equipment license information**

The equipment license standard specification information is displayed.

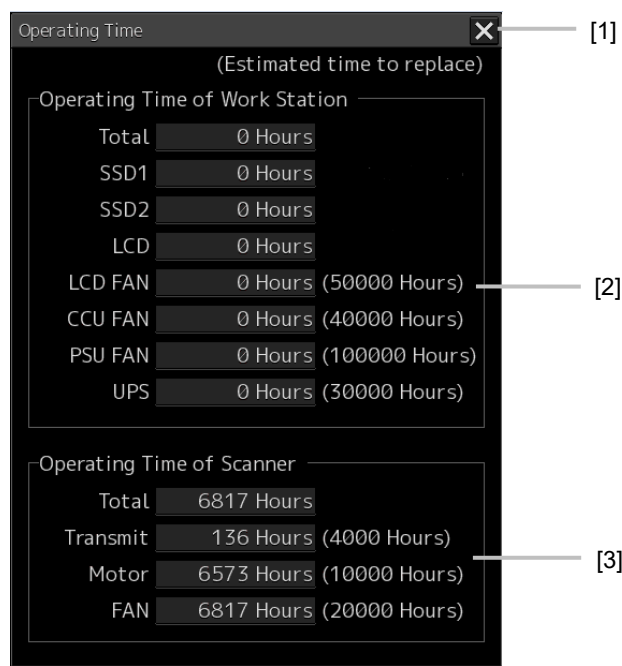
**[3] [Save to USB Device] (Saving to USB flash memory) button**

Click on this button to save the displayed information in a USB flash memory in the text format.

# 21.1.4 Confirming Operating Time

Confirm the operating time of this system.

- 1 Click on the [Menu] button on the left Toolbar.  
The menu is displayed.
- 2 Click on the [Maintenance] - [Operating Time] button on the menu.  
The [Operating Time] dialog box appears.



## [1] [X] button

Click on this button to close the [Operating Time] dialog box.

## [2] [Operating Time Of Work Station]

The operating time of this equipment is displayed.

[Total]: Total operating time of this equipment

[SSD1]: Total operating time of SSD1.

[SSD2]: Total operating time of SSD2.

[LCD]: Total operating time of LCD.

[LCD FAN]: Total operating time of LCD FAN. The estimated replacement time is indicated in ( ).

[CCU FAN]: Total operating time of CCU FAN. The estimated replacement time is indicated in ( ).

[PSU FAN]: Total operating time of PSU FAN. The estimated replacement time is indicated in ( ).

[UPS]: Total operating time of UPS. The estimated replacement time is indicated in ( ).

### Memo

[UPS] is displayed only when UPS is installed as an option.

### [3] [Operating Time Of Scanner]

The total operating time of the radar antenna is displayed.

[Total]: Total operating time of the radar antenna

[Transmit]: Total operating time of the transmitter. The estimated replacement time is indicated in (    ).

[Motor]: Total operating time of the motor. The estimated replacement time is indicated in (    ).

[FAN]: Total operating time of the radar antenna fan.

#### Memo

[Operating Time Of Scanner] is displayed when it is connected with an antenna.

## 21.1.5 Displaying/Resetting the Current Voyage Distance

This equipment displays the current voyage distance (estimated voyage distance) that is calculated from the speed over the ground and the speed through the water.

The voyage distance can also be reset.

#### Note

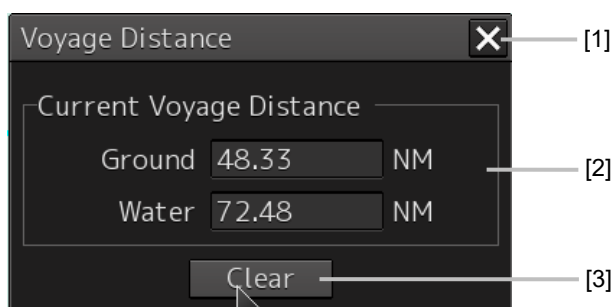
While the ship is anchored or sailing at low speed, it takes up to around 2 minutes to reset the current voyage distance.

#### 1 Click on the [Menu] button on the Left Tool Bar.

A menu is displayed.

#### 2 Click on [Maintenance] - [Voyage Distance] on the menu.

The [Voyage Distance] dialog is displayed.



#### [1] [X] button

The [Voyage Distance] dialog is closed.

#### [2] [Current Voyage Distance]

The current voyage distance is displayed.

[Ground]: Indicates the current voyage distance that is calculated from the speed over the ground.

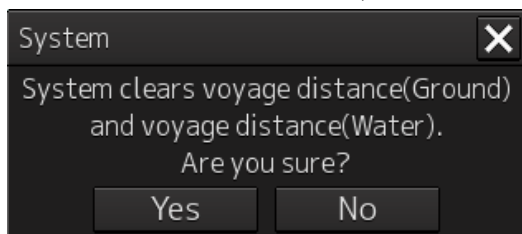
[Water]: Indicates the current sea distance that is calculated from the speed through the water.

---

### [3] [Clear] button

The voyage distance is reset.

When this button is clicked on, a confirmation dialog is displayed.



To reset the voyage distance, click on the [Yes] button. When not resetting the voyage distance, click on the [No] button.

#### **Memo**

When the voyage distance is reset in the [Voyage Distance] dialog, the voyage distance in the event detailed information in the logbook is also reset. The [Voyage distance (ground)] and [Voyage distance (water)] in the event detailed information are reset.

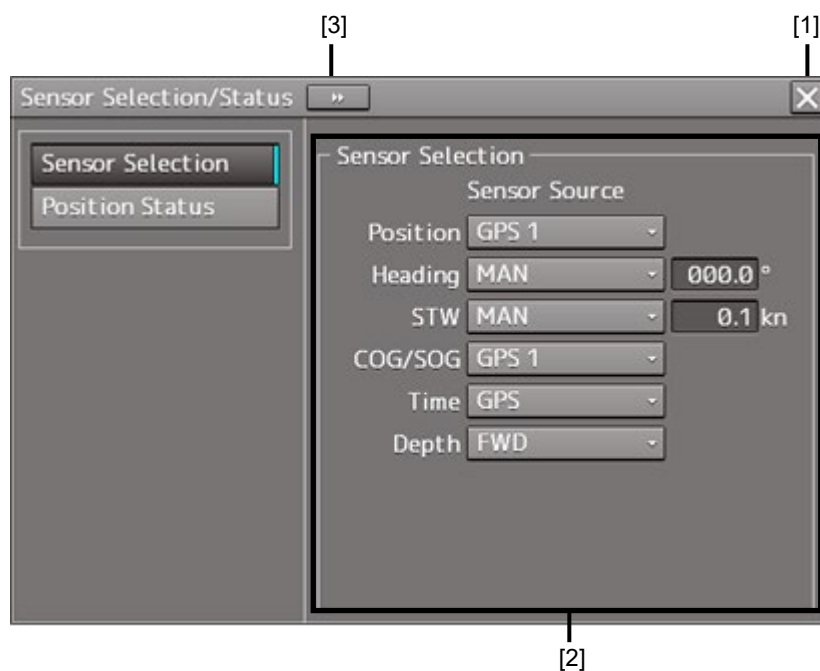
For the details of the event detailed information in the logbook, refer to “15.1.1 Event detailed information”.

---

## 21.1.6 Setting and confirming the Sensor Source

Set and confirm the sensor source.

- 1 Click on the [Menu] button on the left Toolbar.**  
The menu is displayed.
- 2 Click on the [Maintenance] - [Sensor Selection/Status] button on the menu.**  
The [Sensor Selection/Status] dialog box appears.



### [1] [X] button

Closes [Sensor Selection/Status] dialog box.

### [2] [Sensor Selection]

Enables selection of a sensor source.

| Setting item   | Setting contents  | Setting value  |
|--|---|--|
| Position   | Select a Primary Position sensor source from the combo box.   | GPS x, DR<br>("x": equipment number)                     |
| Heading  | <p>Select a heading sensor source from the combo box.</p> <ul style="list-style-type: none"> <li>* The sources that can be selected vary according to the installation.</li> <li>* When GyroSW is enabled, only Gyro and MAN can be selected.</li> </ul> <p>When the Gyro Compass system that is used has the automatic switching function, the sensor source display is switched automatically according to the switching condition.</p> <p>When the sensor source is set to [MAN], the ship's heading value can also be input in the input box.</p> <p>Ship's heading value input range: 0.0-359.9°</p> | MAN, Gyro x, MAG, G/C<br>("x" indicates the unit number) |
| STW (Speed Through Water)                              | <p>Select a Speed Through Water sensor source from the combo box.</p> <ul style="list-style-type: none"> <li>* The source that can be selected varies depending on the installation</li> <li>* When 1AX is installed in Log, Log cannot be selected from the sensor source.</li> </ul> <p>When the sensor source is set to [Manual], a Speed Through Water can also be input in the input box.</p> <p>Speed Through Water value input range: -99.9-99.9kn</p>   | MAN, Logx<br>("x" indicates the unit number)             |
| COG/SOG (Course Over the Ground/Speed Over the Ground) | <p>Select Course Over the Ground/Speed Over the Ground sensor source from the combo box.</p> <ul style="list-style-type: none"> <li>* The source that can be selected varies depending on the installation</li> </ul> <p>When GPS is selected for Position, the same GPS is selected automatically.</p>   | Log x, GPS<br>("x" indicates the unit number)            |
| Time (Time correction)                                 | <p>Select a sensor source to be used for time correction of this equipment from the combo box.</p> <ul style="list-style-type: none"> <li>* The source that can be selected varies depending on the installation</li> </ul>   | GPS, Ship Clock  |
| Depth (Water depth)                                    | <p>Select a water depth sensor source from the combo box.</p> <ul style="list-style-type: none"> <li>* The selectable sources vary depending on the installation. When FURUNO is selected in [Device Installation] - [Echo Sounder 1], it is fixed to AUTO.</li> </ul>  | FWD, AFT, MID, AUTO*1                                    |

\*1: When Echo Sounder 1 and Echo Sounder 2 are installed as depth sensor sources, E/S1 (AUTO) and E/S2 (AUTO) are displayed instead of AUTO.

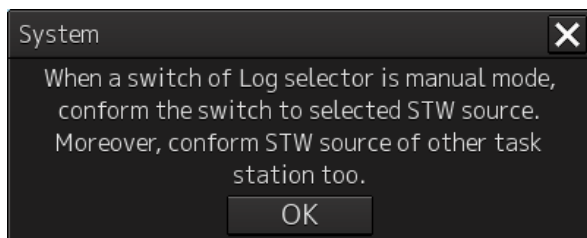
---

### [3] Disclosure button

Clicking on this hides the left pane.

#### Memo

When Log Selector is installed and the Log (speed) sensor is switched automatically, a popup window is displayed, notifying the effect.

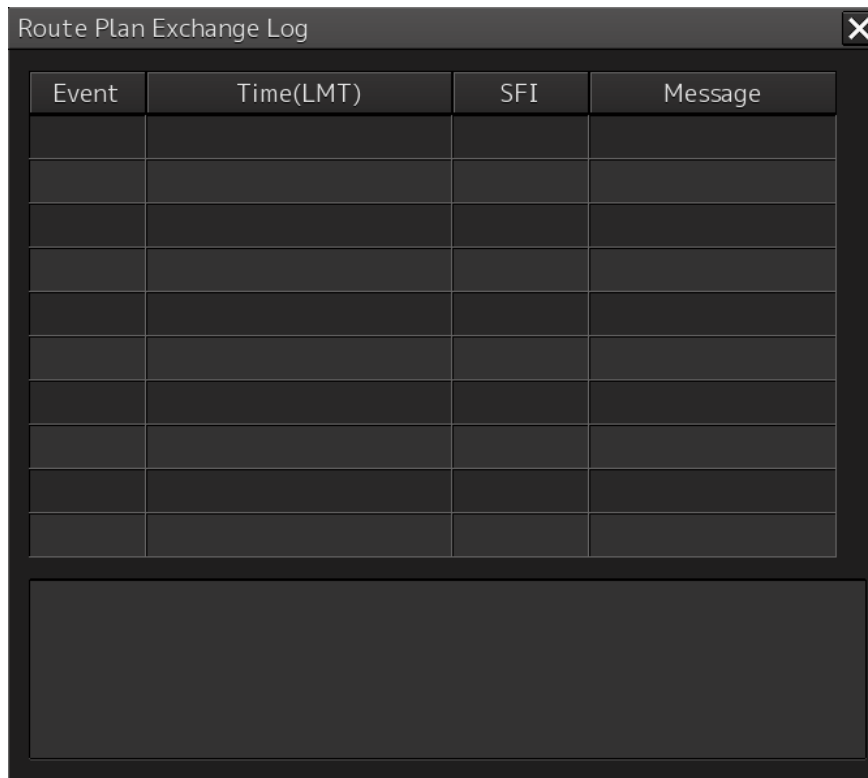




## 21.1.7 Checking the Route Plan Exchange Log

Checking the Route Plan Exchange Log.









- 1 Click on the [Menu] button on the left Toolbar.**  
The menu is displayed.
- 2 Click on the [Maintenance] - [Route Plan Exchange Log] button on the menu.**  
The [Route Plan Exchange Log] dialog box appears.



| Setting item           | Setting contents  | Setting value   |
|------------------------|---|---|
| Event                  | Specify reception or transmission.  | Recv/Send/Timeout/Check   |
| Time(UTC) or Time(LMT) | Displays the time of reception or transmission.   |   |
| SFI                    | When receiving: SFI of the transmission source device<br>When transmitting: SFI of destination device |   |
| Message                | Displays the transmission / reception contents.   | Query/Route Data/Route Plan/<br>Monitored Route/Alternate Route/<br>Response(Error)/Response(Accepted)/<br>Response(Reject)/Response(Pending)/<br>No Response(Query)/<br>No Response(Route)/No Data/<br>No Report/Correct/Incorrect |
| Detail View            | Detailed display of error content etc.  |   |

---

## 21.2 General Maintenance

|  <b>DANGER</b> |  |
|---|--|
|                | Never attempt to check or repair the inside of the equipment.<br>Checking or repair by an unqualified person may cause a fire or an electric shock.<br>Contact our head office, or a nearby branch or local office to request servicing.   |
|                | Never remove the cover of this equipment.<br>Touching the high-voltage section inside will cause an electric shock.  |
|                | Do not attempt to disassemble or tamper with this equipment.<br>Otherwise, a fire, an electric shock, or a malfunction may occur.  |
|              | When conducting maintenance, make sure to turn the main power off.<br>Failure may result in electric shock.  |
|              | Turn off all the main powers before cleaning the equipment. Make sure to turn it off since voltage is still outputted from the rectifier even after the indicator and the radar are turned off. Failure may result in equipment failure, or death or serious injury due to electric shock. |
|              | When conducting maintenance work on the radar antenna, make sure to turn all the main powers off.<br>Failure may result in electric shock or injuries.   |
|              | Make sure to turn off the radar antenna safety switch. Failure may result in injuries caused by physical contact with the rotating radar antenna.  |

For operating this 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.

The general maintenance work common among each equipment is as follows.

### **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.

## 21.3 Maintenance on Each Unit

### 21.3.1 Radar antenna NKE-1125/A、1129/A、1130/A、1139/A、1696、1632/A、2632/A

#### **WARNING**



When turning off the power supply, do not hold down the power button of the operation unit.

Otherwise, a trouble may occur due to termination failure.



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



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



Keep away from the radar antenna during transmission.

Microwaves are generated from the front center of the radiant section of the radar antenna at the levels indicated in the table below. Exposure to microwaves at close range can result in injury (especially damage to eyes).

Microwave radiation level of the radar antenna

| System                         | 50 W/m <sup>2</sup> | 10 W/m <sup>2</sup> | 2.5 W/m <sup>2</sup> |
|--------------------------------|---------------------|---------------------|----------------------|
| NKE-2103                       | n/a                 | 26 cm               | 123 cm               |
| NKE-1125/1125A/1129/1129A/2254 | 5 cm                | 81 cm               | 162 cm               |
| NKE-1130/1130A/1139/1139A      | 11 cm               | 76 cm               | 181 cm               |
| NKE-1696                       | 120 cm              | 168 cm              | 282 cm               |
| NKE-2632/2632A                 | 1.38 cm             | 3.1 cm              | 209.76 cm            |
| NKE-1632/1632A                 | 1.45 cm             | 3.25 cm             | 128.37 cm            |



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



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



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

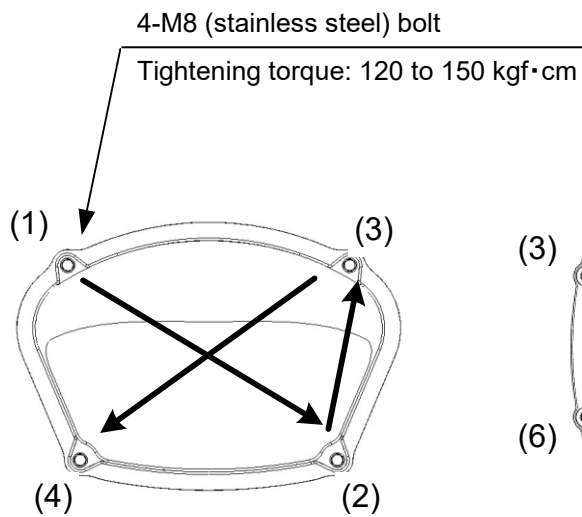
After the maintenance work, turn the safety switch to stop the radar antenna to "ON".

### 21.3.1.1 Precautions in mounting the cover

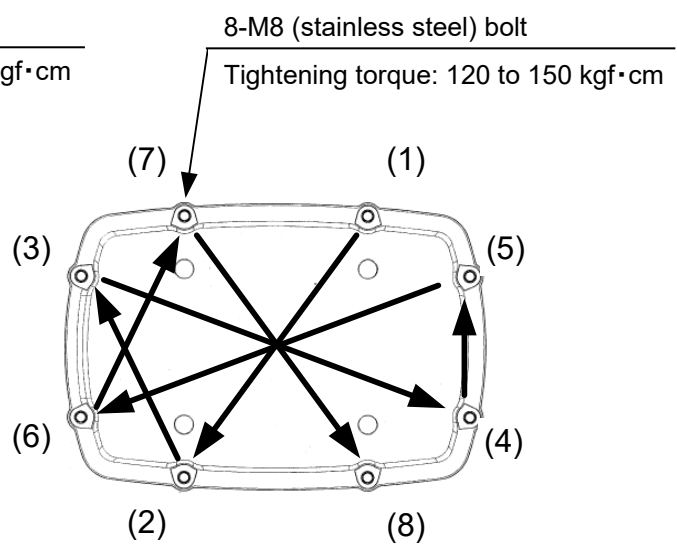
When the cover is removed for regular inspection and replacement of parts and refitted after such work, the procedures of fastening bolts shall be taken with the following precautions:

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

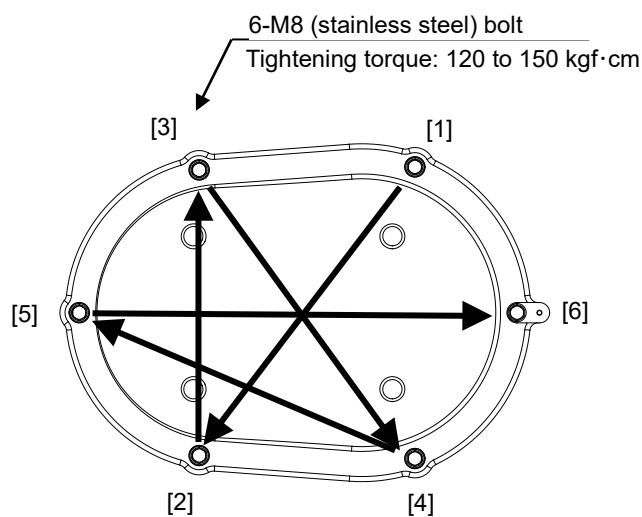
\*: Fasten the bolts in the diagonal order.



Bolt Tightening Order of  
NKE-1125/A, 1129/A, 1696 Cover



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



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

---

### 21.3.1.2 Radiator

Perform inspection and cleaning of the radiator.

#### Note

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

### 21.3.1.3 Rotating section

#### Supply oil seal

When there is not a grease nipple, the replenishment of grease oil is unnecessary.

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

#### Oiling gears

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

Use the grease of Mobilux2 of Mobil Oil or equivalent.

#### Mounting legs

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

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





#### Note

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

---

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

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



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

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

### 21.3.4 Transmitter-receiver (NTG-3225/A,NTG-3230/A)

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

### 21.3.5 Display unit

|  |   |
|--|---|
|  <b>WARNING</b> |   |
|                 | When cleaning the screen and Trackball of Operation Unit, do not wipe hard with a dry cloth. Also, do not use glass cleaner, alcohol, gasoline, or thinner to clean the screen. Also avoid wiping with water. It may cause surface damage or equipment failure. |

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### 21.3.5.1 The Screen

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

Use a soft cloth such as flannel and cotton to clean the screen to prevent damage or degradation of the screen coating.

### 21.3.5.2 The Trackball

Clean carefully the trackball operation unit in accordance with this procedure in order not to scratch the lens. The tools shown in the following table are required in this work.

|   | Required tools                   |
|---|----------------------------------|
| 1 | Dry/Moist soft cloth (Lint-free) |
| 2 | Swab                             |

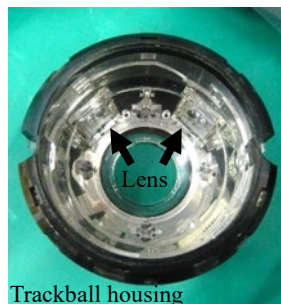
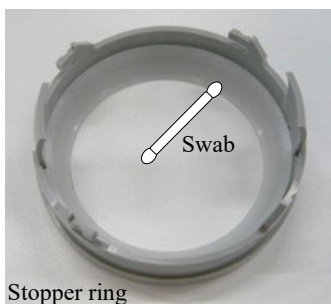
#### Note

If you do not have the swab, please use lint-free cloth, moistened with water, instead.

- 1 Turn stopper ring in the direction of the triangle marks (counterclockwise), then remove the stopper ring together with the ball.



- 2 Clean the ball with a moist lint-free cloth, then wipe the ball with a dry soft cloth carefully.
- 3 Clean the inside of the stopper ring and the trackball housing, and the lens with a swab, moistened with water. Change the swab regularly so that dirt and dust build-up is easily removed. Wipe away moisture with a dry swab.



- 4 After cleaning them, reinstall the ball and the stopper ring. Don't forget to tighten the stopper ring.



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## 21.4 Performance Check

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

Carry out performance check on the items listed in the check list below.

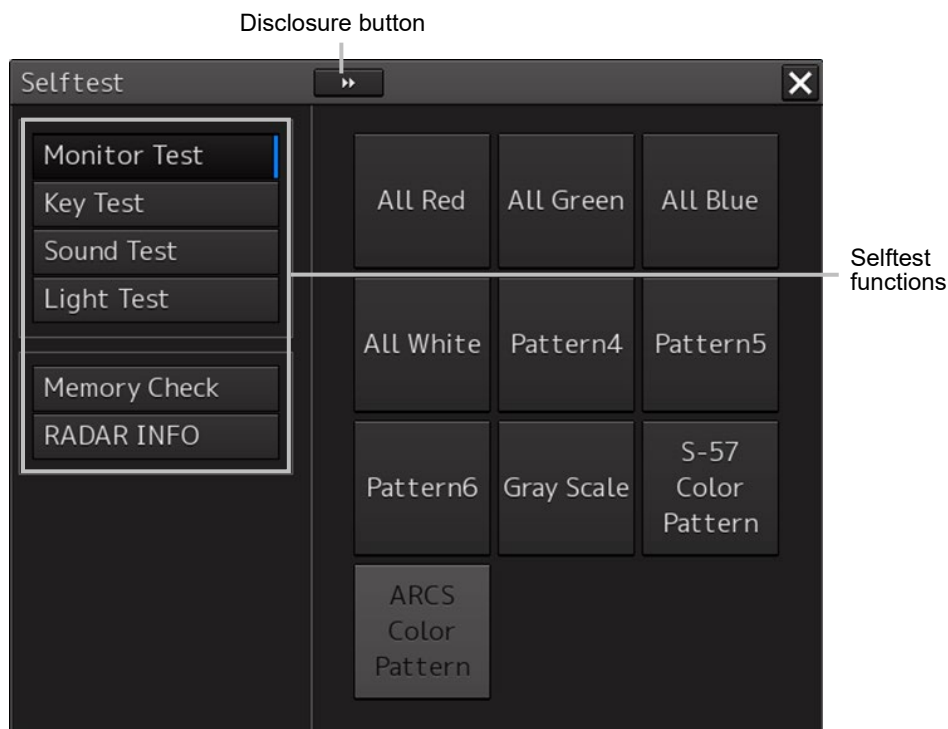
Check List

| Equipment     | Item to be checked  | Criteria   | Remarks |
|---------------|---|--|---------|
| Display unit  | Video and echoes on the screen<br>Sensitivity<br>Brightness<br>Various markers<br>Various numerical indications<br>Lighting | Can be correctly controlled  |         |
|               | Cleaning the DVD drive  | 21.4.9 Cleaning the lens of the DVD drive                                  |         |
| Radar antenna | Magnetron current   | 21.4.6 Checking the magnetron current level of the radar [Magnetron Curr.] |         |
|               | Performance Monitor   | 21.4.8 Checking the performance monitor status                             |         |

---

## 21.4.1 Starting Selftest functions

- 1 Click on the [Menu] button on the left Toolbar.  
The menu is displayed.
- 2 Click on the [Maintenance] - [Selftest] button on the menu.  
The [Selftest] dialog box appears.



The Selftest functions are displayed in the left pane.  
Click on the disclosure button to hide the left pain.

- 3 Click on a Selftest function to be executed.  
The execution dialog of the selected Selftest function is displayed.

---

## 21.4.2 Confirming the screen status [Monitor Test]

Confirm the screen status.

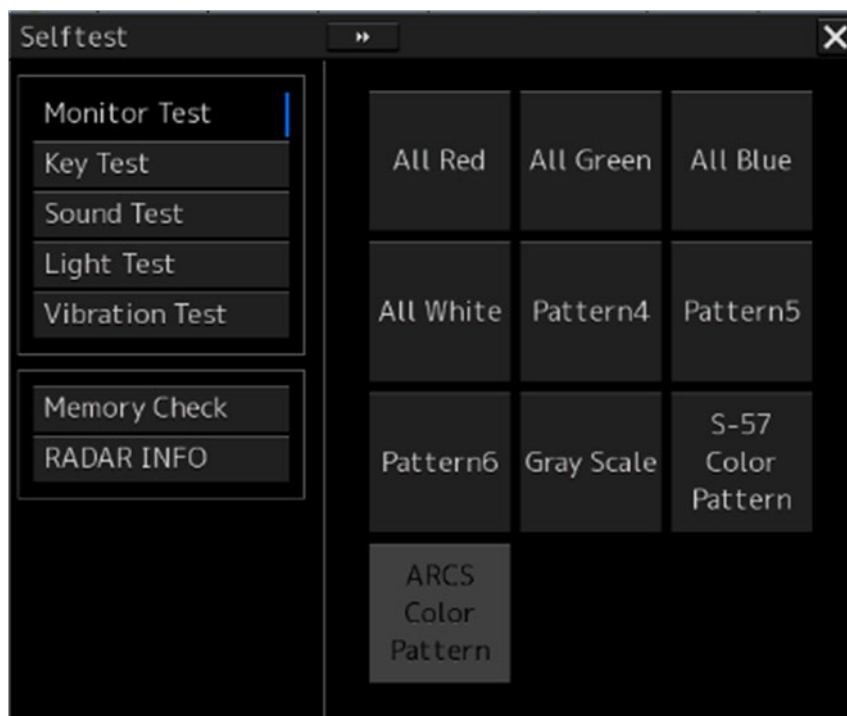
- 1 Click on the [Menu] button on the left Toolbar.

The menu is displayed.

- 2 Click on the [Maintenance] - [Selftest] - [Monitor Test] button on the menu.


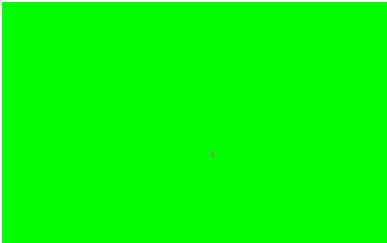
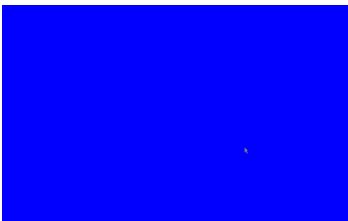
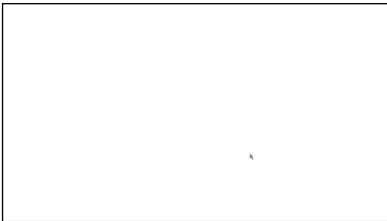
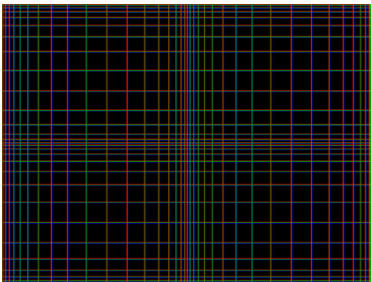
When the color or pattern of the dialog is clicked on, the color or pattern is displayed on the screen.

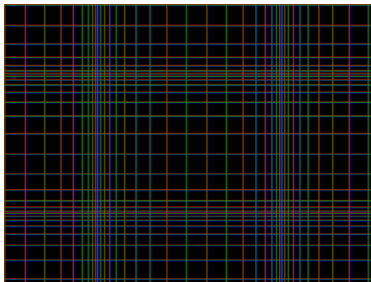
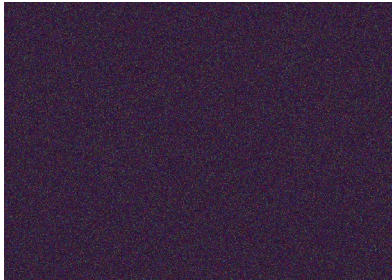
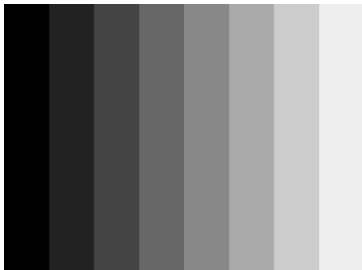
Check the screen status with the display status.

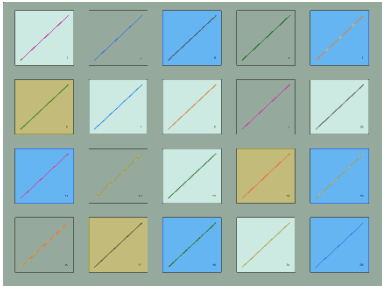
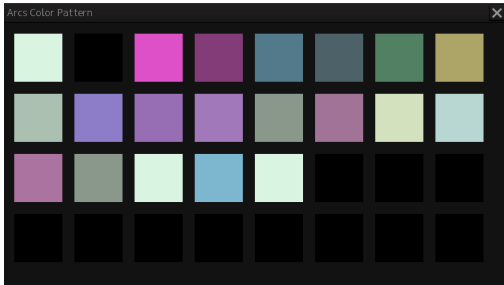


To reset the display, click the button again.

Pattern list

| Pattern button name | Display   |
|---------------------|---|
| All Red             |  <p>The entire screen is displayed in red.</p>                                 |
| All Green           |  <p>The entire screen is displayed in green.</p>                               |
| All Blue            |  <p>The entire screen is displayed in blue.</p>                               |
| All White           |  <p>The entire screen is displayed in white.</p>                             |
| Pattern4            |  <p>Displays the pattern for checking the communication quality for VDR.</p> |

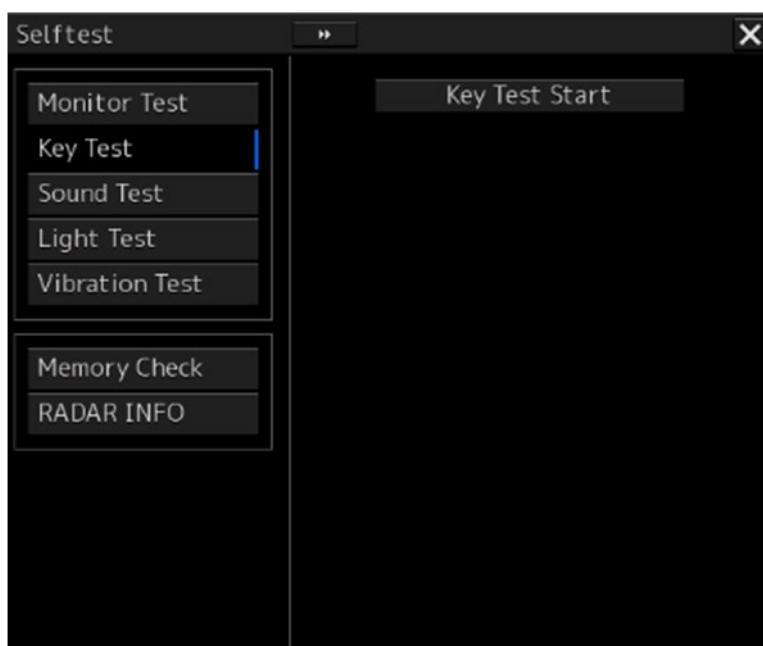
| Pattern button name | Display   |
|---------------------|---|
| Pattern5            |  <p>Displays the pattern for checking the communication quality for VDR.</p>   |
| Pattern6            |  <p>Displays the pattern for checking the communication quality for VDR.</p>   |
| Gray Scale          |  <p>Displays the grey scale pattern for checking the monitor brightness adjustment.</p> <p>Grey scale patterns can be identified with brightness in day/night mode. By adjusting the monitor brightness to facilitate identification of grey scale patterns, the optimum brightness can be set. The brightness in night mode can also be adjusted in the same way.</p> <p>Use the Day/Night button on the right Toolbar for switching between the day and night mode.</p> <p>For the details of the Day/Night button, refer to “2.2.2 Right toolbar”.</p> |

| Pattern button name | Display   |
|---------------------|---|
| S-57 Color Pattern  |  <p>A color test pattern of the S57 chart is displayed.</p> <p>By identifying the color pattern, the S57 chart display status can be verified.</p> <p>A color pattern can be displayed in Day/Night mode.</p> <p>Use the Day/Night button on the right Toolbar for switching between the day and night mode.</p> <p>For the details of the Day/Night button, refer to "2.2.2 Right toolbar".</p>   |
| ARCS Color Pattern  | <p>The [ARCS Color Pattern] dialog is displayed.</p>  <p>A color test pattern of the ARCS chart is displayed.</p> <p>By identifying the color pattern, the ARCS chart display status can be verified.</p> <p>A color pattern can be displayed in Day/Night mode.</p> <p>Use the Day/Night button on the right Toolbar for switching between the day and night mode.</p> <p>For the details of the Day/Night button, refer to "2.2.2 Right toolbar".</p> |

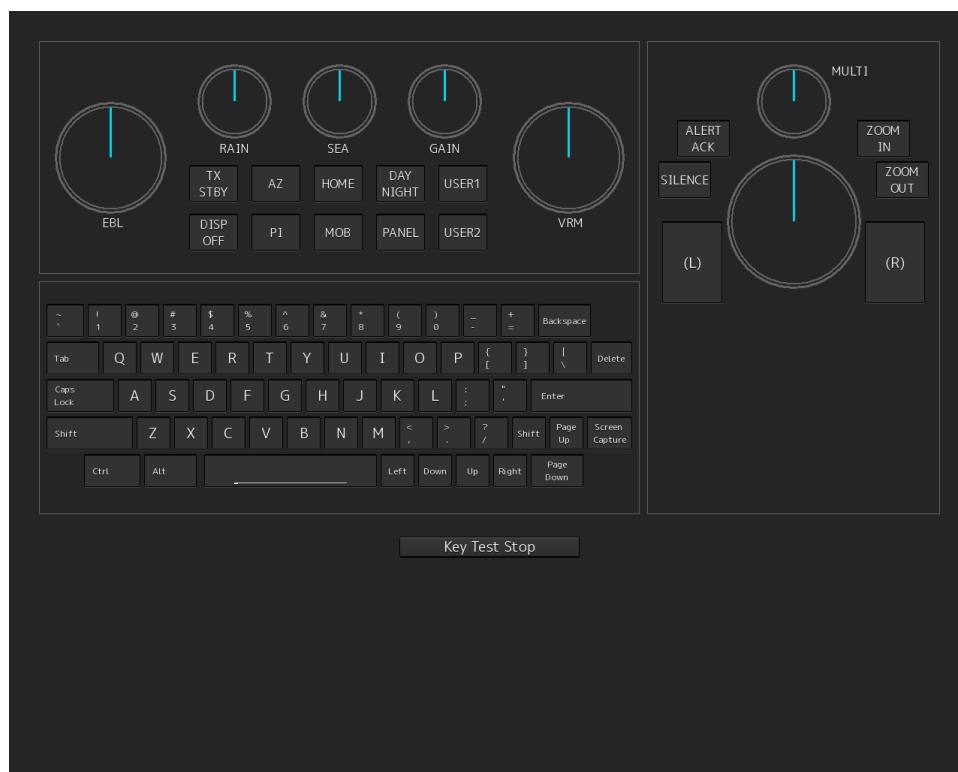
## 21.4.3 Confirming the operation of the operation unit [Key Test]

Confirm the operation of the keys of the operation unit.

- 1 Click on the [Menu] button on the left Toolbar.  
The menu is displayed.
- 2 Click on the [Maintenance] - [Selftest] - [Key Test] button on the menu.
- 3 Click on the [Key Test Start] button.



Key Test screen is displayed.



---

**4 Operate the keys, buttons and dials in the operation unit.**

If the performance of the operation unit is normal, the colors of the keys, buttons and dials are changed.

**5 Click on the [Key Test Stop] button after the operation check.**

Returns to the [Selftest] dialog box.

## 21.4.4 Confirming the alert sound [Sound Test]

Confirm the alert sound.

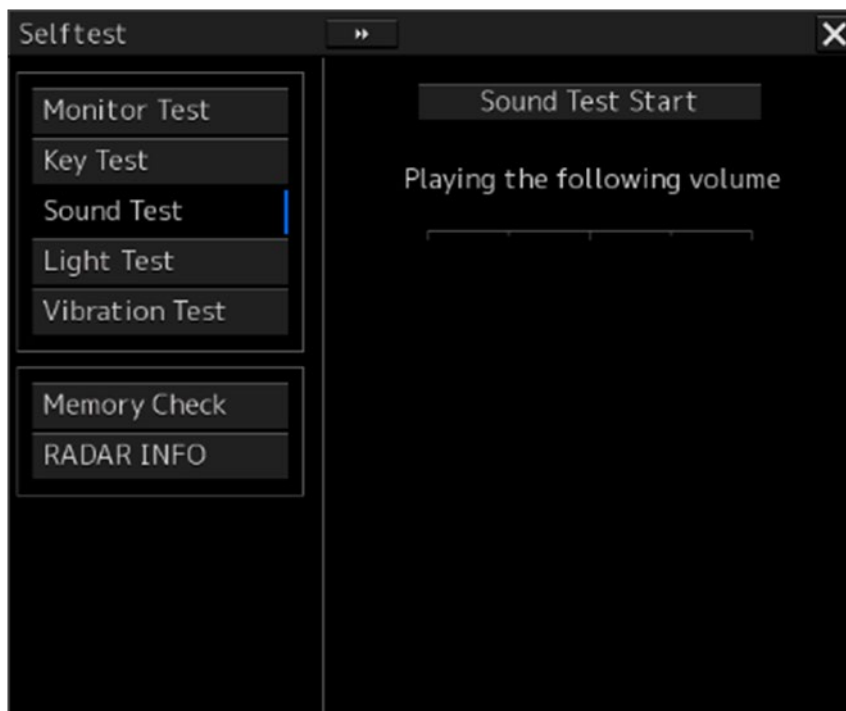
**1 Click on the [Menu] button on the left Toolbar.**

The menu is displayed.

**2 Click on the [Maintenance] - [Selftest] - [Sound Test] button on the menu.**

**3 Click on the [Sound Test Start] button.**

A sound test starts. All the available beep sound volumes can be tested by increasing the level from 0.





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## 21.4.5 Testing the brightness of LED [Light Test]

Test the brightness of the LED of the operation unit.

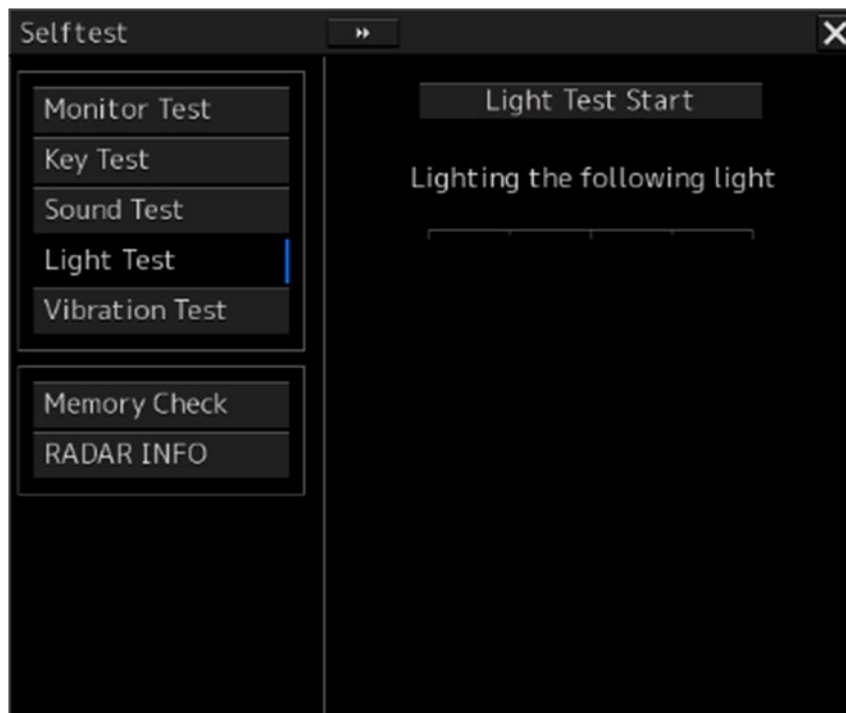
- 1 Click on the [Menu] button on the left Toolbar.

The menu is displayed.

- 2 Click on the [Maintenance] - [Selftest] - [Light Test] button on the menu.

- 3 Click on the [Light Test Start] button.

A LED brightness test starts. All the available brightness levels can be tested by increasing the level from 0.



---

## 21.4.6 Checking the magnetron current level of the radar [Magnetron Curr.]

This function is used to check the magnetron current level of the radar.

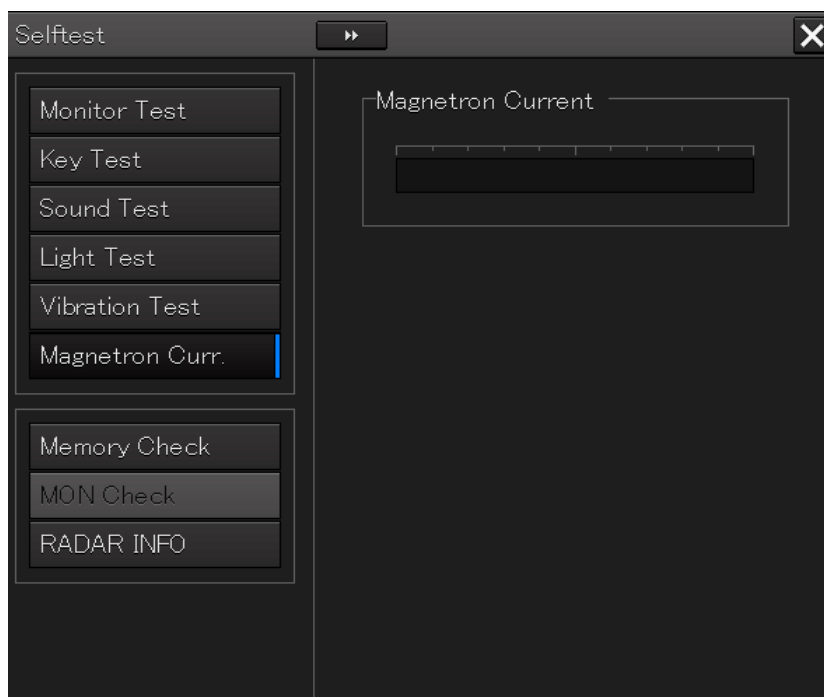
This function is displayed only when the magnetron radar antenna is connected.

**1 Click on the [Menu] button on the left Toolbar.**

The menu is displayed.

**2 Click on the [Maintenance] - [Selftest] - [Magnetron Curr.] button on the menu.**

The magnetron current level of the radar antenna is displayed.



The current level is normal if it is within the following scope under the 48NM range.

10kW transmitter: Scale 4 to 7

25/30kW transmitter: Scale 6 to 10

### Note

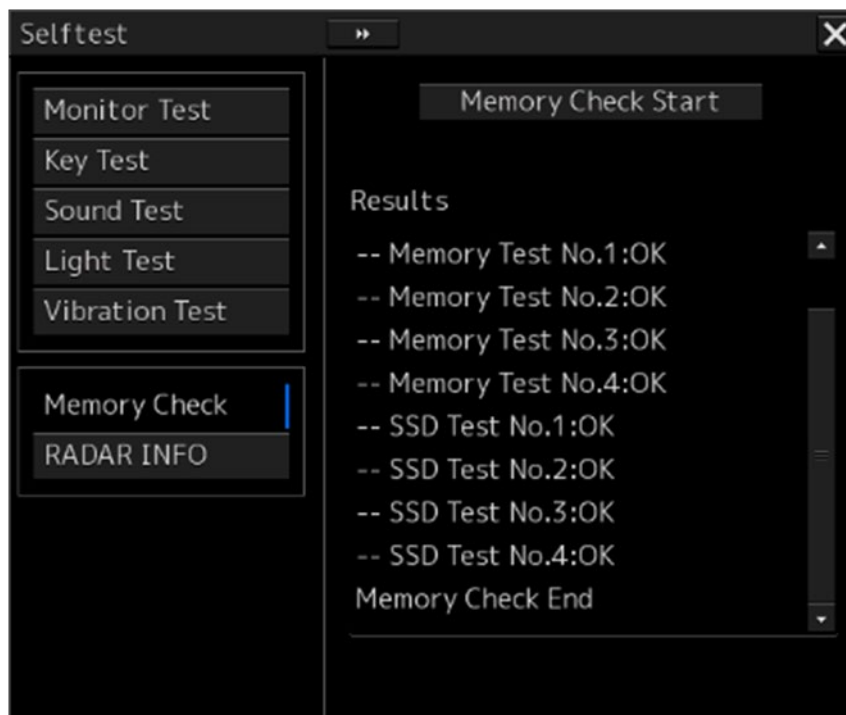
- In the sector blank area, the display of the magnetron current becomes unstable.
- Check that there are no fluctuations (drift) of 2 scales or more while sector blank is not set. For the details of sector blank setting, refer to “19.2.5 Setting Sector Blank”.
- If the magnetron is used for more than 4000 hours, it is strongly recommended to frequently check the Magnetron Current because, towards the end of the magnetron's life, deterioration progresses rapidly. This can result in sudden radar operation stoppage or damage to peripheral components such as the modulator and power supply unit.

---

## 21.4.7 Checking the memory [Memory Check]

Check the memory.

- 1** Click on the [Menu] button on the left Toolbar.  
The menu is displayed.
- 2** Click on the [Maintenance] - [Selftest] - [Memory Check] button on the menu.
- 3** Click on the [Memory Check Start] button.  
Memory checking starts and the checking result is displayed on the [Result] list.



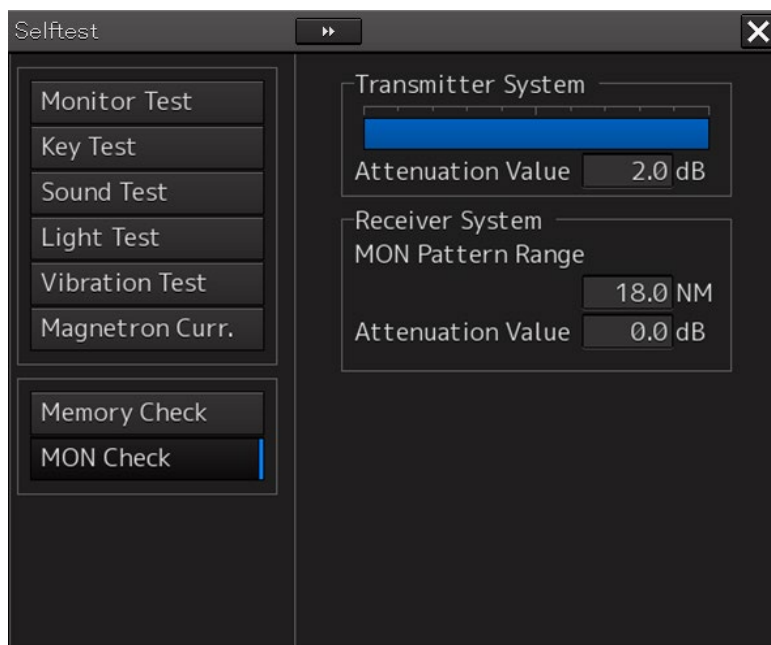
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## 21.4.8 Checking the performance monitor status

This function is used to check the condition of the radar performance monitor.

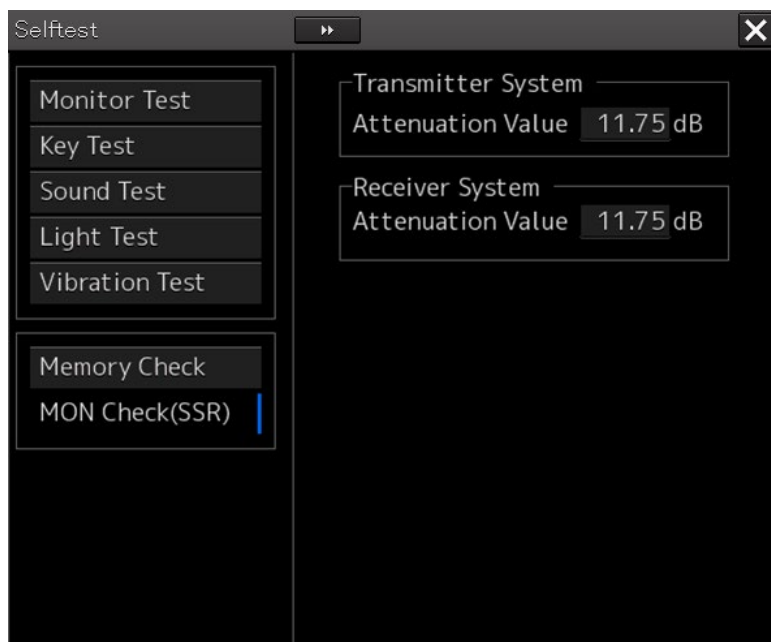
Items displayed under this function vary depending on the type of the radar antenna.

When magnetron radar is used, the following dialog box appears.



For the details of this dialog box, refer to "21.4.8.1 MON Check".

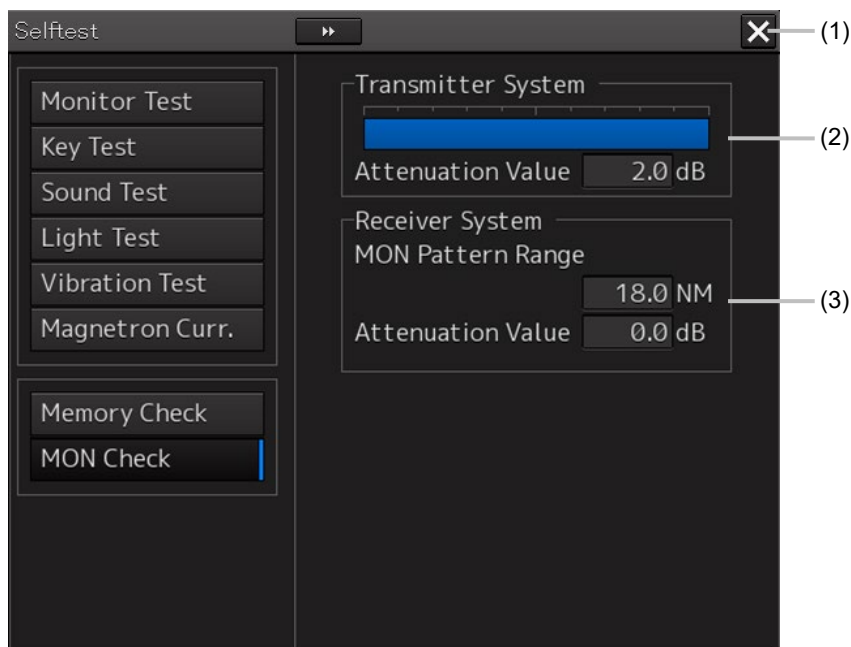
When a solid-state radar is used, the following dialog box will be displayed.



For the details of this dialog box, refer to "21.4.8.2 MON Check (SSR)".

### 21.4.8.1 MON Check

- 1 Click on the [Menu] button on the left Toolbar.  
The menu is displayed.
- 2 Click on the [Maintenance] - [Selftest] - [MON Check] button on the menu.



#### [1] [X] button

Click on this button to close the [Diagnosis] dialog box.

#### [2] [Transmitter System]

The amount of attenuation at the radar transmitter is displayed in a bar graph as well as in a numerical value [dB].

#### [3] [Receiver System]

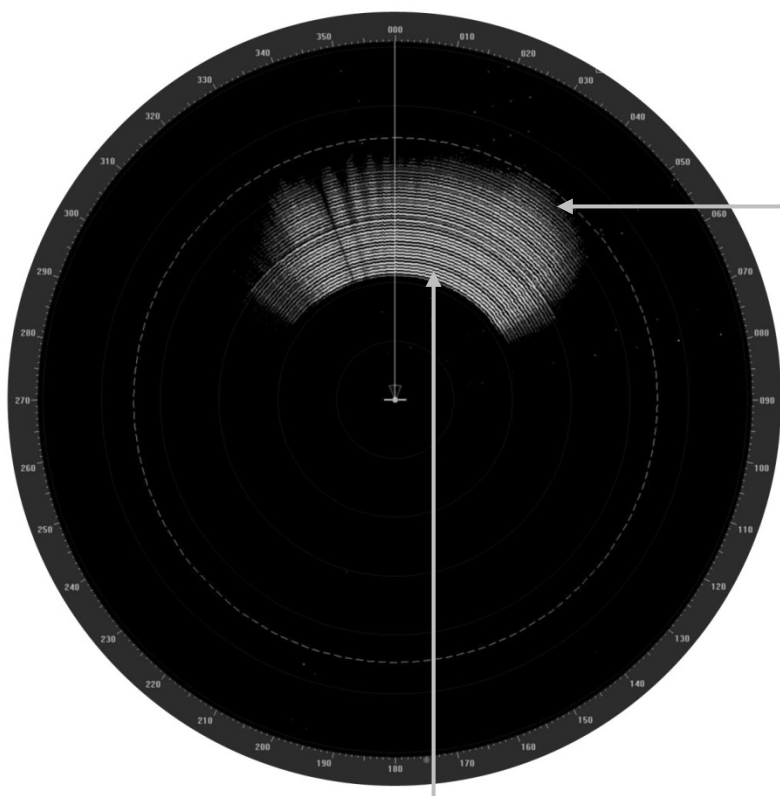
- MON Pattern Range  
The distance [NM] is displayed when the user adjusts VRM to the farthest edge of the performance monitor pattern.
- Attenuation Value  
The amount of attenuation at the radar receiver is displayed in a numerical value [dB].

## Checking a performance monitor status



### In case of equipped with Interswitch function (Option)

To check the performance with the performance monitor, set the interswitch connection to straight (i.e. No. 1 radar antenna is connected to No. 1 display unit).



Adjust VRM to the farthest edge of the performance monitor pattern.

Performance monitor pattern  
(If the performance of the receiver degrades, the pattern range becomes short.)

- 1 Click on the [Menu] button on the left Toolbar.**  
The menu is displayed.
- 2 Click on the [Maintenance] - [Selftest] - [MON Check] button on the menu.**
- 3 Turn the [VRM] control on the keyboard operation unit to the farthest edge of the performance monitor pattern.**

#### 4 Check the amount of attenuation in the dialog box.

Benchmarks for the amount of attenuation are as follows:

Attention Value of Transmitter:

At normal: -6.9 dB to +2.0 dB

At degrading performances: -15.0 dB to -7.0 dB

Attention Value of Receiver:

At normal: -2.9 dB to +3.5 dB

At degrading performances: -15.0 dB to -3.0 dB



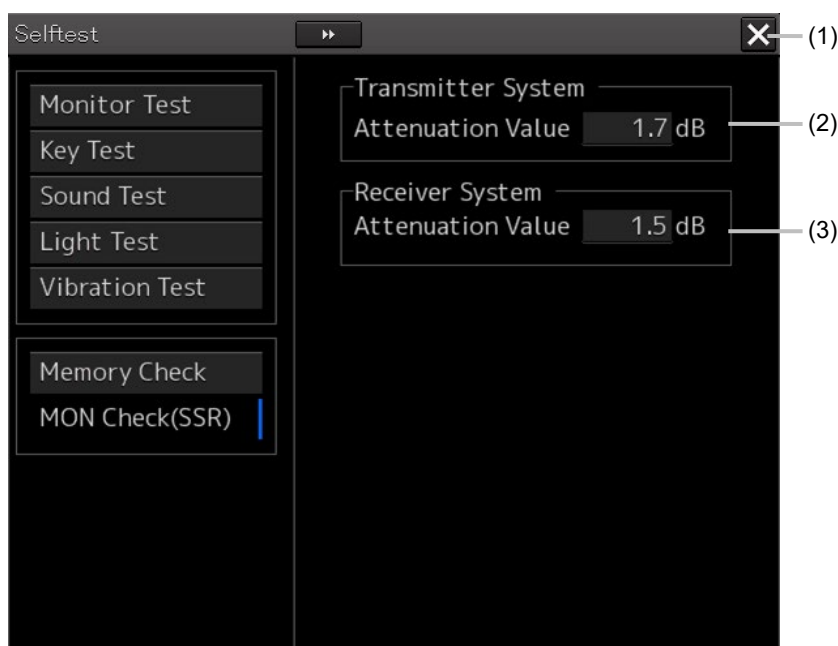
- When confirming the attenuation value of the transmitter, after opening the dialog box, wait for one minute, and then read its value.
- If the attenuation value of the transmitter is -7dB or lesser, or the receiver's attenuation indicator is -3dB or lesser, it indicates that performances of the transmitter/receiver unit are degrading.  
In this case, inspection by the specialized service personnel is required. Contact our dealer, the nearest service representative or JRC sales.
- If the magnetron is used for more than 4000 hours, it is strongly recommended to frequently check the Performance Monitor because, towards the end of the magnetron's life, deterioration progresses rapidly. This can result in sudden radar operation stoppage or damage to peripheral components such as the modulator and power supply unit.

### 21.4.8.2 MON Check (SSR)

#### 1 Click on the [Menu] button on the left Toolbar.

The menu is displayed.

#### 2 Click on the [Maintenance] - [Selftest] - [MON Check (SSR)] button on the menu.



[1] [X] button

---

Click on this button to close the [Diagnosis] dialog box.

**[2] [Transmitter System]**

The amount of attenuation at the radar transmitter is displayed in a numerical value [dB].

**[3] [Receiver System]**

The amount of attenuation at the radar receiver is displayed in a numerical value [dB].

**3 Check the attenuation value with the dialog.**

The guidelines of attenuation values are as follows.

Transmission section attenuation value:

Normal: -6.9dB to +7.0dB

Performance deterioration: -20.0dB to -7.0dB

Reception section attenuation value:

Normal: -6.9dB to +7.0dB

Performance deterioration: -20.0dB to -7.0dB



- When confirming the attenuation value of the transmitter, after opening the dialog box, wait for one minute, and then read its value.
- If the attenuation value of the transmitter is -7dB or lesser, or the receiver's attenuation indicator is -7dB or lesser, it indicates that performances of the transmitter/receiver unit are degrading.  
In this case, inspection by the specialized service personnel is required. Contact our dealer, the nearest service representative or JRC sales.

## 21.4.9 Cleaning the lens of the DVD drive

**1 Insert the supplied lens cleaner CD into the DVD drive.**

**2 Click on the [Menu] button on the left Toolbar.**

The menu is displayed.

**3 Click [Maintenance] - [Selftest] - [DVD Drive Cleaning] from the menu.**

Cleaning automatically starts.

The following dialog box appears during cleaning:





---

**4 When the cleaning completion dialog box appears, click on the [OK] button.**

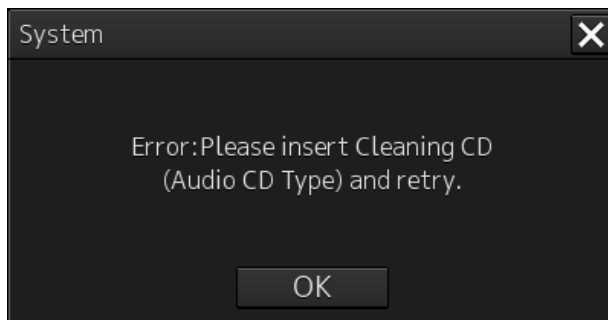


Remove the supplied lens cleaner CD.

**Note**




It is recommended that the DVD drive is cleaned at least once a month. If the lens becomes dirty, it may not be possible to read data from a CD/DVD, or else it may not be possible to install a chart or an update.

When reading the lens cleaner CD fails, an error dialog box appears.



## 21.5 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.

|  |  |
|--|--|
|  <b>CAUTION</b> |  |
|                 | Turn off the main power source before inspecting and replacing parts. Otherwise, an electric shock or trouble may be caused.                   |
|                 | The liquid crystal monitor shall be replaced by two more persons. If only one person does this work, he may drop the LCD, resulting in injury. |

### 21.5.1 Parts expected for periodic replacement

Here are parts expected for periodic replacement.

| Part type             | Name                              | Part name                    | Life expectancy | Replacement kit type  |
|-----------------------|-----------------------------------|------------------------------|-----------------|-----------------------|
| NWZ-207               | 19inch monitor                    | FAN                          | 40,000 hours    | 7ZYNA4004             |
| NWZ-214               | 19inch monitor                    | FAN                          | 60,000 hours    | 7BFRD0008             |
| NWZ-208               | 26inch monitor                    | FAN                          | 40,000 hours    | 7ZYNA4005             |
| NBD-913               | Power supply unit                 | FAN                          | 100,000 hours   | 7ZYNA4007             |
| QUINT-BAT/24 DC/3.4AH | UPS unit dedicated battery module | Battery                      | 30,000 hours    | QUINT-BAT/24D C/3.4AH |
| NDC-1590/A            | Central control unit              | FAN                          | 40,000 hours    | 7ZYNA4006             |
| NKE-1130/A            | S band radar antenna              | Magnetron                    | 4,000 hours     | 5VMAA00104            |
|                       |                                   | Motor                        | 10,000 hours    | MDBW10823             |
|                       |                                   | FAN for motor driver circuit | 20,000 hours    | 7BFRD0002             |
|                       |                                   | FAN for modulation           | 20,000 hours    | 5BFAB00674            |
| NKE-1139/A            | S band radar antenna              | Motor                        | 10,000 hours    | MDBW10823             |
| NTG-3230/A            | S band transceiver                | Magnetron                    | 4,000 hours     | 5VMAA00104            |

| Part type   | Name                             | Part name          | Life expectancy | Replacement kit type |
|-------------|----------------------------------|--------------------|-----------------|----------------------|
| NKE-1125/A  | X band radar antenna             | Magnetron          | 4,000 hours     | 5VMAA00106           |
|             |                                  | Motor              | 10,000 hours    | MDBW10822            |
|             |                                  | Fan for magnetron  | 20,000 hours    | 7BFRD0002            |
|             |                                  | FAN for modulation | 20,000 hours    | 7BFRD0002            |
| NKE-1129/A  | X band radar antenna             | Motor              | 10,000 hours    | MDBW10822            |
| NTG-3225/A  | X band transceiver               | Magnetron          | 4,000 hours     | 5VMAA00106           |
| NKE-2254-HS | X band radar antenna             | Magnetron          | 4,000 hours     | 5VMAA00106           |
|             |                                  | Motor              | 10,000 hours    | 7BDRD0045A           |
|             |                                  | FAN for modulation | 20,000 hours    | 7BFRD0002            |
|             |                                  | FAN for modulation | 20,000 hours    | 7BFRD0002            |
| NKE-2103    | X band radar antenna             | Magnetron          | 4,000 hours     | 5VMAA00102           |
|             |                                  | Motor              | 10,000 hours    | 7BDRD0048            |
| NKE-1632/A  | S band solid state radar antenna | Motor              | 10,000 hours    | MDBW10823            |
|             |                                  | FAN                | 100,000 hours   | 109L0912S410         |
| NKE-2632/A  | S band solid state radar antenna | Motor              | 10,000 hours    | MDBW10823            |
|             |                                  | FAN                | 100,000 hours   | 109L0912S410         |
| NKE-2632-H  | S band solid state radar antenna | Motor              | 10,000 hours    | MDBW10967            |
|             |                                  | FAN                | 100,000 hours   | 109L0912S410         |
| NKE-1696    | X band solid state radar antenna | Motor              | 10,000 hours    | MDBW10822            |
|             |                                  | FAN for processor  | 100,000 hours   | 109L0912S410         |
|             |                                  | FAN for Amplifier  | 100,000 hours   | 5BFAB00869           |

#### Memo

[UPS] is required only when it is installed as an option.

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### 21.5.1.1 Life time of Magnetron

The lifespan of the magnetron may vary depending on use of the frequency of long-pulse transmission (long distance detection), and the recommended time in the manual (4000 hours) is a guideline when the magnetron is used continuously under the highest load on the safe side.

If the magnetron is used for more than 4000 hours, it is recommended to check the following values within the specified range using the Performance Monitor.


-1. On the performance monitor, the attenuation amount should show normal values as shown below.

Transmission system : -6.9 dB to +2.0 dB

-2. The current level to the magnetron is normal if it is within the following range.  
48NM range.




10kw Transmitter : scale 4-7

25/30kW Transmitter : scale 6-10

|   |   |
|---|---|
|  | <p><b>Do not use the magnetron for more than 8000 hours.</b></p> <p>The magnetrons may rapidly be deteriorated in performance and result sudden stoppage of radar operation and further damage peripheral parts such as Modulator and Power Supply Unit. Thus, the frequent check of the Performance Monitor is strongly recommended over 4000 hours.</p> |
|---|---|

---

### 21.5.1.2 Replacement of magnetron

|  |   |
|--|---|
|  <b>CAUTION</b> |   |
|                 | When replacing magnetrons, make sure to shut off the main power and let the equipment stand for more than 5 minutes to discharge the high-voltage circuit.<br>Failure may result in electric shock. |
|                 | Make sure to take off your watch when your hand must get close to the magnetron.<br>Failure may result in damage to the watch since the magnetron is a strong magnet.                               |

#### Note

Replacement of magnetron must be made by a specialized service personnel.  
For details, refer to Service Manual.  
Use necessarily the parts to meet the part types in the above shown in the table.

Do not touch the magnet of the magnetron with a screwdriver or put the magnetron on an iron plate.  
When replacing the magnetron, connect the lead wire correctly.

### 21.5.1.3 Handling of magnetron under long-time storage

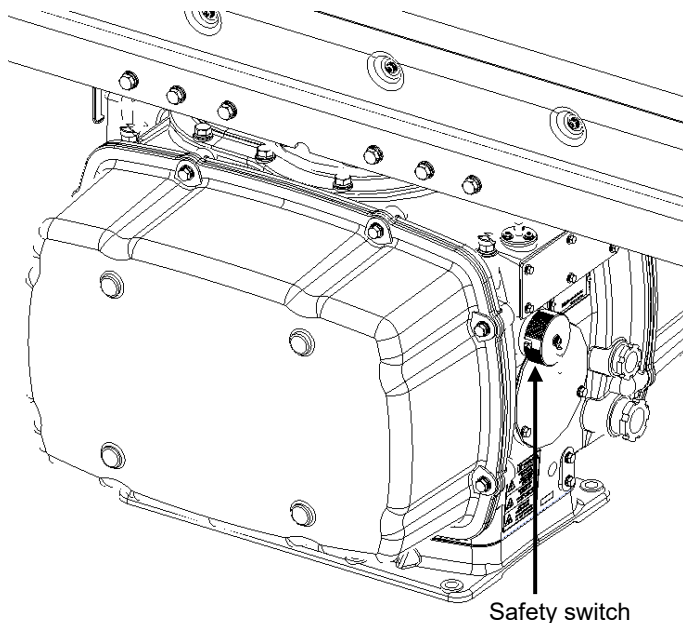
The magnetron that has been kept in storage for a long time may cause sparks and operate unstably when its operation is started. Perform the aging in the following procedures:

- 1 Warm up the cathode for a longer time than usually. (20 to 30 minutes in the standby 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 and repeat the operation.

## 21.5.1.4 Magnetron replacement procedure for radar antenna NKE-1130/A

### 1 Turn Off the safety switch of the radar antenna.

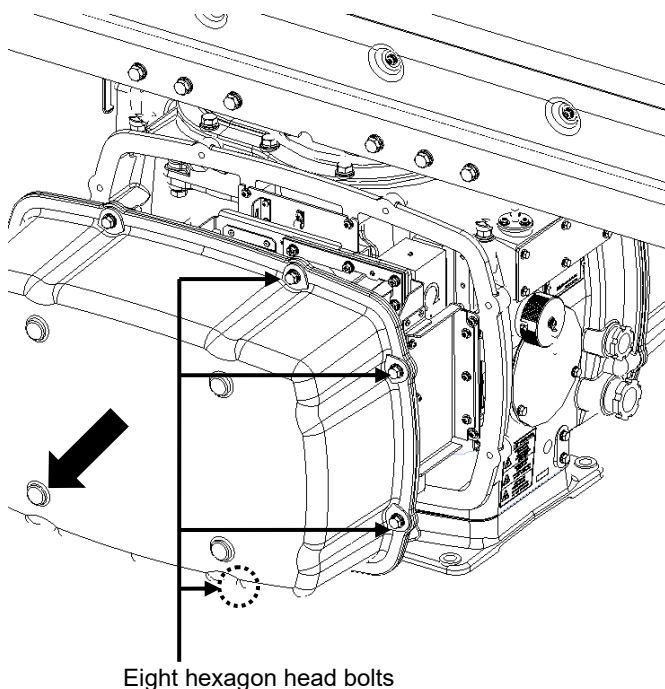


**!** When replacing a magnetron, ensure that the safety switch of the radar antenna is turned Off prior to commencing the replacement work.

The safety switch is located on the rear (stern) side of the radar antenna.

Remove the cover and turn Off (to the lower side) the safety switch.

### 2 Remove the cover.



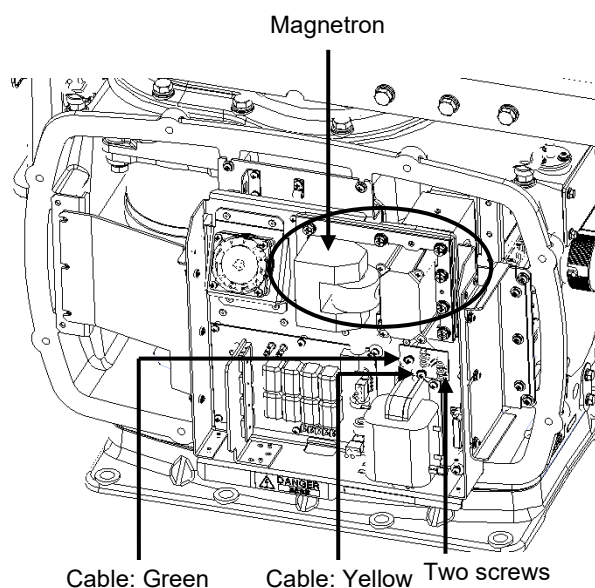
The magnetron is mounted on the left side (port side) of the radar antenna. Remove the left side cover.

The cover is secured in place with hexagon head bolts (M8, designed to be protected from falling out) at eight positions.

After removing the cover, place it in a safe area.

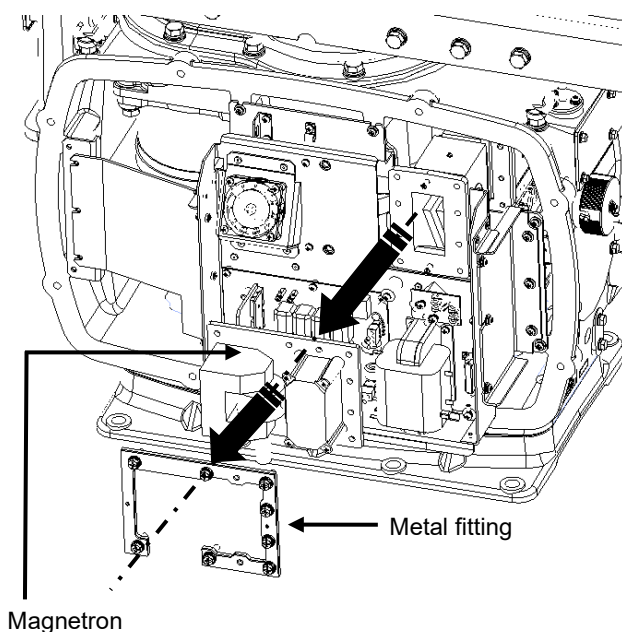
Exercise care to avoid dust or other foreign matters adhering to the packing.

### 3 Replace the magnetron.



To detach the cables to which the magnetron is connected, remove the two screws (M4×12) holding the cables.

Use caution not to lose the screws after removing them.



The magnetron is secured in place with a special metal fitting. The fitting uses bolts protected from falling out. Loosen all bolts and demount the fitting and bolts together.

- ⚠ The magnetron is attached to the radar antenna with pins. Use caution not to drop the magnetron.
- ⚠ Use a shielded screwdriver for this work.
- ⚠ Contact with metal (tools) can cause performance degradation in the magnetron.

Install a replacement magnetron and cables.

After replacing the magnetron, reassemble the unit by following the same steps in reverse order. Do not forget to tighten the bolts and screws, and do not forget to reconnect the cables.

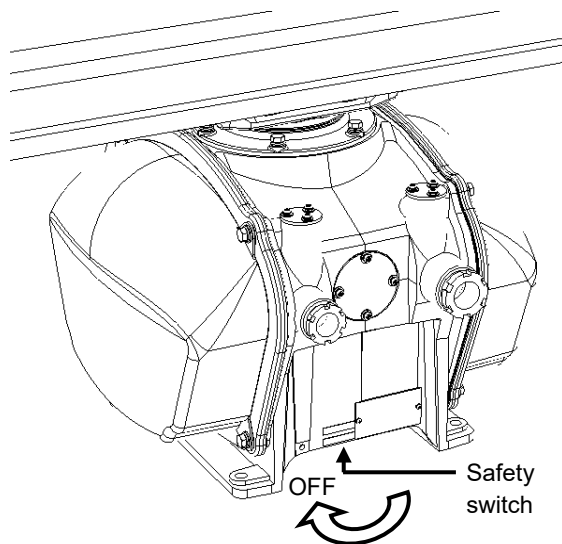
The above steps complete the magnetron replacement procedure.



### 21.5.1.5 Magnetron replacement procedure for radar antenna

#### NKE-1125/A, NKE-2254-HS

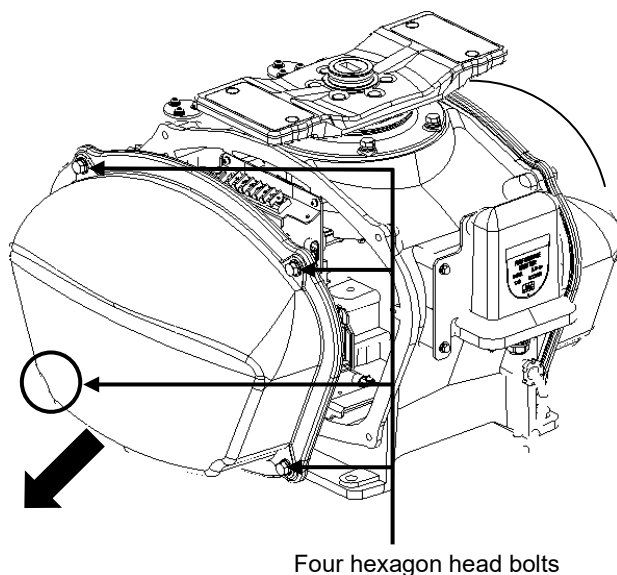
##### 1 Turn Off the safety switch of the radar antenna.



**!** When replacing a magnetron, turn Off the safety switch of the radar antenna.

Turn off the safety switch located on the bottom of the stern side of the radar antenna.

##### 2 Remove the cover.



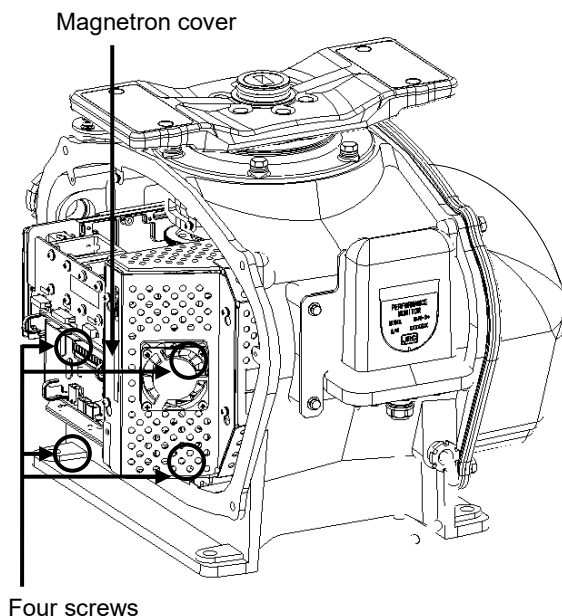
The magnetron is mounted on the right side (starboard side) of the radar antenna. Remove the right side cover.

The cover is secured in place with hexagon head bolts (M8, designed to be protected from falling out) at four positions.

After removing the cover, place it in a safe area.

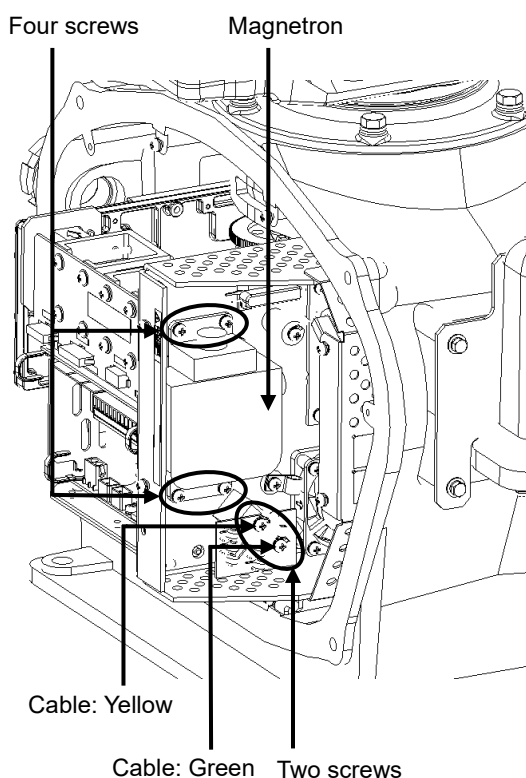
Exercise care to avoid dust or other foreign matters adhering to the packing.

### 3 Replace the magnetron.



Loosen the screws (M4×10) at four positions to remove the magnetron cover.

Remove the screws (M4×12) at two positions and detach the magnetron cables.



**⚠** Use a shielded screwdriver for this work.  
Contact with metal (tools) can cause performance degradation in the magnetron.

Remove the screws (M4×12) at four positions and demount the magnetron.

Exercise caution not to lose the screws after removing them.

Install a replacement magnetron and cables.

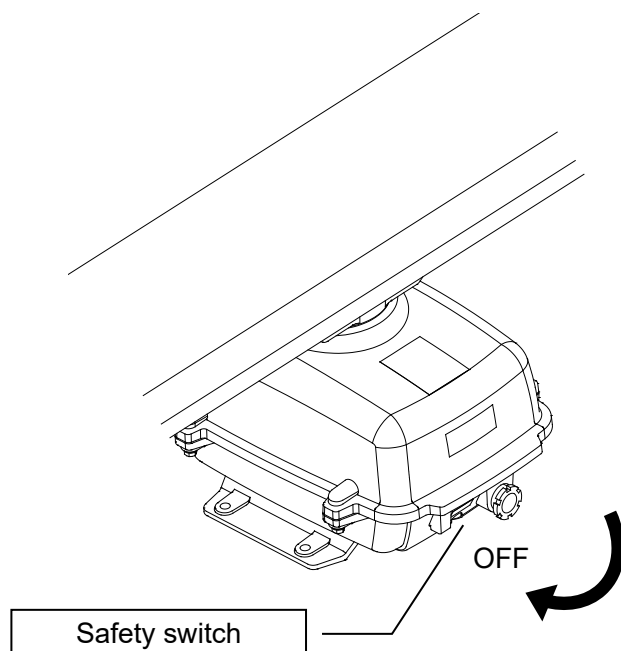
After replacing the magnetron, reassemble the unit by following the same steps in reverse order.

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

## 21.5.1.6 Magnetron replacement procedure for radar antenna

### NKE-2103、NKE-2103HS

- 1 Turn off the antenna safety switch.

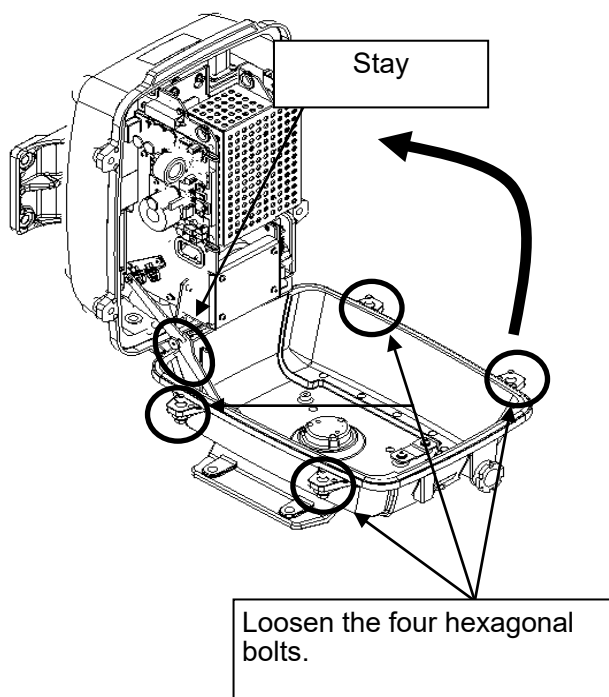


When replacing a motor, make sure to first turn off the antenna safety switch.

The switch is at the rear bottom of the antenna.

Turn off the switch.

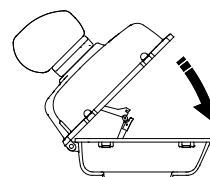
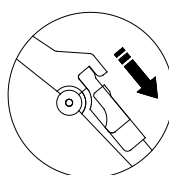
- 2 Remove the bolts and open the top cover.



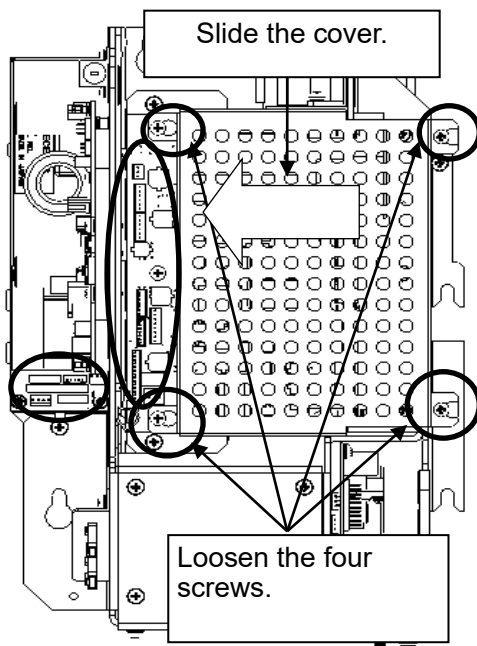
The top cover is fixed with 4 hexagonal bolts (M8 captive screw).

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.

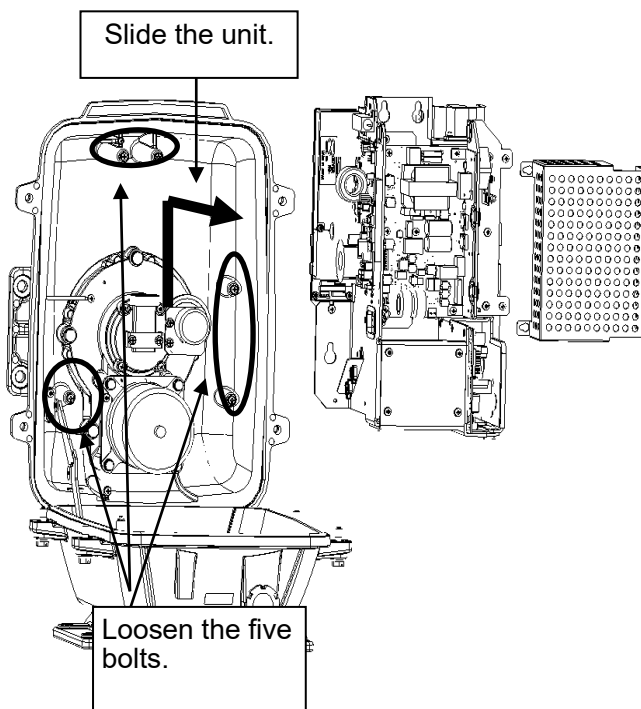


### 3 Remove the cable.



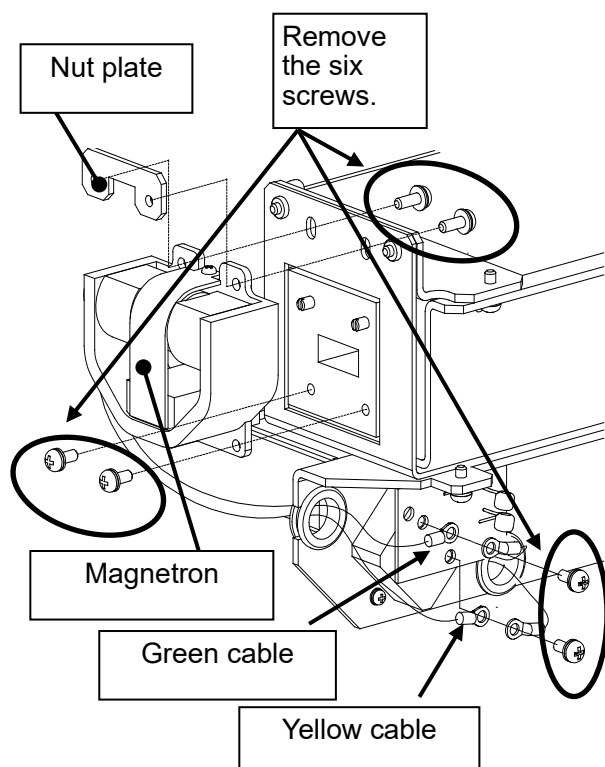
Loosen the screws (four M4 screws), remove the transmitter-receiver unit cover, and remove the cables connected to the transmitter-receiver unit (ten cables). Slide the cover of the transmitter-receiver unit to remove it.

### 4 Remove the transmitter-receiver.



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

## 5 Replace the magnetron.



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



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

Cut the leads (yellow and green) for the replacement magnetron to an appropriate length, then tighten the screws and fix the cables in place. After having replaced the magnetron, reassemble the unit by following the disassembly procedure in the reverse order.

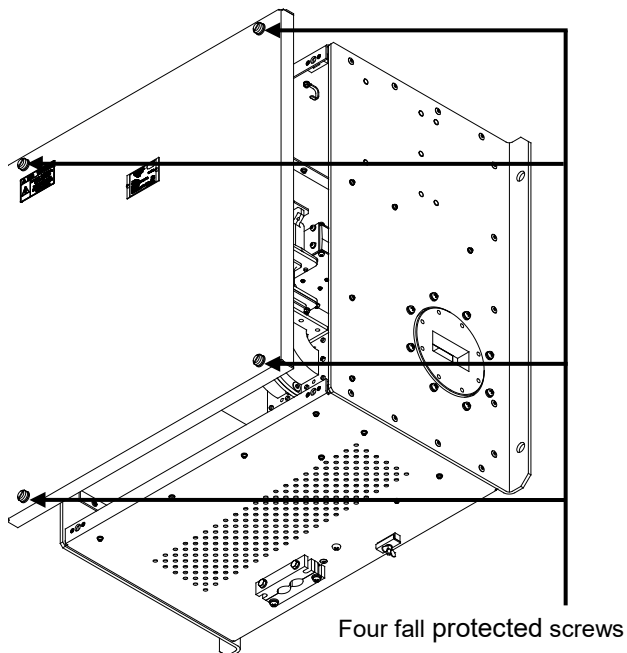
Do not forget to tighten the bolts and screws, and do not forget to reconnect the cables.



Extreme care should be taken to connect the leads (yellow and green) to the magnetron for prevention of contact with other parts or the casing. Contact may cause them to discharge.

### 21.5.1.7 Magnetron replacement procedure for transmitter-receiver unit NTG-3230/A

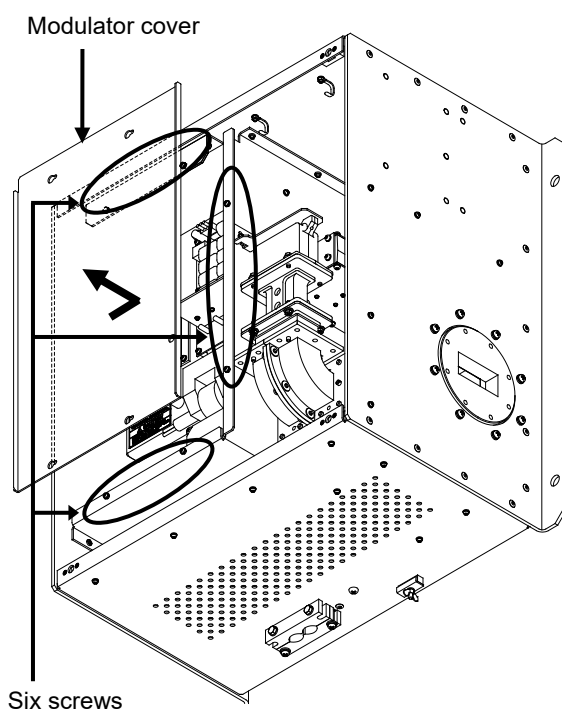
#### 1 Remove the cover of the transmitter-receiver unit.



Loosen the four screws designed to be protected from falling out, and remove the cover.

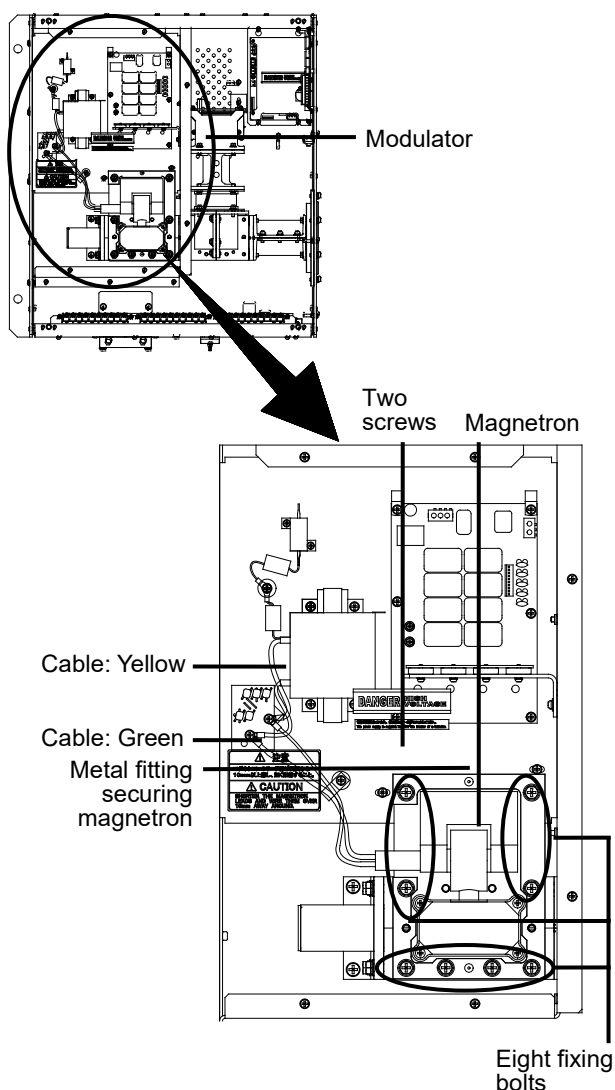
The fall protected screws have slotted heads.  
Use a slotted screwdriver for this work.

#### 2 Remove the modulator cover.



Loosen the screws (M4×12) at six positions and slide the modulator cover to the right to remove it.

### 3 Replace the magnetron.



Remove the screws (M4×12) holding the cables at two positions, and detach the cables.



Use a shielded screwdriver for this work.

Contact with metal (tools) can cause performance degradation in the magnetron.

Remove the bolts (M6×25) holding the magnetron in place at eight positions, and demount the metal fitting and magnetron.

Install a replacement magnetron by securing it in place with the metal fitting, and fix the cables in position.

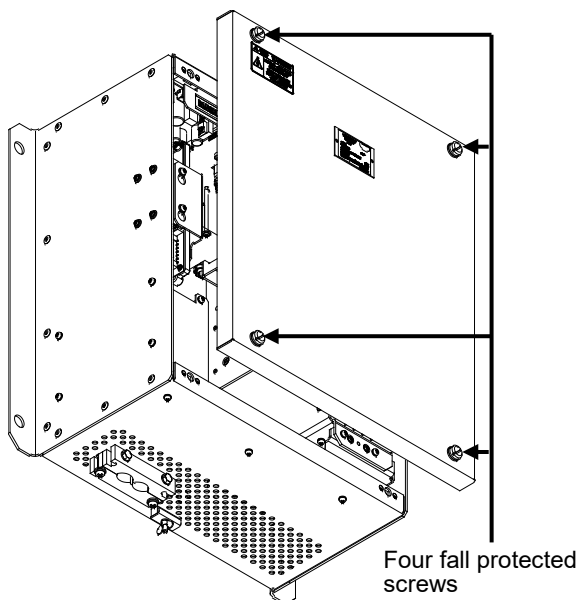
Pay special attention to the positions to which the cables (yellow and green) of the magnetron and pulse transformer are fixed.

After replacing the magnetron, install the cover by following the same steps in reverse order.

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

### 21.5.1.8 Magnetron replacement procedure for transmitter-receiver unit NTG-3225/A

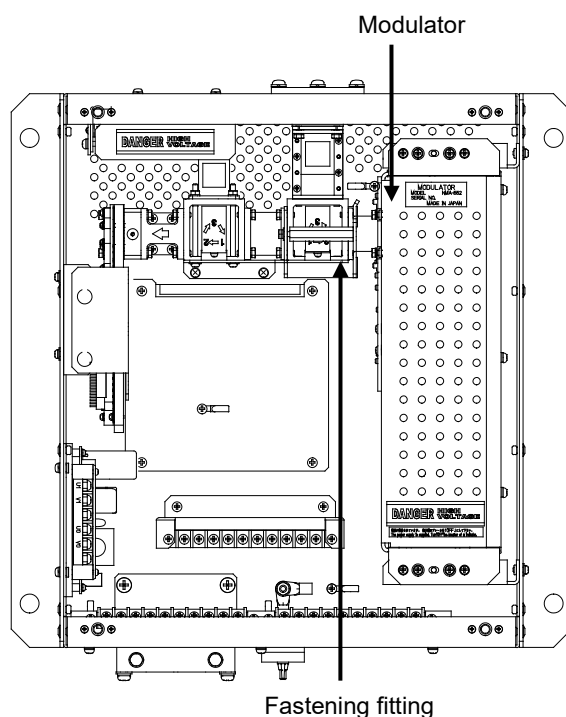
#### 1 Remove the cover of the transmitter-receiver unit.



Loosen the screws designed to be protected from falling out at four positions, and remove the cover.

The fall protected screws have slotted heads.

Use a slotted screwdriver for this work.



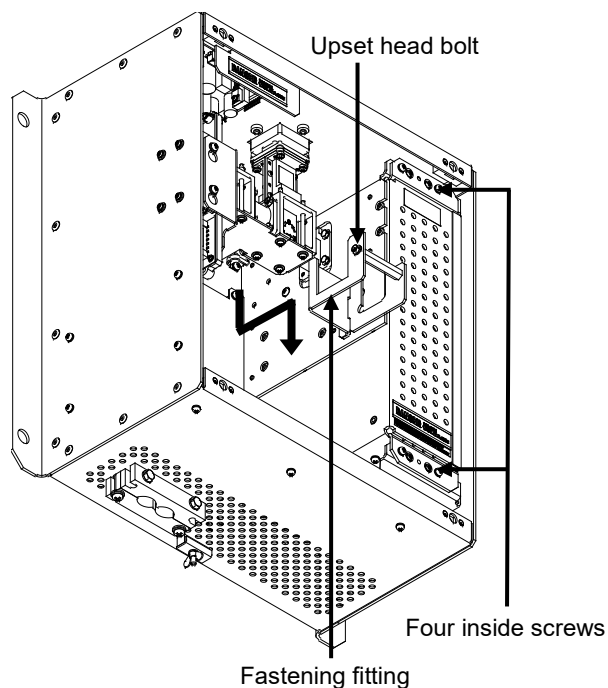
The magnetron is embedded inside the modulator.

The modulator can be demounted by removing the fastening fitting. The cables connected to the unit shall be detached before removing the fitting.

Transmitter-receiver unit after the cover is removed

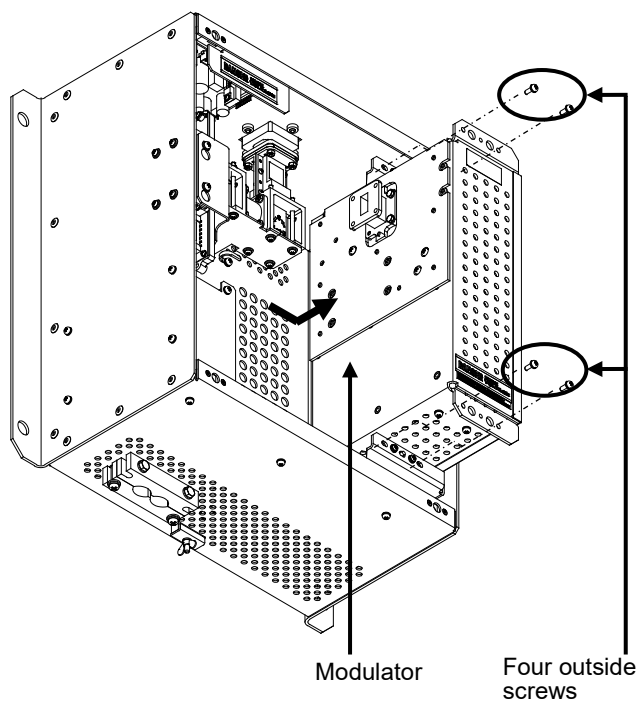


## 2 Demount the modulator.



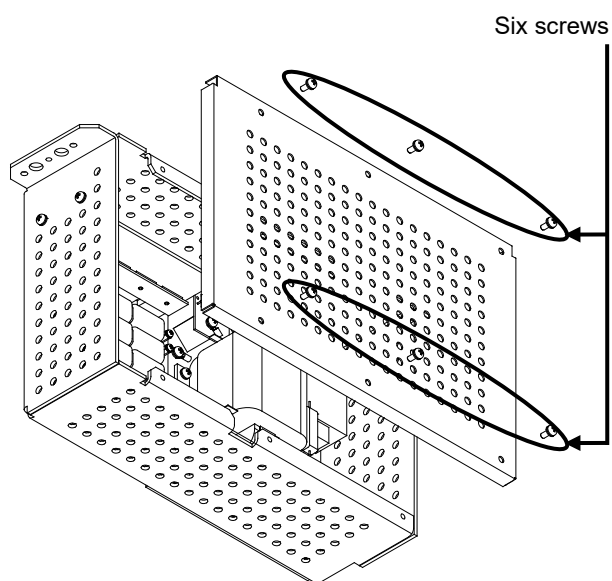
Loosen the upset head bolt (M4×12) and slide down the fastening fitting to remove it.

Loosen the inside screws of the modulator at four positions.  
(Removing the outside screws makes it possible to slide the modulator.)

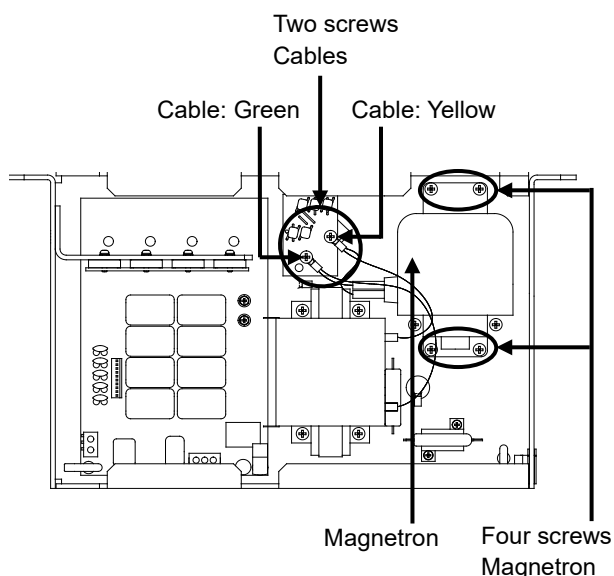


Loosen the outside screws (M4×12) at four positions and slide the modulator to the right to remove it.

### 3 Replace the magnetron.



Loosen the screws (M4×10) at six positions and remove the modulator cover.



Modulator after the cover is removed

Remove the screws (M4×12) holding the cables at two positions, and detach the cables.



Use a shielded screwdriver for this work.

Contact with metal (tools) can cause performance degradation in the magnetron.

Remove the bolts (M4×12) holding the magnetron in place at four positions, and demount the metal fitting and magnetron.

Install a replacement magnetron by securing it in place with the metal fitting, and fix the cables in position.

Pay special attention to the positions to which the magnetron and pulse transformer cables (yellow and green) are fixed.

After replacing the magnetron, reassemble the unit by following the same steps in reverse order. Do not forget to tighten the bolts and screws, and do not forget to reconnect the cables.

## 21.5.2 Replacing the motor

### Note

Replacement of motor must be made by specialized service personnel.

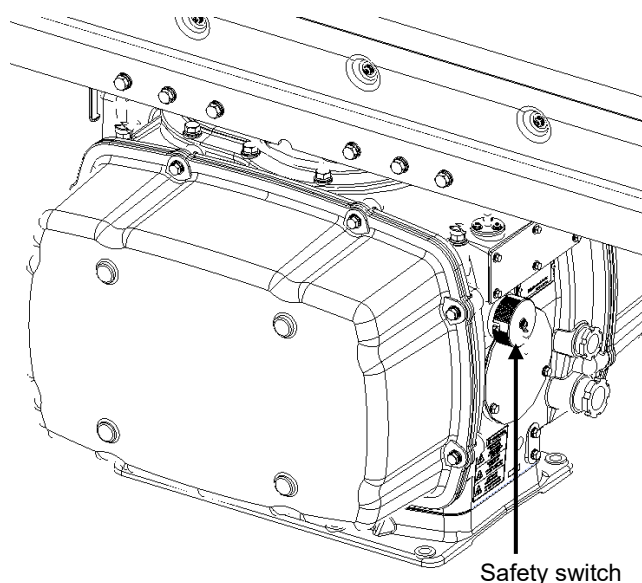
For details, refer to Service Manual.

After replacement, connect the lead wire correctly.

### 21.5.2.1 Motor replacement procedure for radar antenna

#### NKE-1130/A, NKE-1139/A

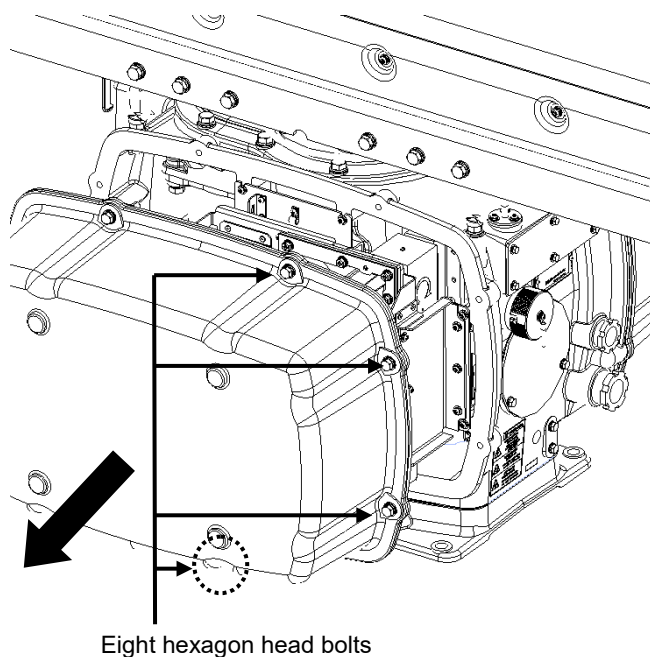
##### 1 Turn Off the safety switch of the radar antenna.



**!** When replacing a motor, ensure that the safety switch of the radar antenna is turned Off prior to commencing the replacement work.

The safety switch is located on the rear (stern) side of the radar antenna. Remove the cover and turn Off (to the lower side) the safety switch.

##### 2 Remove the cover.



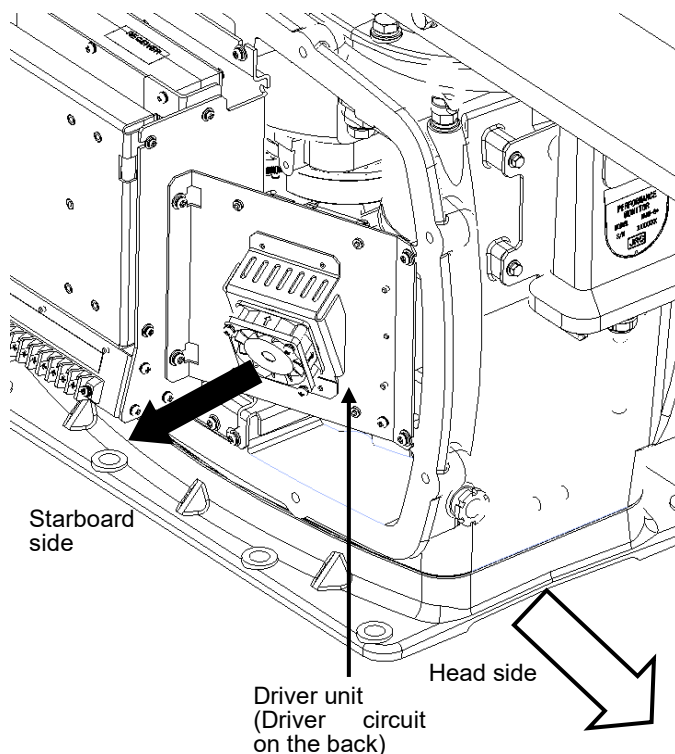
The motor is mounted on the front side (head side) of the radar antenna. Both left and right side covers need to be removed to carry out the motor replacement work.

The cover is secured in place with hexagon head bolts (M8, designed to be protected from falling out) at eight positions.

After removing the cover, place it in a safe area.

Exercise care to avoid dust or other foreign matters adhering to the packing.

### 3 Remove the motor cable.

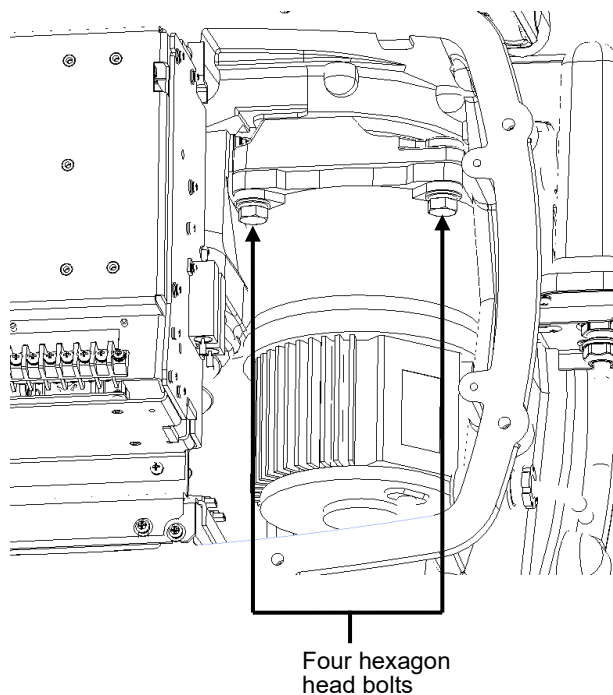


The motor driver unit is located on the right side (starboard side).

The motor driver is secured in place with screws (M5×12) at four positions.

Demount the motor driver unit and detach the motor cables connected to the driver circuit on the back of the driver unit.

### 4 Replace the motor.

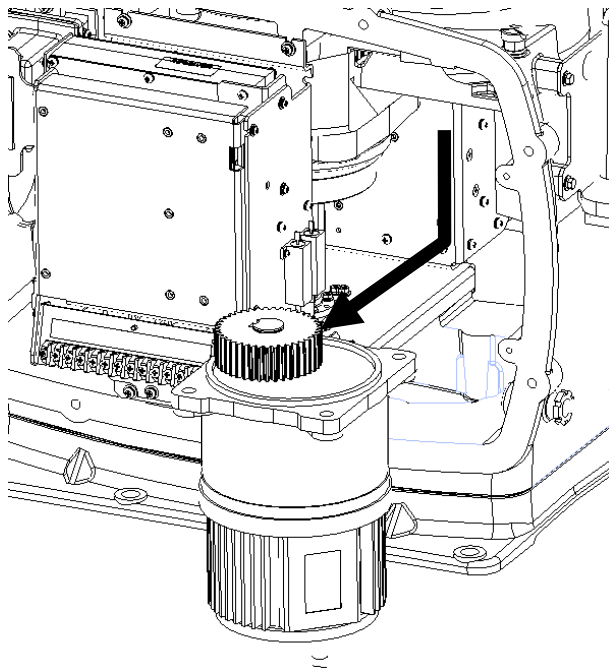


The motor is secured in place with hexagon head bolts (M10×40, SW10 and W10) at four positions.

Remove the four hexagon head bolts.



The weight of the motor is about 10 kg.  
Use due caution when undertaking this procedure.



Remove the motor.

Apply grease to the gear wheel of the new motor.

Install the new motor in the radar antenna.

Fasten the hexagon head bolts with proper torque (350 kgf·cm) to ensure that none of the bolts is left without being tightened or tightened too loosely.

## **5 Connect the motor cables.**

Connect each cable back to its original position on the motor driver circuit.

## **6 Install the cover.**

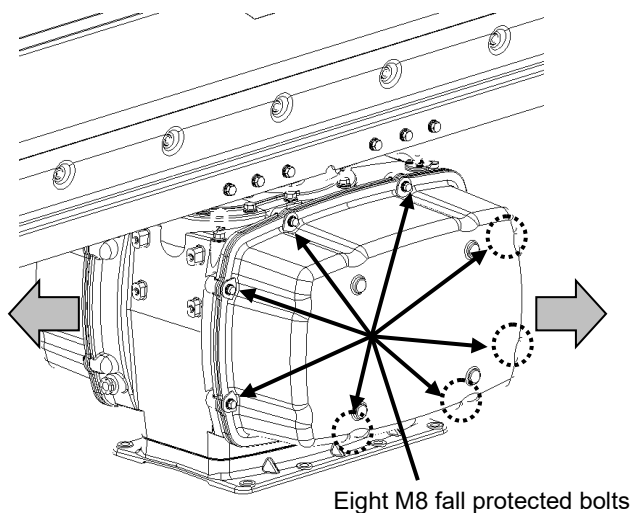
Before installing the cover on the radar antenna, check to confirm that there are no deformations, cracks or other abnormalities in the packing of the cover. Remove any foreign matters, dust or other contaminants if found.


Leaving any hexagon head bolts without tightened, or tightening them too loosely, may result in the waterproof performance of the radar antenna being adversely affected. Fasten the hexagon head bolts with proper torque to ensure that none of the bolts is left without being tightened or tightened too loosely.


When the motor replacement is complete, turn on the safety switch of the radar antenna and check if the equipment operates properly.

## 21.5.2.2 Motor replacement procedure for NKE-1632/A

### 1 Remove the cover.



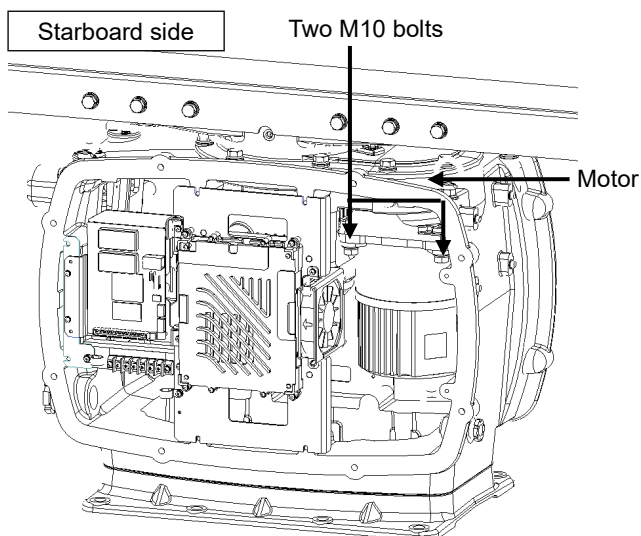
 When replacing a motor, ensure that the safety switch of the radar antenna is turned Off prior to commencing the replacement work.

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

Both left and right side covers need to be removed to carry out the motor replacement work.

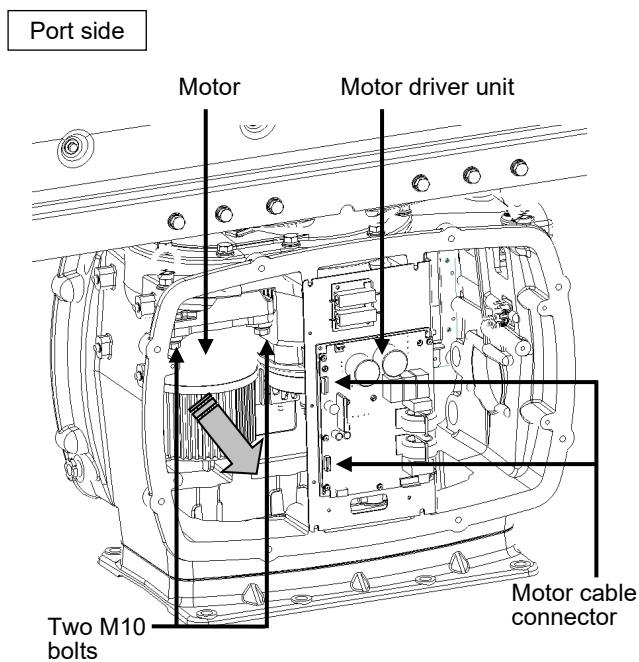
Loosen the M8 bolts designed to be protected from falling out at eight positions, and remove the cover.

## 2 Replace the motor.



[Starboard side]

Unscrew the M10 bolts at two positions.



[Port side]

Detach the motor cables connected to the motor driver.

Remove the M10 bolts at two positions and pull the motor carefully to demount it.

Apply grease to the gear wheel of the replacement motor prior to installation.

Install the new motor in the radar antenna.

Fasten the hexagon head bolts with proper torque (350 kgf·cm) to ensure that none of the bolts is left without being tightened or tightened too loosely.

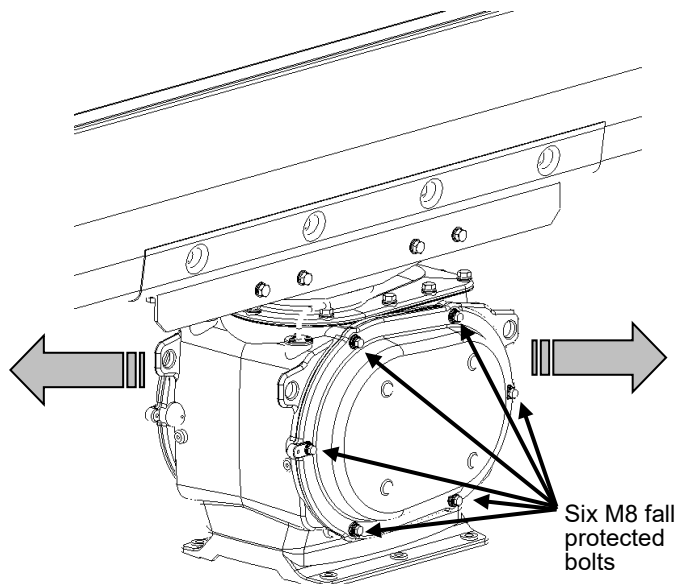
Install the cover by following the same steps in reverse order.

Turn On the safety switch and confirm if the equipment operates properly.

### 21.5.2.3 Motor replacement procedure for radar antenna

#### NKE-2632/A, NKE-2632-H

##### 1 Remove the cover.



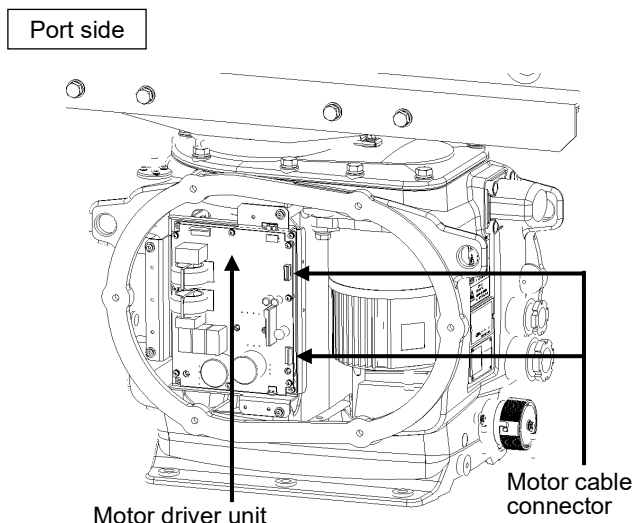
**!** When replacing a motor, ensure that the safety switch of the radar antenna is turned Off prior to commencing the replacement work.

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

Both left and right side covers need to be removed to carry out the motor replacement work.

Loosen the M8 bolts designed to be protected from falling out at six positions, and remove the cover.

##### 2 (Port side) Detach the motor cable.

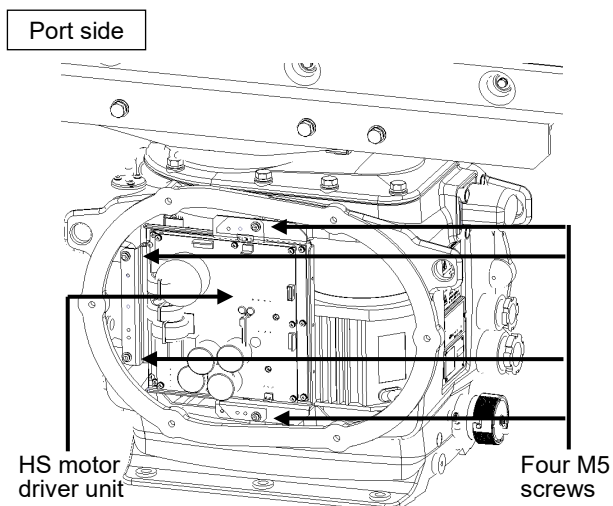


[Port side]

Detach the motor cables connected to the motor driver.



(Port side) Detach the motor cable. \* In case of NKE-2632-H

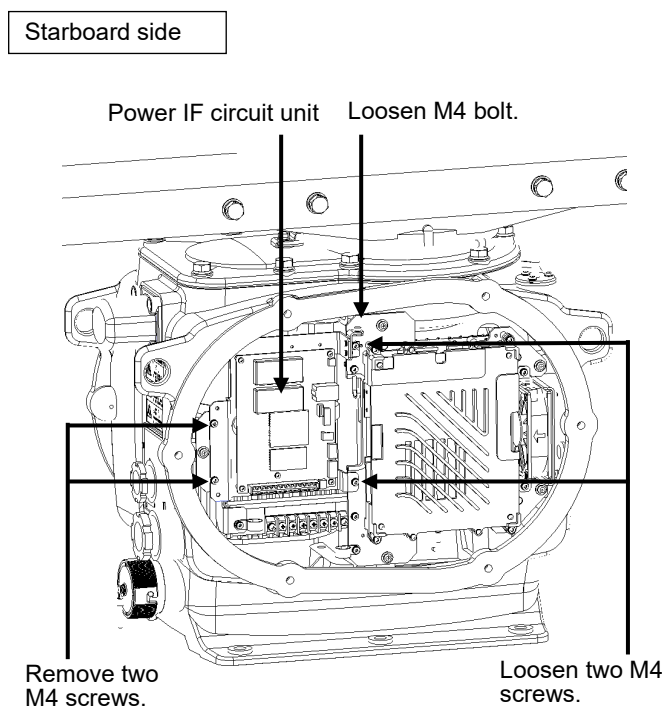


\* In case of NKE-2632-H  
Demount the HS motor driver unit.

[Port side]  
Detach the cables connected to the  
HS motor driver unit.

Remove the M5 screws at four  
positions and demount the motor  
driver unit.

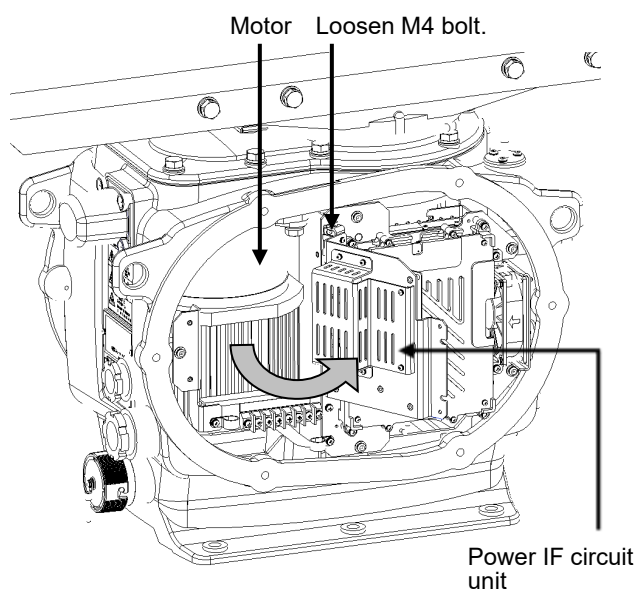
### 3 (Starboard side) Open the power IF circuit unit.



[Starboard side]

The power IF circuit unit can be  
opened to the near side by  
loosening the M4 bolts and two M4  
screws while removing the other  
two M4 screws.

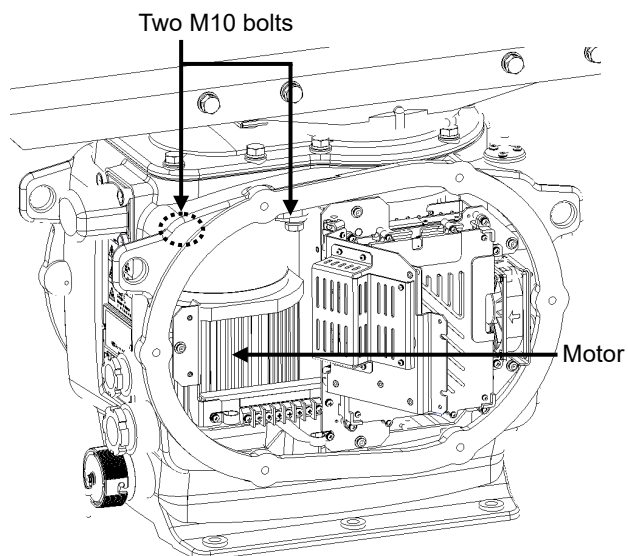
Starboard side



Loosen the M4 bolt and fix the power IF circuit unit with the unit open.

#### 4 Replace the motor.

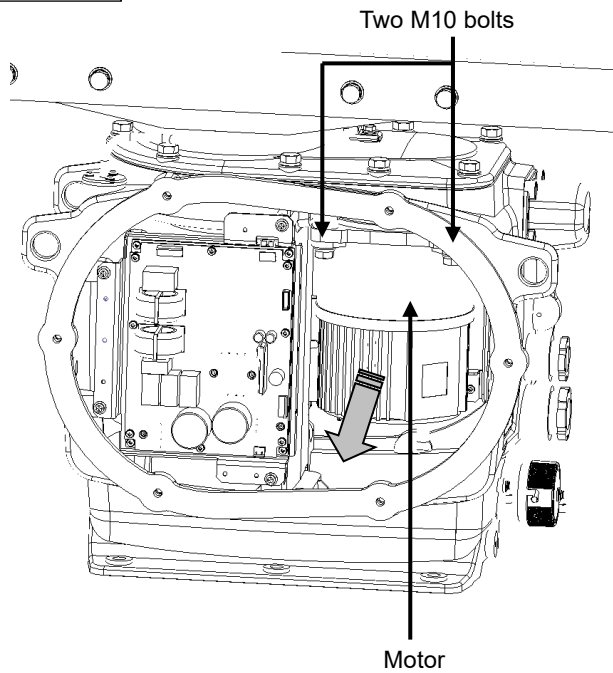
Starboard side



[Starboard side]

Remove the M10 bolts at two positions.

Port side



[Port side]

Remove the M10 bolts at two positions and pull the motor to demount it.

Apply grease to the gear wheel of the replacement motor prior to installation.

Install the new motor in the radar antenna.

Fasten the hexagon head bolts with proper torque (350 kgf·cm) to ensure that none of the bolts is left without being tightened or tightened too loosely.

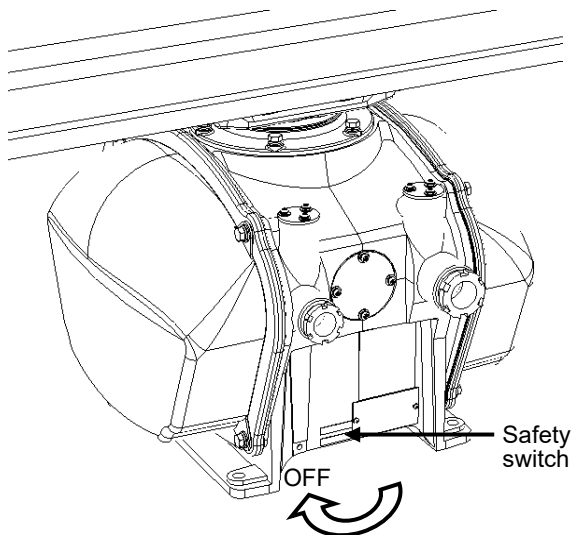
Install the cover by following the same steps in reverse order.

Turn On the safety switch and confirm if the equipment operates properly.

## 21.5.2.4 Motor replacement procedure for radar antenna

### NKE-1125/A, NKE-1129/A, NKE-1696

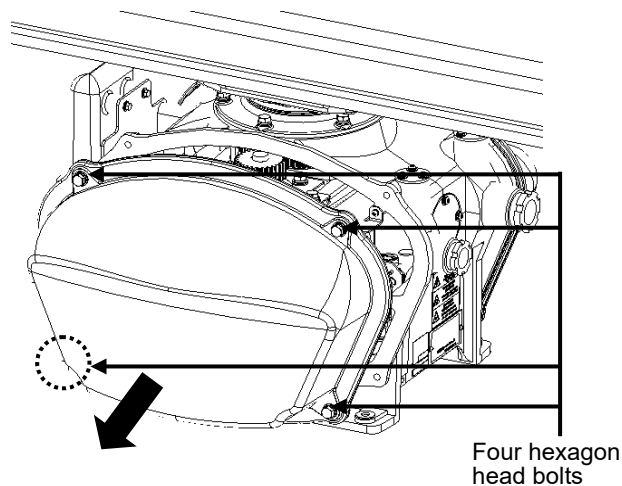
#### 1 Turn Off the safety switch of the radar antenna.



**!** When replacing a motor, ensure that the safety switch of the radar antenna is turned Off prior to commencing the replacement work.

Turn Off the safety switch located on the bottom of the stern side of the radar antenna.

#### 2 Remove the cover.



The motor is mounted on the left side (port side) of the radar antenna.

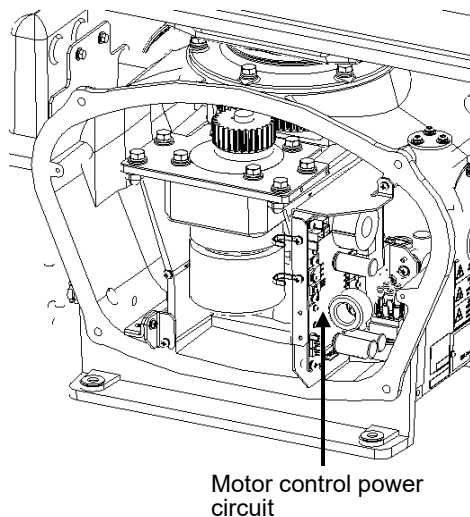
Remove the left side cover.

The cover is secured in place with hexagon head bolts (M8, designed to be protected from falling out) at four positions.

After removing the cover, place it in a safe area.

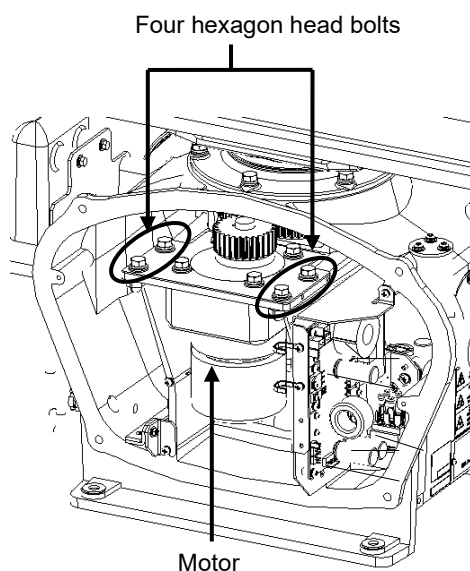
Exercise care to avoid dust or other foreign matters adhering to the packing.

### 3 Remove the cover.



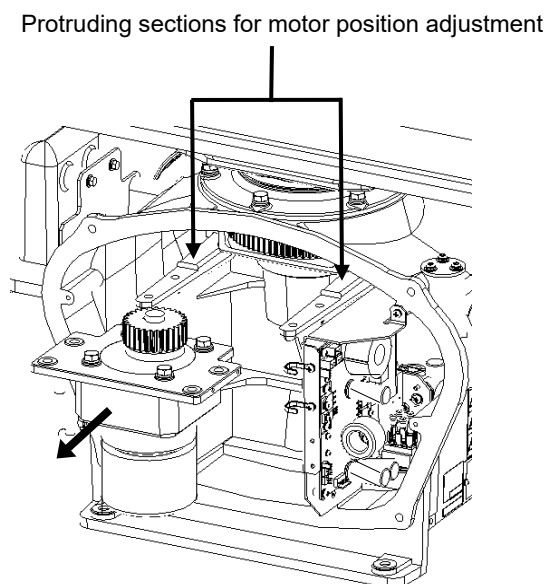
Detach the motor cables connected to the motor control power circuit.

### 4 Replace the motor.



The motor is secured in place with hexagon head bolts (M8×20, SW + W assembled) at four positions.

Remove the four hexagon head bolts.

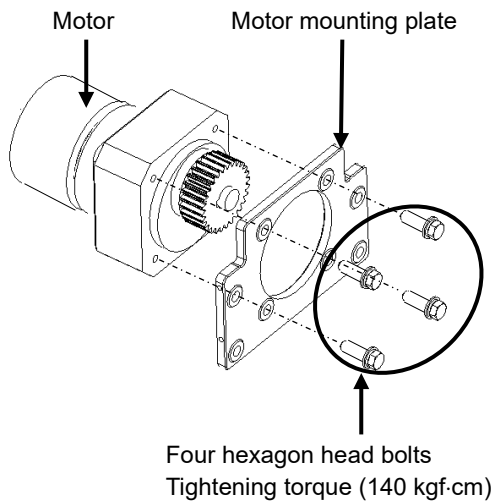


Demount the motor.



The weight of the motor is about 6 kg.

Use due caution when undertaking this procedure.



Set a mounting plate on a replacement motor.

Remove a motor mounting plate from the motor demounted from the radar antenna. The mounting plate is secured to the motor with stainless steel hexagon head bolts (M8×30, SW + W assembled) at four positions.

Attach the removed parts to the replacement motor.

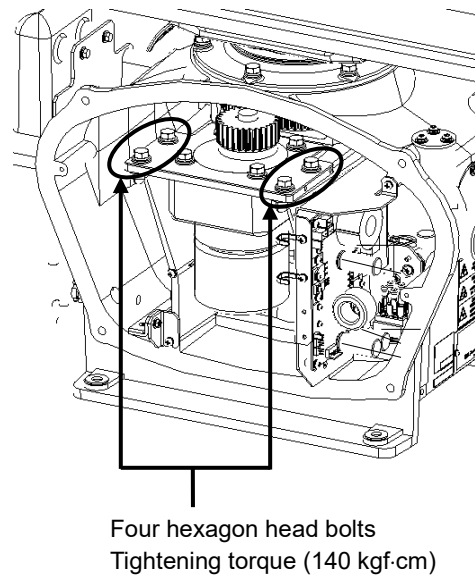
Fasten the hexagon head bolts with proper torque (140 kgf·cm) to ensure that none of the bolts is left without being tightened or tightened too loosely.

Install the motor in the radar antenna.

Press the motor against the mounting face of the motor-mounting arm projecting out from the cabinet, and secure it in place after making adjustment to minimize backlash.

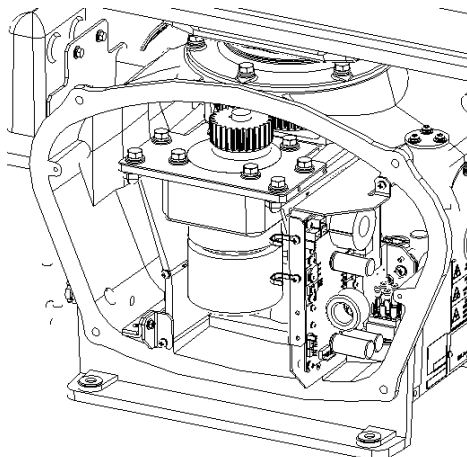
Fasten the hexagon head bolts with proper torque (140 kgf·cm) to ensure that none of the bolts is left without being tightened or tightened too loosely.

After installing the motor, apply grease to the gear wheel.



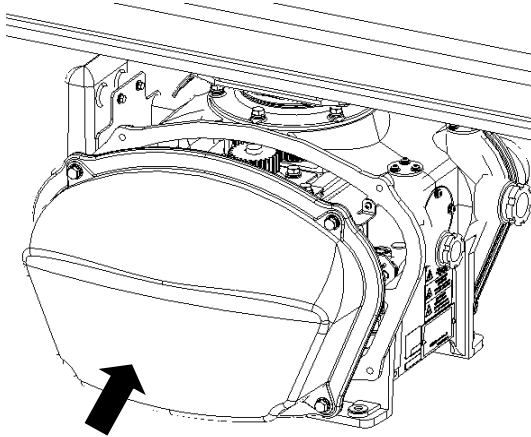
## 5 Connect the motor cables.

Connect each cable back to its original position on the motor control power circuit.



---

## 6 Install the cover.



Before installing the cover on the radar antenna, check to confirm that there are no deformations, cracks or other abnormalities in the packing of the cover.

Remove any foreign matters, dust or other contaminants if found.

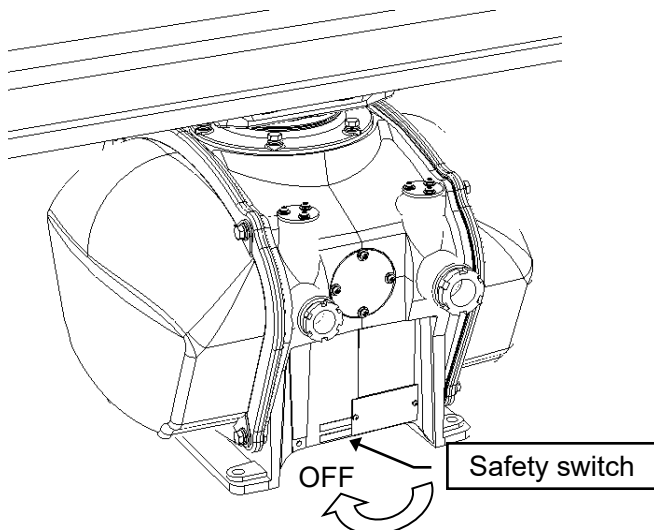
Secure the cover in place with hexagon head bolts (M8) at four positions.

Leaving any hexagon head bolts without tightened, or tightening them too loosely, may result in the waterproof performance of the radar antenna being adversely affected. Fasten the hexagon head bolts with proper torque to ensure that none of the bolts is left without being tightened or tightened too loosely.

When the motor replacement is complete, turn on the safety switch of the radar antenna.

## 21.5.2.5 Motor replacement procedure for radar antenna NKE-2254-HS

### 1 Turn off the antenna safety switch.

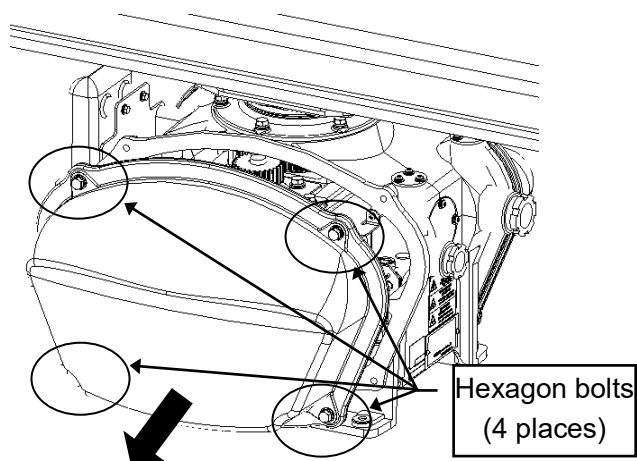


**!** When replacing a motor, make sure to first turn off the antenna safety switch.

The switch is at the rear bottom of the antenna.

Turn off the switch.

### 2 Remove the cover.



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

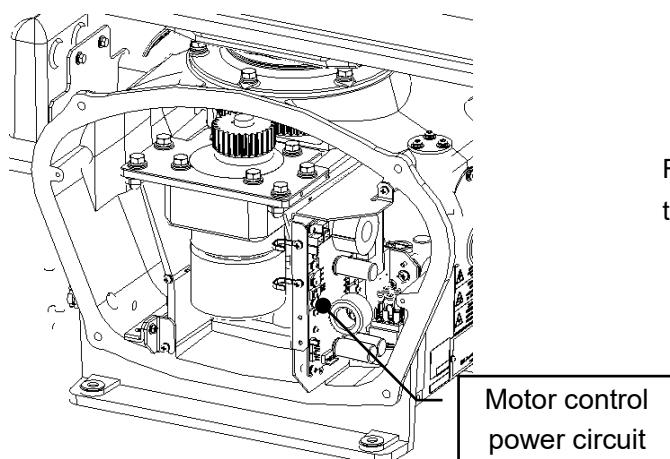
Therefore, remove the left cover.

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.

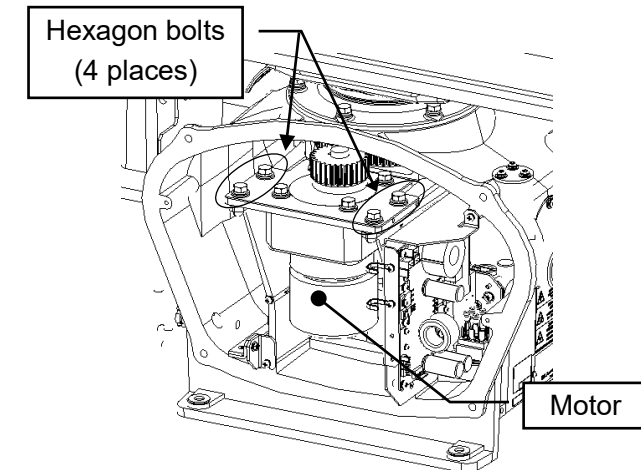
### 3 Remove the motor cable.



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

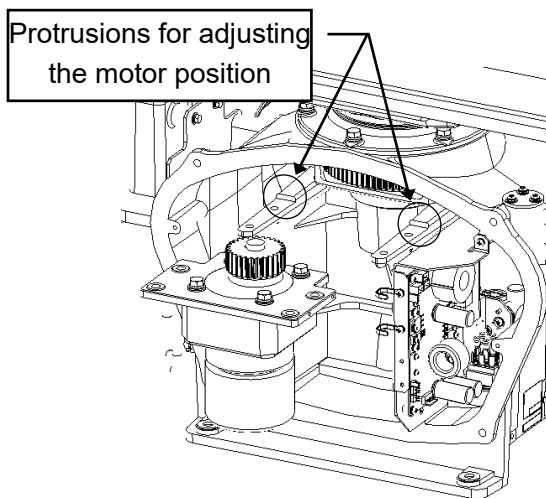


#### 4 Replace the motor.




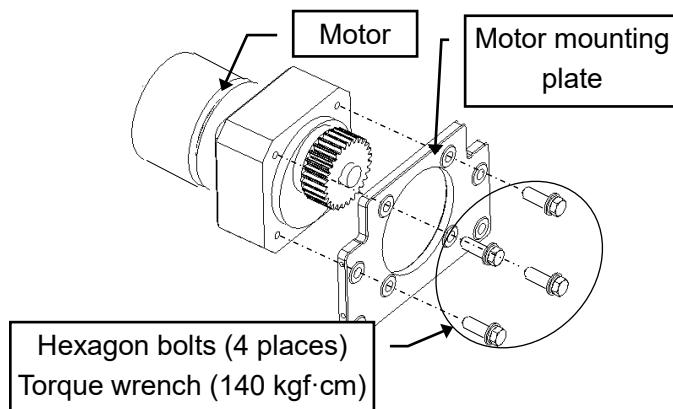
The motor is fixed with 4 hexagon bolts (M8 x 20 SW W, embedded type).

Remove all the hexagon bolts (4 pieces).



Remove the motor.

 The motor weighs about 6 kg. Handle it carefully.

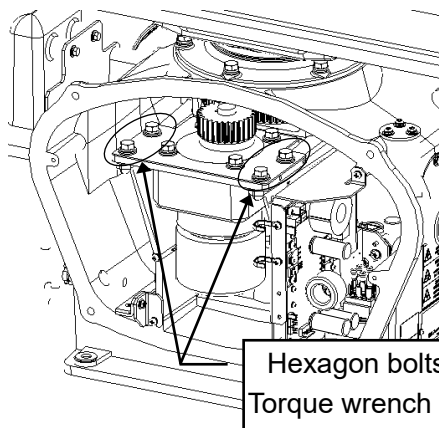


Attach the mounting plate to the new motor.

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 (140 kgf·cm).



Hexagon bolts (4 places)  
Torque wrench (140 kgf·cm)

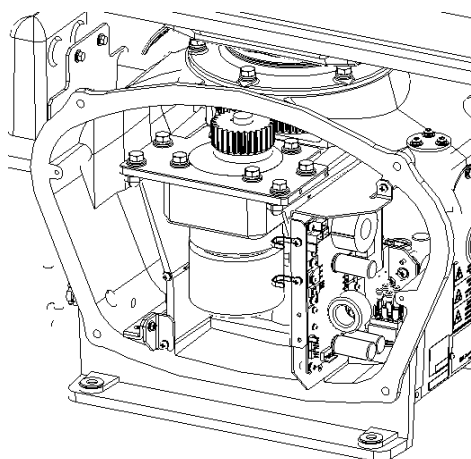
Place the motor in the antenna.

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).

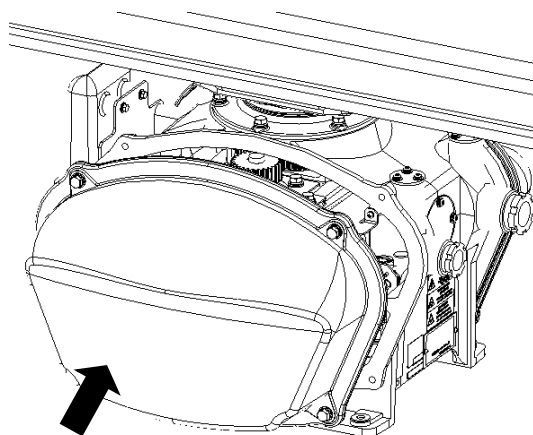
Apply grease to the gear after placing the motor in the case. Step 5: Connect the motor cables.

## 5 Connect the motor cables.



Reconnect the cables to the motor control power circuit.

## 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.

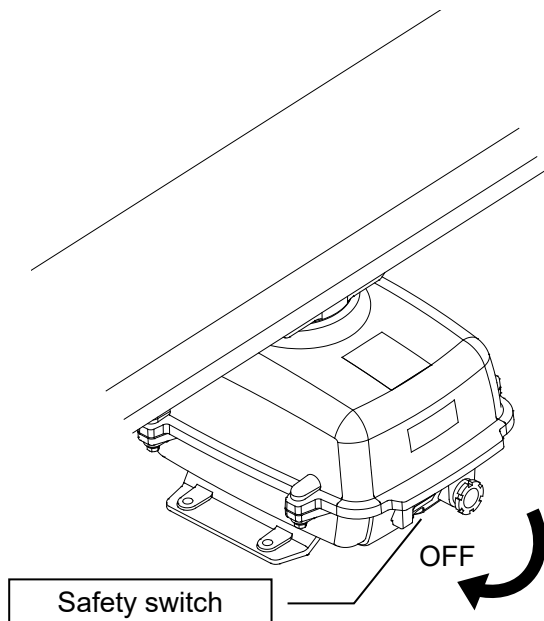
Fix the cover with 4 hexagon bolts.

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.

## 21.5.2.6 Motor replacement procedure for radar antenna NKE-2103, NKE-2103-HS

- 1 Turn off the antenna safety switch.

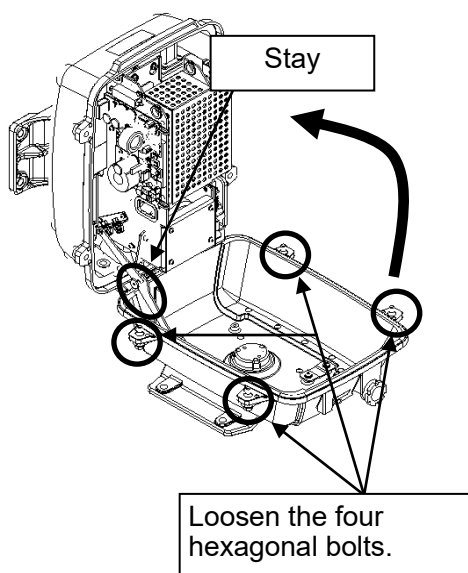


When replacing a motor, make sure to first turn off the antenna safety switch.

The switch is at the rear bottom of the antenna.

Turn off the switch.

- 2 Remove the bolts and open the top cover.

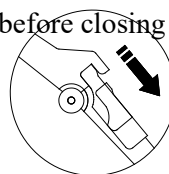


The top cover is fixed with 4 hexagonal bolts (M8 captive screw).

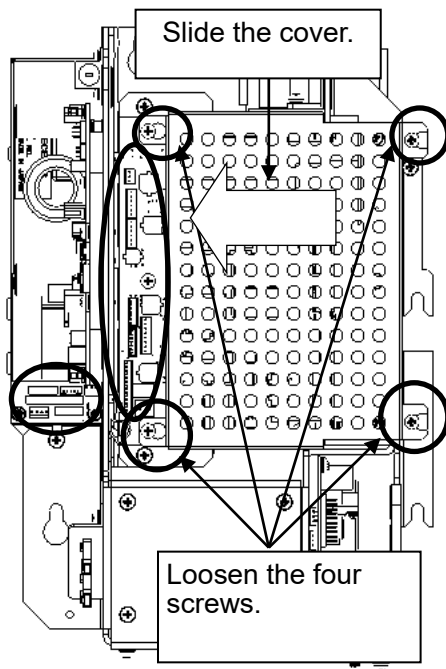
Remove the bolts and fully open the top cover such that the stopper of the joint fitting is locked.

\* When closing the top cover

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

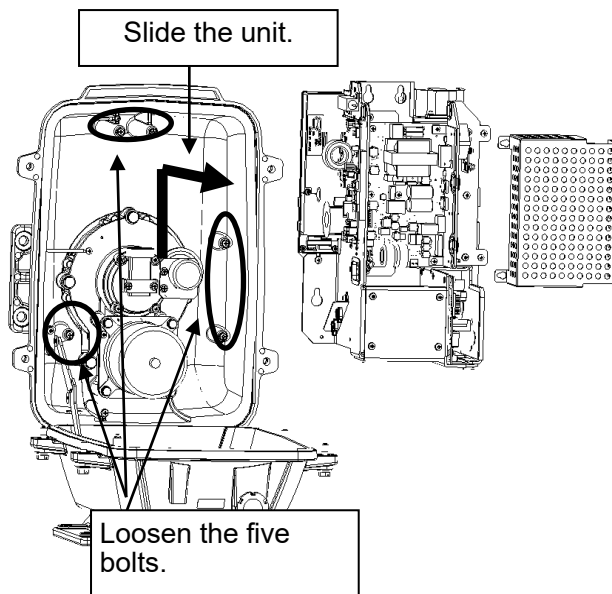


### 3 Remove the cable.



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

### 4 Remove the transmitter-receiver.



Loosen all the hexagon bolts (5 places).

Slide upward and remove the transmitter-receiver.

---

## 5 Replace the motor.

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

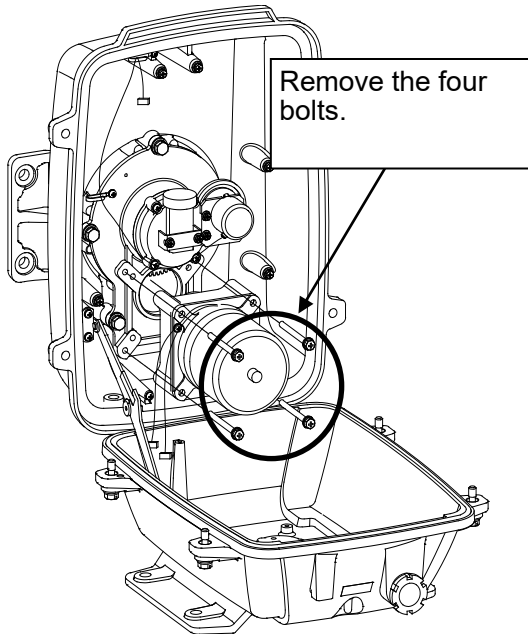
Apply grease to the gears of the new motor, and bolt the new motor.

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

Reverse the order to complete the procedure.

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.



---

## 21.6 Software Update

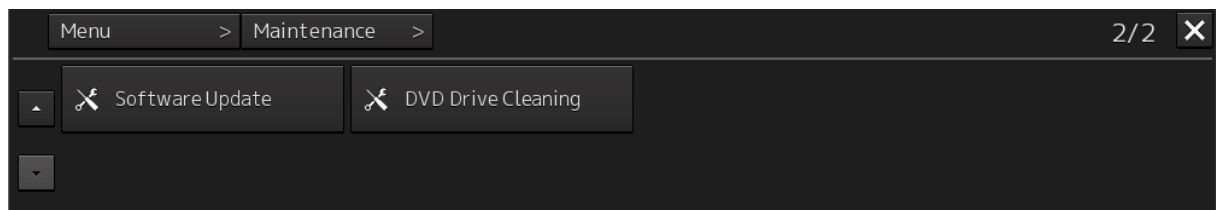
This section describes software update of this equipment.

### Note

When software update starts, the tasks that are active are automatically terminated. Complete the necessary operation such as saving of settings prior to the start of update.

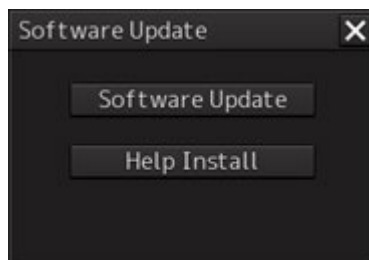
### 21.6.1 Local Update

- 1 Set the CD/DVD or USB flash memory containing the update data.**
- 2 Click on the [Menu] button on the left Toolbar.**  
The menu is displayed.
- 3 Change over to the second page using the page switching button, and click [Maintenance] - [Software Update].**

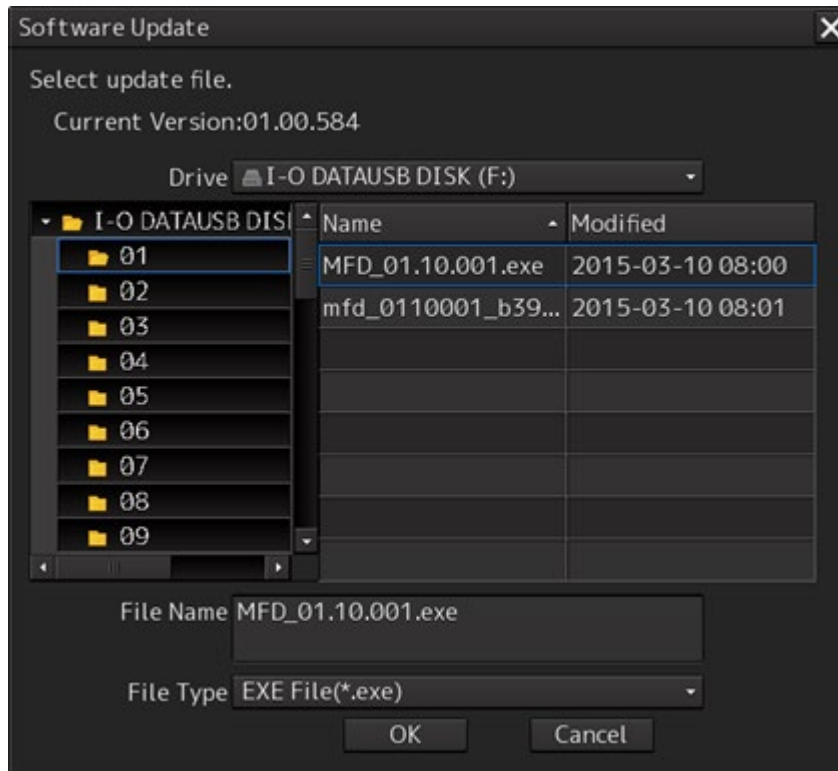


The [Software Update] dialog box appears.

- 4 Click on the [Software Update] button.**



A file selection dialog box appears.

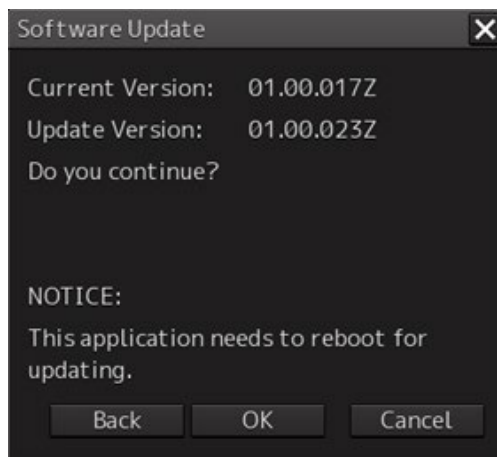


**5** From the [Drive] combo box, select the drive where the updating data is stored.

**6** From the file list, select the file MFD\_xx.xx.xxx.exe.  
MFD\_xx.xx.xxx.exe is displayed in [File name].

**7** Click the "OK" button.

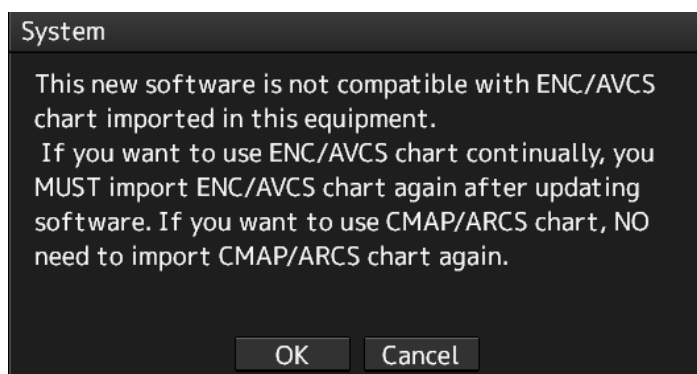
The update content confirmation dialog box appears.



---

## 8 Confirm the contents and click "OK".

The following screen may be displayed.

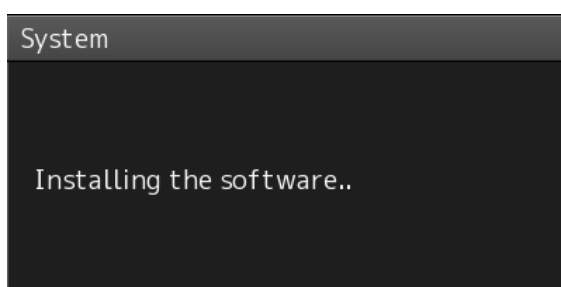


### Note

When this popup message is displayed, the chart data is deleted after completion of software update. Re-import the chart after completion of software update.

## 9 Check the contents and click on [OK].

Installation of the update is started and the following screen is displayed.

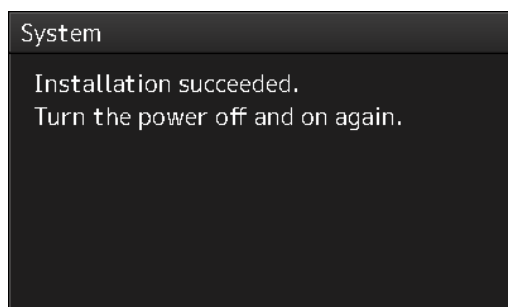


Wait for some time until the installation is completed.

### Note

This equipment may restart during installation.

At completion of installation, the following screen is displayed.



## 10 Switch OFF the power supply of this equipment.

## 11 Restart this equipment.

## 12 Start MFD, and confirm that the software version number has been updated in the [Software] tab by selecting [Maintenance] - [System Information].



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## 21.6.2 Remote Update

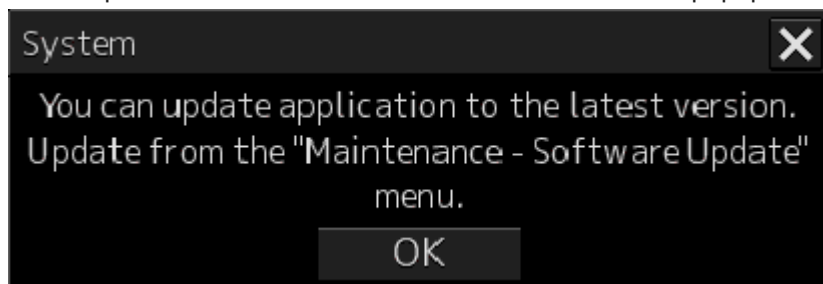
When Enable RMS of the menu [service] – [Installation] – [Settings] – [RMS] is valid, if you need to update the software, the installer will be downloaded automatically from the RMS server.

You can use this installer to update the software.

### Memo

Once a day, at 12:00 automatically check the version of the updater on the RMS server to see if software update is necessary, and if it needs updating, download it.

The completion of the download will be notified in the next popup.



### Note

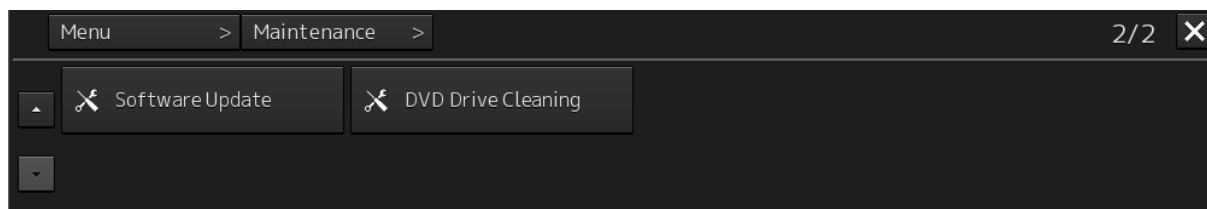
Please do not perform remote update work while navigating.

During the update, you can not observe using ECDIS.

- 1 Click on the [Menu] button on the left Tool Bar.

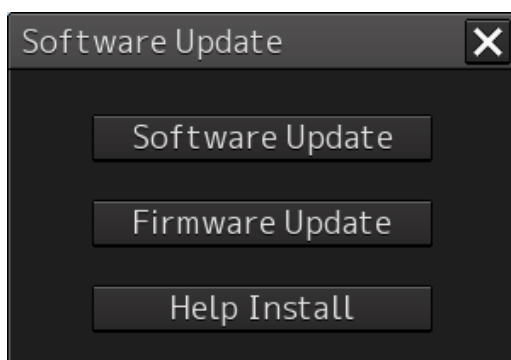
The menu is displayed.

- 2 Change over to the second page using the page switching button, and click [Maintenance] - [Software Update].

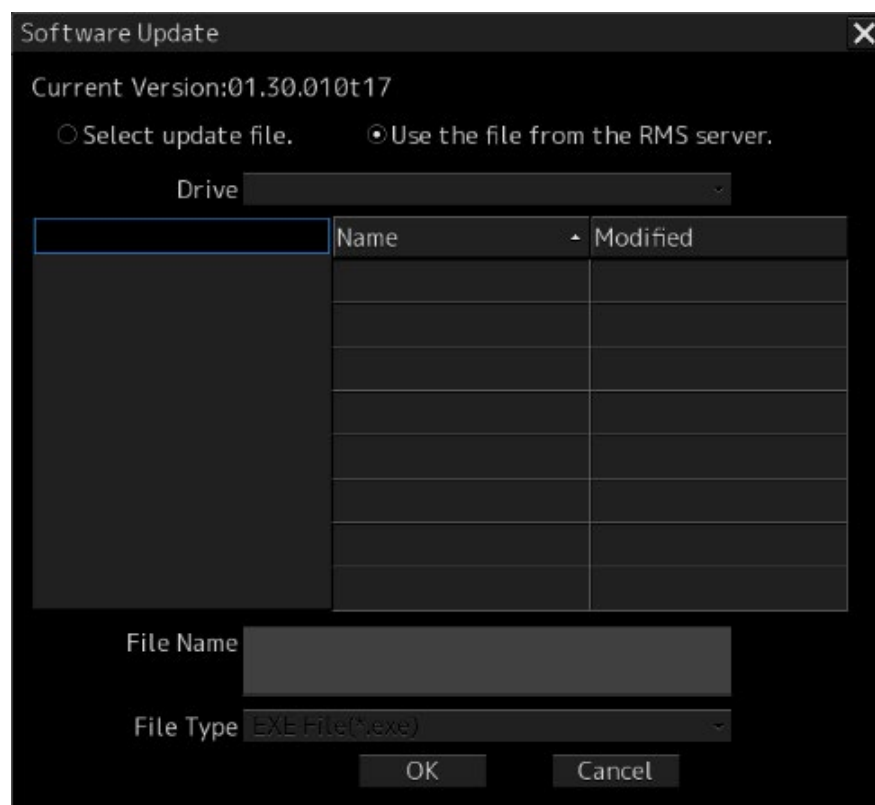


The [Software Update] dialog box appears.

- 3 Click on the [Software Update] button.



A file selection dialog box appears.

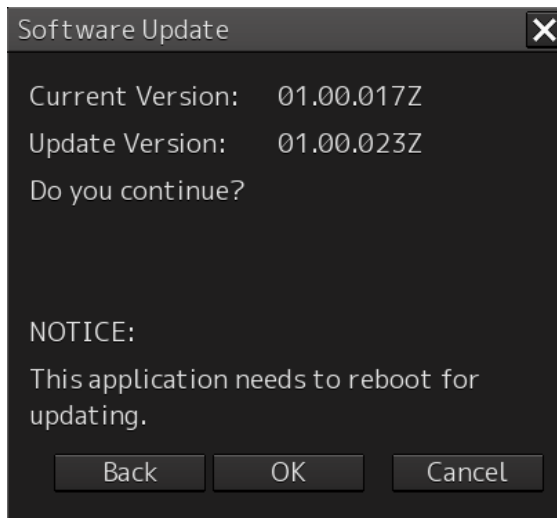


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**4** Check "Use the file from the RMS server."

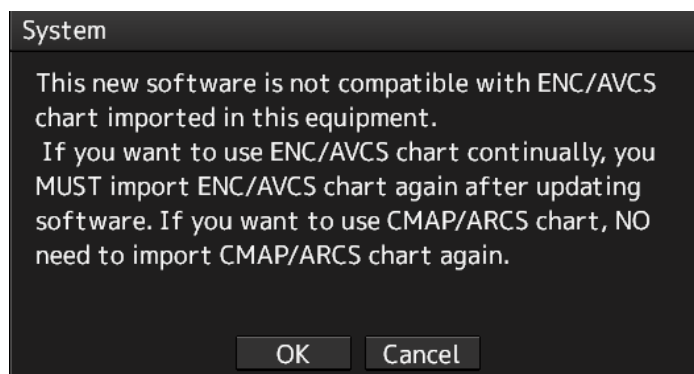
**5** Click the [OK] button.

The update content confirmation dialog box appears.



**6** Confirm the contents and click "OK".

The following screen may be displayed.



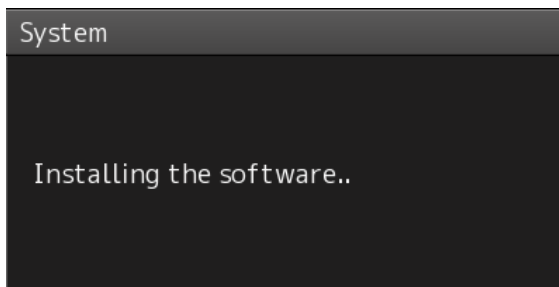
**Note**

When this popup message is displayed, the chart data is deleted after completion of software update. Re-import the chart after completion of software update.

---

**7 Check the contents and click on [OK].**

Installation of the update is started and the following screen is displayed.

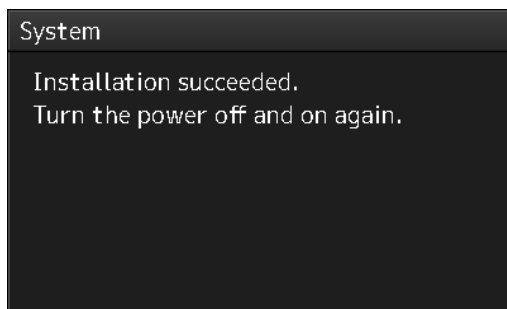


Wait for some time until the installation is completed.

**Note**

This equipment may restart during installation.

At completion of installation, the following screen is displayed.



**8 Switch OFF the power supply of this equipment.**

**9 Restart this equipment.**

**10 Start ECDIS, and confirm that the software version number has been updated in the "Software" tab by selecting [Maintenance] - [System Information].**

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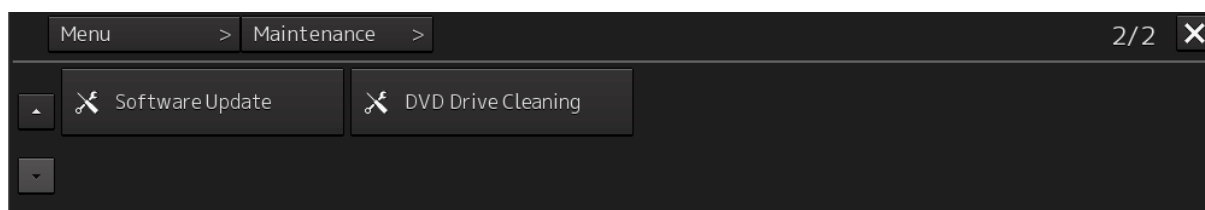
## 21.7 Firmware Update

Explain firmware update of this product.

### Note

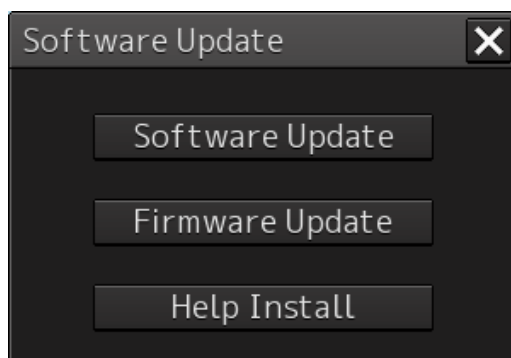
When the firmware update is started, the active task is automatically terminated.  
Please complete necessary operations, such as saving settings, before updating starts.

- 1 Click on the [Menu] button on the left Tool Bar.**  
The menu is displayed.
- 2 Change over to the second page using the page switching button, and click [Maintenance] - [Software Update].**

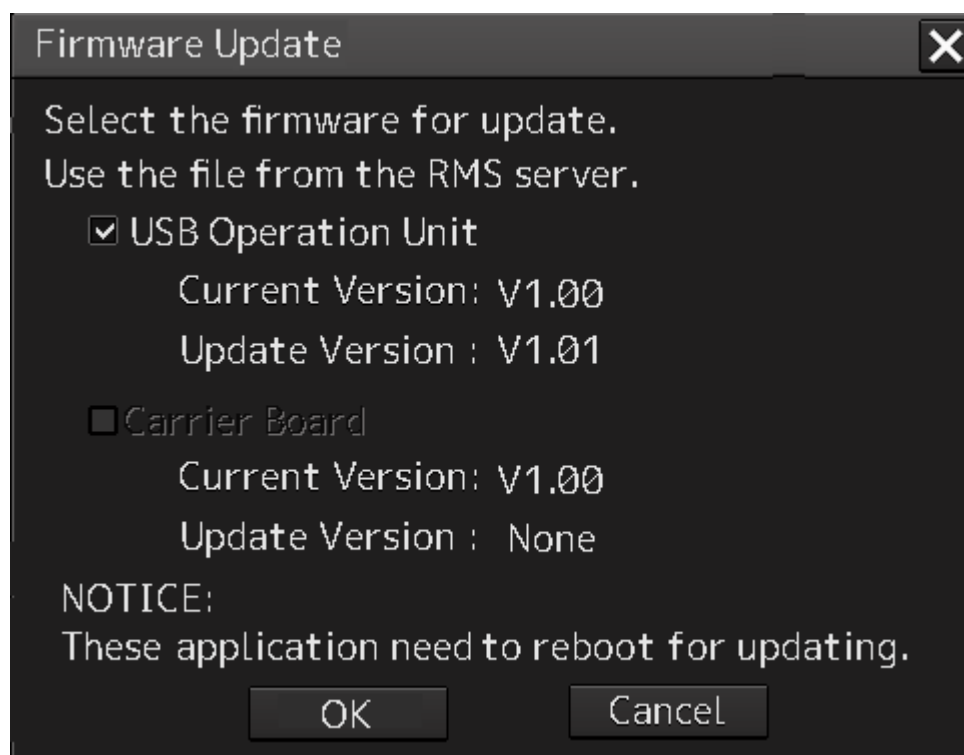


The [Software Update] dialog box appears.

- 3 Click on the [Software Update] button.**



A file selection dialog box appears.



#### **USB Operation Unit**

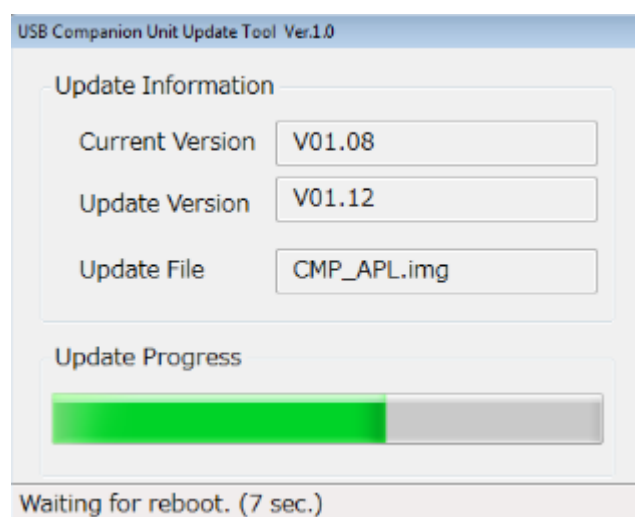
Select this when updating the firmware of the USB operation unit.

#### **Carrier Board**

Select this when updating the companion's firmware.

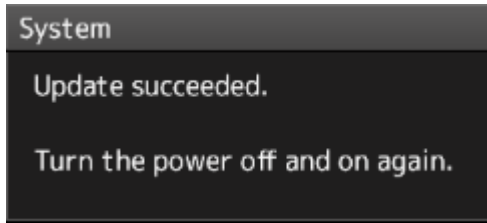
#### **4 Click the [OK] button.**

Firmware update is started and a popup is displayed.



---

When the update is completed, the following screen will be displayed.



- 5** Switch OFF the power supply of this equipment.
- 6** Restart this equipment.

---

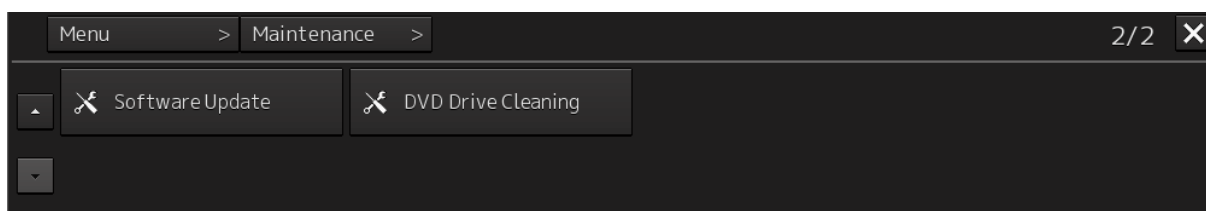
## 21.8 Updating Help Data

This section describes updating of help data of this product.

### Note

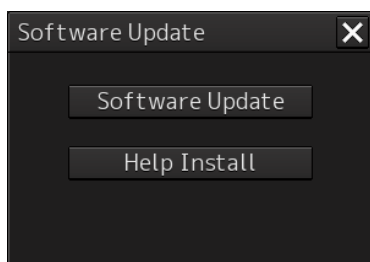
- Help data is classified to the data for RADAR, data for ECDIS, and data for Conning Display. To display help information on each of the RADAR screen, ECDIS screen, and Conning Display screen, install the help data for each display.
- When Help update starts, currently active tasks are terminated automatically. Complete the necessary operations, such as saving the settings, before the start of update.

- 1 Set the CD/DVD or USB memory where update data is stored.**
- 2 Click the [Menu] button on the Left Tool Bar.**  
A menu is displayed.
- 3 Switch the page to the 2nd page by using the page switching button and click [Maintenance] - [Software Update].**



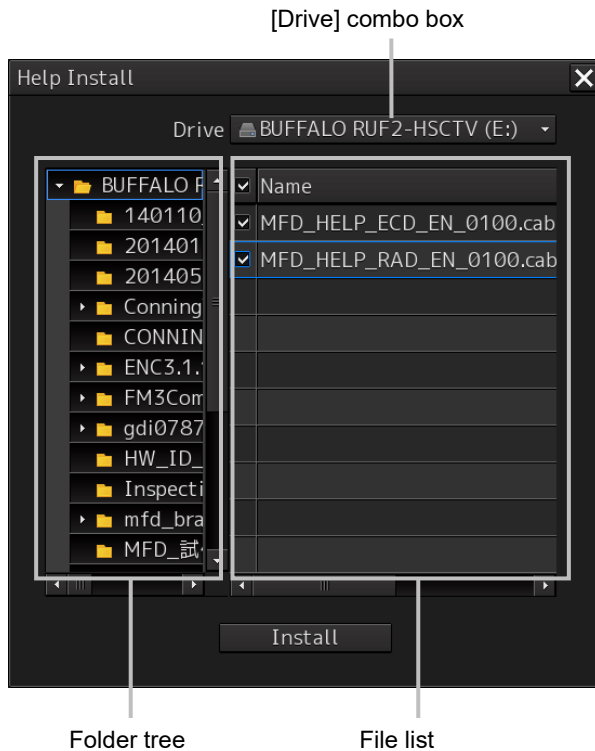
The [Software Update] dialog is displayed.

- 4 Click the [Help Install] button.**



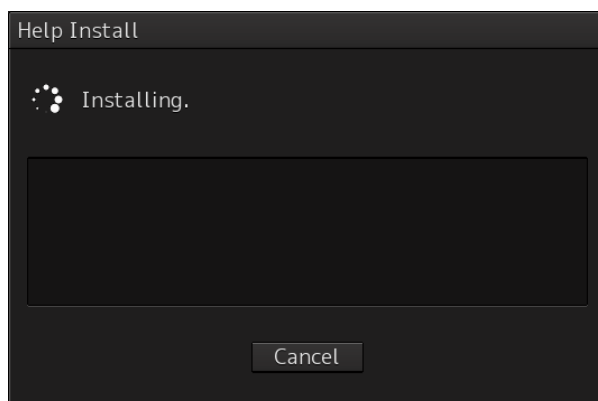


A file selection dialog is displayed.



- 5** Select the drive containing update data from the [Drive] combo box.
- 6** Select the folder containing update data from the folder tree and check the file to be updated from the file list.
- 7** Click the [Install] button.

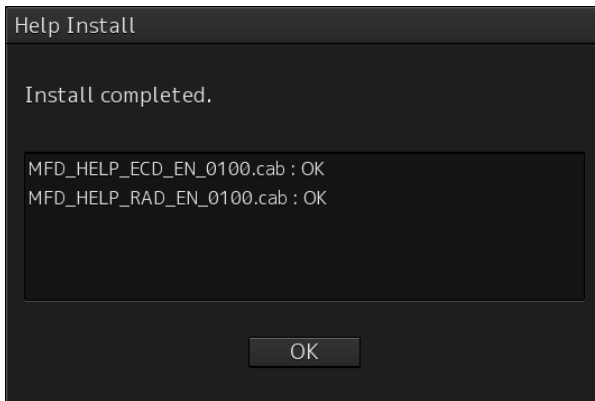
Installation starts and the following screen is displayed.



Wait until installation is completed.

---

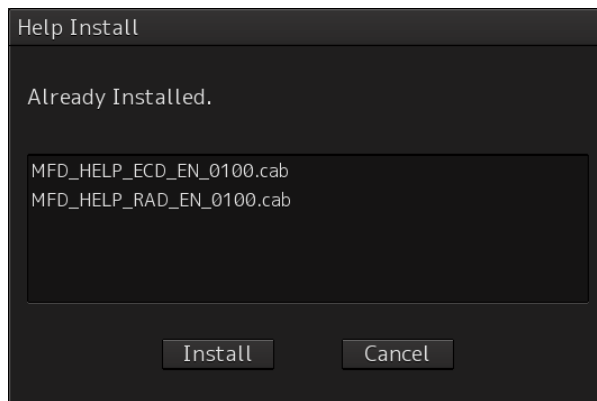
When installation is completed, the following screen is displayed.



## 8 Click the [OK] button.

### Memo

- When the [Cancel] button is clicked during installation, installation of subsequent files is cancelled after the installation of the file that is currently being installed is completed.
- When the selected update file already exists, the following screen is displayed.



End the operation by clicking on the [Cancel] button.

## 21.9 Confirming Maintenance INFO

### 21.9.1 Screen items/fields and their function

Maintenance INFO can be confirmed.

- 1 Click on the [Menu] button on the left Tool Bar.  
The menu is displayed.
- 2 Click on the [Maintenance] - [Maintenance INFO] button on the menu.

The screenshot shows the 'Information Reference' window with the 'Maintenance INFO' tab selected. The window is divided into two main sections. The left section contains a table of 17 maintenance informations, and the right section displays detailed information for the selected entry.

(1) points to the 'Maintenance INFO' button in the top toolbar.

(2) points to the 'Maintenance INFO' button in the left toolbar.

(3) points to the table of maintenance informations.

(4) points to the detailed view of the selected entry.

(5) points to the 'Export' button at the bottom right.

| Status | Cause                                | Raised(UTC)         |
|--------|--------------------------------------|---------------------|
| !      | Gyro 1(Communication Failed, Mai...  | 2020-09-07 10:04:29 |
| !      | Gyro 1(Communication Failed, Dire... | 2020-09-07 10:04:29 |
| !      | Multi Current(unavailable)           | 2020-09-07 10:04:20 |
| !      | Depth(unavailable)                   | 2020-09-07 10:04:20 |
| !      | Time(unavailable)                    | 2020-09-07 10:04:20 |
| !      | AIS(Communication failed, Main L...  | 2020-09-07 10:04:19 |
| !      | Log 1(Communication failed, Main ... | 2020-09-07 10:04:19 |
| !      | Current(Communication failed, Ma...  | 2020-09-07 10:04:19 |
| !      | Echo Sounder 1(Communication fai...  | 2020-09-07 10:04:19 |
| !      | NAVTEX(Communication failed, Ma...   | 2020-09-07 10:04:19 |
| !      | Autopilot(Communication Failed, ...  | 2020-09-07 10:04:19 |
| !      | Autopilot(Unavailable)               | 2020-09-07 10:04:19 |
| !      | GPS 1(Communication Failed, Main...  | 2020-09-07 10:04:19 |
| !      | GPS 2(Communication Failed, Main...  | 2020-09-07 10:04:19 |
| !      | GPS 1(Communication Failed, Direct)  | 2020-09-07 10:04:19 |
| !      | Log 1(Communication failed, Direct)  | 2020-09-07 10:04:19 |
| !      | AIS(Communication failed, Direct)    | 2020-09-07 10:04:19 |
|        | SLC1-1(Communication failed, Mai...  | 2020-09-07 07:43:24 |
|        | No.1 Conning(Communication faile...  | 2020-09-07 07:43:24 |
|        | No.1 Radar(Communication failed, ... | 2020-09-07 07:43:24 |

Detailed view of the first entry:

Cause: Gyro 1(Communication Failed, Main LAN)  
Raised(UTC): 2020-09-07 10:04:29  
Rectified(UTC): -  
Details: Communication with Gyro 1 cannot be performed via Main LAN.

The screen can be switched to either the standard window or the expanded window.

An example of an expanded window is shown above.

For the screen switching method, refer to "21.9.2 Switching to the standard window or the expanded window."

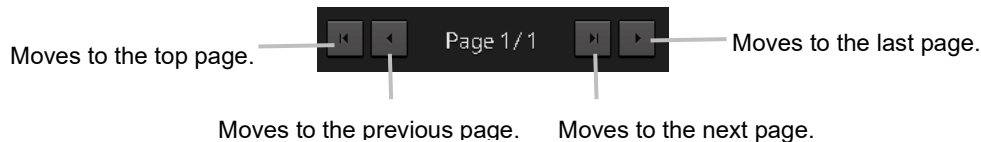
---

### (1) Number of pieces of maintenance information

The number of pieces of maintenance information being generated is displayed.

### (2) Active page information

Up to twenty pieces of maintenance information can be displayed on a page. If maintenance information exceeds 20 pieces and is displayed over multiple pages, the pages are switched by operating the page change buttons.



### (3) Maintenance information list

Maintenance information being generated is displayed. Clicking any information selects the information.

- Details of the selected information are displayed in "(4) Detailed maintenance information."
- New maintenance information generated during screen display is added to the top of the list.
- Up to 1000 pieces of information can be displayed. When 1000 pieces are exceeded, information is sequentially deleted from the oldest information.
- Either of the following icons is displayed in the [Status] column.

! : Generated

✓ : Resolved

Blank: Maintenance information which had been generated before the MFD was restarted

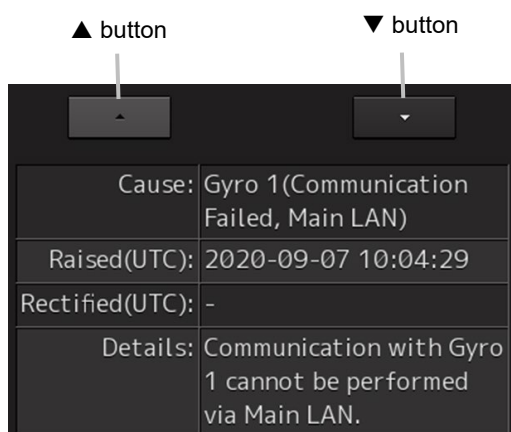
- The [Cause] column shows the names of maintenance information.
- The [Raised(UTC)] column shows the generation time and date (UTC) of maintenance information.
- Clicking any item in the title line rearranges the list with reference to the clicked item.

| Status ▾ | Cause                      | Raised(UTC)         |
|----------|----------------------------|---------------------|
| !        | Life Expectancy SSD1       | 2016-01-13 05:31:48 |
| ✓        | Life Expectancy Magnetron1 | 2016-01-13 05:31:48 |
|          | Life Expectance UPS        | 2016-01-10 01:00:00 |
|          |                            |                     |

---

#### (4) Detailed maintenance information

Details of the currently selected maintenance information are displayed.



| Information    | Description   |
|----------------|---|
| Cause          | The cause of the maintenance information is displayed.                          |
| Raised(UTC)    | The generation time and date (UTC) of the maintenance information is displayed. |
| Rectified(UTC) | The resolution time and date (UTC) of the maintenance information is displayed. |
| Details        | Detailed information is displayed.  |

##### [▲] button

Clicking this button displays the details of the information with higher priority than currently displayed information.

##### [▼] button

Clicking this button displays the details of the information with lower priority than currently displayed information.

#### (5) [Export] button

Use this button to export maintenance information.

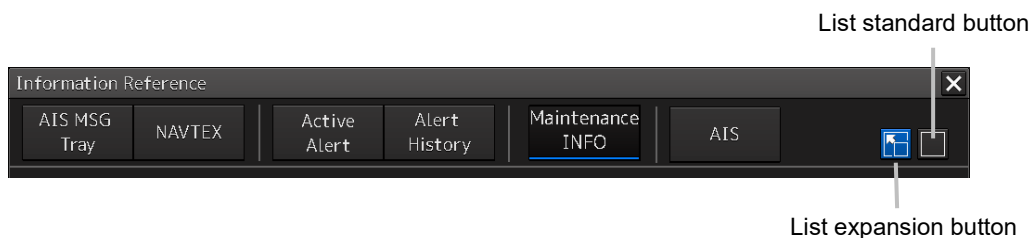
Refer to "21.9.3 Exporting maintenance information."

## 21.9.2 Switching to the standard window or the expanded window

The Maintenance INFO screen can be switched to either the standard window or the expanded window.

To switch to the expanded window, click the list expansion button.

To switch to the standard window, click the list standard button.



[Example of expanded window]

17 Maintenance Informations Page 1/24

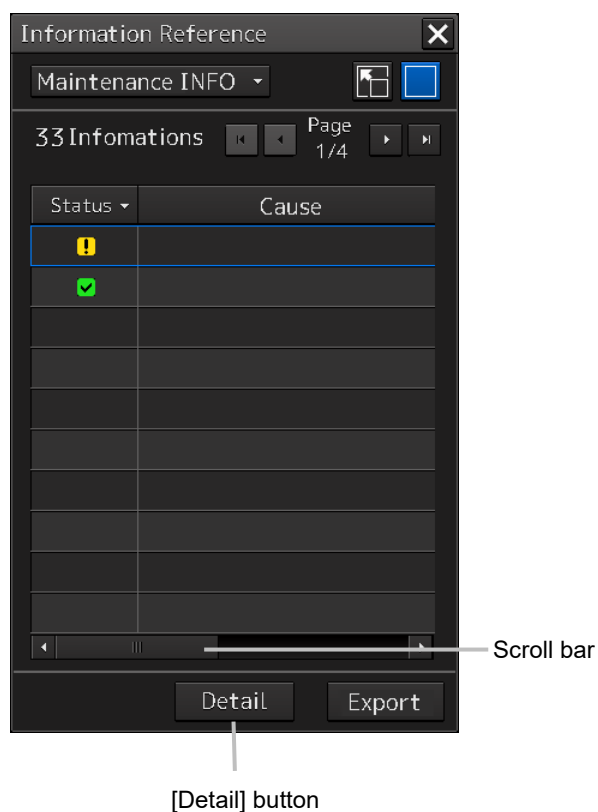
| Status | Cause                                | Raised(UTC)         |
|--------|--------------------------------------|---------------------|
| !      | Gyro 1(Communication Failed, Mai...  | 2020-09-07 10:04:29 |
| !      | Gyro 1(Communication Failed, Dire... | 2020-09-07 10:04:29 |
| !      | Multi Current(unavailable)           | 2020-09-07 10:04:20 |
| !      | Depth(unavailable)                   | 2020-09-07 10:04:20 |
| !      | Time(unavailable)                    | 2020-09-07 10:04:20 |
| !      | AIS(Communication failed, Main L...  | 2020-09-07 10:04:19 |
| !      | Log 1(Communication failed, Main ... | 2020-09-07 10:04:19 |
| !      | Current(Communication failed, Ma...  | 2020-09-07 10:04:19 |
| !      | Echo Sounder 1(Communication fai...  | 2020-09-07 10:04:19 |
| !      | NAVTEX(Communication failed, Ma...   | 2020-09-07 10:04:19 |
| !      | Autopilot(Communication Failed, ...  | 2020-09-07 10:04:19 |
| !      | Autopilot(Unavailable)               | 2020-09-07 10:04:19 |
| !      | GPS 1(Communication Failed, Main...  | 2020-09-07 10:04:19 |
| !      | GPS 2(Communication Failed, Main...  | 2020-09-07 10:04:19 |
| !      | GPS 1(Communication Failed, Direct)  | 2020-09-07 10:04:19 |
| !      | Log 1(Communication failed, Direct)  | 2020-09-07 10:04:19 |
| !      | AIS(Communication failed, Direct)    | 2020-09-07 10:04:19 |
|        | SLC1-1(Communication failed, Mai...  | 2020-09-07 07:43:24 |
|        | No.1 Conning(Communication faile...  | 2020-09-07 07:43:24 |
|        | No.1 Radar(Communication failed, ... | 2020-09-07 07:43:24 |

Export

Details for selected item:

- Cause: Gyro 1(Communication Failed, Main LAN)
- Raised(UTC): 2020-09-07 10:04:29
- Rectified(UTC): -
- Details: Communication with Gyro 1 cannot be performed via Main LAN.

[Example of standard window]



The standard window includes the list screen and the details screen.

To switch to the details screen, click the [Detail] button. Then, the [Detail] button turns into the [List] button.

To switch to the list screen, click the [List] button.

If the screen contents do not fit in the screen width, the scroll bar is displayed.

Dragging the scroll bar displays the contents not currently shown.

#### Memo

The initial display is shown in the expanded window.

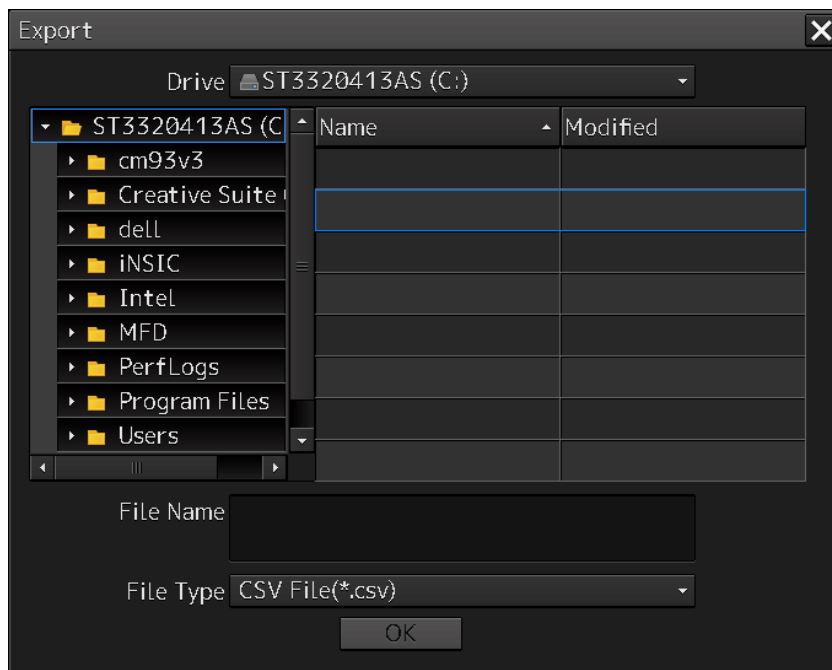
## 21.9.3 Exporting maintenance information

Maintenance information can be exported as a CSV file to USB memory.

Information to be exported is that in the Cause, Raised(UTC), Rectified(UTC), and Detail fields.

### 1 Click the [Export] button on the Maintenance INFO screen.

The "Export" dialog box will appear.



### 2 Specify the Drive (name of the drive for the USB memory) to which information is exported, Folder, and File Name.

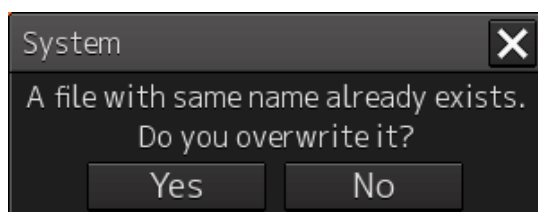
Only [CSV File(\*.csv)] can be selected for File Type.

### 3 Click the [OK] button.

To cancel information export, click the [x] button.

**If a file with the same name exists:**

The following pop-up window will appear.




To cancel the export, click the [No] button.


To overwrite the existing file with the same file name, click the [Yes] button.



# 21.10 Data Backup/Restore




CAUTION



Do not turn off the power supply during backup/restore.

Otherwise, a function fault occurs, leading to the possibility of an accident.



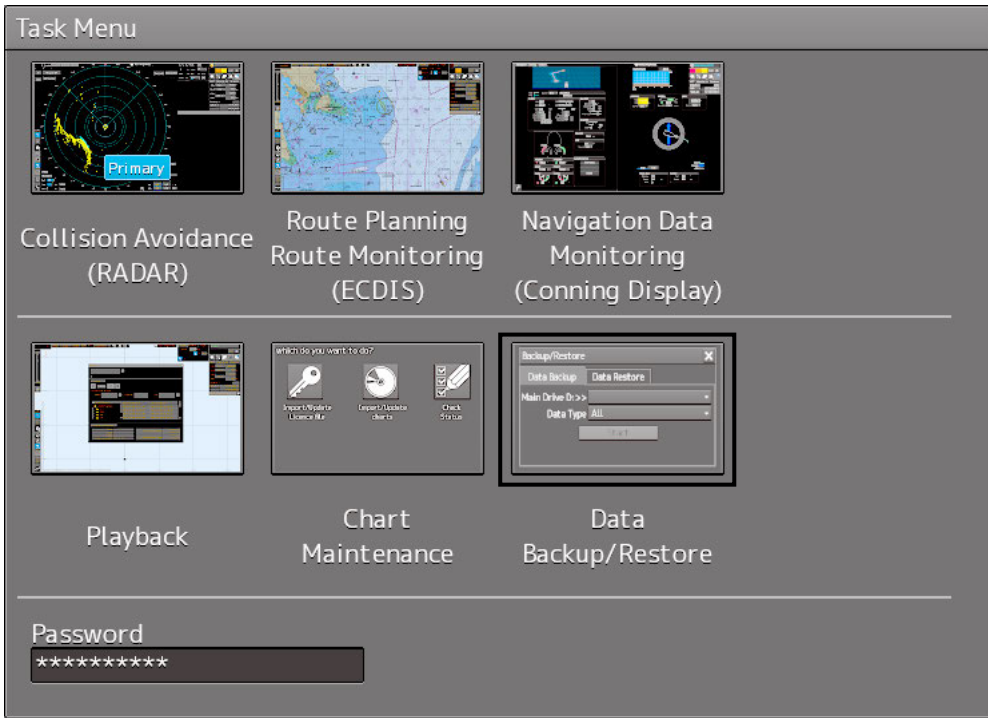
Do not back up data during sailing.

To start backup data, the radar application must be terminated. Otherwise, observation using a radar is disabled, leading to the possibility of an accident.

## 21.10.1 Backing up data

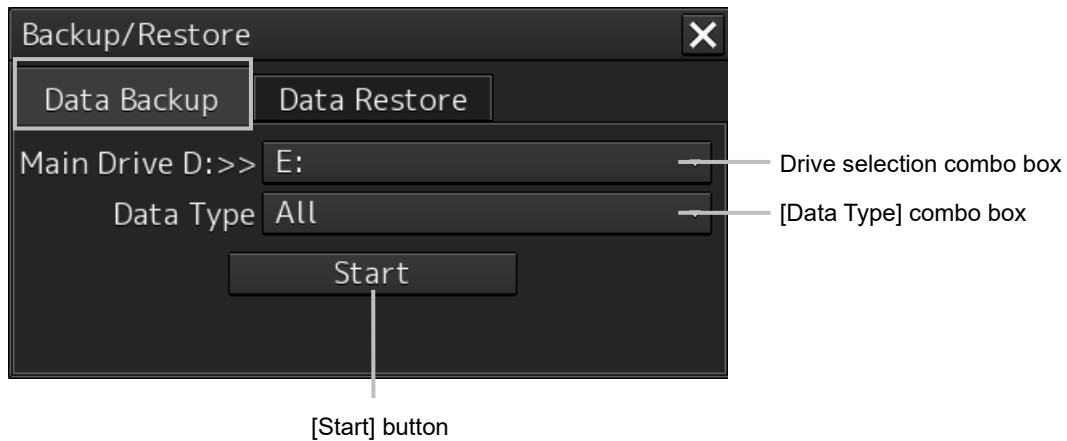
To maintain customer data, back up the data regularly by using the following procedure.  
Connect an external medium such as USB memory for backup.

- 1 Press the Power supply button of the operation unit.**  
The power supply button is lit. Then, the task menu is displayed.
- 2 Click on the [Data Backup/Restore] button in the task menu.**



The [Backup/Restore] dialog is displayed.

**3 Click on the [Data Backup] tab.**



**4 Select a drive of the data backup destination from the drive selection combo box.**

**5 Select the type of the data to be backed up in the [Data Type] combo box.**

All: The entire user data is backed up.

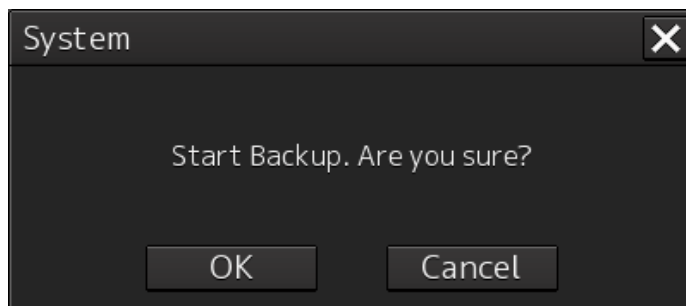
Except Charts: The user data excluding chart data is backed up.

**Note**

When All is selected and there are many charts, backup operation may require a long period of time.

**6 Click on the [Start] button.**

A confirmation dialog is displayed.



**7 Click on the [OK] button.**

Copying of data to the backup destination that is selected in the drive selection combo box starts.

**Note**

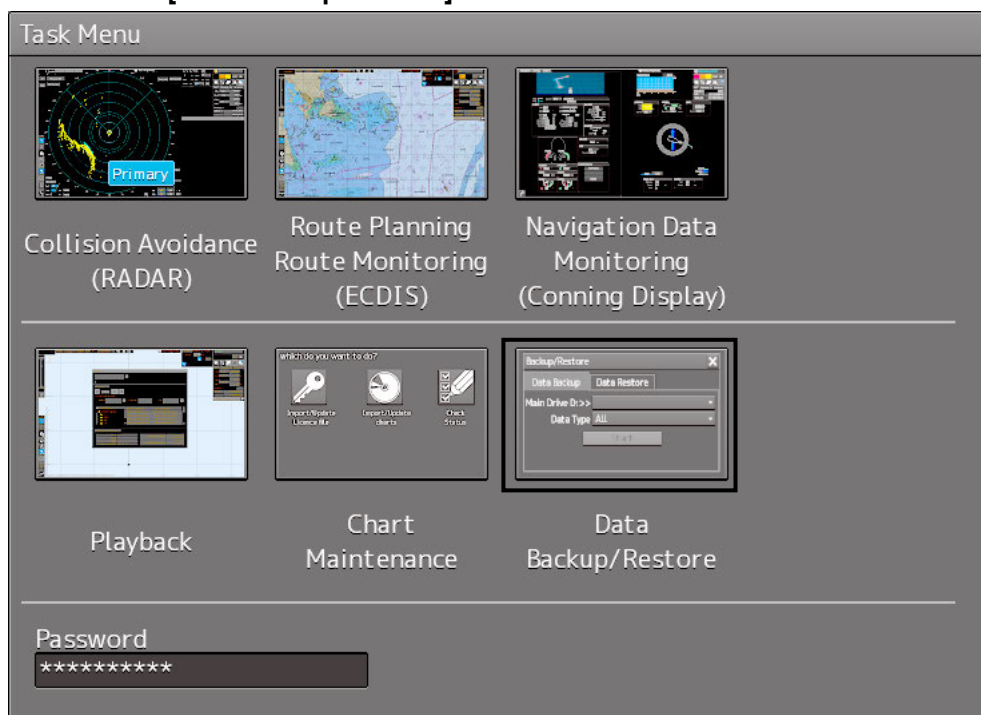
Do not perform any other operations until backup is completed. Otherwise, backup may fail.

## 21.10.2 Restoring backed up data

Use the following procedure to restore backed up data into this equipment.

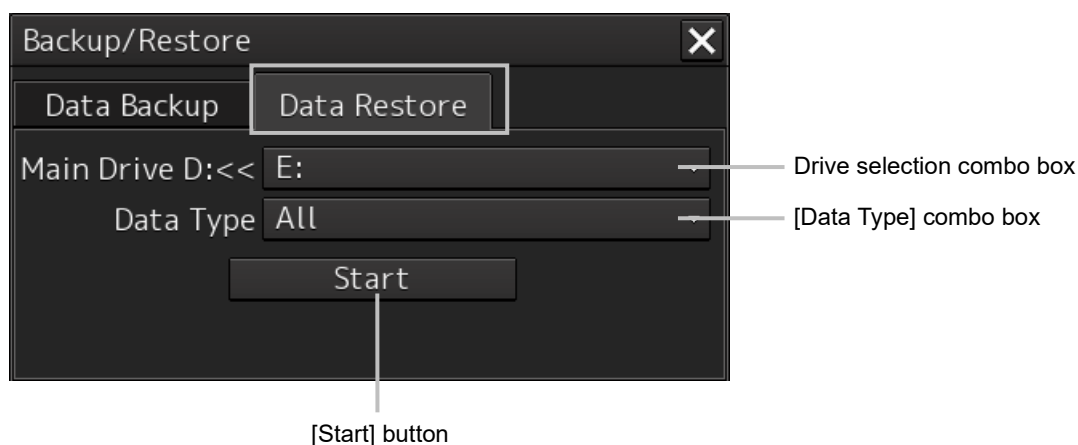
Connect the external medium (USB memory, etc.) in which backup data has been saved.

- 1 Press the power supply button of the operation unit.**  
The power supply button is lit. Then the task menu is displayed.
- 2 Click on the [Data Backup/Restore] button in the task menu.**



The [Backup/Restore] dialog is displayed.

- 3 Click on the [Data Restore] tab.**

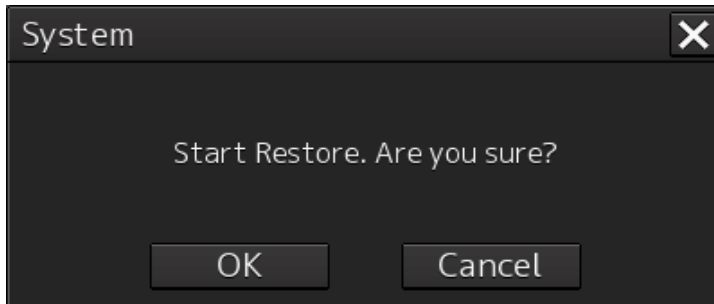


- 4 Select the drive in which backup data has been saved from the drive selection combo box.**
- 5 Select the type of the data to be restored in the [Data Type] combo box.**  
All: The entire user data is restored.  
Except Charts: The user data excluding chart data is restored.

---

**6 Click on the [Start] button.**

A confirmation dialog is displayed.



**7 Click on the [OK] button.**

Restoration of data from the drive that was selected from the drive selection combo box to the hard disk of this equipment starts.

If data already exists in the hard disk, an overwriting confirmation dialog is displayed.

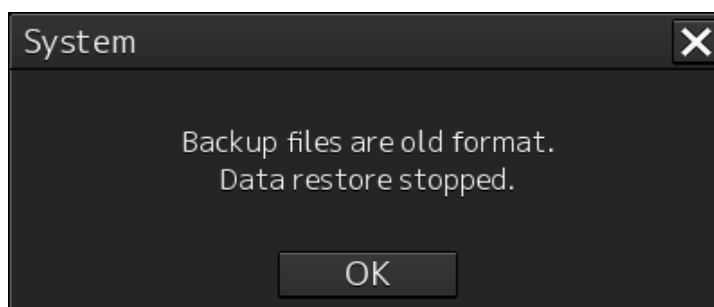
To start restoration, click the [OK] button.

**Note**

- Do not perform any operation until restoration is completed. If some operation is performed, restoration may fail.
- If backup is executed while enough free space is not available in the USB memory, the "Error" message is displayed. Secure free space before executing backup. For the size of the data to be backed up, check the "Usage" column in the "File Information" list in "19.4.2 Managing storage". (For instance, when the AVCS chart for the entire world is installed, the size will be about 11GB.)

**Memo**

If the data to be restored is incompatible with this equipment, the following dialog is displayed and data is not restored.



Cancel the task by clicking on the [OK] button.

---

---

## 21.11 Recovery of the Images in the C Drive

### CAUTION



The backup power supply (DC power supply, etc.) of the equipment must be connected when recovery of the C drive image is performed. If the power supply stops during recovery, an accident may occur.



Do not turn off the power supply during recovery of the C drive image. Otherwise, equipment malfunction occurs, possibly causing an accident.

The operating system (OS) of this equipment runs on the C drive.

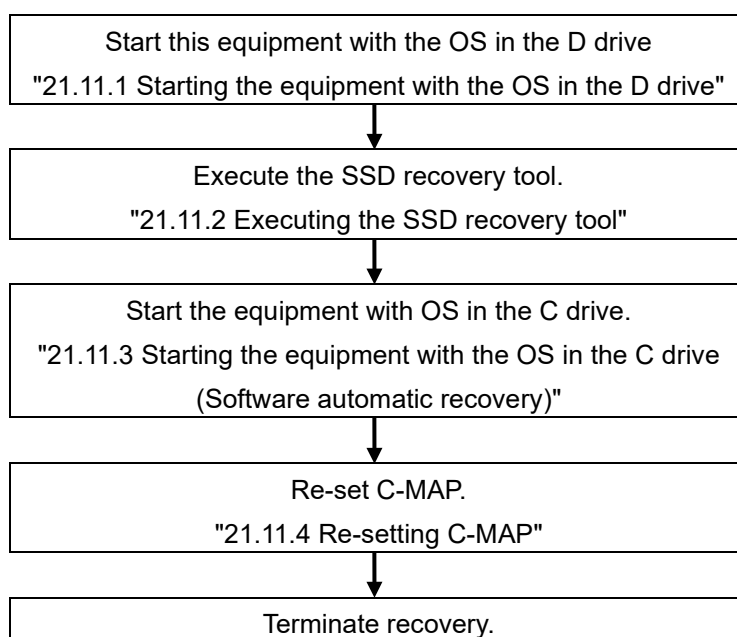
The contents of the C drive including the images are stored in the D drive.

When the OS operation on the C drive becomes unstable, the images in the C drive can be written back from the D drive.

#### Note

When the images in the C drive are written back, the information relating to C-MAP is cleared. After writing back of images, re-register the database and license of C-MAP and perform update as required.

The flow of writing back of images in the C drive is as follows.



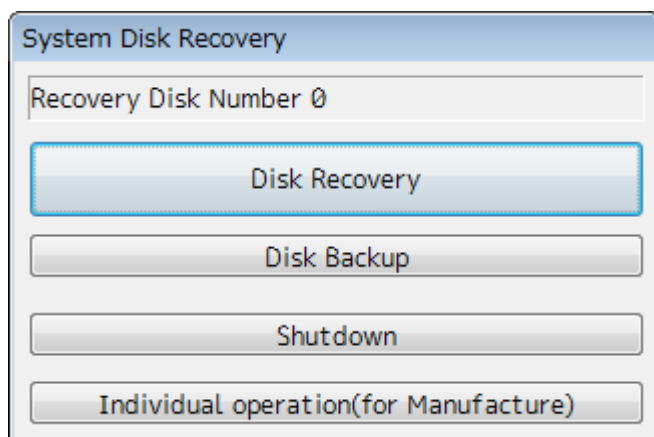
---

## 21.11.1 Starting the equipment with the OS in the D drive

Start this equipment with OS in the D drive by using the following procedure.

- 1 Turn on the power supply of this equipment while pressing the [SILENCE] key and the [ZOOM OUT] key of the trackball operation unit simultaneously. The power is supplied to this equipment.

When the equipment starts, the following screen is displayed.



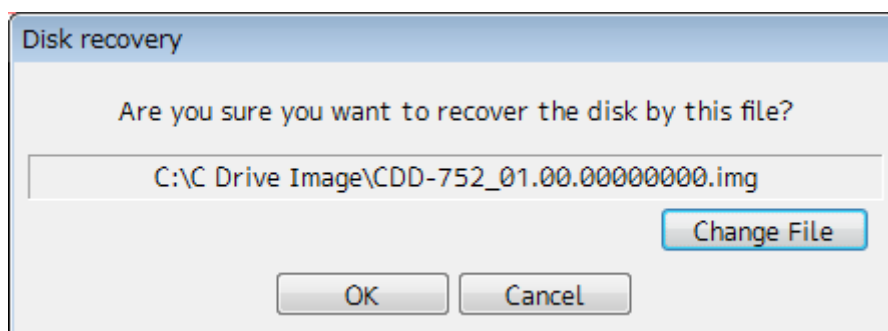
The SSD recovery tool can be executed in this state.

## 21.11.2 Executing the SSD recovery tool

Write back the images in the C drive by executing the SSD recovery tool.

- 1 Click on the [Disk Recovery] button on the screen that is displayed at activation from the D drive.

The following screen is displayed.



- 2 Select an image file to be written back to the C drive.

Normally, proceed with the next step with the image file that is currently displayed.

To specify a different image file, select a required image file from the list that is displayed by clicking on the [Change File] button.

---

---

**Note**

Since the equipment is started from the D drive, the usual C drive is displayed as the D drive and the usual D drive is displayed as C drive. Therefore, note this point when selecting an image file.

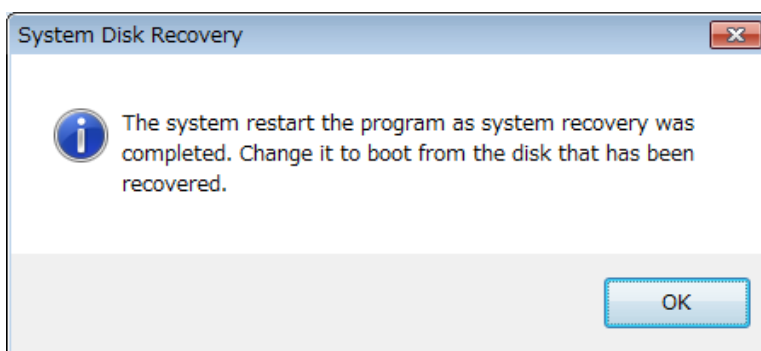
**3 Click on the [OK] button.**

Image file write-back operation starts.

**Note**

Do not perform any operation until write-back operation is completed. If any operation is performed, the image write-back operation may fail.

At termination of recovery, the following screen is displayed.



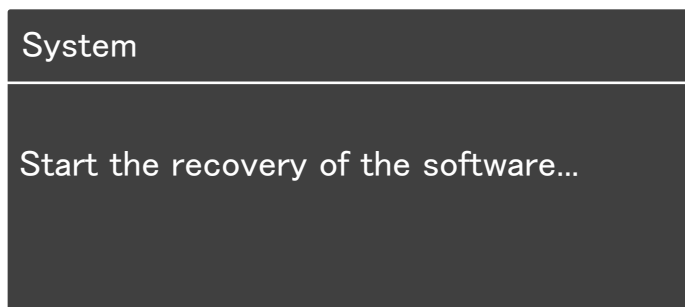
### 21.11.3 Starting the equipment with the OS in the C drive (Software automatic recovery)

Start this equipment with the OS that is written back to the C drive.

**1 Click on the [OK] button on the screen that is displayed at termination of write-back operation.**

The equipment starts from the C drive and, at the same time, the applications and various OS settings on the C drive are recovered automatically.

When recovery starts, the following screen is displayed for several seconds.

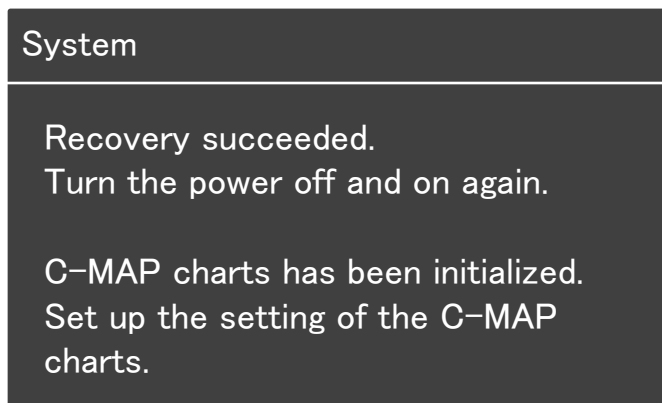
**Note**

This equipment restarts during the recovery operation. Do not perform any other operations until the recovery is completed.

Otherwise, recovery may fail, possibly causing an accident.

---

After completion of recovery, the following screen is displayed.



- 2 Turn off the power supply of this equipment by pressing the power button of the operation unit.**

## **21.11.4 Re-setting C-MAP**

Re-set the settings of C-MAP by restarting this equipment.

Re-register the database and the license.

Update as required.



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# Section 22 Failures and After-Sale Services

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## 22.1 Failure Detection

Semiconductor circuits can be considered to be almost free from defective semiconductors and/or performance deterioration except when there are design and inspection errors, or external and human induced causes. Generally, the causes of comparably frequent failures include line disconnection due to humidity of the high resistor, failure of the variable resistor as well as contact failures of switches and relays.

In addition to faulty parts, faulty adjustments (especially faulty tuning) or faulty maintenance (especially faulty cable contact) occasionally make up causes of failures; thus, it is effective to reinspect or readjust these items.

### 22.1.1 About alerts

Failures can be detected from alerts.

For details on alerts, please refer to "Appendix B, Alert List."

### 22.1.2 Alert description

For a description of alerts to be displayed, please refer to "Appendix B, Alert List."

### 22.1.3 S-57/63 chart related error message list

For more information about error messages that are displayed when the S-57/63 charts are imported and updated on the ECDIS, please refer to "Reference Data 1: Notes on Alert Information of the S-57/63 Charts" in the Instruction Manual provided separately from charts.

### 22.1.4 ARCS chart related error message list

For more information about error messages that are displayed when the ARCS charts are displayed, please refer to "Reference Data 2: Notes on Alert Information of the ARCS Charts" in the Instruction Manual provided separately from charts.

---

## 22.1.5 Fuse inspection

Because there is a specific cause for any fuse meltdown, it is necessary to check the related circuits even if there is no abnormality after changing a fuse. However, please give consideration that the fuse meltdown characteristics vary significantly. The following table shows a list of the fuses used in this unit.

List of Fuses Used

| Fuse Name                     | Name of Model Used | Placement Location | Count | Part Spec.     | Change Kit Model Name       |
|-------------------------------|--------------------|--------------------|-------|----------------|-----------------------------|
| Blade fuse (Auto fuse)        | NBD-913            | Power supply unit  | 2     | 32VDC 15A part | 1015(5ZFCK00008)            |
| Blade (mini) fuse (Auto fuse) | NQE-1143           | JB                 | 1     | 32VDC 15A part | 1215(5ZFCK00017)            |
| Blade (mini) fuse (Auto fuse) |                    |                    | 2     | 32VDC 3A part  | 1203(5ZFCK00016)            |
| Glass fuse                    |                    |                    | 4     | 250V 0.5A part | MF51NR 250V 0.5(5ZFGD00019) |

---

## 22.2 Countermeasures for Failures

Because radar equipment is composed of complex circuits, please ask a qualified technician for repair or instructions regarding countermeasures in case of failure.

Note that failures may be caused by the following causes, so check them during inspection or repair of failure.

- Contact failure in terminal blocks of cables between equipment
  - a) Contact failure in terminal blocks
  - b) Cable terminal treatment failure - In contact with other grounded terminal
  - c) Cable disconnection
- Contact failure of connectors inside equipment

### 22.2.1 Special parts

[I] NKE-1125/A, NKE-2254 (JMR-9225-6X/6XH/9X)

| Part No.  | Item Name     | Model Name | Manufacturer    | Location of Use | Code       |
|-----------|---------------|------------|-----------------|-----------------|------------|
| V101      | Magnetron     | CMG-347    | New Japan Radio | Radar antenna   | CMG347     |
| A101/A102 | Circulator    | NJC3901M   | New Japan Radio | Radar antenna   | 5AJBV00007 |
| A103      | Dummy         | NJC4002    | New Japan Radio | Radar antenna   | 5ANDF00001 |
| A104      | Filter        | NJC9952    | New Japan Radio | Radar antenna   | 5AWAX00002 |
| A301      | Diode limiter | NJS6930    | New Japan Radio | Radar antenna   | 5ATBT00006 |

[II] NTG-3225/A (JMR-9225-7X3/9X3)

| Part No.  | Item Name      | Model Name | Manufacturer    | Location of Use      | Code       |
|-----------|----------------|------------|-----------------|----------------------|------------|
| V101      | Magnetron      | CMG-347    | New Japan Radio | Transmitter-receiver | CMG347     |
| A101/A102 | Circulator     | NJC3901M   | New Japan Radio | Transmitter-receiver | 5AJBV00007 |
| A103      | Dummy          | NJC4002    | New Japan Radio | Transmitter-receiver | 5ANDF00001 |
| A104      | Filter         | NJC9952    | New Japan Radio | Transmitter-receiver | 5AWAX00002 |
| A301      | Diode limiter  | NJS6930    | New Japan Radio | Transmitter-receiver | 5ATBT00006 |
| A302      | PIN attenuator | NJS6926    | New Japan Radio | Transmitter-receiver | 5ATBT00007 |

[III] NKE-1130/A (JMR-9230-S)

| Part No. | Item Name     | Model Name | Manufacturer    | Location of Use | Code       |
|----------|---------------|------------|-----------------|-----------------|------------|
| V101     | Magnetron     | CMG-348    | New Japan Radio | Radar antenna   | CMG348     |
| A101     | Circulator    | NJC3316    | New Japan Radio | Radar antenna   | 5AJBV00008 |
| A301     | Diode limiter | NJS6318    | New Japan Radio | Radar antenna   | 5ATBT00005 |

[IV] NTG-3230/A (JMR-9230-S3)

| Part No. | Item Name  | Model Name | Manufacturer    | Location of Use      | Code       |
|----------|------------|------------|-----------------|----------------------|------------|
| V101     | Magnetron  | CMG-348    | New Japan Radio | Transmitter-receiver | CMG348     |
| A101     | Circulator | NJC3317    | New Japan Radio | Transmitter-receiver | 5AJBV00009 |
| A301     | TR limiter | TL378A     | New Japan Radio | Transmitter-receiver | 5VLAA00037 |

[V] NKE-2103-6/6HS (JMR-9210-6X/6XH)

| Part No.  | Item Name     | Model Name | Manufacturer     | Location of Use | Code       |
|-----------|---------------|------------|------------------|-----------------|------------|
| V101      | Magnetron     | MAF1565N   | New Japan Radio  | Radar antenna   | 5VMAA00102 |
| A101/A102 | Circulator    | FCX68R     | Orient Microwave | Radar antenna   | 5AJIX00027 |
| A103      | Dummy         | NJC4002    | New Japan Radio  | Radar antenna   | 5ANDF00001 |
| A104      | Filter        | NJC9952    | New Japan Radio  | Radar antenna   | 5AWAX00002 |
| A301      | Diode limiter | NJS6930    | New Japan Radio  | Radar antenna   | 5ATBT00006 |

[VI] NKE-1696-6/9 (JMR-9296-6X/9X)

| Part No. | Item Name     | Model Name | Manufacturer     | Location of Use | Code       |
|----------|---------------|------------|------------------|-----------------|------------|
| A2/A3    | Circulator    | FCX68R     | Orient Microwave | Radar antenna   | 5AJIX00027 |
| A4       | Diode limiter | NJS6930    | New Japan Radio  | Radar antenna   | 5ATBT00006 |
| A5       | Dummy         | NJC4002    | New Japan Radio  | Radar antenna   | 5ANDF00001 |

## 22.2.2 Repair circuit block

Repair Circuit Block (JMR-9225-6X/9X)

\* indicates a revision such as A and B.

| Location      | Circuit Block Name    | Model Name   | Remarks   |
|---------------|-----------------------|--------------|---|
| Radar antenna | Geared motor          | MDBW10822*   | Common to 100/220VAC  |
|               | Encoder circuit       | CHT-71*      |   |
|               | Motor driver circuit  | H-7EPRD0034* | For 220VAC  |
|               | Motor driver circuit  | H-7EPRD0035* | For 100VAC  |
|               | Motor driver circuit  | H-7EPRD0043* | Common to 100/220VAC  |
|               | Brake circuit         | CFA-253      |   |
|               | Brake control circuit | CCB-655*     |   |
|               | Brake circuit unit    | NZR-16       | Including the CFA-259/260   |
|               | Performance monitor   | NJU-85       |   |
|               | T/R control circuit   | CMC-1205R2   |   |
|               | Modulation unit       | NMA-550-1    | Including the CPA-264A<br>Including the CMB-404<br>Including the CFR-229<br>Not including the magnetron |
|               | Modulation circuit    | CPA-264A     |   |
|               | Receiver              | NRG-162*     | Including the CMA-866*  |
|               | Power supply circuit  | CBD-1682A    |   |
|               | Relay filter circuit  | CSC-656      |   |
|               | Fan                   | H-7BFRD0002  |   |

| Location | Circuit Block Name              | Model Name  | Remarks                      |
|----------|---------------------------------|-------------|------------------------------|
| Display  | Display unit                    | NWZ-208     | 26-inch                      |
|          | 26-inch MNU replacement FAN kit | H-7ZYNA4005 | Incorporated into NWZ-208    |
|          | Display unit                    | NWZ-233     | 27-inch                      |
|          | Power supply unit               | NBD-913     |                              |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913    |
|          | Central control unit            | NDC-1590/A  |                              |
|          | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A |
|          | CCU replacement FAN kit         | H-7ZYNA4006 |                              |
|          | CCU repair kit                  | NZC-1590/A  |                              |
|          | SSD 256GB                       | CDD-753     |                              |
|          | Trackball operation unit        | NCE-5605    |                              |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605   |
|          | Operation circuit A             | CCK-1050    |                              |
|          | Operation circuit SW            | CCK-1069    |                              |
|          | Operation circuit CN            | CCK-1070    |                              |
|          | Keyboard operation unit         | NCE-5625    |                              |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625   |
|          | Optional keyboard               | CCK-1061    |                              |
|          | φ38 button                      | MPHD30460   | Incorporated into NCE-5625   |
|          | φ22 button                      | MPHD30459   |                              |
|          | Screw cover bottom              | MTV305169   |                              |
|          | Screw cover top                 | MTV305170   |                              |
|          | Serial LAN interface circuit    | CMH-2370    |                              |
|          | Gyro interface circuit          | CMJ-554     |                              |
|          | Radar interface circuit         | CQD-2273    |                              |
|          | Analog option circuit           | CMJ-560     |                              |
|          | Sensor LAN switch               | NQA-2443/A  |                              |

## Repair Circuit Block (JMR-9225-7X3/9X3)

\* indicates a revision such as A and B.

| Location             | Circuit Block Name    | Model Name   | Remarks   |
|----------------------|-----------------------|--------------|---|
| Radar antenna        | Geared motor          | MDBW10822*   | Common to 100/220VAC  |
|                      | Encoder circuit       | CHT-71*1     |   |
|                      | Motor driver circuit  | H-7EPRD0034* | For 220VAC  |
|                      | Motor driver circuit  | H-7EPRD0035* | For 100VAC  |
|                      | Motor driver circuit  | H-7EPRD0043* | Common to 100/220VAC  |
|                      | Brake circuit         | CFA-253      |   |
|                      | Brake control circuit | CCB-655*     |   |
|                      | Brake circuit unit    | NZR-15       | Including the CFA-259/260   |
|                      | Performance monitor   | NJU-85       |   |
| Transmitter-receiver | T/R control circuit   | CMC-1205R2   |   |
|                      | Modulation unit       | NMA-552-1    | Including the CPA-264A<br>Including the CMB-404<br>Including the CFR-229<br>Not including the magnetron |
|                      | Modulation circuit    | CPA-264A     |   |
|                      | Receiver              | NRG-162*3    | Including the CMA-866*3   |
|                      | Power supply circuit  | CBD-1682A    |   |
|                      | Relay filter circuit  | CSC-656      |   |

| Location | Circuit Block Name              | Model Name  | Remarks                      |
|----------|---------------------------------|-------------|------------------------------|
| Display  | Display unit                    | NWZ-208     | 26-inch                      |
|          | 26-inch MNU replacement FAN kit | H-7ZYNA4005 | Incorporated into NWZ-208    |
|          | Display unit                    | NWZ-233     | 27-inch                      |
|          | Power supply unit               | NBD-913     |                              |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913    |
|          | Central control unit            | NDC-1590/A  |                              |
|          | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A |
|          | CCU replacement FAN kit         | H-7ZYNA4006 |                              |
|          | CCU repair kit                  | NZC-1590/A  |                              |
|          | SSD 256GB                       | CDD-753     |                              |
|          | Trackball operation unit        | NCE-5605    |                              |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605   |
|          | Operation circuit A             | CCK-1050    |                              |
|          | Operation circuit SW            | CCK-1069    |                              |
|          | Operation circuit CN            | CCK-1070    |                              |
|          | Keyboard operation unit         | NCE-5625    |                              |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625   |
|          | Optional keyboard               | CCK-1061    |                              |
|          | φ38 button                      | MPHD30460   |                              |
|          | φ22 button                      | MPHD30459   |                              |
|          | Screw cover bottom              | MTV305169   |                              |
|          | Screw cover top                 | MTV305170   |                              |
|          | Serial LAN interface circuit    | CMH-2370    |                              |
|          | Gyro interface circuit          | CMJ-554     |                              |
|          | Radar interface circuit         | CQD-2273    |                              |
|          | Analog option circuit           | CMJ-560     |                              |
|          | Sensor LAN switch               | NQA-2443/A  |                              |



## Repair circuit block (JMR-9230-S)

\* indicates a revision such as A and B.

| Location      | Circuit Block Name    | Model Name   | Remarks   |
|---------------|-----------------------|--------------|---|
| Radar antenna | Geared motor          | MDBW10823*   | Common to 100/220VAC  |
|               | Encoder circuit       | CHT-71*      |   |
|               | Motor driver circuit  | H-7EPRD0034* | NKE-1130、For 220VAC   |
|               | Motor driver circuit  | H-7EPRD0035* | NKE-1130、For 100VAC   |
|               | Motor driver circuit  | H-7EPRD0043* | NKE-1130A、<br>Common to 100/220VAC  |
|               | Brake circuit         | CFA-255/A    |   |
|               | Brake control circuit | CCB-655*     | For NKE-1130  |
|               | Brake circuit unit    | NZR-17       | For NKE-1130<br>Including the CFA-261/262   |
|               | Performance monitor   | NJU-84       |   |
|               | T/R control circuit   | CMC-1205R2   |   |
|               | Modulation unit       | NMA-551-1    | Including the CPA-264A<br>Including the CMB-406<br>Including the CFR-229<br>Not including the magnetron |
|               | Modulation circuit    | CPA-264A     |   |
|               | Receiver              | NRG-229      | Including the<br>CAF-595/CAE-499  |
|               | Power supply circuit  | CBD-1682A    |   |
|               | Relay filter circuit  | CSC-656      | For NKE-1130  |
|               | Fan                   | H-7BFRD0002  |   |

| Location | Circuit Block Name              | Model Name  | Remarks                      |
|----------|---------------------------------|-------------|------------------------------|
| Display  | Display unit                    | NWZ-208     | 26-inch                      |
|          | 26-inch MNU replacement FAN kit | H-7ZYNA4005 | Incorporated into NWZ-208    |
|          | Display unit                    | NWZ-233     | 27-inch                      |
|          | Power supply unit               | NBD-913     |                              |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913    |
|          | Central control unit            | NDC-1590/A  |                              |
|          | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A |
|          | CCU replacement FAN kit         | H-7ZYNA4006 |                              |
|          | CCU repair kit                  | NZC-1590/A  |                              |
|          | SSD 256GB                       | CDD-753     |                              |
|          | Trackball operation unit        | NCE-5605    |                              |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605   |
|          | Operation circuit A             | CCK-1050    |                              |
|          | Operation circuit SW            | CCK-1069    |                              |
|          | Operation circuit CN            | CCK-1070    |                              |
|          | Keyboard operation unit         | NCE-5625    |                              |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625   |
|          | Optional keyboard               | CCK-1061    |                              |
|          | φ38 button                      | MPHD30460   |                              |
|          | φ22 button                      | MPHD30459   |                              |
|          | Screw cover bottom              | MTV305169   |                              |
|          | Screw cover top                 | MTV305170   |                              |
|          | Serial LAN interface circuit    | CMH-2370    |                              |
|          | Gyro interface circuit          | CMJ-554     |                              |
|          | Radar interface circuit         | CQD-2273    |                              |
|          | Analog option circuit           | CMJ-560     |                              |
|          | Sensor LAN switch               | NQA-2443/A  |                              |

# Repair circuit block (JMR-9230-S3)

\* indicates a revision such as A and B.

| Location             | Circuit Block Name    | Model Name   | Remarks   |
|----------------------|-----------------------|--------------|---|
| Radar antenna        | Geared motor          | MDBW10823*   | Common to 100/220VAC  |
|                      | Encoder circuit       | CHT-71*1     |   |
|                      | Motor driver circuit  | H-7EPRD0034* | For 220VAC  |
|                      | Motor driver circuit  | H-7EPRD0035* | For 100VAC  |
|                      | Motor driver circuit  | H-7EPRD0043* | Common to 100/220VAC  |
|                      | Brake circuit         | CFA-255/A    |   |
|                      | Brake control circuit | CCB-655*     |   |
|                      | Brake circuit unit    | NZR-17       | Including the CFA-261/262   |
|                      | Performance monitor   | NJU-84       |   |
| Transmitter-receiver | T/R control circuit   | CMC-1205R2   |   |
|                      | Modulation unit       | NMA-553-1    | Including the CPA-264A<br>Including the CMB-407<br>Including the CFR-229<br>Not including the magnetron |
|                      | Modulation circuit    | CPA-264A     |   |
|                      | Receiver              | NRG-229      |   |
|                      | Power supply circuit  | CBD-1682A    |   |
|                      | Relay filter circuit  | CSC-656      |   |
|                      |                       |              |   |

| Location | Circuit Block Name              | Model Name  | Remarks                      |
|----------|---------------------------------|-------------|------------------------------|
| Display  | Display unit                    | NWZ-208     | 26-inch                      |
|          | 26-inch MNU replacement FAN kit | H-7ZYNA4005 | Incorporated into NWZ-208    |
|          | Display unit                    | NWZ-233     | 27-inch                      |
|          | Power supply unit               | NBD-913     |                              |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913    |
|          | Central control unit            | NDC-1590/A  |                              |
|          | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A |
|          | CCU replacement FAN kit         | H-7ZYNA4006 |                              |
|          | CCU repair kit                  | NZC-1590/A  |                              |
|          | SSD 256GB                       | CDD-753     |                              |
|          | Trackball operation unit        | NCE-5605    |                              |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605   |
|          | Operation circuit A             | CCK-1050    |                              |
|          | Operation circuit SW            | CCK-1069    |                              |
|          | Operation circuit CN            | CCK-1070    |                              |
|          | Keyboard operation unit         | NCE-5625    |                              |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625   |
|          | Optional keyboard               | CCK-1061    |                              |
|          | φ38 button                      | MPHD30460   |                              |
|          | φ22 button                      | MPHD30459   |                              |
|          | Screw cover bottom              | MTV305169   |                              |
|          | Screw cover top                 | MTV305170   |                              |
|          | Serial LAN interface circuit    | CMH-2370    |                              |
|          | Gyro interface circuit          | CMJ-554     |                              |
|          | Radar interface circuit         | CQD-2273    |                              |
|          | Analog option circuit           | CMJ-560     |                              |
|          | Sensor LAN switch               | NQA-2443/A  |                              |

## Repair circuit block (MR-9225-6XH)

\* indicates a revision such as A and B.

| Location      | Circuit Block Name              | Model Name   | Remarks   |
|---------------|---------------------------------|--------------|---|
| Radar antenna | Geared motor                    | H-7BDRD0045A | DC brushless  |
|               | Encoder circuit                 | CHT-71*      |   |
|               | Motor control circuit           | CBD-1779     |   |
|               | Brake circuit                   | CFA-257      |   |
|               | Performance monitor             | NJU-85       |   |
|               | Heater control circuit          | CHG-216      | Option (100VAC)   |
|               | Power supply circuit            | CBD-1682A    |   |
|               | T/R control circuit             | CMC-1205R2   |   |
|               | Modulation unit                 | NMA-550-1    | Including the CPA-264A, CMB-404, CFR-229<br>Not including the magnetron |
|               | Modulation circuit              | CPA-264A     |   |
|               | Receiver                        | NRG-162*     | Including the CMA-866*  |
|               | Fan                             | H-7BFRD0002  |   |
| Display       | Display unit                    | NWZ-208      | 26-inch   |
|               | 26-inch MNU replacement FAN kit | H-7ZYNA4005  | Incorporated into NWZ-208   |
|               | Display unit                    | NWZ-233      | 27-inch   |
|               | Power supply unit               | NBD-913      |   |
|               | PSU replacement FAN kit         | H-7ZYNA4007  | Incorporated to NBD-913   |
|               | Central control unit            | NDC-1590/A   |   |
|               | DVD drive                       | CDD-754      | Incorporated into NDC-1590/A  |
|               | CCU replacement FAN kit         | H-7ZYNA4006  |   |
|               | CCU repair kit                  | NZC-1590/A   |   |
|               | SSD 256GB                       | CDD-753      |   |
|               | Trackball operation unit        | NCE-5605     |   |
|               | Trackball                       | CCK-1060     | Incorporated into NCE-5605  |
|               | Operation circuit A             | CCK-1050     |   |
|               | Operation circuit SW            | CCK-1069     |   |
|               | Operation circuit CN            | CCK-1070     |   |
|               | Keyboard operation unit         | NCE-5625     |   |
|               | Operation circuit B             | CCK-1059     | Incorporated into NCE-5625  |
|               | Optional keyboard               | CCK-1061     |   |
|               | φ38 button                      | MPHD30460    |   |
|               | φ22 button                      | MPHD30459    |   |
|               | Screw cover bottom              | MTV305169    |   |
|               | Screw cover top                 | MTV305170    |   |
|               | Serial LAN interface circuit    | CMH-2370     |   |
|               | Gyro interface circuit          | CMJ-554      |   |
|               | Radar interface circuit         | CQD-2273     |   |
|               | Analog option circuit           | CMJ-560      |   |
|               | Sensor LAN switch               | NQA-2443/A   |   |

Repair Circuit Block (JMR-9210-6X/6XH)

\* indicates a revision such as A and B.

| Location      | Circuit Block Name                 | Model Name  | Remarks  |
|---------------|------------------------------------|-------------|--|
| Radar antenna | Geared motor                       | H-7BDRD0048 | DC brushless (common to HS)                        |
|               | Receiver modulation circuit        | NZK-2103    | Including the CME-363A, NRG-610A, internal harness |
|               | Power supply circuit               | CBD-1783    |  |
|               | Encoder circuit                    | CHT-71*     |  |
|               | Motor control power supply circuit | CBD-1779    |  |
|               | Brake circuit                      | CFA-252     |  |
|               | Fan                                | H-7BFRD0002 |  |
| Display       | Display unit                       | NWZ-208     | 26-inch  |
|               | 26-inch MNU replacement FAN kit    | H-7ZYNA4005 | Incorporated into NWZ-208                          |
|               | Display unit                       | NWZ-233     | 27-inch  |
|               | Power supply unit                  | NBD-913     |  |
|               | PSU replacement FAN kit            | H-7ZYNA4007 | Incorporated to NBD-913                            |
|               | Central control unit               | NDC-1590/A  |  |
|               | DVD drive                          | CDD-754     | Incorporated into NDC-1590/A                       |
|               | CCU replacement FAN kit            | H-7ZYNA4006 |  |
|               | CCU repair kit                     | NZC-1590/A  |  |
|               | SSD 256GB                          | CDD-753     |  |
|               | Trackball operation unit           | NCE-5605    |  |
|               | Trackball                          | CCK-1060    | Incorporated into NCE-5605                         |
|               | Operation circuit A                | CCK-1050    |  |
|               | Operation circuit SW               | CCK-1069    |  |
|               | Operation circuit CN               | CCK-1070    |  |
|               | Keyboard operation unit            | NCE-5625    |  |
|               | Operation circuit B                | CCK-1059    | Incorporated into NCE-5625                         |
|               | Optional keyboard                  | CCK-1061    |  |
|               | φ38 button                         | MPHD30460   |  |
|               | φ22 button                         | MPHD30459   |  |
|               | Screw cover bottom                 | MTV305169   |  |
|               | Screw cover top                    | MTV305170   |  |
|               | Serial LAN interface circuit       | CMH-2370    |  |
|               | Gyro interface circuit             | CMJ-554     |  |
|               | Radar interface circuit            | CQD-2273    |  |
|               | Analog option circuit              | CMJ-560     |  |
|               | Sensor LAN switch                  | NQA-2443/A  |  |

Repair circuit block (JMR-9272-S)

\* indicates a revision such as A and B.

| Location      | Circuit Block Name              | Model Name  | Remarks   |
|---------------|---------------------------------|-------------|---|
| Radar antenna | TRX module                      | CMN-797     |   |
|               | Signal processing unit          | NDC-4920    |   |
|               | Power supply/interface circuit  | CMP-493     |   |
|               | Encoder                         | CHT-85      |   |
|               | Fan                             | NZF-100     | 9LG0912S4005  |
|               | Motor driver circuit            | CBD-1949    | Common to AC100/220V  |
|               | Motor driver circuit            | CBD-2400    | Common to AC100/220V  |
|               | Motor with gear                 | MDBW10823*  | Common to AC100/220V<br>* indicates a revision such as A and B. |
| Display       | Display unit                    | NWZ-208     | 26-inch   |
|               | 26-inch MNU replacement FAN kit | H-7ZYNA4005 | Incorporated into NWZ-208                                       |
|               | Display unit                    | NWZ-233     | 27-inch   |
|               | Power supply unit               | NBD-913     |   |
|               | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated to NBD-913   |
|               | Central control unit            | NDC-1590/A  |   |
|               | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A                                    |
|               | CCU replacement FAN kit         | H-7ZYNA4006 |   |
|               | CCU repair kit                  | NZC-1590/A  |   |
|               | SSD 256GB                       | CDD-753     |   |
|               | Trackball operation unit        | NCE-5605    |   |
|               | Trackball                       | CCK-1060    | Incorporated into NCE-5605                                      |
|               | Operation circuit A             | CCK-1050    |   |
|               | Operation circuit SW            | CCK-1069    |   |
|               | Operation circuit CN            | CCK-1070    |   |
|               | Keyboard operation unit         | NCE-5625    |   |
|               | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625                                      |
|               | Optional keyboard               | CCK-1061    |   |
|               | φ38 button                      | MPHD30460   |   |
|               | φ22 button                      | MPHD30459   |   |
|               | Screw cover bottom              | MTV305169   |   |
|               | Screw cover top                 | MTV305170   |   |
|               | Serial LAN interface circuit    | CMH-2370    |   |
|               | Gyro interface circuit          | CMJ-554     |   |
|               | Radar interface circuit         | CQD-2273    |   |
|               | Analog option circuit           | CMJ-560     |   |
|               | Sensor LAN switch               | NQA-2443/A  |   |

Repair circuit block (JMR-9282-S)

\* indicates a revision such as A and B.

| Location      | Circuit Block Name              | Model Name  | Remarks   |
|---------------|---------------------------------|-------------|---|
| Radar antenna | TRX module                      | CMN-797     |   |
|               | Signal processing unit          | NDC-4920    |   |
|               | Power supply/IF circuit         | CMP-493     |   |
|               | Encoder                         | CHT-85      |   |
|               | Fan                             | NZF-100     | 9LG0912S4005  |
|               | Motor driver circuit            | CBD-1949    | Common to AC100/220V  |
|               | Motor driver circuit            | CBD-2400    | Common to AC100/220V  |
|               | Motor with gear                 | MDBW10823*  | Common to AC100/220V<br>* indicates a revision such as A and B. |
| Display       | Display unit                    | NWZ-208     | 26-inch   |
|               | 26-inch MNU replacement FAN kit | H-7ZYNA4005 | Incorporated into NWZ-208                                       |
|               | Display unit                    | NWZ-233     | 27-inch   |
|               | Power supply unit               | NBD-913     |   |
|               | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated to NBD-913   |
|               | Central control unit            | NDC-1590/A  |   |
|               | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A                                    |
|               | CCU replacement FAN kit         | H-7ZYNA4006 |   |
|               | CCU repair kit                  | NZC-1590/A  |   |
|               | SSD 256GB                       | CDD-753     |   |
|               | Trackball operation unit        | NCE-5605    |   |
|               | Trackball                       | CCK-1060    | Incorporated into NCE-5605                                      |
|               | Operation circuit A             | CCK-1050    |   |
|               | Operation circuit SW            | CCK-1069    |   |
|               | Operation circuit CN            | CCK-1070    |   |
|               | Keyboard operation unit         | NCE-5625    |   |
|               | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625                                      |
|               | Optional keyboard               | CCK-1061    |   |
|               | φ38 button                      | MPHD30460   |   |
|               | φ22 button                      | MPHD30459   |   |
|               | Screw cover bottom              | MTV305169   |   |
|               | Screw cover top                 | MTV305170   |   |
|               | Serial LAN interface circuit    | CMH-2370    |   |
|               | Gyro interface circuit          | CMJ-554     |   |
|               | Radar interface circuit         | CQD-2273    |   |
|               | Analog option circuit           | CMJ-560     |   |
|               | Sensor LAN switch               | NQA-2443/A  |   |



Repair circuit block (JMR-9282-SH)

\* indicates a revision such as A and B.

| Location      | Circuit Block Name              | Model Name  | Remarks                      |
|---------------|---------------------------------|-------------|------------------------------|
| Radar antenna | TRX module                      | CMN-797     |                              |
|               | Signal processing unit          | NDC-4920    |                              |
|               | Power supply/IF circuit         | CMP-493     |                              |
|               | Encoder                         | CHT-85      |                              |
|               | Fan                             | NZF-100     | 9LG0912S4005                 |
|               | Motor driver circuit            | CBD-1950    | Common to AC100/220V         |
|               | Motor with gear                 | MDBW10967*  | Common to AC100/220V         |
| Display       | Display unit                    | NWZ-208     | 26-inch                      |
|               | 26-inch MNU replacement FAN kit | H-7ZYNA4005 | Incorporated into NWZ-208    |
|               | Display unit                    | NWZ-233     | 27-inch                      |
|               | Power supply unit               | NBD-913     |                              |
|               | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913    |
|               | Central control unit            | NDC-1590/A  |                              |
|               | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A |
|               | CCU replacement FAN kit         | H-7ZYNA4006 |                              |
|               | CCU repair kit                  | NZC-1590/A  |                              |
|               | SSD 256GB                       | CDD-753     |                              |
|               | Trackball operation unit        | NCE-5605    |                              |
|               | Trackball                       | CCK-1060    | Incorporated into NCE-5605   |
|               | Operation circuit A             | CCK-1050    |                              |
|               | Operation circuit SW            | CCK-1069    |                              |
|               | Operation circuit CN            | CCK-1070    |                              |
|               | Keyboard operation unit         | NCE-5625    |                              |
|               | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625   |
|               | Optional keyboard               | CCK-1061    |                              |
|               | φ38 button                      | MPHD30460   |                              |
|               | φ22 button                      | MPHD30459   |                              |
|               | Screw cover bottom              | MTV305169   |                              |
|               | Screw cover top                 | MTV305170   |                              |
|               | Serial LAN interface circuit    | CMH-2370    |                              |
|               | Gyro interface circuit          | CMJ-554     |                              |
|               | Radar interface circuit         | CQD-2273    |                              |
|               | Analog option circuit           | CMJ-560     |                              |
|               | Sensor LAN switch               | NQA-2443/A  |                              |

Repair circuit block (JMR-9296-6X/9X)

\* indicates a revision such as A and B

| Location      | Circuit Block Name              | Model Name   | Remarks                      |
|---------------|---------------------------------|--------------|------------------------------|
| Radar antenna | PA module                       | CAH-1696     |                              |
|               | TRX module                      | CMN-897      |                              |
|               | Signal processing unit          | NDC-4921     |                              |
|               | Power supply/IF circuit         | CMP-503      |                              |
|               | Encoder                         | CHT-85*      |                              |
|               | Fan                             | H-7BFRD0013  |                              |
|               | Fan                             | 9LG0912S4005 |                              |
|               | Motor driver circuit            | CBD-2400     | Common to AC100/220V         |
|               | Motor with gear                 | MDBW10822*   | Common to AC100/220V         |
| Display       | Display unit                    | NWZ-208      | 26-inch                      |
|               | 26-inch MNU replacement FAN kit | H-7ZYNA4005  | Incorporated into NWZ-208    |
|               | Display unit                    | NWZ-233      | 27-inch                      |
|               | Power supply unit               | NBD-913      |                              |
|               | PSU replacement FAN kit         | H-7ZYNA4007  | Incorporated into NBD-913    |
|               | Central control unit            | NDC-1590/A   |                              |
|               | DVD drive                       | CDD-754      | Incorporated into NDC-1590/A |
|               | CCU replacement FAN kit         | H-7ZYNA4006  |                              |
|               | CCU repair kit                  | NZC-1590/A   |                              |
|               | SSD 256GB                       | CDD-753      |                              |
|               | Trackball operation unit        | NCE-5605     |                              |
|               | Trackball                       | CCK-1060     | Incorporated into NCE-5605   |
|               | Operation circuit A             | CCK-1050     |                              |
|               | Operation circuit SW            | CCK-1069     |                              |
|               | Operation circuit CN            | CCK-1070     |                              |
|               | Keyboard operation unit         | NCE-5625     |                              |
|               | Operation circuit B             | CCK-1059     | Incorporated into NCE-5625   |
|               | Optional keyboard               | CCK-1061     |                              |
|               | φ38 button                      | MPHD30460    |                              |
|               | φ22 button                      | MPHD30459    |                              |
|               | Screw cover bottom              | MTV305169    |                              |
|               | Screw cover top                 | MTV305170    |                              |
|               | Serial LAN interface circuit    | CMH-2370     |                              |
|               | Gyro interface circuit          | CMJ-554      |                              |
|               | Radar interface circuit         | CQD-2273     |                              |
|               | Analog option circuit           | CMJ-560      |                              |
|               | Sensor LAN switch               | NQA-2443/A   |                              |

## Repair Circuit Block (JMR-7225-6X/9X)

\* indicates a revision such as A and B.

| Location      | Circuit Block Name    | Model Name   | Remarks   |
|---------------|-----------------------|--------------|---|
| Radar antenna | Motor with gear       | MDBW10822*   | Common to AC100/220V  |
|               | Encoder circuit       | CHT-71*      |   |
|               | Motor driver circuit  | H-7EPRD0034* | For AC220V  |
|               | Motor driver circuit  | H-7EPRD0035* | For AC100V  |
|               | Motor driver circuit  | H-7EPRD0043* | Common to AC100/220V  |
|               | Brake circuit         | CFA-253      |   |
|               | Brake control circuit | CCB-655*     |   |
|               | Brake circuit unit    | NZR-16       | Including CFA-259/260   |
|               | Performance monitor   | NJU-85       |   |
|               | T/R control circuit   | CMC-1205R2   |   |
|               | Modulation unit       | NMA-550-1    | Including CPA-264A<br>Including CMB-404<br>Including CFR-229<br>Not including the magnetron |
|               | Modulation circuit    | CPA-264A     |   |
|               | Receiver              | NRG-162*     | Including CMA-866*  |
|               | Power supply circuit  | CBD-1682A    |   |
|               | Relay filter circuit  | CSC-656      |   |
|               | Fan                   | H-7BFRD0002  |   |

| Location | Circuit Block Name              | Model Name  | Remarks                      |
|----------|---------------------------------|-------------|------------------------------|
| Display  | Display unit                    | NWZ-207     | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7ZYNA4004 | Incorporated into NWZ-207    |
|          | Display unit                    | NWZ-214     | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7BFRD0008 | Incorporated into NWZ-214    |
|          | Power supply unit               | NBD-913     |                              |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913    |
|          | Central control unit            | NDC-1590/A  |                              |
|          | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A |
|          | CCU replacement FAN kit         | H-7ZYNA4006 |                              |
|          | CCU repair kit                  | NZC-1590/A  |                              |
|          | SSD 256GB                       | CDD-753     |                              |
|          | Trackball operation unit        | NCE-5605    | Incorporated into NCE-5605   |
|          | Trackball                       | CCK-1060    |                              |
|          | Operation circuit A             | CCK-1050    |                              |
|          | Operation circuit SW            | CCK-1069    |                              |
|          | Operation circuit CN            | CCK-1070    |                              |
|          | Keyboard operation unit         | NCE-5625    |                              |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625   |
|          | Optional keyboard               | CCK-1061    |                              |
|          | φ38 button                      | MPHD30460   |                              |
|          | φ22 button                      | MPHD30459   |                              |
|          | Screw cover bottom              | MTV305169   |                              |
|          | Screw cover top                 | MTV305170   |                              |
|          | Serial LAN interface circuit    | CMH-2370    |                              |
|          | Gyro interface circuit          | CMJ-554     |                              |
|          | Radar interface circuit         | CQD-2273    |                              |
|          | Analog option circuit           | CMJ-560     |                              |
|          | Sensor LAN switch               | NQA-2443/A  |                              |

## Repair Circuit Block (JMR-7225-7X3/9X3)

\* indicates a revision such as A and B.

| Location    | Circuit Block Name    | Model Name   | Remarks   |
|-------------|-----------------------|--------------|---|
| Antenna     | Motor with gear       | MDBW10822*   | Common to AC100/220V  |
|             | Encoder circuit       | CHT-71*1     |   |
|             | Motor driver circuit  | H-7EPRD0034* | For AC220V  |
|             | Motor driver circuit  | H-7EPRD0035* | For AC100V  |
|             | Motor driver circuit  | H-7EPRD0043* | Common to AC100/220V  |
|             | Brake circuit         | CFA-253      |   |
|             | Brake control circuit | CCB-655*     |   |
|             | Brake circuit unit    | NZR-15       | Including CFA-259/260   |
|             | Performance monitor   | NJU-85       |   |
| Transceiver | T/R control circuit   | CMC-1205R2   |   |
|             | Modulation unit       | NMA-552-1    | Including CPA-264A<br>Including CMB-405<br>Including CFR-229<br>Not including the magnetron |
|             | Modulation circuit    | CPA-264A     |   |
|             | Receiver              | NRG-162*3    | Including CMA-866*3   |
|             | Power supply circuit  | CBD-1682A    |   |
|             | Relay filter circuit  | CSC-656      |   |

| Location | Circuit Block Name              | Model Name  | Remarks                    |
|----------|---------------------------------|-------------|----------------------------|
| Display  | Display unit                    | NWZ-207     | 19-inch                    |
|          | 19-inch MNU replacement FAN kit | H-7ZYNA4004 | Incorporated into NWZ-207  |
|          | Display unit                    | NWZ-214     | 19-inch                    |
|          | 19-inch MNU replacement FAN kit | H-7BFRD0008 | Incorporated into NWZ-214  |
|          | Power supply unit               | NBD-913     |                            |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913  |
|          | Central control unit            | NDC-1590/A  |                            |
|          | DVD drive                       | CDD-754     | Incorporated into          |
|          | CCU replacement FAN kit         | H-7ZYNA4006 | NDC-1590/A                 |
|          | CCU repair kit                  | NZC-1590/A  |                            |
|          | SSD 256GB                       | CDD-753     |                            |
|          | Trackball operation unit        | NCE-5605    |                            |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605 |
|          | Operation circuit A             | CCK-1050    |                            |
|          | Operation circuit SW            | CCK-1069    |                            |
|          | Operation circuit CN            | CCK-1070    |                            |
|          | Keyboard operation unit         | NCE-5625    |                            |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625 |
|          | Optional keyboard               | CCK-1061    |                            |
|          | φ38 button                      | MPHD30460   |                            |
|          | φ22 button                      | MPHD30459   |                            |
|          | Screw cover bottom              | MTV305169   |                            |
|          | Screw cover top                 | MTV305170   |                            |
|          | Serial LAN interface circuit    | CMH-2370    |                            |
|          | Gyro interface circuit          | CMJ-554     |                            |
|          | Radar interface circuit         | CQD-2273    |                            |
|          | Analog option circuit           | CMJ-560     |                            |
|          | Sensor LAN switch               | NQA-2443/A  |                            |

## Repair circuit block (JMR-7230-S)

\* indicates a revision such as A and B.

| Location | Circuit Block Name    | Model Name   | Remarks   |
|----------|-----------------------|--------------|---|
| Antenna  | Motor with gear       | MDBW10823*   | Common to AC100/220V  |
|          | Encoder circuit       | CHT-71*      |   |
|          | Motor driver circuit  | H-7EPRD0034* | For AC220V  |
|          | Motor driver circuit  | H-7EPRD0035* | For AC100V  |
|          | Motor driver circuit  | H-7EPRD0043* | Common to AC100/220V  |
|          | Brake circuit         | CFA-255/A    |   |
|          | Brake control circuit | CCB-655*     |   |
|          | Brake circuit unit    | NZR-17       | Including CFA-261/262   |
|          | Performance monitor   | NJU-84       |   |
|          | T/R control circuit   | CMC-1205R2   |   |
|          | Modulation unit       | NMA-551-1    | Including CPA-264A<br>Including CMB-406<br>Including CFR-229<br>Not including the magnetron |
|          | Modulation circuit    | CPA-264A     |   |
|          | Receiver              | NRG-229      | Including CAF-595/CAE-499   |
|          | Power supply circuit  | CBD-1682A    |   |
|          | Relay filter circuit  | CSC-656      |   |
|          | Fan                   | H-7BFRD0002  |   |

| Location | Circuit Block Name              | Model Name  | Remarks                      |
|----------|---------------------------------|-------------|------------------------------|
| Display  | Display unit                    | NWZ-207     | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7ZYNA4004 | Incorporated into NWZ-207    |
|          | Display unit                    | NWZ-214     | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7BFRD0008 | Incorporated into NWZ-214    |
|          | Power supply unit               | NBD-913     |                              |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913    |
|          | Central control unit            | NDC-1590/A  |                              |
|          | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A |
|          | CCU replacement FAN kit         | H-7ZYNA4006 |                              |
|          | CCU repair kit                  | NZC-1590/A  |                              |
|          | SSD 256GB                       | CDD-753     |                              |
|          | Trackball operation unit        | NCE-5605    |                              |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605   |
|          | Operation circuit A             | CCK-1050    |                              |
|          | Operation circuit SW            | CCK-1069    |                              |
|          | Operation circuit CN            | CCK-1070    |                              |
|          | Keyboard operation unit         | NCE-5625    |                              |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625   |
|          | Optional keyboard               | CCK-1061    |                              |
|          | φ38 button                      | MPHD30460   |                              |
|          | φ22 button                      | MPHD30459   |                              |
|          | Screw cover bottom              | MTV305169   |                              |
|          | Screw cover top                 | MTV305170   |                              |
|          | Serial LAN interface circuit    | CMH-2370    |                              |
|          | Gyro interface circuit          | CMJ-554     |                              |
|          | Radar interface circuit         | CQD-2273    |                              |
|          | Analog option circuit           | CMJ-560     |                              |
|          | Sensor LAN switch               | NQA-2443/A  |                              |



## Repair circuit block (JMR-7230-S3)

\* indicates a revision such as A and B.

| Location    | Circuit Block Name    | Model Name   | Remarks   |
|-------------|-----------------------|--------------|---|
| Antenna     | Motor with gear       | MDBW10823*   | Common to AC100/220V  |
|             | Encoder circuit       | CHT-71*1     |   |
|             | Motor driver circuit  | H-7EPRD0034* | For AC220V  |
|             | Motor driver circuit  | H-7EPRD0035* | For AC100V  |
|             | Motor driver circuit  | H-7EPRD0043* | Common to AC100/220V  |
|             | Brake circuit         | CFA-255/A    |   |
|             | Brake control circuit | CCB-655*     |   |
|             | Brake circuit unit    | NZR-17       | Including CFA-261/262   |
|             | Performance monitor   | NJU-84       |   |
| Transceiver | T/R control circuit   | CMC-1205R2   |   |
|             | Modulation unit       | NMA-553-1    | Including CPA-264A<br>Including CMB-407<br>Including CFR-229<br>Not including the magnetron |
|             | Modulation circuit    | CPA-264A     |   |
|             | Receiver              | NRG-229      |   |
|             | Power supply circuit  | CBD-1682A    |   |
|             | Relay filter circuit  | CSC-656      |   |

| Location | Circuit Block Name              | Model Name  | Remarks                    |
|----------|---------------------------------|-------------|----------------------------|
| Display  | Display unit                    | NWZ-207     | 19-inch                    |
|          | 19-inch MNU replacement FAN kit | H-7ZYNA4004 | Incorporated into NWZ-207  |
|          | Display unit                    | NWZ-214     | 19-inch                    |
|          | 19-inch MNU replacement FAN kit | H-7BFRD0008 | Incorporated into NWZ-214  |
|          | Power supply unit               | NBD-913     |                            |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913  |
|          | Central control unit            | NDC-1590/A  |                            |
|          | DVD drive                       | CDD-754     | Incorporated into          |
|          | CCU replacement FAN kit         | H-7ZYNA4006 | NDC-1590/A                 |
|          | CCU repair kit                  | NZC-1590/A  |                            |
|          | SSD 256GB                       | CDD-753     |                            |
|          | Trackball operation unit        | NCE-5605    |                            |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605 |
|          | Operation circuit A             | CCK-1050    |                            |
|          | Operation circuit SW            | CCK-1069    |                            |
|          | Operation circuit CN            | CCK-1070    |                            |
|          | Keyboard operation unit         | NCE-5625    |                            |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625 |
|          | Optional keyboard               | CCK-1061    |                            |
|          | φ38 button                      | MPHD30460   |                            |
|          | φ22 button                      | MPHD30459   |                            |
|          | Screw cover bottom              | MTV305169   |                            |
|          | Screw cover top                 | MTV305170   |                            |
|          | Serial LAN interface circuit    | CMH-2370    |                            |
|          | Gyro interface circuit          | CMJ-554     |                            |
|          | Radar interface circuit         | CQD-2273    |                            |
|          | Analog option circuit           | CMJ-560     |                            |
|          | Sensor LAN switch               | NQA-2443/A  |                            |

Repair circuit block (JMR-7225-6XH)

\* indicates a revision such as A and B.

| Location | Circuit Block Name              | Model Name   | Remarks  |
|----------|---------------------------------|--------------|--|
| Antenna  | Motor with gear                 | H-7BDRD0045A | DC brushless   |
|          | Encoder circuit                 | CHT-71*      |  |
|          | Motor control circuit           | CBD-1779     |  |
|          | Brake circuit                   | CFA-257      |  |
|          | Performance monitor             | NJU-85       |  |
|          | Heater control circuit          | CHG-216      | Optional (AC100V)  |
|          | Power supply circuit            | CBD-1682A    |  |
|          | T/R control circuit             | CMC-1205R2   |  |
|          | Modulation unit                 | NMA-550-1    | Including CPA-264A, CMB-404,<br>and CFR-229<br>Not including the magnetron |
|          | Modulation circuit              | CPA-264A     |  |
|          | Receiver                        | NRG-162*     | Including CMA-866*   |
|          | Fan                             | H-7BFRD0002  |  |
|          |                                 |              |  |
| Display  | Display unit                    | NWZ-207      | 19-inch  |
|          | 19-inch MNU replacement FAN kit | H-7ZYNA4004  | Incorporated into NWZ-207  |
|          | Display unit                    | NWZ-214      | 19-inch  |
|          | 19-inch MNU replacement FAN kit | H-7BFRD0008  | Incorporated into NWZ-214  |
|          | Power supply unit               | NBD-913      |  |
|          | PSU replacement FAN kit         | H-7ZYNA4007  | Incorporated into NBD-913  |
|          | Central control unit            | NDC-1590/A   |  |
|          | DVD drive                       | CDD-754      | Incorporated into NDC-1590/A   |
|          | CCU replacement FAN kit         | H-7ZYNA4006  |  |
|          | CCU repair kit                  | NZC-1590/A   |  |
|          | SSD 256GB                       | CDD-753      |  |
|          | Trackball operation unit        | NCE-5605     |  |
|          | Trackball                       | CCK-1060     | Incorporated into NCE-5605   |
|          | Operation circuit A             | CCK-1050     |  |
|          | Operation circuit SW            | CCK-1069     |  |
|          | Operation circuit CN            | CCK-1070     |  |
|          | Keyboard operation unit         | NCE-5625     |  |
|          | Operation circuit B             | CCK-1059     | Incorporated into NCE-5625   |
|          | Optional keyboard               | CCK-1061     |  |
|          | φ38 button                      | MPHD30460    |  |
|          | φ22 button                      | MPHD30459    |  |
|          | Screw cover bottom              | MTV305169    |  |
|          | Screw cover top                 | MTV305170    |  |
|          | Serial LAN interface circuit    | CMH-2370     |  |
|          | Gyro interface circuit          | CMJ-554      |  |
|          | Radar interface circuit         | CQD-2273     |  |
|          | Analog option circuit           | CMJ-560      |  |
|          | Sensor LAN switch               | NQA-2443/A   |  |

## Repair Circuit Block (JMR-7210-6X/6XH)

\* indicates a revision such as A and B.

| Location | Circuit Block Name                 | Model Name  | Remarks  |
|----------|------------------------------------|-------------|--|
| Antenna  | Motor with gear                    | H-7BDRD0048 | DC brushless (shared with HS)                      |
|          | Receiver modulation circuit        | NZK-2103    | Including the CME-363A, NRG-610A, internal harness |
|          | Power supply circuit               | CBD-1783    |  |
|          | Encoder circuit                    | CHT-71*     |  |
|          | Motor control power supply circuit | CBD-1779    |  |
|          | Brake circuit                      | CFA-252     |  |
|          | Fan                                | H-7BFRD0002 |  |
| Display  | Display unit                       | NWZ-207     | 19-inch  |
|          | 19-inch MNU replacement FAN kit    | H-7ZYNA4004 | Incorporated into NWZ-207                          |
|          | Display unit                       | NWZ-214     | 19-inch  |
|          | 19-inch MNU replacement FAN kit    | H-7BFRD0008 | Incorporated into NWZ-214                          |
|          | Power supply unit                  | NBD-913     |  |
|          | PSU replacement FAN kit            | H-7ZYNA4007 | Incorporated into NBD-913                          |
|          | Central control unit               | NDC-1590/A  |  |
|          | DVD drive                          | CDD-754     | Incorporated into NDC-1590/A                       |
|          | CCU replacement FAN kit            | H-7ZYNA4006 |  |
|          | CCU repair kit                     | NZC-1590/A  |  |
|          | SSD 256GB                          | CDD-753     |  |
|          | Trackball operation unit           | NCE-5605    |  |
|          | Trackball                          | CCK-1060    | Incorporated into NCE-5605                         |
|          | Operation circuit A                | CCK-1050    |  |
|          | Operation circuit SW               | CCK-1069    |  |
|          | Operation circuit CN               | CCK-1070    |  |
|          | Keyboard operation unit            | NCE-5625    |  |
|          | Operation circuit B                | CCK-1059    | Incorporated into NCE-5625                         |
|          | Optional keyboard                  | CCK-1061    |  |
|          | φ38 button                         | MPHD30460   |  |
|          | φ22 button                         | MPHD30459   |  |
|          | Screw cover bottom                 | MTV305169   |  |
|          | Screw cover top                    | MTV305170   |  |
|          | Serial LAN interface circuit       | CMH-2370    |  |
|          | Gyro interface circuit             | CMJ-554     |  |
|          | Radar interface circuit            | CQD-2273    |  |
|          | Analog option circuit              | CMJ-560     |  |
|          | Sensor LAN switch                  | NQA-2443/A  |  |

Repair circuit block (JMR-7272-S)

\* indicates a revision such as A and B.

| Location | Circuit Block Name              | Model Name  | Remarks                      |
|----------|---------------------------------|-------------|------------------------------|
| Antenna  | TRX module                      | CMN-797     |                              |
|          | Signal processing unit          | NDC-4920    |                              |
|          | Power supply/IF circuit         | CMP-493     |                              |
|          | Encoder                         | CHT-85      |                              |
|          | Fan                             | NZF-100     | 9LG0912S4005                 |
|          | Motor driver circuit            | CBD-1949    | Common to AC100/220V         |
|          | Motor driver circuit            | CBD-2400    | Common to AC100/220V         |
|          | Motor with gear                 | MDBW10823*  | Common to AC100/220V         |
| Display  | Display unit                    | NWZ-207     | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7ZYNA4004 | Incorporated into NWZ-207    |
|          | Display unit                    | NWZ-214     | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7BFRD0008 | Incorporated into NWZ-214    |
|          | Power supply unit               | NBD-913     |                              |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913    |
|          | Central control unit            | NDC-1590/A  |                              |
|          | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A |
|          | CCU replacement FAN kit         | H-7ZYNA4006 |                              |
|          | CCU repair kit                  | NZC-1590/A  |                              |
|          | SSD 256GB                       | CDD-753     |                              |
|          | Trackball operation unit        | NCE-5605    |                              |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605   |
|          | Operation circuit A             | CCK-1050    |                              |
|          | Operation circuit SW            | CCK-1069    |                              |
|          | Operation circuit CN            | CCK-1070    |                              |
|          | Keyboard operation unit         | NCE-5625    |                              |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625   |
|          | Optional keyboard               | CCK-1061    |                              |
|          | φ38 button                      | MPHD30460   |                              |
|          | φ22 button                      | MPHD30459   |                              |
|          | Screw cover bottom              | MTV305169   |                              |
|          | Screw cover top                 | MTV305170   |                              |
|          | Serial LAN interface circuit    | CMH-2370    |                              |
|          | Gyro interface circuit          | CMJ-554     |                              |
|          | Radar interface circuit         | CQD-2273    |                              |
|          | Analog option circuit           | CMJ-560     |                              |
|          | Sensor LAN switch               | NQA-2443/A  |                              |

Repair circuit block (JMR-7282-S)

\* indicates a revision such as A and B.

| Location | Circuit Block Name              | Model Name  | Remarks   |
|----------|---------------------------------|-------------|---|
| Antenna  | TRX module                      | CMN-797     |   |
|          | Signal processing unit          | NDC-4920    |   |
|          | Power supply/IF circuit         | CMP-493     |   |
|          | Encoder                         | CHT-85      |   |
|          | Fan                             | NZF-100     | 9LG0912S4005  |
|          | Motor driver circuit            | CBD-1949    | Common to AC100/220V  |
|          | Motor driver circuit            | CBD-2400    | Common to AC100/220V  |
|          | Motor                           | MDBW10823*  | Common to AC100/220V<br>* indicates a revision such as A and B. |
| Display  | Display unit                    | NWZ-207     | 19-inch   |
|          | 19-inch MNU replacement FAN kit | H-7ZYNA4004 | Incorporated into NWZ-207                                       |
|          | Display unit                    | NWZ-214     | 19-inch   |
|          | 19-inch MNU replacement FAN kit | H-7BFRD0008 | Incorporated into NWZ-214                                       |
|          | Power supply unit               | NBD-913     |   |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913                                       |
|          | Central control unit            | NDC-1590/A  |   |
|          | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A                                    |
|          | CCU replacement FAN kit         | H-7ZYNA4006 |   |
|          | CCU repair kit                  | NZC-1590/A  |   |
|          | SSD 256GB                       | CDD-753     |   |
|          | Trackball operation unit        | NCE-5605    |   |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605                                      |
|          | Operation circuit A             | CCK-1050    |   |
|          | Operation circuit SW            | CCK-1069    |   |
|          | Operation circuit CN            | CCK-1070    |   |
|          | Keyboard operation unit         | NCE-5625    |   |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625                                      |
|          | Optional keyboard               | CCK-1061    |   |
|          | φ38 button                      | MPHD30460   |   |
|          | φ22 button                      | MPHD30459   |   |
|          | Screw cover bottom              | MTV305169   |   |
|          | Screw cover top                 | MTV305170   |   |
|          | Serial LAN interface circuit    | CMH-2370    |   |
|          | Gyro interface circuit          | CMJ-554     |   |
|          | Radar interface circuit         | CQD-2273    |   |
|          | Analog option circuit           | CMJ-560     |   |
|          | Sensor LAN switch               | NQA-2443/A  |   |

# Repair circuit block (JMR-7282-SH)

\* indicates a revision such as A and B.

| Location | Circuit Block Name              | Model Name  | Remarks                      |
|----------|---------------------------------|-------------|------------------------------|
| Antenna  | TRX module                      | CMN-797     |                              |
|          | Signal processing unit          | NDC-4920    |                              |
|          | Power supply/IF circuit         | CMP-493     |                              |
|          | Encoder                         | CHT-85      |                              |
|          | Fan                             | NZF-100     | 9LG0912S4005                 |
|          | Motor driver circuit            | CBD-1950    | Common to AC100/220V         |
|          | Motor                           | MDBW10967   | Common to AC100/220V         |
| Display  | Display unit                    | NWZ-207     | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7ZYNA4004 | Incorporated into NWZ-207    |
|          | Display unit                    | NWZ-214     | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7BFRD0008 | Incorporated into NWZ-214    |
|          | Power supply unit               | NBD-913     |                              |
|          | PSU replacement FAN kit         | H-7ZYNA4007 | Incorporated into NBD-913    |
|          | Central control unit            | NDC-1590/A  |                              |
|          | DVD drive                       | CDD-754     | Incorporated into NDC-1590/A |
|          | CCU replacement FAN kit         | H-7ZYNA4006 |                              |
|          | CCU repair kit                  | NZC-1590/A  |                              |
|          | SSD 256GB                       | CDD-753     |                              |
|          | Trackball operation unit        | NCE-5605    |                              |
|          | Trackball                       | CCK-1060    | Incorporated into NCE-5605   |
|          | Operation circuit A             | CCK-1050    |                              |
|          | Operation circuit SW            | CCK-1069    |                              |
|          | Operation circuit CN            | CCK-1070    |                              |
|          | Keyboard operation unit         | NCE-5625    |                              |
|          | Operation circuit B             | CCK-1059    | Incorporated into NCE-5625   |
|          | Optional keyboard               | CCK-1061    |                              |
|          | φ38 button                      | MPHD30460   |                              |
|          | φ22 button                      | MPHD30459   |                              |
|          | Screw cover bottom              | MTV305169   |                              |
|          | Screw cover top                 | MTV305170   |                              |
|          | Serial LAN interface circuit    | CMH-2370    |                              |
|          | Gyro interface circuit          | CMJ-554     |                              |
|          | Radar interface circuit         | CQD-2273    |                              |
|          | Analog option circuit           | CMJ-560     |                              |
|          | Sensor LAN switch               | NQA-2443/A  |                              |

Repair circuit block (JMR-7296-6X/9X)

\* indicates a revision such as A and B.

| Location | Circuit Block Name              | Model Name   | Remarks                      |
|----------|---------------------------------|--------------|------------------------------|
| Antenna  | PA module                       | CAH-1696     |                              |
|          | TRX module                      | CMN-898      |                              |
|          | Signal processing unit          | NDC-4921     |                              |
|          | Power supply/IF circuit         | CMP-503      |                              |
|          | Encoder                         | CHT-85*      |                              |
|          | Fan                             | H-7BFRD0013  |                              |
|          | Fan                             | 9LG0912S4005 |                              |
|          | Motor driver circuit            | CBD-2400     | Common to AC100/220V         |
|          | Motor with gear                 | MDBW10822*   | Common to AC100/220V         |
| Display  | Display unit                    | NWZ-207      | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7ZYNA4004  | Incorporated into NWZ-207    |
|          | Display unit                    | NWZ-214      | 19-inch                      |
|          | 19-inch MNU replacement FAN kit | H-7BFRD0008  | Incorporated into NWZ-214    |
|          | Power supply unit               | NBD-913      |                              |
|          | PSU replacement FAN kit         | H-7ZYNA4007  | Incorporated into NBD-913    |
|          | Central control unit            | NDC-1590/A   |                              |
|          | DVD drive                       | CDD-754      | Incorporated into NDC-1590/A |
|          | CCU replacement FAN kit         | H-7ZYNA4006  |                              |
|          | CCU repair kit                  | NZC-1590/A   |                              |
|          | SSD 256GB                       | CDD-753      | Incorporated into NCE-5605   |
|          | Trackball operation unit        | NCE-5605     |                              |
|          | Trackball                       | CCK-1060     |                              |
|          | Operation circuit A             | CCK-1050     |                              |
|          | Operation circuit SW            | CCK-1069     |                              |
|          | Operation circuit CN            | CCK-1070     | Incorporated into NCE-5625   |
|          | Keyboard operation unit         | NCE-5625     |                              |
|          | Operation circuit B             | CCK-1059     |                              |
|          | Optional keyboard               | CCK-1061     |                              |
|          | φ38 button                      | MPHD30460    |                              |
|          | φ22 button                      | MPHD30459    |                              |
|          | Screw cover bottom              | MTV305169    |                              |
|          | Screw cover top                 | MTV305170    |                              |
|          | Serial LAN interface circuit    | CMH-2370     |                              |
|          | Gyro interface circuit          | CMJ-554      |                              |
|          | Radar interface circuit         | CQD-2273     |                              |



## 22.3 Troubleshooting

When this equipment does not operate correctly, check the following points before asking for repairs. Consult with your nearest subsidiary company, branch office, or sales office if the problem does not get solved even after checking and correcting these points, or if there are any abnormally locations other than the following items.

| Symptom  | Cause   | Action  |
|--|---|---|
| The power is not supplied.<br>Alternatively, the equipment does not start even if the Power button of the operation unit is pressed. | The AC or DC power supply is not connected.                                   | Connect the AC or DC power supply.                                    |
|  | The breaker at the front of the power supply unit (NBD-913) is not set to ON. | Set the breaker to ON by pushing up the lever of the breaker.         |
|  | The AC or DC power supply is not input within the specified voltage range.    | Connect the AC or DC power supply within the specified voltage range. |
|  | The internal wiring is faulty.  | Make a request to the distributor for repair.                         |
|  | The power supply unit (NBD-913) is faulty.                                    | Make a request to the distributor for repair.                         |
|  | The central control unit (NDC-1590/A) is faulty.                              | Make a request to the distributor for repair.                         |
|  | The operation unit (NCE-5605) is faulty.                                      | Make a request to the distributor for repair.                         |
| The power is not supplied to the monitor.  | The display unit is not activated.  | Activate the display unit.  |
|  | The internal wiring is faulty.  | Make a request to the distributor for repair.                         |
|  | Display (NWZ-208/233/NWZ-207/214) is faulty.                                  | Make a request to the distributor for repair.                         |
| Although the power is supplied to the monitor, the screen is not displayed.  | The brightness of the monitor is set to the minimum level.                    | Adjust the brightness of the monitor to the appropriate level.        |
|  | The internal wiring is faulty.  | Make a request to the distributor for repair.                         |
|  | Display (NWZ-208/233/NWZ-207/214) is faulty.                                  | Make a request to the distributor for repair.                         |
| The brightness of the monitor cannot be adjusted.  | Display (NWZ-208/233/NWZ-207/214) is faulty.                                  | Make a request to the distributor for repair.                         |
| The trackball or the option keyboard cannot be operated.   | The internal wiring is faulty.  | Make a request to the distributor for repair.                         |
|  | The display unit (NCE-5605/NCE5625) is faulty.                                | Make a request to the distributor for repair.                         |

| Symptom  | Cause   | Action  |
|--|---|---|
| The trackball does not move smoothly.  | The trackball is dirty.   | Clean the trackball.  |
| Although the power is supplied and the screen is displayed, the display is frozen, disabling processing to advance up to display of the task menu. | The central control unit (NDC-1590/A) is abnormal.  | Make a request to the distributor for repair.   |
| Some task menus cannot be selected.  | The device license has not been installed.  | Install the license of the device to be used.   |
| The cursor is not displayed correctly.   | The central control unit (NDC-1590/A) is faulty.  | Make a request to the distributor for repair.   |
| Characters/symbols are not displayed correctly.  | The central control unit (NDC-1590/A) is faulty.  | Make a request to the distributor for repair.   |
| Position information (GPS) is not displayed.   | The communication is not set correctly.   | Set the communication correctly.  |
|  | The power supply for the GPS equipment is not turned on.  | Turn on the power supply for the GPS equipment.   |
|  | The GPS equipment does not perform positioning.   | Check the state of the GPS equipment.   |
|  | The connection with the GPS equipment is abnormal.  | Check the connection with the GPS equipment.<br>When GPS equipment is connected to the serial LAN interface circuit, check if the LED of the corresponding port is lit at data reception. |
|  | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on.<br>(Case where the GPS equipment is connected to the serial-LAN interface circuit) | Turn on the power supply for the serial-LAN interface circuit.  |
|  | The serial-LAN interface circuit (CMH-2370) is faulty.<br>(Case where the GPS equipment is connected to the serial-LAN interface circuit)                             | Make a request to the distributor for repair.   |
|  | The internal wiring is faulty.  | Make a request to the distributor for repair.   |
|  | The central control unit (NDC-1590/A) is faulty.  | Make a request to the distributor for repair.   |

| Symptom  | Cause  | Action  |
|--|--|---|
| AIS information is not displayed.  | The communication is not set correctly.  | Set the communication correctly.  |
|  | The power supply for the AIS equipment is not turned on.   | Turn on the power supply for the AIS equipment.   |
|  | The AIS equipment does not perform positioning.  | Check the state of the AIS equipment.   |
|  | The connection with the AIS equipment is abnormal.   | Check the connection with the AIS equipment.<br>When AIS equipment is connected to the serial LAN interface circuit, check if the LED of the corresponding port is lit at data reception.                                   |
|  | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on.<br>(Case where the AIS equipment is connected to the serial-LAN interface circuit)          | Turn on the power supply for the serial-LAN interface circuit.  |
|  | The serial-LAN interface circuit (CMH-2370) is faulty.<br>(Case where the AIS equipment is connected to the serial-LAN interface circuit)                                      | Make a request to the distributor for repair.   |
|  | The internal wiring is faulty.   | Make a request to the distributor for repair.   |
|  | The central control unit (NDC-1590/A) is faulty.   | Make a request to the distributor for repair.   |
| The azimuth of the Gyro compass is not displayed.<br>Alternatively, the azimuth rotation direction is not displayed correctly. | The communication is not set correctly.  | Set the communication correctly.  |
|  | The power supply for the Gyro compass equipment is not turned on.  | Turn on the power supply for the Gyro compass equipment.  |
|  | The connection with the Gyro compass equipment is abnormal.  | Check the connection with the Gyro compass equipment.<br>When gyro compass equipment is connected to the serial LAN interface circuit or gyro interface circuit, check if the corresponding LED is lit at signal reception. |
|  | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on.<br>(Case where the Gyro compass equipment is connected to the serial-LAN interface circuit) | Turn on the power supply for the serial-LAN interface circuit.  |
|  | The serial-LAN interface circuit (CMH-2370) is faulty.<br>(Case where the Gyro compass equipment is connected to the serial-LAN interface circuit)                             | Make a request to the distributor for repair.   |

| Symptom  | Cause  | Action  |
|--|--|---|
| The azimuth of the Gyro compass is not displayed.<br>Alternatively, the azimuth rotation direction is not displayed correctly. | The Gyro interface circuit (CMJ-554) is not set correctly<br>(Case where the Gyro compass equipment is connected to the Gyro interface circuit)                        | Set the Gyro interface circuit correctly according to the Gyro compass equipment.   |
|  | The fuse of the gyro interface circuit (CMJ-554) has blown.  | Replace the fuse of the gyro interface circuit.   |
|  | The Gyro interface circuit (CMJ-554) is faulty.<br>(Case where the Gyro compass equipment is connected to the Gyro interface circuit)                                  | Make a request to the distributor for repair.   |
|  | The internal wiring is faulty.   | Make a request to the distributor for repair.   |
|  | The central control unit (NDC-1590/A) is faulty.   | Make a request to the distributor for repair.   |
| Log is not displayed or the values are not displayed correctly.  | The communication is not set correctly.  | Set the communication correctly.  |
|  | The power supply for the log equipment is not turned on.   | Turn on the power supply for the log equipment.   |
|  | The connection with the log equipment is abnormal.   | Check the connection with the log equipment.<br>When log equipment is connected to the serial LAN interface circuit or gyro interface circuit, check if the corresponding LED blinks at signal reception. |
|  | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on.<br>(Case where the log equipment is connected to the serial-LAN interface circuit). | Turn on the power supply for the serial-LAN interface circuit.  |
|  | The serial-LAN interface circuit (CMH-2370) is faulty.<br>(Case where the log equipment is connected to the serial-LAN interface circuit).                             | Make a request to the distributor for repair.   |
|  | The Gyro interface circuit (CMJ-554) is not set correctly.<br>(Case where the log equipment is connected to the Gyro interface circuit).                               | Set the Gyro interface circuit correctly according to the log equipment.  |
|  | The Gyro interface circuit (CMJ-554) is faulty.<br>(Case where the log equipment is connected to the Gyro interface circuit).  | Make a request to the distributor for repair.   |

| Symptom  | Cause  | Action  |
|--|--|---|
| Log is not displayed or the values are not displayed correctly.                            | The internal wiring is faulty.   | Make a request to the distributor for repair.   |
|  | The central control unit (NDC-1590/A) is faulty.   | Make a request to the distributor for repair.   |
| Rudder angles are not displayed.<br>Alternatively, the values are not displayed correctly. | The communication is not set correctly.  | Set the communication correctly.  |
|  | The power supply for the rudder angle indicator is not turned on.  | Turn on the power supply for the rudder angle indicator.  |
|  | The connection with the rudder angle indicator is abnormal.  | Check the connection with the rudder angle indicator.<br>When a rudder angle indicator is connected to the serial LAN interface circuit, check if the LED of the corresponding port is lit at data reception. |
|  | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on.<br>(Case where the rudder angle indicator is connected to the serial-LAN interface circuit or the rudder angle indicator is connected to the analog option circuit) | Turn on the power supply for the serial-LAN interface circuit.  |
|  | The serial-LAN interface circuit (CMH-2370) is faulty.<br>(Case where the rudder angle indicator is connected to the serial-LAN interface circuit or the rudder angle indicator is connected to the analog option circuit)                             | Make a request to the distributor for repair.   |
|  | The analog option circuit (CMJ-560) is not set correctly.<br>(Case where the rudder angle indicator is connected to the analog option circuit)   | Set the analog option circuit correctly according to the rudder angle indicator.  |
|  | The analog option circuit (CMJ-560) is faulty.<br>(Case where the rudder angle indicator is connected to the analog option circuit)  | Make a request to the distributor for repair.   |
|  | The internal wiring is faulty.   | Make a request to the distributor for repair.   |
|  | The central control unit (NDC-1590/A) is faulty.   | Make a request to the distributor for repair.   |

| Symptom  | Cause  | Action   |
|--|--|--|
| Wind direction/wind speed (anemoscope/anemometer) data is not displayed. | The communication is not set correctly.  | Set the communication correctly.   |
|  | The power supply for the anemoscope/anemometer is not turned on.                   | Turn on the power supply for the anemoscope/anemometer.  |
|  | The connection with the anemoscope/anemometer is abnormal.                         | Check the connection with the anemoscope/anemometer.<br>Check if the LED of the corresponding port of the serial LAN interface circuit is lit at data reception. |
|  | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on. | Turn on the power supply for the serial-LAN interface circuit.   |
|  | The serial-LAN interface circuit (CMH-2370) is faulty.                             | Make a request to the distributor for repair.  |
|  | The internal wiring is faulty.   | Make a request to the distributor for repair.  |
|  | The central control unit (NDC-1590/A) is faulty.                                   | Make a request to the distributor for repair.  |
| Water depth values are not displayed.                                    | The communication is not set correctly.  | Set the communication correctly.   |
|  | The power supply for the echo sounder is not turned on.                            | Turn on the power supply for the echo sounder.   |
|  | The connection with the echo sounder is abnormal.                                  | Check the connection with the echo sounder.<br>Check if the LED of the corresponding port of the serial LAN interface circuit is lit at data reception.          |
|  | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on. | Turn on the power supply for the serial-LAN interface circuit.   |
|  | The serial-LAN interface circuit (CMH-2370) is faulty.                             | Make a request to the distributor for repair.  |
|  | The internal wiring is faulty.   | Make a request to the distributor for repair.  |
|  | The central control unit (NDC-1590/A) is faulty.                                   | Make a request to the distributor for repair.  |

| Symptom                           | Cause   | Action   |
|-----------------------------------|---|--|
| Sensor signals are not displayed. | The communication is not set correctly.   | Set the communication correctly.   |
|                                   | The power supply for the sensor equipment is not turned on.   | Turn on the power supply for the sensor equipment.   |
|                                   | The connection with the sensor equipment is faulty.   | Check the connection with the sensor equipment.<br>Check if the LED of the corresponding port of the serial LAN interface circuit is lit at data reception.    |
|                                   | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on.  | Turn on the power supply for the serial-LAN interface circuit.   |
|                                   | The internal wiring is faulty.  | Make a request to the distributor for repair.  |
|                                   | The display unit such as the serial-LAN interface circuit (CMH-2370), analog option circuit (CMJ-560), and central control unit (NDC-1590/A) is faulty. | Make a request to the distributor for repair.  |
| Autopilot is disabled.            | The communication is not set correctly.   | Set the communication correctly.   |
|                                   | The autopilot function is not operated correctly.   | Operate autopilot correctly.   |
|                                   | The power supply for the autopilot equipment is not turned on.  | Turn on the power supply for the autopilot equipment.  |
|                                   | The connection with the autopilot equipment is faulty.  | Check the connection with the autopilot equipment.<br>Check if the LED of the corresponding port of the serial LAN interface circuit is lit at data reception. |
|                                   | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on.  | Turn on the power supply for the serial-LAN interface circuit.   |
|                                   | The serial-LAN interface circuit (CMH-2370) is faulty.  | Make a request to the distributor for repair.  |
|                                   | The internal wiring is faulty.  | Make a request to the distributor for repair.  |
|                                   | The central control unit (NDC-1590/A) is faulty.  | Make a request to the distributor for repair.  |

| Symptom                                | Cause  | Action   |
|--|--|--|
| Contact signals are not output.        | The power supply for the serial-LAN interface circuit (CMH-2370) is not turned on.<br>(Case where contact signal output is acquired from the serial-LAN interface circuit) | Turn on the power supply for the serial-LAN interface circuit.   |
|  | The serial-LAN interface circuit (CMH-2370) is faulty.<br>(Case where contact signal output is acquired from the serial-LAN interface circuit)                             | Make a request to the distributor for repair.  |
|  | The internal wiring is faulty.   | Make a request to the distributor for repair.  |
|  | The central control unit (NDC-1590/A) is faulty.   | Make a request to the distributor for repair.  |
| The radar antenna is not acknowledged. | The connection with the radar antenna is abnormal.   | Check the connection with the radar antenna.   |
|  | Power is not supplied from the power supply unit to the radar antenna.   | Check the power supply wiring between the power supply unit and the radar interface circuit.   |
|  |  | Check the power supply connection inside of the radar antenna.   |
|  | Only AC power is supplied to the power supply unit.<br>(NKE-2254 or NKE-2103 is connected as the radar antenna)  | <b>[Note]</b><br>For checking wiring inside of the radar antenna, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur. |
|  | The radar interface circuit (CQD-2273) is not set correctly.   | To connect the NKE-2254 or NKE-2103 antenna, the DC power supply must be connected to the power supply unit.   |
|  | The radar interface circuit (CQD-2273) is faulty.  | Set the radar interface circuit correctly.   |
|  | The radar antenna is faulty.   | Make a request to the distributor for repair.  |



| Symptom   | Cause   | Action  |
|---|---|---|
| The radar antenna is not acknowledged.          | The internal wiring is faulty.  | Make a request to the distributor for repair.   |
|   | The central control unit (NDC-1590/A) is faulty.  | Make a request to the distributor for repair.   |
| The power is not supplied to the radar antenna. | The connection with the radar antenna is abnormal.  | Check the connection with the radar antenna.  |
|   | The connection with the radar antenna is abnormal and overcurrent protection is functioning in the power supply unit. | Check the connection with the radar antenna and remove the cause of short-circuit.  |
|   | DC power is not supplied to the power supply unit. (NKE-2254 or NKE-2103 is connected as the radar antenna)           | To connect the NKE-2254 or NKE-2103 radar antenna, DC power supply must be connected to the power supply unit.                                  |
|   | The 24V DC output fuse is blown out. (NKE-2254 or NKE-2103 is connected as the radar antenna.)                        | After removing the cause of fuse blow-out, replace the fuse.<br>The fuse is the 15A blade fuse at the front of the power supply unit (NBD-913). |
|   | The radar interface circuit (CQD-2273) is faulty.   | Make a request to the distributor for repair.   |
|   | The internal wiring is faulty.  | Make a request to the distributor for repair.   |
|   | The power supply unit (NBD-913) is abnormal.  | Make a request to the distributor for repair.   |
|   | The central control unit (NDC-1590/A) is faulty.  | Make a request to the distributor for repair.   |

| Symptom   | Cause  | Action  |
|---|--|---|
| The preheat count down of the radar antenna is not displayed. | The connection with the radar antenna is abnormal.           | Check the connection with the radar antenna.  |
|   | The safety switch of the radar antenna is set to OFF.        | Set the safety switch of the radar antenna to ON.<br><br>[Note]<br>For operating the safety switch of the radar antenna, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur. |
|   | A solid-state radar antenna is connected.                    | Preheat count-down is not displayed for a solid-state radar antenna.  |
|   | The radar antenna is faulty.                                 | Make a request to the distributor for repair.   |
|   | The radar interface circuit (CQD-2273) is not set correctly. | Set the radar interface circuit correctly.  |
|   | The radar interface circuit (CQD-2273) is faulty.            | Make a request to the distributor for repair.   |
|   | The internal wiring is faulty.                               | Make a request to the distributor for repair.   |
|   | The central control unit (NDC-1590/A) is faulty.             | Make a request to the distributor for repair.   |

| Symptom   | Cause   | Action   |
|---|---|--|
| The radar antenna does not rotate even if the [Transmit] button is pressed. | The connection with the radar antenna is abnormal.  | Check the connection with the radar antenna.   |
|   | The safety switch of the radar antenna is set to OFF.   | Set the safety switch of the radar antenna to ON.<br><b>[Note]</b><br>For operating the safety switch of the radar antenna, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur.   |
|   | Power is not supplied from the power supply unit to the radar antenna.  | Check the power supply wiring between the power supply unit and the radar interface circuit.<br>Check the power supply connection inside of the radar antenna.<br><b>[Note]</b><br>For checking the wiring inside of the radar antenna, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur. |
|   | The motor driver circuit inside of the radar antenna is not set correctly.<br>(NKE-1125A, NKE-1130A, NKE-1632/A, NKE-2632/A, or NKE-2632-H, or NKE-1696 is connected as the radar antenna.) | Set the motor driver circuit correctly.<br><b>[Note]</b><br>For setting the motor driver circuit, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur.   |
|   | The radar antenna rotation unit is frozen.  | De-freeze the frozen section by using the neck heater option.  |
|   | Strong wind of relative wind velocity exceeding 100kt (about 51.5m/s) is blowing.   | When strong wind of relative wind velocity exceeding 100kt is blowing, the radar antenna does not rotate due to the protection function.   |
|   | The radar antenna is faulty.  | Make a request to the distributor for repair.  |

| Symptom  | Cause   | Action   |
|--|---|--|
| The radar antenna does not rotate even if the [Transmit] button is pressed.        | The radar interface circuit (CQD-2273) is faulty.   | Make a request to the distributor for repair.  |
|  | The internal wiring is faulty.  | Make a request to the distributor for repair.  |
|  | The power supply unit (NBD-913) is abnormal.  | Make a request to the distributor for repair.  |
|  | The central control unit (NDC-1590/A) is faulty.  | Make a request to the distributor for repair.  |
| If the power supply is turned off, the track data is cleared without being stored. | The central control unit (NDC-1590/A) is faulty.  | Make a request to the distributor for repair.  |
| No radar image is displayed.   | The connection with the radar antenna is abnormal.  | Check the connection with the radar antenna.   |
|  | The GAIN value is set to the minimum.   | Set a proper value for GAIN.   |
|  | The SEA/RAIN value is set to the maximum.   | Set a proper value for SEA/RAIN.   |
|  | The magnetron is deteriorated significantly.<br>(Case where a radar antenna that uses a magnetron is connected) | Replace the magnetron.<br><br><b>[Note]</b><br>For magnetron replacement, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur. |
|  | The radar antenna is faulty.  | Make a request to the distributor for repair.  |
|  | The radar interface circuit (CQD-2273) is faulty.   | Make a request to the distributor for repair.  |
|  | The internal wiring is faulty.  | Make a request to the distributor for repair.  |
|  | The power supply unit (NBD-913) is abnormal.  | Make a request to the distributor for repair.  |
|  | The central control unit (NDC-1590/A) is faulty.  | Make a request to the distributor for repair.  |

| Symptom  | Cause  | Action   |
|--|--|--|
| Radar images cannot be tuned.                              | The magnetron is deteriorated significantly.<br>(Case where an radar antenna that uses a magnetron is connected) | Replace the magnetron.<br><br><b>[Note]</b><br>For magnetron replacement, always request the work to the specialized service person. Before starting the work, turn off the power supply of the display unit. Otherwise, an unexpected accident may occur. |
|  | A solid-state radar antenna is connected.  | Tuning bar is not displayed for a solid-state radar antenna.   |
| The azimuth of the radar image is not displayed correctly. | Azimuth is not set correctly.  | Set the azimuth correctly.   |
|  | CCRP is not set correctly.   | Set CCRP correctly.  |
|  | The GPS radar antenna position is not set correctly.   | Set the GPS radar antenna position correctly.  |
| The range of the radar image is not displayed correctly.   | The range is not set correctly.  | Set the range correctly.   |
|  | CCRP is not set correctly.   | Set CCRP correctly.  |
|  | The GPS radar antenna position is not set correctly.   | Set the GPS radar antenna position correctly.  |
| Interswitch does not function.                             | Power for the interswitch is not turned on.  | Turn on the power for the interswitch.   |
|  | The connection with the interswitch is abnormal.   | Check the connection with the interswitch.   |
|  | The interswitch is faulty.   | Make a request to the distributor for repair.  |
|  | The radar interface circuit (CQD-2273) is not set correctly.   | Set the radar interface circuit correctly.   |
|  | The radar interface circuit (CQD-2273) is faulty.  | Make a request to the distributor for repair.  |
|  | The internal wiring is faulty.   | Make a request to the distributor for repair.  |
|  | The central control unit (NDC-1590/A) is faulty.   | Make a request to the distributor for repair.  |

| Symptom   | Cause  | Action  |
|---|--|---|
| If the power supply is turned off, the trail data is cleared without being stored.                            | The central control unit (NDC-1590/A) is faulty.     | Make a request to the distributor for repair.   |
| Radar images cannot be superimposed.  | The radar overlay option license does not exist.     | Install the radar overlay option license.   |
|   | The connection with the radar antenna is abnormal.   | Check the connection with the radar antenna.  |
|   | The connection with the radar indicator is abnormal. | Check the connection with the radar indicator.  |
|   | The radar interface circuit (CQD-2273) is faulty.    | Make a request to the distributor for repair.   |
|   | The internal wiring is faulty.                       | Make a request to the distributor for repair.   |
|   | The power supply unit (NBD-913) is faulty.           | Make a request to the distributor for repair.   |
|   | The central control unit (NDC-1590/A) is faulty.     | Make a request to the distributor for repair.   |
| UPS does not function.  | The connection with UPS is faulty.                   | Check the connection with UPS.  |
|   | UPS is not set correctly.                            | Set UPS correctly.  |
|   | The UPS battery is extremely depleted.               | Replace the battery.<br><br>[Note]<br>At the battery replacement, make a request for the work to the specialized service staff. During the replacement, turn off the corresponding power supply breaker in the ship. Otherwise, an unexpected accident may occur. |
|   | The internal wiring is faulty.                       | Make a request to the distributor for repair.   |
|   | UPS is faulty.                                       | Make a request to the distributor for repair.   |
| The following popup window is displayed.<br>System has detected an error.<br>Turn the power off and on again. | A communication error occurred.                      | Close the popup window and after checking that there is no problem even if the power of this equipment is turned off, turn off the power once and turn on the power again.  |

| Symptom   | Cause   | Action  |
|---|---|---|
| <p>The following popup window is displayed.</p> <p>Network failure has been detected. This system is operating under restricted mode. Contact JRC or JRC service agent. To restart this system, click the OK button at safe waters.</p> | A network failure occurred.                             | <p>Make a request to the distributor for repair.</p> <p>And restart this system at safe waters.</p> |
| <p>The following popup window is displayed.</p> <p>Main LAN is disabled. This system is operating with Sub LAN only. Contact JRC or JRC service agent. After recovering by service engineer, click the bellow button.</p>               | A network failure occurred on the main LAN.             | Make a request to the distributor for repair.   |
| <p>The following popup window is displayed.</p> <p>Sub LAN is disabled. This system is operating with Main LAN only. Contact JRC or JRC service agent. After recovering by service engineer, click the bellow button.</p>               | A network failure occurred on the sub LAN.              | Make a request to the distributor for repair.   |
| <p>The following popup window is displayed.</p> <p>Main/Sub LAN is disabled. This system is operating with serial in CCU only. Contact JRC or JRC service agent. After recovering by service engineer, click the bellow button.</p>     | A network failure occurred on the main LAN and sub LAN. | Make a request to the distributor for repair.   |
| The system repeats restart.   | DMA error.  | When the system repeats restart, turn off the power of the equipment and contact the distributor.   |

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## 22.4 After-Sale Services

### 22.4.1 About the retaining period of service parts

The retaining period of the performance-critical parts for servicing this product (parts required to maintain the functionality of the product) is 10 years after the discontinuation of production.

### 22.4.2 When requesting a repair

If you suspect a failure, please read "22.3 Trouble shooting" thoroughly and check the unit again.

If you still detect abnormality, stop using the product and contact your sales representative, our sales department, nearest branch office or sales office.

- **Repair during the warranty period:** If a failure occurs in the course of using the product correctly according to the explanations and instructions in the Instruction Manual, your sales representative or our company shall repair the product at no charge. However, repairs of failures caused by misuse, negligence, or act of God such as natural disasters and fire shall be chargeable.
- **If the warranty period has expired:** If functionality can be recovered by repair, repair shall be made by the request of the customer for a fee.
- **Please provide the following information:**
  - Product name, model name, manufacturing date, serial number
  - Description of abnormality (as detail as possible) (Please refer to the next page "Radar Failure Checklist.")
  - Business name or organization name, address, phone number

### 22.4.3 Recommendation of inspection and maintenance

Although it depends on the usage state, performance may deteriorate by change in parts over time, Separately from regular care, inspection and maintenance are recommended.

Regarding inspection and maintenance, please contact your sales representative, our sales department, nearest branch office or sales office.

Please note that there is a charge for inspection and maintenance.

**If you have questions regarding after-sale services, please inquire your sales representative, our sales department, nearest branch office or sales office.**



## Radar Failure Checklist

[Important] Before ordering a repair, please check and fill in the following items and then contact the applicable repair office.

If there are unknown items, please contact the ship and fill in as accurate as possible.

Ship Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Integrated Radar Model Name: JMR- \_\_\_\_\_ Serial Number: \_\_\_\_\_

(Please fill in all digits accurately.)

(1) Check the following items sequentially and circle either YES or NO for each item.

If none is applicable, please write down the specific reason in No. (18) Others.

(2) If any of check items (1) through (5) is NO, please check the fuses of the equipment. (See "22.1.5 Fuse inspection.")

(3) Check items (4) through (17) with transmission (TX) ON.

\* It may not be possible to use (14), (15) and (17) unless options and external devices are not connected; if they are not connected, it is not necessary to answer these items.

| No.   | Check Item   | Result |    |
|-------|--|--------|----|
| (1)   | The power turns ON. (The light of the operation unit illuminates.)   | YES    | NO |
| (2)   | The unit is placed in the standby state several minutes after turning the power ON.  | YES    | NO |
| (3)   | When the power is turned ON (or transmission ON), something is displayed on the LCD/LED monitor. (Illuminates)   | YES    | NO |
| (4)   | When transmission (TX) is turned ON, the Radar antenna rotates. (Check all of the following items with transmission ON.)   | YES    | NO |
| (5)   | Magnetron current flows. (See the Instruction Manual.)   | YES    | NO |
| (6)   | Tuning can be performed. (Check in a range of 6NM or above.)   | YES    | NO |
| (7)   | Fixed markers are displayed.   | YES    | NO |
| (8)   | The VRM is displayed.  | YES    | NO |
| (9)   | White noise is displayed with minimum STC and FTC, maximum GAIN, IR-OFF and range 48NM.  | YES    | NO |
| (10)  | Target reflection echoes are displayed,  | YES    | NO |
| (11)  | The sensitivity of reflection echoes is normal.  | YES    | NO |
| (12)  | The EBL is displayed.  | YES    | NO |
| (13)  | The cursor symbols move.   | YES    | NO |
| *(14) | The GYRO course can be set up and is displayed normally.   | YES    | NO |
| *(15) | The LOG speed is displayed normally.   | YES    | NO |
| (16)  | The target tracking function operates normally.  | YES    | NO |
| *(17) | If the straight mode (II) is switched to the cross mode (X) when an interswitch is provided, the failed (NO) items in (1) through (16) above are swapped between the right and left display units. | YES    | NO |
| (18)  | Other description (error messages, etc.)   |        |    |
|       |  |        |    |

## 22.4.4 Extending the functions

The functions that are available for this equipment can be extended.

To extend a function, new license information (file) must be obtained and imported to this equipment. For function extension, please request to our sales department or our branch office, sales office, or agent near your premises.

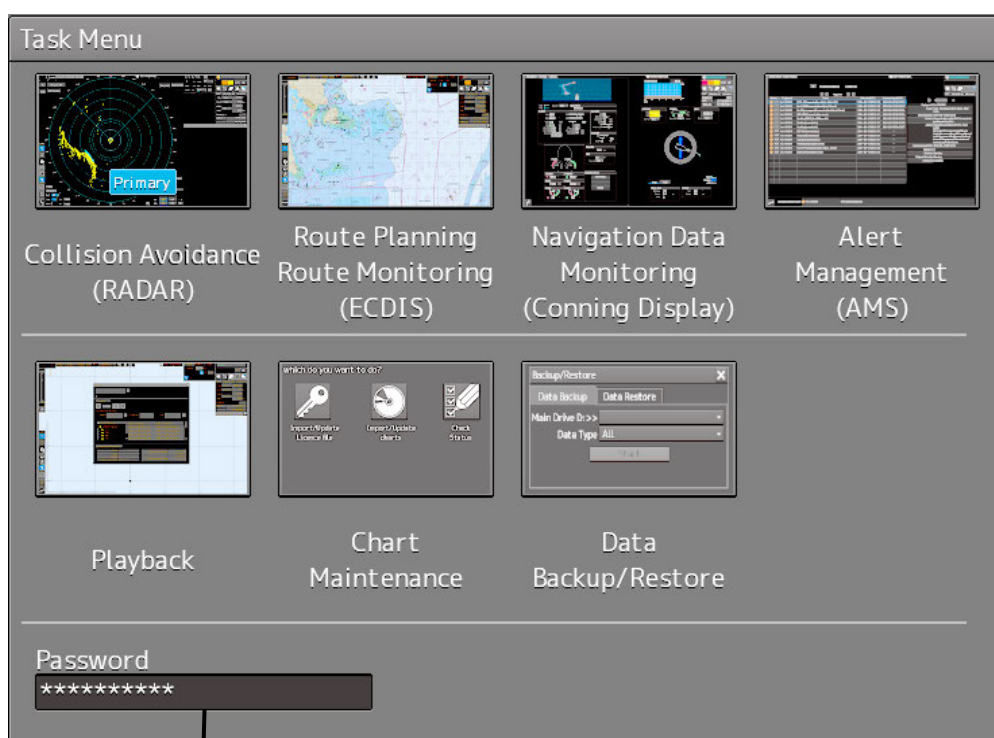
### 22.4.4.1 Importing the license information

Import the license information that was obtained (license file) to this equipment via the USB flash memory.

Connect the USB flash memory in which the license information is stored.

#### 1 Press the Power button of the operation unit.

The Power button is lit. After a while, a task menu is displayed.



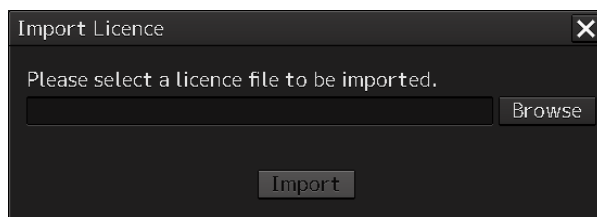
Password input section

#### 2 Click on the password input section.

A password input dialog is displayed.

#### 3 Enter the password, 9380.

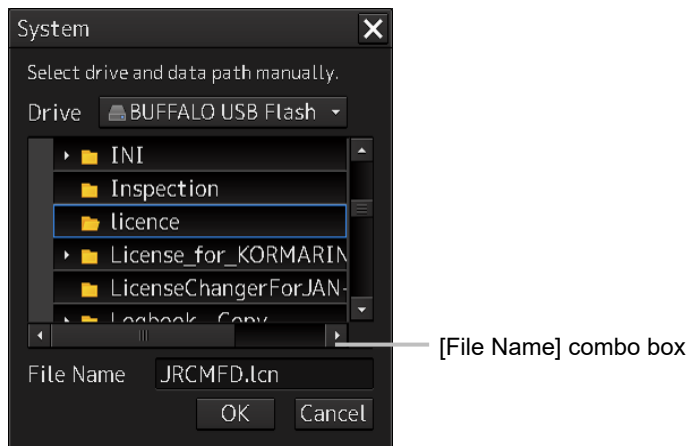
The [Import License] dialog is displayed.



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**4 Click on the [Browse] button.**

The [System] dialog is displayed.



**5 Select the name of the license file (example: JRCMFD.lcn) that is stored in the USB flash memory from the [File Name] combo box and click on the [OK] button.**

The [System] dialog is closed.

**6 Click on the [Import] button.**

When import is completed, a confirmation dialog box appears.

Close the dialog box by clicking on the [OK] button.

**7 Close the "import License" dialog box by clicking on [x] button and return to the task menu.**

In this case, a new license is adopted.



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## Section 23 About Disposal

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### 23.1 About Disposal of This Equipment

When disposing of this equipment, follow the regulations and/or rules of the local regulatory authority which has control over the location of disposal.

### 23.2 About Disposal of Used Magnetrons

A magnetron is used in the radar antennas (NKE-1125/A, NKE-1130/A, NKE-2254, NKE-2103) and the transmitter/receiver unit (NTG-3230/A, 3225/A) of this equipment.

- When a magnetron is changed with new one, please return the old magnetron to our dealer or sales office.

For more information, please inquire our dealer or sales office.

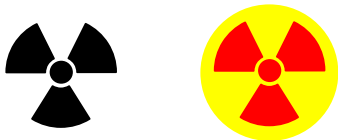
### 23.3 About Disposal of TR Tubes

If a TR tube used in the transmitter/receiver (NTG-3230/A, NTG-3225/A) of this equipment is indicated by either one of the radiation warning symbols shown below, that TR tube contains an isotope. Thus, it cannot be disposed of as an industrial waste in Japan.

- When TR tubes indicated with a radiation warning symbol need to be disposed of in Japan, please return them to our dealer or sales office.

For more information, please inquire our dealer or sales office.

- The leakage radiation from these TR tubes is as little as the natural exposure level, so there is no harm to the human body.
- Never disassembly TR tubes.



## 23.4 Chinese Version 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): JMR-7200,9200 Series

名称(Name): RADAR

| 部件名称<br>(Part name)  | 有毒有害物质或元素<br>(Toxic and Hazardous Substances and Elements) |           |           |               |               |                 |
|--|--|-----------|-----------|---------------|---------------|-----------------|
|  | 铅<br>(Pb)  | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(Cr6+) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 雷达天线单元<br>(Scanner Unit)   | ×  | ×         | ×         | ×             | ○             | ○               |
| 主船内装置 (Inboard Unit)<br>• 显示装置 (Display Unit)<br>• 键盘装置 (Operation Unit)<br>• 信号处理装置<br>(RADAR Process Unit)   | ×  | ○         | ×         | ×             | ○             | ○               |
| 外部设备 (Peripherals)<br>• 选择 (Options)<br>• 电线类 (Cables)<br>• 手册 (Documents)   | ×  | ○         | ×         | ×             | ○             | ○               |
| <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。<br/>(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。<br/>(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 24 Specifications

## 24.1 JMR-9230-S3

| GENERAL SPECIFICATION                     |  | JMR-9230-S3  |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96NM  |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | 93% at +40°C   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                |
| Power Consumption                         |  | Rating: Approx. 450VA<br>Approx. 1900VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input $+30\%/-10\%$  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1139/A   |
| See Section 24.29                         |  |  |
| Transmitter Receiver Unit                 |  | NTG-3230/A   |
| See Section 24.38                         |  |  |
| Performance Monitor                       |  | NJU-84   |
| See Section 24.40                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-208/NWZ-233  |
| See Section 24.50                         |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1139/A-D   |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | N/A  |
| Scanner unit to transmitter receiver unit |  | 30m  |
| Display unit to transmitter receiver unit |  | 35m  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 1.4m   |
| Transmitter Receiver Unit                 |  | 3.9m   |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)                                   |

## 24.2 JMR-9230-S

| GENERAL SPECIFICATION                     |  | JMR-9230-S   |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  |  |
| - Relative Humidity                       |  | 93% at +40°C   |
| Ambient Condition                         |  |  |
| - Vibration                               |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$            |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                |
| Power Consumption                         |  | Rating: Approx. 450VA<br>Approx. 1900VA at Maximum wind speed<br>(DC: 72W at AC power outage)              |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input $+30\%/-10\%$  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1130/A   |
| See Section 24.30                         |  |  |
| Performance Monitor                       |  | NJU-84   |
| See Section 24.40                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-208/NWZ-233  |
| See Section 24.50                         |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1130/A-D   |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to transmitter receiver unit |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 5.1m   |
| Transmitter Receiver Unit                 |  | N/A  |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)                                   |



## 24.3 JMR-9225-9X3

| GENERAL SPECIFICATION                     |  | JMR-9225-9X3   |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | 93% at +40°C   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                |
| Power Consumption                         |  | Rating: Approx. 300VA<br>Approx. 1700VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1129/A-9   |
| See Section 24.31                         |  |  |
| Transmitter Receiver Unit                 |  | NTG-3225/A   |
| See Section 24.39                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-208/NWZ-233  |
| See Section 24.50                         |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1129/A-9D  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | N/A  |
| Scanner unit to transmitter receiver unit |  | 30m  |
| Display unit to transmitter receiver unit |  | 35m  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 1.05m  |
| Transmitter Receiver Unit                 |  | 2.8m   |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)                                   |

## 24.4 JMR-9225-7X3

| GENERAL SPECIFICATION                     |  | JMR-9225-7X3   |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | 93% at +40°C   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                |
| Power Consumption                         |  | Rating: Approx. 300VA<br>Approx. 1700VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input $+30\%/-10\%$  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1129/A-7   |
| See Section 24.31                         |  |  |
| Transmitter Receiver Unit                 |  | NTG-3225/A   |
| See Section 24.39                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-208/NWZ-233  |
| See Section 24.50                         |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1129/A-7D  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | N/A  |
| Scanner unit to transmitter receiver unit |  | 30m  |
| Display unit to transmitter receiver unit |  | 35m  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 1.05m  |
| Transmitter Receiver Unit                 |  | 2.8m   |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)                                   |

## 24.5 JMR-9225-9X

| GENERAL SPECIFICATION                     |  | JMR-9225-9X  |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | 93% at +40°C   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm}$ $\pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                |
| Power Consumption                         |  | Rating: Approx. 300VA<br>Approx. 1700VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1125/A-9   |
| See Section 24.32                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-208/NWZ-233  |
| See Section 24.50                         |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1125/A-9D  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to transmitter receiver unit |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 2.4m   |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)                                   |

## 24.6 JMR-9225-6X

| GENERAL SPECIFICATION                     |  | JMR-9225-6X  |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  |  |
| - Relative Humidity                       |  | 93% at +40°C   |
| Ambient Condition                         |  |  |
| - Vibration                               |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$            |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                |
| Power Consumption                         |  | Rating: Approx. 300VA<br>Approx. 1700VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1125/A-6   |
| See Section 24.32                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-208/NWZ-233  |
| See Section 24.50                         |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1125/A-6D  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to transmitter receiver unit |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 2.4m   |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)                                   |

## 24.7 JMR-9225-6XH

| GENERAL SPECIFICATION                     |  | JMR-9225-6XH  |
|---|--|---|
| Class of emission                         |  | P0N   |
| Display                                   |  | Color Raster Scan   |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM  |
| Range Resolution                          |  | Less than 30m   |
| Minimum Detection Range                   |  | Less than 40m   |
| Bearing Accuracy                          |  | Less than 1°  |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP                |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)   |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C  |
| Ambient Condition                         |  | 93% at +40°C  |
| - Relative Humidity                       |  |   |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm}$ $\pm 10\%$  |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$   |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC   |
| Power Consumption                         |  | Rating: Approx. AC 150VA, DC: 150W<br>Approx. AC:240VA, DC: 350W at Maximum wind speed<br>(DC:72W max at AC power outage) |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%   |
| Pre Heating Time                          |  | Within 4 minutes  |
| From standby to transmit                  |  | Within 5 seconds  |
| Scanner Unit                              |  | NKE-2254-6HS  |
| See Section 24.33                         |  |   |
| Performance Monitor                       |  | NJU-85  |
| See Section 24.41                         |  |   |
| Display                                   |  |   |
| Central control unit                      |  | NDC-1590/A  |
| Power Supply Unit                         |  | NBD-913   |
| Trackball Operation Unit                  |  | NCE-5605  |
| Display                                   |  | NWZ-208/NWZ-233   |
| See Section 24.50                         |  |   |
| Junction Box                              |  | NQE-1143  |
| Option Unit                               |  |   |
| Scanner Unit Deicing Heater               |  | NKE-2254-6HSD   |
| Keyboard Operation Unit                   |  | NCE-5625  |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596  |
| Sensor LAN Switch Unit                    |  | NQA-2443/A  |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660   |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246   |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A  |
| Power Control Unit                        |  | NQE-3167  |
| MAXIMUM CABLE LENGTH                      |  |   |
| Display to scanner unit                   |  | 65m   |
| Scanner unit to transmitter receiver unit |  | N/A   |
| Display unit to transmitter receiver unit |  | N/A   |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |   |
| Scanner Unit                              |  | 2.4m  |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)  |

## 24.8 JMR-9210-6X

| GENERAL SPECIFICATION                     |  | JMR-9210-6X   |
|---|--|---|
| Class of emission                         |  | P0N   |
| Display                                   |  | Color Raster Scan   |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM  |
| Range Resolution                          |  | Less than 30m   |
| Minimum Detection Range                   |  | Less than 40m   |
| Bearing Accuracy                          |  | Less than 1°  |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP                |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)   |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C  |
| Ambient Condition                         |  |   |
| - Relative Humidity                       |  | 93% at +40°C  |
| Ambient Condition                         |  |   |
| - Vibration                               |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$                           |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC   |
| Power Consumption                         |  | Rating: Approx. AC:150VA, DC: 150W<br>Approx. AC:240VA, DC: 200W at Maximum wind speed<br>(DC:72W max at AC power outage) |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%   |
| Pre Heating Time                          |  | Within 4 minutes  |
| From standby to transmit                  |  | Within 5 seconds  |
| Scanner Unit                              |  | NKE-2103-6  |
| See Section 24.34                         |  |   |
| Performance Monitor                       |  | NJU-85  |
| See Section 24.41                         |  |   |
| Display                                   |  |   |
| Central control unit                      |  | NDC-1590/A  |
| Power Supply Unit                         |  | NBD-913   |
| Trackball Operation Unit                  |  | NCE-5605  |
| Display                                   |  | NWZ-208/NWZ-233   |
| See Section 24.45                         |  |   |
| Junction Box                              |  | NQE-1143  |
| Option Unit                               |  |   |
| Scanner Unit Deicing Heater               |  | N/A   |
| Keyboard Operation Unit                   |  | NCE-5625  |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596  |
| Sensor LAN Switch Unit                    |  | NQA-2443/A  |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660   |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246   |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A  |
| Power Control Unit                        |  | NQE-3167  |
| MAXIMUM CABLE LENGTH                      |  |   |
| Display to scanner unit                   |  | 65m   |
| Scanner unit to transmitter receiver unit |  | N/A   |
| Display unit to transmitter receiver unit |  | N/A   |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |   |
| Scanner Unit                              |  | 2.4m  |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)  |

## 24.9 JMR-9210-6XH

| GENERAL SPECIFICATION                     |  | JMR-9210-6XH  |
|---|--|---|
| Class of emission                         |  | P0N   |
| Display                                   |  | Color Raster Scan   |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM  |
| Range Resolution                          |  | Less than 30m   |
| Minimum Detection Range                   |  | Less than 40m   |
| Bearing Accuracy                          |  | Less than 1°  |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP                |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)   |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C  |
| Ambient Condition                         |  | 93% at +40°C  |
| - Relative Humidity                       |  |   |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm}$ $\pm 10\%$  |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$   |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC   |
| Power Consumption                         |  | Rating: Approx. AC:150VA, DC: 150W<br>Approx. AC:240VA, DC: 300W at Maximum wind speed<br>(DC:72W max at AC power outage) |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%   |
| Pre Heating Time                          |  | Within 4 minutes  |
| From standby to transmit                  |  | Within 5 seconds  |
| Scanner Unit                              |  | NKE-2103-6HS  |
| See Section 24.34                         |  |   |
| Performance Monitor                       |  | NJU-85  |
| See Section 24.41                         |  |   |
| Display                                   |  |   |
| Central control unit                      |  | NDC-1590/A  |
| Power Supply Unit                         |  | NBD-913   |
| Trackball Operation Unit                  |  | NCE-5605  |
| Display                                   |  | NWZ-208/NWZ-233   |
| See Section 24.45                         |  |   |
| Junction Box                              |  | NQE-1143  |
| Option Unit                               |  |   |
| Scanner Unit Deicing Heater               |  | N/A   |
| Keyboard Operation Unit                   |  | NCE-5625  |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596  |
| Sensor LAN Switch Unit                    |  | NQA-2443/A  |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660   |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246   |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A  |
| Power Control Unit                        |  | NQE-3167  |
| MAXIMUM CABLE LENGTH                      |  |   |
| Display to scanner unit                   |  | 65m   |
| Scanner unit to transmitter receiver unit |  | N/A   |
| Display unit to transmitter receiver unit |  | N/A   |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |   |
| Scanner Unit                              |  | 2.4m  |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)  |

## 24.10 JMR-9272-S

| GENERAL SPECIFICATION                        |  | JMR-9272-S   |
|--|--|--|
| Class of emission                            |  | P0N, Q0N   |
| Display                                      |  | Color Raster Scan  |
| Screen                                       |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                                  |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                             |  | Less than 30m  |
| Minimum Detection Range                      |  | Less than 35m  |
| Bearing Accuracy                             |  | Less than 1°   |
| Bearing Indication                           |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition<br>- Operating Temperature |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)<br>Other Unit: -15°C to +55°C                        |
| Ambient Condition<br>- Relative Humidity     |  | 93% at +40°C   |
| Ambient Condition<br>- Vibration             |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$            |
| Power Supply Input                           |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                |
| Power Consumption                            |  | Rating: Approx. 400VA<br>Approx. 1900VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation             |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                             |  | Within 10 seconds  |
| From standby to transmit                     |  | Within 5 seconds   |
| Scanner Unit                                 |  | NKE-1632/A   |
| See Section 24.35                            |  |  |
| Display                                      |  |  |
| Central control unit                         |  | NDC-1590/A   |
| Power Supply Unit                            |  | NBD-913  |
| Trackball Operation Unit                     |  | NCE-5605   |
| Display                                      |  | NWZ-208/NWZ-233  |
| See Section 24.50                            |  |  |
| Junction Box                                 |  | NQE-1143   |
| Option Unit                                  |  |  |
| Scanner Unit Deicing Heater                  |  | NKE-1632/A-D/NKE-1632/A-E  |
| Keyboard Operation Unit                      |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK            |  | CWB-1596   |
| Sensor LAN Switch Unit                       |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK                 |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT             |  | CWA-246  |
| Inter Switch Unit                            |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                           |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                         |  |  |
| Display to scanner unit                      |  | 65m  |
| Scanner unit to transmitter receiver unit    |  | N/A  |
| Display unit to transmitter receiver unit    |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS           |  |  |
| Scanner Unit                                 |  | 0.8m   |
| Transmitter Receiver Unit                    |  | N/A  |
| Display unit                                 |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)                                   |



## 24.11 JMR-9282-S

| GENERAL SPECIFICATION                     |  | JMR-9282-S   |
|---|--|--|
| Class of emission                         |  | P0N, Q0N   |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 35m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | 93% at +40°C   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                |
| Power Consumption                         |  | Rating: Approx. 350VA<br>Approx. 1500VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 10 seconds  |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-2632/A   |
| See Section 24.36                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-208/NWZ-233  |
| See Section 24.50                         |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-2632/A-D/NKE-2632/A-E  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to transmitter receiver unit |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 0.8m   |
| Transmitter Receiver Unit                 |  | N/A  |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)                                   |

## 24.12 JMR-9282-SH

| GENERAL SPECIFICATION                     |  | JMR-9282-SH  |
|---|--|--|
| Class of emission                         |  | P0N, Q0N   |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 35m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | 93% at +40°C   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                |
| Power Consumption                         |  | Rating: Approx. 400VA<br>Approx. 1900VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 10 seconds  |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-2632-H   |
| See Section 24.36                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display Unit                              |  | NWZ-208/NWZ-233  |
| See Section 24.50                         |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-2632-HD/NKE-2632-HE  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK              |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT          |  | CWA-246  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to transmitter receiver unit |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 0.6m   |
| Transmitter Receiver Unit                 |  | N/A  |
| Display unit                              |  | 2.4m (2.6m when installed in the optional 26inch Display Unit Mount Kit)                                   |

## 24.13 JMR-9296-9X

| GENERAL SPECIFICATION                        |  | JMR-9296-9X  |
|--|--|--|
| Class of emission                            |  | P0N, Q0N   |
| Display                                      |  | Color Raster Scan  |
| Screen                                       |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                                  |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                             |  | Less than 30m  |
| Minimum Detection Range                      |  | Less than 40m  |
| Bearing Accuracy                             |  | Less than 1°   |
| Bearing Indication                           |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition<br>- Operating Temperature |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)<br>Other Unit: -15°C to +55°C                        |
| Ambient Condition<br>- Relative Humidity     |  | 93% at +40°C   |
| Ambient Condition<br>- Vibration             |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$            |
| Power Supply Input                           |  | 100 to 115VAC, 50/60Hz 1 $\phi$ ,<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                              |
| Power Consumption                            |  | Rating: Approx. 400VA<br>Approx. 1200VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation             |  | AC input $\pm 10\%$ ,<br>DC input +30%/-10%  |
| Pre Heating Time                             |  | Within 10 seconds  |
| From standby to transmit                     |  | Within 5 seconds   |
| Scanner Unit                                 |  | NKE-1696-9   |
| See Section 24.37                            |  |  |
| Display                                      |  |  |
| Central control unit                         |  | NDC-1590/A   |
| Power Supply Unit                            |  | NBD-913  |
| Trackball Operation Unit                     |  | NCE-5605   |
| Display                                      |  | NWZ-208/NWZ-233  |
| Junction Box                                 |  | NQE-1143   |
| Option Unit                                  |  |  |
| Deicing Heater                               |  | CCK-1105   |
| Keyboard Operation Unit                      |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK            |  | CWB-1596   |
| Sensor LAN Switch Unit                       |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK                 |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT             |  | CWA-246  |
| Inter Switch Unit                            |  | NQE-3141-4A, NQE-3141-8A   |
| Power Control Unit                           |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                         |  |  |
| Display to scanner unit                      |  | 65m  |
| Scanner unit to transmitter receiver unit    |  | N/A  |
| Display unit to transmitter receiver unit    |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS           |  |  |
| Scanner unit                                 |  | 0.6m   |
| Display unit                                 |  | 2.4m (2.6m when installed in optional 26inch Display Unit Mount Kit)                                       |

## 24.14 JMR-9296-6X

| GENERAL SPECIFICATION                        |  | JMR-9296-6X  |
|--|--|--|
| Class of emission                            |  | P0N, Q0N   |
| Display                                      |  | Color Raster Scan  |
| Screen                                       |  | 26/27inch Wide LCD (Effective diameter of RADAR: more than 320mm)  |
| Range Scale                                  |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                             |  | Less than 30m  |
| Minimum Detection Range                      |  | Less than 40m  |
| Bearing Accuracy                             |  | Less than 1°   |
| Bearing Indication                           |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition<br>- Operating Temperature |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)<br>Other Unit: -15°C to +55°C                        |
| Ambient Condition<br>- Relative Humidity     |  | 93% at +40°C   |
| Ambient Condition<br>- Vibration             |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$            |
| Power Supply Input                           |  | 100 to 115VAC, 50/60Hz 1 $\phi$ ,<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                              |
| Power Consumption                            |  | Rating: Approx. 400VA<br>Approx. 1200VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation             |  | AC input $\pm 10\%$ ,<br>DC input $+30\%/-10\%$  |
| Pre Heating Time                             |  | Within 10 seconds  |
| From standby to transmit                     |  | Within 5 seconds   |
| Scanner Unit                                 |  | NKE-1696-6   |
| See Section 24.37                            |  |  |
| Display                                      |  |  |
| Central control unit                         |  | NDC-1590/A   |
| Power Supply Unit                            |  | NBD-913  |
| Trackball Operation Unit                     |  | NCE-5605   |
| Display                                      |  | NWZ-208/NWZ-233  |
| Junction Box                                 |  | NQE-1143   |
| Option Unit                                  |  |  |
| Deicing Heater                               |  | CCK-1105   |
| Keyboard Operation Unit                      |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK            |  | CWB-1596   |
| Sensor LAN Switch Unit                       |  | NQA-2443/A   |
| 26/27inch DESKTOP FRAME RACK                 |  | CWB-1595/CWB-1660  |
| 26/27inch DISPLAY UNIT MOUNT KIT             |  | CWA-246  |
| Inter Switch Unit                            |  | NQE-3141-4A, NQE-3141-8A   |
| Power Control Unit                           |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                         |  |  |
| Display to scanner unit                      |  | 65m  |
| Scanner unit to transmitter receiver unit    |  | N/A  |
| Display unit to transmitter receiver unit    |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS           |  |  |
| Scanner unit                                 |  | 0.6m   |
| Display unit                                 |  | 2.4m (2.6m when installed in optional 26inch Display Unit Mount Kit)                                       |

## 24.15 JMR-7230-S3

| GENERAL SPECIFICATION                     |  | JMR-7230-S3  |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | +40°C, 93%   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude ±1mm ±10%   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration 7m/s <sup>2</sup>  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1φ<br>220 to 240VAC, 50/60Hz 1φ<br>24VDC  |
| Power Consumption                         |  | Rating: Approx. 450VA<br>Approx. 1900VA at Maximum wind speed<br>(DC:72W at AC power outage)                     |
| Power Supply Voltage Fluctuation          |  | AC input ±10%<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1139/A   |
| See Section 24.29                         |  |  |
| Transmitter Receiver Unit                 |  | NTG-3230/A   |
| See Section 24.38                         |  |  |
| Performance Monitor                       |  | NJU-84   |
| See Section 24.40                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1139/A-D   |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | N/A  |
| Scanner unit to TXRX                      |  | 30m  |
| Display unit to transmitter receiver unit |  | 35m  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 1.4m   |
| Transmitter Receiver Unit                 |  | 3.9m   |
| Display unit                              |  | 2.4m   |

## 24.16 JMR-7230-S

| GENERAL SPECIFICATION                     |  | JMR-7230-S   |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | +40°C, 93%   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 400VA<br>Approx. 1900VA at Maximum wind speed<br>(DC:72W at AC power outage)                     |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input $+30\%/-10\%$  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1130/A   |
| See Section 24.30                         |  |  |
| Performance Monitor                       |  | NJU-84   |
| See Section 24.40                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1130/A-D   |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to TXRX                      |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 5.1m   |
| Transmitter Receiver Unit                 |  | N/A  |
| Display unit                              |  | 2.4m   |

## 24.17 JMR-7225-9X3

| GENERAL SPECIFICATION                     |  | JMR-7225-9X3   |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | +40°C, 93%   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 300VA<br>Approx. 1700VA at Maximum wind speed<br>(DC:72W at AC power outage)                     |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1129/A-9   |
| See Section 24.31                         |  |  |
| Transmitter Receiver Unit                 |  | NTG-3225/A   |
| See Section 24.39                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1129/A-9D  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | N/A  |
| Scanner unit to TXRX                      |  | 30m  |
| Display unit to transmitter receiver unit |  | 35m  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 1.05m  |
| Transmitter Receiver Unit                 |  | 2.8m   |
| Display unit                              |  | 2.4m   |

## 24.18 JMR-7225-7X3

| GENERAL SPECIFICATION                     |  | JMR-7225-7X3   |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | +40°C, 93%   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 300VA<br>Approx. 1700VA at Maximum wind speed<br>(DC:72W at AC power outage)                     |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input $+30\%/-10\%$  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1129/A-7   |
| See Section 24.31                         |  |  |
| Transmitter Receiver Unit                 |  | NTG-3225/A   |
| See Section 24.39                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1129/A-7D  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | N/A  |
| Scanner unit to TXRX                      |  | 30m  |
| Display unit to transmitter receiver unit |  | 35m  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 1.05m  |
| Transmitter Receiver Unit                 |  | 2.8m   |
| Display unit                              |  | 2.4m   |



## 24.19 JMR-7225-9X

| GENERAL SPECIFICATION                     |  | JMR-7225-9X  |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  |  |
| - Relative Humidity                       |  | +40°C, 93%   |
| Ambient Condition                         |  |  |
| - Vibration                               |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$                  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 300VA<br>Approx. 1700VA at Maximum wind speed<br>(DC:72W at AC power outage)                     |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1125/A-9   |
| See Section 24.32                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1125/A-9D  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to TXRX                      |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 2.4m   |
| Display unit                              |  | 2.4m   |

## 24.20 JMR-7225-6X

| GENERAL SPECIFICATION                     |  | JMR-7225-6X  |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  |  |
| - Relative Humidity                       |  | +40°C, 93%   |
| Ambient Condition                         |  |  |
| - Vibration                               |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$                  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 300VA<br>Approx. 1700VA at Maximum wind speed<br>(DC:72W at AC power outage)                     |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1125/A-6   |
| See Section 24.32                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1125/A-6D  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to TXRX                      |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 2.4m   |
| Display unit                              |  | 2.4m   |

## 24.21 JMR-7225-6XH

| GENERAL SPECIFICATION                     |  | JMR-7225-6XH   |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  |  |
| - Relative Humidity                       |  | +40°C, 93%   |
| Ambient Condition                         |  |  |
| - Vibration                               |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$                  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 150VA, 150W DC<br>Approx. 240VA, 350W DC at Maximum wind speed<br>(DC:72W at AC power outage)    |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-2254-6HS   |
| See Section 24.33                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | N/A  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to TXRX                      |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 2.4m   |
| Display unit                              |  | 2.4m   |

## 24.22 JMR-7210-6X

| GENERAL SPECIFICATION                     |  | JMR-7210-6X  |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  |  |
| - Relative Humidity                       |  | +40°C, 93%   |
| Ambient Condition                         |  |  |
| - Vibration                               |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$                  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 150VA, 150W DC<br>Approx. 240VA, 200W DC at Maximum wind speed<br>(DC:72W at AC power outage)    |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input $+30\%/-10\%$  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-2103-6   |
| See Section 24.34                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | N/A  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to TXRX                      |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 2.4m   |
| Display unit                              |  | 2.4m   |

## 24.23 JMR-7210-6XH

| GENERAL SPECIFICATION                     |  | JMR-7210-6XH   |
|---|--|--|
| Class of emission                         |  | P0N  |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 40m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | +40°C, 93%   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 150VA, 150W DC<br>Approx. 240VA, 300W DC at Maximum wind speed<br>(DC:72W at AC power outage)    |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 4 minutes   |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-2103-6HS   |
| See Section 24.34                         |  |  |
| Performance Monitor                       |  | NJU-85   |
| See Section 24.41                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | N/A  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to TXRX                      |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 2.4m   |
| Display unit                              |  | 2.4m   |

## 24.24 JMR-7272-S

| GENERAL SPECIFICATION                     |  | JMR-7272-S   |
|---|--|--|
| Class of emission                         |  | P0N, Q0N   |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 35m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | +40°C, 93%   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$   |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 400VA<br>Approx. 1800VA at Maximum wind speed<br>(DC:72W at AC power outage)                     |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 10 seconds  |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-1632/A   |
| See Section 24.35                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-1632/A-D, NKE-1632/A-E   |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to TXRX                      |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 0.8m   |
| Transmitter Receiver Unit                 |  | N/A  |
| Display unit                              |  | 2.4m   |

## 24.25 JMR-7282-S

| GENERAL SPECIFICATION                     |  | JMR-7282-S   |
|---|--|--|
| Class of emission                         |  | P0N, Q0N   |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 35m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | +40°C, 93%   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm}\pm 10\%$  |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 350VA<br>Approx. 1400VA at Maximum wind speed<br>(DC:72W at AC power outage)                     |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 10 seconds  |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-2632/A   |
| See Section 24.36                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-2632/A-D, NKE-2632/A-E   |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to TXRX                      |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 0.8m   |
| Transmitter Receiver Unit                 |  | N/A  |
| Display unit                              |  | 2.4m   |

## 24.26 JMR-7282-SH

| GENERAL SPECIFICATION                     |  | JMR-7282-SH  |
|---|--|--|
| Class of emission                         |  | P0N, Q0N   |
| Display                                   |  | Color Raster Scan  |
| Screen                                    |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                               |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                          |  | Less than 30m  |
| Minimum Detection Range                   |  | Less than 35m  |
| Bearing Accuracy                          |  | Less than 1°   |
| Bearing Indication                        |  | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Waypoint UP |
| Ambient Condition                         |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)  |
| - Operating Temperature                   |  | Other Unit: -15°C to +55°C   |
| Ambient Condition                         |  | +40°C, 93%   |
| - Relative Humidity                       |  |  |
| Ambient Condition                         |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm}\pm 10\%$  |
| - Vibration                               |  | 13.2 to 100Hz: Acceleration $7\text{m/s}^2$  |
| Power Supply Input                        |  | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                                      |
| Power Consumption                         |  | Rating: Approx. 400VA<br>Approx. 1800VA at Maximum wind speed<br>(DC:72W at AC power outage)                     |
| Power Supply Voltage Fluctuation          |  | AC input $\pm 10\%$<br>DC input +30%/-10%  |
| Pre Heating Time                          |  | Within 10 seconds  |
| From standby to transmit                  |  | Within 5 seconds   |
| Scanner Unit                              |  | NKE-2632-H   |
| See Section 24.36                         |  |  |
| Display                                   |  |  |
| Central control unit                      |  | NDC-1590/A   |
| Power Supply Unit                         |  | NBD-913  |
| Trackball Operation Unit                  |  | NCE-5605   |
| Display                                   |  | NWZ-207/NWZ-214  |
| See Section 24.48/24.49                   |  |  |
| Junction Box                              |  | NQE-1143   |
| Option Unit                               |  |  |
| Scanner Unit Deicing Heater               |  | NKE-2632-HD/NKE-2632-HE  |
| Keyboard Operation Unit                   |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK         |  | CWB-1596   |
| Sensor LAN Switch Unit                    |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                 |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT             |  | CWA-245  |
| Inter Switch Unit                         |  | NQE-3141-4A<br>NQE-3141-8A   |
| Power Control Unit                        |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                      |  |  |
| Display to scanner unit                   |  | 65m  |
| Scanner unit to TXRX                      |  | N/A  |
| Display unit to transmitter receiver unit |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS        |  |  |
| Scanner Unit                              |  | 0.6m   |
| Transmitter Receiver Unit                 |  | N/A  |
| Display unit                              |  | 2.4m   |



## 24.27 JMR-7296-9X

| GENERAL SPECIFICATION                        |  | JMR-7296-9X  |
|--|--|--|
| Class of emission                            |  | P0N, Q0N   |
| Display                                      |  | Color Raster Scan  |
| Screen                                       |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                                  |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                             |  | Less than 30m  |
| Minimum Detection Range                      |  | Less than 40m  |
| Bearing Accuracy                             |  | Less than 1°   |
| Bearing Indication                           |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition<br>- Operating Temperature |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)<br>Other Unit: -15°C to +55°C                        |
| Ambient Condition<br>- Relative Humidity     |  | 93% at +40°C   |
| Ambient Condition<br>- Vibration             |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$            |
| Power Supply Input                           |  | 100 to 115VAC, 50/60Hz 1 $\phi$ ,<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                              |
| Power Consumption                            |  | Rating: Approx. 400VA<br>Approx. 1200VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation             |  | AC input $\pm 10\%$ ,<br>DC input $+30\%/-10\%$  |
| Pre Heating Time                             |  | Within 10 seconds  |
| From standby to transmit                     |  | Within 5 seconds   |
| Scanner Unit                                 |  | NKE-1696-9   |
| See Section 24.37                            |  |  |
| Display                                      |  |  |
| Central control unit                         |  | NDC-1590/A   |
| Power Supply Unit                            |  | NBD-913  |
| Trackball Operation Unit                     |  | NCE-5605   |
| Display                                      |  | NWZ-207/NWZ-214  |
| Junction Box                                 |  | NQE-1143   |
| Option Unit                                  |  |  |
| Deicing Heater                               |  | CCK-1105   |
| Keyboard Operation Unit                      |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK            |  | CWB-1596   |
| Sensor LAN Switch Unit                       |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                    |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT                |  | CWA-245  |
| Inter Switch Unit                            |  | NQE-3141-4A, NQE-3141-8A   |
| Power Control Unit                           |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                         |  |  |
| Display to scanner unit                      |  | 65m  |
| Scanner unit to transmitter receiver unit    |  | N/A  |
| Display unit to transmitter receiver unit    |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS           |  |  |
| Scanner unit                                 |  | 0.6m   |
| Display unit                                 |  | 2.4m   |

## 24.28 JMR-7296-6X

| GENERAL SPECIFICATION                        |  | JMR-7296-6X  |
|--|--|--|
| Class of emission                            |  | P0N, Q0N   |
| Display                                      |  | Color Raster Scan  |
| Screen                                       |  | 19inch Wide LCD (Effective diameter of RADAR: more than 250mm)   |
| Range Scale                                  |  | 0.125/0.25/0.5/0.75/1.5/3/6/12/24/48/96 NM   |
| Range Resolution                             |  | Less than 30m  |
| Minimum Detection Range                      |  | Less than 40m  |
| Bearing Accuracy                             |  | Less than 1°   |
| Bearing Indication                           |  | Relative motion mode: North-UP/Course-UP/Heading-UP/Waypoint-UP<br>True motion mode: N-UP/C-UP/Waypoint-UP |
| Ambient Condition<br>- Operating Temperature |  | Scanner Unit: -25°C to +55°C (Storage -25°C to +70°C)<br>Other Unit: -15°C to +55°C                        |
| Ambient Condition<br>- Relative Humidity     |  | 93% at +40°C   |
| Ambient Condition<br>- Vibration             |  | 2 to 13.2Hz: Amplitude $\pm 1\text{mm} \pm 10\%$<br>13.2 to 100Hz: Acceleration $7\text{m/s}^2$            |
| Power Supply Input                           |  | 100 to 115VAC, 50/60Hz 1 $\phi$ ,<br>220 to 240VAC, 50/60Hz 1 $\phi$<br>24VDC                              |
| Power Consumption                            |  | Rating: Approx. 400VA<br>Approx. 1200VA at Maximum wind speed<br>(DC:72W at AC power outage)               |
| Power Supply Voltage Fluctuation             |  | AC input $\pm 10\%$ ,<br>DC input $+30\%/-10\%$  |
| Pre Heating Time                             |  | Within 10 seconds  |
| From standby to transmit                     |  | Within 5 seconds   |
| Scanner Unit                                 |  | NKE-1696-6   |
| See Section 24.37                            |  |  |
| Display                                      |  |  |
| Central control unit                         |  | NDC-1590/A   |
| Power Supply Unit                            |  | NBD-913  |
| Trackball Operation Unit                     |  | NCE-5605   |
| Display                                      |  | NWZ-207/NWZ-214  |
| Junction Box                                 |  | NQE-1143   |
| Option Unit                                  |  |  |
| Deicing Heater                               |  | CCK-1105   |
| Keyboard Operation Unit                      |  | NCE-5625   |
| OPERATION UNIT DESKTOP FRAME RACK            |  | CWB-1596   |
| Sensor LAN Switch Unit                       |  | NQA-2443/A   |
| 19inch DESKTOP FRAME RACK                    |  | CWB-1594/CWB-1659  |
| 19inch DISPLAY UNIT MOUNT KIT                |  | CWA-245  |
| Inter Switch Unit                            |  | NQE-3141-4A, NQE-3141-8A   |
| Power Control Unit                           |  | NQE-3167   |
| MAXIMUM CABLE LENGTH                         |  |  |
| Display to scanner unit                      |  | 65m  |
| Scanner unit to transmitter receiver unit    |  | N/A  |
| Display unit to transmitter receiver unit    |  | N/A  |
| SAFE DISTANCE FOR STANDARD COMPASS           |  |  |
| Scanner unit                                 |  | 0.6m   |
| Display unit                                 |  | 2.4m   |

# 24.29 NKE-1139/A

| GENERAL SPECIFICATION  | NKE-1139/A  |
|------------------------|---|
| Dimension              | Height 791 × Swing Circle 4000 (mm)                       |
| Mass                   | Approx. 150kg   |
| Polarization           | Horizontal  |
| Horizontal beam width: | 1.9°  |
| Vertical beam width:   | 25°   |
| Side lobe level:       | below -26dB (within ±10°)<br>below -30dB (outside ±10°)   |
| Revolution             | Approx. 24 rpm  |
| Power Supply for Motor | 100 to 115VAC, 50/60Hz 1ϕ or<br>220 to 240VAC, 50/60Hz 1ϕ |
| Maximum Wind Velocity  | 51.5m/s (100kt)   |

## 24.30 NKE-1130/A

| GENERAL SPECIFICATION  |  | NKE-1130/A   |
|--|--|--|
| Dimension  |  | Height 791 × Swing Circle 4000 (mm)                        |
| Mass   |  | Approx. 180kg  |
| Polarization   |  | Horizontal   |
| Horizontal beam width:                                       |  | 1.9°   |
| Vertical beam width:   |  | 25°  |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)    |
| Revolution   |  | Approx. 24 rpm   |
| Power Supply for Motor                                       |  | 100 to 115VAC, 50/60Hz 1φ or<br>220 to 240VAC, 50/60Hz 1φ  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)  |
| Transmitting Frequency                                       |  | 3050 ±20MHz  |
| Transmitting Power   |  | 30kW ±50%  |
| Transmitting Tube  |  | Magnetron [M1555]  |
| TX Pulse width / Repetition Frequency<br>(Observation Range) |  | SP1: 0.07μs/2250Hz (0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM) |
|  |  | MP1: 0.2μs/2250Hz (0.75NM, 1.5NM, 3NM, 6NM, 12NM)          |
|  |  | MP2: 0.3μs/1900Hz (1.5NM, 3NM, 6NM, 12NM)                  |
|  |  | MP3: 0.4μs/1400Hz (1.5NM, 3NM, 6NM, 12NM, 24NM)            |
|  |  | LP1: 0.8μs/750Hz (3NM, 6NM, 12NM, 24NM)                    |
|  |  | LP2: 1.0μs/650Hz (6NM, 12NM, 24NM, 48NM)                   |
|  |  | LP3: 1.2μs/510Hz (96NM)                                    |
| Modulator  |  | Solid State Modulator Circuit                              |
| Duplexer   |  | Circulator + Diode Limiter                                 |
| Front End Module   |  | Built-in   |
| Overall Noise Figure   |  | 7.5dB (typical)  |
| Tuning   |  | Manual/AUTO  |
| Intermediate Frequency Amplifier                             |  |  |
| Intermediate Frequency                                       |  | 60MHz  |
| Band Width   |  | 25/8/3MHz  |
| Gain   |  | More than 90dB   |
| Amplifying Characteristics                                   |  | Logarithmic Amplifier                                      |

## 24.31 NKE-1129/A

| GENERAL SPECIFICATION  | NKE-1129/A-7  |
|------------------------|---|
| Dimension              | Height 536 × Swing Circle 2270 (mm)                       |
| Mass                   | Approx. 51kg  |
| Polarization           | Horizontal  |
| Horizontal beam width: | 1.0°  |
| Vertical beam width:   | 20°   |
| Side lobe level:       | below -26dB (within ±10°)<br>below -30dB (outside ±10°)   |
| Revolution             | Approx. 24 rpm  |
| Power Supply for Motor | 100 to 115VAC, 50/60Hz 1φ or<br>220 to 240VAC, 50/60Hz 1φ |
| Maximum Wind Velocity  | 51.5m/s (100kt)   |
| GENERAL SPECIFICATION  | NKE-1129/A-9  |
| Dimension              | Height 536 × Swing Circle 2825 (mm)                       |
| Mass                   | Approx. 53kg  |
| Polarization           | Horizontal  |
| Horizontal beam width: | 0.8°  |
| Vertical beam width:   | 20°   |
| Side lobe level:       | below -26dB (within ±10°)<br>below -30dB (outside ±10°)   |
| Revolution             | Approx. 24 rpm  |
| Power Supply for Motor | 100 to 115VAC, 50/60Hz 1φ or<br>220 to 240VAC, 50/60Hz 1φ |
| Maximum Wind Velocity  | 51.5m/s (100kt)   |

## 24.32 NKE-1125/A

| GENERAL SPECIFICATION  |  | NKE-1125/A-9   |
|--|--|--|
| Dimension  |  | Height 536 × Swing Circle 2825 (mm)  |
| Mass   |  | Approx. 60kg   |
| Polarization   |  | Horizontal   |
| Horizontal beam width:                                       |  | 0.8°   |
| Vertical beam width:   |  | 20°  |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)                    |
| Revolution   |  | Approx. 24 rpm   |
| Power Supply for Motor                                       |  | 100 to 115VAC, 50/60Hz 1ϕ or<br>220 to 240VAC, 50/60Hz 1ϕ                  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)  |
| Transmitting Frequency                                       |  | 9410 ±30MHz  |
| Transmitting Power   |  | 25kW ±50%  |
| Transmitting Tube  |  | Magnetron [M1568BS]  |
| TX Pulse width / Repetition Frequency<br>(Observation Range) |  | SP1: 0.07μs/2250Hz (0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM, 3NM, 6NM, 12NM) |
|  |  | MP1: 0.2μs/2250Hz (0.75NM, 1.5NM, 3NM, 6NM, 12NM)                          |
|  |  | MP2: 0.3μs/1900Hz (1.5NM, 3NM, 6NM, 12NM)                                  |
|  |  | MP3: 0.4μs/1400Hz (1.5NM, 3NM, 6NM, 12NM, 24NM)                            |
|  |  | LP1: 0.8μs/750Hz (3NM, 6NM, 12NM, 24NM)                                    |
|  |  | LP2: 1.0μs/650Hz (6NM, 12NM, 24NM, 48NM)                                   |
|  |  | LP3: 1.2μs/510Hz (96NM)  |
| Modulator  |  | Solid State Modulator Circuit  |
| Duplexer   |  | Circulator + Diode Limiter   |
| Front End Module   |  | Built-in   |
| Overall Noise Figure   |  | 7.5dB (typical)  |
| Tuning   |  | Manual/AUTO  |
| Intermediate Frequency Amplifier                             |  |  |
| Intermediate Frequency                                       |  | 60MHz  |
| Band Width   |  | 25/8/3MHz  |
| Gain   |  | More than 90dB   |
| Amplifying Characteristics                                   |  | Logarithmic Amplifier  |
| GENERAL SPECIFICATION  |  | NKE-1125/A-6   |
| Dimension  |  | Height 536 × Swing Circle 1910 (mm)  |
| Mass   |  | Approx. 55kg   |
| Polarization   |  | Horizontal   |
| Horizontal beam width:                                       |  | 1.2°   |
| Vertical beam width:   |  | 20°  |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)                    |
| Revolution   |  | Approx. 24 rpm   |
| Power Supply for Motor                                       |  | 100 to 115VAC, 50/60Hz 1ϕ or<br>220 to 240VAC, 50/60Hz 1ϕ                  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)  |
| Transmitting Frequency                                       |  | 9410 ±30MHz  |
| Transmitting Power   |  | 25kW   |
| Transmitting Tube  |  | Magnetron [M1568BS]  |
| TX Pulse width / Repetition Frequency<br>(Observation Range) |  | SP1: 0.07μs/2250Hz (0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM, 3NM, 6NM, 12NM) |
|  |  | MP1: 0.2μs/2250Hz (0.75NM, 1.5NM, 3NM, 6NM, 12NM)                          |
|  |  | MP2: 0.3μs/1900Hz (1.5NM, 3NM, 6NM, 12NM)                                  |
|  |  | MP3: 0.4μs/1400Hz (1.5NM, 3NM, 6NM, 12NM, 24NM)                            |
|  |  | LP1: 0.8μs/750Hz (3NM, 6NM, 12NM, 24NM)                                    |
|  |  | LP2: 1.0μs/650Hz (6NM, 12NM, 24NM, 48NM)                                   |
|  |  | LP3: 1.2μs/510Hz (96NM)  |
| Modulator  |  | Solid State Modulator Circuit  |
| Duplexer   |  | Circulator + Diode Limiter   |
| Front End Module   |  | Built-in   |
| Overall Noise Figure   |  | 7.5dB (typical)  |
| Tuning   |  | Manual/AUTO  |
| Intermediate Frequency Amplifier                             |  |  |
| Intermediate Frequency                                       |  | 60MHz  |
| Band Width   |  | 25/8/3MHz  |
| Gain   |  | More than 90dB   |
| Amplifying Characteristics                                   |  | Logarithmic Amplifier  |

## 24.33 NKE-2254-6HS

| GENERAL SPECIFICATION  |  | NKE-2254-6HS   |
|--|--|--|
| Dimension  |  | Height 536 × Swing Circle 1910 (mm)  |
| Mass   |  | Approx. 55kg   |
| Polarization   |  | Horizontal   |
| Horizontal beam width:                                       |  | 1.2°   |
| Vertical beam width:   |  | 20°  |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)                    |
| Revolution   |  | Approx. 48 rpm   |
| Power Supply for Motor                                       |  | 24VDC  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)  |
| Transmitting Frequency                                       |  | 9410 ±30MHz  |
| Transmitting Power   |  | 25kW ±50%  |
| Transmitting Tube  |  | Magnetron [M1568BS]  |
| TX Pulse width / Repetition Frequency<br>(Observation Range) |  | SP1: 0.07μs/2250Hz (0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM, 3NM, 6NM, 12NM) |
|  |  | MP1: 0.2μs/2250Hz (0.75NM, 1.5NM, 3NM, 6NM, 12NM)                          |
|  |  | MP2: 0.3μs/1900Hz (1.5NM, 3NM, 6NM, 12NM)                                  |
|  |  | MP3: 0.4μs/1400Hz (1.5NM, 3NM, 6NM, 12NM, 24NM)                            |
|  |  | LP1: 0.8μs/750Hz (3NM, 6NM, 12NM, 24NM)                                    |
|  |  | LP2: 1.0μs/650Hz (6NM, 12NM, 24NM, 48NM)                                   |
|  |  | LP3: 1.2μs/510Hz (96NM)  |
| Modulator  |  | Solid State Modulator Circuit  |
| Duplexer   |  | Circulator + Diode Limiter   |
| Front End Module   |  | Built-in   |
| Overall Noise Figure   |  | 7.5dB (typical)  |
| Tuning   |  | Manual/AUTO  |
| Intermediate Frequency Amplifier                             |  |  |
| Intermediate Frequency                                       |  | 60MHz  |
| Band Width   |  | 25/8/3MHz  |
| Gain   |  | More than 90dB   |
| Amplifying Characteristics                                   |  | Logarithmic Amplifier  |

## 24.34 NKE-2103

| GENERAL SPECIFICATION  |  | NKE-2103-6   |
|--|--|--|
| Dimension  |  | Height 458 × Swing Circle 1910 (mm)  |
| Mass   |  | Approx. 36kg   |
| Polarization   |  | Horizontal   |
| Horizontal beam width:                                       |  | 1.2°   |
| Vertical beam width:   |  | 20°  |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)                    |
| Revolution   |  | Approx. 27 rpm   |
| Power Supply for Motor                                       |  | 24VDC  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)  |
| Transmitting Frequency                                       |  | 9410 ±30MHz  |
| Transmitting Power   |  | 10kW ±50%  |
| Transmitting Tube  |  | Magnetron [MAF1565N]   |
| TX Pulse width / Repetition Frequency<br>(Observation Range) |  | SP1: 0.08μs/2250Hz (0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM, 3NM, 6NM, 12NM) |
|  |  | MP1: 0.25μs/1700Hz (0.75NM, 1.5NM, 3NM, 6NM, 12NM)                         |
|  |  | MP2: 0.5μs/1200Hz (1.5NM, 3NM, 6NM, 12NM, 24NM)                            |
|  |  | LP1: 0.8μs/750Hz (3NM, 6NM, 12NM, 24NM)                                    |
|  |  | LP2: 1.0μs/650Hz (6NM, 12NM, 24NM, 48NM, 96NM)                             |
| Modulator  |  | Solid State Modulator Circuit  |
| Duplexer   |  | Circulator + Diode Limiter   |
| Front End Module   |  | Built-in   |
| Overall Noise Figure   |  | 7.5dB (typical)  |
| Tuning   |  | Manual/AUTO  |
| Intermediate Frequency Amplifier                             |  |  |
| Intermediate Frequency                                       |  | 60MHz  |
| Band Width   |  | 25/8/3MHz  |
| Gain   |  | More than 90dB   |
| Amplifying Characteristics                                   |  | Logarithmic Amplifier  |
| GENERAL SPECIFICATION  |  | NKE-2103-6HS   |
| Dimension  |  | Height 458 × Swing Circle 1910 (mm)  |
| Mass   |  | Approx. 37kg   |
| Polarization   |  | Horizontal   |
| Horizontal beam width:                                       |  | 1.2°   |
| Vertical beam width:   |  | 20°  |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)                    |
| Revolution   |  | Approx. 48 rpm   |
| Power Supply for Motor                                       |  | 24VDC  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)  |
| Transmitting Frequency                                       |  | 9410 ±30MHz  |
| Transmitting Power   |  | 10kW   |
| Transmitting Tube  |  | Magnetron [MAF1565N]   |
| TX Pulse width / Repetition Frequency<br>(Observation Range) |  | SP1: 0.08μs/2250Hz (0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM, 3NM, 6NM, 12NM) |
|  |  | MP1: 0.25μs/1700Hz (0.75NM, 1.5NM, 3NM, 6NM, 12NM)                         |
|  |  | MP2: 0.5μs/1200Hz (1.5NM, 3NM, 6NM, 12NM, 48NM)                            |
|  |  | LP1: 0.8μs/750Hz (3NM, 6NM, 12NM, 24NM)                                    |
|  |  | LP2: 1.0μs/650Hz (6NM, 12NM, 24NM, 48NM, 96NM)                             |
| Modulator  |  | Solid State Modulator Circuit  |
| Duplexer   |  | Circulator + Diode Limiter   |
| Front End Module   |  | Built-in   |
| Overall Noise Figure   |  | 7.5dB (typical)  |
| Tuning   |  | Manual/AUTO  |
| Intermediate Frequency Amplifier                             |  |  |
| Intermediate Frequency                                       |  | 60MHz  |
| Band Width   |  | 25/8/3MHz  |
| Gain   |  | More than 90dB   |
| Amplifying Characteristics                                   |  | Logarithmic Amplifier  |



## 24.35 NKE-1632/A

| GENERAL SPECIFICATION  |  | NKE-1632/A   |
|--|--|--|
| Dimension  |  | Height 791 × Swing Circle 4000 (mm)  |
| Mass   |  | Approx. 160kg  |
| Polarization   |  | Horizontal   |
| Horizontal beam width:   |  | 1.9°   |
| Vertical beam width:   |  | 25°  |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)                                    |
| Revolution   |  | Approx. 24 rpm   |
| Power Supply for Motor   |  | 100 to 115VAC, 50/60Hz 1ϕ or<br>220 to 240VAC, 50/60Hz 1ϕ                                  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)  |
| Transmitting Frequency   |  | P0N(3035MHz), Q0N(3065 ±4MHz) or (3060 ±4MHz)  |
| Transmission output  |  | Peak-to-peak value 250W ±50% (Average value 5.8W or lower)                                 |
| Transmitting Tube  |  | Solid State Device   |
| TX Pulse width (1st) /<br>(TX Pulse width, Frequency Deviation Width<br>(2nd)) / Repetition Frequency<br>(Observation Range) |  | SP1: 0.07μs/(4.6μs, 8MHz)/1860Hz or 2280Hz (0.125NM, 0.25NM,<br>0.5NM, 0.75NM, 1.5NM, 3NM) |
|  |  | MP1: 0.14μs/(9.1μs, 8MHz)/1860Hz or 2280Hz (0.75NM, 1.5NM, 3NM,<br>6NM)                    |
|  |  | MP2: 0.29μs/(9.1μs, 8MHz)/1860Hz or 2280Hz (1.5NM, 3NM, 6NM,<br>12NM)                      |
|  |  | LP1: 0.57μs/(9.1μs, 8MHz)/1280Hz (3NM, 6NM, 12NM, 24NM)                                    |
|  |  | LP2: 1.14μs/(18.3μs, 8MHz)/640Hz (3NM, 6NM, 12NM, 24NM, 48NM,<br>96NM)                     |
| Duplexer   |  | Circulator + Diode Limiter   |
| Front End Module   |  | Built-in   |
| Overall Noise Figure   |  | 4.0dB (typical)  |
| Performance Monitor  |  | Built-in   |
| Intermediate Frequency Amplifier   |  |  |
| Intermediate Frequency   |  | 63MHz  |
| Band Width   |  | 30MHz  |
| Gain   |  | More than 28dB   |
| Amplifying Characteristics   |  | Linear Amplifier   |

## 24.36 NKE-2632/A、NKE-2632-H

| GENERAL SPECIFICATION  |  | NKE-2632/A   |
|--|--|--|
| Dimension  |  | Height 720 × Swing Circle 2770 (mm)  |
| Mass   |  | Approx. 85kg   |
| Polarization   |  | Horizontal   |
| Horizontal beam width:   |  | 2.7°   |
| Vertical beam width:   |  | 25°  |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)                                    |
| Revolution   |  | Approx. 24 rpm   |
| Power Supply for Motor   |  | 100 to 115VAC, 50/60Hz 1φ or<br>220 to 240VAC, 50/60Hz 1φ                                  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)  |
| Transmitting Frequency   |  | P0N(3035MHz), Q0N(3065 ±4MHz) or (3060 ±4MHz)  |
| Transmission output  |  | Peak-to-peak value 250W ±50% (Average value 5.8W or lower)                                 |
| Transmitting Tube  |  | Solid State Device   |
| TX Pulse width (1st) /<br>(TX Pulse width, Frequency Deviation Width<br>(2nd)) / Repetition Frequency<br>(Observation Range) |  | SP1: 0.07μs/(4.6μs, 8MHz)/1860Hz or 2280Hz (0.125NM, 0.25NM,<br>0.5NM, 0.75NM, 1.5NM, 3NM) |
|  |  | MP1: 0.14μs/(9.1μs, 8MHz)/1860Hz or 2280Hz (0.75NM, 1.5NM, 3NM,<br>6NM)                    |
|  |  | MP2: 0.29μs/(9.1μs, 8MHz)/1860Hz or 2280Hz (1.5NM, 3NM, 6NM,<br>12NM)                      |
|  |  | LP1: 0.57μs/(9.1μs, 8MHz)/1280Hz (3NM, 6NM, 12NM, 24NM)                                    |
|  |  | LP2: 1.14μs/(18.3μs, 8MHz)/640Hz (3NM, 6NM, 12NM, 24NM, 48NM,<br>96NM)                     |
| Duplexer   |  | Circulator + Diode Limiter   |
| Front End Module   |  | Built-in   |
| Overall Noise Figure   |  | 4.0dB (typical)  |
| Performance Monitor  |  | Built-in   |
| Intermediate Frequency Amplifier   |  |  |
| Intermediate Frequency   |  | 63MHz  |
| Band Width   |  | 30MHz  |
| Gain   |  | More than 28dB   |
| Amplifying Characteristics   |  | Linear Amplifier   |
| GENERAL SPECIFICATION  |  | NKE-2632-H   |
| Dimension  |  | Height 720 × Swing Circle 2770 (mm)  |
| Mass   |  | Approx. 90kg   |
| Polarization   |  | Horizontal   |
| Horizontal beam width:   |  | 2.7°   |
| Vertical beam width:   |  | 25°  |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)                                    |
| Revolution   |  | Approx. 48 rpm   |
| Power Supply for Motor   |  | 100 to 115VAC, 50/60Hz 1φ or 220 to 240VAC, 50/60Hz 1φ                                     |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)  |
| Transmitting Frequency   |  | P0N(3035MHz), Q0N(3065 ±4MHz) or (3060 ±4MHz)  |
| Transmission output  |  | Peak-to-peak value 250W ±50% (Average value 5.8W or lower)                                 |
| Transmitting Tube  |  | Solid State Device   |
| TX Pulse width (1st) /<br>(TX Pulse width, Frequency Deviation Width<br>(2nd)) / Repetition Frequency<br>(Observation Range) |  | SP1: 0.07μs/(4.6μs, 8MHz)/1860Hz or 2280Hz (0.125NM, 0.25NM,<br>0.5NM, 0.75NM, 1.5NM, 3NM) |
|  |  | MP1: 0.14μs/(9.1μs, 8MHz)/1860Hz or 2280Hz (0.75NM, 1.5NM, 3NM,<br>6NM)                    |
|  |  | MP2: 0.29μs/(9.1μs, 8MHz)/1860Hz or 2280Hz (1.5NM, 3NM, 6NM,<br>12NM)                      |
|  |  | LP1: 0.57μs/(9.1μs, 8MHz)/1280Hz (3NM, 6NM, 12NM, 24NM)                                    |
|  |  | LP2: 1.14μs/(18.3μs, 8MHz)/640Hz (6NM, 12NM, 24NM, 48NM,<br>96NM)                          |
| Duplexer   |  | Circulator + Diode Limiter   |
| Front End Module   |  | Built-in   |
| Overall Noise Figure   |  | 4.0dB (typical)  |
| Performance Monitor  |  | Built-in   |
| Intermediate Frequency Amplifier   |  |  |
| Intermediate Frequency   |  | 63MHz  |
| Band Width   |  | 30MHz  |
| Gain   |  | More than 28dB   |
| Amplifying Characteristics   |  | Linear Amplifier   |

## 24.37 NKE-1696

| GENERAL SPECIFICATION  |  | NKE-1696-9  |
|--|--|---|
| Dimension  |  | Height 507 × Swing Circle 2810 (mm)   |
| Mass   |  | Approx. 58kg  |
| Polarization   |  | Horizontal  |
| Horizontal beam width:   |  | 0.8°  |
| Vertical beam width:   |  | 20°   |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)   |
| Revolution   |  | Approx. 24 rpm  |
| Power Supply for Motor   |  | 100 to 115VAC, 50/60Hz 1φ or 220 to 240VAC, 50/60Hz 1φ  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)   |
| Transmitting Frequency   |  | P0N(9410MHz), Q0N(9440±4MHz) or (9435MHz±4MHz)  |
| Transmitting Power   |  | Peak-to-peak value 600W ±50% (Average value 5.8W or lower)  |
| Transmitting Module  |  | Solid State Device  |
| TX Pulse width (1st) /<br>(TX Pulse width, Frequency Deviation Width<br>(2nd)) / Repetition Frequency<br>(Observation Range) |  | SP1: 0.07μs/(4.6μs, 8MHz)/1360Hz or 1700Hz<br>(0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM, 3NM, 6NM, 12NM) |
|  |  | MP1: 0.14μs/(4.6μs, 8MHz)/1360Hz or 1700Hz<br>(0.75NM, 1.5NM, 3NM, 6NM, 12NM)                         |
|  |  | MP2: 0.28μs/(9.1μs, 8MHz)/1000Hz<br>(1.5NM, 3NM, 6NM, 12NM)   |
|  |  | LP1: 0.56μs/(9.1μs, 8MHz)/1000Hz<br>(3NM, 6NM, 12NM, 24NM)  |
|  |  | LP2: 1.12μs/(9.1μs, 8MHz)/660Hz or 730Hz<br>(3NM, 6NM, 12NM, 24NM, 48NM, 96NM)                        |
| Duplexer   |  | Circulator + Diode Limiter  |
| Front End Module   |  | Built-in  |
| Overall Noise Figure   |  | 4.5dB (typical)   |
| Performance Monitor  |  | Built in  |
| Intermediate Frequency Amplifier   |  |   |
| Intermediate Frequency   |  | 63MHz   |
| Band Width   |  | 30MHz   |
| Amplifying Characteristics   |  | Linear Amplifier  |
| GENERAL SPECIFICATION  |  | NKE-1696-6  |
| Dimension  |  | Height 507 × Swing Circle 1880 (mm)   |
| Mass   |  | Approx. 53kg  |
| Polarization   |  | Horizontal  |
| Horizontal beam width:   |  | 1.2°  |
| Vertical beam width:   |  | 20°   |
| Side lobe level:   |  | below -26dB (within ±10°)<br>below -30dB (outside ±10°)   |
| Revolution   |  | Approx. 24 rpm  |
| Power Supply for Motor   |  | 100 to 115VAC, 50/60Hz 1φ or 220 to 240VAC, 50/60Hz 1φ  |
| Maximum Wind Velocity  |  | 51.5m/s (100kt)   |
| Transmitting Frequency   |  | P0N(9410MHz), Q0N(9440±4MHz) or (9435MHz±4MHz)  |
| Transmitting Power   |  | Peak-to-peak value 600W ±50% (Average value 5.8W or lower)  |
| Transmitting Module  |  | Solid State Device  |
| TX Pulse width (1st) /<br>(TX Pulse width, Frequency Deviation Width<br>(2nd)) / Repetition Frequency<br>(Observation Range) |  | SP1: 0.07μs/(4.6μs, 8MHz)/1360Hz or 1700Hz<br>(0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM, 3NM, 6NM, 12NM) |
|  |  | MP1: 0.14μs/(4.6μs, 8MHz)/1360Hz or 1700Hz<br>(0.75NM, 1.5NM, 3NM, 6NM, 12NM)                         |
|  |  | MP2: 0.28μs/(9.1μs, 8MHz)/1000Hz<br>(1.5NM, 3NM, 6NM, 12NM)   |
|  |  | LP1: 0.56μs/(9.1μs, 8MHz)/1000Hz<br>(3NM, 6NM, 12NM, 24NM)  |
|  |  | LP2: 1.12μs/(9.1μs, 8MHz)/660Hz or 730Hz<br>(3NM, 6NM, 12NM, 24NM, 48NM, 96NM)                        |
| Duplexer   |  | Circulator + Diode Limiter  |
| Front End Module   |  | Built-in  |
| Overall Noise Figure   |  | 4.5dB (typical)   |
| Performance Monitor  |  | Built in  |
| Intermediate Frequency Amplifier   |  |   |
| Intermediate Frequency   |  | 63MHz   |
| Band Width   |  | 30MHz   |
| Amplifying Characteristics   |  | Linear Amplifier  |

## 24.38 NTG-3230/A

| GENERAL SPECIFICATION  | NTG-3230/A   |
|--|--|
| Dimension  | Width 615 × Depth 365 × Height 615 (mm)                    |
| Structure  | Wall mount, Drip Proof                                     |
| Mass   | Approx. 33kg   |
| Transmitting Frequency                                       | 3050 ±20MHz  |
| Transmitting Power   | 30kW ±50%  |
| Transmitting Tube  | Magnetron [M1555]  |
| TX Pulse width / Repetition Frequency<br>(Observation Range) | SP1: 0.07μs/2250Hz (0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM) |
|  | MP1: 0.2μs/2250Hz (0.75NM, 1.5NM, 3NM, 6NM, 12NM)          |
|  | MP2: 0.3μs/1900Hz (1.5NM, 3NM, 6NM, 12NM)                  |
|  | MP3: 0.4μs/1400Hz (1.5NM, 3NM, 6NM, 12NM, 24NM)            |
|  | LP1: 0.8μs/750Hz (3NM, 6NM, 12NM, 24NM)                    |
|  | LP2: 1.0μs/650Hz (6NM, 12NM, 24NM, 48NM)                   |
|  | LP3: 1.2μs/510Hz (96NM)                                    |
| Modulator  | Solid State Modulator Circuit                              |
| Duplexer   | Circulator + TRHPL   |
| Front End Module   | Built-in   |
| Overall Noise Figure   | 7.5dB (typical)  |
| Tuning   | Manual/AUTO  |
| Intermediate Frequency Amplifier                             |  |
| Intermediate Frequency                                       | 60MHz  |
| Band Width   | 25/8/3MHz  |
| Gain   | More than 90dB   |
| Amplifying Characteristics                                   | Logarithmic Amplifier                                      |

## 24.39 NTG-3225/A

| GENERAL SPECIFICATION  | NTG-3225/A   |
|--|--|
| Dimension  | Width 460 × Depth 227 × Height 461 (mm)                                    |
| Structure  | Wall mount, Drip Proof   |
| Mass   | Approx. 15kg   |
| Transmitting Frequency                                       | 9410 ±30MHz  |
| Transmitting Power   | 25kW ±50%  |
| Transmitting Tube  | Magnetron [M1568BS]  |
| TX Pulse width / Repetition Frequency<br>(Observation Range) | SP1: 0.07μs/2250Hz (0.125NM, 0.25NM, 0.5NM, 0.75NM, 1.5NM, 3NM, 6NM, 12NM) |
|  | MP1: 0.2μs/2250Hz (0.75NM, 1.5NM, 3NM, 6NM, 12NM)                          |
|  | MP2: 0.3μs/1900Hz (1.5NM, 3NM, 6NM, 12NM)                                  |
|  | MP3: 0.4μs/1400Hz (1.5NM, 3NM, 6NM, 12NM, 24NM)                            |
|  | LP1: 0.8μs/750Hz (3NM, 6NM, 12NM, 24NM)                                    |
|  | LP2: 1.0μs/650Hz (6NM, 12NM, 24NM, 48NM)                                   |
|  | LP3: 1.2μs/510Hz (96NM)  |
| Modulator  | Solid State Modulator Circuit  |
| Duplexer   | Circulator + Diode Limiter   |
| Front End Module   | Built-in   |
| Overall Noise Figure   | 7.5dB (typical)  |
| Tuning   | Manual/AUTO  |
| Intermediate Frequency Amplifier                             |  |
| Intermediate Frequency                                       | 60MHz  |
| Band Width   | 25/8/3MHz  |
| Gain   | More than 90dB   |
| Amplifying Characteristics                                   | Logarithmic Amplifier  |

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# 24.40 NJU-84

| GENERAL SPECIFICATION | NJU-84                                 |
|-----------------------|--|
| Dimension             | Width 130 × Depth 180 × Height 70 (mm) |
| Mass                  | 0.7kg                                  |
| Operating Frequency   | 3050 ±30MHz                            |

# 24.41 NJU-85

| GENERAL SPECIFICATION | NJU-85                                 |
|-----------------------|--|
| Dimension             | Width 130 × Depth 149 × Height 70 (mm) |
| Mass                  | 0.7kg                                  |
| Operating Frequency   | 9410 ±30MHz                            |

## 24.42 Display Unit

<Radar function>

| FUNCTIONAL SPECIFICATION            |  |
|-------------------------------------|--|
| <b>View</b>                         |  |
| Range Scale                         | 0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96NM  |
| Motion mode                         | TM (True Motion) display/(RM (Relative Motion) display   |
| Bearing display mode                | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Head UP/Waypoint UP   |
| Constaview                          | Yes  |
| Off Center                          | Within 66% of Radius, except 96NM range.   |
| Tuning Indication                   | Bar graph  |
| Trails Indication                   | Off/0.25/0.5/1/3/6/10/15/30/60min  |
| Own ship track                      | Yes  |
| 2nd PPI                             | Yes  |
| <b>Navigational tools</b>           |  |
| Bearing Scale                       | 360° in 1° step  |
| Heading Line Indication             | Yes  |
| Range Marker                        | 0.025, 0.05, 0.1, 0.25, 0.5, 1, 2, 4, 8, 16 NM   |
| Range Accuracy                      | Less than 1% of the Range Scale in use, or 30m whichever is larger.  |
| Variable Range Marker (VRM)         | 2  |
| VRM range display                   | 0.000 to 96.0NM, 4-digit display   |
| Electronic Bearing Line (EBL)       | 2 (center/independent)   |
| EBL bearing display                 | 0.000 to 359.9°, 4-digit display   |
| Trackball Cursor                    | Yes (range, true/relative bearing, TTG, ETA display)   |
| Parallel Index Line (PI)            | Yes (All/Individual/Track/Equiangular)   |
| <b>Signal Process</b>               |  |
| Anti Sea Clutter (SEA)              | Manual/AUTO  |
| Anti Rain Clutter (RAIN)            | Manual/AUTO  |
| Interference Rejection (IR)         | Yes  |
| Video Process                       | Yes  |
| <b>TT/AIS</b>                       |  |
| Auto-acquisition Zone (AZ)          | 2 (Sector)   |
| TT indication                       | 100 (100 for processing)   |
| AIS indication                      | 460 (Sleeping/Activate) #Option: up to 960 (460 or 960 for processing),<br>20 locating devices (20 for processing),<br>20 data reports (20 for processing)   |
| <b>Chart Functions (option)</b>     |  |
| Chart display function              | S-57 Ed3.0/3.1<br>S-63<br>C-Map Ed3.0 Professional/Professional+ *1<br>C-Map ENC *1<br>Jeppesen PRIMAR ECDIS Service *1<br>Display color: 64 colors  |
| Chart additional function           | AVCS Pre-install<br>AIO<br>C-Map Dynamic License *1  |
| <b>Sailing monitoring functions</b> |  |
| Own ship                            | Monitoring by positioning equipment<br>Time stamp display<br>Dragging anchor monitoring<br>Own ship track display  |
| Route monitoring                    | Safety contour cross monitoring<br>Spot depth monitoring<br>Monitoring obstacle and approaching obstruction and prohibited area (S-57/S-63/C-Map)<br>Cross track monitoring<br>Next WP arrival monitoring<br>Off-course monitoring |
| <b>User Chart</b>                   |  |
| Number of points displayed          | 100,000 points (marks, lines)  |
| Export                              | Possible (USB memory)  |
| <b>Other functions</b>              |  |
| Data display functions              | Conning data block display   |
| Self-diagnosis function             | Available  |
| Remote maintenance function         | Available  |
| Upgrading to multi-function display | Possible   |

|                                     |  |
|-------------------------------------|--|
| <b>Receivable signals (i)</b>       |  |
| Ship heading                        | THS > HDT (over 40Hz)  |
| Course                              | GGA > RMC > RMA > GNS > GLL  |
| Geodetic positioning system         | DTM  |
| Date information                    | ZDA  |
| COG/SOG                             | RMC > RMA > VTG  |
| Ship speed through water            | VBW > VHW  |
| Turning speed                       | ROT  |
| Water depth                         | DPT > DBS > DBT > DBK  |
| Wind direction/wind speed           | MWV > MWD  |
| Air temperature                     | XDR > MTA > MDA  |
| Water temperature                   | MTW > MDA  |
| Atmospheric pressure                | XDR > MMB > MDA  |
| Humidity                            | XDR > MHU > MDA  |
| AIS                                 | VDM, VDO   |
| Alert                               | ACN, HBT   |
| NAVTEX                              | NRX or JRC format  |
| Azimuth/distance to the destination | RMB > BWC > BWR (Plotter option)   |
| Water current                       | CUR  |
| <b>Transmittable signals</b>        |  |
| RADAR system data                   | RSD  |
| Own ship data                       | OSD  |
| Watch Timer Reset                   | EVE*2  |
| TT data                             | TTM, TLL, TTD, TLB   |
| AIS target data                     | TTM, TLL, TTD  |
| AIS remote control data             | VSD, AIR, AIQ, ABM, BBM  |
| Remote maintenance data             | JRC format   |
| Alert                               | ALC, ALF, ARC, HBT   |
| NAVTEX                              | NRM  |
| Azimuth/distance to the destination | RMB, BWC   |
| Navigation Data                     | DBK, DPT, DTM, GGA, GLL, HDG, HDT, MDA, MWV, NSR, POS, RMB, RMC, ROT, RSA, THS, VBW, VDR, VTG, VWR, VWT, XDR, ZDA, HBT, BWC, RTE, WPL, HSC, OSD, RSD, XTE, ZTG |
| <b>Visual range</b>                 |  |
| Visual range                        | 1.00m from the center of display(NWZ-208/207/214)<br>1.07m from the center of display(NWZ-233)   |

- i. 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).

\*1 e-Token (Option) is required to use C-map.

\*2 When the value exceeds the set value, a message is output indicating a non-operation state. The value is set at installation.

## <ECDIS function>

| <b>FUNCTIONAL SPECIFICATION</b>     |   |
|-------------------------------------|---|
| <b>View</b>                         |   |
| Scale                               | 1:1,000–1:40,000,000 (19 inch)<br>1:1,000–1:30,000,000 (26 inch)  |
| Range                               | 0.125, 0.25, 0.5, 0.75, 1.5, 3, 6, 12, 24, 48, 96NM   |
| Motion mode                         | TM (True Motion) display/(RM (Relative Motion) display  |
| Electronic Bearing Line (EBL)       | Relative motion mode: North UP/Course UP/Head UP/Waypoint UP<br>True motion mode: North UP/Course UP/Head UP/Waypoint UP  |
| View mode                           | Zoom area selection<br>Fix View<br>Multi View<br>Chart drag<br>Off Center<br>Chart original scale display   |
| <b>Sailing tools</b>                |   |
| Bearing Scale                       | 360° in 1° step   |
| Heading Line Indication             | Yes   |
| Range Marker                        | 0.025, 0.05, 0.1, 0.25, 0.5, 1, 2, 4, 8, 16 NM  |
| Variable Range Marker (VRM)         | 2   |
| VRM range display                   | 0.000 to 999.9NM, 4-digit display   |
| Electronic Bearing Line (EBL)       | 2 (center/independent)  |
| EBL bearing display                 | 0.000 to 359.9°, 4-digit display  |
| Trackball Cursor                    | Yes (range, true/relative bearing, TTG, ETA display)  |
| Parallel Index Line (PI)            | Yes (All/Individual/Track/Equiangular)  |
| <b>Chart functions</b>              |   |
| Chart display function              | S-57 Ed3.0/3.1<br>S-63<br>C-Map Ed3.0 Professional/Professional+ * <sup>1</sup><br>C-Map ENC * <sup>1</sup><br>Jeppesen PRIMAR ECDIS Service * <sup>1</sup><br>ARCS   |
| Chart addition function             | AVCS Pre-install<br>AIO<br>C-Map Dynamic License * <sup>1</sup>   |
| Update                              | Manual/Semi-automatic   |
| <b>Route plan functions</b>         |   |
| Route creation                      | Table editing<br>Graphic editing  |
| Route editing                       | Way Point addition/deletion/editing<br>Alternative route creation<br>Route copying<br>Inter-route connection  |
| Safety check                        | Available   |
| Number of routes displayed          | Up to 4 types   |
| <b>Route monitoring functions</b>   |   |
| Own ship                            | Monitoring by positioning equipment<br>Monitoring by duplicated positioning equipment<br>Time stamp display<br>Dragging anchor monitoring<br>Own ship track display   |
| Route monitoring                    | Safety contour cross monitoring<br>Spot depth monitoring<br>Monitoring obstacle and approaching obstruction and prohibited area (S-57/S-63/C-Map)<br>Cross track monitoring<br>Next WP arrival monitoring<br>Off-course monitoring                          |
| Other ship monitoring               | Monitoring by TT (targets max: display 200 / processing 200)<br>Monitoring by AIS (targets max: display 460 / processing 460. (option: display 960 / processing 960), locating device: display 20 / processing 20, data report: display 20 / processing 20) |
| <b>User Chart</b>                   |   |
| Number of points displayed          | 100,000 points (marks, lines)   |
| Export                              | Possible (USB memory)   |
| <b>Other functions</b>              |   |
| Data display functions              | Conning data block display  |
| Self-diagnosis function             | Available   |
| Remote maintenance function         | Available   |
| Playback                            | Playback data (up to 3 months)  |
| Logbook function                    | Logbook recorded data (up to 3 months)  |
| Radar overlay function              | Available (option)  |
| TCS(Track Control System)           | Available (option)  |
| Upgrading to multi-function display | Possible  |



|                                     |  |
|-------------------------------------|--|
| <b>Receivable signals (i)</b>       |  |
| Ship heading                        | THS > HDT (over 40Hz)  |
| Course                              | GGA > RMC > RMA > GNS > GLL  |
| Geodetic positioning system         | DTM  |
| Date information                    | ZDA  |
| COG/SOG                             | RMC > RMA > VTG  |
| Ship speed through water            | VBW > VHW  |
| Turning speed                       | ROT  |
| Water depth                         | DPT>DBS>DBT>DBK  |
| Wind direction/wind speed           | MWV>MWD  |
| Air temperature                     | MTA > MDA  |
| Water temperature                   | MTW > MDA  |
| Atmospheric pressure                | MMB > MDA  |
| Humidity                            | MHU > MDA  |
| AIS                                 | VDM, VDO   |
| TT data                             | TTM, TLL, TTD, TLB   |
| AIS target data                     | TTM, TLL, TTD  |
| Alert                               | ACN, HBT   |
| NAVTEX                              | NRX or JRC format  |
| Azimuth/distance to the destination | RMB > BWC > BWR (Plotter option)   |
| Water current                       | CUR  |
| Automatic sailing and Track control | (Can be received during automatic sailing or track control)  |
| TOKIMEC : Autopilot (KELVIN)        | ROT  |
| TOKYO KEIKI : PR-6000, HCS-9000     | HTD  |
| YDK : PT500, PT900                  | HTD, ZDL   |
| ALPHATRON : Alphapilot MFM          | HTD, ZDL   |
| <b>Transmittable signals</b>        |  |
| Own ship data                       | OSD  |
| Watch Timer Reset                   | EVE*2  |
| TT data                             | TTM, TLL, TTD, TLB   |
| Remote maintenance data             | JRC format   |
| Alert                               | ALC, ALF, ARC, HBT   |
| Route information                   | ECDIS information notification (PJRC,EIF00/PJRC,EIS00/WPL)   |
| Auto pilot information              | ECDIS information notification (PJRC,EIF00)  |
| NAVTEX                              | NRM  |
| Azimuth/distance to the destination | RMB, BWC   |
| Automatic sailing and Track control | (Can be transmitted during automatic sailing or track control)   |
| TOKIMEC : Autopilot (KELVIN)        | CTS, HTR   |
| TOKYO KEIKI : PR-6000, HCS-9000     | HTC, XTE, VBW, VTG, PJRCI, HSC   |
| YDK : PT500, PT900                  | HTC, XTE, VBW, VTG   |
| ALPHATRON : Alphapilot MFM          | HTC, XTE, GLL, VHW, VTG, PNEY,001, PNEY,002  |
| Navigation Data                     | DBK, DPT, DTM, GGA, GLL, HDG, HDT, MDA, MWV, NSR, POS, RMB, RMC, ROT, RSA, THS, VBW, VDR, VTG, VWR, VWT, XDR, ZDA, HBT, BWC, RTE, WPL, HSC, OSD, RSD, XTE, ZTG |
| <b>Visual range</b>                 |  |
| Visual range                        | 1.00m from the center of display(NWZ-208/207/214)<br>1.07m from the center of display(NWZ-233)   |

- ii. The measuring precision of the speed sensor complies with IMO Resolution MSC.96(72).  
The measuring precision of the GPS sensor complies with IMO Resolution MSC.112(73).

\*1 e-Token (Option) is required to use C-map.

\*2 When the value exceeds the set value, a message is output indicating a non-operation state. The value is set at installation.

## 24.43 Target Tracking

| FUNCTIONAL SPECIFICATION      |   |
|-------------------------------|---|
| <b>Acquisition</b>            |   |
| Acquisition Mode              | Manual/AUTO (AUTO mode uses Auto-acquisition Zone)  |
| Manual Cancellation           | Any one Target or All targets at once   |
| Acquisition Range             | 0.1NM to 32NM (Available in all range scale)  |
| <b>Tracking</b>               |   |
| Number of Target              | 100 targets   |
| Tracking Range                | 0.1NM to 32NM (Available in all range scale)  |
| <b>View</b>                   |   |
| Motion mode                   | TM (True Motion) / RM (Relative Motion)   |
| Azimuth mode                  | North UP, Head UP, Course UP, Waypoint UP   |
| Vector mode                   | True / Relative Display   |
| Vector Length                 | Variable, 1 to 120 min. (1min. step)  |
| Past Position                 | True / Relative Display<br>Number of Dots --- 10 points<br>Display Interval Time --- 0.5 / 1 / 2 / 4 min<br>Display range: 0.1NM, 0.2NM, 0.5NM, and 1NM |
| Time to Display Vector        | within 1 minute   |
| Time to Stabilize Vector      | within 3 minutes  |
| <b>Alarm</b>                  |   |
| Auto-acquisition Zone (AZ)    | 2 (sector)  |
| Setting range                 | 0.5NM to 32NM   |
| Alarm Indication              | Symbol on Display, Visible/Audible Alarm  |
| <b>Safe Limits (CPA/TCPA)</b> |   |
| CPA LIMIT                     | 0.1 to 9.9NM  |
| TCPA LIMIT                    | 1 to 99 minutes   |
| Conditions                    |   |
| Safe Target                   | CPA > CPA Limit<br>0 > TCPA<br>TCPA > TCPA Limit  |
| Dangerous Target              | CPA ≤ CPA Limit<br>0 ≤ TCPA ≤ TCPA Limit  |
| Lost Target                   | Symbol on Display, Visible/Audible Alarm  |
| Alert Indication              |   |
| Safe Target                   | Color: White, Alert: OFF, Buzzer: OFF   |
| Dangerous Target              | Color: Red, Alert: ON, Buzzer: ON   |
| <b>Data Indication</b>        |   |
| Target Data                   | Simultaneous display for 10 targets (26-inch screen)/4 targets (19-inch screen)<br>True Bearing, Range, True Course, True Speed, CPA, TCPA, BCR, BCT    |
| Own Ship's Data               | Course and Speed  |
| <b>Trial Maneuver</b>         |   |
| Manual Setting                |   |
| Trial Course                  | 0° to 359.9°  |
| Trial Speed                   | 0 to 100 kn   |
| Accuracy of Display           | Complied with IMO Requirements  |
| System Failure                | Visible / Audible Alarm   |
| Speed Input                   | Manual / AUTO (LOG)   |

## 24.44 AIS

| FUNCTIONAL SPECIFICATION                   |  |
|--|--|
| <b>Activation</b>                          |  |
| Acquisition Mode                           | Manual/AUTO (AUTO mode uses Auto-acquisition Zone)   |
| Manual Cancellation                        | Any one Target   |
| <b>Presentation</b>                        |  |
| Number of Target (Sleeping and activated ) | 500 [475] targets (Option: 1000 [950])*1   |
| No. targets processed                      | 1024 targets   |
| Past Position                              | True / Relative Display<br>Number of Dots --- 10 points<br>Display Interval Time --- 0.5 / 1 / 2 / 4 min<br>Display Interval Distance --- 0.1 / 0.2 / 0.5 / 1 NM     |
| Message                                    | Broadcast Message, Addressed Message   |
| Motion mode                                | TM (True Motion) / RM (Relative Motion)  |
| Azimuth mode                               | North UP, Head UP, Course UP, Waypoint UP  |
| Vector mode                                | True / Relative Display  |
| Vector Length                              | Variable, 1 to 60 min. (1min. step)  |
| <b>Alarm</b>                               |  |
| Auto-acquisition Zone (AZ)                 | 2 (sector)   |
| Setting range                              | 0.5NM to 32NM  |
| Alarm Indication                           | Symbol on Display, Visible/Audible Alarm   |
| <b>Safe Limits (CPA/TCPA)</b>              |  |
| CPA LIMIT                                  | 0.1 to 9.9NM   |
| TCPA LIMIT                                 | 1 to 99 minutes  |
| Conditions                                 |  |
| Safe Target                                | CPA > CPA Limit<br>0 > TCPA<br>TCPA > TCPA Limit   |
| Dangerous Target                           | CPA ≤ CPA Limit<br>0 ≤ TCPA ≤ TCPA Limit   |
| Lost Target                                | Symbol on Display, Visible/Audible Alarm   |
| Alert Indication                           |  |
| Safe Target                                | Color: White, Alert: OFF, Buzzer: OFF  |
| Dangerous Target                           | Color: Red, Alert: ON, Buzzer: ON  |
| <b>Data Indication</b>                     |  |
| Target Data                                | Simultaneous and Continuous Display for 10 Targets   |
| Simple Display                             | Ship's name, Call sign, MMSI, Course, Speed, CPA and TCPA  |
| Details Display                            | Ship's name, Call sign, MMSI, Course, Speed, CPA, TCPA, Bearing, Range, Ship's Heading Bearing, Rate of turn, Latitude, Longitude, Destination and Navigation Status |
| Own Ship's Data                            | The ship's name, Call sign, MMSI, Course, Speed, Ship's heading bearing, Rate of turn, Latitude, Longitude, Destination, and Navigation status of own ship           |
| <b>Trial Maneuver</b>                      |  |
| Manual Setting                             |  |
| Trial Course                               | 0° to 359.9°   |
| Trial Speed                                | 0 to 100 kn  |
| Accuracy of Display                        | Complied with IMO Requirements   |
| System Failure                             | Visible / Audible Alarm  |
| Speed Input                                | AUTO (LOG)   |

\*1 The value in [ ] indicates the 95% of the number of maximum targets.

## 24.45 Central Control Unit

| GENERAL SPECIFICATION     | NDC-1590/A: Central Control Unit  |
|---------------------------|---|
| CPU                       | Intel Core i5 2515E 2.5GHz (NDC-1590)<br>/ CPU Intel Core i3 6100E 2.7GHz (NDC-1590A)   |
| Main Memory               | 2GB (DDR3, NDC-1590) / 4GB (DDR4, NDC-1590A)  |
| JRC ASIC                  | Yes   |
| <b>Mechanical</b>         |   |
| Dimension                 | Width 400 × Depth 240 × Height 125 (mm)   |
| Mass                      | 5.6kg   |
| FAN                       | 1   |
| <b>Environment</b>        |   |
| Operational Temperature   | -15°C to +55°C  |
| Operational Humidity      | 40°C RH 93%   |
| Vibration                 | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                       | IEC60945-Ed4.0  |
| Ingress Protection Rating | IP20  |
| <b>Interfaces</b>         |   |
| DVI-D                     | 1   |
| VGA                       | 1 (Slave output with same resolution as DVI-D)  |
| IEC61162-1                | 2 input (GPS and LOG)   |
| IEC61162-2                | 2 input (AIS and THD)   |
| IEC61162-450              | 2 (IEEE802.3u/IEEE802.3ab compliance (100BASE-TX/1000BASE-T))   |
| Dry Contact Output        | 2 (Power Fail and Watch Timer Reset )   |
| Normally Close            | Power Fail (32V 0.8A MAX)   |
| Normally Open             | Watch Timer Reset (32V 0.8A MAX)  |
| Operation Unit            | 1 (5m max)  |
| Extended Operation Unit   | 1 (up to 30m)   |
| USB I/F                   | 3 (1 for MNU, Others are general purpose)   |
| RADAR I/F                 | 1 input for scanner unit, 1 output for other equipment  |
| Power                     | Connecting with NBD-913   |

## 24.46 Power Supply Unit

| GENERAL SPECIFICATION     | NBD-913: Power Supply Unit  |
|---------------------------|---|
| <b>AC Input</b>           |   |
| Voltage                   | 100 to 115VAC, 50/60Hz 1 $\phi$<br>220 to 240VAC, 50/60Hz 1 $\phi$  |
| Voltage Range             | 85 to 264VAC  |
| Overvoltage Protection    | 295VAC $\pm$ 2V   |
| Input Current             | Max 6.8A(100VAC) / 3.4A(220VAC)   |
| Over current Protection   | YES   |
| <b>DC Input</b>           |   |
| Voltage                   | 24VDC   |
| Voltage Range             | 21.6 to 31.2VDC   |
| Overvoltage Protection    | 42V   |
| Input Current             | Max 16A   |
| Over current Protection   | YES   |
| <b>Rated Output</b>       |   |
| Output 1                  | 12.0V $\pm$ 0.24V 2A  |
| Output 2A (for CCU)       | 24.0V $\pm$ 0.48V 4A  |
| Output 2B (for MNU)       | 24.0V $\pm$ 0.48V 6A  |
| Output 3 (for TXRX)       | 48.0V $\pm$ 0.96V 4A  |
| <b>Mechanical</b>         |   |
| Dimension                 | Width 400 $\times$ Depth 240 $\times$ Height 85 (mm)  |
| Mass                      | 4.2kg   |
| FAN                       | 2   |
| <b>Environment</b>        |   |
| Operational Temperature   | -15°C to +55°C  |
| Operational Humidity      | 40°C RH 93%   |
| Vibration                 | Sweep 2Hz to 13.2Hz at $\pm$ 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                       | IEC60945-Ed4.0  |
| Ingress Protection Rating | IP20  |

## 24.47 Trackball Operation Unit

| GENERAL SPECIFICATION     | NCE-5605: Trackball Operation Unit  |
|---------------------------|---|
| Pointing Device           | 2inch Trackball   |
| Click Button              | 2-buttons (Left and Right)  |
| USB I/F                   | 1   |
| Speaker                   | 1   |
| Keys                      | SILENCE/ALERT ACK/ZOOM IN/ZOOM OUT  |
| Knob                      | Multi Function Knob   |
| Cable Length              | Up to 5m (Up to 30m when using the extended option)   |
| <b>Mechanical</b>         |   |
| Dimension                 | Width 130 × Depth 210 × Height 177 (mm)   |
| Mass                      | 1.3kg   |
| <b>Environment</b>        |   |
| Operational Temperature   | -15°C to +55°C  |
| Operational Humidity      | 40°C RH 93%   |
| Vibration                 | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                       | IEC60945-Ed4.0  |
| Ingress Protection Rating | Front : IP22  |

## 24.48 19inch Display (NWZ-207)

| GENERAL SPECIFICATION              | NWZ-207: Display  |
|------------------------------------|---|
| Screen Size                        | 19inch  |
| Aspect Ratio                       | 5:4   |
| Full Resolution                    | 1280×1024   |
| Supported format                   | 1280×1024, 1280×960, 1024×768, 800×600, 640×480, 720×400  |
| Dot Pitch                          | 0.294mm   |
| Viewing Area                       | 376.32mm × 301.06mm   |
| Display Colors                     | 16.77 million colors  |
| Contrast Ratio                     | 2000:1  |
| Viewing Angles (H / V)             | 178° / 178°   |
| Back Light                         | LED   |
| Brightness                         | 500cd/m2 Type   |
| Digital Scanning Frequency (H / V) | Horizon 30kHz to 80kHz<br>Vertical 56Hz to 75Hz   |
| DVI-D input                        | 1   |
| VGA input                          | 1   |
| VGA output                         | N/A   |
| USB I/F                            | 1   |
| Power                              | 21.6 to 31.2VDC   |
| Overvoltage Protection             | N/A   |
| DC Reverse Connection Protection   | Self Return Type  |
| Cables                             | Up to 5m  |
| Glass Bonding                      | Standard  |
| <b>Mechanical</b>                  |   |
| Dimension                          | Width 429 × Depth 76 × Height 382 (mm)  |
| Mass                               | 6.0kg   |
| Fan                                | 1   |
| Glass                              | Tempered Glass + AR Coating   |
| <b>Environment</b>                 |   |
| Operational Temperature            | -15°C to +55°C  |
| Operational Humidity               | 40°C RH 93%   |
| Vibration                          | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMS                                | IEC60945-Ed4.0  |
| Ingress Protection Rating          | Front:IP65 Back:IP22  |

## 24.49 19inch Display (NWZ-214)

| GENERAL SPECIFICATION              | NWZ-214 : Display   |
|------------------------------------|---|
| Screen Size                        | 19inch  |
| Aspect Ratio                       | 5:4   |
| Full Resolution                    | 1280×1024   |
| Supported format                   | 1280×1024, 1280×960, 1024×768, 800×600, 640×480, 720×400  |
| Dot Pitch                          | 0.294mm   |
| Viewing Area                       | 376.32mm × 301.06mm   |
| Display Colors                     | 16.77 million colors  |
| Contrast Ratio                     | 2000:1  |
| Viewing Angles (H / V)             | 178° / 178°   |
| Back Light                         | LED   |
| Brightness                         | 1000cd/m <sup>2</sup> Type  |
| Digital Scanning Frequency (H / V) | Horizon 30kHz to 80kHz<br>Vertical 56Hz to 75Hz   |
| DVI-D input                        | 1   |
| VGA input                          | 1   |
| VGA output                         | N/A   |
| USB I/F                            | N/A   |
| Power                              | 21.6 to 31.2VDC   |
| Overvoltage Protection             | N/A   |
| DC Reverse Connection Protection   | Self Return Type  |
| Cables                             | Up to 5m  |
| Glass Bonding                      | Standard  |
| <b>Mechanical</b>                  |   |
| Dimension                          | Width 429 × Depth 76 × Height 382 (mm)  |
| Mass                               | 4.6kg   |
| Fan                                | 1   |
| Glass                              | Tempered Glass + AR Coating   |
| <b>Environment</b>                 |   |
| Operational Temperature            | -15°C to +55°C  |
| Operational Humidity               | 40°C RH 93%   |
| Vibration                          | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                                | IEC60945-Ed4.0  |
| Ingress Protection Rating          | Front:IP65 Back:IP22  |

# 24.50 26inch Display

| GENERAL SPECIFICATION              | NWZ-208: Display   |
|------------------------------------|--|
| Screen Size                        | 26inch   |
| Aspect Ratio                       | 16:10  |
| Full Resolution                    | 1920×1200RB  |
| Supported format                   | 1920×1200RB, 1680×1050, 1680×1050RB, 1600×1200, 1600×1200RB, 1280×1024, 1024×768, 800×600, 640×480   |
| Dot Pitch                          | 0.2865mm   |
| Viewing Area                       | 550.08mm × 343.8 mm  |
| Display Colors                     | 16.77 million colors   |
| Contrast Ratio                     | 1500:1   |
| Viewing Angles (H / V)             | 176° / 176°  |
| Back Light                         | LED  |
| Brightness                         | 400cd/m <sup>2</sup> Type  |
| Digital Scanning Frequency (H / V) | Horizontal 30kHz to 75kHz<br>Vertical 56Hz to 75Hz   |
| DVI-D input                        | 1  |
| VGA input                          | 1  |
| VGA output                         | 1  |
| USB I/F                            | 1  |
| Power                              | 21.6 to 31.2VDC<br>85 to 265VAC 50/60Hz  |
| Overvoltage Protection             | N/A  |
| DC Reverse Connection Protection   | Self-Return Type   |
| Cables                             | Up to 5m   |
| Glass Bonding                      | Optional   |
| <b>Mechanical</b>                  |  |
| Dimension                          | Width 624 × Depth 85 × Height 456 (mm)   |
| Mass                               | 16kg   |
| Fan                                | 2  |
| Glass                              | Tempered Glass + AR Coating  |
| <b>Environment</b>                 |  |
| Operational Temperature            | -15°C to +55°C   |
| Operational Humidity               | 40°C RH 93%  |
| Vibration                          | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup><br>and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                                | IEC60945-Ed4.0   |
| Ingress Protection Rating          | Front: IP65 Back: IP22   |



## 24.51 27inch Display

| GENERAL SPECIFICATION              | NWZ-233: Display   |
|------------------------------------|--|
| Screen Size                        | 27inch   |
| Aspect Ratio                       | 16:9   |
| Full Resolution                    | 1920x1080  |
| Supported format                   | 1920x1200, 1920x1080, 1680x1050, 1600x1200, 1280x1024, 1280x960, 1024x768, 800x600, 720x400, 640x480                                       |
| Dot Pitch                          | 0.311mm  |
| Viewing Area                       | 597.6mm × 336.2 mm   |
| Display Colors                     | 16.77 million colors   |
| Contrast Ratio                     | 3000:1   |
| Viewing Angles (H / V)             | 178° / 178°  |
| Back Light                         | LED  |
| Brightness                         | 350cd/m <sup>2</sup> Type  |
| Digital Scanning Frequency (H / V) | Horizontal 31kHz to 76kHz<br>Vertical 59Hz to 61Hz   |
| DVI-D input                        | 1  |
| VGA input                          | 1  |
| DP input                           | 1  |
| USB I/F                            | 1  |
| Power                              | 21.6 to 31.2VDC<br>85 to 265VAC 50/60Hz  |
| Overvoltage Protection             | N/A  |
| DC Reverse Connection Protection   | Reverse current protection with FET control  |
| Cables                             | Up to 5m   |
| Glass Bonding                      | Optional   |
| <b>Mechanical</b>                  |  |
| Dimension                          | Width 656 × Depth 62.5 × Height 454 (mm)   |
| Mass                               | 8.6kg  |
| Fan                                | N/A  |
| Glass                              | Tempered Glass + AR/AF Coating   |
| <b>Environment</b>                 |  |
| Operational Temperature            | -15°C to +55°C   |
| Operational Humidity               | 40°C RH 93%  |
| Vibration                          | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup><br>and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                                | IEC60945-Ed4.0   |
| Ingress Protection Rating          | Front: IP65 Back: IP22   |

## 24.52 Keyboard OPU

| GENERAL SPECIFICATION     | NCE-5625: Keyboard Operation Unit   |
|---------------------------|---|
| <b>PC Keyboard</b>        |   |
| Layout                    | QWERTY  |
| Pitch                     | 15mm  |
| Stroke                    | 2mm   |
| <b>Dedicated Keys</b>     |   |
| Keys                      | HOME, TX/STBY, PI, DISP OFF, AZ, PANEL, DAY/NIGHT, MOB, USER1, USER2  |
| Knobs                     | EBL, VRM, SEA, RAIN, GAIN   |
| <b>Mechanical</b>         |   |
| Dimension                 | Width 270 × Depth 210 × Height 30 (mm)  |
| Mass                      | 0.8kg   |
| <b>Environment</b>        |   |
| Operational Temperature   | -15°C to +55°C  |
| Operational Humidity      | 40°C RH 93%   |
| Vibration                 | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                       | IEC60945-Ed4.0  |
| Ingress Protection Rating | Front : IP22  |

## 24.53 26/27inch Display Unit Mount Kit

| GENERAL SPECIFICATION     | CWA-246: 26/27inch Display Unit Mount Kit   |
|---------------------------|---|
| <b>Mechanical</b>         |   |
| Dimension                 | Width 680 × Depth 718 × Height 1100 (mm)  |
| Mass                      | APPROX. 65kg  |
| <b>Environment</b>        |   |
| Operational Temperature   | -15°C to +55°C  |
| Operational Humidity      | 40°C RH 93%   |
| Vibration                 | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                       | IEC60945-Ed4.0  |
| Ingress Protection Rating | Front : IP22  |

## 24.54 19inch Display Unit Mount Kit

| GENERAL SPECIFICATION     | CWA-245: 19inch DISPLAY UNIT MOUNT KIT  |
|---------------------------|---|
| <b>Structure</b>          |   |
| Dimension                 | Width 580 × Depth 718 × Height 1100 (mm)  |
| Mass                      | Approx. 55kg  |
| <b>Environment</b>        |   |
| Operational Temperature   | -15°C to +55°C  |
| Operational Humidity      | 40°C RH 93%   |
| Vibration                 | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                       | IEC60945-Ed4.0  |
| Ingress Protection Rating | Front: IP22   |

## 24.55 Sensor LAN Switch Unit

| GENERAL SPECIFICATION       |   | NQA-2443: Sensor LAN switch unit  |
|-----------------------------|---|-----------------------------------|
| Technology                  |   |                                   |
| Standards                   | IEEE802.3, 802.3u, 802.3x   |                                   |
| Processing type             | Store and Forward, with IEEE802.3 full duplex, back pressure flow control   |                                   |
| Forward and Filtering Rate  | 148810 pps  |                                   |
| Latency                     | Less than 5us   |                                   |
| Interface                   |   |                                   |
| Number of ports             | 16  |                                   |
| RJ45                        | 10/100BASE-T(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection  |                                   |
| LED                         | Power, Fault, Speed   |                                   |
| Power                       |   |                                   |
| Input Voltage               | 12 to 48 VDC, redundant inputs  |                                   |
| Input Current               | 0.34A max   |                                   |
| Over Current Protection     | 1.6A  |                                   |
| Reverse Polarity Protection | Yes   |                                   |
| Mechanical                  |   |                                   |
| Dimension                   | Width 75.0 × Depth 105 × Height 179 (mm)  |                                   |
| Mass                        | 1.5kg   |                                   |
| Environment                 |   |                                   |
| Operational Temperature     | -15°C to +55°C  |                                   |
| Operational Humidity        | 40°C RH 93%   |                                   |
| Vibration                   | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes       |                                   |
| EMC                         | IEC60945-Ed4.0  |                                   |
| GENERAL SPECIFICATION       |   | NQA-2443A: Sensor LAN switch unit |
| Technology                  |   |                                   |
| Standards                   | IEEE802.3, 802.3u, 802.3x, 802.3ab  |                                   |
| Processing type             | Store and Forward, with IEEE802.3 full duplex, 14880 pps / port (10Mbps, 64byte pkt, uni-cast)  |                                   |
| Maximum throughput          | 148810 pps / port (100Mbps, 64byte pkt, uni-cast)   |                                   |
|                             | 1488100 pps / port (1000Mbps, 64byte pkt, uni-cast)   |                                   |
|                             | *Wire speed : 100%  |                                   |
| Interface                   |   |                                   |
| Number of ports             | 16  |                                   |
| RJ45                        | 10/100/1000BASE-T(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection   |                                   |
| LED                         | PWR, UVP/OVP, RVP, LOOP, LINK/ACT   |                                   |
| Power                       |   |                                   |
| Input Voltage               | 18 to 36 VDC  |                                   |
| Maximum Power Consumption   | 13.2 W and under  |                                   |
| Reverse Polarity Protection | Yes   |                                   |
| Mechanical                  |   |                                   |
| Dimension                   | Width 75.0 x Depth 105 x Height 179 (mm)  |                                   |
| Mass                        | 0.8kg   |                                   |
| Environment                 |   |                                   |
| Operational Temperature     | -25°C to +70°C  |                                   |
| Operational Humidity        | 40°C RH 93%   |                                   |
| Vibration                   | Sweep 2 Hz to 13.2 Hz at ± 1 mm, 13.2 Hz to 100 Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30 Hz in all three axes |                                   |
| EMC                         | IEC60945-Ed4.0  |                                   |

## 24.56 Junction Box

| GENERAL SPECIFICATION                   |  | NQE-1143: Junction Box  |
|---|--|---|
| <b>Mechanical</b>                       |  |   |
| Dimension                               |  | Width 400 × Depth 86 × Height 261.5 (mm)  |
| Mass                                    |  | 3.8kg   |
| <b>Environment</b>                      |  |   |
| Operational Temperature                 |  | -15°C to +55°C  |
| Operational Humidity                    |  | 40°C RH 93%   |
| Vibration                               |  | Sweep 2Hz to 13.2Hz at ± 1mm, 13.2Hz to 100Hz at 7m/s <sup>2</sup> and for 2h on each resonance, otherwise 2h at 30Hz in all three axes |
| EMC                                     |  | IEC60945-Ed4.0  |
| Ingress Protection Rating               |  | Front : IP20  |
| <b>Power</b>                            |  |   |
| Input Voltage                           |  | 21.6 to 31.2 VDC  |
| Power Consumption                       |  | 48W MAX   |
| Over Current Protection                 |  | 3A×2, 15A×1 Mini Blade Fuse   |
| Reverse Polarity Protection             |  | Yes   |
| FUNCTIONAL SPECIFICATION                |  | CMH-2370: Serial LAN Interface Circuit  |
| <b>Interface</b>                        |  |   |
| IEC61162-1                              |  | 8 input / 8 output  |
| IEC61162-2                              |  | 2 input / 2 output  |
| IEC61162-450                            |  | 1 (100BASE-TX)  |
| Dry Contact Output (N.C/N.O selectable) |  | 8 (32V, 0.8A sink MAX)  |
| Dry Contact Input                       |  | 8 (5V, 50mA source MAX)   |
| Ingress Protection Rating               |  | Front : IP20  |
| FUNCTIONAL SPECIFICATION                |  | CMJ-554: Gyro Interface Circuit   |
| <b>GYRO</b>                             |  |   |
| STEP                                    |  | 22 to 70 VDC  |
| SYNC                                    |  | 24 to 115VAC, 50/60/400Hz   |
| RATIO                                   |  | 36X/90X/180X/360X   |
| OUTPUT                                  |  | THS (50Hz)  |
| <b>LOG</b>                              |  |   |
| PULSE                                   |  | Dry contact: 30V(max), 50mA(max)<br>Voltage signal: 0-50V (threshold level is 2V)   |
| RATIO                                   |  | 100/200/400/800 [P/NM]  |
| OUTPUT                                  |  | VBW (1Hz), VLW (0.1Hz)  |
| FUNCTIONAL SPECIFICATION                |  | CMJ-556: Analog Option Circuit  |
| <b>Interface</b>                        |  |   |
| Isolated Input                          |  | 4   |
| Input Signal Range                      |  | -10 to 10 VDC or<br>4 to 20 mA  |
| FUNCTIONAL SPECIFICATION                |  | CQD-2286: Radar Interface Circuit   |
| <b>Interface</b>                        |  |   |
| Scanner Input                           |  | 1   |
| Slave Video output                      |  | 1   |
| radar video                             |  | 0 to -2.6 VDC, output with 50 ohm termination, log scale: 50dB/V  |
| trigger                                 |  | Positive, 4V, 1us to 4.4us, output with 50 ohm termination  |
| BP (:Bearing Pulse)                     |  | 2048 pulse/round, open-collector output with 5V-1k ohm pull-up  |
| BZ (:Bearing Zero)                      |  | 1 pulse/round, open-collector output with 5V-1k ohm pull-up   |
| ISW                                     |  | YES   |

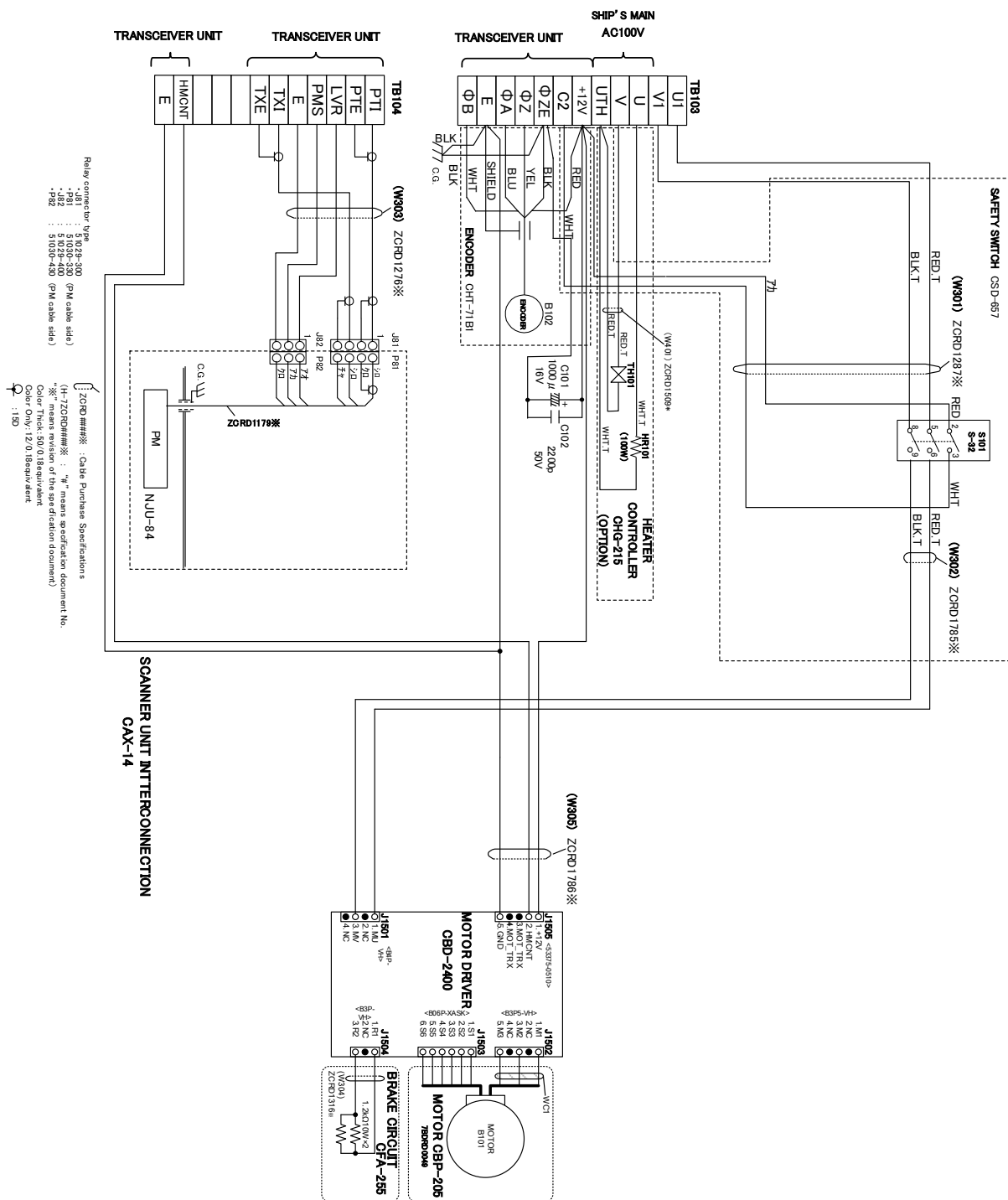
### A.1 NKE-1139 (110 VAC)



## Appendix A Radar Antenna Block Diagrams



# A.3 NKE-1139A(110/220 VAC)



## Appendix A Radar Antenna Block Diagrams

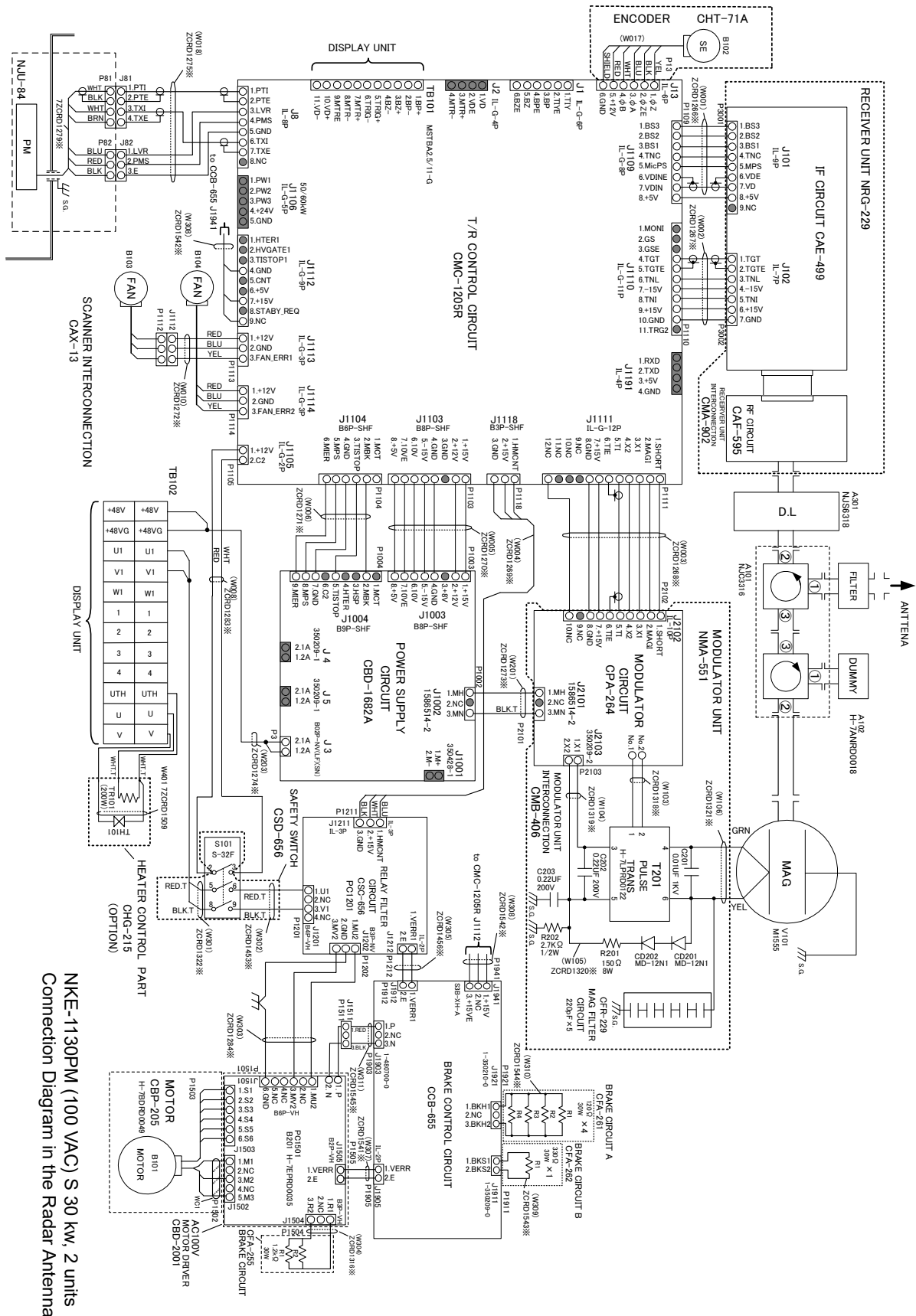


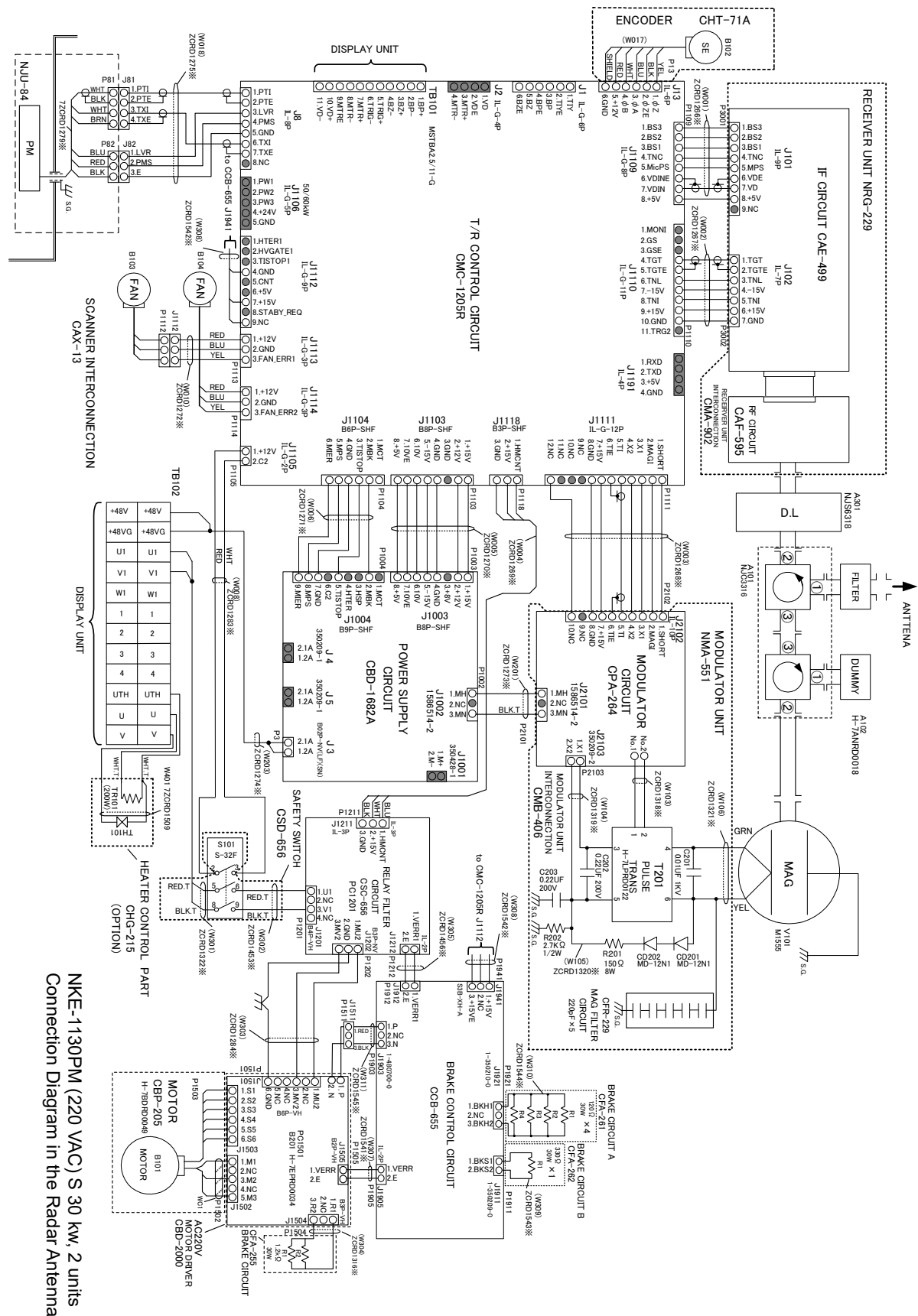


## APP A

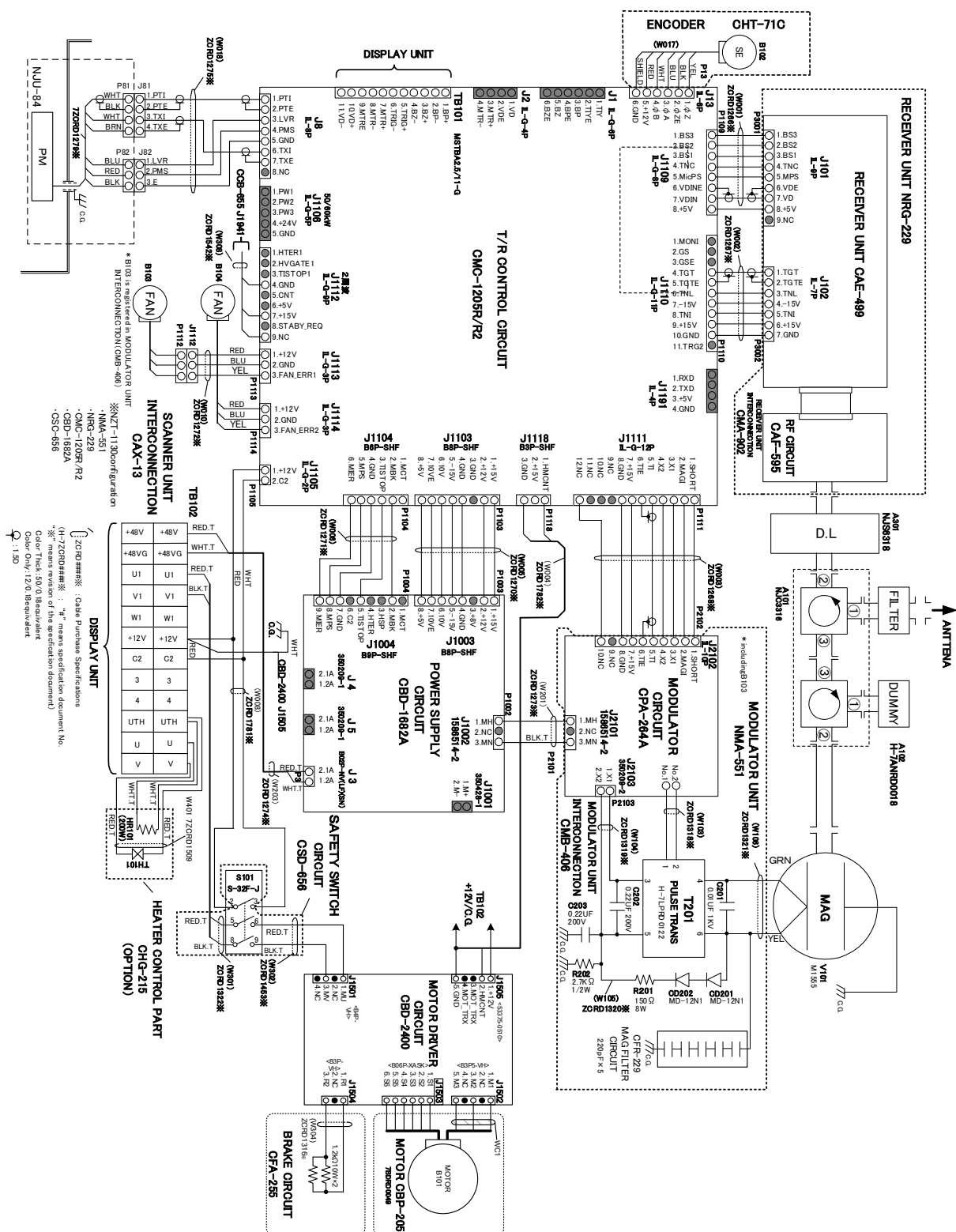


# A.6 NKE-1130 (110 VAC)

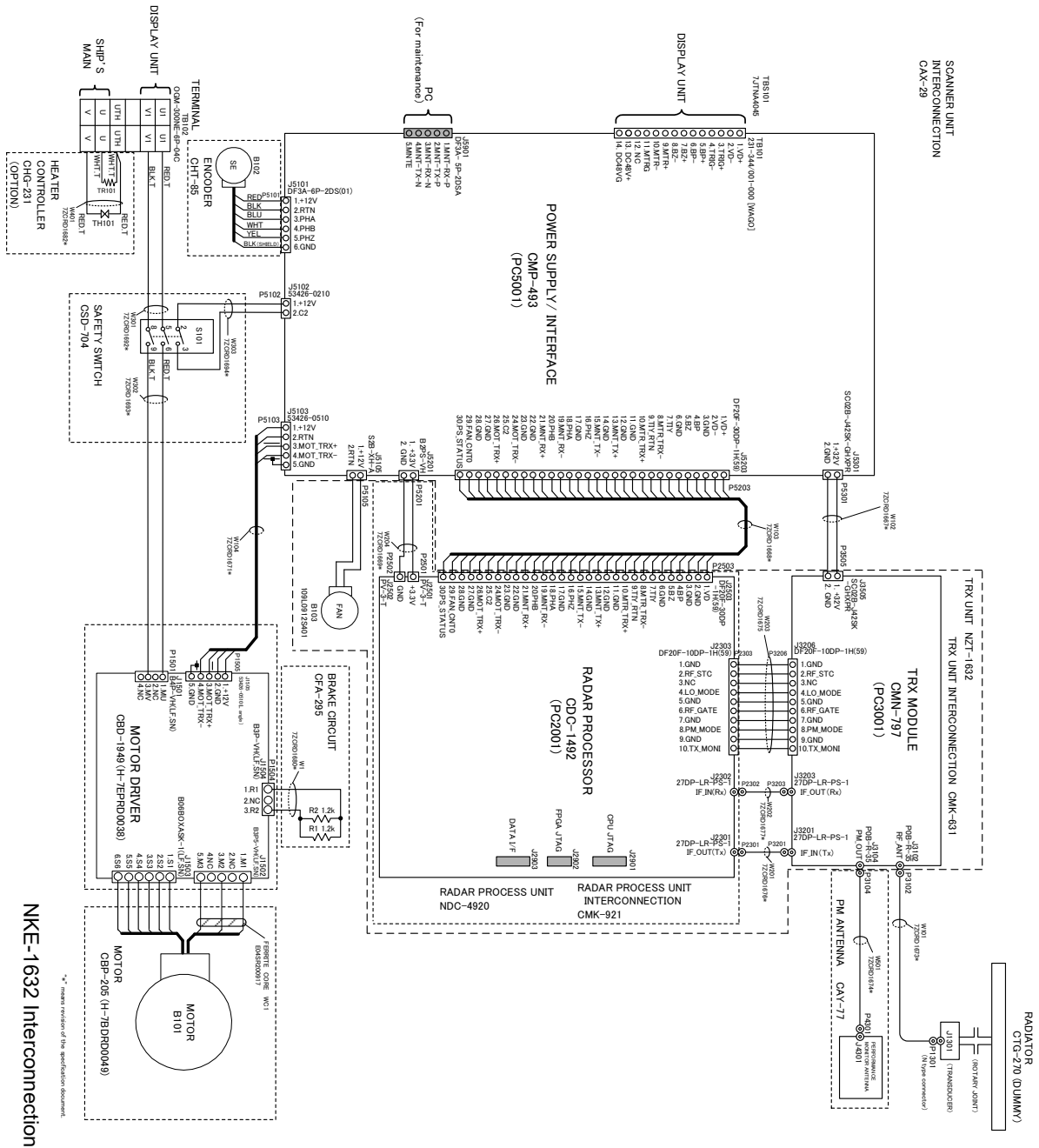




## A-8



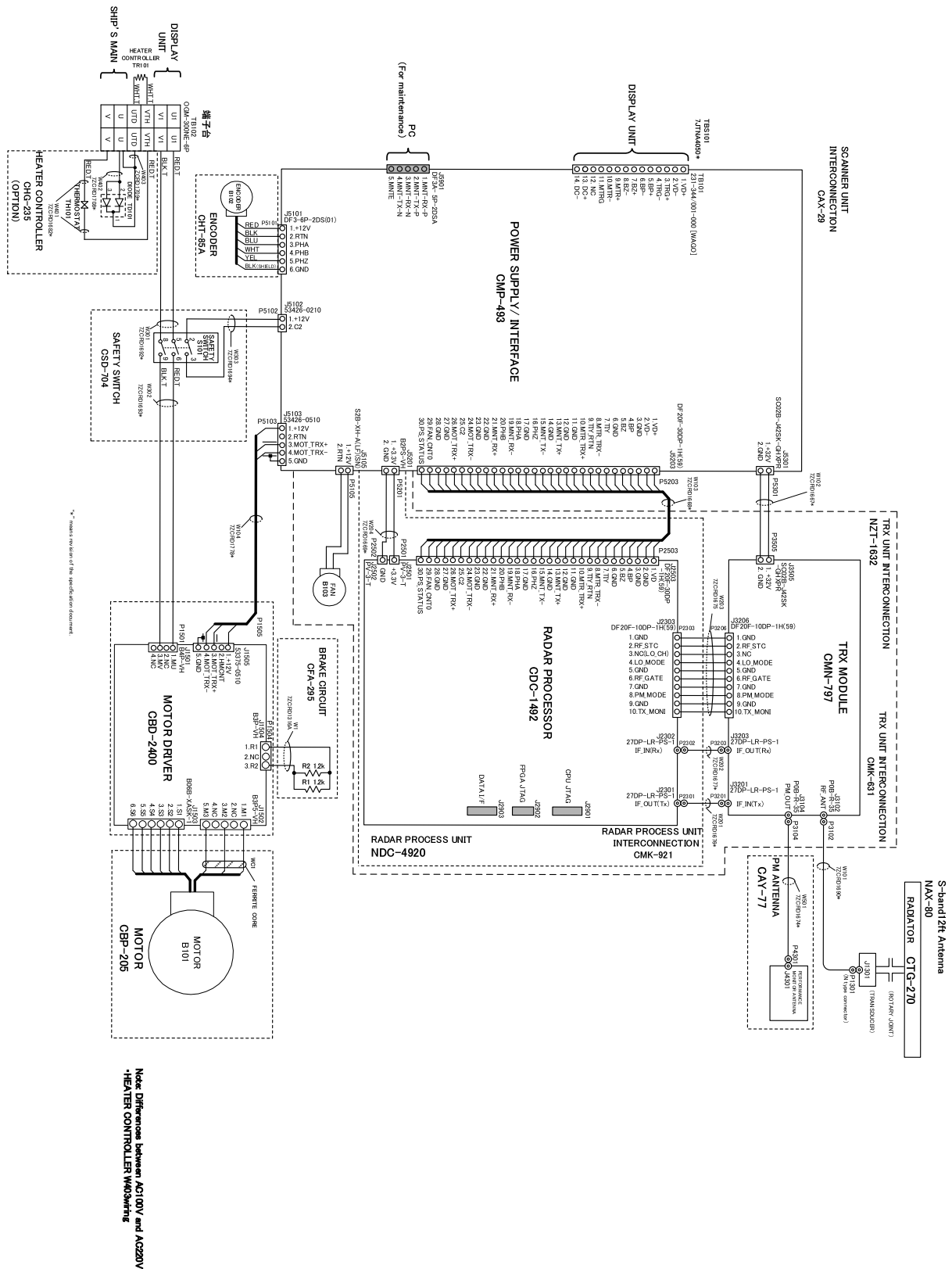
# A.9 NKE-1632



NKE-1632 Interconnection

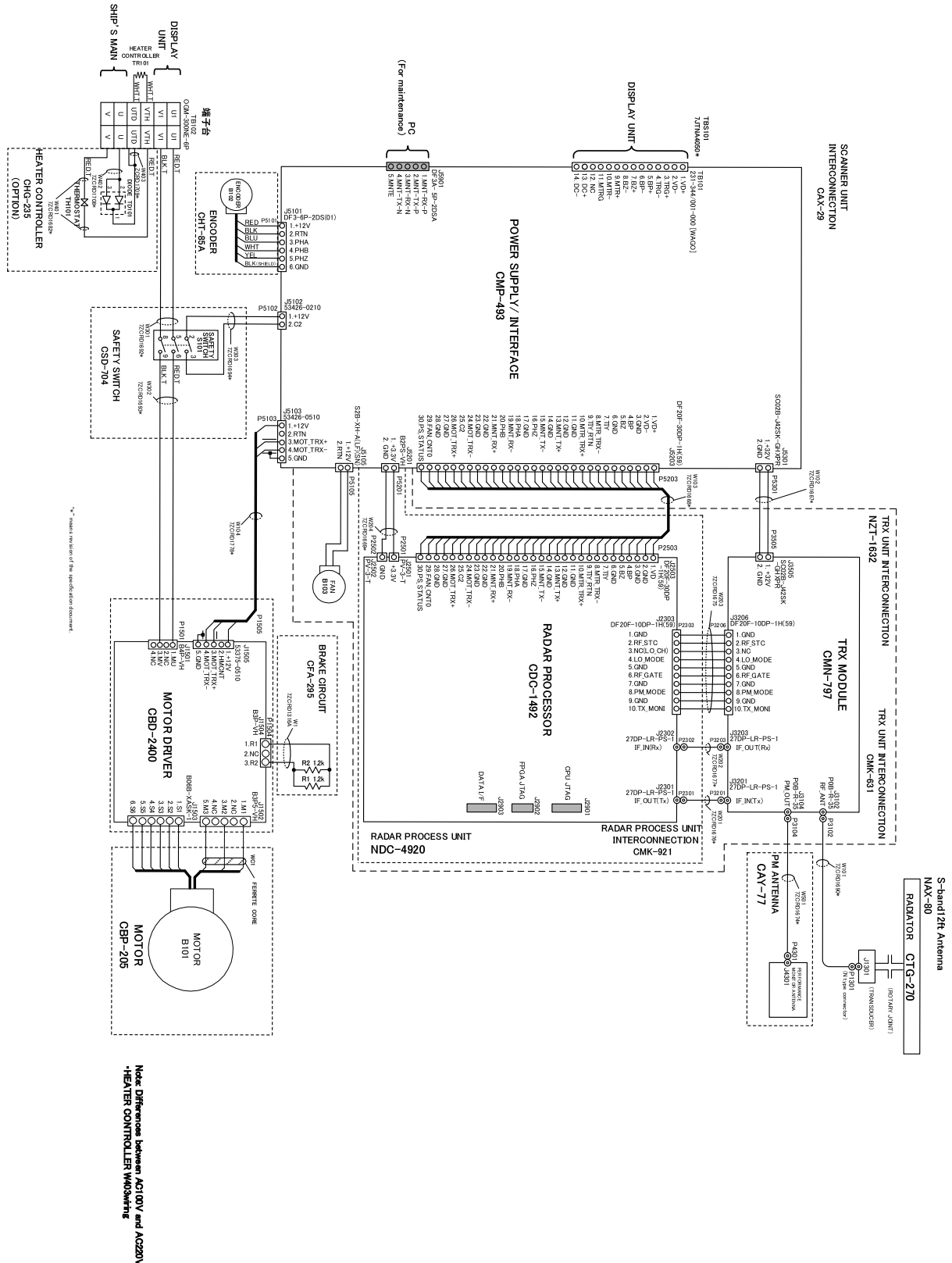
\* means revision of the specification document.

# A.10 NKE-1632A(AC100V)



## NKE-1632A(AC100V) INTERCONNECTION

# A.11 NKE-1632A(AC220V)



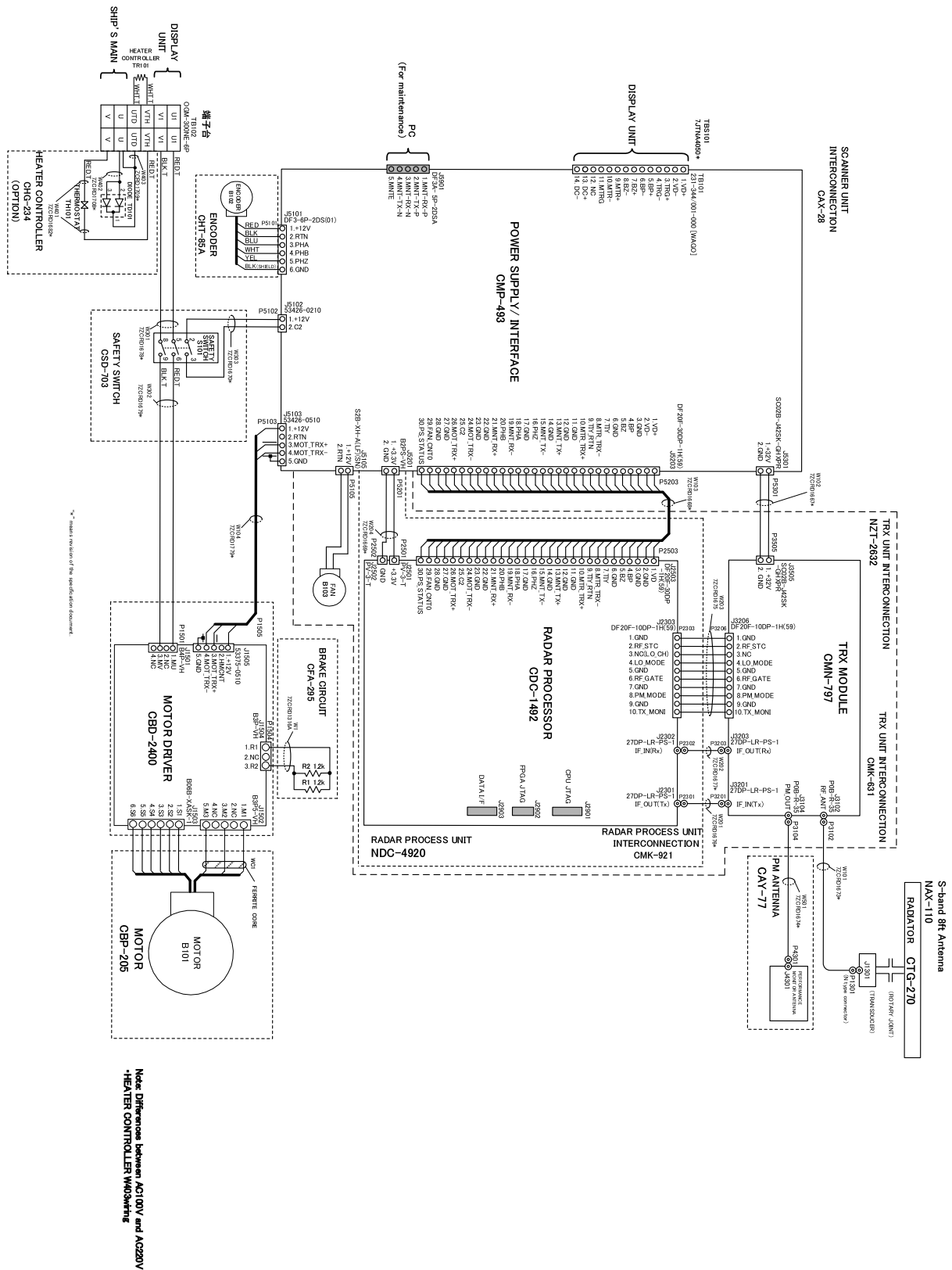
NKE-1632A(AC220V) INTERCONNECTION

## A-12



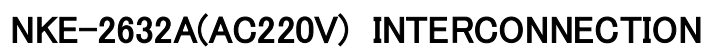


# A.13 NKE-2632A(AC100V)

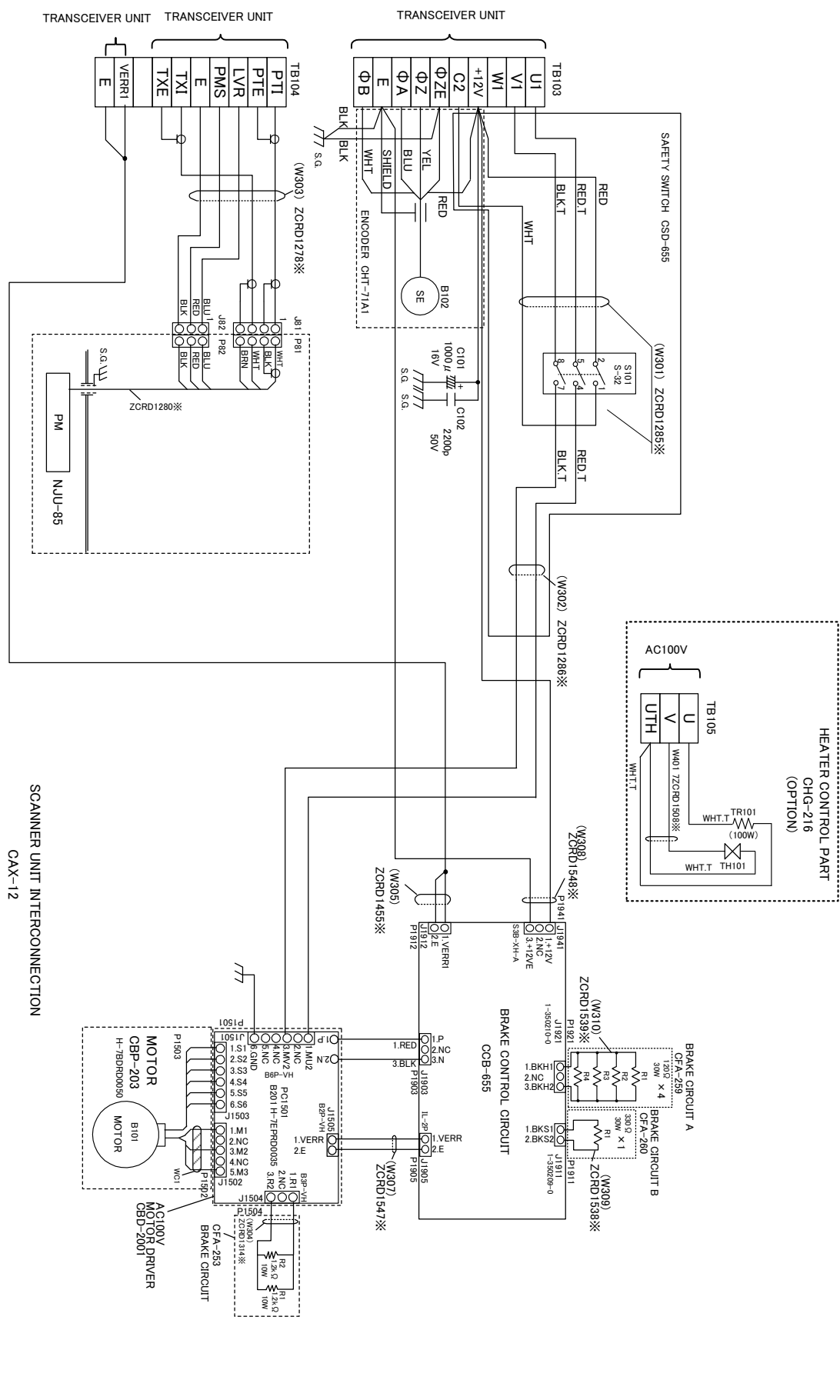


NKE-2632A(AC100V) INTERCONNECTION

## A-14

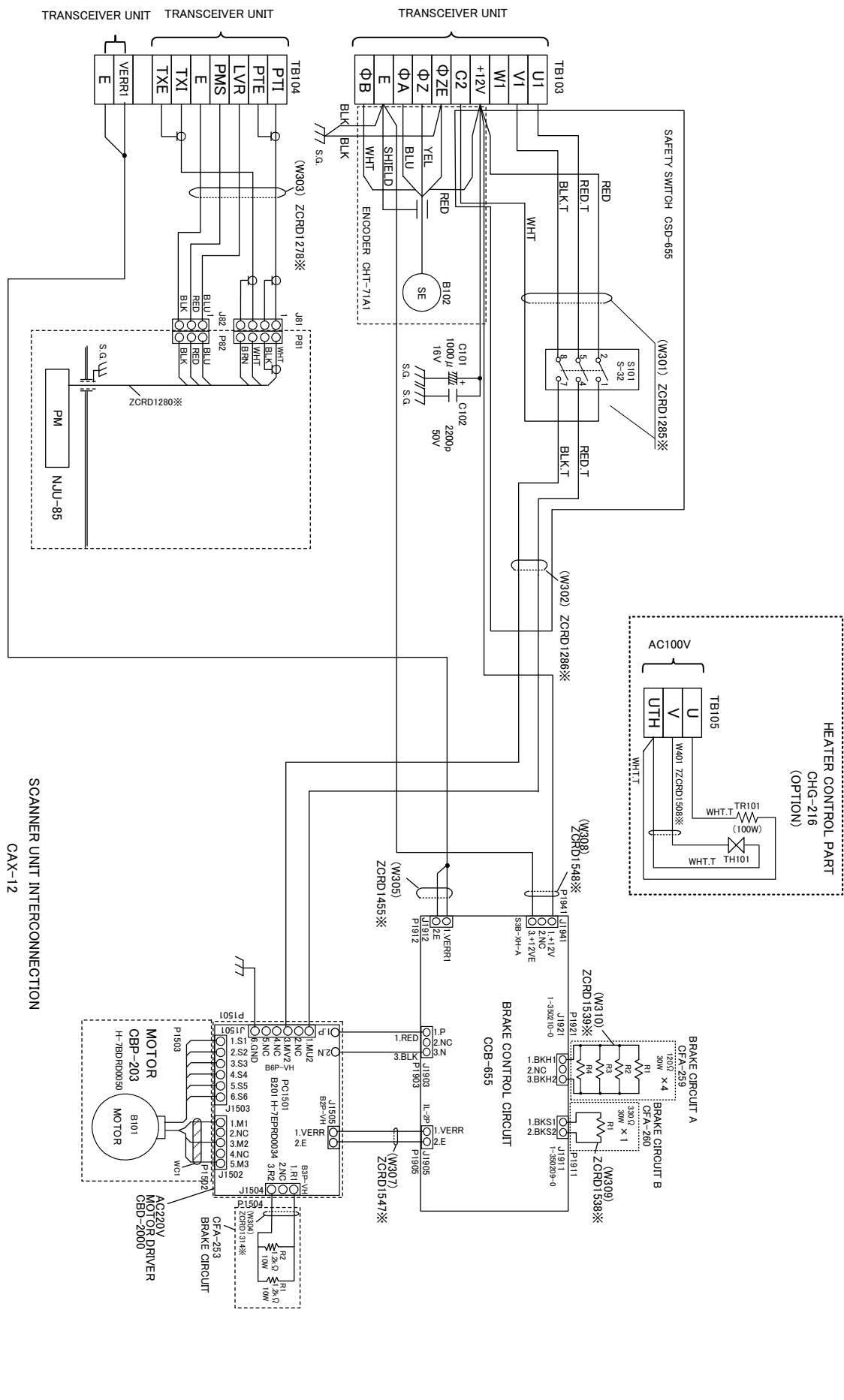


# A.15 NKE-1129 (110 VAC)



NKE-1129PM (100 VAC) X band, 3 units  
Connection Diagram in the Radar Antenna

## A-16



## APP A



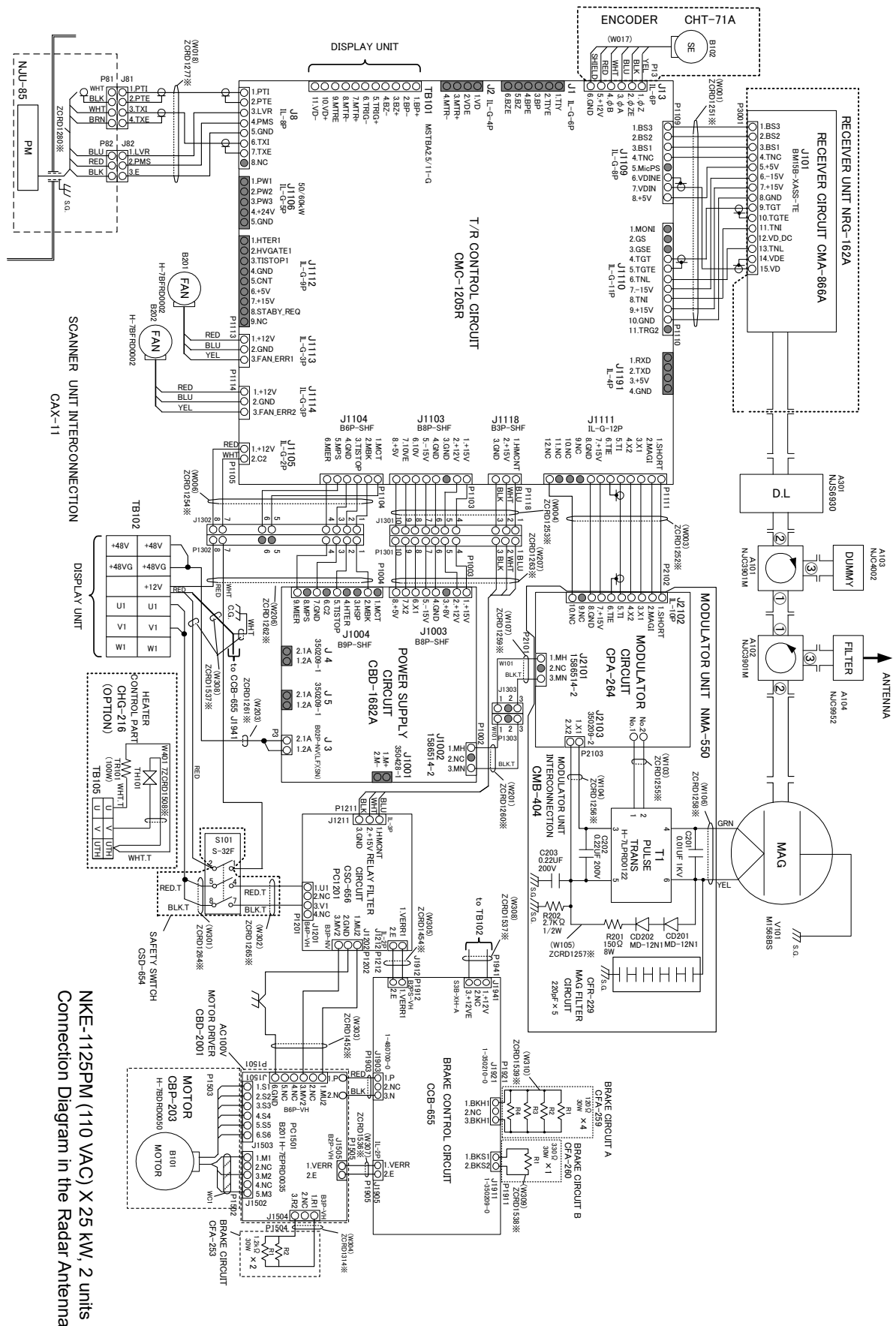
## A-18



## APP A

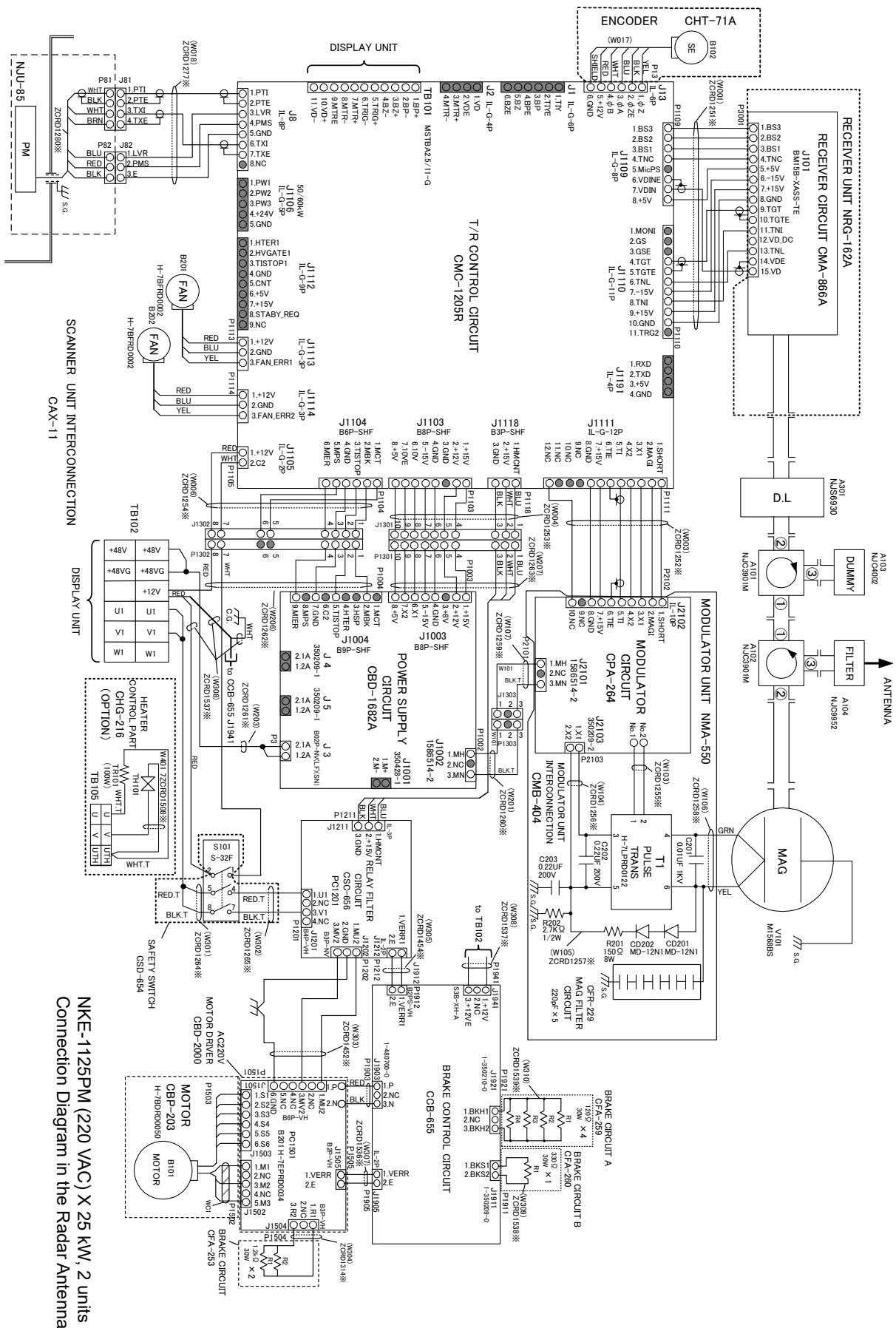


# A.20 NKE-1125 (110 VAC)

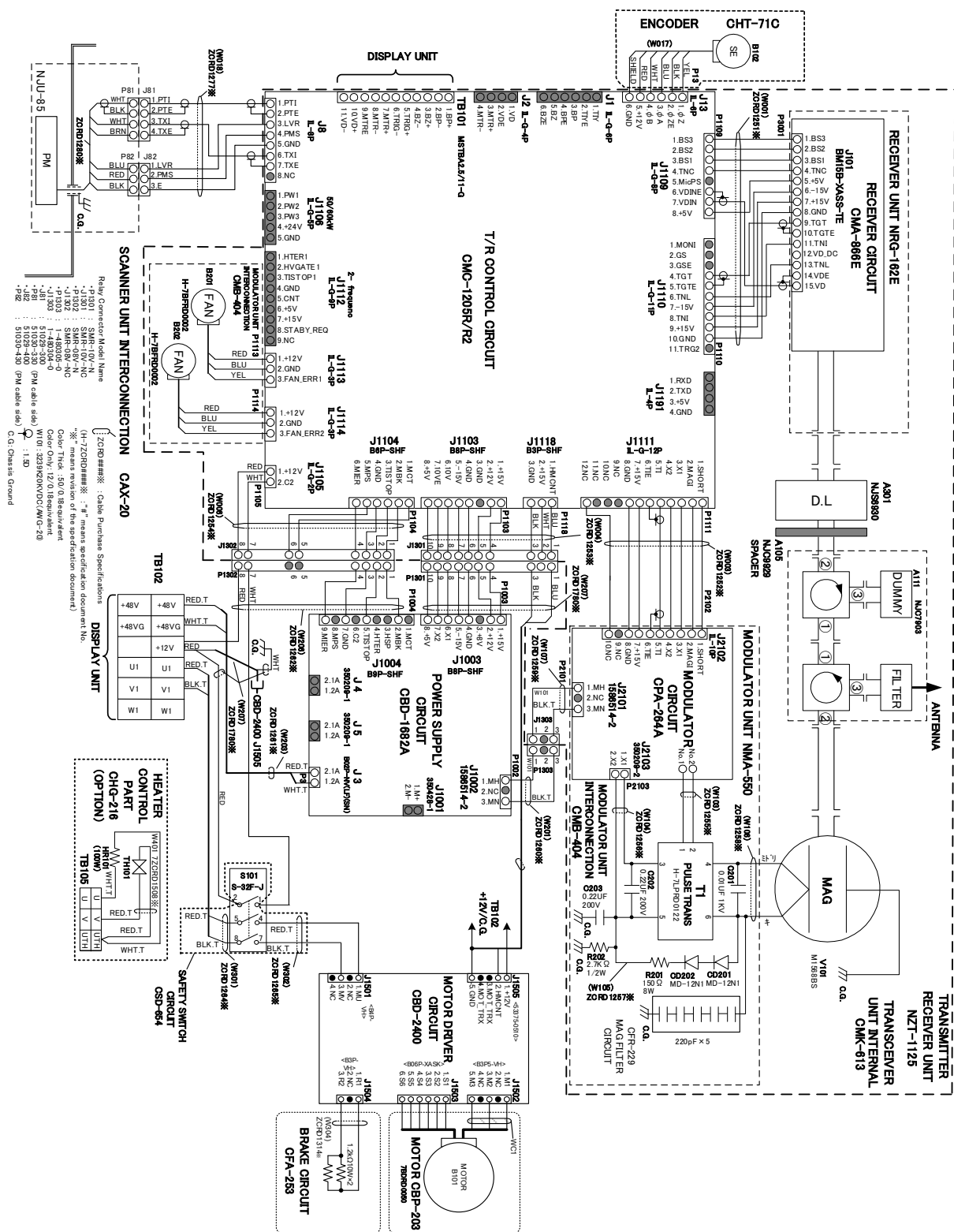




# A.21 NKE-1125 (220 VAC)



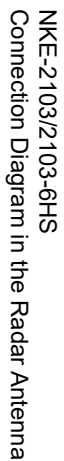
## A-22

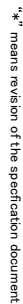


(H-ZZCROH##\*)  
 ("##" means specification document No. ##)  
 ("##" means revision of the specification document)

Connection Diagram in the Radar

## A-24



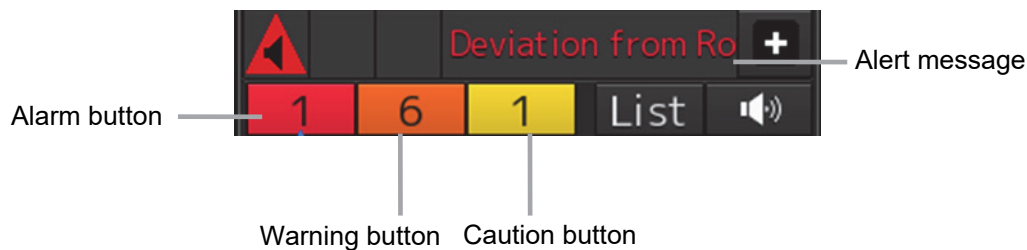




# Appendix B Alert, Maintenance INFO and Permanent information

## B.1 Alert

When an alert occurs, alert information is displayed in the alert notification area.



The numbers displayed in the buttons indicate the number of such alerts that have occurred.

### Memo

The alert button of a category that has not occurred will not be displayed.

The display colors of alert messages are defined as follows according to the type and seriousness of alerts.

| Alert Type  | Alert Class (Seriousness) | Display Color | Alert Display Status  | Alert Sound                          |
|---|---------------------------|---------------|---|--------------------------------------|
| Alarms<br>(An alert indicating a state asking sailors to pay immediate attention and take immediate action.)  | Alarms                    | Red           | Before alarm acknowledgement: Blinking<br>After alarm acknowledgement: Lighting     | 3 short audible signals (repetitive) |
| Warnings<br>(An alert indicating that the state has changed, which although is not immediately dangerous, but may become so in the near future if no action is taken. Warnings are alerts displayed for preventing possible future hazardous states.) | Warnings                  | Orange        | Before warning acknowledgement: Blinking<br>After warning acknowledgement: Lighting | 2 short audible signals (repetitive) |
| Cautions<br>(Although these are neither alarms nor warnings, these alerts indicate that it is necessary to pay more than normal attention to cautions, statuses, or to the supplied information.)   | Cautions                  | Yellow        | Lighting  | No sound                             |
| No Alarm  | -                         | Green         | -   | -                                    |

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The list of alerts is shown below.

Types of alert categories is shown below.

Category A: Alert about grounding, collision

Category B: All alerts except category A

## B.1.1 Priority: Alarms

| Cause                     | Conditions to raise   | Conditions to rectify   | Detail   | Category | Required standard      |
|---------------------------|---|---|--|----------|------------------------|
| Alarm Symbol              | The ship is near a user-defined Symbol.                                       | The ship moved away from user-defined Symbols.  | Check ahead on the DISP                            | A        | IEC 61174<br>IEC 62388 |
| CPA/TCPA(AIS)             | AIS target was detected within a preset CPA/TCPA limit.                       | AIS target exceeded a preset CPA/TCPA limit.  | Check the collision ship on the DISP               | A        | IEC 62388              |
| CPA/TCPA(TT)              | TT target was detected within a preset CPA/TCPA limit.                        | TT target exceeded a preset CPA/TCPA limit.   | Check the collision ship on the DISP               | A        | IEC 62388              |
| Crossing Safety Contour   | The ship is near a safety contour.  | The ship moved away from safety contour.  | Check ahead on the DISP                            | A        | IEC 61174<br>IEC 62388 |
| Deviation From Route      | The ship deviated from the track beyond a preset cross-track limit.           | The ship is deviated from the track within a preset cross-track limit.  | Check the DIST from Route on the DISP              | A        | IEC 61174<br>IEC 62388 |
| Need to Change Course     | Own ship enters within safe passing distance of other ship within TCPA limit. | Own ship no longer enters within safe passing distance of other ship, or enters there but not within TCPA limit | Check the collision ship on the DISP and avoid it. | A        | -                      |
| Outside Anchor Watch Area | A Outside Anchor Watch Area warning was not acknowledged for 120 seconds.     | Own ship entered the dragging anchor monitoring area.   | Check position on the DISP                         | A        | IEC 61174              |



## B.1.2 Priority: Warnings

| Cause                     | Conditions to raise  | Conditions to rectify   | Detail                              | Category | Required standard      |
|---------------------------|--|---|-------------------------------------|----------|------------------------|
| AC Power Failure          | The AC input voltage is 75V or less  | The AC input voltage is more than 75V                               | The AC input voltage is 75V or less | B        | -                      |
| AIS Maximum Capacity      | The AIS target count exceeded the maximum target display count.  | The AIS target count is less than the maximum target display count. | Unable to add new AIS target        | A        | IEC 61174<br>IEC 62388 |
| Anchorage Area            | The ship is near an Anchorage Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.            | The ship moved away from Anchorage Area.                            | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |
| Anchorage Prohibited      | The ship is near an Anchorage Prohibited Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship moved away from Anchorage Prohibited.                      | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |
| Antenna Failure           | Antenna Failure is occurred.   | Antenna Failure is repaired.  | Lost Radar functions                | B        | -                      |
| Antenna Reverse Rotation  | Reverse rotation of the antenna was detected.  | Antenna rotation is normal condition.                               | -                                   | B        | -                      |
| Antenna Safety Switch Off | Safety switch of antenna is off.   | Safety switch of antenna is on.                                     | -                                   | B        | -                      |
| Archipelagic Sea Lane     | The ship is near an Archipelagic Sea Lane.<br>Warning or caution as selected by user.<br>Default Setting is Caution.     | The ship moved away from Archipelagic Sea Lane.                     | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |
| Arrived at WOL            | Arrived at WOL.  | Warning is acknowledged.  | Check on the DISP.                  | A        | IEC 61174<br>IEC 62388 |
| Arrived at WPT            | Arrived at WPT.  | Warning is acknowledged.  | Check on the DISP.                  | A        | IEC 61174<br>IEC 62388 |
| Buoy/Light                | The ship is near a Buoy/Light.   | The ship moved away from Buoy/Light.                                | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |

| Cause                    | Conditions to raise   | Conditions to rectify                              | Detail                  | Category | Required standard      |
|--------------------------|---|--|-------------------------|----------|------------------------|
| Cable Area               | The ship is near a Cable Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.                  | The ship moved away from Cable Area.               | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Canal                    | The ship is near a Canal.<br>Warning or caution as selected by user.<br>Default Setting is Caution.                       | The ship moved away from Canal.                    | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Cargo Transshipment Area | The ship is near a Cargo Transshipment Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.    | The ship moved away from Cargo Transshipment Area. | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Caution Area             | The ship is near a Caution Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.                | The ship moved away from Caution Area.             | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Dangerous Symbol         | The ship is near a Dangerous Symbol.  | The ship moved away from Dangerous Symbol.         | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Deeper Water Route       | The ship is navigating in a deeper water route.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship exits a deeper water route.               | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |

| Cause                  | Conditions to raise   | Conditions to rectify                                       | Detail                      | Category | Required standard      |
|------------------------|---|---|-----------------------------|----------|------------------------|
| Delivery Failed To VDR | Equipment can't send the image to VDR for 1 minute.   | Equipment can send the image to VDR for more than 1 minute. | Can't send image to VDR     | B        | IEC 61174<br>IEC 62388 |
| Depth Area             | The ship is navigating in a water shallower than safety waters.   | The ship exits a water shallower than safety waters.        | Check ahead on the DISP     | A        | IEC 61174<br>IEC 62388 |
| Dredge Area            | The ship is near a Dredge Area.   | The ship moved away from Dredge Area.                       | Check ahead on the DISP     | A        | IEC 61174<br>IEC 62388 |
| Dumping Ground         | The ship is navigating in a dumping ground.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship exits a dumping ground.                            | Check ahead on the DISP     | A        | IEC 61174<br>IEC 62388 |
| Emergency Mode         | Both disks have failed.   | Both disks are normal condition.                            | Only RADAR mode can be used | B        | -                      |
| Fairway                | The ship is near a Fairway.<br>Warning or caution as selected by user.<br>Default Setting is Caution.                 | The ship moved away from Fairway.                           | Check ahead on the DISP     | A        | IEC 61174<br>IEC 62388 |
| Fishing Ground         | The ship is near a Fishing Ground.<br>Warning or caution as selected by user.<br>Default Setting is Caution.          | The ship moved away from Fishing Ground                     | Check ahead on the DISP     | A        | IEC 61174<br>IEC 62388 |
| Fishing Prohibited     | The ship is near a Fishing Ground.<br>Warning or caution as selected by user.<br>Default Setting is Caution.          | The ship moved away from Fishing Prohibited                 | Check ahead on the DISP     | A        | IEC 61174<br>IEC 62388 |
| Ice Area               | The ship is near an Ice Area  | The ship moved away from Ice Area                           | Check ahead on the DISP     | A        | IEC 61174<br>IEC 62388 |
| Incineration Area      | The ship is near an Incineration Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.      | The ship moved away from Incineration Area                  | Check ahead on the DISP     | A        | IEC 61174<br>IEC 62388 |

| Cause                   | Conditions to raise   | Conditions to rectify                              | Detail                                | Category | Required standard      |
|-------------------------|---|--|---------------------------------------|----------|------------------------|
| Inshore Traffic Zone    | The ship is near an Inshore Traffic Zone.<br>Warning or caution as selected by user.<br>Default Setting is Caution.   | The ship moved away from Inshore Traffic Zone      | Check ahead on the DISP               | A        | IEC 61174<br>IEC 62388 |
| Lost AIS IF             | AIS interface is lost.  | AIS interface is normal condition.                 | AIS target cannot be displayed        | B        | IEC 62388              |
| Lost AIS Target         | The AIS target is lost.   | Warning is acknowledged.                           | Check the lost AIS target on the DISP | A        | IEC 62388              |
| Lost Antenna Control    | Antenna control is lost.  | Antenna control is normal condition.               | Lost Radar functions.                 | B        | IEC 61174              |
| Lost COG/SOG            | COG/SOG data from primary sensor is lost.   | COG/SOG data from primary sensor can be received.  | -                                     | B        | IEC 61174<br>IEC 62388 |
| Lost HDG                | Heading data from primary sensor is lost.   | Heading data from primary sensor can be received.  | -                                     | B        | IEC 61174<br>IEC 62388 |
| Lost JOYSTICK           | JOYSTICK Failure is occurred.   | JOYSTICK Failure is repaired.                      | -                                     | B        | IEC 61174              |
| Lost POSN               | Position data from primary sensor is lost.  | Position data from primary sensor can be received. | -                                     | B        | IEC 61174<br>IEC 62388 |
| Lost RADAR Function     | Radar Antenna signal is lost.   | Radar Antenna signal can be received.              | Lost Radar Antenna signal.            | B        | IEC 62388<br>IEC 62388 |
| Lost Reference Target   | Reference TT target is lost.  | Warning is acknowledged.                           | POSN cannot be calculated             | A        | IEC 62388<br>IEC 62388 |
| Lost STW                | Speed data from primary sensor is lost.   | Speed data from primary sensor can be received.    | -                                     | B        | IEC 61174              |
| Lost TT Target          | The TT target is lost.  | Warning is acknowledged.                           | Check the lost TT target on the DISP  | A        | IEC 62388              |
| Marine Farm/Aquaculture | The ship is near a Marine Farm/Aquaculture.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship moved away from Marine Farm/Aquaculture.  | Check ahead on the DISP               | A        | IEC 61174<br>IEC 62388 |

| Cause                     | Conditions to raise  | Conditions to rectify                                 | Detail                               | Category | Required standard      |
|---------------------------|--|---|--------------------------------------|----------|------------------------|
| Military Practice Area    | The ship is near a Military Practice Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.   | The ship moved away from Military Practice Area.      | Check ahead on the DISP              | A        | IEC 61174<br>IEC 62388 |
| New AIS Target            | New AIS target is detected within AZ.  | Warning is acknowledged.                              | Check the new AIS target on the DISP | A        | IEC 62388              |
| New TT Target             | New TT target is detected within AZ.   | Warning is acknowledged.                              | Check the new TT target on the DISP  | A        | IEC 62388              |
| Obstruction               | The ship is near an Obstruction.   | The ship moved away from Obstruction.                 | Check ahead on the DISP              | A        | IEC 61174<br>IEC 62388 |
| Offshore Production Area  | The ship is near an Offshore Production Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.  | The ship moved away from Offshore Production Area.    | Check ahead on the DISP              | A        | IEC 61174<br>IEC 62388 |
| Outside Anchor Watch Area | Own ship exited from the dragging anchor monitoring area.<br>If Outside Anchor Watch Area warning is not acknowledged for 2 minutes, the warning escalates to Outside Anchor Watch Area alarm. | Own ship entered the dragging anchor monitoring area. | Check position on the DISP           | A        | IEC 61174              |
| Over 83 Degrees           | Own ship position is 83 degrees or more.   | Own ship position is less than 83 degrees.            | Radar functions are reduced.         | A        | -                      |
| Over 85 Degrees           | Own ship position is 85 degrees or more.   | Own ship position is less than 85 degrees.            | System performance is reduced.       | A        | IEC 61174<br>IEC 62388 |
| Pipeline Area             | The ship is near a Pipeline Area.  | The ship moved away from Pipeline Area.               | Check ahead on the DISP              | A        | IEC 61174<br>IEC 62388 |
| Recommended Traffic Lane  | The ship is near a Recommended Traffic Lane.<br>Warning or caution as selected by user.<br>Default Setting is Caution.   | The ship moved away from Recommended Traffic Lane.    | Check ahead on the DISP              | A        | IEC 61174<br>IEC 62388 |

| Cause                    | Conditions to raise  | Conditions to rectify                                      | Detail                  | Category | Required standard      |
|--------------------------|--|--|-------------------------|----------|------------------------|
| Restricted Area          | The ship is near a Restricted Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.          | The ship moved away from Restricted Area.                  | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Seaplane Landing Area    | The ship is near a Seaplane Landing Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.    | The ship moved away from Seaplane Landing Area.            | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Sensitive Sea Area       | The ship is near a Sensitive Sea Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.       | The ship moved away from Sensitive Sea Area.               | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Specially Protected Area | The ship is near a Specially Protected Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship moved away from Specially Protected Area.         | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Spoil Ground             | The ship is near a Spoil Ground.<br>Warning or caution as selected by user.<br>Default Setting is Caution.             | The ship moved away from Spoil Ground.                     | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| Submarine Transit Area   | The ship is near a Submarine Transit Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.   | The ship moved away from Transit Area.                     | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |
| System Failure           | CCU or PSU or OPU or GIF or RIF Abnormal is occurred (Check Maintenance info for details of the cause).                | CCU and PSU and OPU and GIF and RIF Abnormal are repaired. | -                       | B        | IEC 61174              |
| Traffic Crossing         | The ship is near a Traffic Crossing.<br>Warning or caution as selected by user.<br>Default Setting is Caution.         | The ship moved away from Traffic Crossing.                 | Check ahead on the DISP | A        | IEC 61174<br>IEC 62388 |

| Cause                    | Conditions to raise   | Conditions to rectify  | Detail                              | Category | Required standard      |
|--------------------------|---|--|-------------------------------------|----------|------------------------|
| Traffic Precautionary    | The ship is near a Traffic Precautionary.<br>Warning or caution as selected by user.<br>Default Setting is Caution.   | The ship moved away from Traffic Precautionary.                    | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |
| Traffic Roundabout       | The ship is near a Traffic Roundabout.<br>Warning or caution as selected by user.<br>Default Setting is Caution.      | The ship moved away from Traffic Roundabout.                       | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |
| Traffic Separation Zone  | The ship is near a Traffic Separation Zone.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship moved away from Traffic Separation Zone.                  | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |
| TT Maximum Capacity      | The TT target count exceeded the maximum target display count.  | The TT target count is less than the maximum target display count. | Unable to add new TT target         | A        | IEC 62388              |
| TT Out Of Range          | The TT target exceeded 32NM.  | The TT target moved within 32NM.                                   | Target has become out of 32NM range | A        | IEC 62388              |
| Two Way Traffic          | The ship is near a Two Way Traffic.<br>Warning or caution as selected by user.<br>Default Setting is Caution.         | The ship moved away from Two Way Traffic.                          | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |
| Under Rater Rock         | The ship is near a Under Rater Rock.<br>Warning or caution as selected by user.<br>Default Setting is Caution.        | The ship moved away from Under Rater Rock.                         | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |
| Unexpected Data From VDR | Unexpected data was received from VDR.  | No unexpected data is received from the VDR.                       | Unable to connect to VDR            | B        | IEC 61174<br>IEC 62388 |
| Warning Symbol           | The ship is near a Warning Symbol.  | The ship moved away from Warning Symbol.                           | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |
| Wreck                    | The ship is near a Wreck.   | The ship moved away from Wreck.                                    | Check ahead on the DISP             | A        | IEC 61174<br>IEC 62388 |

## B.1.3 Priority: Cautions

| Cause                 | Conditions to raise  | Conditions to rectify   | Detail                                  | Category | Required standard      |
|-----------------------|--|---|---|----------|------------------------|
| AIS 95% Capacity      | The AIS target count exceeded 95% of the maximum target display count.   | The AIS target count is less than 95% of the maximum target display count.            | A few more AIS targets can be added     | B        | IEC 61174<br>IEC 62388 |
| AIS ACT 95% Capacity  | The AIS activation target count exceeded 95% of the maximum target display count.                                    | The AIS activation target count is less than 95% of the maximum target display count. | A few more AIS ACT targets can be added | B        | IEC 61174<br>IEC 62388 |
| Anchorage Area        | The ship is near an Anchorage Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.        | The ship moved away from Anchorage Area.  | Check ahead on the DISP                 | B        | IEC 61174<br>IEC 62388 |
| Anchorage Prohibited  | The ship is near an Anchorage Prohibited.<br>Warning or caution as selected by user.<br>Default Setting is Caution.  | The ship moved away from Anchorage Prohibited.  | Check ahead on the DISP                 | B        | IEC 61174<br>IEC 62388 |
| Antenna Rotating      | ICE class standby of standby setting is ON.  | ICE class standby of standby setting is OFF.  | -                                       | B        | -                      |
| Archipelagic Sea Lane | The ship is near an Archipelagic Sea Lane.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship moved away from Archipelagic Sea Lane.                                       | Check ahead on the DISP                 | B        | IEC 61174<br>IEC 62388 |
| AtoN                  | The ship is near an AtoN.  | The ship moved away from AtoN.  | Check ahead on the DISP                 | B        | IEC 61174<br>IEC 62388 |
| Cable Area            | The ship is near a Cable Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.             | The ship moved away from Cable Area.  | Check ahead on the DISP                 | B        | IEC 61174<br>IEC 62388 |
| Canal                 | The ship is near a Canal.<br>Warning or caution as selected by user.<br>Default Setting is Caution.                  | The ship moved away from Canal.   | Check ahead on the DISP                 | B        | IEC 61174<br>IEC 62388 |



| Cause                                   | Conditions to raise  | Conditions to rectify  | Detail                              | Category | Required standard      |
|---|--|--|-------------------------------------|----------|------------------------|
| Cargo Transshipment Area                | The ship is near a Cargo Transshipment Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship moved away from Cargo Transshipment Area.                 | Check ahead on the DISP             | B        | IEC 61174<br>IEC 62388 |
| Caution Area                            | The ship is near a Caution Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.             | The ship moved away from Caution Area.                             | Check ahead on the DISP             | B        | IEC 61174<br>IEC 62388 |
| Caution Symbol                          | The ship is near a Caution Symbol.   | The ship moved away from Caution Symbol.                           | Check ahead on the DISP             | B        | IEC 61174<br>IEC 62388 |
| Chart license will expire soon (SSE 20) | Chart license will expire within 30 days.  | Chart license is renewed with a license valid for 30 days or more. | Renew chart license within 30 days  | B        | -                      |
| DC Power Failure                        | The DC input voltage is 18V or less  | The DC input voltage is more than 18V                              | The DC input voltage is 18V or less | B        | -                      |
| Deeper Water Route                      | The ship is near a Deeper Water Route.<br>Warning or caution as selected by user.<br>Default Setting is Caution.       | The ship moved away from Deeper Water Route.                       | Check ahead on the DISP             | B        | IEC 61174<br>IEC 62388 |
| Dumping Ground                          | The ship is near a Dumping Ground.<br>Warning or caution as selected by user.<br>Default Setting is Caution.           | The ship moved away from Dumping Ground.                           | Check ahead on the DISP             | B        | IEC 61174<br>IEC 62388 |
| ENC Data Are Available                  | ENC Data are available.  | ENC Data are not available.  | -                                   | B        | -                      |
| Fairway                                 | The ship is near a Fairway.<br>Warning or caution as selected by user.<br>Default Setting is Caution.                  | The ship moved away from Fairway.                                  | Check ahead on the DISP             | B        | IEC 61174<br>IEC 62388 |
| Fishing Ground                          | The ship is near a Fishing Ground.<br>Warning or caution as selected by user.<br>Default Setting is Caution.           | The ship moved away from Fishing Ground.                           | Check ahead on the DISP             | B        | IEC 61174<br>IEC 62388 |

| Cause                   | Conditions to raise   | Conditions to rectify                              | Detail                         | Category | Required standard      |
|-------------------------|---|--|--------------------------------|----------|------------------------|
| Fishing Prohibited      | The ship is near a Fishing Prohibited. Warning or caution as selected by user. Default Setting is Caution.      | The ship moved away from Fishing Prohibited.       | Check ahead on the DISP        | B        | IEC 61174<br>IEC 62388 |
| Incineration Area       | The ship is near a Fishing Prohibited. Warning or caution as selected by user. Default Setting is Caution.      | The ship moved away from Fishing Prohibited.       | Check ahead on the DISP        | B        | IEC 61174<br>IEC 62388 |
| Inshore Traffic Zone    | The ship is near an Inshore Traffic Zone. Warning or caution as selected by user. Default Setting is Caution.   | The ship moved away from Inshore Traffic Zone.     | Check ahead on the DISP        | B        | IEC 61174<br>IEC 62388 |
| Lost AIS IF             | AIS interface is lost.  | AIS interface is normal condition.                 | AIS target cannot be displayed | B        | IEC 61174              |
| Lost COG/SOG            | COG/SOG data from primary sensor is lost.   | COG/SOG data from primary sensor can be received.  | -                              | B        | -                      |
| Lost HDG                | Heading data from primary sensor is lost.   | Heading data from primary sensor can be received.  | -                              | B        | -                      |
| Lost POSN               | Position data from primary sensor is lost.  | Position data from primary sensor can be received. | -                              | B        | -                      |
| Lost RADAR Function     | Radar Antenna signal is lost.   | Radar Antenna signal can be received.              | Lost Radar Antenna signal.     | B        | IEC 61174              |
| Lost STW                | Speed data from primary sensor is lost.   | Speed data from primary sensor can be received.    | -                              | B        | -                      |
| Marine Farm/Aquaculture | The ship is near a Marine Farm/Aquaculture. Warning or caution as selected by user. Default Setting is Caution. | The ship moved away from Marine Farm/Aquaculture.  | Check ahead on the DISP        | B        | IEC 61174<br>IEC 62388 |
| Military Practice Area  | The ship is near a Military Practice Area. Warning or caution as selected by user. Default Setting is Caution.  | The ship moved away from Military Practice Area.   | Check ahead on the DISP        | B        | IEC 61174<br>IEC 62388 |

| Cause                    | Conditions to raise   | Conditions to rectify                              | Detail                            | Category | Required standard      |
|--------------------------|---|--|-----------------------------------|----------|------------------------|
| NON-WGS84                | DATUM of POSN source is not WGS84.  | DATUM of POSN source is WGS84.                     | DATUM of POSN source is not WGS84 | B        | IEC 62388              |
| Offshore Production Area | The ship is near an Offshore Production Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship moved away from Offshore Production Area. | Check ahead on the DISP           | B        | IEC 61174<br>IEC 62388 |
| Pipeline Area            | The ship is near a Pipeline Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.             | The ship moved away from Pipeline Area.            | Check ahead on the DISP           | B        | IEC 61174<br>IEC 62388 |
| Recommended Traffic Lane | The ship is near a Recommended Traffic Lane.<br>Warning or caution as selected by user.<br>Default Setting is Caution.  | The ship moved away from Recommended Traffic Lane. | Check ahead on the DISP           | B        | IEC 61174<br>IEC 62388 |
| Restricted Area          | The ship is near a Restricted Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.           | The ship moved away from Restricted Area.          | Check ahead on the DISP           | B        | IEC 61174<br>IEC 62388 |
| Seaplane Landing Area    | The ship is near a Seaplane Landing Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.     | The ship moved away from Seaplane Landing Area.    | Check ahead on the DISP           | B        | IEC 61174<br>IEC 62388 |
| Selected Fix View        | Fix view is selected.   | Fix view is not selected.                          | -                                 | B        | -                      |
| Sensitive Sea Area       | The ship is near a Sensitive Sea Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.        | The ship moved away from Sensitive Sea Area.       | Check ahead on the DISP           | B        | IEC 61174<br>IEC 62388 |

| Cause                    | Conditions to raise  | Conditions to rectify                              | Detail                  | Category | Required standard      |
|--------------------------|--|--|-------------------------|----------|------------------------|
| Specially Protected Area | The ship is near a Specially Protected Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship moved away from Specially Protected Area. | Check ahead on the DISP | B        | IEC 61174<br>IEC 62388 |
| Spoil Ground             | The ship is near a Spoil Ground.<br>Warning or caution as selected by user.<br>Default Setting is Caution.             | The ship moved away from Spoil Ground.             | Check ahead on the DISP | B        | IEC 61174<br>IEC 62388 |
| Spot Sounding            | The ship is near a Spot Sounding.  | The ship moved away from Spot Sounding.            | Check ahead on the DISP | B        | IEC 61174<br>IEC 62388 |
| Submarine Transit Area   | The ship is near a Submarine Transit Area.<br>Warning or caution as selected by user.<br>Default Setting is Caution.   | The ship moved away from Submarine Transit Area.   | Check ahead on the DISP | B        | IEC 61174<br>IEC 62388 |
| To Be Avoided            | The ship is near an Obstacle.  | The ship moved away from Obstacle.                 | Check ahead on the DISP | B        | IEC 61174<br>IEC 62388 |
| Traffic Crossing         | The ship is near a Traffic Crossing.<br>Warning or caution as selected by user.<br>Default Setting is Caution.         | The ship moved away from Traffic Crossing.         | Check ahead on the DISP | B        | IEC 61174              |
| Traffic Precautionary    | The ship is near a Traffic Precautionary.<br>Warning or caution as selected by user.<br>Default Setting is Caution.    | The ship moved away from Traffic Precautionary.    | Check ahead on the DISP | B        | IEC 61174<br>IEC 62388 |
| Traffic Roundabout       | The ship is near a Traffic Roundabout.<br>Warning or caution as selected by user.<br>Default Setting is Caution.       | The ship moved away from Traffic Roundabout.       | Check ahead on the DISP | B        | IEC 61174<br>IEC 62388 |

| Cause                   | Conditions to raise   | Conditions to rectify   | Detail                             | Category | Required standard      |
|-------------------------|---|---|------------------------------------|----------|------------------------|
| Traffic Separation Zone | The ship is near a Traffic Separation Zone.<br>Warning or caution as selected by user.<br>Default Setting is Caution. | The ship moved away from Traffic Separation Zone.                         | Check ahead on the DISP            | B        | IEC 61174<br>IEC 62388 |
| Trial                   | Under the trial process.  | Not under trial process.  | -                                  | B        | -                      |
| TT 95% Capacity         | The TT target count exceeded 95% of the maximum target display count.   | The TT target count is less than 95% of the maximum target display count. | A few more TT targets can be added | B        | IEC 62388              |
| Two Way Traffic         | The ship is near a Two Way Traffic.<br>Warning or caution as selected by user.<br>Default Setting is Caution.         | The ship moved away from Two Way Traffic.                                 | Check ahead on the DISP            | B        | IEC 61174<br>IEC 62388 |
| Vertical Clearance      | The ship is near a Vertical Clearance.  | The ship moved away from Vertical Clearance.                              | Check ahead on the DISP            | B        | IEC 61174<br>IEC 62388 |

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## B.1.4 List of Alert escalation

There are unacknowledged alert that escalates as follows.

### - Alarm to Back-up Navigator Call

If the alarm is not acknowledged for an extra period, Back-up Navigator Call is transferred to BNWAS.

### - Warning to Alarm

If warning is not acknowledged, the warning escalates to alarm.

### - Warning to Warning

An unacknowledged warning will be generated repeatedly until it is acknowledged.

The Alerts to escalation are as shown below.

| Cause                             | Escalation                      | Time          | Explanation   |
|-----------------------------------|---------------------------------|---------------|---|
| CPA/TCPA(AIS) alarm               | Alarm to Back-up Navigator Call | 30s           | If the alarm is not acknowledged for an extra period of 30 seconds, Back-up Navigator Call is transferred to BNWAS.               |
| CPA/TCPA(TT) alarm                | Alarm to Back-up Navigator Call | 30s           | If the alarm is not acknowledged for an extra period of 30 seconds, Back-up Navigator Call is transferred to BNWAS.               |
| Alarm Symbol alarm                | Alarm to Back-up Navigator Call | 30s           | If the alarm is not acknowledged for an extra period of 30 seconds, Back-up Navigator Call is transferred to BNWAS.               |
| Crossing Safety Contour alarm     | Alarm to Back-up Navigator Call | 30s           | If the alarm is not acknowledged for an extra period of 30 seconds, Back-up Navigator Call is transferred to BNWAS.               |
| Deviation From Route alarm        | Alarm to Back-up Navigator Call | 30s           | If the alarm is not acknowledged for an extra period of 30 seconds, Back-up Navigator Call is transferred to BNWAS.               |
| Outside Anchor Watch Area alarm   | Alarm to Back-up Navigator Call | 30s           | If the alarm is not acknowledged for an extra period of 30 seconds, Back-up Navigator Call is transferred to BNWAS.               |
| Outside Anchor Watch Area warning | Warning to Alarm                | 120s          | If Outside Anchor Watch Area warning is not acknowledged for 2 minutes, the warning escalates to Outside Anchor Watch Area alarm. |
| Other warning                     | Warning to Warning              | 60s (Default) | An unacknowledged warning will be generated repeatedly until it is acknowledged.  |

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## B.1.5 List of Alerts with responsibility-transferred state

The responsibility-transferred state is a state for priority reduction. When the equipment managing the alert in the system requests a transfer of responsibility of alert, the requested equipment changes state of the alert to responsibility transferred.

Alerts in responsibility transferred state will not be displayed on the active alert list. Whether to display of the responsibility have been transferred alerts on the active alert list can be switched to ON or OFF in the setting. Refer to 17.9 Setting up Alert Processing.

These alerts with responsibility transferred states are as shown below.

| Cause                     | Priority | Category |
|---------------------------|----------|----------|
| Lost POSN                 | Warning  | B        |
| Lost HDG                  | Warning  | B        |
| Lost COG/SOG              | Warning  | B        |
| Lost STW                  | Warning  | B        |
| Lost AIS IF               | Warning  | B        |
| Lost RADAR Function       | Warning  | B        |
| Lost Antenna Control      | Warning  | B        |
| Delivery Failed to VDR    | Warning  | B        |
| Unexpected Data from VDR  | Warning  | B        |
| System Failure            | Warning  | B        |
| Antenna Safety Switch Off | Warning  | B        |
| Antenna Reverse Rotation  | Warning  | B        |
| Antenna Failure           | Warning  | B        |
| AC Power Failure          | Warning  | B        |
| Lost JOYSTICK             | Warning  | B        |
| Emergency Mode            | Warning  | B        |

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## B.1.6 List of Aggregated Alerts

Aggregated Alerts are the ability to display multiple alerts in an apparent single alert.

The apparent alerts are called header alerts and the alerts that are aggregated are called member alerts.

A header alert has the following characteristics:

- 1) Header alerts and that's member alerts has same category and same priority.
- 2) The priority of the header alert is the same as the highest priority among the member alerts.
- 3) Header alerts cannot be acknowledged directly.

| Header alerts       | Priority | Category | Member alerts            |
|---------------------|----------|----------|--------------------------|
| Warning Area/Object | Warning  | A        | Traffic Separation Zone  |
|                     |          |          | Traffic Crossing         |
|                     |          |          | Traffic Roundabout       |
|                     |          |          | Traffic Precautionary    |
|                     |          |          | Two Way Traffic          |
|                     |          |          | Deeper Water Route       |
|                     |          |          | Recommended Traffic Lane |
|                     |          |          | Inshore Traffic Zone     |
|                     |          |          | Fairway                  |
|                     |          |          | Restricted Area          |
|                     |          |          | Caution Area             |
|                     |          |          | Offshore Production Area |
|                     |          |          | Military Practice Area   |
|                     |          |          | Seaplane Landing Area    |
|                     |          |          | Submarine Transit Area   |
|                     |          |          | Crossing Ice Area        |
|                     |          |          | Canal                    |
|                     |          |          | Fishing Ground           |
|                     |          |          | Fishing Prohibited       |
|                     |          |          | Pipeline Area            |
|                     |          |          | Cable Area               |
|                     |          |          | Anchorage Area           |
|                     |          |          | Anchorage Prohibited     |
|                     |          |          | Spoil Ground             |
|                     |          |          | Dumping Ground           |
|                     |          |          | Crossing Dredge Area     |

















| Header alerts       | Priority | Category | Member alerts            |
|---------------------|----------|----------|--------------------------|
|                     |          |          | Cargo Transshipment Area |
|                     |          |          | Incineration Area        |
|                     |          |          | Specially Protected Area |
|                     |          |          | Sensitive Sea Area       |
|                     |          |          | Archipelagic Sea Lane    |
|                     |          |          | Marine Farm/Aquaculture  |
|                     |          |          | Depth Area               |
|                     |          |          | Warning Object           |
|                     |          |          | Obstruction              |
|                     |          |          | Under Water Rock         |
|                     |          |          | Wreck                    |
|                     |          |          | Buoy/Light               |
|                     |          |          | Dangerous Symbol         |
| Caution Area/Object | Caution  | B        | Traffic Separation Zone  |
|                     |          |          | Traffic Crossing         |
|                     |          |          | Traffic Roundabout       |
|                     |          |          | Traffic Precautionary    |
|                     |          |          | Two Way Traffic          |
|                     |          |          | Deeper Water Route       |
|                     |          |          | Recommended Traffic Lane |
|                     |          |          | Inshore Traffic Zone     |
|                     |          |          | Fairway                  |
|                     |          |          | Restricted Area          |
|                     |          |          | Caution Area             |
|                     |          |          | Offshore Production Area |
|                     |          |          | Military Practice Area   |
|                     |          |          | Seaplane Landing Area    |
|                     |          |          | Submarine Transit Area   |
|                     |          |          | Canal                    |

| Header alerts | Priority | Category | Member alerts            |
|---------------|----------|----------|--------------------------|
|               |          |          | Fishing Ground           |
|               |          |          | Fishing Prohibited       |
|               |          |          | Pipeline Area            |
|               |          |          | Cable Area               |
|               |          |          | Anchorage Area           |
|               |          |          | Anchorage Prohibited     |
|               |          |          | Spoil Ground             |
|               |          |          | Dumping Ground           |
|               |          |          | Cargo Transshipment Area |
|               |          |          | Incineration Area        |
|               |          |          | Specially Protected Area |
|               |          |          | Sensitive Sea Area       |
|               |          |          | Archipelagic Sea Lane    |
|               |          |          | Marine Farm/Aquaculture  |
|               |          |          | Caution Object           |
|               |          |          | Spot Sounding            |
|               |          |          | AtoN                     |
|               |          |          | Vertical Clearance       |
|               |          |          | To Be Avoided            |

## B.1.7 List of Alert Icons

The alert icons displayed in the alert status area are listed below.

| No. | Name of alert icon                          | Functional outline   | Alert icon  |
|-----|---|--|---|
| 1   | Active – unacknowledged alarm               | A flashing red triangle.<br>A symbol of loudspeaker in the middle of the triangle.   |    |
| 2   | Active – silenced alarm                     | A flashing red triangle.<br>A symbol as in icon number 1 with a prominent diagonal line above it.                          |    |
| 3   | Active – acknowledged alarm                 | A red triangle.<br>An exclamation mark in the middle of the triangle.  |    |
| 4   | Active - responsibility transferred alarm   | A red triangle.<br>An arrow pointing towards the right in the middle of the triangle.                                      |    |
| 5   | Rectified – unacknowledged alarm            | A flashing red triangle.<br>A tick mark in the middle of the triangle.   |    |
| 6   | Active - unacknowledged warning             | A flashing yellowish orange circle.<br>A symbol of loudspeaker in the middle of the circle.                                |   |
| 7   | Active – silenced warning                   | A flashing yellowish orange circle.<br>A symbol as in icon number 6 with a prominent diagonal line above it.               |  |
| 8   | Active – acknowledged warning               | A yellowish orange circle.<br>An exclamation mark in the middle of the circle.   |  |
| 9   | Active - responsibility transferred warning | A yellowish orange circle.<br>An arrow pointing towards the right in the middle of the circle.                             |  |
| 10  | Rectified – unacknowledged warning          | A flashing yellowish orange circle.<br>A tick mark in the middle of the circle.  |  |
| 11  | Caution                                     | A yellow square.<br>An exclamation mark in the middle of the square.   |  |
| a   | Aggregation                                 | A plus sign.<br>To be presented together with icons number 1 to 11   |  |
| b   | Acknowledge not allowed for alarm           | A red triangle with a cross in the middle of triangle.<br>To be presented together with icons number 1, 2 and 5.           |  |
| c   | Acknowledge not allowed for warning         | A yellowish orange circle with a cross in the middle of circle.<br>To be presented together with icons number 6, 7 and 10. |  |

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## B.2 Maintenance INFO

The list of Maintenance INFO message is shown below.

| Message                              | Explanation   | Advice   |
|--------------------------------------|---|--|
| Air Pressure(invalid)                | There is a format error or a status error of the data.    | Check the sensor condition.  |
| Air Pressure(not plausible)          | There is a range error of the data.                       | Check the sensor condition.  |
| Air Pressure(unavailable)            | The data cannot be received.                              | Check the condition of the sensor and the communication path.  |
| Air TEMP(invalid)                    | There is a format error or a status error of the data.    | Check the sensor condition.  |
| Air TEMP(not plausible)              | There is a range error of the data.                       | Check the sensor condition.  |
| Air TEMP(unavailable)                | The data cannot be received.                              | Check the condition of the sensor and the communication path.  |
| AIS(Communication failed, Direct)    | Communication with AIS cannot be performed via Serial.    | Check the condition of AIS and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.    |
| AIS(Communication failed, Main LAN)  | Communication with AIS cannot be performed via Main LAN.  | Check the condition of AIS and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| AIS(Communication failed, Sub LAN)   | Communication with AIS cannot be performed via Sub LAN.   | Check the condition of AIS and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| ALC1(Communication failed, Main LAN) | Communication with ALC1 cannot be performed via Main LAN. | Check the condition of ALC1 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |

| Message                              | Explanation   | Advice   |
|--------------------------------------|---|--|
| ALC1(Communication failed, Sub LAN)  | Communication with ALC1 cannot be performed via Sub LAN.  | Check the condition of ALC1 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| ALC2(Communication failed, Main LAN) | Communication with ALC2 cannot be performed via Main LAN. | Check the condition of ALC2 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| ALC2(Communication failed, Sub LAN)  | Communication with ALC2 cannot be performed via Sub LAN.  | Check the condition of ALC2 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| ALC3(Communication failed, Main LAN) | Communication with ALC3 cannot be performed via Main LAN. | Check the condition of ALC3 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| ALC3(Communication failed, Sub LAN)  | Communication with ALC3 cannot be performed via Sub LAN.  | Check the condition of ALC3 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| ALC4(Communication failed, Main LAN) | Communication with ALC4 cannot be performed via Main LAN. | Check the condition of ALC4 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |

| Message                                    | Explanation   | Advice   |
|--|---|--|
| ALC4(Communication failed, Sub LAN)        | Communication with ALC4 cannot be performed via Sub LAN.        | Check the condition of ALC4 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.        |
| Anemometer(Communication failed, Main LAN) | Communication with Anemometer cannot be performed via Main LAN. | Check the condition of Anemometer and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Anemometer(Communication failed, Sub LAN)  | Communication with Anemometer cannot be performed via Sub LAN.  | Check the condition of Anemometer and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Autopilot malfunction                      | AP equipment error  | Turn off the power of the device and request the distributor to repair.  |
| Autopilot malfunction                      | AP equipment error  | Turn off the power of the device and request the distributor to repair.  |
| Autopilot(Communication Failed, Main LAN)  | Communication with Autopilot cannot be performed via Main LAN.  | Check the condition of Autopilot and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Autopilot(Communication Failed, Sub LAN)   | Communication with Autopilot cannot be performed via Sub LAN.   | Check the condition of Autopilot and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |

| Message                           | Explanation  | Advice  |
|-----------------------------------|--|---|
| Autopilot(Invalid)                | There is a format error or a status error of the Autopilot data. | Check the sensor condition. Switch to a sensor in good condition, if available.                                   |
| Autopilot(Not Plausible)          | There is a range error of Autopilot data.                        | Check the sensor condition. Switch to a sensor in good condition, if available.                                   |
| Autopilot(Unavailable)            | The Autopilot data cannot be received.                           | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available. |
| Azimuth Thruster 1(invalid)       | There is a format error or a status error of the data.           | Check the sensor condition.   |
| Azimuth Thruster 1(not plausible) | There is a range error of the data.                              | Check the sensor condition.   |
| Azimuth Thruster 1(unavailable)   | The data cannot be received.                                     | Check the condition of the sensor and the communication path.   |
| Azimuth Thruster 2(invalid)       | There is a format error or a status error of the data.           | Check the sensor condition.   |
| Azimuth Thruster 2(not plausible) | There is a range error of the data.                              | Check the sensor condition.   |
| Azimuth Thruster 2(unavailable)   | The data cannot be received.                                     | Check the condition of the sensor and the communication path.   |
| Azimuth Thruster 3(invalid)       | There is a format error or a status error of the data.           | Check the sensor condition.   |
| Azimuth Thruster 3(not plausible) | There is a range error of the data.                              | Check the sensor condition.   |
| Azimuth Thruster 3(unavailable)   | The data cannot be received.                                     | Check the condition of the sensor and the communication path.   |
| Azimuth Thruster 4(invalid)       | There is a format error or a status error of the data.           | Check the sensor condition.   |
| Azimuth Thruster 4(not plausible) | There is a range error of the data.                              | Check the sensor condition.   |
| Azimuth Thruster 4(unavailable)   | The data cannot be received.                                     | Check the condition of the sensor and the communication path.   |
| Azimuth Thruster 5(invalid)       | There is a format error or a status error of the data.           | Check the sensor condition.   |
| Azimuth Thruster 5(not plausible) | There is a range error of the data.                              | Check the sensor condition.   |
| Azimuth Thruster 5(unavailable)   | The data cannot be received.                                     | Check the condition of the sensor and the communication path.   |
| Azimuth Thruster 6(invalid)       | There is a format error or a status error of the data.           | Check the sensor condition.   |

| Message                             | Explanation  | Advice   |
|-------------------------------------|--|--|
| Azimuth Thruster 6(not plausible)   | There is a range error of the data.                      | Check the sensor condition.  |
| Azimuth Thruster 6(unavailable)     | The data cannot be received.                             | Check the condition of the sensor and the communication path.  |
| Blizzard(Process Error)             | The control circuit in the radar antenna is abnormal.    | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.                 |
| Blizzard(SYNC Signal Lost)          | ASIC for radar detected an error in an interrupt signal. | Restart the device.  |
| Blizzard1 DSP1(Load Failed)         | DSP cannot be started.                                   | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.                 |
| Blizzard1 DSP2(Load Failed)         | DSP cannot be started.                                   | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.                 |
| Blizzard1 High TEMP                 | The temperature of Blizzard is too high.                 | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor. |
| Blizzard1-DSP1(Communication error) | There is an error in communication with DSP.             | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.                 |
| Blizzard2 DSP1(Load Failed)         | DSP cannot be started.                                   | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.                 |
| Blizzard2 High TEMP                 | The temperature of Blizzard is too high.                 | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor. |
| Blizzard2-DSP1(Communication error) | There is an error in communication with DSP.             | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.                 |



| Message                               | Explanation  | Advice  |
|---------------------------------------|--|---|
| BNWAS(Communication failed, Main LAN) | Communication with BNWAS cannot be performed via Main LAN. | Check the condition of BNWAS and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| BNWAS(Communication failed, Sub LAN)  | Communication with BNWAS cannot be performed via Sub LAN.  | Check the condition of BNWAS and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Bow Azimuth Thruster 1(invalid)       | There is a range error of the data.                        | Check the sensor condition.   |
| Bow Azimuth Thruster 1(not plausible) | There is a range error of the data.                        | Check the sensor condition.   |
| Bow Azimuth Thruster 1(unavailable)   | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| Bow Azimuth Thruster 2(invalid)       | There is a format error or a status error of the data.     | Check the sensor condition.   |
| Bow Azimuth Thruster 2(not plausible) | There is a range error of the data.                        | Check the sensor condition.   |
| Bow Azimuth Thruster 2(unavailable)   | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| Bow Thruster 1(invalid)               | There is a format error or a status error of the data.     | Check the sensor condition.   |
| Bow Thruster 1(invalid)               | There is a format error or a status error of the data.     | Check the sensor condition.   |
| Bow Thruster 1(not plausible)         | There is a range error of the data.                        | Check the sensor condition.   |
| Bow Thruster 1(not plausible)         | There is a range error of the data.                        | Check the sensor condition.   |
| Bow Thruster 1(unavailable)           | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| Bow Thruster 1(unavailable)           | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| Bow Thruster 2(invalid)               | There is a format error or a status error of the data.     | Check the sensor condition.   |

| Message                                | Explanation  | Advice   |
|--|--|--|
| Bow Thruster 2(invalid)                | There is a format error or a status error of the data.     | Check the sensor condition.  |
| Bow Thruster 2(not plausible)          | There is a range error of the data.                        | Check the sensor condition.  |
| Bow Thruster 2(not plausible)          | There is a range error of the data.                        | Check the sensor condition.  |
| Bow Thruster 2(unavailable)            | The data cannot be received.                               | Check the condition of the sensor and the communication path.  |
| Bow Thruster 2(unavailable)            | The data cannot be received.                               | Check the condition of the sensor and the communication path.  |
| Bow Thruster 3(invalid)                | There is a format error or a status error of the data.     | Check the sensor condition.  |
| Bow Thruster 3(not plausible)          | There is a range error of the data.                        | Check the sensor condition.  |
| Bow Thruster 3(unavailable)            | The data cannot be received.                               | Check the condition of the sensor and the communication path.  |
| Bow Thruster 4(invalid)                | There is a format error or a status error of the data.     | Check the sensor condition.  |
| Bow Thruster 4(not plausible)          | There is a range error of the data.                        | Check the sensor condition.  |
| Bow Thruster 4(unavailable)            | The data cannot be received.                               | Check the condition of the sensor and the communication path.  |
| Bow Thruster 5(invalid)                | There is a format error or a status error of the data.     | Check the sensor condition.  |
| Bow Thruster 5(not plausible)          | There is a range error of the data.                        | Check the sensor condition.  |
| Bow Thruster 5(unavailable)            | The data cannot be received.                               | Check the condition of the sensor and the communication path.  |
| CCU Fan                                | The CCU unit fan revolution per minute has been decreased. | Request the distributor to repair.   |
| CIF(Communication error)               | There is an error in communication with Companion MPU.     | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor. |
| CMP RelaySoftware(Communication error) | There is an error in communication with Companion MPU.     | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor. |

| Message                                 | Explanation  | Advice  |
|---|--|---|
| COG/SOG(invalid)                        | There is a format error or a status error of the SOG/COG data.           | Check the sensor condition. Switch to a sensor in good condition, if available.   |
| COG/SOG(not plausible)                  | There is a range error of SOG/COG data.                                  | Check the sensor condition. Switch to a sensor in good condition, if available.   |
| COG/SOG(unavailable)                    | The SOG/COG data cannot be received.                                     | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available.   |
| CPU Core1 Clock down                    | The CPU core has been underclocked.                                      | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor.  |
| CPU Core1 High TEMP                     | The CPU core temperature is too high.                                    | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor.  |
| CPU Core2 Clock down                    | The CPU core has been underclocked.                                      | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor.  |
| CPU Core2 High TEMP                     | The CPU core temperature is too high.                                    | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor.  |
| CPU Fan                                 | The RPS fan revolution per minute has been decreased.                    | Request the distributor to repair.  |
| CPU High TEMP                           | The CPU temperature is too high.   | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor.  |
| Current(Communication failed, Main LAN) | Communication with tidal current meter cannot be performed via Main LAN. | Check the condition of tidal current meter and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |

| Message                                | Explanation  | Advice   |
|--|--|--|
| Current(Communication failed, Sub LAN) | Communication with tidal current meter cannot be performed via Sub LAN.    | Check the condition of tidal current meter and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Current(invalid)                       | There is a format error or a status error of the Tidal Current data.       | Check the sensor condition. Switch to a sensor in good condition, if available.  |
| Current(invalid)                       | There is a format error or a status error of the Tidal Current data.       | Check the sensor condition.  |
| Current(not plausible)                 | There is a range error of Tidal Current data.                              | Check the sensor condition. Switch to a sensor in good condition, if available.  |
| Current(not plausible)                 | There is a range error of Tidal Current data.                              | Check the sensor condition.  |
| Current(unavailable)                   | The Tidal Current data cannot be received.                                 | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available.  |
| Current(unavailable)                   | The Tidal Current data cannot be received.                                 | Check the condition of the sensor and the communication path.  |
| DATUM(unavailable)                     | The DTM data cannot be received.   | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available.  |
| Depth(invalid)                         | There is a format error or a status error of the Depth data.               | Check the sensor condition. Switch to a sensor in good condition, if available.  |
| Depth(unavailable)                     | The Depth data cannot be received.   | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available.  |
| Dongle Disable Mode                    | It is operating in dongle-disabled mode when the USB dongle is in failure. | Request the distributor to provide a USB dongle.   |
| Draft(invalid)                         | There is a format error or a status error of the data.                     | Check the sensor condition.  |
| Draft(not plausible)                   | There is a range error of the data.  | Check the sensor condition.  |

| Message  | Explanation   | Advice   |
|--|---|--|
| Draft(unavailable)                             | The data cannot be received.                                      | Check the condition of the sensor and the communication path.  |
| DSC(Communication failed, Main LAN)            | Communication with DSC cannot be performed via Main LAN.          | Check the condition of DSC and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.          |
| DSC(Communication failed, Sub LAN)             | Communication with DSC cannot be performed via Sub LAN.           | Check the condition of DSC and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.           |
| DSP(Heading Data)                              | There is an error in the heading data received by DSP.            | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.   |
| Dual Axis SOG(invalid)                         | There is a format error or a status error of the data.            | Check the sensor condition.  |
| Dual Axis SOG(not plausible)                   | There is a range error of the data.                               | Check the sensor condition.  |
| Dual Axis SOG(unavailable)                     | The data cannot be received.                                      | Check the condition of the sensor and the communication path.  |
| Echo Sounder 1(Communication failed, Direct)   | Communication with Echo Sounder cannot be performed via Serial.   | Check the condition of Echo Sounder and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| Echo Sounder 1(Communication failed, Main LAN) | Communication with Echo Sounder cannot be performed via Main LAN. | Check the condition of Echo Sounder and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |

| Message  | Explanation   | Advice  |
|--|---|---|
| Echo Sounder<br>1(Communication failed,<br>Sub LAN)  | Communication with Echo<br>Sounder cannot be<br>performed via Sub LAN.  | Check the condition of Echo Sounder and<br>Sub LAN.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.  |
| Echo Sounder<br>2(Communication failed,<br>Direct)   | Communication with Echo<br>Sounder cannot be<br>performed via Serial.   | Check the condition of Echo Sounder and<br>Serial.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.   |
| Echo Sounder<br>2(Communication failed,<br>Main LAN) | Communication with Echo<br>Sounder cannot be<br>performed via Main LAN. | Check the condition of Echo Sounder and<br>Main LAN.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor. |
| Echo Sounder<br>2(Communication failed,<br>Sub LAN)  | Communication with Echo<br>Sounder cannot be<br>performed via Sub LAN.  | Check the condition of Echo Sounder and<br>Sub LAN.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.  |
| Echo<br>Sounder(Communication failed, Direct)        | Communication with Echo<br>Sounder cannot be<br>performed via Serial.   | Check the condition of Echo Sounder and<br>Serial.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.   |

| Message                                      | Explanation   | Advice   |
|--|---|--|
| Echo Sounder(Communication failed, Main LAN) | Communication with Echo Sounder cannot be performed via Main LAN. | Check the condition of Echo Sounder and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Echo Sounder(Communication failed, Sub LAN)  | Communication with Echo Sounder cannot be performed via Sub LAN.  | Check the condition of Echo Sounder and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Engine Telegraph 1(invalid)                  | There is a format error or a status error of the data.            | Check the sensor condition.  |
| Engine Telegraph 1(not plausible)            | There is a range error of the data.                               | Check the sensor condition.  |
| Engine Telegraph 1(unavailable)              | The data cannot be received.                                      | Check the condition of the sensor and the communication path.  |
| Engine Telegraph 2(invalid)                  | There is a format error or a status error of the data.            | Check the sensor condition.  |
| Engine Telegraph 2(not plausible)            | There is a range error of the data.                               | Check the sensor condition.  |
| Engine Telegraph 2(unavailable)              | The data cannot be received.                                      | Check the condition of the sensor and the communication path.  |
| Engine/Propeller 1(invalid)                  | There is a format error or a status error of the data.            | Check the sensor condition.  |
| Engine/Propeller 1(not plausible)            | There is a range error of the data.                               | Check the sensor condition.  |
| Engine/Propeller 1(unavailable)              | The data cannot be received.                                      | Check the condition of the sensor and the communication path.  |
| Engine/Propeller 2(invalid)                  | There is a format error or a status error of the data.            | Check the sensor condition.  |
| Engine/Propeller 2(not plausible)            | There is a range error of the data.                               | Check the sensor condition.  |
| Engine/Propeller 2(unavailable)              | The data cannot be received.                                      | Check the condition of the sensor and the communication path.  |

| Message   | Explanation  | Advice  |
|---|--|---|
| e-Token(Communication error)                        | There is an error in communication with e-Token.                         | Restart the device.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.   |
| General Equipment1(Communication Failed, Main LAN)  | Communication with General Equipment1 cannot be performed via Main LAN.  | Check the condition of General Equipment1 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| General Equipment1(Communication Failed, Sub LAN)   | Communication with General Equipment1 cannot be performed via Sub LAN.   | Check the condition of General Equipment1 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| General Equipment10(Communication Failed, Main LAN) | Communication with General Equipment10 cannot be performed via Main LAN. | Check the condition of General Equipment10 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| General Equipment10(Communication Failed, Sub LAN)  | Communication with General Equipment10 cannot be performed via Sub LAN.  | Check the condition of General Equipment10 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| General Equipment2(Communication Failed, Main LAN)  | Communication with General Equipment2 cannot be performed via Main LAN.  | Check the condition of General Equipment2 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |



| Message   | Explanation   | Advice   |
|---|---|--|
| General<br>Equipment2(Communication Failed, Sub LAN)  | Communication with General Equipment2 cannot be performed via Sub LAN.  | Check the condition of General Equipment2 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| General<br>Equipment3(Communication Failed, Main LAN) | Communication with General Equipment3 cannot be performed via Main LAN. | Check the condition of General Equipment3 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| General<br>Equipment3(Communication Failed, Sub LAN)  | Communication with General Equipment3 cannot be performed via Sub LAN.  | Check the condition of General Equipment3 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| General<br>Equipment4(Communication Failed, Main LAN) | Communication with General Equipment4 cannot be performed via Main LAN. | Check the condition of General Equipment4 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| General<br>Equipment4(Communication Failed, Sub LAN)  | Communication with General Equipment4 cannot be performed via Sub LAN.  | Check the condition of General Equipment4 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |

| Message  | Explanation   | Advice   |
|--|---|--|
| General Equipment5(Communication Failed, Main LAN) | Communication with General Equipment5 cannot be performed via Main LAN. | Check the condition of General Equipment5 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| General Equipment5(Communication Failed, Sub LAN)  | Communication with General Equipment5 cannot be performed via Sub LAN.  | Check the condition of General Equipment5 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| General Equipment6(Communication Failed, Main LAN) | Communication with General Equipment6 cannot be performed via Main LAN. | Check the condition of General Equipment6 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| General Equipment6(Communication Failed, Sub LAN)  | Communication with General Equipment6 cannot be performed via Sub LAN.  | Check the condition of General Equipment6 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| General Equipment7(Communication Failed, Main LAN) | Communication with General Equipment7 cannot be performed via Main LAN. | Check the condition of General Equipment7 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |

| Message  | Explanation   | Advice   |
|--|---|--|
| General Equipment7(Communication Failed, Sub LAN)  | Communication with General Equipment7 cannot be performed via Sub LAN.  | Check the condition of General Equipment7 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| General Equipment8(Communication Failed, Main LAN) | Communication with General Equipment8 cannot be performed via Main LAN. | Check the condition of General Equipment8 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| General Equipment8(Communication Failed, Sub LAN)  | Communication with General Equipment8 cannot be performed via Sub LAN.  | Check the condition of General Equipment8 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| General Equipment9(Communication Failed, Main LAN) | Communication with General Equipment9 cannot be performed via Main LAN. | Check the condition of General Equipment9 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| General Equipment9(Communication Failed, Sub LAN)  | Communication with General Equipment9 cannot be performed via Sub LAN.  | Check the condition of General Equipment9 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Generator (invalid)                                | There is a format error or a status error of the data.                  | Check the sensor condition.  |
| Generator (not plausible)                          | There is a range error of the data.                                     | Check the sensor condition.  |

| Message                    | Explanation  | Advice   |
|----------------------------|--|--|
| Generator (unavailable)    | The data cannot be received.                           | Check the condition of the sensor and the communication path.  |
| Generator 1(invalid)       | There is a format error or a status error of the data. | Check the sensor condition.  |
| Generator 1(not plausible) | There is a range error of the data.                    | Check the sensor condition.  |
| Generator 1(unavailable)   | The data cannot be received.                           | Check the condition of the sensor and the communication path.  |
| Generator 2(invalid)       | There is a format error or a status error of the data. | Check the sensor condition.  |
| Generator 2(not plausible) | There is a range error of the data.                    | Check the sensor condition.  |
| Generator 2(unavailable)   | The data cannot be received.                           | Check the condition of the sensor and the communication path.  |
| Generator 3(invalid)       | There is a format error or a status error of the data. | Check the sensor condition.  |
| Generator 3(not plausible) | There is a range error of the data.                    | Check the sensor condition.  |
| Generator 3(unavailable)   | The data cannot be received.                           | Check the condition of the sensor and the communication path.  |
| Generator 4(invalid)       | There is a format error or a status error of the data. | Check the sensor condition.  |
| Generator 4(not plausible) | There is a range error of the data.                    | Check the sensor condition.  |
| Generator 4(unavailable)   | The data cannot be received.                           | Check the condition of the sensor and the communication path.  |
| Generator 5(invalid)       | There is a format error or a status error of the data. | Check the sensor condition.  |
| Generator 5(not plausible) | There is a range error of the data.                    | Check the sensor condition.  |
| Generator 5(unavailable)   | The data cannot be received.                           | Check the condition of the sensor and the communication path.  |
| GIF(Communication error)   | There is a communication error with Gyro IF.           | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor. |
| GIF-RIF(Open)              | GIF-RIF open is detected.                              | Check the status of the cable (W81 in Junction Box:NQE-1143).  |
| GIF-SLC(Open)              | GIF-SLC open is detected.                              | Check the status of the cable (W82 in Junction Box:NQE-1143).  |

| Message                               | Explanation  | Advice  |
|---------------------------------------|--|---|
| GPS 1(Communication Failed, Direct)   | Communication with GPS 1 cannot be performed via Serial.   | Check the condition of GPS 1 and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| GPS 1(Communication Failed, Main LAN) | Communication with GPS 1 cannot be performed via Main LAN. | Check the condition of GPS 1 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| GPS 1(Communication Failed, Sub LAN)  | Communication with GPS 1 cannot be performed via Sub LAN.  | Check the condition of GPS 1 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| GPS 2(Communication Failed, Direct)   | Communication with GPS 2 cannot be performed via Serial.   | Check the condition of GPS 2 and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| GPS 2(Communication Failed, Main LAN) | Communication with GPS 2 cannot be performed via Main LAN. | Check the condition of GPS 2 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| GPS 2(Communication Failed, Sub LAN)  | Communication with GPS 2 cannot be performed via Sub LAN.  | Check the condition of GPS 2 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |

| Message                               | Explanation  | Advice  |
|---------------------------------------|--|---|
| GPS 3(Communication Failed, Direct)   | Communication with GPS 3 cannot be performed via Serial.   | Check the condition of GPS 3 and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| GPS 3(Communication Failed, Main LAN) | Communication with GPS 3 cannot be performed via Main LAN. | Check the condition of GPS 3 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| GPS 3(Communication Failed, Sub LAN)  | Communication with GPS 3 cannot be performed via Sub LAN.  | Check the condition of GPS 3 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| GPS 4(Communication Failed, Direct)   | Communication with GPS 4 cannot be performed via Serial.   | Check the condition of GPS 4 and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| GPS 4(Communication Failed, Main LAN) | Communication with GPS 4 cannot be performed via Main LAN. | Check the condition of GPS 4 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| GPS 4(Communication Failed, Sub LAN)  | Communication with GPS 4 cannot be performed via Sub LAN.  | Check the condition of GPS 4 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |

| Message   | Explanation  | Advice   |
|---|--|--|
| GPS Compass<br>1(Communication failed,<br>Direct)   | Communication with GPS<br>Compass 1 cannot be<br>performed via Serial.   | Check the condition of GPS Compass 1 and<br>Serial.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.   |
| GPS Compass<br>1(Communication failed,<br>Main LAN) | Communication with GPS<br>Compass 1 cannot be<br>performed via Main LAN. | Check the condition of GPS Compass 1 and<br>Main LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor. |
| GPS Compass<br>1(Communication failed,<br>Sub LAN)  | Communication with GPS<br>Compass 1 cannot be<br>performed via Sub LAN.  | Check the condition of GPS Compass 1 and<br>Sub LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.  |
| GPS Compass<br>2(Communication failed,<br>Direct)   | Communication with GPS<br>Compass 2 cannot be<br>performed via Serial.   | Check the condition of GPS Compass 2 and<br>Serial.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.   |
| GPS Compass<br>2(Communication failed,<br>Main LAN) | Communication with GPS<br>Compass 2 cannot be<br>performed via Main LAN. | Check the condition of GPS Compass 2 and<br>Main LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor. |

| Message  | Explanation   | Advice  |
|--|---|---|
| GPS Compass<br>2(Communication failed,<br>Sub LAN) | Communication with GPS<br>Compass 2 cannot be<br>performed via Sub LAN. | Check the condition of GPS Compass 2 and<br>Sub LAN.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor. |
| GPS<br>Selector(Communication<br>Failed, Direct)   | Communication with GPS<br>Selector cannot be<br>performed via Serial.   | Check the condition of GPS Selector and<br>Serial.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.   |
| Gyro 1(Communication<br>Failed, Direct)            | Communication with Gyro<br>1 cannot be performed via<br>Serial.         | Check the condition of Gyro 1 and Serial.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.            |
| Gyro 1(Communication<br>Failed, GIF-Direct)        | Communication with Gyro<br>1 cannot be performed via<br>Serial.         | Check the condition of Gyro 1, GIF and Serial.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.       |
| Gyro 1(Communication<br>Failed, GIF-Main LAN)      | Communication with Gyro<br>1 cannot be performed via<br>Main LAN.       | Check the condition of Gyro 1, GIF and Main<br>LAN.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.  |
| Gyro 1(Communication<br>Failed, GIF-Sub LAN)       | Communication with Gyro<br>1 cannot be performed via<br>Sub LAN.        | Check the condition of Gyro 1, GIF and Sub<br>LAN.<br><br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.   |



| Message                                    | Explanation   | Advice  |
|--|---|---|
| Gyro 1(Communication Failed, Main LAN)     | Communication with Gyro 1 cannot be performed via Main LAN. | Check the condition of Gyro 1 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.      |
| Gyro 1(Communication Failed, Sub LAN)      | Communication with Gyro 1 cannot be performed via Sub LAN.  | Check the condition of Gyro 1 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.       |
| Gyro 2(Communication Failed, Direct)       | Communication with Gyro 2 cannot be performed via Serial.   | Check the condition of Gyro 2, GIF and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| Gyro 2(Communication Failed, GIF-Direct)   | Communication with Gyro 2 cannot be performed via Serial.   | Check the condition of Gyro 2, GIF and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| Gyro 2(Communication Failed, GIF-Main LAN) | Communication with Gyro 2 cannot be performed via Main LAN. | Check the condition of Gyro 2, GIF and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Gyro 2(Communication Failed, GIF-Sub LAN)  | Communication with Gyro 2 cannot be performed via Sub LAN.  | Check the condition of Gyro 2, GIF and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |

| Message                                  | Explanation   | Advice  |
|--|---|---|
| Gyro 2(Communication Failed, Main LAN)   | Communication with Gyro 2 cannot be performed via Main LAN. | Check the condition of Gyro 2 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.    |
| Gyro 2(Communication Failed, Sub LAN)    | Communication with Gyro 2 cannot be performed via Sub LAN.  | Check the condition of Gyro 2 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.     |
| Gyro(Communication Failed, Direct)       | Communication with Gyro cannot be performed via Serial.     | Check the condition of Gyro, GIF and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| Gyro(Communication Failed, GIF-Direct)   | Communication with Gyro cannot be performed via Serial.     | Check the condition of Gyro, GIF and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| Gyro(Communication Failed, GIF-Main LAN) | Communication with Gyro cannot be performed via Main LAN.   | Check the condition of Gyro, GIF and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Gyro(Communication Failed, GIF-Sub LAN)  | Communication with Gyro cannot be performed via Sub LAN.    | Check the condition of Gyro, GIF and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |

| Message                              | Explanation  | Advice   |
|--------------------------------------|--|--|
| Gyro(Communication Failed, Main LAN) | Communication with Gyro cannot be performed via Main LAN.      | Check the condition of Gyro and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Gyro(Communication Failed, Sub LAN)  | Communication with Gyro cannot be performed via Sub LAN.       | Check the condition of Gyro and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| HASP(Communication error)            | There is an error in communication with HASP.                  | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.   |
| HDG(No Correction)                   | No correction included in heading                              | Perform the operation carefully.   |
| HDOP exceeded(GPS1)                  | The GPS1 precision is deteriorated.                            | Check the sensor condition.  |
| HDOP exceeded(GPS2)                  | The GPS2 precision is deteriorated.                            | Check the sensor condition.  |
| HDOP exceeded(GPS3)                  | The GPS3 precision is deteriorated.                            | Check the sensor condition.  |
| HDOP exceeded(GPS4)                  | The GPS4 precision is deteriorated.                            | Check the sensor condition.  |
| Heading(invalid)                     | There is a format error or a status error of the Heading data. | Check the sensor condition. Switch to a sensor in good condition, if available.  |
| Heading(not plausible)               | There is a range error of Heading data.                        | Check the sensor condition. Switch to a sensor in good condition, if available.  |
| Heading(unavailable)                 | The Heading data cannot be received.                           | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available.  |
| Hull Motion(invalid)                 | There is a format error or a status error of the data.         | Check the sensor condition.  |
| Hull Motion(not plausible)           | There is a range error of the data.                            | Check the sensor condition.  |
| Hull Motion(unavailable)             | The data cannot be received.                                   | Check the condition of the sensor and the communication path.  |

| Message  | Explanation  | Advice  |
|--|--|---|
| Humidity(invalid)                                | There is a format error or a status error of the data.   | Check the sensor condition.   |
| Humidity(not plausible)                          | There is a range error of the data.                      | Check the sensor condition.   |
| Humidity(unavailable)                            | The data cannot be received.                             | Check the condition of the sensor and the communication path.   |
| IAS<br>Primary(Communication Failed, Main LAN)   | Communication with IAS cannot be performed via Main LAN. | Check the condition of IAS and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| IAS<br>Primary(Communication Failed, Sub LAN)    | Communication with IAS cannot be performed via Sub LAN.  | Check the condition of IAS and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| IAS<br>Secondary(Communication Failed, Main LAN) | Communication with IAS cannot be performed via Main LAN. | Check the condition of IAS and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| IAS<br>Secondary(Communication Failed, Sub LAN)  | Communication with IAS cannot be performed via Sub LAN.  | Check the condition of IAS and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| IAS(Communication failed, Main LAN)              | Communication with IAS cannot be performed via Main LAN. | Check the condition of IAS and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |

| Message                                 | Explanation   | Advice   |
|---|---|--|
| IAS(Communication failed, Sub LAN)      | Communication with IAS cannot be performed via Sub LAN.     | Check the condition of IAS and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| ISW(Communication error)                | There is a communication error with ISW.                    | If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Joystick(Communication Failed, MainLAN) | A communication error with MJS via Main LAN was detected.   | Check MJS.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.                              |
| Joystick(Communication Failed, SubLAN)  | A communication error with MJS via Sub LAN was detected.    | Check MJS.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.                              |
| LCD Fan1(LCD)                           | The fan in the display unit has stopped.                    | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.   |
| LCD Fan2(LCD)                           | The fan in the display unit has stopped.                    | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.   |
| LCD High TEMP                           | The temperature of LCD is too high. It will be dim or dark. | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor.   |

| Message                                   | Explanation  | Advice   |
|---|--|--|
| Log 1(Communication failed, Direct)       | Communication with Log 1 cannot be performed via Serial.   | Check the condition of Log 1 and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.        |
| Log 1(Communication failed, GIF-Direct)   | Communication with Log 1 cannot be performed via Serial.   | Check the condition of Log 1, GIF and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| Log 1(Communication failed, GIF-Main LAN) | Communication with Log 1 cannot be performed via Main LAN. | Check the condition of Log 1, GIF and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Log 1(Communication failed, GIF-Sub LAN)  | Communication with Log 1 cannot be performed via Sub LAN.  | Check the condition of Log 1, GIF and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Log 1(Communication failed, Main LAN)     | Communication with Log 1 cannot be performed via Main LAN. | Check the condition of Log 1 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.      |
| Log 1(Communication failed, Sub LAN)      | Communication with Log 1 cannot be performed via Sub LAN.  | Check the condition of Log 1 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.       |

| Message                                   | Explanation  | Advice   |
|---|--|--|
| Log 2(Communication failed, Direct)       | Communication with Log 2 cannot be performed via Serial.   | Check the condition of Log 2 and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.        |
| Log 2(Communication failed, GIF-Direct)   | Communication with Log 2 cannot be performed via Serial.   | Check the condition of Log 2, GIF and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| Log 2(Communication failed, GIF-Main LAN) | Communication with Log 2 cannot be performed via Main LAN. | Check the condition of Log 2, GIF and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Log 2(Communication failed, GIF-Sub LAN)  | Communication with Log 2 cannot be performed via Sub LAN.  | Check the condition of Log 2, GIF and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Log 2(Communication failed, Main LAN)     | Communication with Log 2 cannot be performed via Main LAN. | Check the condition of Log 2 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.      |
| Log 2(Communication failed, Sub LAN)      | Communication with Log 2 cannot be performed via Sub LAN.  | Check the condition of Log 2 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.       |

| Message  | Explanation   | Advice   |
|--|---|--|
| Log Selector(Communication failed, Direct)         | Communication with Log Selector cannot be performed via Serial.         | Check the condition of Log Selector and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.         |
| Magnetic Compass 1(Communication failed, Direct)   | Communication with Magnetic Compass 1 cannot be performed via Serial.   | Check the condition of Magnetic Compass 1 and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| Magnetic Compass 1(Communication failed, Main LAN) | Communication with Magnetic Compass 1 cannot be performed via Main LAN. | Check the condition of Magnetic Compass 1 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Magnetic Compass 1(Communication failed, Sub LAN)  | Communication with Magnetic Compass 1 cannot be performed via Sub LAN.  | Check the condition of Magnetic Compass 1 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Magnetic Compass 2(Communication failed, Direct)   | Communication with Magnetic Compass 2 cannot be performed via Serial.   | Check the condition of Magnetic Compass 2 and Serial.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |



| Message  | Explanation   | Advice   |
|--|---|--|
| Magnetic Compass 2(Communication failed, Main LAN) | Communication with Magnetic Compass 2 cannot be performed via Main LAN. | Check the condition of Magnetic Compass 2 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Magnetic Compass 2(Communication failed, Sub LAN)  | Communication with Magnetic Compass 2 cannot be performed via Sub LAN.  | Check the condition of Magnetic Compass 2 and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| MJS IF <-> AP(Communication error)                 | MJS detected a communication error with AP.                             | Check AP.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| MJS IF(Unit failure)                               | An error occurred in the MJS unit.                                      | Turn off the power of the device and request the distributor to repair.  |
| MJS OPE <-> MJS IF(Communication error)            | MJS detected a communication error with MJS I/O.                        | Turn off the power of the device and request the distributor to repair.  |
| MJS OPE(Unit failure)                              | An error occurred in the MJS equipment.                                 | Turn off the power of the device and request the distributor to repair.  |
| Multi Current(unavailable)                         | The data cannot be received.  | Check the condition of the sensor and the communication path.  |
| NAVTEX(Communication failed, Main LAN)             | Communication with NAVTEX cannot be performed via Main LAN.             | Check the condition of NAVTEX and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.             |

| Message                                      | Explanation   | Advice   |
|--|---|--|
| NAVTEX(Communication failed, Sub LAN)        | Communication with NAVTEX cannot be performed via Sub LAN.        | Check the condition of NAVTEX and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.        |
| No.1 Conning(Communication failed, Main LAN) | Communication with No.1 Conning cannot be performed via Main LAN. | Check the condition of No.1 Conning and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| No.1 Conning(Communication failed, Sub LAN)  | Communication with No.1 Conning cannot be performed via Sub LAN.  | Check the condition of No.1 Conning and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| No.1 ECDIS(Communication failed, Main LAN)   | Communication with No.1 ECDIS cannot be performed via Main LAN.   | Check the condition of No.1 ECDIS and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |
| No.1 ECDIS(Communication failed, Sub LAN)    | Communication with No.1 ECDIS cannot be performed via Sub LAN.    | Check the condition of No.1 ECDIS and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.    |

| Message   | Explanation  | Advice  |
|---|--|---|
| No.1 Radar(Communication failed, Main LAN)          | Communication with No.1 RADAR cannot be performed via Main LAN.          | Check the condition of No.1 RADAR and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.          |
| No.1 Radar(Communication failed, Sub LAN)           | Communication with No.1 RADAR cannot be performed via Sub LAN.           | Check the condition of No.1 RADAR and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.           |
| No.1 Remote-Conning(Communication failed, Main LAN) | Communication with No.1 Remote-Conning cannot be performed via Main LAN. | Check the condition of No.1 Remote-Conning and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| No.1 Remote-Conning(Communication failed, Sub LAN)  | Communication with No.1 Remote-Conning cannot be performed via Sub LAN.  | Check the condition of No.1 Remote-Conning and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| No.1 RPS(Communication failed, Main LAN)            | Communication with No.1 RPS cannot be performed via Main LAN.            | Check the condition of No.1 RPS and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.            |

| Message  | Explanation  | Advice  |
|--|--|---|
| No.1<br>RPS(Communication failed, Sub LAN)           | Communication with No.1 RPS cannot be performed via Sub LAN.           | Check the condition of No.1 RPS and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.           |
| No.1<br>Wing-Conning(Communication failed, Main LAN) | Communication with No.1 Wing-Conning cannot be performed via Main LAN. | Check the condition of No.1 Wing-Conning and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| No.1<br>Wing-Conning(Communication failed, Sub LAN)  | Communication with No.1 Wing-Conning cannot be performed via Sub LAN.  | Check the condition of No.1 Wing-Conning and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| No.2<br>Conning(Communication failed, Main LAN)      | Communication with No.2 Conning cannot be performed via Main LAN.      | Check the condition of No.2 Conning and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.      |
| No.2<br>Conning(Communication failed, Sub LAN)       | Communication with No.2 Conning cannot be performed via Sub LAN.       | Check the condition of No.2 Conning and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.       |

| Message   | Explanation   | Advice   |
|---|---|--|
| No.2<br>ECDIS(Communication<br>failed, Main LAN)              | Communication with No.2<br>ECDIS cannot be<br>performed via Main LAN.             | Check the condition of No.2 ECDIS and Main<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.          |
| No.2<br>ECDIS(Communication<br>failed, Sub LAN)               | Communication with No.2<br>ECDIS cannot be<br>performed via Sub LAN.              | Check the condition of No.2 ECDIS and Sub<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.           |
| No.2<br>Radar(Communication<br>failed, Main LAN)              | Communication with No.2<br>RADAR cannot be<br>performed via Main LAN.             | Check the condition of No.2 RADAR and Main<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.          |
| No.2<br>Radar(Communication<br>failed, Sub LAN)               | Communication with No.2<br>RADAR cannot be<br>performed via Sub LAN.              | Check the condition of No.2 RADAR and Sub<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.           |
| No.2<br>Remote-Conning(Comm<br>unication failed, Main<br>LAN) | Communication with No.2<br>Remote-Conning cannot<br>be performed via Main<br>LAN. | Check the condition of No.2 Remote-Conning<br>and Main LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor. |

| Message  | Explanation   | Advice   |
|--|---|--|
| No.2 Remote-Conning(Communication failed, Sub LAN) | Communication with No.2 Remote-Conning cannot be performed via Sub LAN. | Check the condition of No.2 Remote-Conning and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| No.2 RPS(Communication failed, Main LAN)           | Communication with No.2 RPS cannot be performed via Main LAN.           | Check the condition of No.2 RPS and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.           |
| No.2 RPS(Communication failed, Sub LAN)            | Communication with No.2 RPS cannot be performed via Sub LAN.            | Check the condition of No.2 RPS and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.            |
| No.2 Wing-Conning(Communication failed, Main LAN)  | Communication with No.2 Wing-Conning cannot be performed via Main LAN.  | Check the condition of No.2 Wing-Conning and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| No.2 Wing-Conning(Communication failed, Sub LAN)   | Communication with No.2 Wing-Conning cannot be performed via Sub LAN.   | Check the condition of No.2 Wing-Conning and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |

| Message  | Explanation   | Advice  |
|--|---|---|
| No.3<br>ECDIS(Communication<br>failed, Main LAN) | Communication with No.3<br>ECDIS cannot be<br>performed via Main LAN. | Check the condition of No.3 ECDIS and Main<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor. |
| No.3<br>ECDIS(Communication<br>failed, Sub LAN)  | Communication with No.3<br>ECDIS cannot be<br>performed via Sub LAN.  | Check the condition of No.3 ECDIS and Sub<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.  |
| No.3<br>Radar(Communication<br>failed, Main LAN) | Communication with No.3<br>RADAR cannot be<br>performed via Main LAN. | Check the condition of No.3 RADAR and Main<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor. |
| No.3<br>Radar(Communication<br>failed, Sub LAN)  | Communication with No.3<br>RADAR cannot be<br>performed via Sub LAN.  | Check the condition of No.3 RADAR and Sub<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.  |
| No.4<br>ECDIS(Communication<br>failed, Main LAN) | Communication with No.4<br>ECDIS cannot be<br>performed via Main LAN. | Check the condition of No.4 ECDIS and Main<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor. |

| Message  | Explanation   | Advice  |
|--|---|---|
| No.4<br>ECDIS(Communication<br>failed, Sub LAN)  | Communication with No.4<br>ECDIS cannot be<br>performed via Sub LAN.  | Check the condition of No.4 ECDIS and Sub<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.  |
| No.4<br>Radar(Communication<br>failed, Main LAN) | Communication with No.4<br>RADAR cannot be<br>performed via Main LAN. | Check the condition of No.4 RADAR and Main<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor. |
| No.4<br>Radar(Communication<br>failed, Sub LAN)  | Communication with No.4<br>RADAR cannot be<br>performed via Sub LAN.  | Check the condition of No.4 RADAR and Sub<br>LAN.<br>If it cannot be recovered after you check the<br>connection of the equipment cable in<br>power-off status and restart, turn off the<br>power of the device and contact your<br>distributor.  |
| OPA-OPB(Communication<br>error)                  | -   | -   |
| OPU-Serial(Communication<br>error)               | There is a communication<br>error with the operating<br>portion.      | Restart the power.<br>If it cannot be recovered after three times of<br>restart, turn off the device and contact the<br>distributor.  |
| OPU-USB(Communication<br>error)                  | There is a communication<br>error with the operating<br>portion.      | Restart the power.<br>If it cannot be recovered after three times of<br>restart, turn off the device and contact the<br>distributor.  |
| Port Main<br>Propeller(Invalid)                  | There is a format error or<br>a status error of the data.             | Check the sensor condition.   |
| Port Main Propeller(not<br>plausible)            | There is a range error of<br>the data.                                | Check the sensor condition.   |
| Port Main<br>Propeller(unavailable)              | The data cannot be<br>received.                                       | Check the condition of the sensor and the<br>communication path.  |
| Position(Invalid)                                | There is a format error or<br>a status error of the<br>Position data. | Check the sensor condition. Switch to a<br>sensor in good condition, if available.  |



| Message                                   | Explanation   | Advice  |
|---|---|---|
| Position(not plausible)                   | There is a range error of Position data.                              | Check the sensor condition. Switch to a sensor in good condition, if available.   |
| Position(unavailable)                     | The Position data cannot be received.                                 | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available.   |
| POSN(GPS1) Not Differential               | Differential operation is not performed by GPS1.                      | Check the sensor condition.   |
| POSN(GPS2) Not Differential               | Differential operation is not performed by GPS2.                      | Check the sensor condition.   |
| POSN(GPS3) Not Differential               | Differential operation is not performed by GPS3.                      | Check the sensor condition.   |
| POSN(GPS4) Not Differential               | Differential operation is not performed by GPS4.                      | Check the sensor condition.   |
| POSN(Low Integrity, GPS1)                 | Integrity of the GPS position is low.                                 | Perform the operation carefully.  |
| POSN(Low Integrity, GPS2)                 | Integrity of the GPS position is low.                                 | Perform the operation carefully.  |
| POSN(Navigational Status Not Valid, GPS1) | Navigational status of GPS is not valid.                              | Perform the operation carefully.  |
| POSN(Navigational Status Not Valid, GPS2) | Navigational status of GPS is not valid.                              | Perform the operation carefully.  |
| Power Fail                                | Power incoming of 3.3V/2.5V/1.5V/1.2V etc. has decreased and stopped. | Check the electronic power supply.  |
| Power(Fan)                                | A failure of the fan in the power supply unit has been detected.      | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| Power(TXRX, Failed)                       | There is an error in the power supply unit for the radar antenna.     | Turn off the power of the device and request the distributor to repair.   |
| PROC(AZI)                                 | An azimuth signal error has occurred at the signal processing unit.   | Turn off the power of the device and check the connection of the equipment cable.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor. |

| Message                  | Explanation   | Advice  |
|--------------------------|---|---|
| PROC(HL)                 | A heading line signal error has occurred at the signal processing unit. | Turn off the power of the device and check the connection of the equipment cable.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor. |
| PROC(Interrupt1)         | There is a stern interrupt error in the signal processing unit.         | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| PROC(Interrupt2)         | There is a stern interrupt error in the signal processing unit.         | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| PROC(Trigger)            | A trigger signal error has occurred at the signal processing unit.      | Turn off the power of the device and check the connection of the equipment cable.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor. |
| PROC(Video)              | A radar image signal error has occurred at the signal processing unit.  | Turn off the power of the device and check the connection of the equipment cable.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor. |
| RADAR PROC(Data)         | Control of radar signal/image processing failed.                        | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| RIF(Communication error) | There is an error in communication with RIF.                            | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| ROT(Invalid)             | There is a format error or a status error of the ROT data.              | Check the sensor condition.   |
| ROT(unavailable)         | The ROT data cannot be received.  | Check the condition of the sensor and the communication path.   |
| RTC Abnormal             | RTC is abnormal.  | Restart the power.<br>If it cannot be recovered after three times of restart, contact the distributor.  |

| Message                                | Explanation   | Advice  |
|--|---|---|
| Rudder 1(invalid)                      | There is a format error or a status error of the Rudder data. | Check the sensor condition.   |
| Rudder 1(invalid)                      | There is a format error or a status error of the Rudder data. | Check the sensor condition.   |
| Rudder 1(not plausible)                | There is a range error of Rudder data.                        | Check the sensor condition.   |
| Rudder 1(not plausible)                | There is a range error of Rudder data.                        | Check the sensor condition.   |
| Rudder 1(unavailable)                  | The Rudder data cannot be received.                           | Check the condition of the sensor and the communication path.   |
| Rudder 1(unavailable)                  | The Rudder data cannot be received.                           | Check the condition of the sensor and the communication path.   |
| Rudder 2(invalid)                      | There is a format error or a status error of the Rudder data. | Check the sensor condition.   |
| Rudder 2(invalid)                      | There is a format error or a status error of the Rudder data. | Check the sensor condition.   |
| Rudder 2(not plausible)                | There is a range error of Rudder data.                        | Check the sensor condition.   |
| Rudder 2(not plausible)                | There is a range error of Rudder data.                        | Check the sensor condition.   |
| Rudder 2(unavailable)                  | The Rudder data cannot be received.                           | Check the condition of the sensor and the communication path.   |
| Rudder 2(unavailable)                  | The Rudder data cannot be received.                           | Check the condition of the sensor and the communication path.   |
| Rudder(Communication failed, Main LAN) | Communication with Rudder cannot be performed via Main LAN.   | Check the condition of Rudder and Main LAN. If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Rudder(Communication failed, Sub LAN)  | Communication with Rudder cannot be performed via Sub LAN.    | Check the condition of Rudder and Sub LAN. If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |

| Message                                      | Explanation  | Advice   |
|--|--|--|
| Sea TEMP(invalid)                            | There is a format error or a status error of the Water temperature data. | Check the sensor condition. Switch to a sensor in good condition, if available.  |
| Sea TEMP(invalid)                            | There is a format error or a status error of the Water temperature data. | Check the sensor condition.  |
| Sea TEMP(invalid)                            | There is a format error or a status error of the data.                   | Check the sensor condition.  |
| Sea TEMP(unavailable)                        | The Water temperature data cannot be received.                           | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available.  |
| Sea TEMP(unavailable)                        | The Water temperature data cannot be received.                           | Check the condition of the sensor and the communication path.  |
| Sea TEMP(unavailable)                        | The data cannot be received.   | Check the condition of the sensor and the communication path.  |
| Ship's clock(Communication failed, Main LAN) | Communication with Ship's clock cannot be performed via Main LAN.        | Check the condition of Ship's clock and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Ship's clock(Communication failed, Sub LAN)  | Communication with Ship's clock cannot be performed via Sub LAN.         | Check the condition of Ship's clock and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| S-J I/O <-> AP(Communication error)          | S-JOY detected a communication error with AP.                            | Check AP.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.   |

| Message                                | Explanation   | Advice   |
|--|---|--|
| S-J I/O Time Out                       | A communication error with S-JOY was detected.              | Check S-JOY.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.                                |
| S-J I/O(Unit failure)                  | An error occurred in the S-JOY unit.                        | Turn off the power of the device and request the distributor to repair.  |
| S-JOY <-> S-J I/O(Communication error) | S-JOY detected a communication error with S-JOY I/O.        | Turn off the power of the device and request the distributor to repair.  |
| S-JOY(Unit failure)                    | An error occurred in the S-JOY equipment.                   | Turn off the power of the device and request the distributor to repair.  |
| SLC1-1(Communication failed, Main LAN) | Communication with SLC1-1 cannot be performed via Main LAN. | Check the condition of SLC1-1 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| SLC1-2(Communication failed, Main LAN) | Communication with SLC1-2 cannot be performed via Main LAN. | Check the condition of SLC1-2 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| SLC1-3(Communication failed, Main LAN) | Communication with SLC1-3 cannot be performed via Main LAN. | Check the condition of SLC1-3 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| SLC1-4(Communication failed, Main LAN) | Communication with SLC1-4 cannot be performed via Main LAN. | Check the condition of SLC1-4 and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |

| Message                               | Explanation  | Advice   |
|---------------------------------------|--|--|
| SLC2-1(Communication failed, Sub LAN) | Communication with SLC2-1 cannot be performed via Sub LAN. | Check the condition of SLC2-1 and Sub LAN. If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| SLC2-2(Communication failed, Sub LAN) | Communication with SLC2-2 cannot be performed via Sub LAN. | Check the condition of SLC2-2 and Sub LAN. If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| SLC2-3(Communication failed, Sub LAN) | Communication with SLC2-3 cannot be performed via Sub LAN. | Check the condition of SLC2-3 and Sub LAN. If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| SLC2-4(Communication failed, Sub LAN) | Communication with SLC2-4 cannot be performed via Sub LAN. | Check the condition of SLC2-4 and Sub LAN. If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Stbd Main Propeller(invalid)          | There is a format error or a status error of the data.     | Check the sensor condition.  |
| Stbd Main Propeller(not plausible)    | There is a range error of the data.                        | Check the sensor condition.  |
| Stbd Main Propeller(unavailable)      | The data cannot be received.                               | Check the condition of the sensor and the communication path.  |
| Stern Thruster 1(invalid)             | There is a format error or a status error of the data.     | Check the sensor condition.  |
| Stern Thruster 1(invalid)             | There is a format error or a status error of the data.     | Check the sensor condition.  |
| Stern Thruster 1(not plausible)       | There is a range error of the data.                        | Check the sensor condition.  |
| Stern Thruster 1(not plausible)       | There is a range error of the data.                        | Check the sensor condition.  |
| Stern Thruster 1(unavailable)         | The data cannot be received.                               | Check the condition of the sensor and the communication path.  |

| Message                         | Explanation  | Advice  |
|---------------------------------|--|---|
| Stern Thruster 1(unavailable)   | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| Stern Thruster 2(invalid)       | There is a format error or a status error of the data.     | Check the sensor condition.   |
| Stern Thruster 2(invalid)       | There is a format error or a status error of the data.     | Check the sensor condition.   |
| Stern Thruster 2(not plausible) | There is a range error of the data.                        | Check the sensor condition.   |
| Stern Thruster 2(not plausible) | There is a range error of the data.                        | Check the sensor condition.   |
| Stern Thruster 2(unavailable)   | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| Stern Thruster 2(unavailable)   | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| Stern Thruster 3(invalid)       | There is a format error or a status error of the data.     | Check the sensor condition.   |
| Stern Thruster 3(not plausible) | There is a range error of the data.                        | Check the sensor condition.   |
| Stern Thruster 3(unavailable)   | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| Stern Thruster 4(invalid)       | There is a format error or a status error of the data.     | Check the sensor condition.   |
| Stern Thruster 4(not plausible) | There is a range error of the data.                        | Check the sensor condition.   |
| Stern Thruster 4(unavailable)   | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| Stern Thruster 5(invalid)       | There is a format error or a status error of the data.     | Check the sensor condition.   |
| Stern Thruster 5(not plausible) | There is a range error of the data.                        | Check the sensor condition.   |
| Stern Thruster 5(unavailable)   | The data cannot be received.                               | Check the condition of the sensor and the communication path.   |
| STW Speed(invalid)              | There is a format error or a status error of the STW data. | Check the sensor condition. Switch to a sensor in good condition, if available.                                   |
| STW Speed(unavailable)          | The STW data cannot be received.                           | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available. |

| Message                   | Explanation   | Advice   |
|---------------------------|---|--|
| Time(Invalid)             | There is a format error or a status error of the Time data. | Check the sensor condition. Switch to a sensor in good condition, if available.  |
| Time(Invalid)             | There is a format error or a status error of the Time data. | Check the sensor condition.  |
| Time(unavailable)         | The Time data cannot be received.                           | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available.  |
| Time(unavailable)         | The Time data cannot be received.                           | Check the condition of the sensor and the communication path.  |
| TXRX(AZI)                 | Azimuth signals cannot be recognized in the radar antenna.  | <p>Confirm that the status is standby and, if the status is transmitting, set the status to standby.</p> <p>After that, set the status to transmitting again.</p> <p>If it cannot be recovered in this transmitting state, visually confirm that the antenna of radar antenna is rotating in a proper way.</p> <p>If the rotation of the antenna has been able to be confirmed, turn off the power of the device and, after confirming cable connection of the encoder in the radar antenna, turn the power on again.</p> <p>If it cannot be recovered after the operation above, turn off the device and contact the distributor.</p> |
| TXRX(Communication error) | There is a communication error with radar antenna.          | <p>Confirm that the setting of the instruction machine is Master.</p> <p>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.</p>   |



| Message               | Explanation   | Advice   |
|-----------------------|---|--|
| TXRX(DRV AC LKV)      | The supply voltage of the motor driver circuit in the radar antenna falls short of the rated value. | Turn off the power of the device and check the connection of the equipment cable.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.<br>Turn off the power of the device if it is equipped and check the AC power voltage provided to the radar antenna and the DIP switch setting of the motor driver circuit. |
| TXRX(DRV AC OVV)      | The supply voltage of the motor driver circuit in the radar antenna exceeds the rated value.        | Turn off the power of the device and check the connection of the equipment cable.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.<br>Turn off the power of the device if it is equipped and check the AC power voltage provided to the radar antenna and the DIP switch setting of the motor driver circuit. |
| TXRX(DRV COM)         | The communication with the motor driver circuit in the radar antenna is abnormal.                   | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.   |
| TXRX(DRV CPU1)        | The control unit of the motor driver circuit in the radar antenna is abnormal.                      | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.   |
| TXRX(DRV Hall Sensor) | The rotation sensor of the motor in the radar antenna is abnormal.                                  | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.   |
| TXRX(DRV High Rotate) | The rotation speed of the antenna is higher than the specification.                                 | Confirm that the status is standby and, if the status is transmitting, set the status to standby.<br>After that, set the status to transmitting again.<br>If it cannot be recovered after repeating the above operation three times, turn off the device and contact the distributor.  |

| Message               | Explanation  | Advice  |
|-----------------------|--|---|
| TXRX(DRV IPM OVH)     | The temperature of IPM of the motor driver circuit in the radar antenna is abnormal. | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor.  |
| TXRX(DRV Low Rotate)  | The rotation speed of the antenna is lower than the specification.                   | Confirm that the status is standby and, if the status is transmitting, set the status to standby.<br>After that, set the status to transmitting again.<br>If it cannot be recovered after repeating the above operation three times, turn off the device and contact the distributor.   |
| TXRX(DRV MOT OVH)     | The temperature of the motor in the radar antenna is abnormal.                       | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor.  |
| TXRX(DRV OVC)         | The supply current of the motor in the radar antenna exceeds the rated value.        | Confirm that the status is standby and, if the status is transmitting, set the status to standby.<br>Then, after confirming that there is no obstruction in the swing circle of the antenna, set the status to transmitting again.<br>If it cannot be recovered after the operation above, turn off the device and contact the distributor. |
| TXRX(DRV Over Rotate) | The rotation speed of the antenna is abnormally higher than the specification.       | Confirm that the status is standby and, if the status is transmitting, set the status to standby.<br>After that, set the status to transmitting again.<br>If it cannot be recovered after repeating the above operation three times, turn off the device and contact the distributor.   |
| TXRX(DRV VBUS LKV)    | The supply voltage of the motor in the radar antenna falls short of the rated value. | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| TXRX(DRV VBUS OVV)    | The supply voltage of the motor in the radar antenna exceeds the rated value.        | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |

| Message                | Explanation   | Advice  |
|------------------------|---|---|
| TXRX(Fan1)             | Fan 1 in the radar antenna is abnormal.                                       | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| TXRX(Fan2)             | Fan 2 in the radar antenna is abnormal.                                       | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| TXRX(Fan3)             | Fan 3 in the radar antenna is abnormal.                                       | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| TXRX(Heater)           | The heater voltage of the magnetron in the radar antenna is abnormal.         | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| TXRX(High Temperature) | The temperature in the radar antenna is abnormal.                             | Turn off the power of the device and restart after ten minutes.<br>If it cannot be recovered, turn off the device and contact the distributor.  |
| TXRX(HL)               | Azimuth reference signals cannot be recognized in the radar antenna.          | Confirm that the status is standby and, if the status is transmitting, set the status to standby.<br>After that, set the status to transmitting again.<br>If it cannot be recovered in this transmitting state, visually confirm that the antenna of radar antenna is rotating in a proper way.<br>If the rotation of the antenna has been able to be confirmed, turn off the power of the device and, after confirming cable connection of the encoder in the radar antenna, turn the power on again.<br>If it cannot be recovered after the operation above, turn off the device and contact the distributor. |
| TXRX(IF PLL)           | The transmitting signal clock in the radar antenna part is in an error state. | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |

| Message                             | Explanation  | Advice  |
|-------------------------------------|--|---|
| TXRX(LO PLL)                        | The radar antenna detected a problem with the LO frequency.  | Restart the device.   |
| TXRX(MHV)                           | The supply voltage to the magnetron in the radar antenna is abnormal.                              | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| TXRX(Option)                        | The option equipment in the radar antenna is abnormal.   | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| TXRX(PROC)                          | The radar antenna detected a problem with the signal control circuit.                              | Restart the device.   |
| TXRX(PS)                            | The power supply circuit in the radar antenna is abnormal.   | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| TXRX(Triiger)                       | There is possibility that timing reference signals are not normally output from the radar antenna. | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| TXRX(Video)                         | There is possibility that radar image signals are not normally output from the radar antenna.      | Restart the power.<br>If it cannot be recovered after three times of restart, turn off the device and contact the distributor.  |
| VDR(Communication failed, Main LAN) | Communication with VDR cannot be performed via Main LAN.   | Check the condition of VDR and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| VDR(Communication failed, Sub LAN)  | Communication with VDR cannot be performed via Sub LAN.  | Check the condition of VDR and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |

| Message  | Explanation  | Advice  |
|--|--|---|
| Water Thermometers(Communication failed, Main LAN) | Communication with Water Thermometer cannot be performed via Main LAN. | Check the condition of Water Thermometer and Main LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor. |
| Water Thermometers(Communication failed, Sub LAN)  | Communication with Water Thermometer cannot be performed via Sub LAN.  | Check the condition of Water Thermometer and Sub LAN.<br>If it cannot be recovered after you check the connection of the equipment cable in power-off status and restart, turn off the power of the device and contact your distributor.  |
| Wind(invalid)                                      | There is a format error or a status error of the Wind data.            | Check the sensor condition. Switch to a sensor in good condition, if available.   |
| Wind(invalid)                                      | There is a format error or a status error of the Wind data.            | Check the sensor condition.   |
| Wind(not plausible)                                | There is a range error of Wind data.                                   | Check the sensor condition. Switch to a sensor in good condition, if available.   |
| Wind(not plausible)                                | There is a range error of Wind data.                                   | Check the sensor condition.   |
| Wind(unavailable)                                  | The Wind data cannot be received.                                      | Check the condition of the sensor and the communication path. Switch to a sensor in good condition, if available.   |
| Wind(unavailable)                                  | The Wind data cannot be received.                                      | Check the condition of the sensor and the communication path.   |

---

## B.3 Permanent Information

The list of Permanent Information is shown below.

| Message   | Explanation  |
|---|--|
| AIS data report capacity  | The AIS data report count exceeded the maximum display count.  |
| AIS locating device capacity  | The AIS locating device count exceeded the maximum display count.  |
| Chart information not up to date  | The cell that is not the latest is displayed in the View (S-57)  |
| Chart license expired (SSE 25)  | The chart license has expired  |
| Datum of position different from WGS-84.                                    | Different geodetic datum and Datum shift not known occur simultaneously                                    |
| Datum shift not known   | Unknown shift amount of RNC chart  |
| Indication of crossing safety contour is Off                                | Safety contour highlight is OFF  |
| Indication of navigational hazard is Off                                    | Navigational hazard is OFF   |
| Indication of some prohibited areas or areas with special conditions is Off | Specific area highlight is OFF   |
| Information overscale   | When own ship moves to another chart, the chart is expanded to the double scale or more of the chart scale |
| Larger scale ENC available  | A detail chart is available  |
| Larger scale information available, overscale                               | From the scale described in RNC, the display scale is larger   |
| Larger scale information available, under scale                             | From the scale described in RNC, the display scale is smaller  |
| Larger scale RNC available for the area of the vessel                       | A cell with a larger scale than the chart displayed at its own ship position is included. (in ARCS)        |
| No ENC Available  | Scaling factor/sea area chart to be indicated is unavailable in ECDIS                                      |
| No RNC at a scale appropriate for navigation                                | There is no RNC in its ship's position   |
| non-ENC data  | ENC of non-HO is displayed or ENC of own ship position is non-HO   |
| Overlapped charts of the same purpose                                       | Charts of the same purpose are duplicated  |
| SSE27 Following cells are not up to date                                    | The cell that is not the latest is displayed in the View (S-63)  |
| Standard display is customized  | Standard display item is displayed OFF   |
| Viewing Does Not Include Current Date                                       | View display does not include current date   |

---

# Appendix C Setting the Inter switch

---

## C.1 Overview

### C.1.1 Overview

The Inter switch NQE-3141 is equipment that makes it possible to freely select several radar display units provided in the bridge and the several radar antennas with different properties.

Even when the power supply of the display unit has been switched OFF or has become faulty, it is possible to operate the radar antennas from other display units.

When it has become impossible to use the Inter switch, it is possible to carry out operations independently.

The selection can be made up to a maximum of 8 units.

When the radar antenna is switched, the following settings are read out.

| Setting                        | Reference   |
|--------------------------------|---|
| Rough adjustment tuning        | 19.2.2 Performing basic adjustments on the radar                  |
| Bearing adjustment             |   |
| Range adjustment               |   |
| Antenna height                 | 19.2.3 Adjusting TXRX (Radar screen only)                         |
| TXRX settings                  |   |
| Performance monitor adjustment | 19.2.4 Adjusting a radar performance monitor (Radar screen only)  |
| Sector blank                   | 19.2.5 Setting Sector Blank (Radar screen only)                   |
| Radar antenna position         | 19.3.2 Verifying/Setting CCRP (Consistent Common Reference Point) |

The setting of each of coarse adjustment tuning, tuning peak setting, tuning indication level, bearing adjustment, monitor transmission level (performance monitor adjustment), Tune Indicator (TXRX adjustment), and Sector Blank is read from the antenna at switching.

Other settings are read from the indicator that is used.

The settings that are saved in the indicator are saved by antenna and the previous setting is read at the connection.

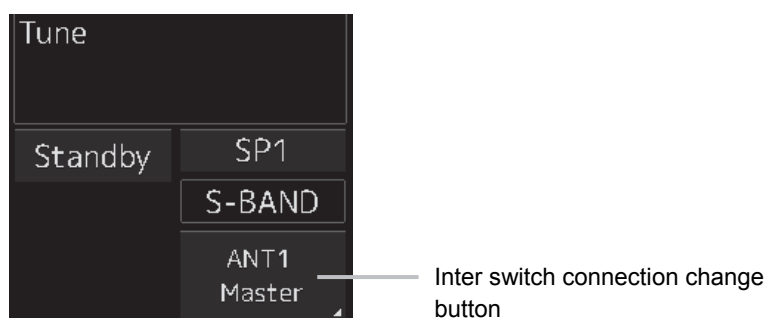
---

## C.1.2 Checking the connection status with the connected radar antennas

The status of connection with the connected radar antenna is displayed by the Inter switch connection change button of the Radar system information.

### Note

Always a display unit that becomes the master is necessary for making a slave connection.  
When putting a slave display unit in the transmit state, it is necessary to put the master display unit in the transmit state.



The name of the connected radar antenna is displayed in the upper part.  
The connection state is displayed in the lower part.

### Memo

In simple Inter switch mode, only the connection status is displayed.

### Connection state

[Master]: The state in which the display unit can control the radar antenna.

[Slave]: The control of the radar antenna is not possible.

In the [slave] state, transmit/stop, and pulse length change cannot be made. Also, there will be restrictions on the usable range.

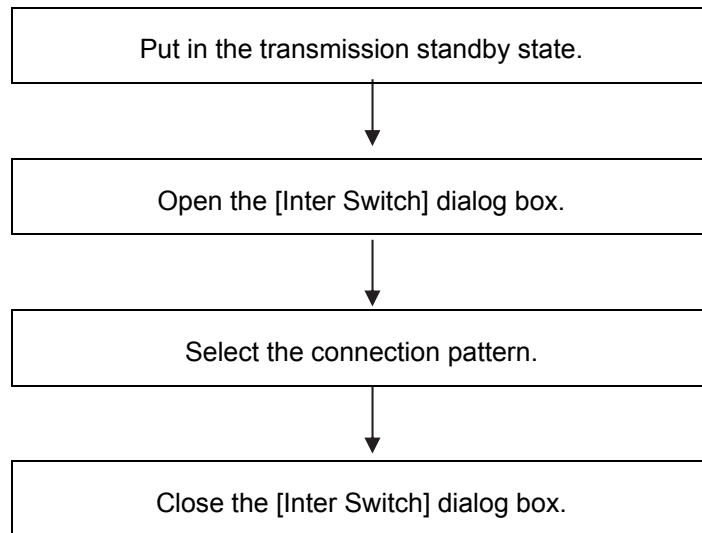


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## C.2 Inter switch Operations

When changing the connection pattern, carry out the operations according to the following flow.

### C.2.1 Flow of operations



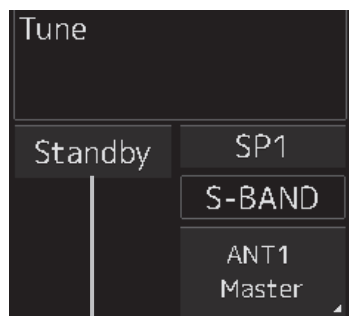
## C.2.2 Opening the [Inter Switch] dialog box

### Memo

The [Inter Switch] dialog can be displayed in the Transmission Not Ready state or preheat state. When transmission is not ready, "Preheat" or "Standby (disable)" is displayed on the Standby/Transmission change button.

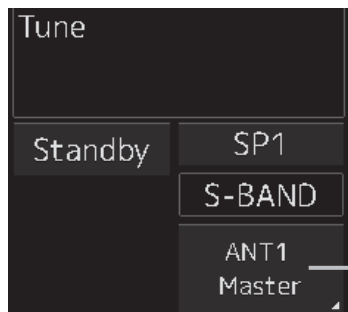
#### 1 In the transmission state, click on the Standby/Transmission change button.

"Standby" is displayed on the button and the equipment is set to Transmission Not Ready state. If the equipment is already in the Transmission Not Ready state, this operation is not required.



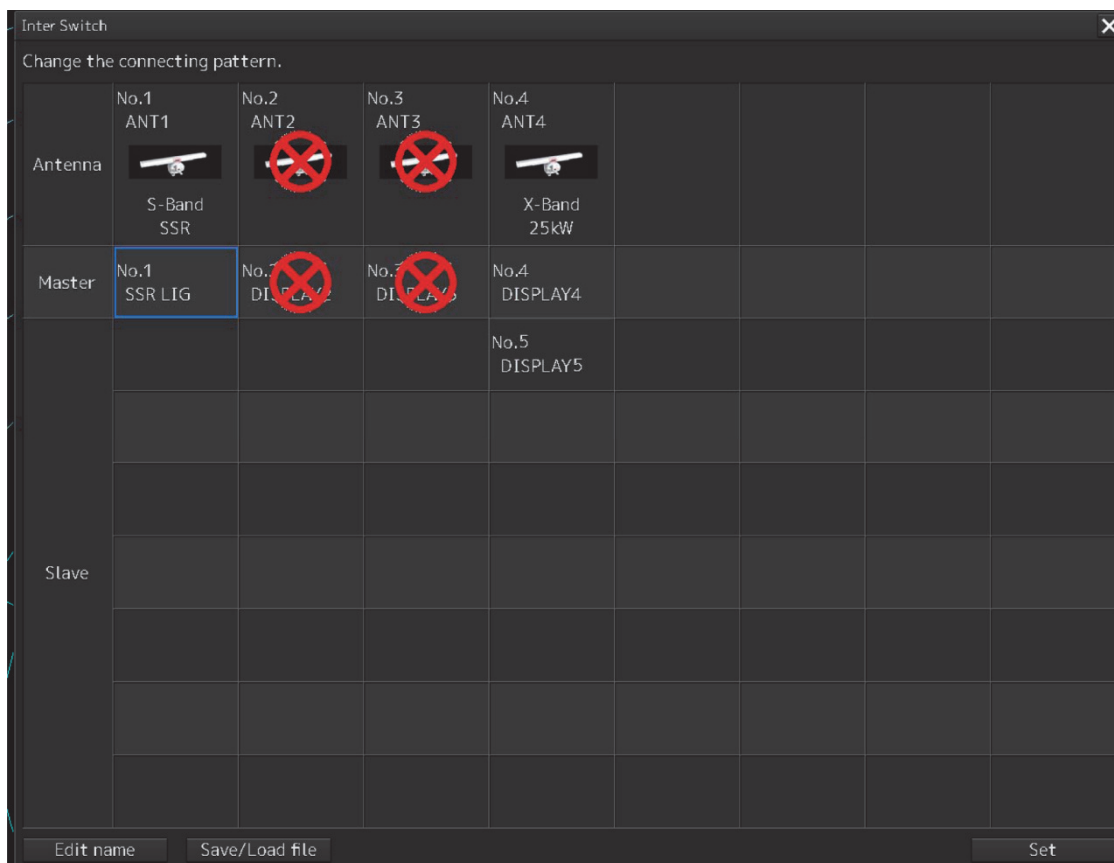
Standby/Transmit changeover button

#### 2 Click the Change Inter switch connection button.



Change Inter switch connection button





The [Inter Switch] dialog box is displayed.

The connection state between the current radar antenna and the display unit obtained by communication with the Inter switch is displayed in the [Inter Switch] dialog box.

## C.2.3 Checking the connection pattern

### ■ When connecting 3 to 4 radar antennae (extension) × 3 to 8 display units

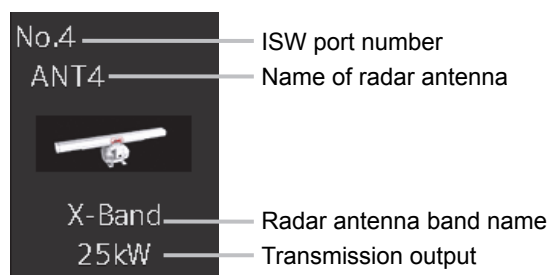


#### [1] [X] button

Closes the [Inter Switch] dialog box.

#### [2] Connected radar antenna

The connected radar antennas are displayed.

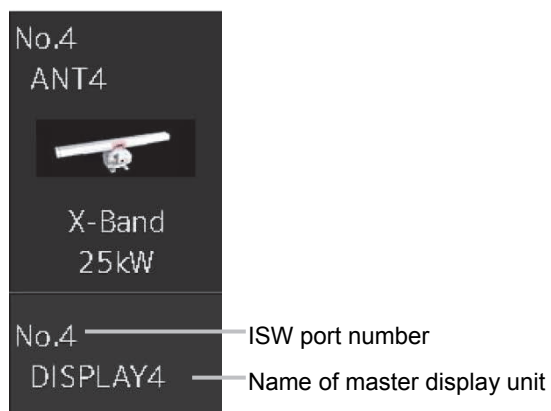


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### [3] Master display unit selection button

Displays radar antenna to which the master display units are respectively connected.

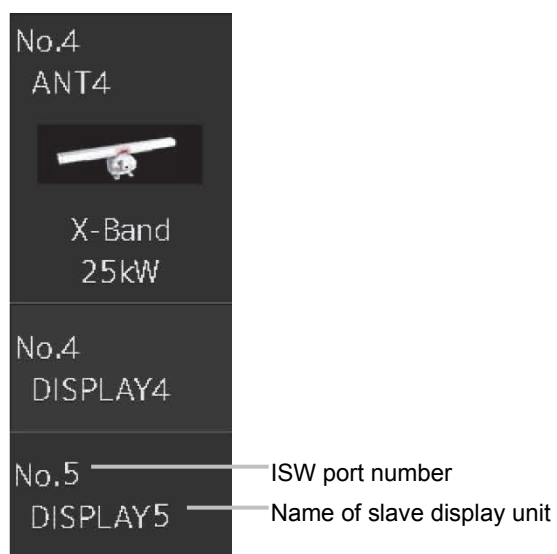
For changing the combinations of master display units and radar antennas, refer to "C.2.4 Changing the connection pattern".



### [4] Slave display unit selection button

Displays radar antenna to which the slave display units are respectively connected.

For changing the combinations of slave display units and radar antennas, refer to "C.2.4 Changing the connection pattern".



### [5] [Set] button

When this button is clicked, the information of the set connection pattern is transmitted to the Inter switch.

#### Note

When a master or slave display unit button in which the error notification mark (❗) is being displayed, the [Set] button becomes disabled.

For the details of error notification marks, refer to " C.2.3.1 About equipment defect mark (❌) and error notification mark (❗)".

---

#### [6] [Edit name] button

When this button is clicked, a dialog box is displayed for changing the names of the radar antennas and display units.

Regarding the operations in the [Edit name] dialog box, refer to "C.2.5 Changing the name of radar antenna or display unit".

#### [7] [Save/Load file] button

When this button is clicked, the [Connection pattern file operation] dialog box is displayed.

The current connection pattern can be saved in the file or the connection pattern that has been saved previously can be loaded.

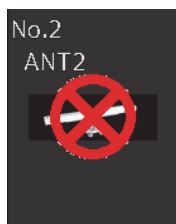
For details of the [Connection pattern file operation] dialog box, refer to "C.2.6 Using the set connection pattern".

### C.2.3.1 About equipment defect mark (⊗) and error notification mark (⚠)

#### ■ Equipment defect mark

This mark is displayed when the power supply of the radar antenna or the indicator unit is OFF or faulty.

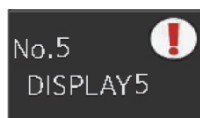
Check the cause and take corrective action.



#### ■ Error notification mark

This mark is displayed when there is some error in the settings of a radar antenna or a display unit.

Check the cause and take corrective action.



| Cause   | Countermeasure  |
|---|---|
| The master display unit does not exist or is faulty although the slave display unit is connected.       | Connect the master display unit.  |
| The master or slave display unit that is connected is not permitted to be connected to a radar antenna. | Check the setting by selecting [Service] - [Installation] - [Settings] - [Inter switch] on the menu and permit the connection to the display unit or connect another display unit whose connection to the radar antenna is permitted. |

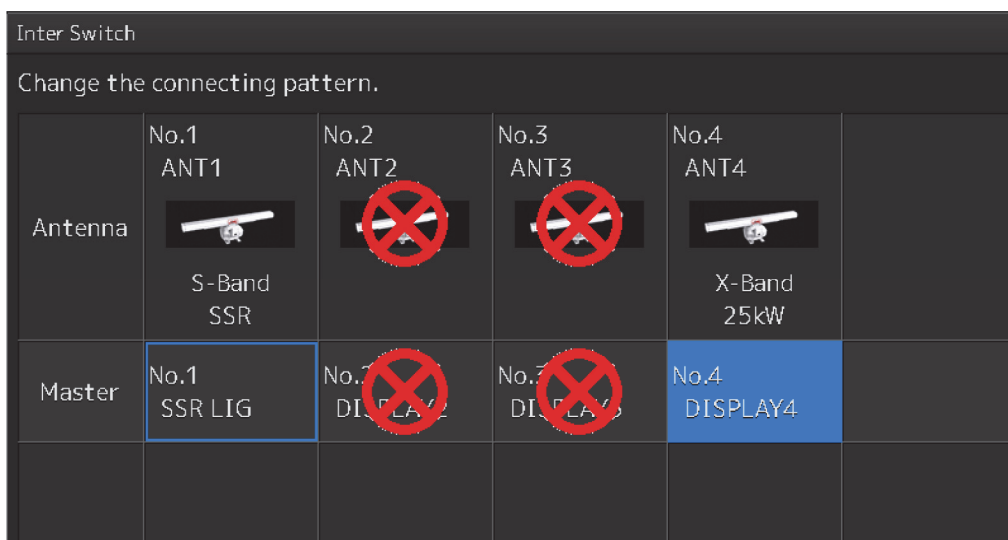
## C.2.4 Changing the connection pattern

### 1 Click the "Change Inter switch connection" button.

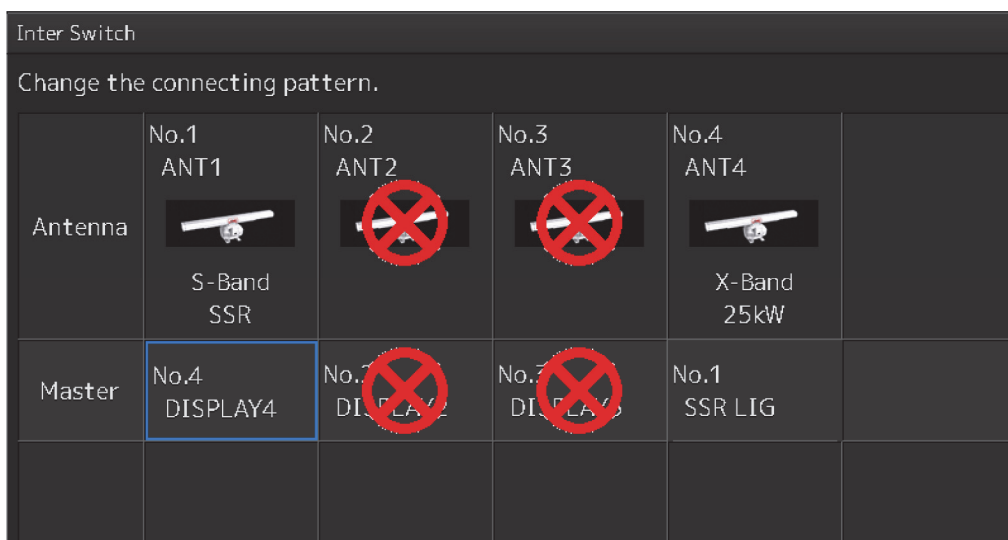
The [Inter Switch] dialog box is displayed.

### 2 Click the Master or Slave display unit selection button to be connected to the radar antenna.

The selected display unit is highlighted.



### 3 Place the cursor to the destination of change and click it on.



The currently selected display unit and the change destination display unit are interchanged.

### 4 If necessary, carry out the steps 2 and 3 for other display units.

### 5 Click the [Set] button.

The information of the set connection pattern is transmitted to the Inter switch.

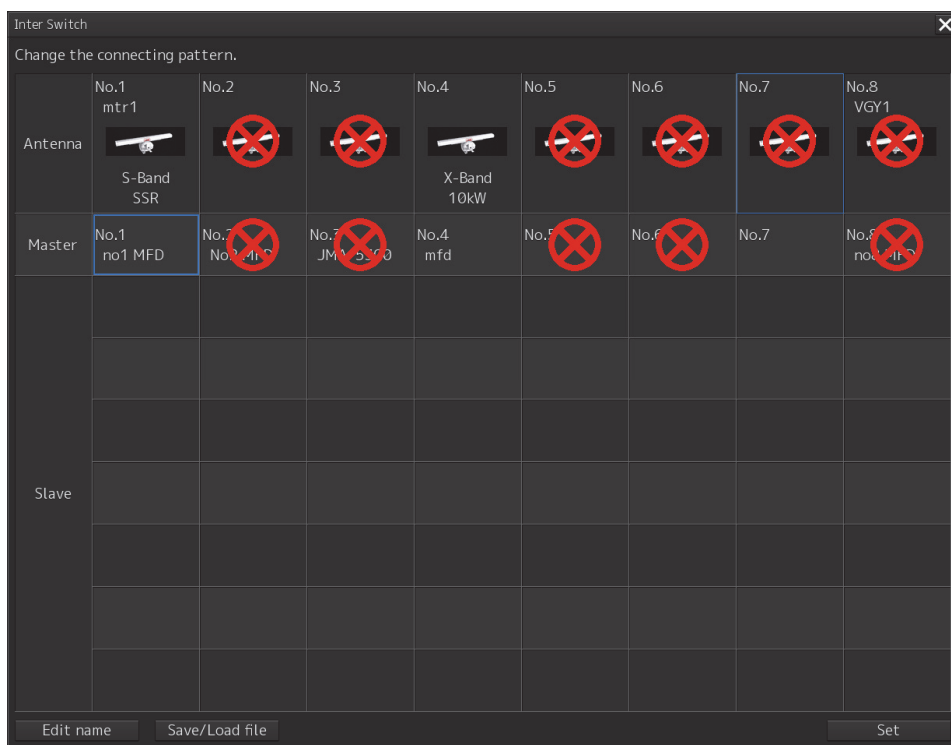
### 6 Click the [×] button.

The [Inter Switch] dialog box is closed.

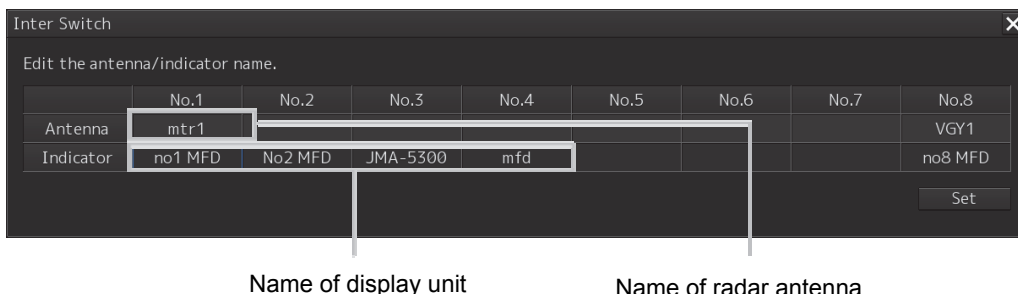
## C.2.5 Changing the name of radar antenna or display unit

- 1 Click the [Edit name] button of the [Inter Switch] dialog box.

The [Edit name] dialog box is displayed.



- 2 Click the name of the radar antenna or the display unit whose name is to be edited.



A software full keyboard is displayed.

- 3 Change the name.  
The name can be input by using 1 to 8 alphanumeric characters and symbols.
- 4 Click the [Set] button.  
The name is changed.
- 5 Click the [×] button.  
The [Edit name] dialog box is closed.



---

## C.2.6 Using the set connection pattern

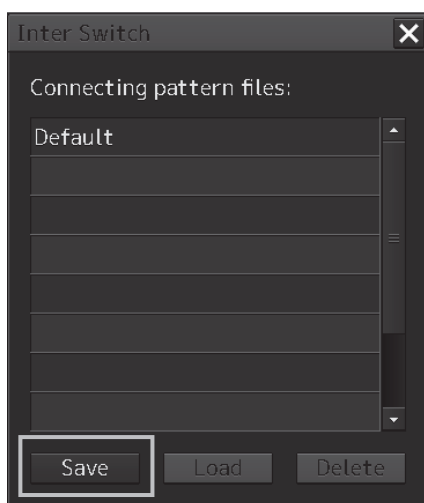
When connecting 3 to 8 radar antennas × 3 to 8 display units, it is possible to save the set connection pattern in a file. By reading out the saved connection pattern when required, it is possible to quickly change the connection pattern.

### ■ Saving a connection pattern

- 1 After setting a connection pattern, click the [Save/Load file] button of the [Inter Switch] dialog box.

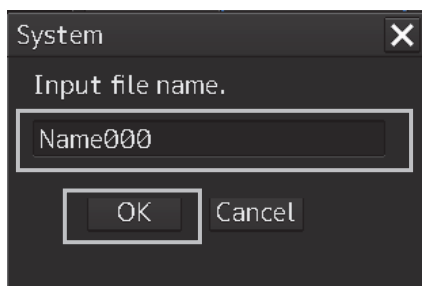
The [Connection pattern file] dialog is displayed.

- 2 Click the [Save] button.

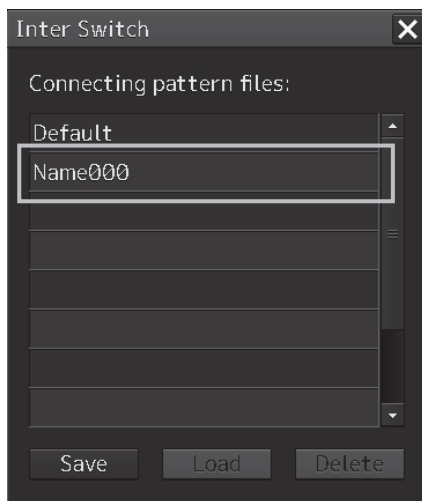


The [Input file name] dialog is displayed.

- 3 Input the file name using the software full keyboard.
- 4 Click the [OK] button.



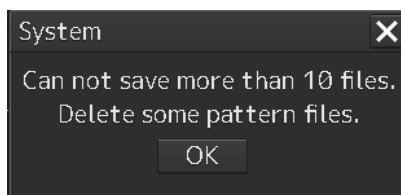
The connection pattern is saved, and the connection pattern name is displayed in the [Connecting pattern files] dialog.



**Note**

- The number of connection patterns that can be saved is up to 10 apart from the connection pattern set at the time of shipment from the factory (default).

If any more connection patterns are attempted to be saved, the following message dialog box appears.



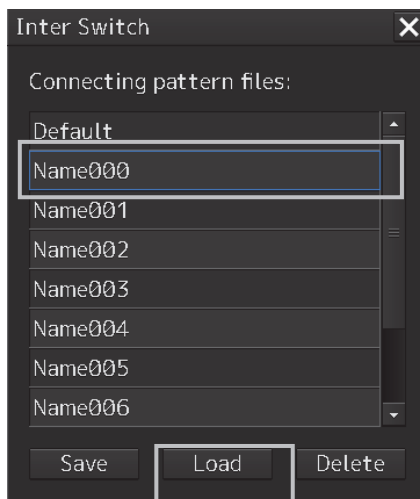
- The pattern that is set at factory delivery (Default) cannot be changed.

## ■ Loading a connection pattern

- 1 Click the [Save/Load file] button of the [Inter Switch] dialog box.

The [Connecting pattern files] dialog is displayed.

## 2 Click the connection pattern to be loaded.



## 3 Click on the [Load] button.

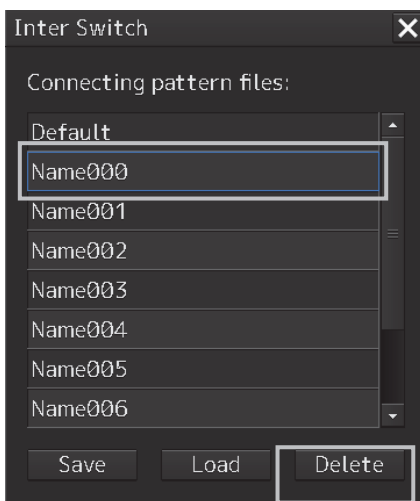
The loaded connection pattern is displayed in the [Inter Switch] dialog.

### ■ Deleting a connection pattern file

## 1 Click the [Save/Load file] button of the [Inter Switch] dialog box.

The [Connecting pattern files] dialog is displayed.

## 2 Click the connection pattern to be deleted.



## 3 Click the [Delete] button.

A dialog box for confirmation of deleting is displayed.

## 4 Click the [OK] button in the dialog box to delete.

The selected connecting pattern file is deleted.

---

## C.3 Reference

### C.3.1 Pre-heat time after changing the connection pattern

After changing an Inter switch connection pattern has been completed, the pre-heat time varies depending on the connection state of the radar antenna and display unit before the change.

This is for protecting the electron tube that emits the radio waves.

- If the radar antenna was already being used before setting the new connection pattern, a pre-heat time will not be required.
- If the radar antenna was not being used before setting the new connection pattern, a pre-heat time will be required.

### C.3.2 Precautions while changing the connection pattern

A setting of change of the connection pattern may not be reflected immediately. This is because time is taken for the internal processing and, in this case, repeat the changing operation again after leaving a time gap of several seconds.

### C.3.3 Precautions during a slave connection

When the master display unit is not in the transmit state, it is not possible to put the slave display unit in the transmit state. Further, when the master display unit goes from the transmit state to the transmission standby state, the slave display unit is forcibly put into the transmission standby state. In this case, the message "ISW(Master Standby)" is displayed in the alert notification area and the notification sound is made.

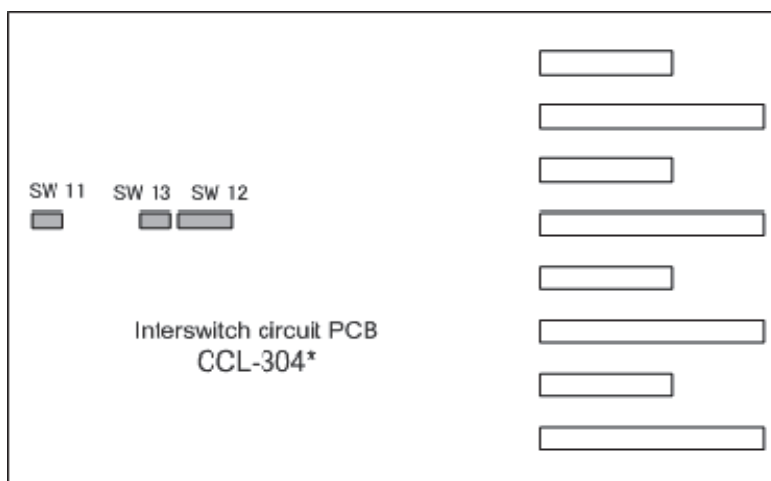
It is not possible to carry out control of tuning in a slave display unit. Tuning is controlled by a master display unit.

Changing the distance range of a slave display unit is restricted by the range and transmission pulse length/transmission pulse repetition frequency of the master display unit. As a rule, although it is not possible to change the range of the slave display unit to a range larger than the range of the master display unit, depending on the range, if the transmission pulse length and the transmission pulse repetition frequency are the same, it may be possible to select a range larger than the range of the master display unit. When the master display unit makes the range smaller or changes the transmission pulse length, the range of the slave display unit may be changed forcibly. In this case, the message "Master Range CHG" is displayed in the alert notification area and the notification sound is made.

## C.3.4 Setting during installation

### ■ Setting of the Inter switch circuit (CCL-304\*)

The details of the dip switches SW11, SW12, and SW13 are given below.



#### 1) Setting of SW11 (setting of extended mode, master/slave)



##### Extended mode setting

| 4   | Description   |
|-----|---------------|
| ON  | Extended mode |
| OFF | Normal mode   |

Set to OFF when 4 or fewer units are connected.

##### Master/slave setting

| 3   | Description |
|-----|-------------|
| ON  | Slave       |
| OFF | Master      |

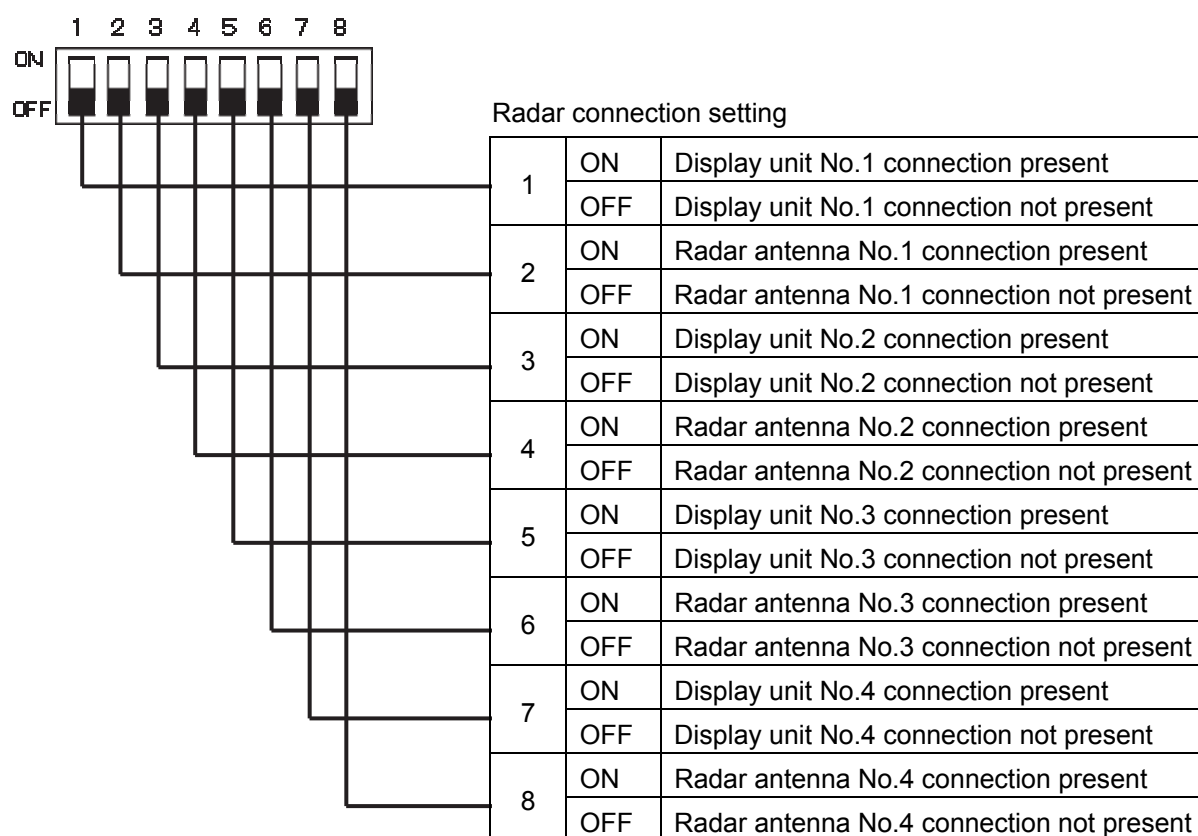
During the extended mode, set to ON in the ISW board on the slave side.

##### Not used

| 1, 2 | Description |
|------|-------------|
| ON   | Not used    |
| OFF  | Not used    |

Normally set to OFF.

## 2) Setting of SW12 (Radar connection setting)



## 3) Setting of SW13 (Not used)



### Note

When setting the dip switches of the Inter switch circuit, turn OFF the circuit breaker of the Inter switch, and ensure safety before carrying out the setting.

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# Appendix D Menu List and Materials

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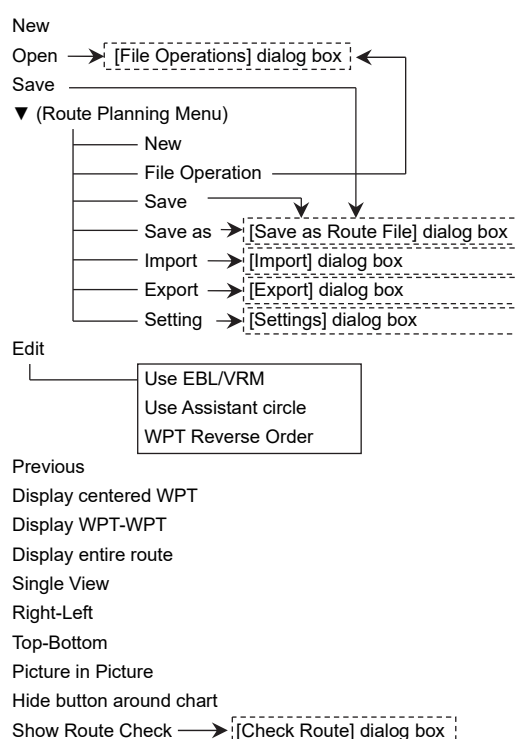
## D.1 Menu List

This section shows the menus and dialog items of this equipment by target menu.

- \* ECDIS RADAR CONNING indicates the task that is targeted for display.
- \* Items that are enclosed by a frame of broken lines indicate the dialog and window names that are displayed by selecting the relevant menu.

### D.1.1 Route Planning

ECDIS



---

Planned Route tab

Insert

Delete

Comment

(WPT list)

|                |
|----------------|
| WPT No.        |
| Name           |
| Position-LAT   |
| Position-LON   |
| Leg-Course     |
| Leg-Distance   |
| Sail           |
| XTD -PORT      |
| XTD -STBD      |
| Arrival Radius |
| Turning Radius |
| Plan Speed     |
| ROT            |
| ETA            |
| Time Zone      |
| TWOL           |
| Total Distance |



---

## D.1.2 Route Monitoring

ECDIS

RADAR

Route

To WPT

[File Operations] dialog box display button → [File Operations] dialog box

Voyage Information → [Voyage Information] dialog box

Voyage Calculation → [Voyage Calculation] dialog box

Pair of data → [Pair of data] dialog box

---

## D.1.3 Anchor Watch

ECDIS

RADAR

Monitoring Anchor

Mode

(Mode: Selecting [Circle])

Position

Radius

(Mode: Selecting [Polygon])

New

Point

(list)

---

## D.1.4 Autosail\*

ECDIS

\* Displayed when the automatic sailing option is attached.

(Select Route)

Track  
Click here to plan a new track  
Click here to confirm and modify the track.  
Next

Select WPT

TO-WPT  
Start  
Back

## D.1.5 Chart

ECDIS

RADAR

### Manual Update ECDIS

Select Chart → [Select Chart] dialog box  
 Save  
 Chart Name  
 FIX  
 Comment  
 Review  
 Load → [Load Update log] dialog

### My Port List ECDIS

Save  
 My Port List  
 Delete  
 Jump

### Select S-57 Chart ECDIS

Search  
 Chart List  
 Reset Picked Chart  
 OK

### Off Center by Entering Position ECDIS

Jump to the following position  
 LAT/LON

### Update Review ECDIS

S-57 Chart List  
 Show  
 Accept  
 Reject

### Date-dependent View ECDIS

Enable Date-dependent View  
 UTC/LMT  
 Start Date Time  
 End Date Time  
 Calendar Icon  
 Time Zone

### Graphical Index ECDIS

Chart Boundary  
     Overview  
     General  
     Coastal  
     Approach  
     Harbour  
     Berthing  
     Show Chart Name  
     Show ENC Data  
     (Active Indicator)

[Edition and date of chart] dialog box

\* Displayed when the chart is clicked on while the [Graphical Index] dialog box appears.

\*\* While C-MAP is displayed, [Show ENC Data] of the [Graphical Index] is hidden.

### Chart Abbreviation

#### T & P(ARCS)

Number  
 Temporary and Preliminary Notice to Mariners

### Datum Offset(ARCS) ECDIS

Offset by Cursor  
 Clear Offset  
 Offset

#### ENC Update Status Report ECDIS

Route Filter  
Select Route  
[File Operations] dialog display button → [File Operations] dialog  
InFormation  
Summary  
Status Report

#### ECDIS Chart1 ECDIS

Information about Chart Display1  
Information about Chart Diaplay2  
Natural and Man-made Features  
Depth, Cerrents, Etc.  
Sea, Obstructions, Pipelines, Etc.  
Traffic Routes  
Special Areas  
Buoys and Beacons  
Topmarks  
Colour Test Diagram  
Approved New Object Symbols  
Overview

#### Datum Transformation ECDIS

(Geodetic Datum)  
From  
To  
(Reference Position)  
Position  
Ship Position  
by Cursor  
(Chart Shift)  
Reference Position  
[Position]  
Shifted Position  
[Position]  
OK  
Cancel

#### Check Applied C-MAP Updates ECDIS

Chart List  
Show

#### Show C-MAP Licence Information

## D.1.6 User Chart

ECDIS

RADAR

File Operation

- New
- Delete
- Copy
- Import
- Export
- Merge Display Files
- Geodetic
- (File List)
- Edit User Chart
- Display Objects

Mark/Line List

- User Chart tab
  - Symbol
  - Line
  - Area
  - Text
  - Delete
  - Page feed button
  - Page number specification
  - Object list
  - Jump
- Mariner's Mark/Line tab **ECDIS**
  - Event Mark
  - Information Mark
  - Tidal Stream
  - Highlight
  - Clearing Line
  - Delete
  - All Delete
  - Page feed button
  - Page number specification
  - Object list
  - Jump

Delete by type/color

- Type
- Color
- OK

※The notation differs between RADAR and ECDIS as follows.

RADAR···User Chart

ECDIS···User Chart

## D.1.7 Logbook

ECDIS

Date

Calendar Icon

Event

Event List (Event List)

User Task Log tab

No.

Date(LMT)

Event

Navigation Alert Log tab

No.

Date(LMT)

Event

System Alert Log tab

No.

Date(LMT)

Event

Event details page (Event detail information)

Event

Date

Time Zone

Descriptions

(Position)

Longitude

Latitude

POSN1

POSN2

(Course/Speed)

HDG

STW

COG

SOG

SOG-Av.(4h)

SOG-Av.(24h)

Depth

Chart

INFO

(Current)

Set

Drift

(Wind)

Dir.

SPD

BFT

(Wave)

Dir.

Height

(Voyage Distance)

(Ground)

(Water)

(Weather)

Air Pressure

Air Temperature

Water Temperature

Weather Condition

Engine Rev.

Comment

## D.1.8 TT/AIS

ECDIS

RADAR

### AIS Voyage Data

Destination  
ETA(UTC)  
Calendar Icon  
NAV Status  
Draft  
Cargo cat.  
Persons on-board  
Send

### Edit and Send AIS Message

(Send To:)  
Addressed MMSI  
Name  
Target ID  
Broadcast  
Category  
LL&Time  
View Tray  
Message  
Save  
Send

### AIS Message - AIS MSG Tray: Same as the common information window (AIS MSG Tray of the information reference screen)

Tray Select  
Message Format:  
Message Category:  
Message List  
MMSI  
Ship's Name  
AIS Message  
Edit  
Select

### Highlighting

Highlighting by the following search criteria  
(TT/AIS)

Transit direction  
TCPA(MIN-MAX)  
TCPA MIN  
TCPA MAX  
CPA(MIN- MAX)  
CPA MIN  
CPA MAX  
SOG(MIN- MAX)  
SOG MIN  
SOG MAX  
Unknown Ship

(AIS)

Length MIN- MAX  
Type of Ship  
Cargo category  
Registry of ship  
Navigation Status



Trial Maneuver **RADAR**

Trial Function  
Course  
Speed  
Vector Time  
Time to Maneuver  
Own Ship's Dynamic Trait

TT/AIS List: Same as the TT/AIS list of the common information window (information monitoring screen)

List Select  
List Expand  
List Normal  
(TT List)  
    Column  
    ID  
    CPA  
    TCPA  
    BCR  
    BCT  
    CTW or COG  
    STW or SOG  
    BRG  
    RNG  
    LAT  
    LON  
    Status  
(AIS List)  
    Column  
    ID  
    CPA **RADAR**  
    TCPA **RADAR**  
    CTW  
    STW  
    Name  
    Call Sign  
    MMSI  
    Source  
    BCR **RADAR**  
    BCT **RADAR**  
    BRG  
    RNG  
    HDG  
    LAT  
    LON  
    Status  
    Show AIS Detail

---

Own Ship AIS Data: Same as AIS of the common information window (information reference screen)

Own Ship AIS Data/Last Lost AIS Target

Name

Call Sign

MMSI

IMO No.

Length

Beam

Destination

ETA(UTC)

Navigation Status

Draft

Type of Ship

Cargo category

CTW or COG

STW or SOG

Heading

ROT

Position

Position Accuracy

Position Sensor

Last Lost AIS Target: Same as AIS of the common information window (information reference screen)

Own Ship AIS Data/Last Lost AIS Target

Name

Call Sign

MMSI

IMO No.

Length

Beam

Destination

ETA(UTC)

Navigation Status

Draft

Type of Ship

Cargo category

Bearing

Range

CTW or COG

STW or SOG

Heading

ROT

Position

Position Accuracy

Position Sensor

Source

## D.1.9 Tools

ECDIS

RADAR

Marker

Position  
Bearing  
Range  
Unit switching button  
TTG  
Time

EBL/VRM readout **ECDIS**

EBL1  
VRM1  
EBL2  
VRM2  
Origin Position of EBL1/VRM1  
Origin Position of EBL2/VRM2  
EBL Bearing Reference  
VRM Distance Unit  
Control Indication

PI Menu

Display for All Lines  
Mode  
(All)  
PI Bearing  
Interval  
Unit switching button  
Operation Area  
(Individual)  
Index Line  
Display  
PI Bearing  
Interval  
Unit switching button  
Length L  
Length R  
Unit switching button  
Sequential  
(Track)  
Group  
Display  
PI Bearing  
Interval  
Unit switching button  
(Equiangular)  
Group  
Display  
PI Bearing  
Vertical Angle  
Floating  
Heading Link  
Reference Bearing

## EBL Maneuver Setting

Display Maneuver curve  
Course T  
Course R  
Reach  
(Turning Set)  
Radius  
Rate  
DWOL  
TWOL

## Manual position fix

### LOPs Fixing tab

LOP  
Total, MAX  
(Observations Time)  
Date  
Calendar Icon  
Time (UTC)  
Position(e.g. landmark)  
Bearing  
Distance  
Transfer Position Line  
HDG/STW  
COG/SOG  
HDG  
STW  
Set  
Drift  
Set  
Delete

### Plot

Set plotted position → [Select LOP or TPL] dialog box  
Offset to plotted POSN(Main)  
Offset to plotted POSN(Sub)

### Plot by cursor

Clear all lines

### Position Offset tab

(POSN(Main)) ECDIS

Offset  
Clear Offset  
Enter Offset  
Enter Position

(POSN(Sub)) ECDIS

Offset  
Clear Offset  
Enter Offset  
Enter Position

[Enter Offset] dialog box

[Enter Position] dialog box

## Node Fixed EBL/VRM ECDIS

Use node fixed EBL/VRM  
Bearing  
Distance

Cursor readout **ECDIS**

BRG  
RNG  
POS  
TTG  
ETA

File Manager

File Management tab

File Type  
Drive  
Name  
Copy >>  
<< Copy  
Select All  
Delete

File Load/Save tab

File Type  
File Type (Included GPS Buoy Track)\*  
\*Setting for using [Utilities] - [GPS Buoy] when [File Type] is [Target Track]  
File List - Name  
File List - Modified  
File List - Display  
Load Mode  
Load  
Unload  
Save Current Target Track

VHF Call

\* Displayed when the VHF radiotelephone option is attached.

VHF (JHS-800S) 1 Call  
VHF (JHS-800S) 2 Call  
VHF (JHS-800S) 3 Call

Timer

(Timer)  
(LMT)

## D.1.10 View

View-Multi View Mode ECDIS

Multi View Mode

View selection

Select Area from View1 for View2

View-Options

Own Ship ECDIS RADAR

Type ECDIS

Heading and Beam Line ECDIS

Stern Line RADAR

(Vector)

Ground stabilised vector

Sea stabilised vector

Time

Stabilization indicator

Vector Time Mark

Interval

POS2 Symbol ECDIS

Setting of AIS Filter

Setting of AZ

Setting of Anti-Grounding Look-ahead \*

\* Case where the chart option is assigned to the radar (chart radar)

Own Track ECDIS RADAR

\* Selecting [ECDIS own Track] on the Utilities menu

Past Track

Plot Color

Track Period

Time Label

Interval

Past Position ECDIS

Interval ECDIS

Current Vector

Current Size

Interval

Route ECDIS RADAR

For ECDIS

\* Selecting ECDIS Route on the Utilities menu.

(Date/Time for Monitoring)

Format

Show ETA

XTD Limit Line

Color

Show WPT Name

WPT Name Font Size

Alternate Route

Colour

User Chart ECDIS RADAR

(Object Type)

(Selecting Individual)

Symbol

Line

Area

Text

Area Fill

Symbol/Simple Line Color

Mark Size

Comment Font Size

---

Mariner's Mark/Line ECDIS RADAR

Clearing Line ECDIS  
Tidal Stream ECDIS  
Information Mark ECDIS  
Highlighting ECDIS  
Event Mark ECDIS  
Plotted position  
NAVTEX Mark

RADAR ECDIS RADAR

RADAR  
RADAR Overlay  
Transparency of Echo/Trails

Targett ECDIS RADAR

CPA Ring RADAR  
AIS Symbol  
(Selecting AIS Symbol)  
Sleeping Class A, Class B  
Physical AtoN  
Virtual AtoN  
TT Symbol  
TT1 Symbol ECDIS  
TT1 Symbol Source Selection ECDIS  
TT2 Symbol ECDIS  
TT2 Symbol Source Selection ECDIS  
TT Vector ECDIS  
GPS Buoy  
TT Target ID  
AIS Target ID  
Safety Zone Viewer RADAR  
Main PPI  
2nd PPI  
Sleeping Target  
Connector Line  
Bow Crossing Symbol

## Target Track ECDIS RADAR

### Display tab

- (Target Track Display)
- (Selecting Individual)
  - Track 1
  - Track 2
  - Track 3
  - Track 4
  - Track 5
  - Track 6
  - Track 7
  - Track 8
  - Track 9
  - Track 10
  - Track 11 to 20
- File Load/Save

### Plot tab

- (Plot Color)
  - For All Target Track
  - For individual Target Track
    - Track 1
    - Track 2
    - Track 3
    - Track 4
    - Track 5
    - Track 6
    - Track 7
    - Track 8
    - Track 9
    - Track 10
    - Track 11 to 20
- Plot Interval
- File Load/Save

### Clear tab

- (Clear by Specified Color)
  - Track Color
- (Clear by Specified Number)
  - Track Number



## Chart Common ECDIS RADAR

\* Case where the chart option is assigned to the radar (chart radar)

- Area Boundary
- Chart Symbol
  - Full Light Lines
  - Scale Minimum
- (Depth)
  - Shallow Contour
  - Safety Depth
  - Safety Contour
  - Deep Contour
  - Four Shades
  - Shallow Pattern
  - Shallow Water Dangers
- C-MAP Ed.3 Database

## Chart Display ECDIS RADAR

\* Case where the chart option is assigned to the radar (chart radar)

- (For Chart Radar)
  - Chart Type
  - Primary Chart INFO.Set
    - Coastlines
    - Safety Contour
    - Danger To Navigation
    - Fixed and Floating Aids to Navigation
  - Land Area
  - Depth Contour
  - Scale Boundary
  - Sounding
  - Text
  - Other Objects
  - Text Size
- (FOR ECDIS)
  - View1 tab
    - Chart Type
    - Chart Load
    - Text Size
    - Readout undisplayed chart object
    - Group Layer
    - Layer
    - Text
  - View2 tab
    - Chart Type
    - Chart Load
    - Text Size
    - Readout undisplayed chart object
    - Group Layer
    - Layer
    - Text

## AIO/T&P ECDIS RADAR

- All AIO Objects
- Temporary Notice(T)
- Preliminary Notice(P)
- ENC Preliminary Notice(EP)
- No Information Objects

## Graphical Indication ECDIS RADAR

- Graphical Indication for the Charted Feature Object
- Crossing Safety Contour
- Navigational Hazards
- Prohibited Areas and Areas with Special Conditions
- Settings for Depth/Safety Contour
- Settings for Look-ahead
- Settings for Are Alert

Tools **ECDIS** **RADAR**

Range Rings  
 Bearing Scale **ECDIS**  
 EBL1  
 EBL2  
 VRM1  
 VRM2  
 PI  
 Index Line 1  
 Index Line 2  
 Index Line 3  
 Index Line 4  
 Index Line 5  
 Index Line 6  
 Index Line 7  
 Index Line 8  
 Node Fixed EBL/VRM **ECDIS**

Unit

Depth(Included depth in Chart)  
 Current Speed **CONNING**  
 Wind Speed  
 Propeller Revolution  
 Propeller Pitch Angle  
 Thruster Revolution  
 Thruster Pitch Angle  
 Air TEMP  
 Water TEMP  
 Air Pressure  
 XTD for TCS Info **CONNING**  
 Wind Direction(True)

Control **ECDIS** **RADAR**

(Top Level Screen Information on RADAR) **RADAR** \*  
 \* Group box units  
     Show Own Track Control  
 (Top Level Screen Information on ECDIS) **ECDIS** \*  
 \* Group box units  
     Show Sub Information Window  
     Watch(Vector / RADAR / Target status)  
     POSN DIFF(Difference between POSN(Main) and POSN(Sub))  
     Depth  
     Current

Tooltips/Infotips **ECDIS** **RADAR**

Tooltips  
 Mouse Over Information

Depth Graph \*

\* Case where the depth sensor is connected.

(Depth Trend Graph)  
 [ Depth Range(Docking)  
   Depth Range(Voyage)  
   Time Range  
   Reference ]

---

#### Rudder Graph

\* Case where the gyro and rudder is connected.

(Rudder Trend Graph)

Time Range

Rudder Range

#### Gyro/Rudder Graph \*

\* Case where the depth sensor is connected.

(Gyro/Rudder Trend Graph)

Time Range

Rudder Range

#### Engine Graph \*

\* Case where the engine is connected.

(Engine REV Trend Graph)

Time Range

Maximum rpm

Minimum rpm

#### Wind Graph

(Wind Speed Trend Graph)

Time Range

(Wind Direction Trend Graph)

Time Tange

#### Sea TEMP

(Sea TEMP Trend Graph)

Time Range

#### ROT

(ROT)

[ROT Scale]

## D.1.11 Alert

ECDIS

RADAR

CONNING

### Collision Avoidance RADAR

(CPA/TCPA Alarm)

CPA Limit

TCPA Limit

(Alarm Detection)

Lost AIS Target Warning

AIS CPA/TCPA Alarm

### New Target Warning ECDIS RADAR

Use AZ 1

Use AZ 2

1 tab

Make AZ1 ⇒ Change to the AZ1 range setting mode

Start Angle

End Angle

Start Distance

End Distance

2 tab

Make AZ 2 ⇒ Change to the AZ2 range setting mode

Start Angle

End Angle

Start Distance

End Distance

### Depth/Safety Contour

\* Case where the Chart option is assigned to the radar (Chart RADAR)

(Crossing Safety Contour Alarm) ECDIS RADAR

Shallow Contour

Safety Depth

Safety Contour

Deep Contour

View Settings for Chart Common ECDIS RADAR

### Look-ahead ECDIS RADAR \*

\* Case where the Chart option is assigned to the radar (Chart RADAR)

(Area(Rectangle))

Use Area(Rectangle)

Length

Width

(Area(Sector))

Use Area(Sector)

Radius

Width

### Special Condition Area ECDIS RADAR \*

\* Case where the Chart option is assigned to the radar (Chart RADAR)

Special Condition Area

Alert Priority

### Position Integrity

( POSN(Deviation) Integrity)

POSN Discrepancy Limit

(POSN(Jump) Integrity)

Radius Limit (GPS)

Radius Limit (DGPS)

Time Limit

(HDOP exceeded)

HDOP Limit

### CAM

(Reactivation of Silenced Alert)

Category A/B Time Limit

Category C Time Limit

(Transfer to BNWAS)

Time Limit

(Repetition of UNACK Warning)

Time Limit

(Responsibility Transfer)

Display On

## D.1.12 Settings

ECDIS

RADAR

CONNING

Signal Process(Basic) ECDIS \*

\* Case where the radar is connected

Gain  
Sea  
Rain  
IR  
Target Enhance  
Echo Process

Signal Process ECDIS \* RADAR

\* Case where the radar is connected

Video Latitude  
Video Noise Rejection  
Auto Dynamic Range Control  
(Process Switch)  
Process Switch  
2nd Process Mode \*  
\* Case where [Process Switch] is set to [Off]  
Process Switch Range \*  
\* Case where [Process Switch] is set to [Range Fix]  
Fast Target Detection  
SART RADAR

Obs, Scene Preset RADAR

Obs.Scene  
(page 1/6)  
IR  
Target Enhance  
Echo Process  
Sea  
Rain  
Save Present State  
Next  
(page 2/6) 4kW, 6kW, 10kW, 25kW, 30kW, 50kW, 60kW scanner or solid-state radar connector  
(Pulse Width)  
0.75(0.75 to 1.5)  
1.5(1.5 to 3)NM  
3(3 to 6)NM  
6(6 to 12)NM  
12(12 to 16)NM  
Back  
Next  
(page 3/6)  
Video Latitude  
Video Noise Rejection  
AUTO Dynamic Range Control  
(Process Switch)  
Process Switch  
2nd Process Mode \*  
\* [Process Switch] is other than [Off]  
Process Switch Range \*  
\* [2nd Process Mode] is other than [Range Fix]  
Fast Target Detection  
Back  
Next  
(page 4/6)  
Trails Mode  
Trails Ref Level  
Trails Reduction  
MAX Length  
Trails Length  
Back  
Next

|                      |   |
|----------------------|---|
|                      | <div> <div>(page 5/6)</div> <div>Gain offset</div> <div>PRF</div> <div>Small Buoy Detection</div> <div>Fishnet Detection</div> <div>Antenna Height</div> <div>Back</div> <div>Next</div> <div>(page 6/6)</div> <div>Save as User Default</div> <div>Load User Default</div> <div>Initialize</div> <div>Back</div> </div>              |
| Trails               | <div> <div>RADAR</div> <div>Trails Mode</div> <div>Trails Ref Level</div> <div>Trails Reduction</div> <div>MAX Length</div> </div>  |
| TXRX                 | <div> <div>RADAR</div> <div>PRF Fine Tuning</div> <div>Stagger Trigger</div> <div>PRF</div> <div>Ice Class Standby Mode</div> </div>  |
| Association          | <div> <div>ECDIS RADAR</div> <div>Association</div> <div>TT/AIS Priority *</div> <div>TT1/TT2 Priority * ECDIS</div> <div>(Threshold) * RADAR</div> <div> <div>Bearing</div> <div>Range</div> <div>Course</div> <div>Speed</div> </div> <div>Applicable AIS Target * RADAR</div> <div>* Case where [Association] is [On]</div> </div> |
| Ship's Dynamic Trait | <div> <div>ECDIS RADAR</div> <div>Reach</div> <div>Turn Mode</div> <div>(Turn Set)</div> <div> <div>Radius</div> <div>Rate</div> </div> <div>Acceleration</div> <div>Deceleration</div> </div>  |
| Safety Zone Viewer   | <div> <div>RADAR</div> <div>Display Area</div> <div> <div>Distance</div> <div>Angle</div> </div> <div>Safe Passing Distance</div> <div> <div>a</div> <div>b</div> <div>c/d</div> </div> </div>  |
| TT Test              | <div> <div>RADAR</div> <div>Test Video</div> <div>TT Simulator</div> <div>Gate Display</div> <div>(Status)</div> <div> <div>Vector Constant</div> <div>VD Level Mode (Manual)</div> <div>VD Level (Manual)</div> <div>VD Level (Auto)</div> <div>Gate Size</div> <div>Tracking</div> </div> </div>                                    |

## Filter ECDIS RADAR

AIS Filter  
 TT  
 Sector Filter  
 Start Angle  
 End Angle  
 Ring Filter  
 Distance  
 Filtering Mode  
 Sector tab  
 [ Make Target Filter  
 Start Angle \*  
 End Angle \*  
 \* Case where [Make Target Filter] is On  
 Ring tab  
 [ Make Target Filter  
 Distance \*  
 \* Case where [Make Target Filter] is On

## Target Track ECDIS RADAR

Target Track Function  
 View for Target Track  
 File Load/Save

## Route

For (ECDIS route) ECDIS RADAR \*  
 \* Selecting [ECDIS Route] on the Utilities menu  
 (Default)  
 [ XTD (PORT)  
 XTD (STBD)  
 Arrival radius  
 Speed  
 Sail  
 Turning Radius  
 Time zone  
 Distance calculation mode  
 Monitoring  
 MAX Latitude  
 Minimum Leg Length for Limit Check

## Autosail \* ECDIS RADAR

\* Displayed when the automatic sailing option is attached.

Turning Gain \*  
 \* Auto Pilot is displayed in the following cases  
 - Tokyo Keiki TCS Category C  
 - Tokyo Keiki TCS Category B (new mode)  
 Tracking Gain \*\*  
 Drift Correction \*\*  
 Dead Band \*\*  
 Dead Band \*\*  
 Alert for Track Control  
 \*\* Auto Pilot is displayed in the following cases  
 - Tokyo Keiki TCS Category B (old mode)  
 - YDK TCS Category C  
 - YDK TCS Category B  
 - All the autosail types

## Temporary Route ECDIS RADAR

Pre Run Speed  
 Pre Run Time  
 Pre Run Distance  
 Enter Angle  
 Turning Radius  
 XTD MAX  
 Course Difference Limit

## Chart ECDIS RADAR \*

\* Displayed when the Chart option is assigned to the radar (Chart RADAR)

|                                   |
|-----------------------------------|
| Chart                             |
| (Redraw)                          |
| Border Range ECDIS                |
| Margin(Chart Rotation)            |
| AUTO Accepting S-57 Updated Chart |
| Deletion Mode(Chart Maintenance)  |

## Logbook ECDIS

|                       |
|-----------------------|
| Logging Events tab    |
| At noon               |
| Every                 |
| Event Mark            |
| Manual Position Fix   |
| Chart Manual Updating |
| System Start          |
| System Exit           |
| Route Alert           |
| Chart Alert           |
| Autosail Alert        |
| System Alert          |
| MOB Start/Stop        |
| View Filter tab       |
| At noon               |
| Specified Period      |
| Event Mark            |
| Manual Position Fix   |
| Chart Manual Updating |
| System Start          |
| System Exit           |
| Route Alert           |
| Chart Alert           |
| Autosail Alert        |
| System Alert          |
| Latest Display Days   |
| MOB Start/Stop        |

## NAVTEX ECDIS

|                                       |
|---------------------------------------|
| (Highlighting of Message List)        |
| Navigation Alarm                      |
| Weather Alarm                         |
| Ice Warning                           |
| Search and Rescue Information         |
| Extended Navigational Information     |
| Display Filtering for NAVTEX Messages |

## Blocking Predoction

\* Displayed when a Satellite Terminal option is attached.

|                           |
|---------------------------|
| Heading Range             |
| Important Antenna         |
| Notify Satellite Blocking |

## VHF

\* Displayed when the VHF radiotelephone option is attached.

|             |
|-------------|
| Call Device |
|-------------|

## General ECDIS RADAR

|                        |
|------------------------|
| (Gyro I/F) *           |
| GYRO Setting           |
| * Gyro I/F is equipped |



## Color and Brightness

Day/Night  
Def.  
Display Color tab  
OuterPPI \*/Dialog  
InnerPPI \*  
Character  
RADAR Video \*  
\* Under radar connection  
RADAR Trails(Time) **RADAR**  
Target Symbol \*  
\* Displayed at the equipment setting for receiving TT information  
Range Rings \*  
\* Under radar connection  
EBL1/VRM1/PI  
EBL2/VRM2  
Own Symbol/HL/Vector  
OZT **RADAR**  
ALL GPS Buoy  
GPS Buoy1~10  
Other  
Brightness tab  
Character  
RADAR Video \*  
\* Under radar connection  
RADAR Trails **RADAR**  
Target Symbol \*  
\* Displayed at the equipment setting for receiving TT information  
Range Rings \*  
\* Under radar connection  
EBL/VRM/PI  
Own Symbol/HL/Vector  
OZT **RADAR**  
Panel  
Day1 : Level4 / Day2 : Level3 / Day3 : Level2 / Dusk,Night : Level1  
Display  
<26 inch>[0~100]Day1/Day2/Day3 : 67 / Dusk : 60 / Night : 11  
<19 inch> Day1/Day2/Day3 : 42 / Dusk : 20 / Night : 4

## Sounds

Volume tab  
Key ACK  
Misoperation  
Response/Notification  
Message Notification  
Alert Setting Reminder  
Alarm  
Warning  
Melody tab  
Alarm  
Warning

## Key Assignment

### User Keys tab \*

\* Under the connection of the optional unit

DISP Off Key ECDIS RADAR

User Key 1

User Key 2

### Multi Dial tab

Vector Time

Trails Length

C UP Angle

Own Track Color

Manual Tune ECDIS

Display Brightness

Panel Brightness

Gain \*

Sea \*

Rain \*

\* Under radar connection

### AZ Key tab \* ECDIS RADAR

\* Under the connection of the optional unit and radar

AZ 1

AZ 2

## Preferences ECDIS RADAR

Name

Save \*

\* Disable is displayed when up to the maximum private settings are saved.

Load \*

\* Disable is displayed when no item is selected in the name list.

Delete \*

\* Disable is displayed when no item is selected in the name list.

Default Setting

## Screen capture ECDIS RADAR

AUTO Capture Interval

AUTO File Erase

\* Disable is displayed when [AUTO Capture Interval] is set to [0].

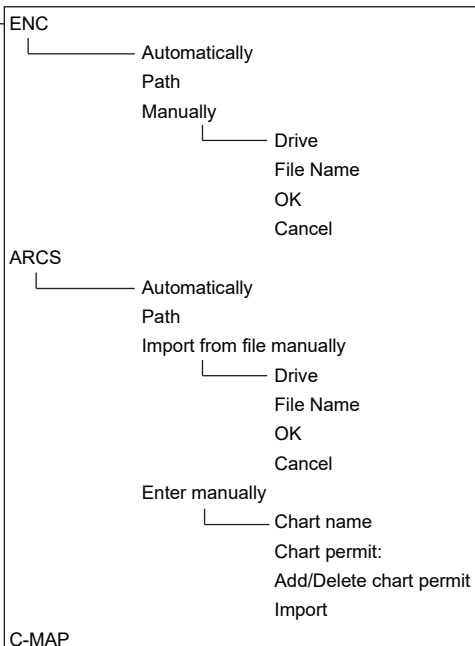
File Management

## D.1.13 Chart Maintenance

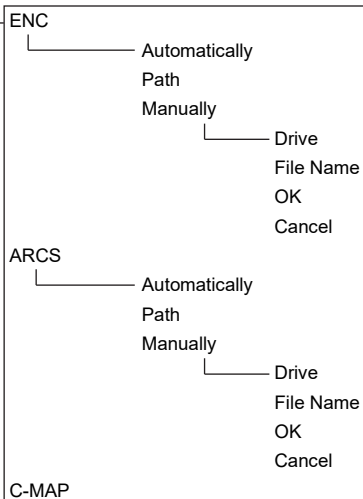
ECDIS

RADAR

Import/Update Licence file



Import/Update charts



Check Status

Status List tab

Delete

(Chart list)

Cell Name

Cell Ver.

Issue Date

Weekly No

Edition Date

Last Update

Expiry Date

Accepted

Rejected

DS\_ID

Scale

(Licence information)

S-63 User permit

S-63 Cell permit

(SA certificate)

SA certificate file

Data Server

Load new SA certificate

(Licence Information)

ARCS User Permit

ARCS Chart Permit

Licensee

Vessel Name

Fixed Site #1

Host Name

Licence Type

(Cell Information)

Log tab

Log

Import/Update Charts

Import/Update Licence

## D.1.14 Maintenance

ECDIS

RADAR

CONNING

### Date/Time/Time Zone

(Date)  
[Month]  
[Year]  
[Day]  
Time(LMT)  
Time Zone  
Display Style  
Synchronise with Time Source(Date/Time)  
Synchronise with Time Source(Time Zone)

### System Information

Software tab  
[Type]  
[Application]  
[Maintenance No.]  
[TXRX]  
[TCS]  
[Presentation Library]  
Functionality tab  
[Device Licence Status]  
[Option Licence Status]  
H/W Key tab  
[(ARCS Information)]  
[PIN]  
[User Permit]  
[(S-63 Information)]  
[User Permit]  
Specification tab  
Specifications  
Save to USB Device

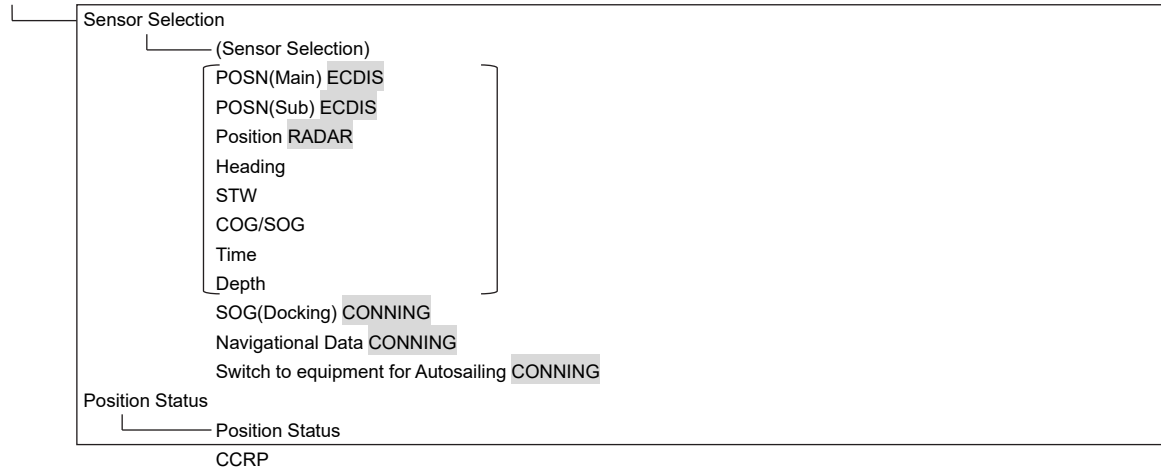
### Operating Time

(Operating Time of Work Station)  
[Total]  
[SSD1]  
[SSD2]  
[LCD]  
[LCD FAN]  
[CCU FAN]  
[PSU FAN]  
[UPS]  
(Operating Time of Scanner)\*  
\* Under radar connection  
[Total]  
[Transmit]  
[Motor]  
[FAN]

### Voyage Distance

(Current Voyage Distance)  
[Ground]  
[Water]  
Clear

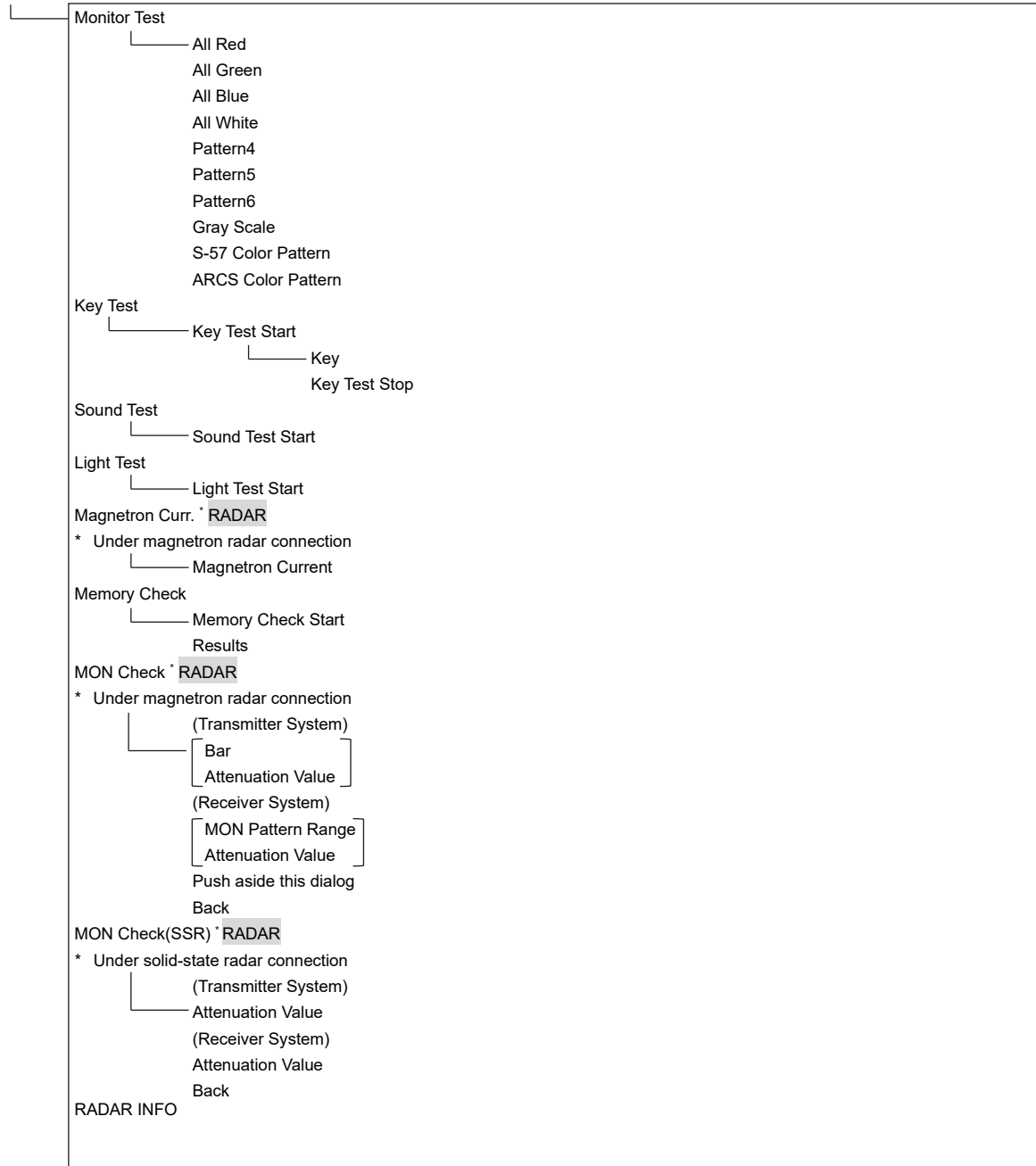
---



## Inmarsat-C DNID(for LRIT)



## Selftest



---

---

Software Update

Software Update  
Firmware Update  
Help Install

DVD Drive Cleaning

Maintenance INFO

---

## D.1.15 Help

ECDIS

RADAR

CONNING

←

→

Home

(Contents tab)

(Search tab)

keyword

Search

Results



---

## D.1.16 Code Input

ECDIS

RADAR

CONNING

Password

## D.1.17 Service

ECDIS

RADAR

CONNING

### Adjustment ECDIS RADAR

#### Basic Adjustment

##### Tune Adjustment \*

\* Under magnetron radar connection

Bearing Adjustment

Range Adjustment

Master/Slave (radar operation mode)

#### TXRX RADAR

##### Antenna Height

##### Tune Peak Adjustment \*

\* Under magnetron radar connection

Tune Indicator

Output BP

#### Performance Monitor (under magnetron connection) RADAR

##### MON Adjustment

MON Indicator Adjustment

MON Level

#### Performance Monitor(SSR) (under SSR connection) RADAR

##### TX Monitor Adjustment

RX Monitor Adjustment

Monitor Sector

Monitor Range

RX Monitor Gain

Reference of Attenuator Value

#### Sector Blank RADAR

##### Use Sector1

Use Sector2

Use Sector3

1 tab

Make Sector1

Start Angle

End Angle

2 tab

Make Sector2

Start Angle

End Angle

3 tab

Make Sector3

Start Angle

End Angle

#### TNI Blank RADAR (Menu for a person in charge of installation)

##### Use TNI Blank \*

\* Under magnetron radar connection

Make Sector

Start Angle

End Angle

#### Input BP Count (Menu for a person in charge of installation)

##### RADAR1

RADAR2

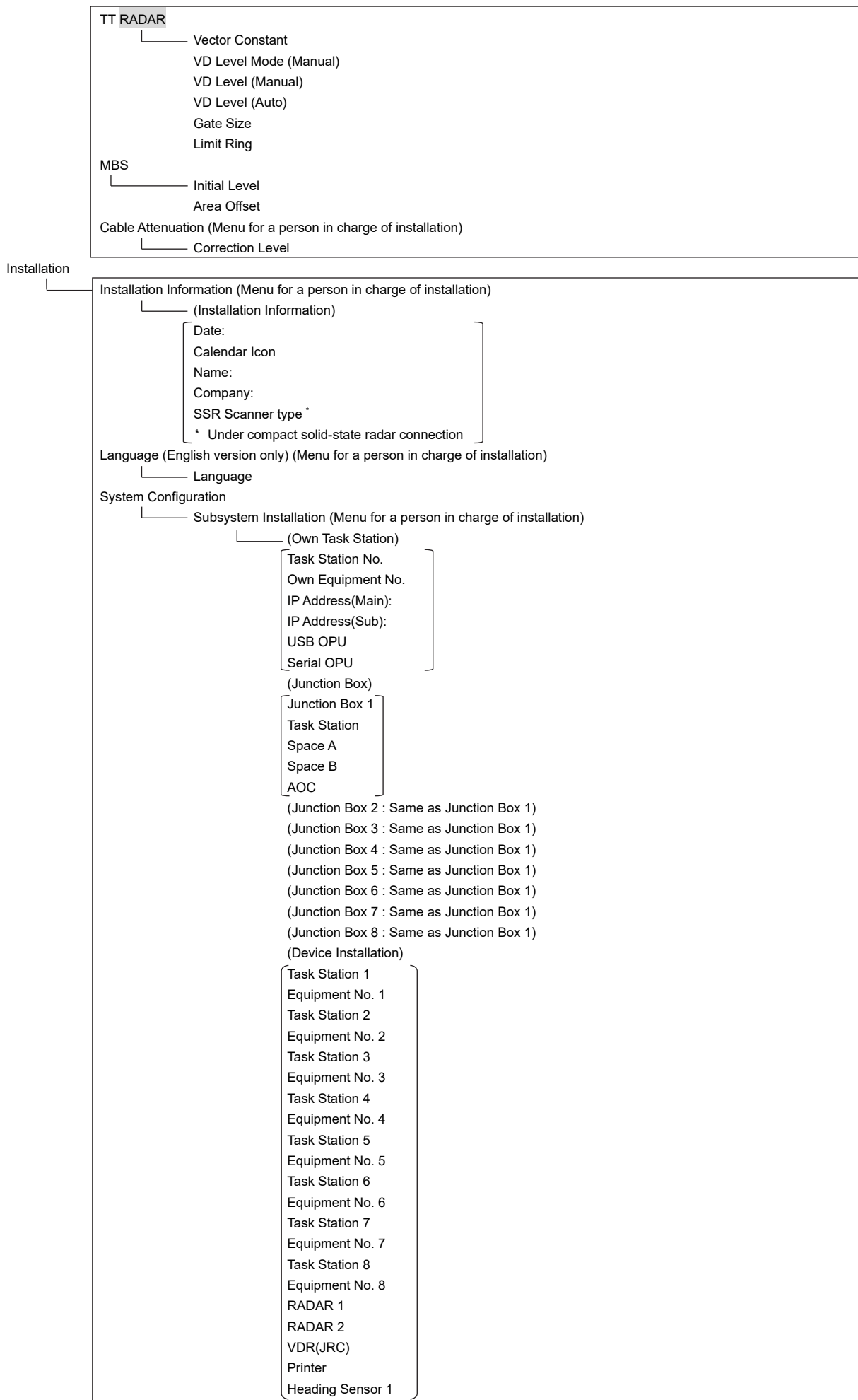
#### Output BP Count (Menu for a person in charge of installation)

##### Output BP

#### Echo Noise Level (Menu for a person in charge of installation)

##### Echo Noise Level

Adjustment Mode



(Heading Sensor 1(Type)  
 Heading Sensor 2  
 Heading Sensor 2(Type)  
 Log 1  
 Log 1 Interface/Type  
 Log 2  
 Log 2 Interface/Type  
 GPS 1  
 GPS 2  
 GPS 3  
 GPS 4  
 Ship's Clock  
 Echo Sounder 1  
 Transducer 1  
 Transducer 2  
 Echo Sounder 2  
 Transducer 3  
 AIS  
 NAVTEX  
 Anemometer  
 Water TEMP Meter  
 Current Meter  
 Climate Meter  
 ROT Indicator  
 Autopilot  
 Autopilot Type  
 Rudder  
 Rudder Number  
 Engine/Propeller  
 Engine/Propeller Number  
 Engine Telegraph  
 Engine Telegraph Number  
 Bow Thruster  
 Bow Thruster Number  
 Stern Thruster  
 Stern Thruster Number  
 Azimuth Thruster  
 Azimuth Thruster Number  
 Generator  
 Generator Number  
 S-JOY/Joystick 1  
 S-JOY/Joystick 2  
 S-JOY/Joystick 3  
 S-JOY/Joystick 4  
 S-JOY/Joystick 5  
 GPS Selector  
 Log Selector  
 Inmarsat-C 1  
 Inmarsat-C 2  
 Satellite Terminal 1  
 Satellite Terminal 2  
 Satellite Terminal 3  
 Satellite Terminal 4  
 BNWAS  
 BNWAS Type  
 General Equipment(Alert)  
 General Equipment(Alert) Number  
 GPS Buoy  
 Plotter  
 VHF (JHS-800S) 1  
 VHF (JHS-800S) 2  
 VHF (JHS-800S) 3  
 Hull Motion  
 Set

CCRP

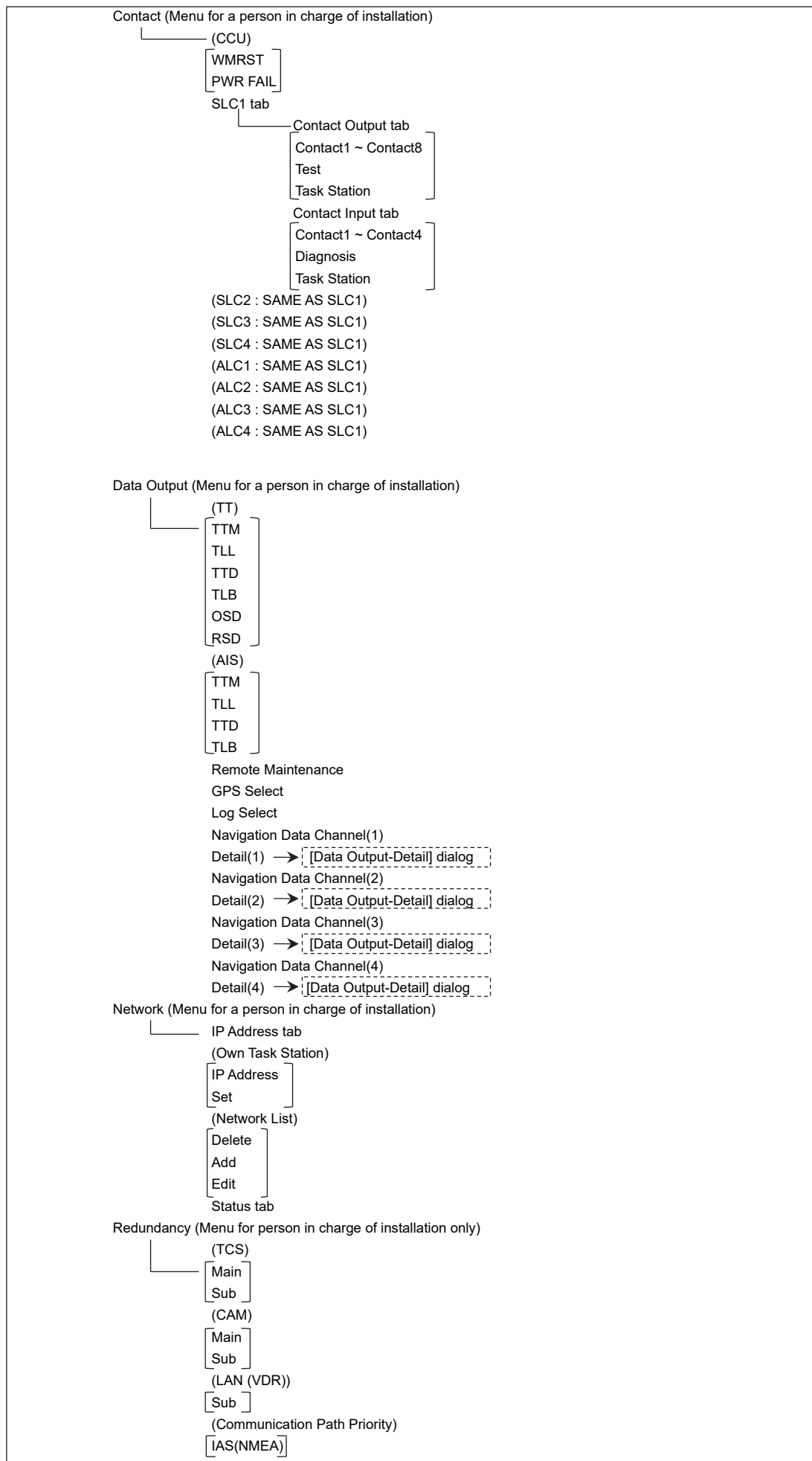
- Length
- Beam
- GPS1 X ~ GPS4 X
- GPS1 Y ~ GPS4 Y
- RADAR Antenna1 X ~ RADAR Antenna8 X
- RADAR Antenna1 Y ~ RADAR Antenna8 Y
- CCRP1 X ~ CCRP4 X
- CCRP1 Y ~ CCRP4 Y
- (Speed Position(from fore Draft))
- Bow
- Stern

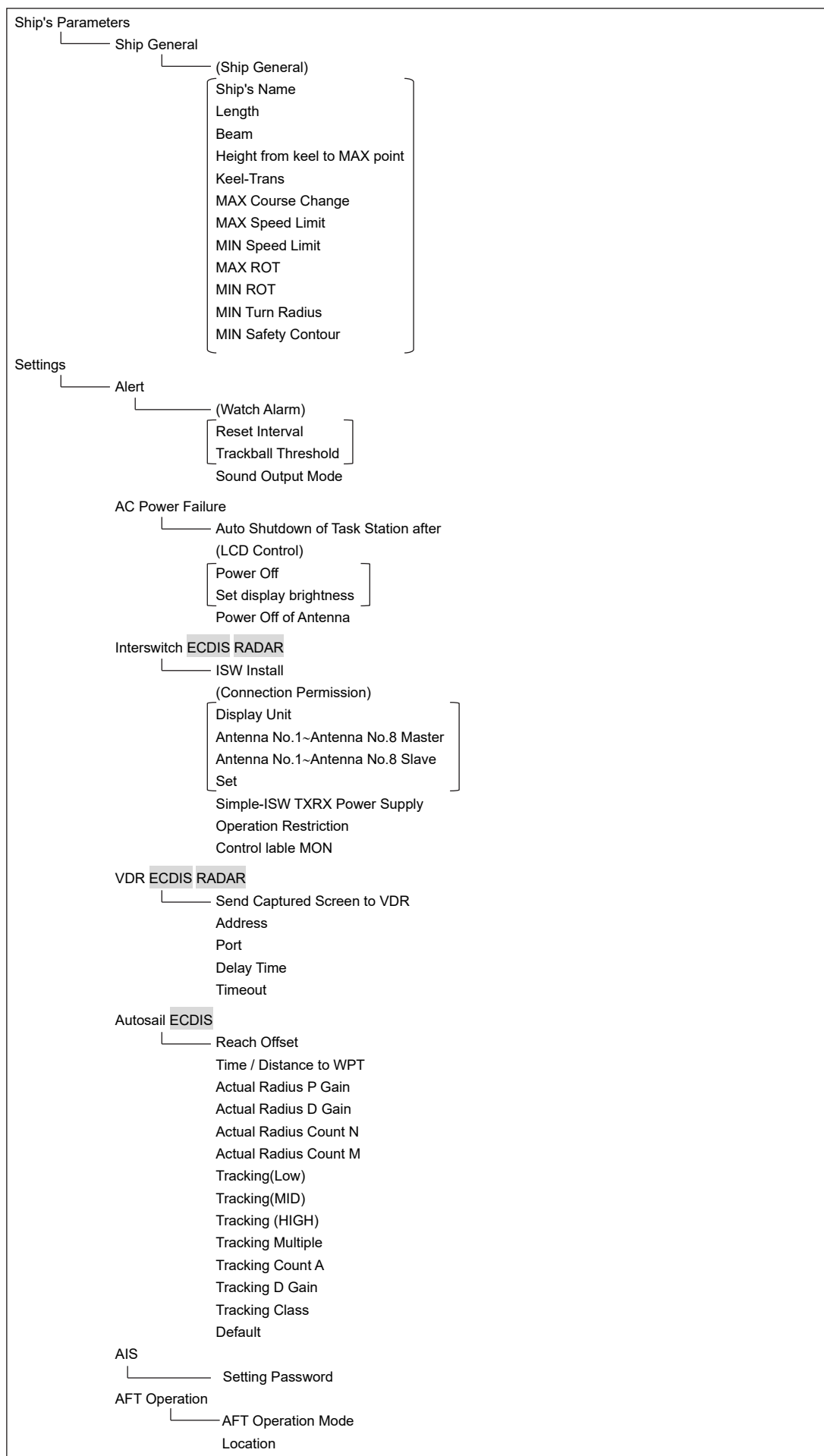
SternSerial Port

- (CCU)
- [ Gyro/Log/GPS/AIS ]
- Sensor
- Diagnosis
- Detail → [Serial Port-Detail] dialog box
- Monitor → [Serial Port-Monitor] dialog box
- [ ISW/MTR/Serial OPU ]
- Diagnosis
- Monitor → [Serial Port-Monitor] dialog box
- SLC1(M) tab
- CH1 ~ CH8
- CH9 ~ CH10
- Gyro I/F
- Sensor
- Diagnosis
- Detail → [Serial Port-Detail] dialog box
- Monitor → [Serial Port-Monitor] dialog box
- (SLC2(M) ~ SLC4(M) : SAME AS SLC1(M))
- (SLC2(S) ~ SLC4(S) : SAME AS SLC1(M))
- (ALC1 ~ ALC4 : SAME AS SLC1(M))

System Function

- Equipment
- Connection
- System Function
- SFI Talker
- SFI No.
- Cluster
- Control Tx
- Alert Tx
- Alert Rx
- Delete
- Add → [System Function(Add)] dialog box
- Edit → [System Function(Edit)] dialog box

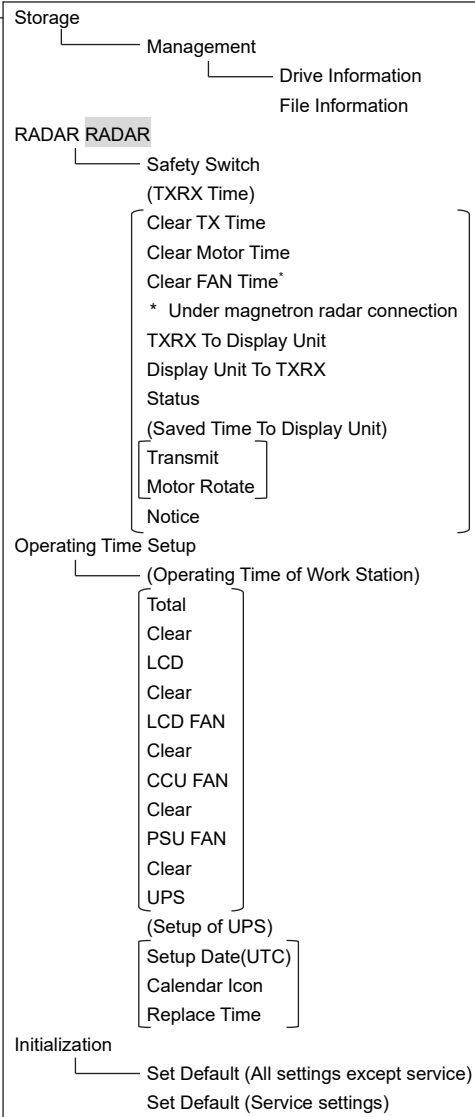




- Inmarsat-C
  - (Inmarsat-C 1)
    - IP Address
    - Port
    - Set
  - (Inmarsat-C 2)
    - IP Address
    - Port
    - Set
- Satellite Terminal
  - Enable the Function of Prediction for Blocking Area
  - (Satellite Terminal 1)
    - Type
    - IP Address
    - Import Blocking Chart Data
  - (Satellite Terminal 2)
    - Type
    - IP Address
    - Import Blocking Chart Data
  - (Satellite Terminal 3)
    - Type
    - IP Address
    - Import Blocking Chart Data
  - (Satellite Terminal 4)
    - Type
    - IP Address
    - Import Blocking Chart Data
  - Set
- Display Size
  - Horizontal Size
- Current
  - Data Set Number
- Sensor
  - Synchronise depth alarm limit
  - Synchronise position sensor selected on Master
- Sentence Input
  - Generator
- Route Sharing
  - Select Route Sharing Type
- GPS Shared Route
  - GPS Shared Route
- Route Plan Exchange
  - Destination Equipment
- RMS
- GPS Buoy
  - GPS Buoy Number
- VHF
  - VHF (JHS-800S) 1
  - VHF (JHS-800S) 2
  - VHF (JHS-800S) 3



## Maintenance



---

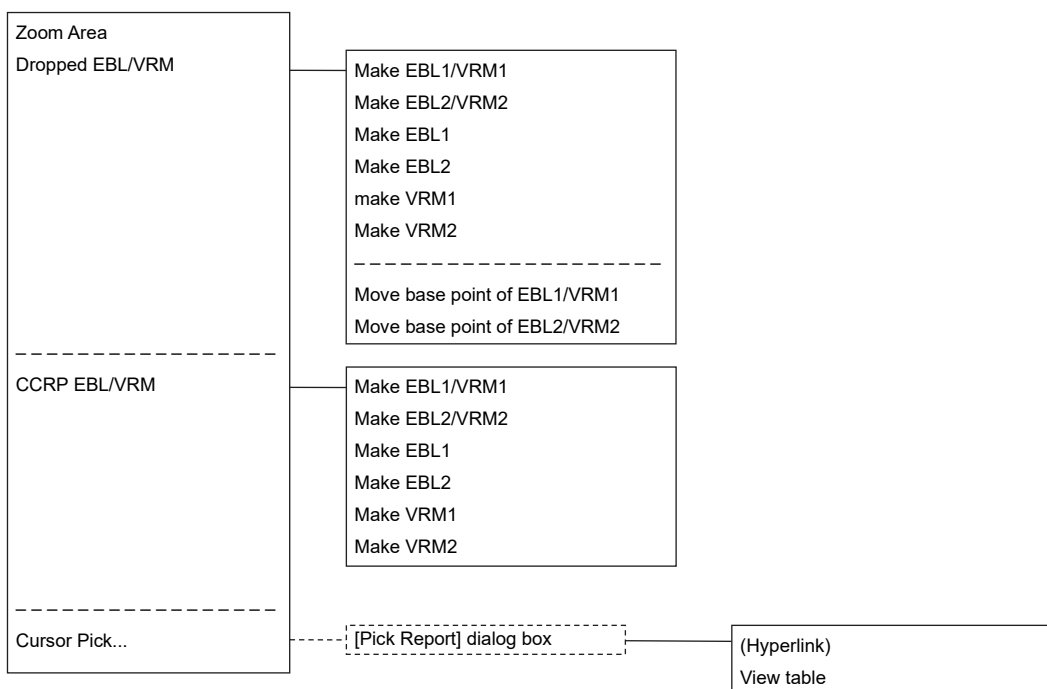
## D.2 Context Menu List

This section shows the context menus that are displayed by clicking the right button by target object.

\* The items that are enclosed by the frame of broken lines indicate the dialogs and windows that are displayed by selecting the relevant menu.

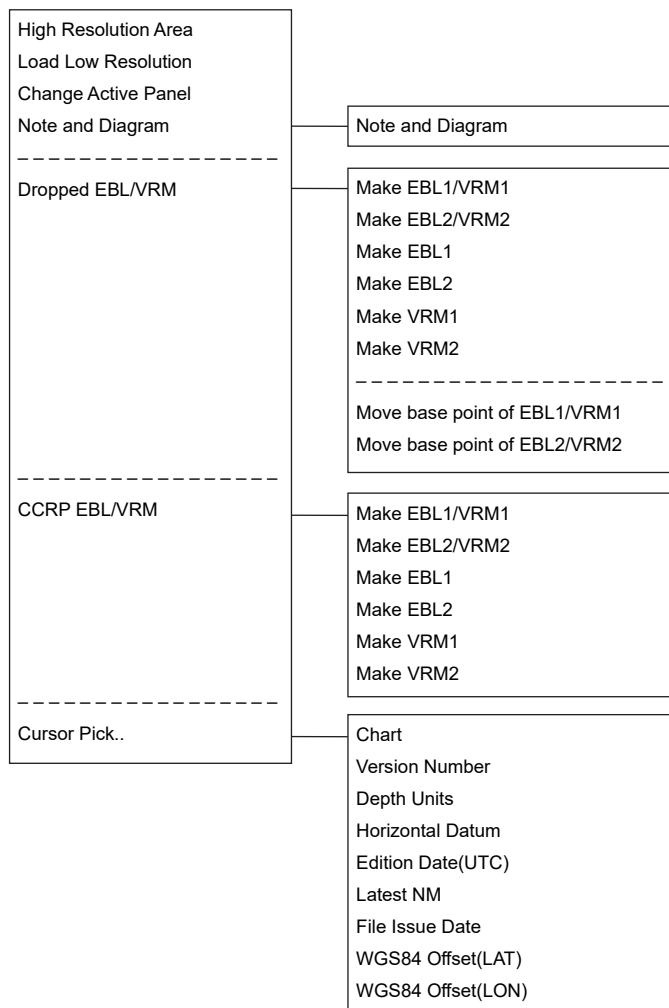
### D.2.1 No object

#### D.2.1.1 ECDIS (S57/C-MAP) screen



---

## D.2.1.2 ECDIS(ARCS) screen



---

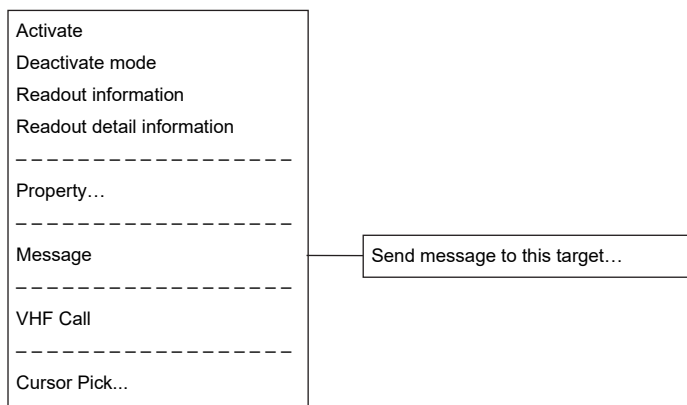
### D.2.1.3 RADAR screen

|                                 |
|---------------------------------|
| Acquire                         |
| Acquire and readout information |
| Cancel all TT                   |
| -----                           |
| Cursor Pick...                  |

---

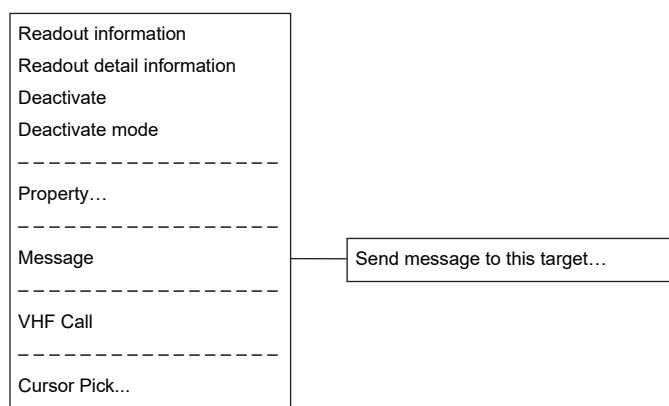
## D.2.2 AIS

### D.2.2.1 Sleeping AIS target



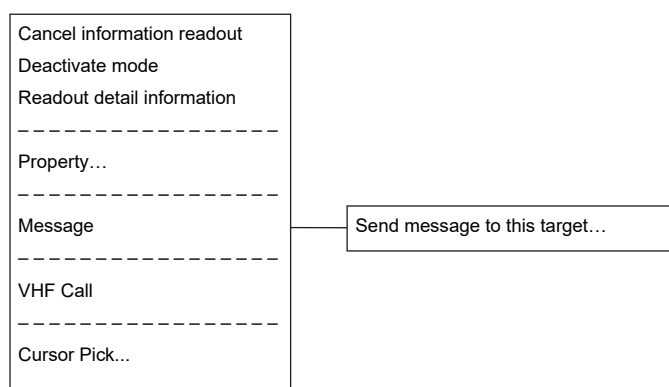
---

## D.2.2.2 Activated AIS target



---

### D.2.2.3 Numeric displayed AIS target



---

## D.2.3 TT

### D.2.3.1 Internal TT

|                     |
|---------------------|
| Readout information |
| Cancel TT           |
| Cancel all TT       |
| Cancel TT mode      |
| -----               |
| Property...         |
| -----               |
| Cursor Pick...      |

### D.2.3.2 External TT

|                     |
|---------------------|
| Readout information |
| -----               |
| Property...         |
| -----               |
| Cursor Pick...      |



---

### D.2.3.3 TT detail information display (internal TT)

|                            |
|----------------------------|
| Cancel information readout |
| Cancel TT                  |
| Cancel all TT              |
| Cancel TT mode             |
| -----                      |
| Property...                |
| -----                      |
| Cursor Pick...             |

### D.2.3.4 TT detail information display (external TT)

|                            |
|----------------------------|
| Cancel information readout |
| -----                      |
| Property...                |
| -----                      |
| Cursor Pick...             |

---

## D.2.4 NAVTEX

### D.2.4.1 NAVTEX

|                            |
|----------------------------|
| Readout NAVTEX information |
| -----                      |
| Cursor Pick...             |

---

## D.2.5 Mariner's Mark/Line

### D.2.5.1 Event mark

|                     |
|---------------------|
| Delete this object. |
| -----               |
| Show Mark/Line List |
| -----               |
| Cursor Pick...      |

### D.2.5.2 Information mark

|                     |
|---------------------|
| Move this object.   |
| Delete this object. |
| -----               |
| Show Mark/Line List |
| -----               |
| Cursor Pick...      |

### D.2.5.3 Current mark

|                     |
|---------------------|
| Move this object    |
| Delete this object. |
| -----               |
| Show Mark/Line List |
| -----               |
| Cursor Pick...      |

### D.2.5.4 Clearing line

|                     |
|---------------------|
| Move start point    |
| Move end point      |
| Move this object.   |
| Delete this object. |
| -----               |
| Show Mark/Line List |
| -----               |
| Cursor Pick...      |

---

## D.2.5.5 Highlighted display

|                     |
|---------------------|
| Insert vertex       |
| Move vertex         |
| Delete vertex       |
| -----               |
| Move this object.   |
| Delete this object. |
| -----               |
| Show Mark/Line List |
| -----               |
| Cursor Pick...      |

---

## D.2.6 User chart

### D.2.6.1 Symbol

|                     |
|---------------------|
| Move this object.   |
| Delete this object. |
| -----               |
| Show Mark/Line List |
| -----               |
| Cursor Pick...      |

### D.2.6.2 Simple line

|                     |
|---------------------|
| Add vertex          |
| Insert vertex       |
| Move vertex         |
| Delete vertex       |
| -----               |
| Select All          |
| Move this object.   |
| Delete this object. |
| -----               |
| Show Mark/Line List |
| -----               |
| Cursor Pick...      |

### D.2.6.3 Line - Circle

|                     |
|---------------------|
| Change radius       |
| Move this object.   |
| Delete this object. |
| -----               |
| Show Mark/Line List |
| -----               |
| Cursor Pick...      |

### D.2.6.4 Line - Ellipse

|                                |
|--------------------------------|
| Change horizontal and vertical |
| Move this object.              |
| Delete this object.            |
| -----                          |
| Show Mark/Line List            |
| -----                          |
| Cursor Pick...                 |

---

### D.2.6.5 Arc

Change radius  
Change start angle  
Change end angle  
Move this object.  
Delete this object.

-----  
Show Mark/Line List  
-----

Cursor Pick...

### D.2.6.6 Polygon

Insert vertex  
Move vertex  
Delete vertex

-----  
Move this object.  
Delete this object.

-----  
Show Mark/Line List  
-----

Cursor Pick...

### D.2.6.7 Area - Circle

Change radius  
Move this object.  
Delete this object.

-----  
Show Mark/Line List  
-----

Cursor Pick...

### D.2.6.8 Area - Ellipse

Change horizontal and vertical  
Move this object.  
Delete this object.

-----  
Show Mark/Line List  
-----

Cursor Pick...

---

### D.2.6.9 Fan

Change radius  
Change start angle  
Change end angle  
Move this object.  
Delete this object.

-----  
Show Mark/Line List  
-----

Cursor Pick...

### D.2.6.10 Text

Move this object.  
Delete this object.

-----  
Show Mark/Line List  
-----

Cursor Pick...

### D.2.6.11 Arrow

Move start point  
Move end point  
Move this object.  
Delete this object.

-----  
Show Mark/Line List  
-----

Cursor Pick...

---

## D.2.7 Manual Update

### D.2.7.1 Symbol

|                     |
|---------------------|
| Move this object.   |
| Delete this object. |
| Remove this object. |
| -----               |
| Cursor Pick...      |
| -----               |
| View-Options...     |

### D.2.7.2 Simple line

|                     |
|---------------------|
| Insert vertex       |
| -----               |
| Select All          |
| Move this object.   |
| Delete this object. |
| Remove this object  |
| -----               |
| Cursor Pick...      |
| -----               |
| View-Options...     |

### D.2.7.3 Line - Circle

|                     |
|---------------------|
| Move this object.   |
| Delete this object. |
| Remove this object. |
| -----               |
| Cursor Pick...      |
| -----               |
| View-Options...     |

### D.2.7.4 Line - Ellipse

|                     |
|---------------------|
| Move this object.   |
| Delete this object. |
| Remove this object. |
| -----               |
| Cursor Pick...      |
| -----               |
| View-Options...     |



---

### D.2.7.5 Arc

Move this object.  
Delete this object.  
Remove this object.

-----  
Cursor Pick...

-----  
View-Options...

### D.2.7.6 Polygon

Insert vertex

-----  
Move this object.  
Delete this object.  
Remove this object.

-----  
Cursor Pick...

-----  
View-Options...

### D.2.7.7 Area - Circle

Move this object.  
Delete this object.  
Remove this object.

-----  
Cursor Pick...

-----  
View-Options...

### D.2.7.8 Area - Ellipse

Move this object.  
Delete this object.  
Remove this object.

-----  
Cursor Pick...

---

### D.2.7.9 Fan

Move this object.  
Delete this object.  
Remove this object.  
-----  
Cursor Pick...  
-----  
View-Options...

### D.2.7.10 Text

Move this object.  
Delete this object.  
Remove this object.  
-----  
Cursor Pick...  
-----  
View-Options...

### D.2.7.11 Arrow

Move this object.  
Delete this object.  
Remove this object.  
-----  
Cursor Pick...  
-----  
View-Options...

## D.2.8 Manual Update(ARCS, C-MAP)

### D.2.8.1 Objects that have not been saved

Same as "D.2.6User chart"

### D.2.8.2 Saved objects (hidden)

Hide  
Restore  
-----  
Show Mark/Line List  
-----  
Readout manual update information...  
-----  
Cursor Pick...

---

## D.2.9 Monitored route

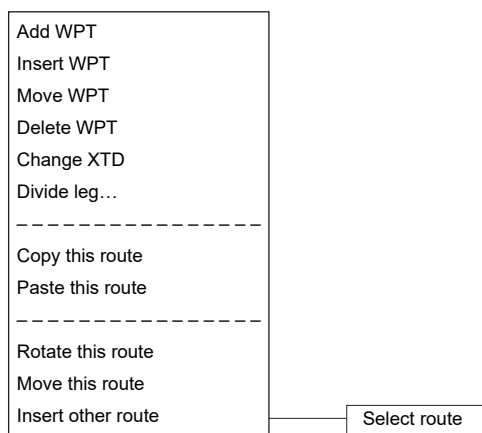
### D.2.9.1 Monitored route

|  |
|--|
| Readout WPT information ...<br>-----<br>Edit this route<br>-----<br>Cursor Pick... |
|--|

---

## D.2.10 Planned route

### D.2.10.1 Planned route



---

## D.2.11 Monitoring dragging anchor

### D.2.11.1 Dragging anchor monitoring circle

Change radius

Move this object.

Finish Monitoring Anchor.

-----

Cursor Pick...

### D.2.11.2 Dragging anchor monitoring polygon

Insert vertex

Delete vertex

Move this object.

Delete this object.

-----

Cursor Pick...

## D.3 Abbreviations of Geodetic Data

| No. | Geodetic Data                        | Display to the top screen | DTM sentence |                  |
|-----|--------------------------------------|---------------------------|--------------|------------------|
|     |                                      |                           | Abbreviation | User-defined No. |
| 0   | WGS 84                               | WGS 84                    | W84          | 0                |
| 1   | WGS 72                               | WGS 74                    | W74          | 1                |
| 2   | Tokyo                                | TOY                       | TOY          | 2                |
| 3   | North American 1927(USA)             | NAS                       | NAS(*2)      | 3                |
| 4   | North American 1927(Canada & Alaska) | NAS                       | NAS(*2)      | 4                |
| 5   | European 1950                        | EUR                       | EUR          | 5                |
| 6   | Australian Geodetic 1966             | AUA                       | AUA          | 6                |
| 7   | Ordnance Survey of Great Britain     | OGB                       | OGB          | 7                |
| 8   | North American 1983                  | NAR                       | NAR          | 8                |
| 9   | No Use                               | Blank display             | -            | 9                |
| 10  | No Use                               | Blank display             | -            | 10               |
| 11  | Adindan                              | ADI                       | ADI          | 11               |
| 12  | Arc 1950                             | ARF                       | ARF          | 12               |
| 13  | Australian Geodetic 1984             | AUG                       | AUG          | 13               |
| 14  | Bermuda 1957                         | BER                       | BER          | 14               |
| 15  | Bogota Observatory                   | BOO                       | BOO          | 15               |
| 16  | Campo Inchauspe                      | CAI                       | CAI          | 16               |
| 17  | Chatam Island Astro 1971             | CHI                       | CHI          | 17               |
| 18  | Chua Astro                           | CHU                       | CHU          | 18               |
| 19  | Corrego Alegre                       | COA                       | COA          | 19               |
| 20  | Djakarta (Batavia)                   | BAT                       | BAT          | 20               |
| 21  | European 1979                        | EUS                       | EUS          | 21               |
| 22  | Geodetic Datum 1949                  | GEO                       | GEO          | 22               |
| 23  | Guam 1963                            | GUA                       | GUA          | 23               |
| 24  | Hayford 1910                         | 024                       | 024(*1)      | 24               |
| 25  | Hjorsey 1955                         | HJO                       | HJO          | 25               |
| 26  | Indian                               | IND                       | IND          | 26               |
| 27  | Ireland 1965                         | IRL                       | IRL          | 27               |
| 28  | Kertau 1948                          | KEA                       | KEA          | 28               |
| 29  | L. C. 5 Astro 1961                   | LCF                       | LCF          | 29               |
| 30  | Liberia 1964                         | LIB                       | LIB          | 30               |
| 31  | Luzon                                | LUZ                       | LUZ          | 31               |
| 32  | Merchich                             | MER                       | MER          | 32               |
| 33  | Minna                                | MIN                       | MIN          | 33               |

| No. | Geodetic Data                   | Display to the top screen | DTM sentence |                  |
|-----|---------------------------------|---------------------------|--------------|------------------|
|     |                                 |                           | Abbreviation | User-defined No. |
| 34  | Nahrwan                         | NAH                       | NAH          | 34               |
| 35  | Naparima, BWI                   | NAP                       | NAP          | 35               |
| 36  | Old Egyptian 1907               | OEG                       | OEG          | 36               |
| 37  | Old Hawaiian                    | OHA                       | OHA          | 37               |
| 38  | Pico de las Nieves              | PLN                       | PLN          | 38               |
| 39  | Provisional South American 1956 | PRP                       | PRP          | 39               |
| 40  | Provisional South Chilean 1963  | HIT                       | HIT          | 40               |
| 41  | Puerto Rico                     | PUR                       | PUR          | 41               |
| 42  | Qornoq                          | QUO                       | QUO          | 42               |
| 43  | RT 90                           | 043                       | 043(*1)      | 43               |
| 44  | Sao Braz                        | SAO                       | SAO          | 44               |
| 45  | South American 1969             | SAN                       | SAN          | 45               |
| 46  | Graciosa Base SW 1948           | GRA                       | GRA          | 46               |
| 47  | Timbalai 1948                   | TIL                       | TIL          | 47               |
| 48  | No Use                          | Blank display             | -            | 48               |
| 49  | No Use                          | Blank display             | -            | 49               |

## D.4 Lists of Terminologies, Units, and Abbreviations

| Abbreviation | Term   |
|--------------|--|
| <b>A</b>     |  |
| A/D = AD     | Analog/ Digital  |
| A/P = AP     | Auto Pilot   |
| AC           | Alternating Current  |
| ACC          | Actual Course Change   |
| ACCA         | Actual Course Change Alarm   |
| ACK          | Acknowledge  |
| ACQ          | Acquire, Acquisition   |
| ACT          | Activate   |
| AIO          | Admiralty Information Overlay (additional information to the navigation) |
| AIS          | Automatic Identification System  |
| ALC          | Alert LAN Converter  |
| AMP          | Amplifiers   |
| AMS          | Alert Management System  |
| ANT          | Antenna  |
| ARCS         | Admiralty Raster Chart Service (A raster chart published by UKHO.)       |
| ASCII        | American Standard Code for Information Interchange                       |
| ASIC         | Application Specific Integrated Circuit                                  |
| AtoN         | Aids to Navigation   |
| AUTO = auto  | Automatic  |
| Av. = AVE    | Average  |
| AVCS         | Admiralty Vector Chart Service   |
| AZ           | Acquisition Zone   |
| AZI          | Azimuth Stabilization Mode   |
| <b>B</b>     |  |
| BAM          | Bridge Alert Management  |
| BCR          | Bow Crossing Range   |
| BCT          | Bow Crossing Time  |
| BFT          | Beaufort   |
| BNWAS        | Bridge Navigational Watch Alarm System                                   |
| BP           | Bearing Pulse  |
| BRG          | Bearing  |
| BWW          | Bearing to waypoint to waypoint  |
| BZ           | Bearing Zero   |



| Abbreviation | Term                                   |
|--------------|--|
| <b>C</b>     |  |
| C UP         | Course Up                              |
| CA-CFAR      | Cell Averaging CFAR                    |
| CAM          | Central Alert Management               |
| Cargo.Cat    | Cargo Category                         |
| CCRP         | Consistent Common Reference Point      |
| CCRS         | Consistent Common Reference System     |
| CCU          | Central Control Unit                   |
| CCW          | Counterclockwise                       |
| CFAR         | Constant False Alarm Rate              |
| CH           | Channel                                |
| CHG          | Change                                 |
| CID          | Conning Information Display            |
| CIF          | Companion MPU Interface                |
| CLR          | Clear                                  |
| COG          | Course Over the Ground                 |
| COM          | Communication Port                     |
| CON          | Conning                                |
| CONN         | Conning                                |
| CONT         | Contrast, Control                      |
| CONV         | Conventional                           |
| CORREL       | Correlation                            |
| CPA          | Closest Point of Approach              |
| CPP          | Controllable Pitch Propeller           |
| CPU          | Central Processing Unit                |
| CTW          | Course Through the Water               |
| Curr.        | Current                                |
| CW           | Clockwise                              |
| <b>D</b>     |  |
| D/N          | Day/Night                              |
| DC           | Direct Current                         |
| Def.         | Definition                             |
| DGPS         | Differential GPS                       |
| DIFF         | Difference                             |
| DIR = Dir.   | Direction                              |
| DISP = Disp  | Display                                |
| DIST         | Distance                               |
| DR           | Dead Reckoning, Dead Reckoned Position |
| DSC          | Digital Selective Calling              |

| <b>Abbreviation</b> | <b>Term</b>                                     |
|---------------------|---|
| DSP                 | Digital Signal Processor                        |
| DWOL                | Distance to Wheel Over Line                     |
| <b>E</b>            |   |
| EBL                 | Electronic Bearing Line                         |
| ECC                 | Early Course Change                             |
| ECDIS               | Electronic Chart Display and Information System |
| Ed.                 | Edition   |
| EGC                 | Enhanced Group Calling                          |
| ENC                 | Electronic Navigational Chart                   |
| ENH                 | Enhance   |
| EOT                 | End of Track                                    |
| EP                  | Estimated Position                              |
| EPA                 | Electronic Plotting Aids                        |
| EPFS                | Electronic Position Fixing System               |
| EQUIP               | Equipment                                       |
| ETA                 | Estimated Time of Arrival                       |
| <b>F</b>            |   |
| FPGA                | Field Programmable Gate Array                   |
| FTC                 | Fast Time Constant                              |
| FWD                 | Forward   |
| <b>G</b>            |   |
| GC                  | Great Circle                                    |
| GIF                 | Gyro Interface                                  |
| GLONASS             | Global Orbiting Navigation Satellite System     |
| GND                 | Ground  |
| GNSS                | Global Navigation Satellite System              |
| GPS                 | Global Positioning System                       |
| GZ                  | Guard Zone                                      |
| <b>H</b>            |   |
| H UP                | Head Up   |
| H/W = HW            | HardWare  |
| HASP                | Hardware Against Software Piracy                |
| HC                  | Heading Control                                 |
| HCS                 | Heading Control System                          |
| HDG                 | Heading   |
| HDOP                | Horizontal Dilution of Precision                |
| HL                  | Heading Line                                    |
| HO                  | Hydrographic Organization                       |
| HSC                 | High Speed Craft                                |

| Abbreviation | Term  |
|--------------|---|
| <b>I</b>     |   |
| I/F = IF     | Interface   |
| I/O          | Input/Output  |
| IALA         | International Association of Marine Aids to Navigation and Lighthouse Authorities |
| IALA-A       | IALA - Region A   |
| IALA-B       | IALA - Region B   |
| ID           | Identification  |
| IMO          | International Maritime Organization   |
| IND          | Indication  |
| INFO         | Information   |
| INIT         | Initialisation  |
| INS          | Integrated Navigation System  |
| INT          | Interval  |
| IP Address   | Internet Protocol Address   |
| IR           | Interference Rejection  |
| ISW          | Interswitch   |
| <b>J</b>     |   |
| JB           | Junction Box  |
| <b>K</b>     |   |
| KOPU         | Keyboard Operation Unit   |
| <b>L</b>     |   |
| L/L = LL     | Latitude/ Longitude   |
| LAN          | Local Area Network  |
| LAT          | Latitude  |
| LCD          | Liquid Crystal Display  |
| LMT          | Local Mean Time   |
| LON          | Longitude   |
| LOP          | Line of Position  |
| LORAN        | Long Range Navigation   |
| LP           | Long Pulse  |
| <b>M</b>     |   |
| M/E          | Main Engine   |
| MAG          | Magnetic  |
| MAN          | Manual  |
| MAX          | Maximum   |
| MBS          | Main Bang Suppression   |
| MFDF         | Medium Frequency Direction Finding  |
| MHV          | Modulator High Voltage  |
| MIC          | Microphone  |

| <b>Abbreviation</b> | <b>Term</b>                              |
|---------------------|--|
| MID                 | Middle                                   |
| MIN                 | Minimum                                  |
| MMSI                | Maritime Mobile Services Identity Number |
| MOB                 | Man Overboard                            |
| MON                 | Monitor                                  |
| MP                  | Medium Pulse                             |
| MSC                 | Maritime Safety Committee                |
| MSG                 | Message                                  |
| <b>N</b>            |  |
| N UP                | North Up                                 |
| NAV = NAVI          | Navigation                               |
| NAVTEX              | Navigational Telex                       |
| NE                  | North East                               |
| NFU                 | Non Follow Up                            |
| NLT                 | Not Less Than                            |
| NMEA                | National Marine Electronics Association  |
| NMEA0183            | NMEA 0183 standards                      |
| NMT                 | Not More Than                            |
| No. = NUM           | Number                                   |
| NW                  | North West                               |
| <b>O</b>            |  |
| OPE                 | Operation                                |
| OPU                 | Operation Unit                           |
| OSD                 | Own Ship Data                            |
| OVRD                | Override                                 |
| OZT                 | Obstacle Zone by Target                  |
| <b>P</b>            |  |
| PI                  | Parallel Index Line                      |
| PIN                 | Personal Identification Number           |
| PL                  | Pulse Length                             |
| PORT                | Port/ Portside                           |
| POS = POSN          | Position                                 |
| PPI                 | Plan Position Indicator                  |
| PRF                 | Pulse Repetition Frequency               |
| PROC                | Process                                  |
| PSU                 | Power Supply Unit                        |
| PS                  | Power Supply                             |
| PWR                 | Power                                    |
| <b>Q</b>            |  |

| Abbreviation | Term                                 |
|--------------|--------------------------------------|
| <b>R</b>     |                                      |
| R            | Relative                             |
| RADAR        | Radio Detecting and Ranging          |
| RAND         | Random                               |
| RCID         | Raster Chart Issue Date              |
| REF          | Reference                            |
| REL          | Relative                             |
| Rev.         | Revolution                           |
| RIF          | Radar I/F Circuit                    |
| RL           | Rhumb Line                           |
| RM           | Relative Motion                      |
| RM(R)        | Relative Motion. Relative Trails.    |
| RM(T)        | Relative Motion. True Trails.        |
| RMS          | Root Mean Square                     |
| RNC          | Raster Navigational Chart            |
| RNG          | Range                                |
| RoRo         | Roll On/ Roll Off (Vessel)           |
| ROM          | Read Only Memory                     |
| ROT          | Rate of Turn                         |
| RPS          | Route Planning System                |
| RX           | Receiver                             |
| <b>S</b>     |                                      |
| SA           | Scheme Administrator                 |
| SAR          | Search and Rescue                    |
| SART         | Search and Rescue Transponder        |
| SATNAV       | Satellite Navigation                 |
| SBAS         | Satellite Based Augmentation System  |
| SCL          | Serial LAN Converter                 |
| SDK          | Software Development Kit             |
| SE           | South East                           |
| SEL          | Select                               |
| SENC         | System Electronic Navigational Chart |
| Seq          | Sequence                             |
| SFI          | System Function ID                   |
| S-JOY        | Steering Joystick Controller         |
| SLC          | Serial LAN Interface Circuit         |
| SOG          | Speed Over the Ground                |
| SP           | Short Pulse                          |
| SPD          | Speed                                |

| Abbreviation | Term   |
|--------------|--|
| SprslLvl     | Spurious Level                               |
| SSD          | Solid State Drive                            |
| SSE          | Security Scheme Error                        |
| SSR          | Solid State Radar                            |
| SSW          | Safety Switch                                |
| STAB         | Stabilised , Stabilisation                   |
| STBD         | Starboard, Starboard Side                    |
| STC          | Sensitivity Time Control                     |
| STD          | Standard                                     |
| STW          | Speed Through the Water                      |
| SW HUB       | Switching Hub                                |
| SYNC         | Synchronisation                              |
| SYS          | System                                       |
| SZV          | Safety Zone Viewer                           |
| <b>T</b>     |  |
| T            | True   |
| T & P        | Temporary and Preliminary Notice to Mariners |
| TCPA         | Time to CPA                                  |
| TCS          | Track Control System                         |
| TD           | Time Difference                              |
| TEMP / Temp. | Temperature                                  |
| TGT          | Target                                       |
| TM           | True Motion                                  |
| TNI          | Tune Indicator                               |
| TOPU         | Trackball Operation Unit                     |
| TPL          | Transferred Line of Position                 |
| TRX          | Transceiver                                  |
| TT           | Target Tracking                              |
| TTG          | Time to Go                                   |
| TWOL         | Time to Wheel Over Line                      |
| TX           | Transmitter                                  |
| TXRX         | Transceiver                                  |
| <b>U</b>     |  |
| U.Map        | User Chart                                   |
| UNACK        | Un-Acknowledge                               |
| Up.No.       | Update Number                                |
| USB          | Universal Serial Bus                         |
| UTC          | Coordinated Universal Time                   |
| <b>V</b>     |  |

| Abbreviation | Term                           |
|--------------|--------------------------------|
| VD           | Video                          |
| VDIN         | Video In                       |
| VDR          | Voyage Data Recorder           |
| Ver.         | Version                        |
| VHF          | Very High Frequency            |
| VOL          | Volume                         |
| VRM          | Variable Range Marker          |
| <b>W</b>     |                                |
| W UP         | Waypoint Up                    |
| WGS          | World Geodetic System          |
| WIG          | Wing-in-ground effect craft    |
| WOL          | Wheel Over Line                |
| WPT          | Waypoint                       |
| WS           | Work Station                   |
| WTRST        | Watch Timer Reset              |
| <b>X</b>     |                                |
| XTD          | Cross Track Distance           |
| XTE          | Cross Track Error              |
| XTL          | Cross Track Limit, Route Width |
| <b>Y</b>     |                                |
| <b>Z</b>     |                                |

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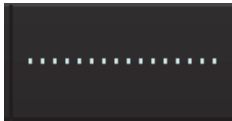










| Abbreviation | Term                   |
|--------------|------------------------|
| <b>Unit</b>  |                        |
| bps          | bit per second         |
| cm           | centimetre             |
| dB           | decibel                |
| deg          | degree                 |
| fm           | fathom                 |
| ft           | feet, foot             |
| h = hr       | hour                   |
| hPa          | hecto pascal           |
| Hz           | hertz                  |
| kg           | kilogram               |
| km           | kilometre              |
| kn = kts     | knot                   |
| m            | metre                  |
| mbar         | millibar               |
| min          | minute                 |
| mph          | mile per hour          |
| NM           | nautical mile          |
| RAD          | radius                 |
| rpm          | revolutions per minute |
| s            | second                 |
| sm           | statute mile           |



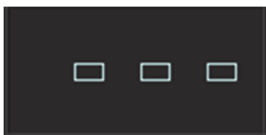





















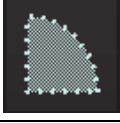

## D.5 Icon Button List for User Chart











The lists of icon buttons that are used for user chart are provided below.

| Button name                  | Icon name        | Icon display example  | Alert generated when the own ship approaches the object |
|------------------------------|------------------|---|---|
| [Mariner's Mark/Line] button | Information mark |    | No alert  |
|                              | Tidal stream     |    | No alert  |
|                              | Clearing line    |    | No alert  |
|                              | Highlight        |    | No alert  |
| [Symbol] button              | Circle           |   | No alert  |
|                              | Triangle         |  | No alert  |
|                              | Square           |  | No alert  |
|                              | Diamond          |  | No alert  |
|                              | Multiple mark    |  | No alert  |
|                              | Caution symbo    |  | Crossing a User defined Caution Object                  |
|                              | Warning symbol   |  | Crossing a User defined Warning Object                  |
|                              | Alert symbol     |  | Crossing a User defined Alert Object                    |

| Button name   | Icon name                | Icon display example  | Alert generated when the own ship approaches the object |
|---------------|--------------------------|---|---|
| [Line] button | Simple line(solid line)  |    | No alert  |
|               | Simple line(dotted line) |    | No alert  |
|               | Simple line(dashed line) |    | No alert  |
|               | Circle(solid line)       |    | No alert  |
|               | Circle(dotted line)      |    | No alert  |
|               | Circle(dashed line)      |   | No alert  |
|               | Eclipse(solid line)      |  | No alert  |
|               | Eclipse(dotted line)     |  | No alert  |
|               | Eclipse(dashed line)     |  | No alert  |
|               | Arc(solid line)          |  | No alert  |
|               | Arc(dotted line)         |  | No alert  |
|               | Arc(dashed line)         |  | No alert  |

| Button name   | Icon name                  | Icon display example  | Alert generated when the own ship approaches the object |
|---------------|----------------------------|---|---|
| [Line] button | Caution line               |    | Crossing a User defined Caution Object                  |
|               | Warning line               |    | Crossing a User defined Warning Object                  |
|               | Alert line                 |    | Crossing a User defined Alert Object                    |
|               | Arrow(Start To End/Small)  |    | No alert  |
|               | Arrow(Start To End/Medium) |    | No alert  |
|               | Arrow(Start To End/Large)  |   | No alert  |
|               | Arrow(End To Start/Small)  |  | No alert  |
|               | Arrow(End To Start/Medium) |  | No alert  |
|               | Arrow(End To Start/Large)  |  | No alert  |
|               | Arrow(Both Direct/Small)   |  | No alert  |
|               | Arrow(Both Direct/Medium)  |  | No alert  |
|               | Arrow(Both Direct/Large)   |  | No alert  |

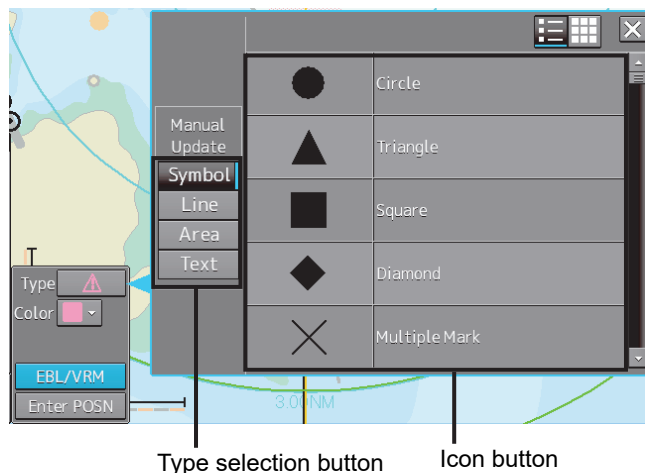
| Button name   | Icon name            | Icon display example  | Alert generated when the own ship approaches the object |
|---------------|----------------------|---|---|
| [Area] button | Polygon(solid line)  |    | No alert  |
|               | Polygon(dotted line) |    | No alert  |
|               | Polygon(dashed line) |    | No alert  |
|               | Circle(solid line)   |    | No alert  |
|               | Circle(dotted line)  |    | No alert  |
|               | Circle(dashed line)  |   | No alert  |
|               | Eclipse(solid line)  |  | No alert  |
|               | Eclipse(dotted line) |  | No alert  |
|               | Eclipse(dashed line) |  | No alert  |
|               | Fan(solid line)      |  | No alert  |
|               | Fan(dotted line)     |  | No alert  |
|               | Fan(dashed line)     |  | No alert  |

| Button name   | Icon name                      | Icon display example  | Alert generated when the own ship approaches the object |
|---------------|--------------------------------|---|---|
| [Area] button | Caution Detection(solid line)  |    | Crossing a User defined Caution Object                  |
|               | Caution Detection(dotted line) |    | Crossing a User defined Caution Object                  |
|               | Caution Detection(dashed line) |    | Crossing a User defined Caution Object                  |
|               | Warning Detection(solid line)  |    | Crossing a User defined Warning Object                  |
|               | Warning Detection(dotted line) |    | Crossing a User defined Warning Object                  |
|               | Warning Detection(dashed line) |   | Crossing a User defined Warning Object                  |
|               | Alarm Detection(solid line)    |  | Crossing a User defined Alarm Object                    |
|               | Alarm Detection(dotted line)   |  | Crossing a User defined Alarm Object                    |
|               | Alarm Detection(dashed line)   |  | Crossing a User defined Alarm Object                    |
| [Text] button | Text                           |  | No alert  |

## D.6 Icon Button List for Manual Update (S-57)

The lists of icon buttons that are used for user chart manual update are provided below.

### How to reference the lists



Icon buttons are displayed in list format

### [List categories]

Lists are classified by "Type Selection Button".

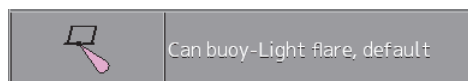
- For [Symbol] type icon buttons, refer to "D.6.1 Symbol".

For [Line] type icon buttons, refer to "0"

- Line".
- For [Area] type icon buttons, refer to "D.6.3 Area".

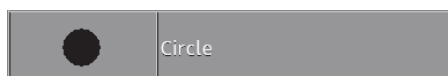
### [Names displayed when tooltip of the icon button and the icon button display list are displayed]

The name of the icon button is displayed under "category name-object name". For instance, when the category name is Can buoy and the object name is Light-flare, default, the name is displayed as Can buoy-Light-flare, default.























### Exception


- When the category name in the list is enclosed by parentheses, only the object name is displayed without displaying the category name. For instance, when the category name is (General) and the object name is Circle, Circle is displayed.








- When the object name of the list is "(No object)", only the category name is displayed. For instance, when the category name is Barrel buoy and the object name is "(No object)", Barrel buoy is displayed.

























## D.6.1 Symbol

| Object name                     | Icon button display example   | Remarks |
|---------------------------------|---|---------|
| Circle                          |    |         |
| Triangle                        |    |         |
| Square                          |    |         |
| Diamond                         |    |         |
| Multiple mark                   |    |         |
| Caution symbol                  |    |         |
| Warning symbol                  |   |         |
| Alert symbol                    |  |         |
| Airport/airfield                |  |         |
| Anchor berth                    |  |         |
| Anchorage area                  |  |         |
| Beacon, cardinal                |  |         |
| Beacon, isolated danger         |  |         |
| Beacon, lateral                 |  |         |
| Beacon, safe water              |  |         |
| Beacon, special purpose/general |  |         |
| Berth                           |  |         |
| Building, single                |  |         |
| Built-up area                   |  |         |
| Buoy, cardinal                  |  |         |



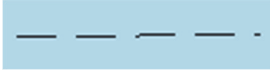











| Object name                   | Icon button display example   | Remarks |
|-------------------------------|---|---------|
| Buoy, installation            |    |         |
| Buoy, isolated danger         |    |         |
| Buoy, lateral                 |    |         |
| Buoy, safe water              |    |         |
| Buoy, special purpose/general |    |         |
| Cargo transshipment area      |    |         |
| Caution area                  |    |         |
| Checkpoint                    |    |         |
| Coastguard station            |    |         |
| Control point                 |    |         |
| Crane                         |    |         |
| Current - non-gravitational   |   |         |
| Dam                           |  |         |
| Daymark                       |  |         |
| Distance mark                 |  |         |
| Dumping ground                |  |         |
| Fishing facility              |  |         |
| Fog signal                    |  |         |
| Fortified structure           |  |         |
| Gate                          |  |         |
| Harbour facility              |  |         |
| Hulk                          |  |         |
| Incineration area             |  |         |
| Land area                     |  |         |
| Land elevation                |  |         |
| Land region                   |  |         |
| Landmark                      |  |         |
| Light                         |  |         |































| Object name                      | Icon button display example   | Remarks |
|----------------------------------|---|---------|
| Light float                      |    |         |
| Light vessel                     |    |         |
| Local magnetic anomaly           |    |         |
| Log pond                         |    |         |
| Magnetic variation               |    |         |
| Marine farm/culture              |    |         |
| Military practice area           |    |         |
| Mooring/Warping facility         |    |         |
| Nautical publication information |   |         |
| New Object                       |  |         |
| Obstruction                      |  |         |
| Offshore platform                |  |         |
| Pile                             |  |         |
| Pilot boarding place             |  |         |
| Pipeline area                    |  |         |
| Precautionary area               |  |         |
| Production/storage area          |  |         |
| Pylon/bridge support             |  |         |
| Radar reflector                  |  |         |
| Radar station                    |  |         |
| Radar transponder beacon         |  |         |
| Radio calling-in point           |  |         |
| Radio station                    |  |         |
| Recommended traffic lane part    |  |         |
| Rescue station                   |  |         |















| Object name                            | Icon button display example   | Remarks |
|--|---|---------|
| Retro-reflector                        |    |         |
| Sand waves                             |    |         |
| Sea area/named water area              | <b>Text</b>   |         |
| Seabed area                            | <b>mud</b>  |         |
| Sea-plane landing area                 |    |         |
| Shoreline construction                 |    |         |
| Signal station, traffic                |    |         |
| Signal station, warning                |    |         |
| Silo/tank                              |    |         |
| Slope topline                          |    |         |
| Sloping ground                         |    |         |
| Small craft facility                   |    |         |
| Sounding                               |  |         |
| Spring                                 | <b>T</b>  |         |
| Tidal stream - flood/ebb               |  |         |
| Tidal stream - harmonic prediction     |  |         |
| Tidal stream - non-harmonic prediction |  |         |
| Tidal stream - time series             |  |         |
| Tidal stream panel data                |  |         |
| Tide - harmonic prediction             |  |         |
| Tide - non-harmonic prediction         |  |         |
| Tide - time series                     |  |         |
| Topmark                                |  |         |
| Underwater/awash rock                  |  |         |
| Vegetation                             |  |         |
| Water turbulence                       |  |         |
| Weed/Kelp                              |  |         |
| Wreck                                  | <b>#</b>  |         |









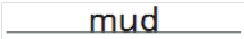






## D.6.2 Line





| Object name              | Icon button display example   | Remarks |
|--------------------------|---|---------|
| Simple line(solid line)  |    |         |
| Simple line(dotted line) |    |         |
| Simple line(dashed line) |    |         |
| Circle(solid line)       |    |         |
| Circle(dotted line)      |    |         |
| Circle(dashed line)      |   |         |
| Eclipse(solid line)      |  |         |
| Eclipse(dotted line)     |  |         |
| Eclipse(dashed line)     |  |         |
| Arc(solid line)          |  |         |
| Arc(dotted line)         |  |         |
| Arc(dashed line)         |  |         |
| Caution line             |  |         |
| Warning line             |  |         |

| Object name                | Icon button display example   | Remarks                               |
|----------------------------|---|---------------------------------------|
| Alert line                 |    |                                       |
| Arrow(Start To End/Small)  |    |                                       |
| Arrow(Start To End/Medium) |    |                                       |
| Arrow(Start To End/Large)  |    |                                       |
| Arrow(End To Start/Small)  |    |                                       |
| Arrow(End To Start/Medium) |    |                                       |
| Arrow(End To Start/Large)  |  |                                       |
| Arrow(Both Direct/Small)   |  |                                       |
| Arrow(Both Direct/Medium)  |  |                                       |
| Arrow(Both Direct/Large)   |  |                                       |
| Archipelagic Sea Lane Axis |  |                                       |
| Berth                      |  |                                       |
| Bridge                     |  | Object name attribute value is "Text" |
| Cable, overhead            |  |                                       |

| Object name                 | Icon button display example   | Remarks                                      |
|-----------------------------|---|--|
| Cable, submarine            |    |  |
| Canal                       |    |  |
| Causeway                    |    |  |
| Conveyor                    |   | Vertical clearance attribute value is "Text" |
| Dam                         |    |  |
| Deep water route centerline |    | Orientation attribute value is "Text"        |
| Dyke                        |   |  |
| Fence/wall                  |  |  |
| Ferry route                 |  |  |
| Fishing facility            |  |  |
| Floating dock               |  |  |
| Fortified structure         |  |  |
| Gate                        |  |  |
| Land area                   | <b>Text</b>   | Object name attribute value is "Text"        |
| Land elevation              |  |  |












| Object name                 | Icon button display example   | Remarks                                      |
|-----------------------------|---|--|
| Landmark                    |    |  |
| Local magnetic anomaly      |    |  |
| Magnetic variation          |    |  |
| Marine farm/culture         |    |  |
| Mooring/Warping facility    |    |  |
| Navigation line             |    |  |
| New Object                  |  |  |
| Obstruction                 |  |  |
| Oil barrier                 |  |  |
| Pipeline, overhead          |  | Vertical clearance attribute value is "Text" |
| Pipeline, submarine/on land |  |  |
| Pontoon                     |  |  |
| Radar line                  |  | Orientation attribute value is "Text"        |
| Radio calling-in point      |  |  |











| Object name                        | Icon button display example   | Remarks                                    |
|------------------------------------|---|--|
| Railway                            |    |  |
| Rapids                             |    |  |
| Recommended route centerline       |    | Orientation attribute value is "Text"      |
| Recommended track                  |    | Orientation attribute value is "Text"      |
| River                              |    |  |
| Road                               |    |  |
| Runway                             |   |  |
| Sand waves                         |  |  |
| Seabed area                        |  | Nature of surface attribute value is "mud" |
| Shoreline construction             |  |  |
| Slope topline                      |  |  |
| Straight territorial sea baseline  |  |  |
| Tideway                            |  |  |
| Traffic separation line            |  |  |
| Traffic separation scheme boundary |  |  |


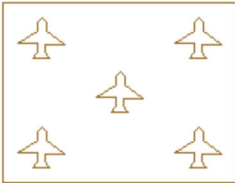
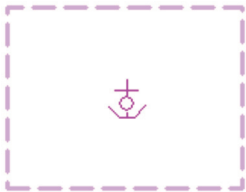
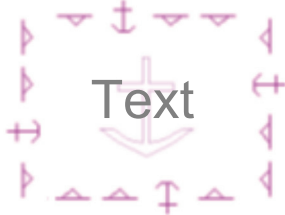



| Object name      | Icon button<br>display example  | Remarks |
|------------------|---|---------|
| Tunnel           |  |         |
| Vegetation       |  |         |
| Water turbulence |  |         |
| Waterfall        |  |         |






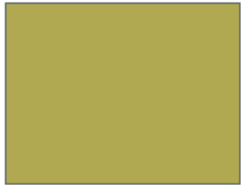






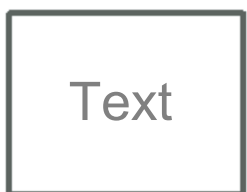



### D.6.3 Area


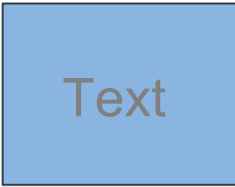




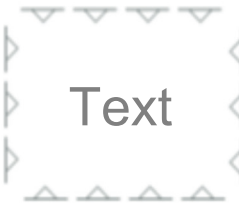
| Object name          | Icon button display example   | Remarks |
|----------------------|---|---------|
| Polygon(solid line)  |    |         |
| Polygon(dotted line) |    |         |
| Polygon(dashed line) |    |         |
| Circle(solid line)   |    |         |
| Circle(dotted line)  |  |         |
| Circle(dashed line)  |  |         |
| Eclipse(solid line)  |  |         |
| Eclipse(dotted line) |  |         |
| Eclipse(dashed line) |  |         |
| Fan(solid line)      |  |         |
| Fan(dotted line)     |  |         |








| Object name                     | Icon button display example   | Remarks                         |
|---------------------------------|---|---------------------------------|
| Fan(dashed line)                |    |                                 |
| Caution Detection(solid line)   |    | Caution Detection(solid line)   |
| Caution Detection(dotted line)  |    | Caution Detection(dotted line)  |
| Caution Detection(dashed line)  |    | Caution Detection(dashed line)  |
| Warning Detection (solid line)  |   | Warning Detection (solid line)  |
| Warning Detection (dotted line) |  | Warning Detection (dotted line) |
| Warning Detection (dashed line) |  | Warning Detection (dashed line) |
| Alert Detection(solid line)     |  | Alert Detection(solid line)     |
| Alert Detection(dotted line)    |  | Alert Detection(dotted line)    |
| Alert Detection(dashed line)    |  | Alert Detection(dashed line)    |




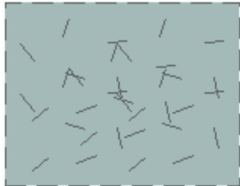



| Object name                 | Icon button display example   | Remarks                               |
|-----------------------------|---|---------------------------------------|
| Administration Area (Named) |    |                                       |
| Airport/airfield            |    |                                       |
| Anchor berth                |    |                                       |
| Anchorage area              |  | Object name attribute value is "Text" |
| Archipelagic Sea Lane       |  |                                       |
| Berth                       |  | Object name attribute value is "Text" |
| Bridge                      |  | Object name attribute value is "Text" |

| Object name             | Icon button display example   | Remarks                               |
|-------------------------|---|---------------------------------------|
| Building, single        |    |                                       |
| Built-up area           |    | Object name attribute value is "Text" |
| Cable area              |    |                                       |
| Canal                   |  |                                       |
| Cargo transhipment area |  |                                       |
| Causeway                |  |                                       |
| Caution area            |  |                                       |







| Object name            | Icon button display example   | Remarks                                      |
|------------------------|---|--|
| Checkpoint             |    |  |
| Contiguous zone        |    |  |
| Continental shelf area |    |  |
| Conveyor               |   | Vertical clearance attribute value is "Text" |
| Crane                  |  |  |
| Custom zone            |  |  |
| Dam                    |  |  |







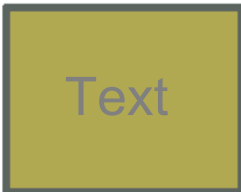
| Object name             | Icon button display example   | Remarks                               |
|-------------------------|---|---------------------------------------|
| Deep water route part   |    |                                       |
| Dock area               |    | Object name attribute value is "Text" |
| Dry dock                |    |                                       |
| Dumping ground          |  |                                       |
| Dyke                    |  |                                       |
| Exclusive economic zone |  |                                       |
| Fairway                 |  | Object name attribute value is "Text" |








| Object name         | Icon button display example   | Remarks |
|---------------------|---|---------|
| Ferry route         |    |         |
| Fishery zone        |    |         |
| Fishing facility    |    |         |
| Fishing ground      |  |         |
| Fortified structure |  |         |
| Free port area      |  |         |
| Gate                |  |         |








| Object name                   | Icon button display example   | Remarks |
|-------------------------------|---|---------|
| Gridiron                      |    |         |
| Harbour area (administrative) |    |         |
| Harbour facility              |    |         |
| Ice area                      |   |         |
| Incineration area             |  |         |
| Inshore traffic zone          |  |         |
| Lake                          |  |         |








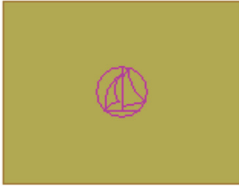






| Object name            | Icon button display example   | Remarks                               |
|------------------------|---|---------------------------------------|
| Land region            | <b>Text</b>   | Object name attribute value is "Text" |
| Landmark               |    |                                       |
| Local magnetic anomaly |    |                                       |
| Lock basin             |   |                                       |
| Log pond               |  |                                       |
| Magnetic variation     |  |                                       |
| Marine farm/culture    |  |                                       |








| Object name                      | Icon button display example   | Remarks                               |
|----------------------------------|---|---------------------------------------|
| Military practice area           |    |                                       |
| Mooring/Warping facility         |    |                                       |
| Nautical publication information |    |                                       |
| Navigational system of marks     |  |                                       |
| New Object                       |  |                                       |
| Obstruction                      |  |                                       |
| Offshore platform                |  | Object name attribute value is "Text" |








| Object name              | Icon button display example   | Remarks |
|--------------------------|---|---------|
| Offshore production area |    |         |
| Pilot boarding place     |    |         |
| Pipeline area            |    |         |
| Precautionary area       |  |         |
| Production/storage area  |  |         |
| Pylon/bridge support     |  |         |
| Radar range              |  |         |

| Object name                   | Icon button display example   | Remarks |
|-------------------------------|---|---------|
| Rapids                        |    |         |
| Recommended track             |    |         |
| Recommended traffic lane part |    |         |
| Restricted area               |  |         |
| River                         |  |         |
| Road                          |  |         |
| Runway                        |  |         |



| Object name               | Icon button display example   | Remarks                                    |
|---------------------------|---|--|
| Sand waves                |    |  |
| Sea area/named water area | <b>Text</b>   | Object name attribute value is "Text"      |
| Seabed area               | <b>mud</b>  | Nature of surface attribute value is "mud" |
| Sea-plane landing area    |   |  |
| Shoreline construction    |  |  |
| Silo/tank                 |  |  |
| Sloping ground            |  |  |

| Object name                            | Icon button display example   | Remarks  |
|--|---|--|
| Small craft facility                   |    |  |
| Submarine transit lane                 |    |  |
| Swept Area                             |    | Depth range value 1<br>attribute value is "Text" |
| Territorial sea area                   |  |  |
| Tidal stream - flood/ebb               |  |  |
| Tidal stream - harmonic prediction     |  |  |
| Tidal stream - non-harmonic prediction |  |  |

| Object name                        | Icon button display example   | Remarks                               |
|------------------------------------|---|---------------------------------------|
| Tidal stream - time series         |    |                                       |
| Tidal stream panel data            |    |                                       |
| Tide - harmonic prediction         |   |                                       |
| Tide - non-harmonic prediction     |  |                                       |
| Tide - time series                 |  |                                       |
| Tideway                            |  | Object name attribute value is "Text" |
| Traffic separation scheme crossing |  |                                       |


| Object name                          | Icon button display example   | Remarks |
|--------------------------------------|---|---------|
| Traffic separation scheme lane part  |    |         |
| Traffic separation scheme roundabout |    |         |
| Traffic separation zone              |    |         |
| Tunnel                               |  |         |
| Two-way route part                   |  |         |
| Vegetation                           |  |         |
| Water turbulence                     |  |         |



| Object name | Icon button display example   | Remarks |
|-------------|---|---------|
| Weed/Kelp   |  |         |
| Wreck       |  |         |

---

## D.6.4 Text

| Object name | Icon button<br>display example  | Remarks |
|-------------|---|---------|
| Text        |  |         |

---

## D.6.5 ENC object attributes

The input rules of the ENC object attributes that are handled by manual update are specified in “S-57 Appendix A Chapter 2 – Attributes”. The following six types of ENC object attributes are available.

| Attribute type    |   |
|-------------------|---|
| enumerated('E')   | One option can be selected from the options.                                  |
| list('L')         | Although this type is the same as enumerated, multiple items can be selected. |
| float('F')        | Decimal digits can be input.  |
| integer('I')      | Integers can be input.  |
| coded string('A') | Free text   |
| free text('S')    | Free text   |

To display an object correctly in manual update, the input must comply with the specification indicated in “S-57 Appendix A Chapter 2 - Attributes”.

For types 'E', 'L', and 'F', the options and the input range are displayed in the input dialog. For types 'A' and 'S', input the values according to the rules that are provided below.

---

### **Attribute:** Communication channel

**Acronym:** COMCHA

**Code:** 77

**Attribute type:** A

#### **Definition:**

A channel number assigned to a specific radio frequency, frequencies or frequency band.

#### **Expected input:**

enter specific VHF-Channel

References:

INT 1: IM 40;

M-4: 488;

The attribute 'communication channel' encodes the various VHF-channels used for communication.

#### **Indication:**

Each VHF-channel should be indicated by 2 digits and up to 2 characters (A-Z);

e.g. VHF-channel 7 -> > 07'

VHF-channel 16 -> > 16';

The indication of several VHF-channels is possible;

#### **Format:**

[XXXX];[XXXX];...

---

**Attribute: Date end**

**Acronym: DATEND**

**Code: 85**

**Attribute type: A**

**Indication:**

the 'date, end' should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month

(MM) (e.g. April = 04) and 2 digits for the day (DD), according to ISO 8601: 1988.

**Format:**

CCYYMMDD (mandatory)

**Example:**

19961007 for 07 October 1996 as ending date.

**Remarks:**

The attribute 'date end' indicates the latest date on which an object (e.g. a buoy) will be present.

This attribute is to be used to indicate the removal or cancellation of an object at a specific date in the

future. See also 'periodic date end'

---

**Attribute: Date start**

**Acronym: DATSTA**

**Code: 86**

**Attribute type: A**

**Indication:**

The 'date, start' should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month

(MM) (e.g. April = 04) and 2 digits for the day (DD), according to ISO 8601: 1988.

**Format:**

CCYYMMDD (mandatory)

**Example:**

19960822 for 22 August 1996 as starting date.

**Remarks:**

The attribute 'date, start' indicates the earliest date on which an object (e.g. a buoy) will be present.

This attribute is to be used to indicate the deployment or implementation of an object at a specific date

in the future. See also 'periodic date start'.

---

---

**Attribute: Nationality**

**Acronym:** NATION

**Code:** 111

**Attribute type:** A

**Indication:**

the nationality is encoded by a 2 character- code following ISO 3166 (refer to Annex A to S-57 Appendix A);

**Format:**

c2 (mandatory)

**Remarks:**

The attribute 'nationality' indicates the nationality of the specific object.

---

**Attribute: Periodic date end**

**Acronym:** PEREND

**Code:** 118

**Attribute type:** A

**Definition:**

The end of the active period for a seasonal object (e.g. a buoy). See also 'date end'.

**References:**

INT 1: IQ71;

M-4: 460.5;

**Indication:**

the 'periodic date end' should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the

month (MM) (e.g. April = 04) and 2 digits for the day (DD). When no specific year is required (ie the

object is removed at the same time each year) the following two cases may be considered:

- same day each year: --MMDD

- same month each year: --MM

This conforms to ISO 8601: 1988.

**Format:**

CCYYMMDD (full date, **mandatory**)

--MMDD (same day each year, **mandatory**)

--MM (same month each year, **mandatory**)

**Example:**

--1015 for an ending date of 15 October each year.

**Remarks:**

No remarks.

---

---

**Attribute: Periodic date start**

**Acronym:** PERSTA

**Code:** 119

**Attribute type:** A

**Definition:**

The start of the active period for a seasonal object (e.g. a buoy). See also 'date start'.

**References:**

INT 1: IQ71;

M-4: 460.5;

**Indication:**

the 'periodic date, start' should be encoded using 4 digits for the calendar year (CCYY), 2 digits for

the month (MM) (e.g. April = 04) and 2 digits for the day (DD). When no specific year is required (ie

the object is deployed at the same time each year) the following two cases may be considered:

- same day each year: --MMDD

- same month each year: --MM

This conforms to ISO 8601: 1988.

**Format:**

CCYYMMDD (full date, **mandatory**)

--MMDD (same day each year, **mandatory**)

--MM (same month each year, **mandatory**)

**Example:**

--04 for an operation starting in April each year.

**Remarks:**

No remarks.

---

**Attribute: Radar wave length**

**Acronym:** RADWAL

**Code:** 126

**Attribute type:** A

**Definition:**

The distance between two successive peaks (or other points of identical phase) on an electromagnetic wave in the radar band of the electromagnetic spectrum.

**References:**

INT 1: IS 3.1-4;

M-4: 486.3-4;

---

**Indication:**

the wavelength and the band code character is indicated;

In the case where two bands should be encoded, these should be separated by a comma.

Unit : m

resolution: 0.01 m

**Format:**

**V.VV-B**

**V.VV-B,V.VV-B**

'VV.VV' encodes the value of wavelength.

'B' encodes the band;

each separated by a hyphen ('-')

**Example:**

the radar transponder beacon wavelength '3cm (X) - Band' is indicated as '0.03-X'

**Remarks:**

The attribute 'radar transponder beacon wavelength' encodes the specific wavelength at which a radar

transponder beacon transmits.

Radar transponder beacons generally work on the following wavelengths:

- 3cm (X) - Band

- 10cm (S) - Band

Nevertheless, wavelengths outside the marine band are used.

---

**Attribute: Reference year for magnetic variation**

**Acronym: RYRMGV**

**Code: 130**

**Attribute type: A**

**Definition:**

The reference calendar year for magnetic variation values.

**References:**

INT 1: IB 68.1, 70-71;

M-4: 270;

**Indication:**

the 'reference calendar year for magnetic variation' should be encoded using a 4 digit year-indication

(CCYY).

**Format:**

**CCYY (mandatory)**

**Acronym: SIGGRP**

**Code: 141**

**Attribute type: A**

**Definition:**

The number of signals, the combination of signals or the morse character(s) within one period of full sequence.

**References:**

INT 1: IP 10.2-9; IR 20, 22;

M-4: 453; 453.1-4; 471.2;

**Indication:**

The signal group of a light is encoded using brackets to separate the individual groups. A group of

signals may be a single number, a chain of numbers separated by "+", a sequence of up to 4 letters

or a letter and a number.

A fixed light has no signal group.

Where no specific signal group is given for one of the light characteristics, this should be shown by

an empty pair of brackets.

**Format:**

(c)(c)...

**Examples:**

Light characteristic SIGGRP Indication

VQ(6)+LFI -> (6)(1)

FI+LFI (2+3) -> (1)(2+3)

FI(2)+Lfi(3) -> (2)(3)

FFI -> ()(1)

Mo(AA) -> (AA)

AIFI(2W+1R) -> (2+1)

AILFIWR -> (2)

FOcW -> ()(1)

AIOc(4)WR -> (4)



---

---

**Attribute: Signal sequence**

**Acronym:** SIGSEQ

**Code:** 143

**Attribute type:** A

**Definition:**

The sequence of times occupied by intervals of light and eclipse for all 'light characteristics' except

for occulting where the sequence of times is occupied by intervals of eclipse and light.

**Indication:**

Unit for value of intervals: second (s)

resolution: 0.01 s

**Format:**

LL.L + (EE.E)

**Example:**

00.8+(02.2)+00.8+(05.2)

The above example encodes a signal sequence with two intervals of light and two intervals of eclipse.

For occulting lights, the 'signal sequence' is indicated using a fixed format to encode the values of

intervals of eclipse (E) and (L).

**Format:**

(EE.E)+LL.L

**Example:**

(00.8)+02.2+(00.8)+05.2)

The above example encodes a signal sequence with two intervals of eclipse and two intervals of light.

**Remarks:**

The 'signal sequence' for all 'light characteristics' except for occulting is indicated using a fixed format

to encode the value of intervals of light (L) and eclipse (E).

---

**Attribute: Tidal stream - panel values**

**Acronym:** TS\_TSP

**Code:** 159

**Attribute type:** A

**Indication:**

The direction in degrees and velocity in knots are encoded in pairs. Each value separated by a comma.

---

**Example:**

63230,Darwin,HW,124,2.2,128,2.1,125,2.9,116,2.8,110,2.0,095,0.6,020,0.2,320,1.9,315,2.1,300,  
2.  
8,268,2.6,200,2.4,165,2.5

**Remarks:**

The attribute 'Tidal stream - panel values' encodes the identification of the reference station with reference water level and the direction of the flow and the springs rate from 6 hours before to 6 hours

after high water (HW) or low water (LW) at the reference station, at hourly intervals.

The relationship to a reference station is encoded using a collection object.

---

**Attribute: Tidal stream, current - time series values**

**Acronym:** TS\_TSV

**Code:** 160

**Attribute type:** A

**Indication:**

The direction in degrees and velocity in knots are encoded in pairs. Each value separated by a comma.

**Example:**

135,1.5,156,1.9,301,1.1,342,0.9

**Remarks:**

The attribute 'Tidal stream, current - time series values' encodes values for a direction and velocity  
time series.

---

**Attribute: Tide - high and low water values**

**Acronym:** T\_HWLW

**Code:** 162

**Attribute type:** A

**Indication:**

Dates/times and heights are to be encoded in pairs, each value separated by a comma.

The date/time should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month

(MM) (eg April = 04) and 2 digits for the day (DD), separated by a capital AT@ from the hour (hh) and

minutes (mm) which should each be encoded using 2 digits. This conforms to ISO 8601: 1988.

Seconds should not be used.

---

The height should be given in metres (xx.x) with a resolution of 0.1 metre.

**Format:**

CCYYMMDDThhmm,xx.x,CCYYMMDDThhmm,xx.x

**Example:**

19950428T1020,1.2,19950428T1455,4.8,...

**Remarks:**

The attribute 'tide - high and low water values' encodes information on the times and heights of high

and low waters for each day of the duration of the time series.

---

**Attribute: Tide - time and height differences**

**Acronym:** T\_THDF

**Code:** 164

**Attribute type:** A

**Indication:**

time difference in hours and minutes: " hhmm (according to ISO 8106: 1988)

height difference: metres (preceded with A-@ if negative value)

rate difference: knots (preceded with A-@ if negative value)

**Example:**

Tidal height: 63230, Darwin,-0040,-0.7,0.9

Tidal stream: 59060, Cairns,+0130,1.2,-0.7

**Remarks:**

The attribute 'tide - time and height differences' encodes the time and tidal height or tidal stream rate

difference comparative to a reference station.

The format is the same for tides and tidal streams, with height difference being replaced by rate difference. The relation to a reference station is encoded by the use of a collection object.

The attribute is used to contain the identification of the reference station and , encoded in triplets,

mean time difference (+ or -), height or rate difference for mean high water or mean high rate (preceded with A-@ if negative value), height or rate difference for mean low water or mean low rate

(preceded with A-@ if negative value), each value separated by a comma.

---

**Attribute: Time end**

**Acronym:** TIMEND

**Code:** 168

**Attribute type:** A

---

**Indication:**

The 'time end' will consist of a date and a time separated by a capital AT@. The date should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and

2 digits for the day (DD). The time should be encoded using 2 digits for the hour (hh), 2 digits for the

minutes (mm) and 2 digits for the seconds (ss). This conforms to ISO 8601: 1988.

**Format:**

CCYYMMDDThhmmss (**mandatory**)

**Example:**

19940426T094500 for a period ending at 09:45 am on 26 April 1994.

**Remarks:**

The attribute 'time end' indicates the end of a active period.

---

**Attribute: Time start**

**Acronym:** TIMSTA

**Code:** 169

**Attribute type:** A

**Indication:**

The 'time start' will consist of a date and a time separated by a capital AT@. The date should be encoded using 4 digits for the calendar year (CCYY), 2 digits for the month (MM) (e.g. April = 04) and

2 digits for the day (DD). The time should be encoded using 2 digits for the hour (hh), 2 digits for the

minutes (mm) and 2 digits for the seconds (ss). This conforms to ISO 8601: 1988.

**Format:**

CCYYMMDDThhmmss (**mandatory**)

**Example:**

19940212T162000 for a period starting at 04:20 pm on 12 February 1994.

**Remarks:**

The attribute 'time start' indicates the start of an active period.

---

**Attribute: Call sign**

**Acronym:** CALSGN

**Code:** 6

**Attribute type:** S

**Definition:**

The designated call-sign of a radio station.

---

**References:**

INT 1: not specified;

M-4: not specified;

**Remarks:**

No remarks.

---

**Attribute: Object name**

**Acronym: OBJNAM**

**Code: 116**

**Attribute type: S**

**Definition:**

The individual name of an object.

**References:**

INT 1: ID 7, IF 19, IN 12.2-3;

M-4: 371; 323.1-2; 431.2-3; 431.5;

**Remarks:**

No remarks.

---

**Attribute: Pilot district**

**Acronym: PILDST**

**Code: 121**

**Attribute type: S**

**Definition:**

The area within which a particular pilotage service operates.

**References:**

INT 1: IT 1.2;

M-4: 491.1-2;

**Remarks:**

No remarks.

---

**Attribute: Object class definition**

**Acronym: CLSDEF**

**Code: 190**

**Attribute type: S**

**Definition:**

---

Specifies the defining characteristics of a 'new object'.

**Remarks:**

Identical definitions must be used for other instances of identical features being encoded.

The wording for the attribute CLSDEF must be approved by TSMAD before use.

---

**Attribute: Object class name**

**Acronym: CLSNAM**

**Code: 191**

**Attribute type: S**

**Definition:**

Specifies the descriptive name of a 'new object' feature object class.

**Remarks:**

All 'new objects' of the same class must share the same CLSNAM.

The wording for the attribute CLSNAM must be approved by TSMAD before use.

---

**Attribute: Object name in national language**

**Acronym: NOBJNM**

**Code: 301**

**Attribute type: S**

**References:**

INT 1: ID 7, IF 19, IN 12.2-3;

M-4: 371; 323.1-2; 431.2-3; 431.5;

**Indication:**

Name of object (c...):string of national language characters

**Format:**

C...

**Remarks:**

The attribute 'object name in national language' encodes the individual name of an object in the specified national language.

---

**Attribute: Pilot district in national language**

**Acronym: NPLDST**

**Code: 302**

**Attribute type: S**

**References:**

INT 1: IT 1.2;

M-4: 491.1-2;

---

**Indication:**

Pilot district (c...):string of national language characters

**Format:**

C...

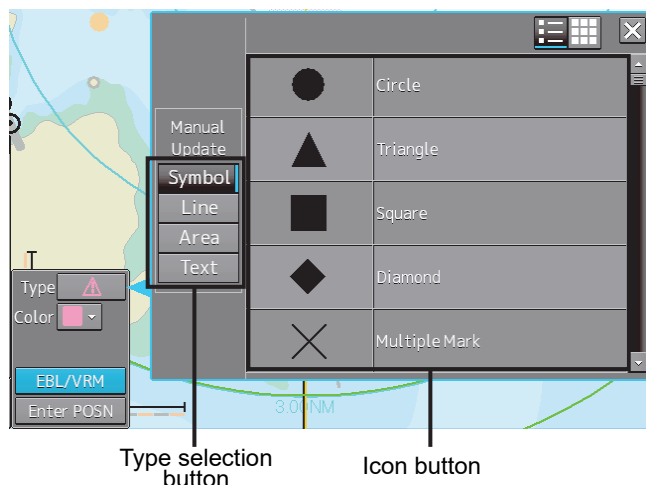
**Remarks:**

The attribute 'pilot district in national language' encodes the pilot district for which a pilot station is responsible in the specified national language.

## D.7 Manual Update Icon Button Lists (ARCS and C-MAP)

The icon buttons that are used for manual update of charts are shown below.

### How to reference the lists



Icon buttons are displayed in list format.

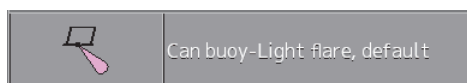
### [Classification of lists]

The lists are grouped based on the [Type Selection Button].

- For [Symbol] type icon buttons, refer to “Appendix D.6.1 Symbol”.
- For [Line] type icon buttons, refer to “Appendix D.6.2 Line”.
- For [Area] type icon buttons, refer to “Appendix D.6.3 Area”.

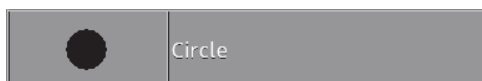
### [Names that are displayed when Tooltip and Icon buttons are displayed in list format]

An icon button name is displayed in the format of “category name – object name”. For instance, when the category name is ‘Can buoy’ and the object name is ‘Light-flare, default’, the icon button name is displayed as ‘Can buoy- Light-flare, default’.



### Exception

















- When the category name of the list is enclosed by parentheses, the category name is not displayed and only the object name is displayed. For instance, when the category name is (General) and the object name is Circle, only Circle is displayed.




































- When the object name of the list is “(No object)”, only the applicable category name is displayed. For instance, when the category name is Barrel buoy and the object name is “(No object)”, Barrel buoy is displayed.




































## D.7.1 Symbol

















| Category name   | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|-----------------|---------------------------|---|---|
| (General)       | Circle                    |    | No alert  |
|                 | Triangle                  |    | No alert  |
|                 | Square                    |    | No alert  |
|                 | Diamond                   |    | No alert  |
|                 | Multiple mark             |    | No alert  |
|                 | Warning symbol            |    | Crossing a danger (dangerous symbol)                    |
| (Manual Update) | Delete symbol             |  | No alert  |
| (Anchor)        | Anchor Point              |  | No alert  |
|                 | Anchorage Area            |  | No alert  |
|                 | Anchor Berth              |  | No alert  |
|                 | Anchor Prohibited Area    |  | No alert  |
| Barrel buoy     | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                 | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                 | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                 | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                 | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |

















| Category name              | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|----------------------------|---------------------------|---|---|
| Can buoy                   | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Conical buoy               | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, red          |   | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Installation buoy          | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Mooring buoy, barrel shape | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                            | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |

















| Category name                 | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|-------------------------------|---------------------------|---|---|
| Mooring buoy, barrel shape    | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Mooring buoy, can shape       | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Pillar buoy                   | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - Cone point up   | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - Cone point down | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                               | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |

| Category name                        | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|--------------------------------------|---------------------------|---|---|
| Pillar buoy - Cone point down        | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - 2 cones point upward   | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, white/yellow |   | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - 2 cones point downward | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - 2 cones base to base   | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |









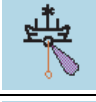
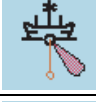
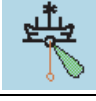





| Category name                        | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|--------------------------------------|---------------------------|---|---|
| Pillar buoy - 2 cones base to base   | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - 2 cones point to point | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - Sphere                 | (No object name)          |   | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - 2 spheres              | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                                      | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |

















| Category name                     | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|-----------------------------------|---------------------------|---|---|
| Pillar buoy - Cylinder            | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - Board               | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, red          |   | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - Cube point up       | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - Flag or other shape | (No object name)          |  | Crossing a danger (dangerous symbol)                    |

















| Category name                     | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|-----------------------------------|---------------------------|---|---|
| Pillar buoy - Flag or other shape | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - T-Shape             | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Pillar buoy - X-shape             | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Spherical buoy                    | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                                   | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
















| Category name     | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|-------------------|---------------------------|---|---|
| Spherical buoy    | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Spar buoy         | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, white/yellow |   | Crossing a danger (dangerous symbol)                    |
| Super-buoy        | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| LANBY, super-buoy | (No object name)          |  | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |



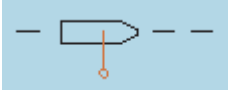































| Category name     | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|-------------------|---------------------------|---|---|
| LANBY, super-buoy | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Light float       | (No object name)          |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, default      |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, red          |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, green        |    | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, white/yellow |    | Crossing a danger (dangerous symbol)                    |
| Light vessel      | (No object name)          |   | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, default      |  | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, red          |  | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, green        |  | Crossing a danger (dangerous symbol)                    |
|                   | Light flare, white/yellow |  | Crossing a danger (dangerous symbol)                    |
| Beacon in general | (No object name)          |  | No alert  |
|                   | Cone point up             |  | No alert  |
|                   | Cone point down           |  | No alert  |
|                   | 2 cones point upward      |  | No alert  |







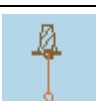
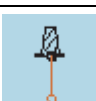







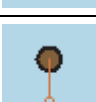
| Category name     | Object name            | Icon button display example   | Alert generated when the own ship approaches the object |
|-------------------|------------------------|---|---|
| Beacon in general | 2 cones point downward |    | No alert  |
|                   | 2 cones base to base   |    | No alert  |
|                   | 2 cones point to point |    | No alert  |
|                   | Sphere                 |    | No alert  |
|                   | 2 spheres              |    | No alert  |
|                   | Cylinder               |    | No alert  |
|                   | Board                  |   | No alert  |
|                   | Cube point up          |  | No alert  |
|                   | X-shape                |  | No alert  |
|                   | Upright cross          |  | No alert  |
|                   | Besom point down       |  | No alert  |
|                   | Besom point up         |  | No alert  |
|                   | T-shape                |  | No alert  |
| Lattice beacon    | (No object name)       |  | No alert  |
|                   | Cone point up          |  | No alert  |
|                   | Cone point down        |  | No alert  |

















| Category name  | Object name            | Icon button display example   | Alert generated when the own ship approaches the object |
|----------------|------------------------|---|---|
| Lattice beacon | 2 cones point upward   |    | No alert  |
|                | 2 cones point downward |    | No alert  |
|                | 2 cones base to base   |    | No alert  |
|                | 2 cones point to point |    | No alert  |
|                | Sphere                 |    | No alert  |
|                | 2 spheres              |    | No alert  |
|                | Cylinder               |    | No alert  |
|                | Board                  |  | No alert  |
|                | Cube point up          |  | No alert  |
|                | X-shape                |  | No alert  |
|                | Upright cross          |  | No alert  |
|                | Besom point down       |  | No alert  |
|                | Besom point up         |  | No alert  |
|                | T-shape                |  | No alert  |
| Beacon tower   | (No object name)       |  | No alert  |
|                | Cone point up          |  | No alert  |

| Category name | Object name            | Icon button display example   | Alert generated when the own ship approaches the object |
|---------------|------------------------|---|---|
| Beacon tower  | Cone point down        |    | No alert  |
|               | 2 cones point upward   |    | No alert  |
|               | 2 cones point downward |    | No alert  |
|               | 2 cones base to base   |    | No alert  |
|               | 2 cones point to point |    | No alert  |
|               | Sphere                 |    | No alert  |
|               | 2 spheres              |    | No alert  |
|               | Cylinder               |  | No alert  |
|               | Board                  |  | No alert  |
|               | Cube point up          |  | No alert  |
|               | X-shape                |  | No alert  |
|               | Upright cross          |  | No alert  |
|               | Besom point down       |  | No alert  |
|               | Besom point up         |  | No alert  |
|               | T-shape                |  | No alert  |















| Category name       | Object name                     | Icon button display example   | Alert generated when the own ship approaches the object |
|---------------------|---------------------------------|---|---|
| (Ports and Harbors) | Berth number                    |    | No alert  |
|                     | Ferry area                      |   | No alert  |
|                     | Cable ferry area                |   | No alert  |
|                     | Fortified structure             |    | No alert  |
|                     | Conspicuous fortified structure |    | No alert  |
|                     | Fish trap, fish weir, tunny net |    | No alert  |
|                     | Fish stakes                     |    | No alert  |
|                     | Fishing harbor                  |  | No alert  |
|                     | Marine farm/aquaculture         |  | No alert  |
|                     | RoRo terminal                   |  | No alert  |
|                     | Mooring dolphin                 |  | No alert  |
|                     | Deviation mooring dolphin       |  | No alert  |
|                     | Pile or bollard                 |  | No alert  |
|                     | Yacht harbor, marina            |  | No alert  |
| (Buildings)         | Airport                         |  | No alert  |
|                     | Opening bridge                  |  | No alert  |













| Category name | Object name                                       | Icon button display example   | Alert generated when the own ship approaches the object |
|---------------|---|---|---|
| (Buildings)   | Built-up area                                     |    | No alert  |
|               | Non-conspicuous religious building, Christian     |    | No alert  |
|               | Conspicuous religious building, Christian         |    | No alert  |
|               | Non-conspicuous religious building, non-Christian |    | No alert  |
|               | Conspicuous religious building, non-Christian     |    | No alert  |
|               | Minaret   |    | No alert  |
|               | Conspicuous minaret                               |    | No alert  |
|               | Single building                                   |   | No alert  |
|               | Conspicuous single building                       |  | No alert  |
|               | Cairn   |  | No alert  |
|               | Conspicuous cairn                                 |  | No alert  |
|               | Chimney   |  | No alert  |
|               | Conspicuous chimney                               |  | No alert  |
|               | Cranes  |  | No alert  |
|               | Dome  |  | No alert  |
|               | Conspicuous dome                                  |  | No alert  |

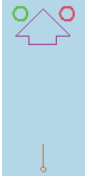













| Category name | Object name             | Icon button display example   | Alert generated when the own ship approaches the object |
|---------------|-------------------------|---|---|
| (Buildings)   | Dish aerial             |    | No alert  |
|               | Conspicuous dish aerial |    | No alert  |
|               | Flagstaff, flagpole     |    | No alert  |
|               | Flare stack             |    | No alert  |
|               | Conspicuous flare stack |    | No alert  |
|               | Hulk                    |    | No alert  |
|               | Monument                |    | No alert  |
|               | Conspicuous monument    |  | No alert  |
|               | Mast                    |  | No alert  |
|               | Conspicuous mast        |  | No alert  |
|               | Mine, quarry            |  | No alert  |
|               | Quarry                  |  | No alert  |
|               | Refinery                |  | No alert  |
|               | Conspicuous refinery    |  | No alert  |
|               | Silo                    |  | No alert  |
|               | Conspicuous silo        |  | No alert  |















| Category name | Object name                         | Icon button display example   | Alert generated when the own ship approaches the object |
|---------------|-------------------------------------|---|---|
| (Buildings)   | Timber yard                         |    | No alert  |
|               | Tank                                |    | No alert  |
|               | Conspicuous tank                    |    | No alert  |
|               | Tank farm                           |    | No alert  |
|               | Conspicuous tank farm               |    | No alert  |
|               | Tower                               |    | No alert  |
|               | Conspicuous tower                   |   | No alert  |
|               | Water tower                         |  | No alert  |
|               | Conspicuous water tower             |  | No alert  |
|               | Radio, television tower             |  | No alert  |
|               | Conspicuous radio, television tower |  | No alert  |
|               | Wind-motor                          |  | No alert  |
|               | Conspicuous wind-motor              |  | No alert  |
|               | Wind generator farm                 |  | No alert  |
|               | Conspicuous wind generator farm     |  | No alert  |
|               | Windmill                            |  | No alert  |









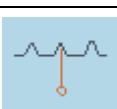






| Category name           | Object name   | Icon button display example   | Alert generated when the own ship approaches the object  |
|-------------------------|---|---|--|
| (Buildings)             | Conspicuous windmill                                |    | No alert   |
| (Artificial Feature)    | Navigable lock gate                                 |    | No alert   |
|                         | Non-navigable lock gate                             |    | No alert   |
|                         | Offshore platform                                   |    | No alert   |
| (Miscellaneous Station) | Coastguard station                                  |    | No alert   |
| (Caution)               | Rescue station                                      |    | No alert   |
|                         | Pilot station                                       |    | No alert   |
|                         | Signal station                                      |  | No alert   |
|                         | Mariner's information note                          |  | No alert   |
|                         | Mariner's caution note                              |  | No alert   |
| (Dangerous)             | Underwater hazard with a defined depth              |  | Crossing a danger (dangerous symbol)   |
|                         | Underwater hazard with depth greater than 20 metres |  | Crossing a danger (dangerous symbol)   |
|                         | Hazard on the surface                               |  | Crossing a danger (dangerous symbol)   |
|                         | Floating hazard to navigation                       |  | No alert<br>Because the object included in ENC does not change to "Isolated danger" depending on the safety contour.<br>This is defined in S-52. |



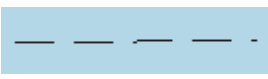













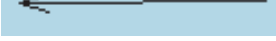
| Category name  | Object name  | Icon button display example   | Alert generated when the own ship approaches the object   |
|----------------|--|---|---|
| (Obstructions) | Isolated danger of depth less than the safety contour                                |    | Crossing a danger (dangerous symbol)  |
|                | Obstruction, depth not stated  |    | Crossing a danger (dangerous symbol)  |
|                | Obstruction in the intertidal area   |    | No alert<br>Because the object included in ENC does not change to "Isolated danger" depending on the safety contour. This is defined in S-52. |
|                | Obstruction  |    | Crossing a danger (dangerous symbol)  |
|                | Obstruction in the water which is always above water level                           |    | Crossing a danger (dangerous symbol)  |
|                | Dangerous underwater rock of uncertain depth   |    | Crossing a danger (dangerous symbol)  |
|                | Rock which covers and uncovers or is awash at low water                              |    | Crossing a danger (dangerous symbol)  |
|                | Wreck showing any portion of hull or superstructure at level of chart datum          |  | Crossing a danger (dangerous symbol)  |
|                | Non-dangerous wreck, depth unknown   |  | Crossing a danger (dangerous symbol)  |
|                | Dangerous wreck, depth unknown   |  | Crossing a danger (dangerous symbol)  |
|                | Direction of buoyage   |  | No alert  |
|                | Direction and color of buoyage for approaching harbor in IALA region A (red to port) |  | No alert  |










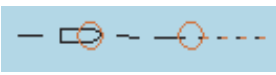






| Category name  | Object name   | Icon button display example   | Alert generated when the own ship approaches the object |
|----------------|---|---|---|
| (Obstructions) | Direction and color of buoyage for approaching harbor in IALA region B (green to port)                                  |    | No alert  |
|                | Fairway with one-way traffic in direction indicated   |    | No alert  |
|                | Fairway with two-way traffic  |    | No alert  |
|                | Inshore traffic   |    | No alert  |
|                | Recommended traffic direction between parts of a traffic separation scheme, or for ships not needing a deep water route |    | No alert  |
|                | Recommended two-way track as an area, based on fixed marks  |   | No alert  |
|                | Recommended one-way track as an area, based on fixed marks  |  | No alert  |
|                | Traffic roundabout  |  | No alert  |
|                | Reciprocal traffic directions in a two-way route of a traffic separation scheme   |  | No alert  |
|                | Single traffic direction in a two-way route part of a traffic separation scheme   |  | No alert  |
|                | Traffic crossing area   |  | No alert  |
|                | Part of deep water route  |  | No alert  |
| (Obstructions) | Reciprocal traffic directions in a two-way part of a deep-water route   |  | No alert  |
|                | Traffic direction in a one way lane of a traffic separation scheme  |  | No alert  |













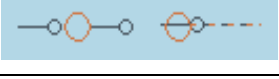

| Category name     | Object name  | Icon button display example   | Alert generated when the own ship approaches the object |
|-------------------|--|---|---|
| (Restricted Area) | Prohibited or restricted area                            |    | No alert  |
| (Fishing Ground)  | Fishing ground   |    | No alert  |
|                   | Fish haven   |    | No alert  |
|                   | Fishing or trawling is prohibited or restricted          |    | No alert  |
| (Radio/Radar)     | Radio calling-in point for traffic in one direction only |    | No alert  |
|                   | Radio calling-in point for traffic in both directions    |    | No alert  |
|                   | Radio station  |    | No alert  |
|                   | Radar transponder beacon                                 |  | No alert  |
|                   | Radar conspicuous  |  | No alert  |
|                   | Radar reflector  |  | No alert  |
|                   | Radar scanner  |  | No alert  |
|                   | Conspicuous radar scanner                                |  | No alert  |
|                   | Retro reflector  |  | No alert  |
| (Fog signal)      | Fog signal   |  | No alert  |

| Category name            | Object name   | Icon button display example   | Alert generated when the own ship approaches the object |
|--------------------------|---|---|---|
| (Local Magnetic anomaly) | Magnetic anomaly at a point                                   |    | No alert  |
|                          | Magnetic anomaly along a line or over an area                 |    | No alert  |
|                          | Magnetic variation at a point                                 |    | No alert  |
|                          | Magnetic variation along a line or over an area               |    | No alert  |
| (Natural Feature/Seabed) | Hill or mountain top  |    | No alert  |
|                          | Conspicuous hill or mountain top                              |   | No alert  |
|                          | Cable area  |  | No alert  |
|                          | Foul area of seabed safe for navigation but not for anchoring |  | No alert  |
|                          | Sand waves  |  | No alert  |
|                          | Spring  |  | No alert  |
|                          | Weed, kelp  |  | No alert  |
| (Unknown)                | ? Mark  |  | No alert  |
|                          | Generic Object  |  | No alert  |



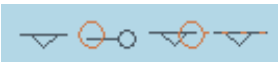


## D.7.2 Line

| Category name | Object name                | Icon button display example  | Alert generated when the own ship approaches the object |
|---------------|----------------------------|--|---|
| (General)     | Simple line(solid line)    |    | No alert  |
|               | Simple line(dotted line)   |    | No alert  |
|               | Simple line(dashed line)   |    | No alert  |
|               | Circle(solid line)         |     | No alert  |
|               | Circle(dotted line)        |     | No alert  |
|               | Circle(dashed line)        |     | No alert  |
|               | Eclipse(solid line)        |    | No alert  |
|               | Eclipse(dotted line)       |   | No alert  |
|               | Eclipse(dashed line)       |   | No alert  |
|               | Arc(solid line)            |   | No alert  |
|               | Arc(dotted line)           |   | No alert  |
|               | Arc(dashed line)           |   | No alert  |
|               | Warning line               |  | Dangerous line  |
|               | Arrow(Start To End/Small)  |  | No alert  |
|               | Arrow(Start To End/Medium) |  | No alert  |
|               | Arrow(Start To End/Large)  |   | No alert  |
|               | Arrow(End To Start/Small)  |  | No alert  |
















| Category name       | Object name   | Icon button display example  | Alert generated when the own ship approaches the object |
|---------------------|---|--|---|
| (General)           | Arrow(End To Start/Medium)                                      |    | No alert  |
|                     | Arrow(End To Start/Large)                                       |    | No alert  |
|                     | Arrow(Both Direct/Small)  |    | No alert  |
|                     | Arrow(Both Direct/Medium)                                       |    | No alert  |
|                     | Arrow(Both Direct/Large)  |    | No alert  |
| (Manual Update)     | Deletion by a manual update                                     |     | No alert  |
| (Anchor)            | Boundary of an anchorage area                                   |    | Dangerous line  |
|                     | Boundary of an area where anchoring is prohibited or restricted |   | Dangerous line  |
| (Ferry Routes)      | Ferry route   |  | No alert  |
|                     | Cable ferry route   |  | No alert  |
| (Ports and Harbors) | Fishing stakes  |  | No alert  |
| (Caution)           | Boundary of area with a specific caution                        |  | Dangerous line  |
|                     | Boundary of area to be navigated with caution                   |  | Dangerous line  |
| (Routes)            | Two-way deep water route centerline, based on fixed marks       |  | No alert  |
|                     | One-way deep water route centerline, based on fixed marks       |  | No alert  |
|                     | Boundary of a deep water route                                  |  | No alert  |

| Category name            | Object name   | Icon button display example  | Alert generated when the own ship approaches the object |
|--------------------------|---|--|---|
| (Routes)                 | Regulated two-way recommended route centerline, based on fixed marks      |    | No alert  |
|                          | Regulated one-way recommended route centerline, based on fixed marks      |    | No alert  |
|                          | Non-regulated recommended two-way track, based on fixed marks             |    | Dangerous line  |
|                          | Non-regulated recommended one-way track, based on fixed marks             |    | Dangerous line  |
|                          | Archipelagic Sea Lane   |    | No alert  |
| (Restricted Area)        | Boundary of an area where entry is prohibited or restricted               |   | Dangerous line  |
|                          | Boundary of a restricted area   |  | Dangerous line  |
| (Administrated Area)     | Jurisdiction boundary   |  | No alert  |
| (Fishing Ground)         | Boundary of an area where trawling or fishing is prohibited or restricted |  | Dangerous line  |
| (Cable/ Pipe)            | Boundary of a submarine cable area  |  | Dangerous line  |
|                          | Submarine cable   |  | No alert  |
|                          | Oil, gas pipeline, submerged or on land                                   |  | No alert  |
|                          | Water pipeline, sewer, etc.   |  | No alert  |
| (Miscellaneous Boundary) | Boundary between IALA-A and IALA-B systems of lateral buoys and beacons   |  | No alert  |




| Category name            | Object name   | Icon button display example  | Alert generated when the own ship approaches the object |
|--------------------------|---|--|---|
| (Miscellaneous Boundary) | Boundary of a navigation feature such as a fairway, magnetic anomaly, etc.  |  | Dangerous line  |
|                          | Boundary of a submarine pipeline area with potentially dangerous contents   |  | Dangerous line  |
|                          | Boundary of a submarine pipeline area with generally non-dangerous contents |  | No alert  |
| (Unknown)                | ? Mark  |  | No alert  |
|                          | Generic Object  |  | No alert  |

## D.7.3 Area

| Category name | Object name               | Icon button display example   | Alert generated when the own ship approaches the object |
|---------------|---------------------------|---|---|
| (General)     | Polygon(solid line)       |    | No alert  |
|               | Polygon(dotted line)      |    | No alert  |
|               | Polygon(dashed line)      |    | No alert  |
|               | Circle(solid line)        |    | No alert  |
|               | Circle(dotted line)       |    | No alert  |
|               | Circle(dashed line)       |    | No alert  |
|               | Eclipse(solid line)       |    | No alert  |
|               | Eclipse(dotted line)      |    | No alert  |
|               | Eclipse(dashed line)      |   | No alert  |
|               | Fan(solid line)           |  | No alert  |
|               | Fan(dotted line)          |  | No alert  |
|               | Fan(dashed line)          |  | No alert  |
|               | Warning Area(solid line)  |  | Dangerous area  |
|               | Warning Area(dotted line) |  | Dangerous area  |
|               | Warning Area(dashed line) |  | Dangerous area  |

---








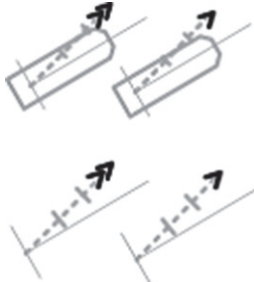

## D.7.4 Text


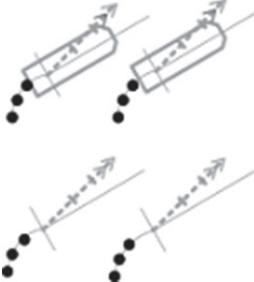
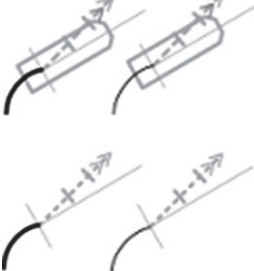
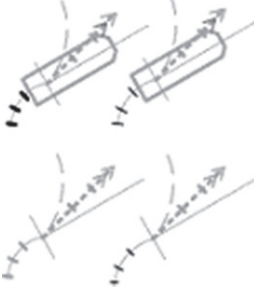

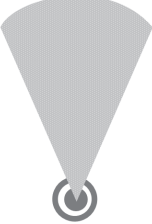
| Category name | Object name | Icon button display example   | Alert generated when the own ship approaches the object |
|---------------|-------------|---|---|
| (General)     | Text        |  | No alert  |

## D.8 List of Navigation-related Symbols

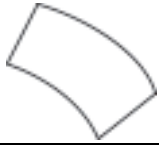
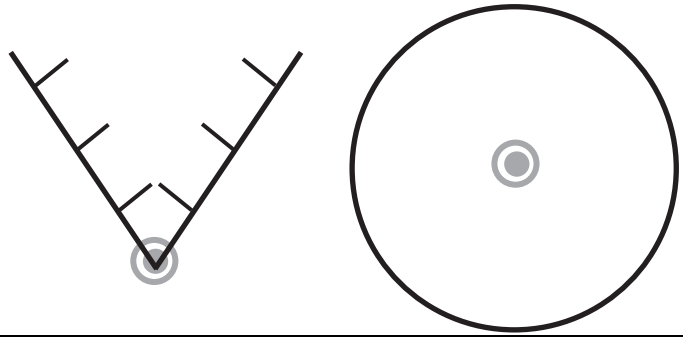
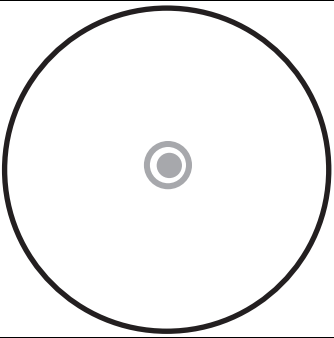
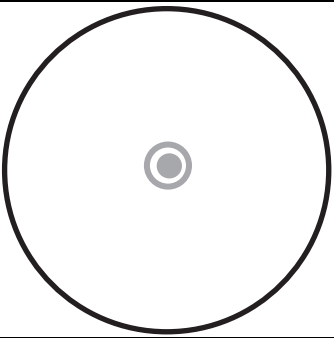

The navigation-related symbols that are displayed in this equipment are listed below.

### D.8.1 Related to own ship symbols

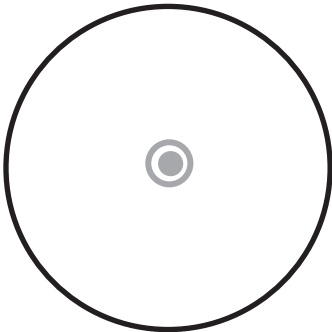


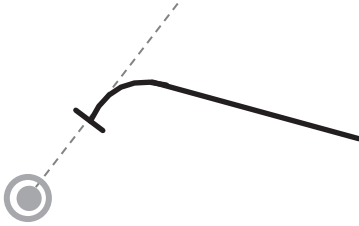
| No. | Drawn object name                     | Drawn object display example   |
|-----|---------------------------------------|--|
| 1   | Own ship symbol (True Scaled Outline) |     |
| 2   | Own ship symbol (Simplified Symbol)   |     |
| 3   | Radar antenna position                |    |
| 4   | Heading Line                          |    |
| 5   | Beam Line                             |   |
| 6   | Stern Line                            |  |
| 7   | Vector                                |  |
| 8   | Ground vector indicator               |  |
| 9   | Water vector indicator                |  |
| 10  | Own ship track Time Mark              |  |

| No. | Drawn object name                       | Drawn object display example   |
|-----|---|--|
| 11  | POS2 Symbol                             |    |
| 12  | PastPOSN                                |    |
| 13  | Own ship track                          |    |
| 14  | Vector Time Mark                        |   |
| 15  | Vector Area (Anti-grounding monitoring) |   |
| 16  | Sector Area (Anti-grounding monitoring) |  |




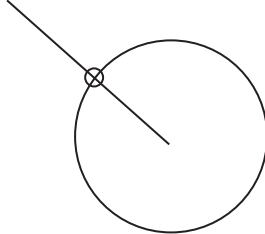


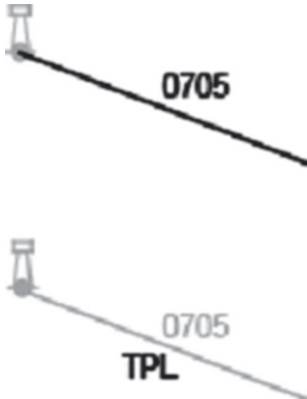
## D.8.2 TT/AIS related

| No. | Drawn object name                | Drawn object display example   |
|-----|----------------------------------|--|
| 1   | AZ                               |     |
| 2   | AIS Filter                       |    |
| 3   | CPA Ring<br>*Thin red circle     |   |
| 4   | Limit Ring<br>*Thin green circle |  |
| 5   | Sector Blank                     |  |




## D.8.3 Navigation monitoring related

| No. | Drawn object name                                      | Drawn object display example   |
|-----|--|--|
| 1   | Dredging anchor monitoring circle<br>*Thick red circle |    |
| 2   | WPT  |    |
|     | Routes   |  |
| 3   | EBL Maneuver   |  |

## D.8.4 Tool related

| No. | Drawn object name                                  | Drawn object display example   |
|-----|--|--|
| 1   | Range Ring   |    |
| 2   | EBL  |    |
| 3   | VRM  |    |
| 4   | Node Fixed EBL/VRM<br>*Thin orange line and circle |   |
| 5   | PI   |  |
| 6   | MOB  |   |
| 7   | LOP  |  |






























| No. | Drawn object name | Drawn object display example   |
|-----|-------------------|--|
| 8   | Plotted Position  | <p>1115<br/>  GNSS</p> <p>1115<br/>  GNSS<br/> EP</p> <p>1115<br/>  GNSS<br/> DR</p> |














## D.9 List of Icons/Icon Buttons



















The icons/icon buttons displayed in this equipment are listed below.
















| No. | Name               | Functional outline   | Displayed image |
|-----|--------------------|--|-----------------|
| 1   | Active indicator   | Indicates that the computer is processing by an animation.   |                 |
| 2   | Delete             | Deletes the item.  |                 |
| 3   | Check again        | Checks the contents being displayed again.   |                 |
| 4   | Setting mark       | Displayed when the operation is valid. (E.g., Latitude and longitude offset of chart)  |                 |
| 5   | Drive              | Displayed at the left of the name when a drive is selected.  |                 |
| 6   | Folder             | Displayed at the left of the name when a folder is selected.   |                 |
| 7   | Home               | Changes from the currently displayed screen to the home screen.  |                 |
| 8   | Close              | Closes the dialog box.   |                 |
| 9   | Date selection     | Displays the calendar picker.  |                 |
| 10  | Dialog box display | Opens another dialog box. (E.g., [Route selection] dialog)   |                 |
| 11  | Day/Night          | Displays the state of the current Day/Night setting by an icon.  |                 |
| 12  | Screen brightness  | Enables adjustment of the screen brightness.   |                 |
| 13  | Panel brightness   | Enables adjustment of the brightness of operation unit.  |                 |
| 14  | MOB                | Starts the MOB (Man Over Board) mode.<br>In the MOB mode, a symbol display of the position of the sailor falling over board and a dotted line connecting it to the own ship are displayed graphically. |                 |

| No. | Name                       | Functional outline   | Displayed image  |
|-----|----------------------------|--|--|
| 15  | Message notification       | When there is a message from outside (AIS safety related messages, etc.), the number of messages is displayed in a badge over the icon.<br>The message window is displayed when the icon is clicked. |    |
| 16  | Menu                       | "Menu" button with freeze indicator function.<br>Displays the menu.<br>Indicates using animation that the system is operating.   |    |
| 17  | Writing tool               | Changes to the writing mode, which includes user chart creation [a)], manual updating [b)] and route creation [c)]. Label of icon changes according to drawing mode.                                 |   <br>a)                  b)                  c) |
| 18  | Cursor mode selection      | Changes the cursor mode to AUTO mode.  |    |
| 19  | Undo                       | Executes an undo operation.  |    |
| 20  | Screen capture             | Creates the capture image at the time this is pressed.   |    |
| 21  | Eraser tool                | Changes to the user chart deleting mode, and user charts can be deleted successively.  |    |
| 22  | Silencing                  | Silences the alert sound.  |    |
| 23  | Multiple knob (small knob) | Displays the functions assigned to the multiple knob. Displayed as an icon with the function name at left.   |    |
| 24  | Brightness                 | Sets the brightness of the screen.   |    |
| 25  | Cursor information display | Displays the cursor read out information area. When pressed again, the cursor read out information area is closed.   |    |
| 26  | Page selection             | The [Page Selection] dialog box is displayed.  |    |
| 27  | Add page                   | (Only in the case of ECDIS)<br>Displays the [Page Selection] dialog box.   |    |

| No. | Name             | Functional outline   | Displayed image  |
|-----|------------------|--|--|
| 28  | Expand List      | Displays the TT/AIS list of the standard mode newly in an expanded window.   |    |
| 29  | Standard List    | Closes the expand mode TT/AIS list (separate window), and displays in the standard mode (information monitoring window pane)   |    |
| 30  | Standard AIS     | Changes to standard AIS display.   |     |
| 31  | Expand AIS       | Changes to expanded AIS display.   |     |
| 32  | Route Planning   | Opens the dialog box for preparing the route.<br>Route preparation is done by editing the table and graphic editing using the cursor.  |    |
| 33  | Route Monitoring | Opens the dialog box for route monitoring.<br>When a route is selected, displays the information up to the next target location, and monitors whether the own ship is traveling according to the route.              |    |
| 34  | Anchor Watch     | Monitors the anchor dredging.<br>When the anchor has been lowered, monitors if the ship is being swept away  |  |
| 35  | Auto Sail        | Starts auto sail.<br>Before starting, a safety check of the route is made, and the result is displayed.  |  |
| 36  | Chart            | Opens the Chart related menu.  |  |
| 37  | User Chart       | Opens the user chart related menu.<br>It is possible to write marks or lines in the user chart.  |  |
| 38  | Logbook          | Opens the dialog box of the Logbook.<br>The ship's position, speed, direction, wind direction, wind speed, etc., are recorded at specific intervals of times, or records events that have occurred in the equipment. |  |
| 39  | TT/AIS           | Opens the TT/AIS related menu.<br>This also has the function of highlighting the display of the TT/AIS symbol depending on the conditions, or the function of sending a message to an AIS ship, etc.                 |  |

| No. | Name                       | Functional outline   | Displayed image  |
|-----|----------------------------|--|--|
| 40  | Tools                      | Tool related menu, such as the range and bearing measurement EBL/VRM or PI, etc.   |    |
| 41  | View                       | Opens the View related menu. Settings are made of the display of objects in the radar PPI or in the chart.   |    |
| 42  | Alert                      | Opens the alert related menu. Settings related to the alerts from the equipment can be made. When clicked, the [Alert] dialog box appears. Alert settings can be made in the dialog box. |    |
| 43  | Settings                   | Opens the menu related to the operation settings of the equipment.   |    |
| 44  | Chart Maintenance          | Opens the chart management related menu. Chart management including importing and updating of charts can be made.  |    |
| 45  | Maintenance                | The maintenance related menu for the users is displayed. It is possible to check the software version and to monitor the status of the equipment.  |  |
| 46  | Help                       | Opens the help screen.   |  |
| 47  | Code Input                 | Input the password.  |  |
| 48  | Service                    | The menu related to adjustment, servicing, and maintenance is displayed for the servicing personnel.   |  |
| 49  | Import/Update Licence file | Imports or updates the chart Licence.  |  |
| 50  | Import/Update charts       | Imports or updates the chart data.   |  |
| 51  | Check Status               | Checks an imported chart.  |  |
| 52  | C-Map                      | Moves to the Licence tab of the C-Map Chart Manager screen.  |  |

| No. | Name                                    | Functional outline  | Displayed image  |
|-----|---|---|--|
| 53  | Back space                              | Carries out a backspace operation.  |    |
| 54  | Backward movement of the input position | Moves back the input position.  |    |
| 55  | Forward movement of the input position  | Moves the input position forward  |    |
| 56  | Operation guide                         | Displays the operation guide when clicked.  |   |
| 57  | Search                                  | Displayed in the search text box.   |   |
| 58  | Thumbnail / list display selection      | Switches between thumbnail and list displays.   |   |
| 59  | Original scale                          | Changes the scale of the screen to the original scale of the chart being displayed at the center of the screen. |   |
| 60  | Home position                           | Displays the chart position in which the forward direction of the own ship can be seen wide.                    |    |
| 61  | Event                                   | Places the event mark at the position of the own ship.  |    |
| 62  | Zoom Area                               | Makes and enlarged display of the specified square area.  |    |
| 63  | Offset display                          | Displays the offset amounts of the chart being displayed.   |    |
| 64  | Chart selection                         | Displays the chart selection dialog box for RNC.  |    |
| 65  | Radar Overlay                           | Selects ON/OFF of the Radar Overlay display.  |    |
| 66  | AIS display                             | Selects ON/OFF of the AIS display.  |    |
| 67  | TT                                      | Selects ON/OFF of the TT display.   |    |
| 68  | Move backward                           | Changes the chart display to the position and scale before the display was changed.                             |    |
| 69  | WPT center                              | Displays the surroundings of the WPT being selected.  |    |

| No. | Name                       | Functional outline   | Displayed image  |
|-----|----------------------------|--|--|
| 70  | Between WPT-WPT            | Displays between the "currently selected WPT" and the "immediately previous WPT".  |    |
| 71  | Overall route              | Displays the entire route.   |    |
| 72  | Single                     | Changes the screen display to single screen.   |    |
| 73  | Left-right division        | Changes the screen display to left-right divided screen.   |    |
| 74  | Top-bottom division        | Changes the screen display to top-bottom divided screen.   |    |
| 75  | Window                     | Changes the screen display to picture in picture display.  |    |
| 76  | Surroundings not displayed | Hides the display of the tool buttons on the ECDIS screen.   |    |
| 77  | Discard tab                | The tab is discarded (discarding the edited route).  |   |
| 78  | All                        | Consolidated mode of PI<br>This is the mode of operating the orientation and spacing of all the parallel lines.  |  |
| 79  | Individual                 | Individual mode of PI<br>The orientation of each line, the distance from the reference position, and the length are operated independently in this mode.   |  |
| 80  | Track                      | PI tracking mode<br>This is the mode of operating the orientation and spacing between two parallel lines.<br>The two parallel lines are placed to the left and right taking CCRP as the reference. |  |
| 81  | Equiangular                | Equal angle mode of PI<br>This is the mode of operating the angle of two lines that intersect at the reference position.   |  |
| 82  | Contents selection         | The display contents of the pane are changed directly  |  |
| 83  | Range Rings                | Selects ON/OFF of the Range Rings display.   |  |
| 84  | CATZOC                     | Selects ON/OFF of the CATZOC display.  |  |

---

## D.10 Data Format of the File that can be Imported/Exported in the ECDIS

### D.10.1 File Types

- Route file
- User chart file
- Logbook file

### D.10.2 File Name

|                                     | File name in device                    | Default exported file name   |
|-------------------------------------|--|--|
| Route file                          | *.csv, *.*, *.rtm, *.rta, *.rtn, *.rtz | The file name that is specified by the user in [File name] of the [Export] dialog is used.<br>The default "File Type" is *.rtm and as other types, *.rta, *.rtn, *.rtz and *.csv are available.<br>If .rtz is selected, the route file will be exported in RTZ version 1.0 format. |
| User chart file                     | *.csv, *.uchm                          | —  |
| Log book file<br>- Specified period | -                                      | Logbook_(Specified start date _end date).csv<br>Example: Logbook_020312_020313.csv   |

### D.10.3 CSV File Data Structure

- At import, lines starting with "//" are processed as comments.
- Commas are used as delimiters.

Example:

```
// SYMBOL,InstName,,,,,  
// Comment  
// Lat,,Lon,,  
SYMBOL,BOYSHP01,,  
User Comment  
30,6.433,N,129,35.583,E
```



## D.10.4 Route File

| Line | Content   | Description                   | Import *1 | Export *2 |
|------|---|-------------------------------|-----------|-----------|
| 1*3  | // (space)  | Fixed string                  |           | √         |
|      | ROUTE SHEET exported by JRC ECDIS.  | Fixed string                  |           | √         |
| 2    | // (space)  | Fixed string                  |           | √         |
|      | <<NOTE>>This strings // indicate comment column/cells. You can edit freely. | Variable-length string        |           | √         |
| 3    | // (space)  | Fixed string                  |           | √         |
|      | Route name  | Route name of the source file |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | <Normal>  | Fixed string                  |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | Route comment   | Comment in the source file    |           | √         |
| 4    | // (space)  | Fixed string                  |           | √         |
|      | WPT No.   | Fixed string                  |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | LAT   | Fixed string                  |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | LON   | Fixed string                  |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | PORT[NM]  | Fixed character               |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | STBD[NM]  | Fixed character               |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | Arr.Rad[NM]   | Fixed character               |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | Speed[kn]   | Fixed string                  |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | Sail(RL/GC)   | Fixed string                  |           | √         |
|      | ,   | Fixed character               |           | √         |
|      | ROT[deg/min]  | Fixed string                  |           | √         |
|      | ,   | Fixed character               |           | √         |

\*1 Information retrieved at import (the same hereinafter)

\*2 Information to be exported (the same hereinafter)

\*3 Lines with a gray background are deemed as comments (the same hereinafter).

| Line | Content                     | Description     | Import *1 | Export *2 |
|------|-----------------------------|-----------------|-----------|-----------|
| 4    | Turn Rad[NM]                | Fixed string    |           | √         |
|      | ,                           | Fixed character |           | √         |
|      | Time Zone                   | Fixed string    |           | √         |
|      | ,                           | Fixed character |           | √         |
|      | ,                           | Fixed character |           | √         |
|      | Name                        | Fixed string    |           | √         |
| 5    | WPT No.                     | 000             | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Latitude (degrees)          | 35              | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Latitude (degrees.minutes)  | 35.123          | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Latitude Sign (N/S)         | N               | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Longitude (degrees)         | 139             | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Longitude (degrees.minutes) | 48.234          | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Longitude Sign (E/W)        | E               | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Port Cross-Track Limit      | 0.50            | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Starboard Cross-Track Limit | 0.50            | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Arrival Circle Radius       | 0.50            | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Planned Ship Speed          | 12.3            | √         | √         |
|      | ,                           | Fixed character | √         | √         |
|      | Navigation (RL/GC)          | RL              | √         | √         |
|      | ,                           | Fixed character | √         | √         |

|   |                                    |                 |   |   |
|---|------------------------------------|-----------------|---|---|
| 5 | Turn rate                          | 10.00           | √ | √ |
|   | ,                                  | Fixed character | √ | √ |
|   | Turn radius                        | 0.50            | √ | √ |
|   | ,                                  | Fixed character | √ | √ |
|   | Time Zone                          | 09:00           | √ | √ |
|   | ,                                  | Fixed character | √ | √ |
|   | Time Zone Sign (E/W)               | E               | √ | √ |
|   | ,                                  | Fixed character | √ | √ |
|   | Name                               | Yokohama        | √ | √ |
| 6 | Hereinafter, repeat Line 5 per WPT |                 | √ | √ |

- On Line WPT000, fields other than the latitude and longitude (degrees, degrees.minutes, sign) are populated with "\*\*\*\*".

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## D.10.5 User Chart File

(1) Header record

| Line | Content   | Description                | Import |
|------|---|----------------------------|--------|
| 1    | // (space)  | Fixed string               |        |
|      | USER CHART SHEET exported by JRC ECDIS.                                     | Fixed string               |        |
| 2    | // (space)  | Fixed string               |        |
|      | <<NOTE>>This strings // indicate comment column/cells. You can edit freely. | Variable-length string     |        |
| 3    | // (space)  | Fixed string               |        |
|      | User Chart Name   | Name of the source file    |        |
|      | ,   | Fixed character            |        |
|      | ,   | Fixed character            |        |
|      | User Chart Comment  | Comment in the source file |        |

## (2) Object records

## a) Symbol

| Line | Content  | Description     | Import |
|------|--|-----------------|--------|
| m    | // (space)   | Fixed string    |        |
|      | SYMBOL   | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | InstName   | Fixed string    |        |
| +1   | // (space)   | Fixed string    |        |
|      | Comment  | Fixed string    |        |
| +2   | // (space)   | Fixed string    |        |
|      | Lat  | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Lon  | Fixed string    |        |
|      |  |                 |        |
| +3   | SYMBOL   | Fixed string    | √      |
|      | ,  | Fixed character | √      |
|      | Instruction name<br>●=~CIRCLE0<br>▲=~TRIANG0<br>■=~SQUARE0<br>◆=~DIAMND0<br>x=~XSHAPE0 | ~CIRCLE0        | √      |
|      | ,  | Fixed character | √      |
|      | ***  | Fixed string    | √      |
|      | ,  | Fixed character | √      |
|      | ***  | Fixed string    | √      |
|      |  |                 |        |
|      |  |                 |        |
| +4   | Comment  | Comment         | √      |
| +5   | Latitude (degrees)   | 35              | √      |
|      | ,  | Fixed character | √      |
|      | Latitude (degrees.minutes)   | 35.123          | √      |
|      | ,  | Fixed character | √      |
|      | Latitude Sign (N/S)  | N               | √      |
|      | ,  | Fixed character | √      |
|      | Longitude (degrees)  | 139             | √      |
|      | ,  | Fixed character | √      |
|      | Longitude (degrees.minutes)  | 48.234          | √      |
|      | ,  | Fixed character | √      |
|      | Longitude Sign (E/W)   | E               | √      |

b) Danger symbol

| Line | Content                     | Description     | Import |
|------|-----------------------------|-----------------|--------|
| m    | // (space)                  | Fixed string    |        |
|      | DANGER_SYMBOL               | Fixed string    |        |
|      | ,                           | Fixed character |        |
|      | InstName                    | Fixed string    |        |
| +1   | // (space)                  | Fixed string    |        |
|      | Comment                     | Fixed string    |        |
| +2   | // (space)                  | Fixed string    |        |
|      | Lat                         | Fixed string    |        |
|      | ,                           | Fixed character |        |
|      | ,                           | Fixed character |        |
|      | ,                           | Fixed character |        |
|      | Lon                         | Fixed string    |        |
| +3   | DANGER_SYMBOL               | Fixed string    | √      |
|      | ,                           | Fixed character | √      |
|      | ~WARNSY0                    | Fixed string    | √      |
|      | ,                           | Fixed character | √      |
|      | ***                         | Fixed string    | √      |
|      | ,                           | Fixed character | √      |
|      | ***                         | Fixed string    | √      |
| +4   | Comment                     | Comment         | √      |
| +5   | Latitude (degrees)          | 35              | √      |
|      | ,                           | Fixed character | √      |
|      | Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,                           | Fixed character | √      |
|      | Latitude Sign (N/S)         | N               | √      |
|      | ,                           | Fixed character | √      |
|      | Longitude (degrees)         | 139             | √      |
|      | ,                           | Fixed character | √      |
|      | Longitude (degrees.minutes) | 48.234          | √      |
|      | ,                           | Fixed character | √      |
|      | Longitude Sign (E/W)        | E               | √      |

c) (Poly-)Line

| Line | Content                            | Description     | Import |
|------|------------------------------------|-----------------|--------|
| m    | // (space)                         | Fixed string    |        |
|      | LINE_AGGREGATE                     | Fixed string    |        |
| +1   | // (space)                         | Fixed string    |        |
|      | Comment                            | Fixed string    |        |
| +2   | // (space)                         | Fixed string    |        |
|      | Lat                                | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | ,                                  | Fixed character |        |
|      | ,                                  | Fixed character |        |
|      | Lon                                | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | ,                                  | Fixed character |        |
|      | ,                                  | Fixed character |        |
|      | Type                               | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | Width                              | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | Color No.                          | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | Comment                            | Fixed string    |        |
| +3   | // (space)                         | Fixed string    |        |
|      | Add "END" to the end of vertex.    | Fixed string    |        |
| +4   | LINE_AGGREGATE                     | Fixed string    | √      |
| +5   | Comment                            | Comment         | √      |
| +6   | Vertex Latitude (degrees)          | 35              | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Latitude Sign (N/S)         | N               | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Longitude (degrees)         | 139             | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Longitude (degrees.minutes) | 48.234          | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Longitude Sign (E/W)        | E               | √      |
|      | ,                                  | Fixed character | √      |
|      | Line Type (Solid=,Dash=2,Dotted=3) | 1               | √      |
|      | ,                                  | Fixed character | √      |
|      | Line Width (1(Thin) - 5(Thick))    | 1               | √      |
|      | ,                                  | Fixed character | √      |

| Line | Content  | Description                 | Import |
|------|--|-----------------------------|--------|
| +6   | Color (White/Black=0,Gray=,Amber=2,<br>Magenta=3,Blue=4,Cyan=5,Green=6,<br>Yellow=7,Orange=8, Red=9) | 8                           | √      |
|      | ,  | Fixed character             | √      |
|      | Comment  | Comment                     | √      |
| +n   | Repeat Line +6 for the number of vertexes.   |                             | √      |
|      | END  | Fixed string (position end) | √      |



d) Circle (line)

| Line | Content  | Description     | Import |
|------|--|-----------------|--------|
| m    | // (space)                                     | Fixed string    |        |
|      | LINE_CIRCLE                                    | Fixed string    |        |
| +1   | // (space)                                     | Fixed string    |        |
|      | Comment  | Fixed string    |        |
| +2   | // (space)                                     | Fixed string    |        |
|      | Base Point-Lat                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Base Point-Lon                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Radius[nm]                                     | Fixed string    |        |
| +3   | LINE_CIRCLE                                    | Fixed string    | √      |
| +4   | Comment  | Comment         | √      |
| +5   | Reference Position Latitude (degrees)          | 35              | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude Sign (N/S)         | N               | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees)         | 139             | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees.minutes) | 48.234          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude Sign (E/W)        | E               | √      |
|      | ,  | Fixed character | √      |
|      | Radius [NM]                                    | 2.0             | √      |

e) Ellipse (line)

| Line | Content  | Description     | Import |
|------|--|-----------------|--------|
| m    | // (space)                                     | Fixed string    |        |
|      | LINE_ELLIPSE                                   | Fixed string    |        |
| +1   | // (space)                                     | Fixed string    |        |
|      | Comment  | Fixed string    |        |
| +2   | // (space)                                     | Fixed string    |        |
|      | Base Point-Lat                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Base Point-Lon                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Horizontal Radius [nm]                         | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | Vertical Radius [nm]                           | Fixed string    |        |
| +3   | LINE_ELLIPSE                                   | Fixed string    | √      |
| +4   | Comment  | Comment         | √      |
| +5   | Reference Position Latitude (degrees)          | 35              | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude Sign (N/S)         | N               | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees)         | 139             | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees.minutes) | 48.234          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude Sign (E/W)        | E               | √      |
|      | ,  | Fixed character | √      |
|      | Horizontal Radius [NM]                         | 2.0             | √      |
|      | ,  | Fixed character | √      |
|      | Vertical Radius [NM]                           | 1.5             | √      |

## f) Arc

| Line | Content  | Description     | Import |
|------|--|-----------------|--------|
| m    | // (space)                                     | Fixed string    |        |
|      | ARC  | Fixed string    |        |
| +1   | // (space)                                     | Fixed string    |        |
|      | Comment  | Fixed string    |        |
| +2   | // (space)                                     | Fixed string    |        |
|      | Base Point-Lat                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Base Point-Lon                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Radius [nm]                                    | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | Start Angle[deg]                               | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | End Angle[deg]                                 | Fixed string    |        |
| +3   | ARC  | Fixed string    | √      |
| +4   | Comment  | Comment         | √      |
| +5   | Reference Position Latitude (degrees)          | 35              | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude Sign (N/S)         | N               | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees)         | 139             | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees.minutes) | 48.234          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude Sign (E/W)        | E               | √      |
|      | ,  | Fixed character | √      |
|      | Radius [NM]                                    | 2.0             | √      |
|      | ,  | Fixed character | √      |
|      | Start Radius [deg]                             | 120.0           | √      |
|      | ,  | Fixed character | √      |
|      | End Radius [deg]                               | 180.0           | √      |

g) User danger line

| Line | Content                            | Description     | Import |
|------|------------------------------------|-----------------|--------|
| m    | // (space)                         | Fixed string    |        |
|      | DANGER_LINE_AGGREGATE              | Fixed string    |        |
| +1   | // (space)                         | Fixed string    |        |
|      | Comment                            | Fixed string    |        |
| +2   | // (space)                         | Fixed string    |        |
|      | Lat                                | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | ,                                  | Fixed character |        |
|      | ,                                  | Fixed character |        |
|      | Lon                                | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | ,                                  | Fixed character |        |
|      | ,                                  | Fixed character |        |
|      | Type                               | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | Width                              | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | ColorNo                            | Fixed string    |        |
|      | ,                                  | Fixed character |        |
|      | Comment                            | Fixed string    |        |
| +3   | // (space)                         | Fixed string    |        |
|      | Add "END" to the end of vertex.    | Fixed string    |        |
| +4   | DANGER_LINE_AGGREGATE              | Fixed string    | √      |
| +5   | Comment                            | Comment         | √      |
| +6   | Vertex Latitude (degrees)          | 35              | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Latitude Sign (N/S)         | N               | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Longitude (degrees)         | 139             | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Longitude (degrees.minutes) | 48.234          | √      |
|      | ,                                  | Fixed character | √      |
|      | Vertex Longitude Sign (E/W)        | E               | √      |
|      | ,                                  | Fixed character | √      |
|      | 0                                  | Fixed character | √      |
|      | ,                                  | Fixed character | √      |
|      | 0                                  | Fixed character | √      |
|      | ,                                  | Fixed character | √      |
|      | 0                                  | Fixed character | √      |

| Line | Content                                    | Description                 | Import |
|------|--|-----------------------------|--------|
| +6   | ,  | Fixed character             | √      |
|      | Comment                                    | Comment                     | √      |
| +n   | Repeat Line +6 for the number of vertexes. |                             | √      |
|      | END  | Fixed string (position end) | √      |

## h) Arrow

| Line | Content  | Description     | Import |
|------|--|-----------------|--------|
| m    | // (space)   | Fixed string    |        |
|      | ARROW  | Fixed string    |        |
| +1   | // (space)   | Fixed string    |        |
|      | Comment  | Fixed string    |        |
| +2   | // (space)   | Fixed string    |        |
|      | LineType   | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | LineWidth  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | LineColorNo  | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | EdgeType   | Fixed character |        |
|      | ,  | Fixed character |        |
| +3   | EdgeSize   | Fixed string    |        |
|      | // (space)   | Fixed string    |        |
|      | Start Lat  | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
| +4   | Lon  | Fixed string    |        |
|      | // (space)   | Fixed string    |        |
|      | End Lat  | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
| +5   | Lon  | Fixed string    |        |
| +5   | ARROW  | Fixed string    | √      |
| +6   | Comment  | Comment         | √      |
| +7   | ,  | Fixed character | √      |
|      | Line Width (1(Thin) - 5(Thick))  | 1               | √      |
|      | ,  | Fixed character | √      |
|      | Color (White/Black=0,Gray=,Amber=2, Magenta=3,Blue=4,Cyan=5,Green=6, Yellow=7,Orange=8, Red=9) | 8               | √      |
|      | ,  | Fixed character | √      |
|      | Arrow Type<br>-> =0<br><- =1<br><-> =2   | 0               | √      |
|      | ,  | Fixed character | √      |
|      | Arrow Size (0(Small) - 2(Large))   | 0               | √      |

| Line | Content                                    | Description     | Import |
|------|--|-----------------|--------|
| +8   | Start Position Latitude (degrees)          | 35              | √      |
|      | ,  | Fixed character | √      |
|      | Start Position Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,  | Fixed character | √      |
|      | Start Position Latitude Sign (N/S)         | N               | √      |
|      | ,  | Fixed character | √      |
|      | Start Position Longitude (degrees)         | 139             | √      |
|      | ,  | Fixed character | √      |
|      | Start Position Longitude (degrees.minutes) | 48.234          | √      |
|      | ,  | Fixed character | √      |
|      | Start Position Longitude Sign (E/W)        | E               | √      |
| +9   | End Position Latitude (degrees)            | 38              | √      |
|      | ,  | Fixed character | √      |
|      | End Position Latitude (degrees.minutes)    | 35.123          | √      |
|      | ,  | Fixed character | √      |
|      | End Position Latitude Sign (N/S)           | N               | √      |
|      | ,  | Fixed character | √      |
|      | End Position Longitude (degrees)           | 142             | √      |
|      | ,  | Fixed character | √      |
|      | End Position Longitude (degrees.minutes)   | 48.234          | √      |
|      | ,  | Fixed character | √      |
|      | End Position Longitude Sign (E/W)          | E               | √      |

i) Polygon

| Line | Content                                    | Description                 | Import |
|------|--|-----------------------------|--------|
| m    | // (space)                                 | Fixed string                |        |
|      | POLYGON                                    | Fixed string                |        |
| +1   | // (space)                                 | Fixed string                |        |
|      | Comment                                    | Fixed string                |        |
| +2   | // (space)                                 | Fixed string                |        |
|      | Base Point-Lat                             | Fixed string                |        |
|      | ,  | Fixed character             |        |
|      | ,  | Fixed character             |        |
|      | ,  | Fixed character             |        |
|      | Base Point-Lat                             | Fixed string                |        |
|      | ,  | Fixed character             |        |
|      | Add "END" to the end of vertex.            | Fixed string                |        |
| +3   | POLYGON                                    | Fixed string                | √      |
| +4   | Comment                                    | Comment                     | √      |
| +5   | Vertex Latitude (degrees)                  | 35                          | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Latitude (degrees.minutes)          | 35.123                      | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Latitude Sign (N/S)                 | N                           | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Longitude (degrees)                 | 139                         | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Longitude (degrees.minutes)         | 48.234                      | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Longitude Sign (E/W)                | E                           | √      |
| +n   | Repeat Line +5 for the number of vertexes. |                             | √      |
|      | END  | Fixed string (position end) | √      |



## j) Circle (polygon)

| Line | Content  | Description     | Import |
|------|--|-----------------|--------|
| m    | // (space)                                     | Fixed string    |        |
|      | CIRCLE   | Fixed string    |        |
| +1   | // (space)                                     | Fixed string    |        |
|      | Comment  | Fixed string    |        |
| +2   | // (space)                                     | Fixed string    |        |
|      | Base Point-Lat                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Base Point-Lon                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Radius[nm]                                     | Fixed string    |        |
| +3   | CIRCLE   | Fixed string    | √      |
| +4   | Comment  | Comment         | √      |
| +5   | Reference Position Latitude (degrees)          | 35              | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude Sign (N/S)         | N               | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees)         | 139             | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees.minutes) | 48.234          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude Sign (E/W)        | E               | √      |
|      | ,  | Fixed character | √      |
|      | Radius [NM]                                    | 2.0             | √      |

k) Ellipse (polygon)

| Line | Content  | Description     | Import |
|------|--|-----------------|--------|
| m    | // (space)                                     | Fixed string    |        |
|      | ELLIPSE  | Fixed string    |        |
| +1   | // (space)                                     | Fixed string    |        |
|      | Comment  | Fixed string    |        |
| +2   | // (space)                                     | Fixed string    |        |
|      | Base Point-Lat                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Base Point-Lon                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Horizontal Radius [nm]                         | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | Vertical Radius [nm]                           | Fixed string    |        |
| +3   | ELLIPSE  | Fixed string    | √      |
| +4   | Comment  | Comment         | √      |
| +5   | Reference Position Latitude (degrees)          | 35              | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude Sign (N/S)         | N               | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees)         | 139             | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees.minutes) | 48.234          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude Sign (E/W)        | E               | √      |
|      | ,  | Fixed character | √      |
|      | Horizontal Radius [NM]                         | 2.0             | √      |
|      | ,  | Fixed character | √      |
|      | Vertical Radius [NM]                           | 1.5             | √      |

I) Fan

| Line | Content  | Description     | Import |
|------|--|-----------------|--------|
| m    | // (space)                                     | Fixed string    |        |
|      | FAN  | Fixed string    |        |
| +1   | // (space)                                     | Fixed string    |        |
|      | Comment  | Fixed string    |        |
| +2   | // (space)                                     | Fixed string    |        |
|      | Base Point-Lat                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Base Point-Lon                                 | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | ,  | Fixed character |        |
|      | Radius [nm]                                    | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | Start Angle[deg]                               | Fixed string    |        |
|      | ,  | Fixed character |        |
|      | End Angle[deg]                                 | Fixed string    |        |
| +3   | FAN  | Fixed string    | √      |
| +4   | Comment  | Comment         | √      |
| +5   | Reference Position Latitude (degrees)          | 35              | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude (degrees.minutes)  | 35.123          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Latitude Sign (N/S)         | N               | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees)         | 139             | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude (degrees.minutes) | 48.234          | √      |
|      | ,  | Fixed character | √      |
|      | Reference Position Longitude Sign (E/W)        | E               | √      |
|      | ,  | Fixed character | √      |
|      | Radius [NM]                                    | 2.0             | √      |
|      | ,  | Fixed character | √      |
|      | Start Radius [deg]                             | 120.0           | √      |
|      | ,  | Fixed character | √      |
|      | End Radius [deg]                               | 180.0           | √      |

m) User danger area

| Line | Content                                    | Description                 | Import |
|------|--|-----------------------------|--------|
| m    | // (space)                                 | Fixed string                |        |
|      | DANGER_AREA                                | Fixed string                |        |
| +1   | // (space)                                 | Fixed string                |        |
|      | Comment                                    | Fixed string                |        |
| +2   | // (space)                                 | Fixed string                |        |
|      | Lat  | Fixed string                |        |
|      | ,  | Fixed character             |        |
|      | ,  | Fixed character             |        |
|      | ,  | Fixed character             |        |
|      | Lon  | Fixed string                |        |
|      | ,  | Fixed character             |        |
|      | Add "END" to the end of vertex.            | Fixed string                |        |
| +3   | DANGER_AREA                                | Fixed string                | √      |
| +4   | Comment                                    | Comment                     | √      |
| +5   | Vertex Latitude (degrees)                  | 35                          | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Latitude (degrees.minutes)          | 35.123                      | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Latitude Sign (N/S)                 | N                           | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Longitude (degrees)                 | 139                         | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Longitude (degrees.minutes)         | 48.234                      | √      |
|      | ,  | Fixed character             | √      |
|      | Vertex Longitude Sign (E/W)                | E                           | √      |
| +n   | Repeat Line +5 for the number of vertexes. |                             | √      |
|      | END  | Fixed string (position end) | √      |

n) Text

| Line | Content                            | Description                 | Import |
|------|------------------------------------|-----------------------------|--------|
| m    | // (space)                         | Fixed string                |        |
|      | TEXT                               | Fixed string                |        |
| +1   | // (space)                         | Fixed string                |        |
|      | Comment                            | Fixed string                |        |
| +2   | // (space)                         | Fixed string                |        |
|      | Lat                                | Fixed string                |        |
|      | ,                                  | Fixed character             |        |
|      | ,                                  | Fixed character             |        |
|      | ,                                  | Fixed character             |        |
|      | Lon                                | Fixed string                |        |
|      | ,                                  | Fixed character             |        |
|      | Rotation                           | Fixed string                |        |
| +3   | TEXT                               | Fixed string                | √      |
|      | ,                                  | Fixed character             | √      |
|      | Text                               | Caution: High flow velocity | √      |
| +4   | Comment                            | Comment                     | √      |
| +5   | Vertex Latitude (degrees)          | 35                          | √      |
|      | ,                                  | Fixed character             | √      |
|      | Vertex Latitude (degrees.minutes)  | 35.123                      | √      |
|      | ,                                  | Fixed character             | √      |
|      | Vertex Latitude Sign (N/S)         | N                           | √      |
|      | ,                                  | Fixed character             | √      |
|      | Vertex Longitude (degrees)         | 139                         | √      |
|      | ,                                  | Fixed character             | √      |
|      | Vertex Longitude (degrees.minutes) | 48.234                      | √      |
|      | ,                                  | Fixed character             | √      |
|      | Vertex Longitude Sign (E/W)        | E                           | √      |
|      | ,                                  | Fixed character             | √      |
|      | Tuning Angle                       | 0                           | √      |
|      | ,                                  | Fixed character             | √      |
|      | Font Size                          | 22                          | √      |

## D.10.6 Log Book File

| Line | Content   | Description            | Export |
|------|---|------------------------|--------|
| 1    | //  | Fixed string           | √      |
|      | LOGBOOK SHEET exported by JRC ECDIS.  | Fixed string           | √      |
| 2    | //  | Fixed string           | √      |
|      | <<NOTE>>This strings // indicate comment column/cells. You can edit freely. | variable-length string | √      |
| 3    | //No  | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | Date  | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | Time  | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | ,   | Fixed character        | √      |
|      | Time Zone   | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | Event   | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | Descriptions  | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | Latitude  | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | ,   | Fixed character        | √      |
|      | ,   | Fixed character        | √      |
|      | Longitude   | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | ,   | Fixed character        | √      |
|      | ,   | Fixed character        | √      |
|      | POSN1   | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | POSN2   | Fixed string           | √      |
|      | ,   | Fixed character        | √      |
|      | HDG(deg)  | Fixed string           | √      |
|      | ,   | Fixed character        | √      |

| Line | Content             | Description     | Export |
|------|---------------------|-----------------|--------|
| 3    | STW(kn)             | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | COG(deg)            | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | SOG(kn)             | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Av.Speed 4h(G)(kn)  | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Av.Speed 24h(G)(kn) | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Depth(m)            | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Chart               | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Set(deg)            | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Drift(kn)           | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Wind Dir.(deg)      | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Wind Speed(kn)      | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Beaufort Scale      | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Wave Dir.(deg)      | Fixed string    | √      |
|      | .                   | Fixed character | √      |
|      | Wave Height(m)      | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Voyage DIST(G)(NM)  | Fixed string    | √      |
|      | ,                   | Fixed character | √      |
|      | Voyage DIST(W)(NM)  | Fixed string    | √      |
|      | .                   | Fixed character | √      |

| Line | Content                  | Description         | Export |
|------|--------------------------|---------------------|--------|
| 3    | Air Pressure(hPa)        | Fixed string        | √      |
|      | ,                        | Fixed character     | √      |
|      | Air Temperature(deg C)   | Fixed string        | √      |
|      | ,                        | Fixed character     | √      |
|      | Water Temperature(deg C) | Fixed string        | √      |
|      | ,                        | Fixed character     | √      |
|      | Weather Condition        | Fixed string        | √      |
|      | ,                        | Fixed character     | √      |
|      | Engine Rev.(rpm)         | Fixed string        | √      |
|      | ,                        | Fixed character     | √      |
|      | Comment                  | Fixed string        | √      |
|      |                          |                     |        |
| 4    | No.                      | 0001                | √      |
|      | ,                        |                     | √      |
|      | Date (LMT)               | 2014/01/17          | √      |
|      | ,                        |                     | √      |
|      | Time (LMT)               | 08:45:24            | √      |
|      | ,                        |                     | √      |
|      | Time Zone Sign           | +                   | √      |
|      | ,                        |                     | √      |
|      | Time Zone                | 09:00               | √      |
|      | ,                        |                     | √      |
|      | Event Type               | Manual Position Fix | √      |
|      | ,                        |                     | √      |
|      | Event Details            |                     | √      |
|      | ,                        |                     | √      |
|      | Latitude                 | 35                  | √      |
|      | ,                        |                     | √      |
|      |                          | 35.123              | √      |
|      | ,                        |                     | √      |
|      |                          | N                   | √      |
|      | ,                        |                     | √      |



| Line | Content                          | Description | Export |
|------|----------------------------------|-------------|--------|
| 4    | Longitude                        | 139         | √      |
|      | ,                                |             | √      |
|      |                                  | 48.234      | √      |
|      | ,                                |             | √      |
|      |                                  | E           | √      |
|      | ,                                |             | √      |
|      | Position 1 Source                | GPS 1       | √      |
|      | ,                                |             | √      |
|      | Position 2 Source                | GPS 2       | √      |
|      | ,                                |             | √      |
|      | Ship's Heading                   | 123.4       | √      |
|      | ,                                |             | √      |
|      | Water Ship Speed                 | 12.3        | √      |
|      | ,                                |             | √      |
|      | Ground Course                    | 123.5       | √      |
|      | ,                                |             | √      |
|      | Ground Ship Speed                | 12.4        | √      |
|      | ,                                |             | √      |
|      | Average Ship Speed In 4h         | 12.0        | √      |
|      | ,                                |             | √      |
|      | Average Ship Speed In 24h        | 13.2        | √      |
|      | ,                                |             | √      |
|      | Depth Of Water                   | 123.9       | √      |
|      | ,                                |             | √      |
|      | Chart Name That Caused The Event | JP34OBJ     | √      |
|      | ,                                |             | √      |
|      | Flow Direction                   | 123.4       | √      |
|      | ,                                |             | √      |
|      | Flow Speed                       | 12.4        | √      |
|      | ,                                |             | √      |
|      | Wind Bearing                     | 234.5       | √      |
|      | ,                                |             | √      |

| Line | Content                                      | Description | Export |
|------|--|-------------|--------|
| n    | Wind Speed                                   | 10.3        | √      |
|      | ,  |             | √      |
|      | Beaufort Scale                               | Hurricane   | √      |
|      | ,  |             | √      |
|      | Wave Direction                               | 123.4       | √      |
|      | .  |             | √      |
|      | Wave Height                                  | 2.1         | √      |
|      | ,  |             | √      |
|      | Ground Running Distance                      | 12345.67    | √      |
|      | ,  |             | √      |
|      | Water Running Distance                       | 12300.23    | √      |
|      | .  |             | √      |
|      | Atmospheric Pressure                         | 1003        | √      |
|      | ,  |             | √      |
|      | Temperature                                  | 23.4        | √      |
|      | ,  |             | √      |
|      | Water Temperature                            | 20.3        | √      |
|      | ,  |             | √      |
|      | Weather Condition                            | Blue sky    | √      |
|      | ,  |             | √      |
|      | Engine Speed                                 | 135.6       | √      |
|      | ,  |             | √      |
|      | Comment                                      |             | √      |
|      | Repeat Line 4 the number of times of events. |             | √      |

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